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Bamboo documentation

Bamboo is a continuous integration and delivery tool that ties automated builds, tests, and releases in a single workflow.

Get started

New to using Bamboo? Get started with some introductory information.

Let's start

What’s new

Read all about the latest changes in Bamboo.

Have a look

Getting started with Bamboo

This page describes how to install, set up, and start using Bamboo.

If you’re upgrading Bamboo, read the Bamboo upgrade guide instead of this page.

For production installs we recommend that you read Bamboo best practice - system requirements.

Atlassian Bamboo is a continuous integration (CI) and deployment server. Bamboo assists software development teams by providing:

- automated building and testing of software source-code status.
- updates on successful and failed builds.
- reporting tools for statistical analysis.

Please see the following pages for information about getting started with Bamboo:

- Bamboo best practice - system requirements
- Understanding the Bamboo CI Server - a conceptual overview of using Bamboo for continuous integration (CI).

1. Install and start Bamboo

See one of:

- Installing Bamboo on Linux
- Installing Bamboo on Mac OS X
- Installing Bamboo on Windows

Once it's started, you can access Bamboo in your browser at http://localhost:8085/.

2. Set up notifications

Bamboo can send build result notifications using:

- Email - see Configuring Bamboo to send SMTP Email
- Other services - see Notifications

3. Get building with Bamboo

Bamboo has the concept of a 'plan' to look after the configuration for a build. So, to run your first build, you create and run a plan:

- Getting started with Java and Bamboo - a guide to setting up a simple CI workflow for Java code.
- Getting started with .NET and Bamboo - a guide to setting up a simple CI workflow on Windows.

Understanding the Bamboo CI Server
Bamboo is a continuous integration (CI) server that can be used to automate the release management for a software application, creating a continuous delivery pipeline.

What does this mean?

CI is a software development methodology in which a build, unit tests and integration tests are performed, or triggered, whenever code is committed to the repository, to ensure that new changes integrate well into the existing code base. Integration builds provide early 'fail fast' feedback on the quality of new changes.

Release management describes the steps that are typically performed to release a software application, including building and functional testing, tagging releases, assigning versions, and deploying and activating the new version in production.

On this page:
- What problem does Bamboo solve?
- How does Bamboo do this?
- What does Bamboo need?
- How is a Bamboo workflow organized?

Related Pages:
- Getting started with Java and Bamboo
- Getting started with .NET and Bamboo
- Using Bamboo
- Installing and upgrading

Continuous Integration

Developers

Source Repository

Code commits

Triggers build

Continuous Integration Server

Compile
Run unit tests
Run integration tests
Package
Build process

Web Server

Deploys application

What problem does Bamboo solve?

If you are a solo developer, then using Bamboo gives you:
- an automated, and therefore reliable, build and test process, leaving you free to code more.
- a way to manage builds that have different requirements or targets.
- automatic deployment to a server, such as the App Store or Google Play.

If you work in a team, then as well as the above advantages, using Bamboo also means that:
- your build and test process is not dependent on a specific local environment.
- builds and integration tests are triggered automatically as soon as a developer commits code (continuous
If you work on a large, complex application, then, in addition to all the above advantages, using Bamboo means that:

- you can optimize build performance through parallelism.
- you can leverage elastic resources.
- you can deploy continuously, for example to user acceptance testing (UAT).
- you can implement release management.

How does Bamboo do this?

- Bamboo is the central management server which schedules and coordinates all work.
- Bamboo itself has interfaces and plugins for lots of types of work.
- Bamboo first gets your source from a source repository (lots of plugins here for a variety of systems).
- Then Bamboo starts the build - that can be done by calling something like MSBuild to build your Visual Studio solution, or Maven to call your compiler and linker - whatever you use.
- Once your solution or project is built, you have “artifacts” (build results, for example, an executable app, config files, etc.).
- You can do additional things with the build artifacts:
  - zip them up into a ZIP file and copy them somewhere.
  - run an install builder on them and create an MSI.
  - install them on a test server to make sure everything installs just fine.
- Bamboo provides a web front-end for configuration and for reporting the status of builds.

What does Bamboo need?

Bamboo schedules and coordinates the work involved in building and testing your application. Therefore, to use Bamboo, you will need to already have the following set up:

- a code repository that contains the complete source code for the project.
- build scripts
- test suites

It is generally assumed that the person who commits a change to the code is responsible for fixing any resulting build errors immediately.

How is a Bamboo workflow organized?

Bamboo uses the concept of a ‘plan’ with ‘jobs’ and ‘tasks’ to configure and order the actions in the workflow.

Project

- Has none, one, or more, plans.
- Provides reporting (using the wallboard, for example) across all plans in the project.
- Provides links to other applications.
- Allows setting up permissions for all the plans it contains

Plan

- Has a single stage, by default, but can be used to group jobs into multiple stages.
- Processes a series of one or more stages that are run sequentially using the same repository.
- Specifies the default repository.
- Specifies how the build is triggered, and the triggering dependencies between the plan and other plans in the project.
- Specifies notifications of build results.
- Specifies who has permission to view and configure the plan and its jobs.
- Provides for the definition of plan variables.

Stage

- By default has a single job but can be used to group multiple jobs.
- Processes its jobs in parallel, on multiple agents (where available).
Must successfully complete all its jobs before the next stage in the plan can be processed.
May produce artifacts that can be made available for use by a subsequent stage.

**Job**
- Processes a series of one or more tasks that are run **sequentially** on the **same** agent.
- Controls the order in which tasks are performed.
- Collects the requirements of individual tasks in the **job**, so that these requirements can be matched with agent **capabilities**.
- Defines the artifacts that the build will produce.
- Can only use artifacts produced in a previous stage.
- Specifies any **labels** with which the **build result** or build artifacts will be tagged.

**Task**
- Is a small discrete unit of work, such as source code checkout, executing a Maven goal, running a script, or parsing test results.
- Is run sequentially within a job on a Bamboo working directory.

**Using Bamboo in the enterprise**
Atlassian **Bamboo** is a continuous integration (CI) and deployment server. Bamboo assists software development teams by providing:
- Automated building and testing of software source code.
- Integration with your existing development environment.
- Status updates on successful and failed builds.
- Automated releases and deployments.
- Reporting tools for statistical analysis.

This page describes best practice for using Bamboo in enterprise environments, that is with 500+ user licenses. Of course, much of this information is also applicable to other Bamboo installations.

**On this page:**
- Platform requirements for hosting Bamboo
- Performance considerations with Bamboo
- High availability with Bamboo
- Setting up Bamboo in a production environment
- Administering Bamboo in a production environment

Platform requirements for hosting Bamboo
Although Bamboo can be run on Windows, Linux and Mac systems, for enterprise use we only recommend, and support, Linux. This recommendation is based on our own testing and experience with using Bamboo.

Please see the Supported platforms page for details of the supported versions of Java, external databases and web browsers.

Performance considerations with Bamboo

In general, Bamboo is ...

High availability with Bamboo

If Bamboo is a critical part of your development workflow, maximizing Bamboo availability becomes an important consideration. Please see...

Setting up Bamboo in a production environment

When setting up Bamboo for a production or enterprise environment, we highly recommend that you configure the following aspects:

Run Bamboo as a dedicated user

- For production environments Bamboo should be run from a dedicated user account with restricted privileges. See...

Install Bamboo as a service

See:

- Running Bamboo as a Linux service
- Running Bamboo as a Windows service

Use an external database

- For production environments Bamboo should use an external database, rather than the embedded database. Set up your external DBMS (for example MySQL) before starting Bamboo for the first time. This allows you to connect Bamboo to that DBMS using the Setup Wizard that launches when you first run Bamboo. See Connecting Bamboo to an external database.

Connect to your existing user directory

- Connect Bamboo to your existing user directory (for example Active Directory). See External user directories.

Secure the Bamboo home directory

- For production environments the Bamboo home directory should be secured against unauthorized access. See...

Secure Bamboo with HTTPS

- Access to Bamboo should be secured using HTTP over SSL, especially if your data is sensitive and Bamboo is exposed to the internet. See Securing Bamboo with HTTPS.

Change the context path for Bamboo

- If you are running Bamboo behind a proxy, or you have another Atlassian application (or any Java web application), available at the same hostname and context path as Bamboo, then you should set a unique context path for Bamboo. See Changing Bamboo's root context path.

Administering Bamboo in a production environment

Upgrading Bamboo
• For production environments we recommend that you test the Bamboo upgrade on a QA server before deploying to production. See the Bamboo upgrade guide.

Backups and recovery

• **We highly recommend** that you establish a data recovery plan that is aligned with your company’s policies. See Data and backups.

Logging

• Bamboo logs record server, build and remote (including elastic) agent activity. See Logging in Bamboo.
• Bamboo audit logs record details of any changes made to the configuration of the Bamboo server. See Tracking changes to your Bamboo server.

AWS account for Bamboo

Create and configure your AWS (Amazon Web Services) account for smooth Elastic Bamboo setup and maintenance.

<table>
<thead>
<tr>
<th>Bamboo</th>
<th>AWS account required</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloud</td>
<td>no</td>
<td>Runs builds on local agents and/or in cloud (with Elastic Bamboo)</td>
</tr>
<tr>
<td>Server</td>
<td>no</td>
<td>Runs builds on local agents and/or in cloud (with Elastic Bamboo)</td>
</tr>
</tbody>
</table>

Creating AWS accounts

You can create an AWS root account on [http://aws.amazon.com](http://aws.amazon.com).

Cost management

The cost of all Amazon Web Services usage is billed to your AWS account, separately from your Atlassian subscription. It means that you are responsible for all AWS usage costs incurred on your AWS account.

You can check the current AWS cost in AWS Billing & Cost Management in the AWS management console. For more information, see What is AWS Billing and Cost Management?

The AWS account billing doesn't distinguish between your Bamboo EC2 usage and your other (non-Bamboo) EC2 usage.

Recommendations

We respect different ways in which you might want to structure your working environment. However, we thought we’d let you know what is important from our perspective.

IAM (AWS Identity and Access Management)

For security reasons, Atlassian recommends using IAM for user and access key management. For more information, see IAM Best Practices and IAM Users and Groups.

Tips:

• Bamboo uses access keys for authorization
• Lost access keys? You must generate a new key set in the AWS account console. For more information, see How Do I Get Security Credentials?

Getting started with Java and Bamboo

This tutorial outlines how to use Bamboo to run, and get rapid feedback on, builds for your Java project. Bamboo has the concept of a 'plan' to look after the configuration for your continuous integration workflow. So, to run your first build, you’ll create and run a Bamboo plan.
Information you need before you begin

This tutorial assumes you are using Bamboo Cloud, which allows us to make some assumptions about the resources available to Bamboo.

You can still use the tutorial if you are using Bamboo Server installed on your local network. You just need to make sure you or your company administrator have properly installed and configured Bamboo for running plans.

We also assume you have an individual Bitbucket account. If you don't, it only takes minutes to create one, and you can always delete it after you're done.

1. Create a project and plan

A Bamboo plan specifies the source code repository, the tasks to run in your build, and when to trigger a build. We start by creating a new plan:

1. Log into your Bamboo instance as a user with permissions to create plans.
2. Choose Create > Create a new plan from the menu bar.

Every plan belongs to a project. We don't have a project yet, so choose Project > New Project, and enter details for both the project and plan.

Bamboo needs to know the plan name, plan key and a brief description of what the plan is for.

See Configuring plans for more details.

2. Connect to a source repository

Bamboo needs to know where the source code repository is located, and needs permissions to access the repo, so that it can check out the code when it runs a build. Enter your Bitbucket credentials, and click Load Repositories to browse to your repository.

Connect to the demonstration atlassian_tutorial/helloworld repo on Bitbucket for this tutorial, if you like.
3. Choose how builds are triggered

We can choose how Bamboo gets prompted to run our plan build. For this tutorial, we want Bamboo to run the build when code is committed to the repo:

Leave the Trigger IP addresses setting empty.

See Triggering builds for more details.

4. Configure tasks

Each plan needs to have at least one task specified. Tasks do the real work of the plan.

The source code checkout task

A newly created plan has a default Source Code Checkout task that gets the source code from the source repository specified earlier.

See Checking out code for details.
The builder task

We also want to compile the code, and run the unit and integration tests. We'll add a builder task to the Bamboo plan to do that. We assume that your project already has a build process set up that Bamboo can call.

Click **Add Task**, then **Builder** and choose the task that matches the build tool for your project. Expand one of the following sections to see configuration details specific to that builder task:

- **Ant**

  Ant Configuration
  
  Task Description
  
  Executable
  
  Ant
  
  Add New Executable
  
  Build File
  
  build.xml
  
  Target
  
  clean test
  
  The target you want to execute. You can also define system properties such as `-Djava.awt.headless=true`.


- **Maven 3.0**

  Maven 3.x Configuration
  
  Task Description
  
  Executable
  
  Maven 3
  
  Add New Executable
  
  Goal
  
  clean test
  
  The goal you want to execute. You can also define system properties such as `-Djava.awt.headless=true`.

  - **Use Maven Return Code**
    
    When determining build success, Bamboo checks Maven return code and searches the log for "BUILD SUCCESS". By checking this option, you will configure Bamboo to skip log parsing. This may fail on some Maven versions/operating systems.

  Bamboo also supports Maven 1.0 and Maven 2.0.


- **Grails**
Grails Configuration

Task Description

Executable

Grails Commands

Use a new line to separate Grails commands. Bamboo will automatically append "-non-interactive" to each command


Note that:

- A build tool needs to be installed on the Bamboo server machine before you can use the Bamboo task.
- There are plugins available for Bamboo that add build tasks for other tools, such as Gant and Gradle. See the [Atlassian Marketplace](https://marketplace.atlassian.com) for details.

**Getting the test results**

Your tests will be run when the builder task compiles the code. Each of the builder tasks above has a section to tell Bamboo to expect test results and where to look for them. You can specify a custom results location if your project directory doesn't use the conventional structure.

**Where should Bamboo look for the test result files?**

- The build will produce test results.
  - If checked, the build will fail if no tests are found. Test output must be in JUnit XML format.

  Test Results Directory

  - Look in the standard test results directory.
  - Specify custom results directories

See [Configuring jobs](https://confluence.atlassian.com/doc/configuring-jobs-719134281) and [Configuring tasks](https://confluence.atlassian.com/doc/configuring-tasks-719151502) for details.

5. Run!

Enable the plan, and click **Create**.

You should see the plan run. Bamboo will:

- Connect to the code repository
- Check out the source code
- Compile the code
- Run unit and integration tests
- Report back the test results

The 'Plan Summary' tab will report whether the build succeeded or not.

Tests in the appropriate directory in the source code repository will be run automatically as part of the build, and the test results will be displayed in Bamboo.
Now, whenever you commit a change to the repository, Bamboo will build your source code and report on your test results.

6. Get feedback

Bamboo displays a summary of the results of the build on the dashboard.

You can get further information about the build in the following ways:

- Build results for one or more plans can be displayed on a wallboard.
- You can get notifications about build results sent to you by email, IM and RSS feed.
- You can get build statistics about plans, and about developers contributing code to the build.
- You can drill down into the results to see the code changes that triggered the build, and the tests that were run for that build.

See Getting feedback for details.

Getting started with .NET and Bamboo

This page describes how your development team can start using the Bamboo continuous integration server to get rapid feedback on your .NET project.

You may want to read Understanding the Bamboo CI Server first.

We assume that you already have:

- Bamboo installed and running. See Installing and upgrading for details. You'll want user accounts in Bamboo for each member of your team.
- Source code under version control. Each team member will have access to the repository.
- Tests, as part of the source code for the project.
- A command that builds the code and executes the tests.

The continuous integration workflow we want is:

1. A developer commits code.
2. Bamboo builds the project:
   a. Connects to the repository and checks out the source code.
   b. Compiles the code.
   c. Runs the unit and integration tests.
3. Bamboo provides feedback on the test results.

How do we achieve this with Bamboo?

Well, we'll create a new Bamboo plan that knows how to check out and build our source code, and then report on our test results.

On this page:

Create a Bamboo plan
1. Plan details
2. Choose a source repository
3. Triggering the build
4. Configure tasks
   - The source code checkout task
   - The builder task
   - Getting the test results
5. Go!
Get feedback

Related pages:
- Getting started with Java and Bamboo

Create a Bamboo plan
A Bamboo plan is where you define the details of your continuous integration workflow. A plan allows us to specify a source code repository, when Bamboo gets triggered to run the build, and how Bamboo should provide feedback on the test results.

1. Plan details

Click **Create Plan** in the menu bar, and then **Create a New Plan**.

Every plan belongs to a project. We don’t have a project yet, so choose **Project > New Project**, and enter details for both the project and plan.

See **Configuring plans** for details.

**Plan Details**

<table>
<thead>
<tr>
<th>Field</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project</td>
<td>Select or add a Project that the new Plan will be created in.</td>
</tr>
<tr>
<td>Plan Name</td>
<td>How do you want to identify the new Plan?</td>
</tr>
<tr>
<td>Plan Key</td>
<td>This is the key for the plan which must be unique within a project. In conjunction with the project key, it is used to identify a build in URLs, trigger scripts and API calls. The key must contain only uppercase alphanumeric characters, e.g. “CORE”</td>
</tr>
<tr>
<td>Plan Description</td>
<td>Choose a meaningful description for the new Plan. For example, “JIRA Release Plan”.</td>
</tr>
</tbody>
</table>

2. Choose a source repository

Bamboo needs to know where the source code repository is located, and needs access to the repo so that it can check out the code when it runs a build.

Choose the repository type from **Source Repository**, and provide access details such as username and password.

See **Linking to source code repositories** for details.

**Source Repositories**

<table>
<thead>
<tr>
<th>Field</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source Repository</td>
<td>Git support works best if the Git executable capability is defined for agents. If not defined, Bamboo will use JGit, which currently does not support submodules.</td>
</tr>
<tr>
<td>Repository URL</td>
<td>The URL of Git repository.</td>
</tr>
<tr>
<td>Branch</td>
<td>The name of the branch (or tag) containing source code.</td>
</tr>
<tr>
<td>Authentication Type</td>
<td>None</td>
</tr>
<tr>
<td>Use shallow clones</td>
<td>Fatches the shallowest commit history possible. Do not use if your build depends on full repository history.</td>
</tr>
</tbody>
</table>

3. Triggering the build
We can choose how Bamboo gets triggered to run the plan build.

We want Bamboo to build the project whenever code is checked into the repository.

Choose **Trigger type > Repository triggers the build...**, and optionally, specify an IP address for the repository server.

See **Triggering builds** for details.

---

**Trigger**

- **Trigger type**: [Repository triggers the build when checked in]
  
  How should Bamboo trigger builds for this Plan? (Dependent Builds are automatically triggered)

- **Trigger IP Addresses**: 
  
  (Optional) Bamboo ensures that triggers originate from IP addresses of the repository server(s). You can authorise additional IP addresses here, separated by a comma.

---

4. Configure tasks

Each plan needs to have one or more tasks specified. Tasks do the real work of the plan.

**The source code checkout task**

A newly created plan has a default Source Code Checkout task that gets the source code from the source repository specified earlier.

See **Checking out code** for details.

**The builder task**

We also want to compile the code. We’ll add a builder task to the Bamboo plan to do that. We assume that your project already has a build process set up that Bamboo can call upon.

Click **Add Task**, then **Builder** and choose the task that matches the build tool for your project. Expand one of the following sections to see configuration details specific to that builder task:

- **MSBuild...**

  **MSBuild Configuration**

<table>
<thead>
<tr>
<th>Task Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

  **Executable**

  - **MSBuild v2.0 (32bit)** 
    
    Add New Executable

  **Project File**

  - **YourSolution.sln**
    
    The Solution, Project File or MSBuild project to execute when this Job Builds

  **Options**

  The MSBuild.exe command line switches you wish to include.


- **NAnt...**
NAnt Configuration

Task Description

Executable*

NAnt

Add New Executable

Build File

default.build

The name of the NAnt build file that you want to execute when this Job builds

Targets *

run

The NAnt targets you want Bamboo to execute when this Job builds

Options

The NAnt command line options you wish to include.

See http://nant.sourceforge.net/ for information about NAnt.

Visual Studio Configuration

Task Description

Executable*

Visual Studio 2010

Add New Executable

Solution*

The Visual Studio solution file you want Bamboo to execute when this Job builds

Options *

The devenv command line options you wish to include.

Platform *

x86

The platform toolset required to compile your Solution.


Note that a build tool needs to be installed on the Bamboo server machine before you can use the Bamboo task.

See Configuring a builder task for details.

Getting the test results

Now we want to run the unit and integration tests, and display the results from those. You need to set up one of the MSTest, NUnit or MBUnit tasks so Bamboo can get and display the test results. You can specify a custom results location if your project directory doesn't use the conventional structure.

See Configuring a test task for details.
5. Go!

Enable the plan, and click Create.

You should see the plan run. The 'Plan Summary' tab will report whether the build succeeded or not.

Tests in the appropriate directory in the source code repository will be run automatically as part of the build, and the test results will be displayed in Bamboo.

Now, whenever you commit a change to the repository, Bamboo will build your source code and report on your test results.

Get feedback

Bamboo displays a summary of the results of the build on the dashboard.

You can get further information about the build in the following ways:

- Build results for one or more plans can be displayed on a wallboard.
- You can get notifications about build results sent to you by email, IM and RSS feed.
- You can get build statistics about plans, and about developers contributing code to the build.
- You can drill down into the results to see the code changes that triggered the build, and the tests that were run for that build.

See Getting feedback for details.

Getting started with PHP and Bamboo

This page describes how to use Bamboo to get rapid feedback on your PHP project. The worked example builds a Bamboo plan where a developer commits code and Bamboo responds by:

- Connecting to the code repository
- Checking out the source code
- Compiling the code
- Running unit and integration tests
- Reporting back test results

On this page:

- Information you need before you begin
- Step 1: Install the PHP base code framework
- Step 2: Install PHPUnit
- Step 3. Create a project and plan
- Step 4. Configure tasks
- Get feedback

Related pages:

- Getting started with .NET and Bamboo

Information you need before you begin

This introduction assumes you are using Bamboo Server installed on your local network. You need to make sure you or your company administrator have properly installed and configured Bamboo for running plans.

You will also need to install:

- The PHP framework
- PHPUnit testing framework
Step 1: Install the PHP base code framework

In order to get full functionality from Bamboo and PHP, you will need to install the PHP base code framework. If you are using Ubuntu, then use the following command to install PHP.

```
$ sudo apt-get install php5-cli
```

See also:

- Installing PHP on MacOS
- Installing PHP on Windows

Step 2: Install PHPUnit

PHPUnit.de provides an excellent PHP archive resource called PHAR.

```
$ wget https://phar.phpunit.de/phpunit.phar  // download the PHPUnit packages
$ chmod +x phpunit.phar  // make PHPUnit executable
$ mv phpunit.phar /usr/local/bin/phpunit  // copy PHPUnit into your path
$ phpunit --version  // double check it's installed completely
```

If you prefer, you may use Composer or PEAR to download and install PHPUnit along with its dependencies, however these approaches are beyond the scope of this introduction.

Step 3. Create a project and plan

1. Create a new project

A Bamboo plan defines the details of your continuous integration workflow. You use a plan to identify the source code repository, specify the tasks to run in your build, and when to trigger a build. Each plan belongs to a project. You can add a plan to an existing project or create a new project. In this example, you create both a new project and a new plan in that project.

1. Log into your Bamboo instance as a user with permissions to create plans.
2. Choose Create > Create a New Plan from the menu bar.

Every plan belongs to a project. We don't have a project yet, so choose Project > New Project, and enter details for both the project and plan.
2. Configure the plan details

Bamboo needs to know the Plan name, Plan key and a brief description of what the plan is for. See Configuring plans for more details.

<table>
<thead>
<tr>
<th>Plan details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plan name</strong></td>
</tr>
<tr>
<td><strong>Plan key</strong></td>
</tr>
<tr>
<td>Description</td>
</tr>
</tbody>
</table>

3. Choose a source repository

Bamboo needs to know where the source code repository is located, and needs access to the repo so that it can check out the code when it runs a build. See Linking to source code repositories for more details.

<table>
<thead>
<tr>
<th>Source repositories</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Source repository</strong></td>
</tr>
<tr>
<td><strong>Username</strong></td>
</tr>
<tr>
<td><strong>Password</strong></td>
</tr>
<tr>
<td><strong>Repository</strong></td>
</tr>
<tr>
<td><strong>Branch</strong></td>
</tr>
<tr>
<td><strong>Use shallow clones</strong></td>
</tr>
</tbody>
</table>
Set this checkbox

4. Triggering the build

We can choose how Bamboo gets triggered to run the plan build:

**Trigger**

- **Repository triggers the build when changes are committed**

**Trigger IP**

- Optionally add an IP address for your repository

See Triggering builds for more details.

**Step 4. Configure tasks**

Each plan needs to have at least one task specified. Tasks do the real work of the plan.

*The source code checkout task*

A newly created plan has a default Source Code Checkout task that gets the source code from the source repository specified earlier.

See Checking out code for details.

*Unit testing*

Unit testing for PHP is completed using the PHPUnit testing framework. This is a port of the popular Java JUnit testing framework to PHP. PHPUnit provides also produces test results in the JUnit XML format required by Bamboo.

You will need to add a server executable capability to run PHPUnit:

1. Go to Overview > Server capabilities.
2. Click Add capability and complete the configuration using the following:
   
   **Capability type**
   
   Executable

   **Type**
   
   PHPUnit

   **Executable label**
   
   PHPUnit x.x

   **Path**
   
   Path to the PHPUnit executable e.g. /usr/bin/phpunit-x.x

3. Click Add to add the PHPUnit capability.

Now you can create a PHPUnit testing task:
Getting the test results

Your tests will be run when the builder task compiles the code. Each of the builder tasks above has a section to tell Bamboo to expect test results and where to look for them. You can specify a custom results location if your project directory doesn't use the conventional structure.

See Jobs and tasks for details.

Step 5: Go!

Enable the plan, and click Create.

You should see the plan run. The 'Plan Summary' tab will report whether the build succeeded or not.

Tests in the appropriate directory in the source code repository will be run automatically as part of the build, and the test results will be displayed in Bamboo.

Now, whenever you commit a change to the repository, Bamboo will build your source code and report on your
Get feedback

Bamboo displays a summary of the results of the build on the dashboard.

You can get further information about the build in the following ways:

- Build results for one or more plans can be displayed on a wallboard.
- You can get notifications about build results sent to you by email, IM and RSS feed.
- You can get build statistics about plans, and about developers contributing code to the build.
- You can drill down into the results to see the code changes that triggered the build, and the tests that were run for that build.

See Getting feedback for details.

Using the Bamboo dashboard

The dashboard is your Bamboo 'home' page. The dashboard has three tabs:

- **My Bamboo** — a convenient summary of information that is relevant to you (only appears if you have logged in to Bamboo):
  - plans that you have nominated as your favorites.
  - your latest build results (i.e. builds that were triggered by your latest code changes).
  - a summary of your build statistics (only appear if your Bamboo User Profile has been associated with your Author Name).

- **All build plans** — a list of plans and each plan’s latest build result.
- **Build Activity** — Bamboo’s agents and build queue, showing which plans Bamboo is currently building and which plans are waiting to be built.

You can return to the dashboard from anywhere in Bamboo by clicking Dashboard in the top navigation menu.

### On this page:

- Viewing the dashboard
- Filtering the plans
- Working with favorites

### Related pages:

- Configuring plans
- Working with builds
- Getting feedback

Viewing the dashboard

You can:

- click the **project name** (e.g. ‘Bamboo Testing’) to view the plans in the project.
- click the **plan name** (e.g. ‘Acceptance Test JDK 1.6’) to view the plan details.
- click the **build number** (e.g. ‘7823’) to view the build result.
- click the **author’s name** to view the author’s details (the author is the person who triggered the build by checking-in code).

The icon next to a build number indicates the plan’s current status:

- **✓** This plan’s latest build was successful.
- **ℹ️** This plan’s latest build failed.
- **🔍** Bamboo is currently checking-out the source-code for this plan, in preparation for starting a build.
Bamboo is currently queuing a build for this plan in the Build Queue.

Bamboo is currently executing a build for this plan.

The plan is stopped at a manual stage.

The plan was not built, perhaps because the build was manually stopped.

This plan has been disabled.

**Screenshot: Bamboo dashboard - 'All Plans' tab**

<table>
<thead>
<tr>
<th>Project</th>
<th>Plan</th>
<th>Build</th>
<th>Completed</th>
<th>Tests</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>core</em> Bamboo</td>
<td>Build WAR</td>
<td>🏫 #01</td>
<td>3 months ago</td>
<td>No tests found</td>
<td>Changes by Krystian Braziewicz</td>
</tr>
<tr>
<td></td>
<td>CI Tests</td>
<td>🚦 #106699</td>
<td>2 hours ago</td>
<td>3020 passed</td>
<td>Changes by Peter Graeveski</td>
</tr>
<tr>
<td></td>
<td>Deploy</td>
<td>🚦 #1309</td>
<td>14 hours ago</td>
<td>No tests found</td>
<td>Scheduled with changes by Krystian Braziewicz</td>
</tr>
<tr>
<td></td>
<td>Federated APIs CTK</td>
<td>🚦 #900</td>
<td>3 hours ago</td>
<td>No tests found</td>
<td>Changes by Peter Graeveski</td>
</tr>
<tr>
<td></td>
<td>Integration Branch Auto Merged</td>
<td>🚦 #96</td>
<td>15 hours ago</td>
<td>No tests found</td>
<td>Changes by Pawel Skorcienski and Piotr Bruski</td>
</tr>
<tr>
<td></td>
<td>JDK 7 Acceptance Test</td>
<td>🚦 #743</td>
<td>4 days ago</td>
<td>2859 passed</td>
<td>Manual run by Mark Chenmugkanan</td>
</tr>
<tr>
<td></td>
<td>License check</td>
<td>🚦 #245</td>
<td>3 hours ago</td>
<td>No tests found</td>
<td>Changes by Peter Graeveski</td>
</tr>
<tr>
<td></td>
<td>MERCURIAL Bamboo WAR</td>
<td>🚦 #27</td>
<td>2 months ago</td>
<td>No tests found</td>
<td>Changes by Marek Parfianowski</td>
</tr>
<tr>
<td></td>
<td>OpenJDK7 CI Tests</td>
<td>🚦 #115</td>
<td>3 hours ago</td>
<td>223 passed</td>
<td>Scheduled with changes by James Hatherly</td>
</tr>
<tr>
<td></td>
<td>REST Docs</td>
<td>🚦 #371</td>
<td>1 month ago</td>
<td>No tests found</td>
<td>Manual run by Mark Chenmugkanan</td>
</tr>
</tbody>
</table>

Filtering the plans

You can filter the plans on your dashboard according to plan labels. For instructions on how to add a label to a plan, see Working with labels.

**To filter the dashboard plans by label:**

1. Navigate to the dashboard.
2. Click the button. If the plan already has labels, they will be displayed next to the button, otherwise the button will read Filter Plans.
3. In the 'Filter Plans' dialog, select the labels to filter by.
4. Click Save. The dashboard will refresh, showing only the plans with the selected labels.

**Screenshot: Filtering plans on a dashboard**
Working with favorites

The **My Bamboo** tab lists your **favorite** plans — that is, the plans you work with the most. You can easily add and remove plans from your favorites.

When you add a plan to your favorites, you become a ‘watcher’ of the plan. This means that you will receive notifications about the build results for your favorite plans, depending on how your administrator has configured each plan’s **notifications**. You can receive notifications by email, Instant Messaging (IM) and RSS feed.

**To add a plan to your favorites:**
1. Click **Dashboard** in the top navigation bar, to display the dashboard.
2. Click the **All Plans** tab. This will display a list of all plans in your Bamboo system.
3. Locate the plan and click the grey star icon at the right.

Viewing Bamboo's agents

A Bamboo **agent** is a service that can run **job builds**. There are the following types of Bamboo agents:

- **local agents** run as part of the Bamboo server.
- **remote agents** run on computers, other than the Bamboo server, that run the remote agent tool.
- **elastic agents** run in the Amazon Elastic Compute Cloud (EC2).

Local agents run in the Bamboo server’s process, i.e. in the same JVM as the server. Each remote agent runs in its own process, i.e. has its own JVM.

Each agent has a defined set of **capabilities** and can only run builds for jobs whose **requirements** match the agent's capabilities.

To view agents that are currently active, see **Using the Bamboo dashboard**.

**Related pages:**
- Configuring agents
- Bamboo remote agent installation guide

View the agents in Bamboo

1. Choose **Build > Build activity** from the Bamboo header.
2. Click the name of the agent in the 'Building' section to see details for that particular agent.
3. Click **X of Y online agents building** in the 'Building' section of the page to see a list of all available agents.

View a specific Bamboo agent as a Bamboo administrator

1. Choose **Agents** from the 'cog' menu of the Bamboo header.
2. Click the name of the agent. You can configure this agent and its capabilities:
   - Click **Executable Plans** to view the plans that this agent can build.
   - Click **System Properties** to view the system properties of this agent.

**Keyboard shortcuts**

<table>
<thead>
<tr>
<th>What are you doing?</th>
<th>Keyboard Shortcut</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viewing any screen</td>
<td>Alt / Cmd + c</td>
<td>Opens Create menu at Create new plan</td>
</tr>
<tr>
<td>Viewing any screen</td>
<td>Alt / Cmd + u</td>
<td>See author report</td>
</tr>
<tr>
<td>Viewing the Dashboard</td>
<td>l</td>
<td>Filter projects</td>
</tr>
<tr>
<td>Viewing a plan or build</td>
<td>e</td>
<td>Edit the plan configuration</td>
</tr>
<tr>
<td>Viewing a build</td>
<td>Alt / Cmd + p</td>
<td>Previous build</td>
</tr>
<tr>
<td>Viewing a build</td>
<td>Alt / Cmd + n</td>
<td>Next build</td>
</tr>
<tr>
<td>Viewing a build</td>
<td>l</td>
<td>Label</td>
</tr>
<tr>
<td>Viewing a build</td>
<td>m</td>
<td>Write a comment</td>
</tr>
<tr>
<td>Viewing a build</td>
<td>Alt / Cmd + s</td>
<td>Save the comment</td>
</tr>
<tr>
<td>Editing a task</td>
<td>Alt / Cmd + s</td>
<td>Save the task</td>
</tr>
</tbody>
</table>

**Getting started with Node.js and Bamboo**

Node.js is described as:

> "a platform built on [Chrome's JavaScript engine](https://developer.chrome.com) for easily building fast, scalable network applications. Node.js uses an event-driven, non-blocking I/O model that makes it lightweight and efficient, perfect for data-intensive real-time applications that run across distributed devices." [Node.js](https://nodejs.org)

We agree, and bundle a number of tasks with Bamboo to make it easy for you to get continuous integration and deployment for your Node.js projects. You can find the official Node.js documentation [here](https://nodejs.org).

**Distributions**

Node.js distributions usually come bundled with **npm**, a package manager for the platform, which runs from the command line and manages dependencies for your applications.

All npm packages contain a file, usually in the project root, called `package.json` - this file holds metadata relevant to the project. You can find out more about the `package.json` file [here](https://nodejs.org).

**Configure your Node.js project**

Add the following dependencies (or devDependencies) to the `package.json` file in your Node.js project. These are required if you want to use the Grunt, Gulp, Bower, Nodeunit or Mocha Test Runner tasks:

**Grunt**

- grunt (v0.4 or newer)
- grunt-cli

**Gulp**

- gulp (v3.3.2 or newer recommended)

**Bower**

- bower
Mocha Test Runner

- `mocha`
- `mocha-bamboo-reporter`

Nodeunit

- `nodeunit`

Your package.json file should look something like this:

```json
...
"devDependencies": {
  ...
  "mocha": "~1.18",
  "mocha-bamboo-reporter": "*",
  ...
  "nodeunit": "~0.8"
}
"dependencies": {
  ...
  "grunt": "~0.4",
  "grunt-cli": "~0.1",
  ...
  "gulp": "~3.3.2",
  ...
  "bower": "~1.3.12"
}
```

Install the necessary `node_modules` before executing any of the Node.js tasks, by adding an `npm` task and using the `install` command.

Node.js tasks

Bamboo ships with specific tasks for Node.js that make it easy to integrate the Node.js platform with Bamboo. You can use these tasks to set up builds for your Node.js project.

Note that it is possible to execute scripts installed by the `npm` task from the `node_modules`; however, we recommend that you use the dedicated tasks for executing such scripts, such as Grunt, Mocha or Nodeunit.

Install the necessary `node_modules` before executing any of the Node.js tasks, by adding an `npm` task and
using the `install` command.

**npm task**

The npm task allows you to execute Node Package Manager commands in build plans and deployment projects. To run npm commands, simply enter the command to execute during task configuration:

In order to execute npm commands, the Node.js capability must be present on your build agent (see below).

Note: since Node.js and npm are distributed together, Bamboo will use the Node.js capability for npm tasks as well. The path will be modified at run time to point to the npm executable.

**Node.js task**

The Node.js task is a general purpose task that can be used to execute Node scripts within Bamboo.

To run the Node.js task, the Node.js capability must be present on your local or remote agents (see below).

Node.js can be used to execute any custom Node.js scripts or applications. To do so, enter the path of the script to execute in the task configuration, and optionally define additional arguments to pass.

Note that it is possible to execute scripts installed by the npm task from the node_modules, however we recommend that you use the dedicated tasks for executing such scripts, such as Grunt, Mocha or Nodeunit.

Mocha
Mocha is a test framework that runs on the Node.js platform.

You can use the Mocha Test Runner task to run your Mocha tests – it will create an output file named `mocha.json`.

You can configure the task to parse test results after a successful execution. Alternatively, you can add a Mocha Test Parser task to run afterwards to parse the test results.

If you don’t do a full checkout on each build, make sure you add a task to delete `mocha.json` before the Mocha Test Runner task. A simple script task that runs `rm -f mocha.json` should do the trick.

**Grunt**

Use the Grunt task to take advantage of the Grunt task runner.

**Nodeunit**

Nodeunit is a tool for defining and running unit tests for Node.js projects.

Running the Nodeunit task will create test results in JUnit XML format.

You can configure the task to parse test results after a successful execution. Alternatively, you can add a following JUnit Parser task to parse the test results.

**Node.js capability**

Bamboo comes with a definition for a new executable capability called Node.js. In order to use the Node.js task (as well as most of the other Node.js tasks in Bamboo), you need this capability to be present on your local or remote agents.

The capability can be auto detected on the server side.

**Server capabilities**

You can use this page to view, add and delete server capabilities. These capabilities will be inherited by all local agents.

**Executable**

<table>
<thead>
<tr>
<th>Executable label</th>
<th>Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ant (Ant)</td>
<td>/usr/share/ant</td>
</tr>
<tr>
<td>Grails (Grails)</td>
<td>/usr/share/grails/2.2.0</td>
</tr>
<tr>
<td>Node.js (Node.js)</td>
<td>/opt/node-v0.10.26-linux-x64/bin/node</td>
</tr>
</tbody>
</table>

**JDK**

<table>
<thead>
<tr>
<th>JDK label</th>
<th>Java home</th>
</tr>
</thead>
<tbody>
<tr>
<td>JDK</td>
<td>/usr/lib/vm1/jdk1.6.0_45</td>
</tr>
<tr>
<td>JDK 1.6</td>
<td>/usr/lib/vm1/jdk1.6.0_45</td>
</tr>
<tr>
<td>JDK 1.8.0_45</td>
<td>/usr/lib/vm1/jdk1.8.0_45</td>
</tr>
</tbody>
</table>

The `NODE_HOME` environment variable will instruct Bamboo where to look for Node.js if it is not installed in a typical directory - it should point to the location of the Node.js installation. Bamboo will search the agent’s default directories to find the Node.js installation; it will also search in location specified by NODE_HOME.

**Getting started with Docker and Bamboo**

Docker is an operating system container technology that allows running applications in isolated environments called containers. Docker containers are equipped with all dependencies required by an app to run. The container abstraction provides many benefits such as: the creation of reproducible environments, redistribution of full application stacks for running on different machines, or limiting the resource consumption of an application running in a container.

The Docker container technology and Bamboo can interact in the following ways:
Run Bamboo in Docker...

**Run Bamboo in Docker**

Bamboo Docker images allows you to run the Bamboo Server or the Bamboo remote agent inside a Docker container. This makes it isolated from other applications that may be running on the same host system. In this type of interaction Bamboo is itself unaware of the existence of Docker container it is running in.

To get Bamboo up and running quickly, we have prepared Bamboo Server and Bamboo Agent Docker images. Both are minimalistic and highly customisable images that allow you to get Bamboo ready for action in no time. These images provide a fully controllable and reproducible environment which makes them perfect for testing purposes. Both images are designed to be easily extensible, allowing you to add capabilities needed to run your builds quickly. You can see an example how to extend an image to suit your needs on our Docker Hub space.

To make your life easier and allow you not to worry which specific Bamboo version to run, we tag our images both with point and minor version numbers. In order to run latest version of Bamboo 6.7, you only need to use it as a version tag: atlassian/bamboo-server:6.7. This will start a container with the latest 6.7.x stable version available. Of course you can still start specific version of Bamboo, by using whole version tag: atlassian/bamboo-server:6.7.1

Also if you’re considering implementing Bamboo in your environment, you can use our Docker images for Bamboo evaluation - just run the Docker and see if Bamboo is the tool for you.

Go to the Docker Hub for the images and instructions how to set them up:

- Bamboo Server
- Bamboo Agent base

Run Bamboo jobs in Docker...

**Run Bamboo jobs in Docker**

Docker Runner is a Bamboo feature that allows the user of Bamboo to run jobs of Bamboo plans inside Docker container environments. In this type of interaction, Bamboo is aware of the Docker container technology and communicates with it to create, manage, and terminate container environments in which jobs are run.

With Docker Runner, you can run builds and deployments in a Docker container to isolate the build process from the environment where the Bamboo build agent runs in. This increases the reliability of your environment by providing isolation, and more strict control over the resources the continuous integration (CI) process has access to. Also, it gives you possibility to recreate the same build environment at different moments in time. The isolation also helps with the reliability of your CI by making sure that environment it runs in can be reliably recreated each time you run your builds.

For information, see Docker Runner.

Use Docker in your Bamboo tasks

**Use Docker in your Bamboo tasks**

A Docker task is a specific task type in Bamboo which allows you to use your own, custom Docker image with Bamboo to run a task of a job inside the Docker container environment. In this type of interaction Bamboo is aware of the Docker container technology and, similarly to the Docker Runner feature, it interacts with it to create, manage, and terminate container environments in which one single task is run.

The main difference between the two is that one works at the level of the Bamboo task, which runs a single task inside the container, while the other works at the level of the Bamboo job, which runs all the tasks that make up the job inside the same Docker container environment.

To learn how to start using these tasks, see Configuring the Docker task in Bamboo.
Installing and upgrading

Installing

Installing Bamboo on Linux
Installing Bamboo on Mac OS X
Installing Bamboo on Windows
Connecting Bamboo to an external database
Bamboo remote agent installation guide

Upgrading

Bamboo upgrade guide

Supported platforms

This page describes the supported platforms for Bamboo 6.9.

See also:

- End of support announcements for Bamboo
- Bamboo Best Practice - System Requirements
- Stock images

Definitions:

- Supported - you can use Bamboo with this platform.
- Limited - you can evaluate Bamboo on this platform, but you can't use it to run a production Bamboo site.
- Deprecated - support for this platform will end in an upcoming release.

Java

Oracle JDK:

- ✔️ Java 1.8

Open JDK:

- ✔️ Java 1.8

Good to know:

- Once the JDK is installed, you will need to set the `JAVA_HOME` environment variable, pointing to the root directory of the JDK. Some JDK installers set this automatically (check by typing `echo %JAVA_HOME%` in a command prompt, or `echo $JAVA_HOME` in a shell). You need to do this before installing Bamboo, as Bamboo will automatically configure JDK capabilities based on the system environment variables on your machine.
- For Bamboo server, it is not enough to have just the JRE. Please ensure that you have the full JDK.
- You only need to run the agent and server using a supported JDK. Agents can build software with any JDK version.

Operating systems

Operating systems:

- ✔️ Microsoft Windows
- ✔️ Linux
- ✔️ Solaris
- ✔️ MacOS / OSX

Good to know:

- For Linux, you should create a dedicated user to run Bamboo. Bamboo runs as the user it is invoked under and can potentially be abused. See Installing Bamboo on Linux.
Databases

MySQL:
- MySQL 5.6.3
- MySQL 5.7

PostgreSQL:
- PostgreSQL 9.2
- PostgreSQL 9.3
- PostgreSQL 9.4
- PostgreSQL 9.5
- PostgreSQL 9.6
- PostgreSQL 10

Microsoft SQL Server:
- SQL Server 2012
- SQL Server 2014
- SQL Server 2016

Oracle:
- Oracle 12c

H2:
- 1.4.194 (shipped with Bamboo)

Good to know:
- MySQL is supported when used with the JDBC Connector/J 5.1.
- Supported only with the InnoDB storage engine.
- PostgreSQL is supported when used with the JDBC driver bundled with Bamboo.
- SQL Server is supported when used with Microsoft's JDBC driver.
- Bamboo ships with a built-in H2 database, which is fine for evaluation purposes but is somewhat susceptible to data loss during system crashes. For production environments we recommend that you configure Bamboo to use an external database.

Web browsers

Web browsers:
- Mozilla Firefox
- Chrome
- Safari
- Microsoft Edge
- Microsoft Internet Explorer 11

Good to know:
- If not specified otherwise, the latest stable version supported.

Source repositories

CVS

Git
- 1.8.1.5 and later

Mercurial:
- 1.8 and later

Perforce

Subversion:
- 1.5
- 1.6

Good to know:
- Due to several known issues in Git 1.8.1.5, this version will soon be deprecated in Bamboo. 2.8 will be the next supported version of Git in Bamboo.
- Bamboo 4.2, and later versions, support Subversion 1.7, but use the Subversion 1.6 Workspace Format by default to keep backwards compatibility with older Subversion working copies. You can set the bamboo.svn.wc.format system property if your Bamboo plans need to use Subversion 1.7 commands as part of your build scripts. See Setting Bamboo to Support Subversion 1.7 Workspace Format for details.
- Bamboo works with Subversion 1.8, and supports the 1.8 Workspace Format.
Docker

**Docker for Mac:**
- 17.07 or later

**Docker for Linux:**
- 17.07 or later

Infrastructure

**Application servers:**
- Bamboo runs on a bundled Apache Tomcat and it's the only supported configuration.

**Internet protocols:**
- You can run Bamboo in both IPv4 and IPv6 environments.
- Raw IPv6 addresses are not always recognized. See the IPv6 in Bamboo for limitations and known issues.

**Agents and custom EC2 images:**

Atlassian doesn't provide support for customized images. Bamboo provides flexibility to use customized machine images, but it's impossible for us to support all individual configurations.

Use Bamboo stock images as the base for all image customizations to ensure a minimal level of consistency of your Elastic Bamboo setup.

**Bamboo upgrade guide**

You can upgrade Bamboo by installing a new version of Bamboo and setting it up with the configuration of the original Bamboo instance.

On this page

<table>
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<tr>
<th>Overview</th>
<th>Before you begin</th>
</tr>
</thead>
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<td>1. Export and back up the existing Bamboo data</td>
<td></td>
</tr>
<tr>
<td>2. Download and install a new Bamboo instance</td>
<td></td>
</tr>
<tr>
<td>3. Configure the new Bamboo instance</td>
<td></td>
</tr>
<tr>
<td>4. Start Bamboo</td>
<td></td>
</tr>
</tbody>
</table>

Version-specific upgrade notes

Troubleshooting

Overview

The recommended paths for upgrading Bamboo to a new version differ depending on whether you want to move to a new server or not:

<table>
<thead>
<tr>
<th>Upgrading Bamboo locally</th>
<th>Upgrading Bamboo with a move to a new server</th>
</tr>
</thead>
</table>
Perform the steps as described on this page.
Make sure that your new Bamboo instance is not installed in the same directory as the original Bamboo instance.

1. Clone your Bamboo instance into the new location.
2. Perform the upgrade steps on the cloned Bamboo instance as described on this page.
The cloned instance on the new server is referred to as original Bamboo instance.

In both scenarios, the new Bamboo instance uses the home directory and the database of the original Bamboo instance.

We recommend that you test the Bamboo upgrade on a QA server before deploying to production.

If you are a Bamboo plugin developer, see our Bamboo API Changes by Version guide, which outlines changes in Bamboo that may affect Bamboo plugins compiled for earlier versions of Bamboo.

Before you begin

Determine your upgrade path

Upgrade path
- When upgrading from very old versions of Bamboo, follow this upgrade path:

```
OLDER VERSIONS    2.0.6    2.6.3
2.7.4    5.0–5.7    5.14    6.5    LATEST
```
- When upgrading from earlier than Bamboo 5.0, follow this upgrade path:

```
4.0–4.4    5.14    LATEST
```
- When upgrading from Bamboo 5.0 and later, follow this upgrade path:

```
5.0–5.13    5.14    LATEST
```
- When upgrading from Bamboo 5.14 and later, follow this upgrade path:

```
5.14+    LATEST
```

Before you begin

- Read the specific upgrade notes for your version of Bamboo.
- Read End of support announcements for Bamboo.
- Check whether the system where you are going to install the new Bamboo instance meets the requirements.
- Check whether any apps may require an update.
- Only import data to an instance running the same version.

The installation path is referred to as `<bamboo-install>` and points to the directory into which you extracted the Bamboo package. It is different from `<bamboo-home>`, which points to the directory where Bamboo data is stored.
1. Export and back up the existing Bamboo data

**Export the Bamboo database**

There are two database backup scenarios, depending on whether you are using an embedded or external database.

<table>
<thead>
<tr>
<th>Embedded HSQL database</th>
<th>External database</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create an export .zip file for the original Bamboo instance. For more information, see Exporting data for backup. The export may take a long time to complete and may require a large amount of disk space, depending on the number of builds and tests in your system. Use native database tools to create a backup. For more information about external databases, see Connecting Bamboo to an external database.</td>
<td></td>
</tr>
<tr>
<td>HSQL is <em>not recommended</em> for production Bamboo instances.</td>
<td></td>
</tr>
</tbody>
</table>

**Stop Bamboo**

Stop the original Bamboo instance.

If you have Bamboo running as a Windows service, uninstall the service by using the UninstallService.bat executable that came with your Bamboo instance.

**Back up the Bamboo configuration**

When the original Bamboo instance is shut down, back up your <bamboo-home > directory, which contains the builds and configuration directories. You can compress it into a .zip file.

- **Viewing Bamboo paths**
  Go to Administration > System > System information > Bamboo paths. Note the Bamboo home path, Build path, and Configuration path:

```
Bamboo paths
- Current running directory
- Configuration path
- Build path
- Build working directory
- Artifacts directory
- Bamboo home
- Bamboo logs
- Temporary directory
- User home
```

For more information about these directories, see Important Directories and Files.

2. Download and install a new Bamboo instance

To upgrade Bamboo, you must install a new Bamboo instance in a <bamboo-install> directory that is different from the <bamboo-install> directory of the original Bamboo instance.
This upgrade scenario uses the home directory and the external database of the original Bamboo instance.

- Make sure that the original Bamboo instance is not running before you start the new installation.
- To prevent data loss during updates or reinstallation, the `<bamboo-home>` directory must be different from the `<Bamboo-install>` directory.

Follow these guidelines to install a new Bamboo instance:

- **MacOS**
  - The Mac installer deletes the previous version of Bamboo.
  - Follow the [Mac OS X install instructions](#).

- **Linux**
  - Delete your old `<Bamboo-install>` directory to remove any legacy files.
  - Follow the [Linux install instructions](#).

- **Windows**
  - The Windows installer deletes the previous version of Bamboo.
  - Follow the [Windows install instructions](#).
  - Configure Bamboo to run as a service on Windows, using the `service.bat` executable.

3. Configure the new Bamboo instance

**Set the home directory for the new Bamboo instance**

Set the `<home-directory>` to use the `<home-directory>` of the original Bamboo instance:

1. Go to the new Bamboo instance `<bamboo-install>` directory. It is the directory where you installed Bamboo.
2. Open `atlassian-bamboo/WEB-INF/classes/bamboo-init.properties`

   For Bamboo versions prior to 5.1, the file path is: `<bamboo-install>/webapp/WEB-INF/classes/bamboo-init.properties`

3. Set the `bamboo.home` variable to use the `<bamboo-home>` path of the original Bamboo instance.

**Reconnect external user directories (optional)**

If you had integrated the original Bamboo instance with Crowd or LDAP, you must enable the integration for the new Bamboo instance.

For more information, see [Integrating Crowd with Bamboo](#) and [Integrating Bamboo with LDAP](#).

**Update any installed apps**

If you installed any apps in addition to the pre-installed system apps:

- Check if all apps are compatible with the new version of Bamboo.
- Update any apps that are out-of-date.
- Disable any apps that are incompatible with the new version of Bamboo.

**Automatic update of remote agents**

For Bamboo 3.2 and later, remote agents are updated automatically. Remote agents automatically detect when a new version is available and downloads new classes from the server.

For more information, see [Bamboo remote agent installation guide](#).
Migrate your existing Bamboo configurations over to your new Bamboo installation

If you have modified properties in configuration files of your existing Bamboo installation, make the same modifications in your new Bamboo installation. However, because the properties in the configuration files may have changed between versions, you cannot simply copy the configuration files from your existing installation and replace the equivalent files in the new installation.

For each file you have modified in your existing Bamboo installation, you need to **manually edit each equivalent file in your new Bamboo installation and re-apply your modifications**.

The table below lists the most commonly modified files and their locations within your Bamboo Installation:

<table>
<thead>
<tr>
<th>File</th>
<th>Location in Bamboo installation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>setenv.bat (Windows) or setenv.sh (Linux)</td>
<td>bin</td>
<td>Configuring your system properties</td>
</tr>
<tr>
<td>seraph-config.xml</td>
<td>atlassian-bamboo/WEB-INF/classes</td>
<td>Modified if you had integrated Bamboo with Crowd</td>
</tr>
<tr>
<td>server.xml</td>
<td>conf</td>
<td>Modified in the following situations:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• If you had previously changed Bamboo's root context path.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• If you had previously secured Bamboo with Tomcat using SSL or proxy server.</td>
</tr>
</tbody>
</table>

**Check database access permission**

Before you start the new Bamboo instance, make sure that it has the `write` access to the database, which is required to complete the upgrade tasks.

4. Start Bamboo

**Start Bamboo**

Once you have installed Bamboo and `set the bamboo.home property`, start the new Bamboo instance. The upgrade runs automatically.

You can check whether the upgrade was successful in the `atlassian-bamboo.log` file.

Upgrading Bamboo may require reindexing.

Depending on the number of existing builds and tests, the reindexing process may take a significant amount of time, during which Bamboo will not be available.

Version-specific upgrade notes

The version-specific notes provide additional information to the main upgrade documentation. We recommend reading the version-specific notes for the original and new Bamboo instance versions.

- Upgrading to Bamboo 6.10...

Remote agent wrapper
Bamboo 6.10 is release with new version of Remote agent wrapper. New installer should be downloaded from Bamboo Server. At agent home folder you need to remove "conf" directory. Then start installer from console.

If agent was executed as service no changes required if previous steps were executed.

**Upgrading to Bamboo 6.9...**

**Project View permission**

Bamboo 6.9 is release with a new project permission - View. The project view permission is a prerequisite for accessing any plans as it takes precedence over plan permissions and without it, you won't be able to access plans for which you might even have Admin permissions.

When upgrading, the View permissions will be given automatically to Bamboo users who previously:

- had any permissions to the project OR
- had any permissions to any plan within in the project

**Hostname verification**

Bamboo 6.9 comes with TLS hostname verification. If Bamboo agents use SSL connection to server and certificate has incorrect host name, the Client Broker settings must include the `socket.verifyHostName=false` parameter to URL.

**HTTP/HTTPS connector for JMS dropped**

The HTTP/HTTPS connector for JMS was dropped from Bamboo 6.9. We advise to use TCP/SSL instead.

**AdoptOpenJDK in stock elastic images**

With Bamboo 6.9 we've changed Java 8 and 11 to AdoptOpenJDK as default on stock elastic images. Oracle JDK is still present in images and can be used. You can find Oracle JDK in the following locations:

- `/opt/jdk-8u172` (Ubuntu/Amazon Linux)
- `C:\opt\jdk-8u172` (Windows)

**Upgrading to Bamboo 6.8...**

**Resolving artifacts content type**

Bamboo allows you to display the content of your artifact based on its extension. This is done using the `resolve artifacts content type by extension` option. If this option is selected, whenever you click on an artifact in a web browser, Bamboo will present you its content with MIME type set according to the artifact's file extension. Opening HTML files in this way, however, could lead to potential XSS attacks. For that reason, starting from version 6.8, the `Resolve artifacts content type by extensions` option is disabled by default. If you wish to enable this option, go to

> Overview > Security settings.

**Deprecation of JGit**

Starting from version 6.8, JGit is deprecated in Bamboo.

**Application Link incompatibilities with Bitbucket versions older than 4.11**

Due to some changes we made, Bamboo 6.8 is not compatible with versions of Bitbucket older than 4.11. This means Bitbucket < 4.11 will not automatically trigger builds or automatically create branches in Bamboo 6.8 due to the bug: `BSERV-8809` - Bitbucket Server does not trigger Bamboo on new commit

---

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Anonymous users remote repository trigger and Bamboo Specs detection disabled by default

Both remote repository trigger and Bamboo Specs detection and by default disabled for anonymous users in Bamboo 6.7. Access to these by anonymous users is necessary e.g. for using webhooks. To enable it, go to

> Overview > Security settings.

When enabled, Bamboo ignores permissions settings for anonymous user access to those REST endpoints but keep restriction on other REST resources.

PostgreSQL 9.2 and 9.3 deprecated

Starting from version 6.7, Bamboo deprecates PostgreSQL 9.2 and 9.3. Support for these versions will end in an upcoming release.

Upgrade time

Bamboo 6.7 contains upgrade tasks for changes to the audit log table which can impact the upgrade time. The upgrade time can differ depending on the size of your audit log so plan some extra time when upgrading.

For reference, during our test, an audit log table with 6,5 records in PostgreSQL took 3 extra minutes of upgrade time.

Upgrading to Bamboo 6.6...

New upgrade threshold

We've made some changes to the possible Bamboo upgrade paths. To figure our the best way to upgrade your Bamboo to the latest version, see the upgrade path.

Heroku plugin not supported

Heroku's API changes rendered the Heroku plugin for Bamboo non-functional and we no longer deploy it with Bamboo. Check this DevCenter article on WAR Deployment for recommended alternatives.

See also:

- the general update steps section above.
- Bamboo 6.5 Release Notes
- the Bamboo Supported platforms page.

Upgrading to Bamboo 6.5...

See:

- the general update steps section above.
- the Bamboo Supported platforms page.

Upgrading to Bamboo 6.4...

Hung Build Killer added to the app blacklist

Bamboo 6.4 is shipped with a native mechanism for monitoring builds. For that reason, the Hung Build Killer plugins becomes deprecated. See Apps blacklist.

See also:

- the general update steps section above.
- the Bamboo Supported platforms page.

**Upgrading to Bamboo 6.3...**

*Change to the built-in database*

Starting with Bamboo 6.3, the built-in HSQL database is replaced by H2. If you store any data in HSQL and want to keep it after the upgrade, you must export the data to XML and import back after you've installed the new version of Bamboo. See:

- Exporting data for backup
- Importing data from backup

The H2 database is fine for evaluation purposes but is somewhat susceptible to data loss during system crashes. For production environments we recommend that you configure Bamboo to use an external database.

See also:

- the general update steps section above.
- the Bamboo Supported platforms page.

**Upgrading to Bamboo 6.2...**

See also:

- the general update steps section above.
- Bamboo 6.1 Release Notes
- the Bamboo Supported platforms page.

You might also want to check our Bamboo Specs reference documentation.

**Upgrading to Bamboo 6.1...**

See also:

- the general update steps section above.
- the Bamboo Supported platforms page.

You might also want to check our Bamboo Specs reference documentation.

**Upgrading to Bamboo 6.0...**

*Microsoft JDBC driver*

With Bamboo 6.0, SQL Server jTDS driver is replaced with the official Microsoft JDBC driver.

If database settings are configured directory in Bamboo, then during 6.0 upgrade it will attempt to update driver settings. In case of customized settings Bamboo instance administrator will be required to manually convert the settings.

To learn more about this change, see here.

*New library for setting up a JNDI resource for SMTP*

Bamboo 6.0 is shipped with the javax.mail-api-1.5.6.jar library. This library needs to copied over to your <Bamboo-install>/lib folder when setting up a JNDI resource for SMTP. For more information, see here.

*Changes to Git support*

Starting from version 6.0, Bamboo changes support for Git to version 1.8.1.5 or later.
Upgrading to Bamboo 5.15...

Bamboo 5.15 contains upgrade tasks that can take extra time when moving from earlier versions of Bamboo. Keep this in mind when planning your upgrade outages.

Older versions of Bamboo...

Upgrading to Bamboo 5.14...

New API for VCS repositories

We've rebuilt the repository subsystem, added new plugin points, and introduced new web repository viewers.

Action required

Before you upgrade to Bamboo 5.14, check for potential plugin incompatibilities, especially if you're using any plugins that aren't officially supported by Atlassian (third-party plugins, plugins developed in-house, or plugins marked as unsupported on Atlassian Marketplace).

We strongly recommend reporting compatibility issues to the plugin vendor and Atlassian Support.

For details about the API changes, see our developer documentation.

Changes in requirements for table names of the external databases

With Bamboo 5.14, we're dropping the lowercase table names requirement for the external database configuration introduced in Bamboo 5.13. For more information, see:

- Upgrading to Bamboo 5.13 below
- MySQL
- Bamboo 5.13 Release Notes

See also

- the general update steps section above.
- Bamboo 5.14 Release Notes
- the Bamboo Supported platforms page.

You might also want to check our developer documentation.

Upgrading to Bamboo 5.13...

Bamboo 5.13 introduces stricter verification of the external database configurations which prevents both upgrade and application start:

<table>
<thead>
<tr>
<th>Microsoft SQL Server</th>
<th>The check ensures that the tables in the Bamboo database have correct collation and correct commit isolation, see Microsoft SQL Server.</th>
</tr>
</thead>
<tbody>
<tr>
<td>All DBs except SQL Server</td>
<td>The check ensures that the database engine is correctly configured to be case-insensitive. Make sure your specific database is configured correctly according to Connecting Bamboo to an external database. For MySQL specifically, this might affect all databases in the instance, see MySQL documentation.</td>
</tr>
</tbody>
</table>

If the check fails

If the check fails and you can't correct your database configuration immediately, you can roll back to the previous installed version of Bamboo without changing anything in your database or home directory configuration.

See also:

- the general update steps section above.
- the Bamboo Supported platforms page.
You might also want to check our developer documentation.

**Upgrading to Bamboo 5.12...**
See:
- the general update steps section above.
- the Bamboo Supported platforms page.

You might also want to check our developer documentation.

**Upgrading to Bamboo 5.11...**
See:
- the general update steps section above.
- Bamboo 5.11 Release Notes.
- the Bamboo Supported platforms page.

You might also want to check our developer documentation.

Remember that remote agents must be restarted after the upgrade.

**Upgrading to Bamboo 5.10...**
Upgrading to Bamboo 5.10
See:
- the general update steps section above.
- Bamboo 5.10 Release Notes.
- the Bamboo Supported platforms page.

You might also want to check our developer documentation.

Remember that remote agents must be restarted after the upgrade.

**Upgrading to Bamboo 5.9...**

*Changes to Clover Plugin integration*

Automatic Clover integration for Maven 2 and Maven 3 tasks has been changed. It has tighter integration and adds Clover goals between goals from an original command so that a build will be performed only once (i.e. it will not run a separate build phase as it did before). Automatic Clover integration will not happen when your Maven task contains the `install` or `deploy` commands; this is to protect your repositories from being polluted by instrumented code. Therefore, please check if any of your Maven tasks that use automatic Clover integration use the `install` or `deploy` Maven commands. If they do: either disable automatic Clover integration for those jobs, or change the phase to the `verify` command (or earlier) or set up a dedicated job for Clover. Otherwise, your jobs will not produce Clover's coverage reports.

See also:
- the general update steps section above.
- the Bamboo 5.9 Release Notes.
- the Bamboo Supported platforms page.

**Upgrading to Bamboo 5.8...**

*Hibernate dialect update*

When you upgrade to Bamboo 5.8, an upgrade task will run that changes the Hibernate dialect in the `bamboo.cfg.xml` file. The new dialects are:
org.hibernate.dialect.PostgreSQLDialect
org.hibernate.dialect.HSQLDialect
org.hibernate.dialect.Oracle10gDialect
org.hibernate.dialect.MySQL5Dialect
com.atlassian.bamboo.hibernate.SQLServerIntlDialect

See also:
- the general update steps section above.
- the Bamboo 5.8 Release Notes.
- the Bamboo Supported platforms page.

If you are upgrading from Bamboo versions earlier than Bamboo 4.0, you must upgrade to any of Bamboo 5.0–5.7 before upgrading to Bamboo 5.8.

**Upgrading to Bamboo 5.7...**

*Global deployment expiry*

If you are updating to Bamboo 5.7 from 5.6 or earlier and you were previously using build expiry then the Global expiry page in Bamboo looks and works the same as it does in 5.6. In other words you are able to expire builds but not deployments. There is an option to enable deployment expiry however and selecting this option enables the new expiry features introduced in Bamboo 5.7.

Note that this may mean that deployment artifacts and deployment result logs that were previously not being removed will start to be removed. Most likely this is what you want but it's important to be aware of this change.

Note also that enabling deployment expiry is not reversible. If you enable deployment expiry you will be unable to go back to the legacy Bamboo 5.6 behavior. The legacy Bamboo 5.6 behavior for expiry is deprecated and will be removed in a future release.

Read more about global expiry in Bamboo 5.7.

See also:
- the general update steps section above.
- the Bamboo 5.7 Release Notes.
- the Bamboo Supported platforms page.

**Upgrading to Bamboo 5.6...**

*Bitbucket Server notifications and the Bitbucket Server web repository type are deprecated*

Bitbucket Server notifications and the legacy Bitbucket Server web repository type are deprecated in Bamboo 5.6, and will be removed in Bamboo 5.7. Use the Bitbucket Server repository integration available in Bamboo 5.6, which is based on application links, to replace that functionality. Read about using Bitbucket Server repositories with Bamboo on Bitbucket Server.

*Update time*

When scheduling the outage window for the Bamboo 5.6 update, keep in mind that update task 4407 that is executed during the update may take up to 45 minutes to complete on large instances, depending on the size of the VARIABLE_CONTEXT table. For a more precise calculation, assume that 10 minutes are needed to process 15 million records in that table.

*Installer package on MAC OS X can not be opened due to code signing requirements*

Note, this issue was found in Bamboo 5.4 and still applies to Bamboo 5.6.

Previously, Mac OS X required binaries to be Developer ID signed in order to run out of the box. Without signing, users would receive a warning that the app isn’t from the App Store or a registered Apple Developer. Users were able to apply a work-around to solve this problem.

The latest version of Mac OS X (10.8 and above), however, now reports that the Bamboo installer for Mac is corrupted rather than being blocked by developer ID.
1. The Mac installer will not be available until this has been resolved
2. There is a temporary work-around available here.

This is a small bug with our installer. Please be assured that we are working on a permanent solution to this issue.

See also:

- the general update steps section above.
- the Bamboo 5.6 Release Notes.
- the Bamboo Supported platforms page.

**Upgrading to Bamboo 5.5...**

- We recommend that you add OAuth authentication (in addition to existing authentication) to any existing application links between your Bamboo and Bitbucket servers. If you have previously integrated Bamboo with Bitbucket Server, you will probably have Basic HTTP authentication configured for your link. The new Bitbucket repository type will work with Basic HTTP, but OAuth is a better as it is an impersonating authentication type. For more information, see Configuring authentication for an application link.
- Git will use `--ancestry-path` when trying to extract changeset due to

  **BAM-13760** - Too many notifications for release -> feature merge in Git plan branches

  RESOLVED

Since that command is available for Git 1.7.2 and above (see Release Notes), please update your native Git, if you have Git 1.7.1 installed (especially those who use RHEL 6 or CentOS).

See also:

- the general update steps section above.
- the Bamboo 5.5 release notes.
- the Bamboo Supported platforms page.

**Upgrading to Bamboo 5.4...**

Note that Bamboo will run a full reindex after updating.

*Installer package on MAC OS X can not be opened due to code signing requirements*

Previously, Mac OS X required binaries to be Developer ID signed to run out of the box. Without signing, users would receive a warning that the app isn't from the App Store or a registered Apple Developer. Users were able to apply a work-around to solve this problem.

The latest version of Mac OS X (10.8 and above), however, now report that the Bamboo installer for Mac is corrupted rather than being blocked by developer ID.

Please see

**BAM-11742** - Installer package is "damaged and cannot be reopened" on Mac OS X

RESOLVED

for more information.

1. The Mac installer will not be available until this has been resolved
2. There is a temporary work-around solution available here.

This is a small bug with our installer, please rest assured that we are working on a permanent solution to this issue.

See also:

- the general update steps section above.
- the Bamboo 5.4 release notes.
- the Bamboo Supported platforms page.
Troubleshooting

If you followed the documentation and you still have problems with the upgrade process:

- Check the How to Upgrade/Migrate Bamboo article in the Bamboo Knowledge Base.
- Check other Knowledge Base articles.
- You can also create a support ticket. To help us address the issue, attach the atlassian-bamboo.log file to the ticket.

IPv6 in Bamboo

Starting from Bamboo 6.7, we’re supporting communication over IPv6. We’ve taken the dual-stack approach (IPv4 + IPv6), so IPv4 addresses will still work. If your systems are IPv6-only, make sure you read about the limitations below.

What is IPv6?

IPv6 stands for “Internet Protocol Version 6”, and is the next-generation Internet protocol designed to replace the current IPv4 protocol. The Internet Engineering Task Force (IETF) created IPv6 standard described in RFC 8200 to accommodate the growing number of users and devices accessing the Internet.

IPv6 addresses are 128 bits, which allows for approx. \(3.4 \times 10^{38}\) unique IP addresses. Here’s an example of an IPv6 address:

```
2401:1d80:ffff:1:202:02ff:fe07:0305
```

Best practices

We recommend that you use hostnames or domain names instead of IP addresses everywhere in the Bamboo configuration. It’s a more reliable way of configuring and accessing both Bamboo and other Atlassian products.

Limitations

General...

These limitations apply if your systems use only IPv6 instead of dual-stack:

- You won’t be able to connect to Atlassian Marketplace, as it requires IPv4.
- End of Life check won’t work, because it needs to connect to Atlassian Marketplace.
- You won’t be able to integrate with Atlassian Cloud products, as they require IPv4.
- Log Analyzer won’t work, as it requires IPv4.
- When configuring LDAP, use hostnames, not IPv6 addresses. Otherwise, you’ll get a validation error.
- Bamboo requires running using with `java.net.preferIPv6Addresses` sys property set to true, to operate normally in IPv6 environment.

AWS...

There are no IPv6 endpoints for EC2, the only service that we use that has IPv6 endpoints is S3.

Agents...

- Remote agents: tested in both IPv4 and IPv6 set ups.
- Remote agents authentication:
  - In case of IPv4 it is possible to use wildcards, e.g. 192.168.50.*
  - In case of IPv6 Use CIDR instead of wildcards: 2a05:d014:f7d:801:14a4:dec3::/32
- Elastic agents: required IPv4 as there are no IPv6 endpoints for EC2.

RSS...

RSS requires dual stack IPv4/IPv6 set up to work properly in both Docker and without Docker modes. RSS is not supported in IPv6 pure set up.

Docker...
- Requires dual stack (IPv4/IPv6) set up on host.
- Tested with Docker version: 18.03.1-ce.

**NPM task...**
- Requires dual stack (IPv4/IPv6) set up on host.
- Tested with npm version: 5.6.0, node version: 8.11.3

**IM notifications...**
- Tested with Openfire 4.2.3

**Databases connectivity...**
- Oracle: tested with Oracle 12c
- MS SQL: tested with MS SQL 2016 Standard edition.
- PostgreSQL: tested with Postgres 9.6.9 and 10.4
- MySQL: tested with JDBC Driver mysql-connector-java-8.0.11.jar and mysql-connector-java-5.1.46.jar, MySQL 5.7.2

**Repositories connectivity...**
- Github: doesn’t support IPv6.
- SVN: tested with: SVNKit 1.8.15, SVN server - SVN 1.9.7, SVN server required the svnservice daemon to be run with -6 option (--prefer-ipv6).
- Mercurial: tested SSH and HTTPS with Hg 4.2.3.
- Git: tested SSH/HTTPS/GIT protocols with git version 2.14.4
- Bitbucket Server: Required setting system property `-Djava.net.preferIPv6Addresses=true`, webhooks don’t work over pure IPv6 setup.
- Bitbucket Cloud: Required setting system property `-Djava.net.preferIPv6Addresses=true`, webhooks don’t work over pure IPv6 setup.

**Integrations with other products...**
- Bitbucket Server: supported since version 5.8
- FeCru: tested with version 4.5.4
- Jira: tested with Jira Software 7.11.0
- Confluence: tested with Confluence 6.10.1
- Crowd: tested with Crowd 3.2.3

**Windows...**
Bamboo doesn’t expose port for IPv6 out of the box. To enable this, in the `server.xml` file, change:

```
<Connector/>'s attribute protocol="HTTP/1.1"
to
```

---

**End of support announcements for Bamboo**

This page announces the end of support for various platforms and browsers used with Atlassian Bamboo.

---

**Why is Atlassian ending support for these platforms?**
Atlassian is committed to delivering improvements and bug fixes as fast as possible. We are also committed to providing world class support for all the platforms our customers run our software on. However, as new versions of databases, web browsers etc. are released, the cost of supporting multiple platforms grows exponentially, making it harder to provide the level of support our customers have come to expect from us. Therefore, we no longer support platform versions marked as end-of-life by the vendor, or very old versions that are no longer widely used.

<table>
<thead>
<tr>
<th>Platform</th>
<th>Announcement date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bitbucket Cloud REST API 1.0</td>
<td>April 2019</td>
<td>The deprecation of Bitbucket Cloud REST API with Bamboo 6.8 release.</td>
</tr>
<tr>
<td>Deprecation of jGit</td>
<td>January 2018</td>
<td>The deprecation of the JGit with Bamboo 6.8 release.</td>
</tr>
<tr>
<td>End of support for Oracle 11g</td>
<td>18 May 2016</td>
<td>The end of support for Oracle 11g databases with the upcoming release of Bamboo Server 5.12.</td>
</tr>
<tr>
<td>End of support for MySQL 5.5</td>
<td>18 May 2016</td>
<td>The end of support for MySQL 5.5 with the upcoming release of Bamboo Server 5.12.</td>
</tr>
<tr>
<td>Deprecation of PostgreSQL 9.0 and 9.1</td>
<td>16 May 2016</td>
<td>The deprecation of PostgreSQL 9.0 and 9.1 with the upcoming release of Bamboo Server 5.12.</td>
</tr>
<tr>
<td>End of support for PostgreSQL 8</td>
<td>13 April 2016</td>
<td>The end of support for PostgreSQL 8 with the upcoming release of Bamboo Server 5.11.</td>
</tr>
<tr>
<td>End of support for Microsoft SQL Server 2005 and 2008</td>
<td>13 April 2016</td>
<td>The end of support for Microsoft SQL Server 2005 and 2008 with the upcoming release of Bamboo Server 5.11.</td>
</tr>
<tr>
<td>Deprecation of Oracle 11g</td>
<td>13 April 2016</td>
<td>The deprecation of the Oracle 11g database with the upcoming release of Bamboo Server 5.11.</td>
</tr>
<tr>
<td>End of support for Windows 2008 and Amazon Linux 32bit stock images</td>
<td></td>
<td>The end of support for Windows 2008 and Amazon Linux 32bit images in Bamboo Server with the upcoming release of Bamboo 5.10. We will provide the last refreshed version of these images with Bamboo 5.10.0. After 5.10.0, the images will continue to be available on upgraded instances, but will not be shown anymore on new installations. Note that the 32bit variant of Amazon Linux has been abandoned by Amazon in 2014 and no longer receives security fixes.</td>
</tr>
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<td>End of support for MySQL 5.1</td>
<td></td>
<td>The end of support for MySQL 5.1 in Bamboo Server with the upcoming release of Bamboo 5.10.</td>
</tr>
<tr>
<td>End of support for Internet Explorer 9 and 10</td>
<td></td>
<td>The end of support for Internet Explorer 9 and 10 in Bamboo Server with the upcoming release of Bamboo 5.10.</td>
</tr>
<tr>
<td>Topic</td>
<td>Date</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>--------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| End of support for JDK 6 and 7                                       | 26 October 2015 | We’re announcing the end of support for JDK 6 and 7 in Bamboo Server with the upcoming release of Bamboo 5.10. It means that agents, custom images, and Bamboo itself won’t run against a JDK less than 8. We highly recommend upgrading to the latest version of JDK 8 as soon as you upgrade to Bamboo 5.10 to avoid any issues with existing agents or custom images. The stock images are upgraded automatically. **Note:** Atlassian doesn’t provide support for customized images. Bamboo provides flexibility to use customized machine images, but it’s impossible for us to support all individual configurations. **Tips:**  
  - Try to match the layout and scripts of our stock images as closely as possible.  
  - Choose Oracle if you have the choice between Oracle and OpenJDK flavor of JDK.  

**Related links:**  
- Bamboo supported platforms  
- Managing your elastic images  
- Managing your elastic agents  
- Latest Oracle JDK 8 download |
<p>| Deprecation of Windows 2008 images                                   | 16 October 2015 | The deprecation of support for Windows 2008 images. After 5.1 s0.0, the images will continue to be available on upgraded instances, but will not be shown anymore on new installations. |
| Deprecation of Amazon Linux 32bit images                             | 16 October 2015 | The deprecation of support for 32bit Amazon Linux images. We will provide the last refreshed version of these images with Bamboo 5.10.0. After 5.10.0, the images will continue to be available on upgraded instances, but will not be shown anymore on new installations. Note that the 32bit variant of Amazon Linux has been abandoned by Amazon in 2014 and no longer receives security fixes. |</p>
<table>
<thead>
<tr>
<th>Deprecation of PostgreSQL 8</th>
<th>17 March 2015</th>
<th>The deprecation of support for PostgreSQL 8 in Bamboo. PostgreSQL 8 will no longer be supported in a future release of Bamboo.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server 2005 and 2008</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deprecation of MySQL 5.1</td>
<td>17 March 2015</td>
<td>The deprecation of support for MySQL 5.1 in Bamboo. MySQL 5.1 will no longer be supported in a future release of Bamboo.</td>
</tr>
<tr>
<td>Deprecation of Java 7</td>
<td>17 March 2015</td>
<td>The deprecation of support for Java 7 in Bamboo. Java 7 will no longer be supported in a future release of Bamboo.</td>
</tr>
<tr>
<td>Deprecation of Java 6</td>
<td>11 November 2014</td>
<td>The deprecation of support for Java 6 in Bamboo. Java 6 will no longer be supported in a future release of Bamboo.</td>
</tr>
<tr>
<td>Deprecation of Apache Tomcat 5.5</td>
<td>11 February 2014</td>
<td>In version 5.5, Bamboo will no longer support Apache Tomcat 5.5 and 6.0, and will only support Apache Tomcat 7.0 and above. Bamboo 5.5 is expected to be released later in 2014.</td>
</tr>
<tr>
<td>and 6.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deprecation of Internet Explorer</td>
<td>15 October 2013</td>
<td>In version 5.3, Bamboo will no longer support Internet Explorer 8, and will only support Internet Explorer 9 and above. Bamboo 5.3 is expected to be released later in 2013.</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deprecation of Maven Artifact</td>
<td>15 October 2013</td>
<td>In version 5.3, Bamboo will no longer support the Maven artifact sharing plugin. Bamboo 5.3 is expected to be released later in 2013.</td>
</tr>
<tr>
<td>Sharing plugin 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deprecated Databases for Bamboo</td>
<td>4 October 2011</td>
<td></td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------</td>
<td></td>
</tr>
</tbody>
</table>

This section announces the end of Atlassian support for certain database versions for Bamboo. End of support means that Atlassian will not fix bugs related to certain database versions past the support end date.

We will **stop supporting the following database versions** in Bamboo 3.4, from December 2011:

- MySQL 5.0
- Oracle 10g

The details are below. Please refer to the list of supported platforms for details of platform support for Bamboo. If you have questions or concerns regarding this announcement, please email eol-announcement at atlassian dot com.

**End of Life Announcement for Database Support**

<table>
<thead>
<tr>
<th>Database</th>
<th>Support End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>MySQL 5.0</td>
<td>When Bamboo 3.4 releases, after December 2011</td>
</tr>
<tr>
<td>Oracle 10g</td>
<td>When Bamboo 3.4 releases, after December 2011</td>
</tr>
</tbody>
</table>

- **Notes for MySQL 5.0 and Oracle 10g:**
  - Atlassian intends to end support for MySQL 5.0 and Oracle 10g in Bamboo 3.4. Bamboo 3.3 is the last version that will support MySQL 5.0 and Oracle 10g.
  - ‘Support End Date’ means that Bamboo 3.3 and previously released versions will continue to work with MySQL 5.0 and Oracle 10g. However, Atlassian will not fix bugs affecting MySQL 5.0 and Oracle 10g past the support end date.
  - Bamboo 3.4 will not be tested with MySQL 5.0 and Oracle 10g.

<table>
<thead>
<tr>
<th>Deprecated Java Platforms for</th>
<th>16 February 2011</th>
</tr>
</thead>
</table>
This section announces the end of Atlassian support for certain Java Platforms for Bamboo.

We will stop supporting the following Java Platforms:

- From Bamboo 3.1, due in the first half of 2011, support for Java Platform 5 (JDK/JRE 1.5) will end.

We are ending support for Java Platform 5, in line with Sun's Java SE Support Road Map (i.e. "End of Service Life" for Java Platform 5 dated October 30, 2009). We are committed to helping our customers understand this decision and assist them in updating to Java Platform 6, our supported Java Platform.

The details are below. Please refer to the Supported platforms for more details regarding platform support for Bamboo. If you have questions or concerns regarding this announcement, please email eol-announcement at atlassian dot com.

---

**End of Life Announcement for Java Platform Support**

<table>
<thead>
<tr>
<th>Java Platform</th>
<th>Support End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Java Platform 5 (JDK/JRE 1.5)</td>
<td>When Bamboo 3.1 releases, due in the first half of 2011</td>
</tr>
</tbody>
</table>
Java Platform 5 End of Support Notes:
- ‘Support End Date’ means that Bamboo 3.0.x and previous released versions will continue to work with Java Platform 5 (JDK/JRE 1.5), however we will not fix bugs related to Java Platform 5 past the support end date.
- Bamboo 3.1 will only be tested with and support Java Platform 6 (JDK/JRE 1.6).
- If you have concerns with this end of support announcement, please email eol-announcement at atlassian dot com.
### Deprecated Web Browsers for Bamboo

<table>
<thead>
<tr>
<th>Support End Date</th>
<th>Web Browser</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 2011</td>
<td>Microsoft Internet Explorer 7 (IE7)</td>
</tr>
</tbody>
</table>

This section announces the end of Atlassian support for certain web browser versions for Bamboo. End of support means that Atlassian will not fix bugs related to certain web browser versions past the support end date.

We will stop supporting the following web browser versions from Bamboo 3.0, due February 2011:

- Microsoft Internet Explorer 7 (IE7)

The details are below. Please refer to the list of supported platforms for details of platform support for Bamboo. If you have questions or concerns regarding this announcement, please email eol-announcement at atlassian dot com.

### End of Life Announcement for Web Browser Support

<table>
<thead>
<tr>
<th>Web Browser</th>
<th>Support End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft Internet Explorer (version 7 only)</td>
<td>When Bamboo 3.0 releases, due February 2011</td>
</tr>
</tbody>
</table>

- **Internet Explorer Notes:**
  - Atlassian intends to end support for IE7 in Bamboo 3.0. Bamboo 2.7 is the last version that will support IE7.
  - IE8 will still be supported.
  - 'Support End Date' means that Bamboo 2.7 and previously released versions will continue to work with IE7. However, we will not fix bugs affecting IE7 past the support end date.
  - Bamboo 3.0 will not be tested with IE7.

### Installing Bamboo on Linux

In this guide we’ll run you through installing Bamboo with an external database on Linux.
Other ways to install Bamboo:

- **Evaluation** - get your free trial up and running in no time.
- **Windows** – install Bamboo on a Windows server.

Before you begin

Before you install Bamboo, there are a few questions you need to answer.

Are you using a supported operating system?

Tell me more...

Check the [Supported platforms](#) page for the version of Bamboo you are installing. This will give you info on supported operating systems, databases and browsers.

**Good to know:**

- We only support Bamboo on x86 and 64 bit x86 derived hardware platforms.
- You will need permissions for both the Bamboo installation and home directories.

Is your JAVA_HOME variable set correctly?

Tell me more...

Before you install Bamboo, check that you’re running a supported Java version and that the `JAVA_HOME` environment variable is set correctly.

**Bamboo can only run with the JDK (not JRE).**

To check your Java version:

```
$ java -version
```

To check your `JAVA_HOME` variable is set correctly:

```
$ echo $JAVA_HOME
```

If you see a path to your Java installation directory, the `JAVA_HOME` environment variable has been set correctly. If a path is not returned you'll need to set your `JAVA_HOME` environment variable manually before installing Bamboo.

Create a dedicated user to run Bamboo.

Bamboo runs as the user it is invoked under and can potentially be abused.

Tell me more...

An example of how to create a dedicated user to run Bamboo in Linux:

```
$ sudo /usr/sbin/useradd --create-home --home-dir /usr/local/bamboo --shell /bin/bash bamboo
```
Install Bamboo

1. Download Bamboo

Download the file for your operating system - [https://www.atlassian.com/software/bamboo/download](https://www.atlassian.com/software/bamboo/download)

- tar.gz for MacOS or Linux distributions.
- zip for Windows.

2. Create the installation directory

   a) Extract the downloaded file to an install location.
   
   b) The path to the extracted directory is referred to as the `<Bamboo installation directory>` in these instructions.

3. Create the home directory

   Specify your Bamboo home directory, where your Bamboo data is stored, before you run Bamboo for the first time.

   a) Create your Bamboo home directory (without spaces in the name).

   **Note:** You should not create your Bamboo home directory inside the `<Bamboo installation directory>` — they should be entirely separate locations. If you do put the home directory in the `<Bamboo installation directory>` it will be overwritten, and lost, when Bamboo is upgraded.

   b) Open `<Bamboo installation directory>/atlassian-bamboo/WEB-INF/classes/bamboo-init.properties`

   c) Uncomment the `bamboo.home` line.

   d) Provide the absolute path absolute path to the bamboo-home directory.

   **Example:**

   `bamboo.home=/var/bamboo/bamboo-home`

4. Start Bamboo

   a) In the command line, change the directory to `<Bamboo installation directory>` and run the commands to start Bamboo:

   ```bash
   $ cd <Bamboo installation directory>
   $ ./bin/start-bamboo.sh
   ```

   b) After successfully starting Bamboo, you will find it online at [http://localhost:8085/](http://localhost:8085/)

5. Configure Bamboo

   You are starting Bamboo for the first time, so you will need to follow the Setup Wizard to configure Bamboo. See [Running the Setup Wizard](#).

Start using Bamboo

That's it! Your Bamboo site is accessible from a URL like this: [http://<computer_name_or_IP_address>:<port>](http://<computer_name_or_IP_address>:<port>)

If you want your Bamboo instance always running, check how to run Bamboo as a service.
Running into problems installing Bamboo?
If something is not working correctly after you have completed the steps above to install Bamboo, please check for known Bamboo issues and try troubleshooting your upgrade as described below:

- **Check for known issues.** Sometimes we find out about a problem with the latest version of Bamboo after we have released the software. In such cases we publish information about the known issues in the Bamboo Knowledge Base. Please check the known issues in the Bamboo Knowledge Base and follow the instructions to apply any necessary patches if necessary.

- **Did you encounter a problem during the Bamboo installation?** Please refer to the guide to troubleshooting upgrades in the Bamboo Knowledge Base.

- If you encounter a problem during the upgrade and cannot solve it, please create a support ticket and one of our support engineers will help you.

### Installing Bamboo on Mac OS X

In this guide we’ll run you through installing Bamboo with an external database on Mac OS X.

#### Before you begin

Before you install Bamboo, there are a few questions you need to answer.

Are you using a supported operating system?

- **Tell me more...**
  
  Check the Supported platforms page for the version of Bamboo you are installing. This will give you info on supported operating systems, databases and browsers.

**Good to know:**

- We only support Bamboo on x86 and 64 bit x86 derived hardware platforms.
You will need permissions for both the Bamboo installation and home directories.

Is your JAVA_HOME variable set correctly?

Tell me more...

Before you install Bamboo, check that you’re running a supported Java version and that the JAVA_HOME environment variable is set correctly.

**Bamboo can only run with the JDK (not JRE).**

To check your Java version:

```
java -version
```

To check your JAVA_HOME variable is set correctly:

```
echo $JAVA_HOME
```

If you see a path to your Java installation directory, the JAVA_HOME environment variable has been set correctly. If a path is not returned you’ll need to set your JAVA_HOME environment variable manually before installing Bamboo.

**Install Bamboo**

1. **Download Bamboo**

Download the file for your operating system - [https://www.atlassian.com/software/bamboo/download](https://www.atlassian.com/software/bamboo/download)

   - `tar.gz` for MacOS or Linux distributions.
   - `zip` for Windows.

2. **Create the installation directory**

   a) Extract the downloaded file to an install location.

   b) The path to the extracted directory is referred to as the `<Bamboo installation directory>` in these instructions.

3. **Specify your Bamboo home location**

   Specify your Bamboo home directory, where your Bamboo data is stored, before you run Bamboo for the first time.

   a) Create your Bamboo home directory (without spaces in the name).

   **Note:** You should not create your Bamboo home directory inside the `<Bamboo installation directory>` — they should be entirely separate locations. If you do put the home directory in the `<Bamboo installation directory>` it will be overwritten, and lost, when Bamboo is upgraded.

   b) Open `<Bamboo installation directory>/atlassian-bamboo/WEB-INF/classes/bamboo-init.properties`.

   c) Uncomment the `bamboo.home` line.

   d) Provide the absolute path to your home directory.

   **Example:**

   ```
   bamboo.home=/home/nathan/bamboo/bamboo-home
   ```

4. **Start Bamboo**
a) In the command line, change the directory to `<Bamboo installation directory>` and run the commands to start Bamboo:

   $ cd <Bamboo installation directory>
   $ ./bin/start-bamboo.sh

b) After successfully starting Bamboo, you will find it online at: http://localhost:8085/

5. Configure Bamboo

You are starting Bamboo for the first time, so you will need to follow the Setup Wizard to configure Bamboo. See [Running the Setup Wizard](#).

Start using Bamboo

That's it! Your Bamboo site is accessible from a URL like this:
http://<computer_name_or_IP_address>:<port>

If you want your Bamboo instance always running, check how to [run Bamboo as a service](#).

Troubleshooting

- **Running into problems installing Bamboo?**
  If something is not working correctly after you have completed the steps above to install Bamboo, please check for known Bamboo issues and try troubleshooting your upgrade as described below:

  - **Check for known issues.** Sometimes we find out about a problem with the latest version of Bamboo after we have released the software. In such cases we publish information about the known issues in the Bamboo Knowledge Base. Please check the [known issues](#) in the Bamboo Knowledge Base and follow the instructions to apply any necessary patches if necessary.

  - **Did you encounter a problem during the Bamboo installation?** Please refer to the guide to [troubleshooting upgrades](#) in the Bamboo Knowledge Base.

  - **If you encounter a problem during the upgrade and cannot solve it, please create a support ticket** and one of our support engineers will help you.

Installing Bamboo on Windows

In this guide we'll run you through installing Bamboo with an external database on Windows.
Before you begin

Before you install Bamboo, there are a few questions you need to answer.

Are you using a supported operating system?

Tell me more...

Check the Supported platforms page for the version of Bamboo you are installing. This will give you info on supported operating systems, databases and browsers.

Good to know:

- We only support Bamboo on x86 and 64 bit x86 derived hardware platforms.
- You will need permissions for both the Bamboo installation and home directories.

Is your JAVA_HOME variable set correctly?

Tell me more...

Before you install Bamboo, check that you're running a supported Java version and that the JAVA_HOME environment variable is set correctly.

Bamboo can only run with the JDK (not JRE).

To check your Java version:

```
java -version
```

To check your JAVA_HOME variable is set correctly:

```
echo %JAVA_HOME%
```

If you see a path to your Java installation directory, the JAVA_HOME environment variable has been set correctly. If a path is not returned you’ll need to set your JAVA_HOME environment variable manually before installing Bamboo.

Install Bamboo

1. Download Bamboo

Download Bamboo from the Atlassian download site. You can choose either the Windows Installer versions (.exe) or the ZIP Archive (.zip).

It is highly recommended to avoid placing the Bamboo home directory in any Windows security controlled directory, for example, C:\Program Files.

Installing using the Windows Installer

i. Launch the Bamboo Windows installer to begin the installation wizard.
ii. The installer requires you to specify two directories:

- **Destination directory**— This is the directory where Bamboo's application files will be installed. The default is:

  ```
  C:\Program Files\Bamboo
  ```

- **Bamboo home directory**— This is the directory where Bamboo will store its configuration data. If the directory you specify doesn't exist, Bamboo will create the directory when it launches. The default is:

  ```
  C:\Users\<current-user>\Bamboo-home
  ```

  Ensure that the Bamboo home directory is not located inside the `<Bamboo installation directory>`.

- **Installing using the Zip archive**

  i. Extract the files from the zip Archive to a `<Bamboo installation directory>` of your choice. By default, the root directory in your zip file is named "Bamboo".

  Warning: Some unzip programs cause errors
  Some archive-extract programs cause errors when unzipping the Bamboo archive file. We highly recommend that you use the free 7Zip archive-extract program (if in doubt, download the '32-bit .exe' version).

  ii. Set up your **Bamboo home directory** — this is the directory where Bamboo will store its root configuration data. To do this, edit the file named `bamboo-init.properties` in the `<Bamboo installation directory>/atlassian-bamboo/WEB-INF/classes/` directory. In this file, insert the property "bamboo.home", with an absolute path to your Bamboo home directory. Your file should look something like this:

  ```
  bamboo.home=C:/test/bamboo-home
  ```

  Alternatively, you can specify an environment variable 'BAMBOO_HOME' which specifies the absolute path to your Bamboo home directory. Bamboo will check if an environment variable is defined.

  iii. If you are going to use Bamboo remote agents, set the following in the `bamboo-init.properties` file in the `<Bamboo installation directory>/atlassian-bamboo/WEB-INF/classes` directory:

  ```
  bamboo.jms.broker.uri=tcp://localhost:54663
  ```

  Replace 'localhost' with the real host name or IP address of your Bamboo server.

  If port number 54663 is already in use, specify a different port number.

  2. Start Bamboo

  a) In the command line, change the directory to `<Bamboo installation directory>` and run the command to start Bamboo:

  ```
  $ cd <Bamboo installation directory>
  ```
$ bin\start-bamboo.bat

b) After successfully starting Bamboo, you will find it online at http://localhost:8085/

3. Configure Bamboo

You are starting Bamboo for the first time, so you will need to follow the Setup Wizard to configure Bamboo. See Running the Setup Wizard.

Start using Bamboo

That's it! Your Bamboo site is accessible from a URL like this:
http://<computer_name_or_IP_address>:<port>

If you want your Bamboo instance always running, check how to run Bamboo as a service.

Troubleshooting

Running into problems installing Bamboo?

If something is not working correctly after you have completed the steps above to install Bamboo, please check for known Bamboo issues and try troubleshooting your upgrade as described below:

- **Check for known issues.** Sometimes we find out about a problem with the latest version of Bamboo after we have released the software. In such cases we publish information about the known issues in the Bamboo Knowledge Base. Please check the known issues in the Bamboo Knowledge Base and follow the instructions to apply any necessary patches if necessary.

- **Did you encounter a problem during the Bamboo installation?** Please refer to the guide to troubleshooting upgrades in the Bamboo Knowledge Base.

- If you encounter a problem during the upgrade and cannot solve it, please create a support ticket and one of our support engineers will help you.

Running the Setup Wizard

When you launch Bamboo for the first time, the Bamboo setup wizard will display. The wizard will lead you through the Bamboo settings that you need to configure before you can start using it.

**Before you begin**

If you are currently using Atlassian's Crowd with Bamboo and wish to import existing data into Bamboo (see Step 5. Starting Data below), you will need to disable Crowd before starting the Setup Wizard. To do this, go to Administration > User Repositories (under 'Security') and choose Local users and groups.
Step 1. License Details and Setup Method

You must have a valid Bamboo license (evaluation or commercial) to use Bamboo. You can generate your own Bamboo evaluation license from your MyAtlassian self-service account here.

Once you have entered a valid license key, you can choose which setup method you prefer for your Bamboo installation:

- **Express Installation** — use this method if you are evaluating or demonstrating Bamboo.
  - The 'Express Installation' method requires only a minimum of configuration information. It sets up Bamboo with default settings and an embedded database (H2).
  - If you choose the 'Express Installation' method you can skip to Step 6. Set Up Administrator User below.

- **Custom Installation** — use this method if you are setting up a production instance of Bamboo.
  - The 'Custom Installation' method takes longer, but allows you to configure Bamboo with an external database, customize the default settings, and/or initialize the server with your own data.
  - If you choose, the 'Custom Installation' method, proceed to Step 2. General Configuration below.

You can then re-enable Crowd and restart Bamboo at the completion of the Setup Wizard.
Step 2. General Configuration

ℹ️ This step applies to the 'Custom Installation' method only.

On this page you specify a number of Bamboo server settings, such as the address of the server, where data is stored and the message broker used to communicate with remote agents.

⚠️ You may find it simplest to keep the default settings for the three directory settings, in the table. For more information please see Locating important directories and files.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>See Specifying Bamboo's Title</td>
</tr>
<tr>
<td>Base URL</td>
<td>See Specifying Bamboo's URL</td>
</tr>
<tr>
<td>Configuration Directory</td>
<td>The location for Bamboo configuration files.</td>
</tr>
<tr>
<td>Build Data Directory</td>
<td>The location for Bamboo project data files.</td>
</tr>
<tr>
<td>Build Working Directory</td>
<td>The location of project files checked out from source control.</td>
</tr>
</tbody>
</table>
| **Broker URL** | Only visible if you are permitted remote agents under your Bamboo license.  

The URL of the embedded messaging broker that Bamboo sets up to communicate with its remote build agents. This URL will be written to `bamboo.cfg.xml` as a property. You can update this file if you want to change your Broker URL.  

- Replace `localhost` with the real host name or IP address of your Bamboo server. You should not use `localhost` as the host name in the Broker URL, as remote agents are provided with the Broker URL on startup and use it to communicate to the server.  

- If port number 54663 is already in use, specify a different port number. |
| **Broker client URL** | The URL used by agents to connect to the broker. This URL will be written to `bamboo.cfg.xml` as a property. You can update this file if you want to change your Broker URL. The default includes an actual IP of the Bamboo server. Specify if the default IP is not reachable from the agents. |

**Screenshot: General Configuration**

![General Configuration](image)

- **What is the title of this Bamboo instance?**  
  Name: *Atlassian Bamboo*  
  The name of this Bamboo instance.  

- **What is the server's address?**  
  Base URL: *http://127.0.1.1:8085*  
  This is the basic URL of this installation of Bamboo. All links created (for emails etc) will be prefixed by this URL. For example "http://127.0.1.1:8085/*"  

- **System paths and directories**  
  - **Configuration directory**: `/home/nathan/Desktop/Bamboo51/atlassian-bamboo-5.1-m2/~/Desktop/bam/`  
    The configuration directory is where your settings for Bamboo will be stored. For example "C:\bamboo-home\xml\data\configuration".  
  
  - **Build data directory**: `/home/nathan/Desktop/Bamboo51/atlassian-bamboo-5.1-m2/~/Desktop/bam/`  
    The build data directory where Bamboo saves the build data such as results and artifacts. For example "C:\bamboo-home\xml\data\builds".  
  
  - **Build working directory**: `/home/nathan/Desktop/Bamboo51/atlassian-bamboo-5.1-m2/~/Desktop/bam/`  
    This is where the source code of your plans will be checked out. For example "C:\bamboo-home\xml\data\build-dir".  
  
  - **Artifacts directory**: `/home/nathan/Desktop/Bamboo51/atlassian-bamboo-5.1-m2/~/Desktop/bam/`  
    Where on the server will Bamboo store build artifacts.  

- **Remote agent communication**  
  Broker URL: `$tcp://0.0.0.0:54663?wireFormat.maxInactiveDuration=300000$`  
  The URL on which your messaging broker will be set up. The messaging broker is used for communication with Bamboo remote agents. Bamboo remote agents will also use this path to communicate back to this server.  

[Continue]
Step 3. Choose a Database Configuration

ℹ️ *This step applies to the 'Custom Installation' method only.*

Picking a database configuration is an important choice. If you pick the ‘Embedded Database’ configuration, you do not have to set up a database. However, the embedded H2 database is only suitable for evaluation purposes. You will need to move to an external database, if you decide to deploy Bamboo in production at a later stage (as described in Moving your Bamboo data to a different database).

Choose one of the following:

- **Embedded** — Choose this for quick and easy first-time installation of Bamboo. This option is suitable for evaluation purposes only. Skip to Step 5. Starting Data.

- **External** — Choose this if you wish to use an external database. Proceed to Step 4. Database Configuration below.

Screenshot: Choose a Database Configuration

Step 4. Database Configuration

ℹ️ *This step applies to the 'Custom Installation' method only.*

If you selected ‘External Database’ in Step 3, you will need to provide the configuration details for your database. Please see Connecting Bamboo to an external database for further instructions.

Screenshot: Database Configuration
Step 5. Starting Data

This step applies to the 'Custom Installation' method only.

Screenshot: Starting Data

On this page you specify how Bamboo will populate the 'home directory' that you set up when you installed Bamboo.

Choose one of the following:

- **Create new Bamboo home** — choose this if you are performing a normal installation or upgrade.
- **Import existing data** — only choose this under exceptional circumstances, e.g. if you are connecting Bamboo to a different database, or moving your pre-existing Bamboo installation to a different server. Avoid importing backups from different versions of Bamboo.

Step 6. Set Up Administrator User

The final step of the setup wizard is to enter the details of the first registered user for the Bamboo system. This user will have global administrative privileges over the entire installation of Bamboo and should not be removed.

Once you have entered the details for your administrator user, click **Finish**. The Bamboo dashboard will be displayed.

Congratulations, you have successfully set up Bamboo!

Screenshot: Set Up Administrator User
Bamboo remote agent installation guide

Before you begin
Before you begin installing remote agents, there are a few questions you need to answer.

Do you need to install a remote agent?
See Agents and capabilities to understand how remote agents interact with your Bamboo server.

Do you have sufficient agent licenses?
See Bamboo licensing for details.

Does your system meet the minimum requirements?
See Supported platforms.

Do you have a supported version of Java installed on the agent machine?
See Supported platforms.

Are you upgrading your version of Bamboo?
If yes, your remote-agents will be upgraded automatically along with Bamboo.

On this page:
Before you begin
1. Enable remote agent support
2. Download and install the remote agent
3. Launch the remote agent
4. Configure the remote agent's capabilities

Related pages:
- Configuring remote agent capabilities using bamboo-capabilities.properties
- Implementing a remote agent service wrapper
- Legacy remote agent installation guide
- Enabling creation of remote agents
- Specifying a Broker URL

Read more about enabling and disabling remote agent support here.

Note that you can run multiple Bamboo agents on the same machine – you just need to provide a separate home directory for each agent installation.

1. Enable remote agent support

   1. Click the
      icon in the Bamboo header and choose Overview.
   2. In the left-hand panel, under Build Resources, click Agents.
   3. Click either Enable Remote Agent Support or Disable Remote Agent Support.
2. Download and install the remote agent

1. Create a directory on the agent machine (e.g. bamboo-agent-home) to serve as the Bamboo agent home for the remote agent.
2. Click the icon in the Bamboo header and choose Overview.
3. In the left-hand panel, under Build Resource, click Agents in the left panel.
   The 'Agents' screen displays showing the lists of all local agents and all remote agents that currently exist on your Bamboo system.
4. If not already enabled, click the Enable remote agent support link
5. Click Install Remote Agent. The 'Installing a remote agent' screen will display
6. Click DOWNLOAD Remote Agent JAR and save the JAR file to the directory on the agent machine that you created above.
7. Copy the command under 'Running a Remote Agent' to the clipboard for use in Step 3 that follows.

3. Launch the remote agent

Once installed, run the remote agent by executing the command line obtained above. This command will look something like this:

```
java -jar atlassian-bamboo-agent-installer-X.X-SNAPSHOT.jar
http://bamboo-host-server:8085/bamboo/agentServer/
```

Where X.X represents your Bamboo version number.

If you are having issues launching the agent, then take a look at our troubleshooting guide.

The name of the jar file, for example, `atlassian-bamboo-agent-installer-5.4-SNAPSHOT.jar`, will vary depending on the version of Bamboo you are running.

You can run the remote agent with a number of additional command line parameters. Configuration options include remote agent data storage, capability detection and logging, suppression of self-signed certificate and running without the Remote Agent Supervisor or with different start-up commands.

See Additional remote agent options for more information.

4. Configure the remote agent’s capabilities

All remote agents feature a capability that can be defined. Examples include an executable, such as Maven, a JDK, a DVCS client or a custom capability. They typically define the path to an executable that has already been installed, and must be defined in Bamboo before Bamboo or its agents can make use of them.

Capabilities can be defined specifically for an agent, or shared between all local or all remote agents.

See Configuring capabilities for more on defining capabilities.

Configuring remote agent capabilities using bamboo-capabilities.properties

You can define the capabilities for a specific remote agent by using a configuration file on the agent machine. When the Bamboo agent starts up, it will look in the current runtime directory (i.e. `<bamboo-agent-home>/bin`) for a file named `bamboo-capabilities.properties`. The capabilities defined in that file will then be published for the Bamboo agent after registering.
We are aware of an issue that prevents a remote agent capability from being updated once it has been added using the `bamboo-capabilities.properties` file. If you choose to add capabilities with the `bamboo-capabilities.properties` file, you will only be able to update them by deleting the capability in Bamboo and restarting the remote agent. Please see [BAM-4213](#) for further details.

To configure remote agent capabilities:

1. Shut down the remote agent, if it is running.
2. Create a file named `bamboo-capabilities.properties` in the current runtime directory (i.e. `<bamboo-agent-home>/bin`) on the agent machine.
3. Edit the bamboo-capabilities.properties file to add capabilities. You need to use the formats shown below:
   
   **Notes:**
   - Use '" to escape spaces, periods and backslashes ('\').
   - All capabilities, other than custom capabilities, should start with 'system'.

### JDK capabilities

system.jdk.JDK\ <jdk number>\=<jdk location>

**Examples:**

```properties
system.jdk.JDK\ 1.6=/System/Library/Frameworks/JavaVM.framework/Versions/1.6
system.jdk.JDK\ 1.6=C:\Program Files\Java\jdk6.0.17
```

### Executable capabilities

system.builder.<executable type>.<executable label>=<executable path>

**Examples:**

```properties
system.builder.ant.Ant=/opt/apache-ant-1.7.1
system.builder.maven.Maven\ 1=/opt/maven-1.0.2
system.builder.mvn2.Maven\ 2=/opt/maven-2.0
system.builder.node.Node.js\ 0.12=/opt/node-0.12/bin/node
```

### Version control capabilities

system.<DVCS>.executable=<DVCS command location>

**Examples:**

```properties
system.git.executable=/usr/bin/git
system.hg.executable=/usr/bin/hg
```

### Perforce capabilities

system.p4Executable=<perforce executable location>

**Example:**

```properties
system.p4Executable=/usr/bin/p4
```

### Custom capabilities

<custom capability name>=<custom capability value>

**Example:**

```properties
system.os=osx
```

4. Save your changes to the bamboo-capabilities.properties file.
5. Start up your remote agent. The capabilities defined in the bamboo-capabilities.properties file will be configured for your agent.
Legacy remote agent installation guide

If you have implemented your own remote agent service wrapper or have problems with the service wrapper used by the remote agent supervisor in Bamboo, you can install the legacy remote agent (pre-Bamboo 2.2) which does not have a service wrapper.

Before you begin:
- Not sure whether to install a Remote Agent? See About Agents to understand how Remote Agents interact with your Bamboo server.
- Ensure that you have specified the Broker URL, as described in the Bamboo Setup Wizard.
- Do you have sufficient Agent licenses? See Bamboo licensing for details.
- Have you enabled the creation of Remote Agents, as described in Disabling and enabling remote agents support.
- Ensure that you have Java Runtime Environment 5.0 or later installed on the agent machine.

Step 1. Download and install the Legacy Remote Agent

1. Create a directory on the agent machine (e.g. bamboo-agent-home), to serve as the "Bamboo agent home" for the remote agent.
2. On your Bamboo server, click Administration in the top menu.
3. Click Agents in the left navigation panel. This will display the 'Agents' screen, showing lists of all Local Agents and all Remote Agents that currently exist in your Bamboo system.
4. Click Install Remote Agent. The 'Install Remote Agent' screen will be displayed.
5. Click bamboo-agent-.jar under the 'Running the agents without the service wrapper' section and save the JAR file to the directory you created in step 1.1.

Note that if you configure the capabilities of the remote agent using a bamboo-capabilities.properties file, that file should be located in the same directory as the JAR file (that is, bamboo-agent-home in the above instructions).

Step 2. Launch the Remote Agent

Once installed, you can run the remote agent by executing the command line obtained in the previous step. This command will look something like the following:

```
java -jar bamboo-agent-2.0-SNAPSHOT.jar
http://bamboo-host-server:8085/agentServer/
```

You may wish to configure the remote agent machine to start the Bamboo remote agent automatically when the machine boots. Please consult your operating system documentation for instructions on how to do this.

You can also choose to run the remote agent with different command line parameters, to change where the remote agent stores its data or suppress the self-signed certificate of the server.

Changing where the remote agent stores its data

By default, the remote agent will store its data in a directory called bamboo-agent-home. If you wish to specify a different directory, add the following command line parameter:

```
-Dbamboo.home=RemoteAgentHome
```

where RemoteAgentHome is the path to the Bamboo agent home directory you created in step 1.1. Your command line will look something like this:

Suppressing the self-signed certificate of the server

If your Bamboo server uses SSL (https) with a self-signed certificate, you will need to carry out one of the following two options:

- **Add the parameter** `-Dbamboo.agent.ignoreServerCertName=true` **to the remote agent's command line**, for example:
  ```
  java -Dbamboo.agent.ignoreServerCertName=true -jar bamboo-agent-2.0-SNAPSHOT.jar http://bamboo-host-server:8085/agentServer/
  ```

  Please be aware that this **reduces the security of your configuration**, as the identity of your Bamboo server will not be authenticated by the remote agent.

- **Use the keytool utility to add the self-signed certificate to the trusted certificates in your keystore**. This is a more secure option, but is complex to set up. For detailed instructions of how to do this, please refer to the relevant Oracle documentation.

Step 3. Configure the Remote Agent’s Capabilities

Please see Configuring capabilities.

**Bamboo installation guide**

1. Check the system requirements

**Supported platforms**

Please read the Supported platforms page before you install Bamboo. The Supported Platforms page lists the applications servers, databases, operating systems, web browsers and JDKs that we have tested Bamboo with and recommend.

Note that Bamboo ships with a built-in H2 database, which is fine for evaluation purposes but is somewhat susceptible to data loss during system crashes. For the production environment, we recommend that you configure Bamboo to use an **external database**.

**Hardware requirements**

While some of our customers run Bamboo on SPARC-based hardware, Atlassian only officially supports Bamboo running on x86 hardware and 64-bit derivatives of x86 hardware.

**Servlet container requirements**

You will need a servlet container that supports the Servlet 2.4 specification. Most modern containers should comply with this.

**Related pages:**

- Running the Setup Wizard
- Upgrade guide
- Bamboo remote agent installation guide
- 2019-04-25_11-57-52_Bamboo releases

2. Install and setup

Choose the relevant instructions for your operating system:

- Linux
- Mac
- Windows
3. Check for known issues and troubleshoot the Bamboo installation

If something is not working correctly after you have completed the steps above to install Bamboo, please check for known Bamboo issues and try troubleshooting your upgrade as described below:

- **Check for known issues.** Sometimes we find out about a problem with the latest version of Bamboo after we have released the software. In such cases we publish information about the known issues in the Bamboo Knowledge Base. Please check the known issues in the Bamboo Knowledge Base and follow the instructions to apply any necessary patches if necessary.

- **Did you encounter a problem during the Bamboo installation?** Please refer to the guide to troubleshooting upgrades in the Bamboo Knowledge Base.

- If you encounter a problem during the upgrade and cannot solve it, please create a support ticket and one of our support engineers will help you.

Running Bamboo as a service

You can configure Bamboo to start automatically on system startup, allowing it to recover automatically after a reboot.

**Running Bamboo as a Windows Service**

**Running Bamboo as a Windows service as the local user**

**Running Bamboo as a Linux service**

**Running Bamboo as a Windows Service**

Once you have installed Bamboo, you can choose to run Bamboo as service so that it starts up every time Windows restarts.

**Upgrading Bamboo server**

- If you have just upgraded your Bamboo server, you must re-install the Bamboo service. You can do this by removing the service and installing it again.

- If you run Bamboo as a Windows service, make sure that the user has 'Full Control' access to the following directories:
  - In version 5.1 or later: `<Bamboo_install_directory>/temp`
  - In version 5.15 or later: `<Bamboo_install_directory>/temp`
  - `<Bamboo_home_directory>/xml-data/configuration/cipher`

Procedure:

1. Click on the Start menu in Windows,
2. Select Bamboo from the programs list,
3. Click on Install Service option to install Bamboo as a service in Windows.
4. Click Start Service to start the service.
Running Bamboo as a Windows service as the local user

1. Install Bamboo Application Server
   1. Download Bamboo and run the Setup Wizard.
   2. Install Bamboo as Windows service, as described in Running Bamboo as a Windows service.

2. Edit the Bamboo service to run as the "local user"
   1. Go to Start -> Run and enter ‘services.msc’.
   2. The 'Services' window will display (see screenshot below). Double-click the 'Bamboo build server' row.

3. The 'Bamboo build server Properties' window will display (see screenshot above). Select the 'This account' option, provide a local admin account credentials, and click the 'OK' button to apply your changes.
3. Give the local user access to "logon as a service"

1. Go to Start -> Run and enter `secpol.msc`
2. The 'Local Security Settings' window will display. Expand the 'Local Policies' tree and click 'User Rights Assignment'.
3. Scroll down and find the 'Logon As a Service' Policy (see screenshot below). Double-click the 'Logon as a service' policy.

4. The properties window for the 'Log on as a service' policy will display (see screenshot below). Click the 'Add User or Group' button.
5. The 'Select Users or Groups' window will display (see screenshot above). Enter your local user and click 'OK' to allow your user to "logon as a service".

6. Click 'OK' and close all open windows.

Bamboo will now start as service, under the local user.

Running Bamboo as a Linux service

Linux system administration is outside the scope of Atlassian support. This page is provided for your information only.

On Linux/Solaris, the best practice is to install, configure and run each service (including Bamboo) as a dedicated user with only the permissions they require.

To install, configure and get Bamboo to start automatically on Linux/Solaris:

1. Create a bamboo user account which will be used to run Bamboo. For example, enter the following at a Linux console:

```bash
sudo useradd --create-home -c "Bamboo role account" bamboo
```

2. Create a directory into which Bamboo will be installed. For example:

```bash
sudo mkdir -p /opt/atlassian/bamboo
sudo chown bamboo: /opt/atlassian/bamboo
```

3. Log in as the bamboo user to install Bamboo:
4. You need to extract Bamboo:

```bash
sudo su - bamboo

cd /opt/atlassian/bamboo
tar zxvf /tmp/atlassian-bamboo-X.Y.tar.gz
ln -s atlassian-bamboo-X.Y/ current
```

5. Edit `current/atlassian-bamboo/WEB-INF/classes/bamboo-init.properties` and set `bamboo.home=/var/atlassian/application-data/bamboo` (or any other directory of your choice, but not the same as Bamboo's installation directory)

6. Proceed with the service configuration. There are two options included below for creating the service configuration, which one you will use will depend on your Linux distribution:

### Systemd Service Configuration

Suitable for modern distributions such as:

- Ubuntu 15
- CentOS 7
- RHEL 7

For anything older see the SysV Init Script section below.

Systemd will ignore environment variable definitions placed in `/etc/environment` as well as other traditional environment variable definitions from Sys-V init. If one needs to define environment variables when running Bamboo as a systemd unit then the variable definitions need to be placed in the unit file.

1. Create a `bamboo.service` file in your `/etc/systemd/system` directory

```ini
[Unit]
Description=Atlassian Bamboo
After=syslog.target network.target

[Service]
Type=forking
User=<bamboo-user>
ExecStart=<bamboo-install>/bin/start-bamboo.sh
ExecStop=<bamboo-install>/bin/stop-bamboo.sh
SuccessExitStatus=143

[Install]
WantedBy=multi-user.target
```

The values for `<bamboo-user>` and `<bamboo-install>` should be replaced with your Bamboo user and the path to your Bamboo Install directory, respectively.

2. Enable the service to start at boot time by running the following in a terminal:
3. Stop Bamboo using the provided Bamboo stop script (<bamboo-install>/bin/stop-bamboo.sh) and restart your system to check that Bamboo starts as expected.
4. Use the following commands to manage the service:

**Disable the service:**

```
systemctl disable bamboo.service
```

**Check that the service is set to start at boot time:**

```
if [ -f /etc/systemd/system/*wants/bamboo.service ]; then echo "On"; else echo "Off"; fi
```

**Manually start and stop the service:**

```
systemctl start bamboo
systemctl stop bamboo
```

**Check the status of Bamboo:**

```
systemctl status bamboo
```

**SysV Init Script**

1. As root, create the file `/etc/init.d/bamboo` (code shown below), which will be responsible for starting up bamboo after a reboot (or when manually invoked).

```bash
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1. As root, create the file `/etc/init.d/bamboo` (code shown below), which will be responsible for starting up bamboo after a reboot (or when manually invoked).
```
#!/bin/sh
set -e
### BEGIN INIT INFO
# Provides: bamboo
# Required-Start: $local_fs $remote_fs $network $time
# Required-Stop: $local_fs $remote_fs $network $time
# Should-Start: $syslog
# Should-Stop: $syslog
# Default-Start: 2 3 4 5
# Default-Stop: 0 1 6
# Short-Description: Atlassian Bamboo Server
### END INIT INFO
# INIT Script

# Define some variables
# Name of app (bamboo, Confluence, etc)
APP=bamboo
# Name of the user to run as
USER=bamboo
# Location of application's bin directory
BASE=/opt/atlassian/bamboo/current

case "$1" in
  start)
    echo "Starting $APP"
    /bin/su - $USER -c "export BAMBOO_HOME=${BAMBOO_HOME};
    $BASE/bin/startup.sh &> /dev/null"
    ;;
  stop)
    echo "Stopping $APP"
    /bin/su - $USER -c "$BASE/bin/shutdown.sh &> /dev/null"
    echo "$APP stopped successfully"
    ;;
  restart)
    $0 stop
    sleep 5
    $0 start
    ;;
  *)
    echo "Usage: /etc/init.d/$APP {start|restart|stop}"
    exit 1
    ;;
esac

exit 0

2. Make the init script executable:
3. Place symlinks in the run-level directories to start and stop this script automatically.
   a. For Debian-based systems:

   ```sh
   chmod a+x /etc/init.d/bamboo
   ```

   The following commands will be executed to place symlinks in the run-level directories:

   ```
   Adding system startup for /etc/init.d/bamboo ...
   /etc/rc0.d/K20bamboo -> ../init.d/bamboo
   /etc/rc1.d/K20bamboo -> ../init.d/bamboo
   /etc/rc2.d/S20bamboo -> ../init.d/bamboo
   /etc/rc3.d/S20bamboo -> ../init.d/bamboo
   /etc/rc4.d/S20bamboo -> ../init.d/bamboo
   /etc/rc5.d/S20bamboo -> ../init.d/bamboo
   ```

   b. For RedHat-based systems:

   ```sh
   sudo /sbin/chkconfig --add bamboo
   ```

4. Ensure the script is executed in the correct order, in particular after the database startup script.

   **Note:** If starting your new bamboo service fails immediately with an error, it may be that your /etc/init.d/bamboo script has had carriage return characters introduced into it. You can confirm this by running:

   ```sh
   cat -v /etc/init.d/bamboo
   ```

   If there are carriage return characters in your /etc/init.d/bamboo script, they will appear as `^M` in the output:

   ```
   #!/bin/sh
   set -e
   ### BEGIN INIT INFO
   # Provides: bamboo
   # Required-Start: $local_fs $remote_fs $network $time
   # Required-Stop: $local_fs $remote_fs $network $time
   # Should-Start: $syslog
   # Should-Stop: $syslog
   ```

   You can remove carriage return characters from /etc/init.d/bamboo with the following command:
Running Bamboo Server in AWS

There are no special prerequisites or configuration options required to run your server in AWS. If you're an experienced AWS user, you can set up your instance using the regular installation instructions.

You may also choose to use our Bamboo Server EC2 Wizard, which will get your Bamboo server up and running in AWS in less than 10 minutes.

Prerequisites

- Amazon Web Services account access (you will need AWS Access and Secret Key, with sufficient access rights to run an instance and perform some maintenance tasks)
- Bamboo EC2 Wizard binary (download from here, optionally verify the SHA256 checksum)
- Java JRE 8 (download from here)

Outcome

After the wizard finishes, it will provide you with a HTTPS link to a Bamboo Server instance set up on Linux Ubuntu 16.04 LTS and Postgres DBMS. All data will be located on a separate persistent EBS volume.

Running the wizard

To run the wizard, execute:

```
java -jar bamboo-server-ec2-wizard.jar
```

You can safely execute that command - the wizard provides extensive guidance and will not perform any actions without asking for your permission.

FAQ

- **Does Atlassian have access to my EC2 instance or manage it any way?**
  No, we do not. In terms of access, support, or management, the instance does not differ from regular instances in any way.
  The instance can only be accessed using the SSH key provided by you during the installation (or generated by the wizard, if you chose that option).

- **Can I restart my EC2 instance without data loss?**
  Yes, you can restart your instance – the Bamboo server is set up to automatically start up after a restart of the EC2 instance.

- **Can I stop my EC2 instance?**
  Yes, in case you temporarily don't need your instance, it can be stopped.

- **Can I shut down my EC2 instance?**
  Yes. The data volume will not be destroyed during shutdown. You will be able to reattach it to a new instance later. You can also decide to destroy the data volume if you no longer need the data.

- **How can I add more resources (memory, CPU, I/O) to my EC2 instance?**
  Shut down your EC2 instance (note: stopping is not enough) and re-run the wizard. It will detect the data volume and offer you the option to reattach it. You will be able to select a new instance type. Use Amazon...
documentation to find an instance type more appropriate for your Bamboo server traffic.

**How can I back up my Bamboo instance?**
In the root directory of data volume (/media/atlassian-data) there's a script called backupInstance.sh. You will need to provide credentials with permissions to create EBS snapshots.

**How can I upgrade Bamboo?**
Note: before upgrading, Atlassian recommends backing up your data.
In the root directory of data volume (/media/atlassian-data) there's a script called upgradeBamboo.sh. Run it and give it a version number (or "latest") as a parameter, eg:

```
upgradeBamboo.sh 5.14.1
```

or

```
upgradeBamboo.sh latest
```

The script will stop your server, download the new Bamboo version, and start the server again. No additional steps are required.

**I need shell access and I've lost my SSH key, how can I access the EC2 instance?**
You can't. Shut down the instance and re-run the wizard, it will give you the option to start a new server using existing data. Remember to choose a new key.

**I want to get rid of the privacy warning, what can I do?**
You need to install a valid certificate instead of the default self-signed one. The files you need to replace are under /etc/apache2/ssl/.

**What customisations are present on the EC2 instance after I run the wizard?**
Overview of changes done by the wizard:
- a couple of packages (DBMS, java, git etc.) are installed using the standard packaging system
- the DBMS data directory is redirected to the EBS mount
- Bamboo start/stop script is added to startup scripts
- Apache reverse proxy setup
- HTTPS certificate is generated

In general, the changes are not fragile, so you should be able to add your customisations without problems.

**Where do I request support/give feedback/report bugs?**
Use the regular communication channels - [http://support.atlassian.com](http://support.atlassian.com) for support, [http://answers.atlassian.com](http://answers.atlassian.com) for community support, [http://jira.atlassian.com](http://jira.atlassian.com) (project Bamboo) for feedback/bugs.

## Using Bamboo

Atlassian Bamboo is a continuous integration (CI) and continuous delivery (CD) server. Bamboo assists software development teams by providing:

- automated building and testing of software source-code status.
- updates on successful/failed builds.
- reporting tools for statistical analysis.
- visibility into, and control over, release artifacts and environments.

This section has information about using Bamboo. Please see [Administering Bamboo](#) for information about managing the Bamboo server itself.

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<th>Continuous integration</th>
<th>Continuous delivery</th>
<th>See also</th>
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<td>Getting started</td>
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Configuring plans

A plan defines everything about your continuous integration build process in Bamboo.

A plan:

- Has a single stage, by default, but can be used to group jobs into multiple stages.
- Processes a series of one or more stages that are run sequentially using the same repository.
- Specifies the default repository.
- Specifies how the build is triggered, and the triggering dependencies between the plan and other plans in the project.
- Specifies notifications of build results.
- Specifies who has permission to view and configure the plan and its jobs.
- Provides for the definition of plan variables.

Every plan belongs to a project.

Projects and plans can only be configured by Bamboo administrators (see Creating a plan).

On this page:

- Navigate to a plan's configuration
- Configure a plan
- Exporting plan configuration to Bamboo Specs

Navigate to a plan's configuration

Choose Build > All build plans from the Bamboo header, then click the edit icon (-pencil) for the plan you want to edit.

The plan's configuration is found on several tabs.

Configure a plan

1. Navigate to the plan's configuration pages as described above.
2. Click a tab to configure that aspect of your plan:

<table>
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<tr>
<th>Plan details</th>
<th>A plan’s Project Key and Plan Key are not editable once the plan is created, however see Moving plans to a different project.</th>
</tr>
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<tbody>
<tr>
<td>Stages</td>
<td>See Using stages in a plan.</td>
</tr>
</tbody>
</table>
Exporting plan configuration to Bamboo Specs

Bamboo instance administrators can export the plan configuration to Bamboo Specs in Plan configuration > Actions:

Viewing a plan's build information

A plan defines everything about your continuous integration build process in Bamboo.

To view information about a plan:

1. Navigate to the desired plan, as follows:
   - If you are viewing the Dashboard, locate and click the plan's name in the list, or
   - If you are viewing a job or build result, click the plan name in the breadcrumb links at the top of the screen.

2. Click a tab to view information about the plan:

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<th>Related pages:</th>
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<td>Using the Bamboo dashboard</td>
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<td>Viewing a build result</td>
</tr>
<tr>
<td>Configuring plans</td>
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<tr>
<td>Configuring a plan's permissions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tab</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan Summary</td>
<td>Information about the plan, as shown in the diagram below.</td>
</tr>
<tr>
<td>Branches</td>
<td>The branch plans for this plan.</td>
</tr>
</tbody>
</table>
Recent Failures | Information about recent failures of the plan, including the builds that failed, links to the build results, time taken to fix, etc.
---|---
History | The full history of builds of the plan.
Tests | A summary of the 10 most frequently broken tests.
Quarantined Tests | Failing test’s results that have been disconnected from the build results.
Issues | View the Jira issues linked to builds of your plan. *(You will only see this if your administrator has integrated Bamboo with Jira.)*

Use the **Actions** menu to access functions for the plan, such as **Disable Plan** and **Configure Plan**. *(This menu is only displayed if you are an administrator for the plan.)*

**Diagram: Plan Summary (annotated)***

1. **Navigation**: Click the project to view a summary of its plans.
2. **Tabs**: View further details for the plan.
3. **Current activity and recent history**: See whether the plan is building. Shows results for the ten most recent plan builds. Click a build number to view that build result.
4. **Run menu**: Choose options for running the plan, e.g., run a parameterised build.
5. **Plan status**: Icons show if the plan is building and the status of recent builds. Click an icon to see the build result.
6. **Actions menu**: E.g., Configure Plan or Disable Plan
7. **Statistics and charts**: For the build history of the plan.
8. **Plan branches**: A summary of all the branches for the plan.

**Creating a plan**

A plan defines everything about your build process, including what gets built, how the build is triggered and what jobs are executed.
This page describes how to:

- Create a new plan
- Clone an existing plan

Note, you need the **Create User** or **Admin** global permission to create or clone a plan.

### Create a new plan

1. In the top menu bar, click **Create > Create plan**.
2. Complete the build plan details on the Configure plan page.
3. Link repository to new build plan:
   - link previously used repository OR
   - link to a new repository...
     a. Select your code repository host.
     b. Give your repository a display name.
     c. Provide repository URL.
     d. Specify access to the repository. You may choose from:

   - **Allow all users to reuse the configuration of this repository**
     All user access. This is the default access setting.

   - **Only you are allowed to reuse the configuration of this repository**
     Limit access to just yourself.

   For more information about source code repositories in Bamboo, see Linking to source code repositories.

4. Click **Configure plan** and you are done.
   You can now configure the **tasks** and **jobs** required by your build plan.

### Clone an existing plan

When you clone an existing plan, you make a copy of that plan and its entire configuration, with the exception of any branches:

1. Click **Create > Clone an existing plan** in the top menu bar.
2. Use **Plan to clone** to select a plan. Only plans for which you have the 'Clone' and/or 'Admin' plan permission are shown.
3. Choose an existing project for the plan, or create a new project.
4. Enter details for the new plan.
5. Choose whether to enable this plan. Enabling the plan instructs Bamboo to start running builds of the plan, based on the plan's trigger configuration.
6. When you click **Create**, the 'Plan Summary' page for the new plan will be displayed. Bamboo will automatically run an initial build for your new plan.

### Using plan branches

Plan branches are used to represent a branch in your version control repository, with the plan branch using the same build configuration as your plan.

Tools such as Git and Mercurial encourage a practice called feature branching, where a developer can use a new branch to work in isolation from his or her team members before merging their changes back into main line development.

With plan branches in Bamboo:

- Any new branch created in the repository can be automatically built and tested using the same build configuration as that of the parent plan.
- Any branches deleted from the repository can be deleted automatically from Bamboo according to the settings.
- You have the flexibility to individually configure branch plans, by overriding the parent plan, if required.
- Optionally, changes from the feature branch can be automatically merged back to the "master" (e.g. trunk, default or mainline branch) when the build succeeds.
You can customize how Bamboo manages branches on the system, plan, and branch levels.

Further reading:
- Atlassian Git Tutorial
- Feature branches explained

On this page:
- Managing plan branches in Bamboo
  - Subversion branches location
  - Automatic branch management
  - Manual branch management
- Integrating branches with Jira applications
- Branch repositories
- Branch notifications
- Branch dependencies
- Branch details configuration
  - Trigger type
  - Merging
  - Notifications
  - Variables
- Automatic branch merging
  - Branch updater
  - Gatekeeper
- Limitations with plan branches
- Branches wallboard

Related pages:
- Disabling or deleting a plan
- Defining plan variables

Managing plan branches in Bamboo

You can create plan branches manually or automatically. The branch configuration can be provided on the plan level and customized on the branch level. The settings provided in the branch configuration override the settings provided for the plan.

Use the Branch status page for quick access to plan branch information.

You can access the list of all branches in a plan from different places. For example, you can click the Branch icon

next to the plan name in the Build Dashboard view:

You can also access the branch list from the Plan summary view:
Subversion branches location

This section is displayed only for plans that use a Subversion source repository. Bamboo assumes that your Subversion repository structure follows the convention for branches, and automatically calculates the branch root URL.

For example, for the fastBuild repo with this URL: https://svn.mycompany.com/svn/fastBuild/trunk, Bamboo will expect that branches will be created at this location: https://svn.mycompany.com/svn/fastBuild/branches.

If your Subversion repository structure follows a different convention, you can specify where repository branches will be created by selecting Change subversion branches URL.

Automatic branch management

Plan branches can be created and deleted automatically based on the updates in the primary source repository. Automatic branch management is available for Git, Mercurial, and Subversion. For other repository types, you can use manual branching. You can override the default settings for a branch, such as values of the variables.

By default, automatic branch management is:

- disabled for branches that you create manually
- enabled for branches that are created automatically

You can specify how often Bamboo checks the primary source repository for new or deleted branches in the general branch settings.

You can override the branch deletion settings in the branch details configuration view.

To hand over the branch management to Bamboo:

1. Go to the Plan Configuration view: in the Plan summary view, click the Actions button and select Configure plan
2. Click the **Branches** tab.
   a. Configure the following:

<table>
<thead>
<tr>
<th>Action</th>
<th>Primary source repository branches</th>
<th>Description</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create plan branch</td>
<td>Manually</td>
<td>Bamboo doesn't create new plan branches automatically. You can <strong>create branches manually</strong>.</td>
<td></td>
</tr>
<tr>
<td>When pull request is created</td>
<td></td>
<td>Bamboo creates a plan branch automatically when a new pull request is created. If a pull request is merged or declined, Bamboo will disable this plan branch. Note that this option is available for environment that provide support for pull requests. Currently, these are Bitbucket Server, and Bitbucket Cloud.</td>
<td></td>
</tr>
<tr>
<td>When new branch in repository is created</td>
<td></td>
<td>Bamboo creates a plan branch for each new branch detected in the primary source repository.</td>
<td></td>
</tr>
<tr>
<td>When new branch in repository is created and matches expression</td>
<td></td>
<td>Bamboo creates a plan branch for each new branch detected in the primary source repository that matches the regular expression that you provided.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Delete plan branch</th>
<th>After branch was deleted from repository</th>
<th>When a branch is deleted from the repository, Bamboo will wait for provided number of days before deleting the plan branch.</th>
<th>If you selected <strong>Clean up plan branch automatically</strong> in the configuration on the branch level, the branch is disabled and deleted according to the daily cleanup rules, regardless of the automatic branch management settings. <strong>Clean up plan branch automatically</strong> is selected by default for manually created &quot;Plan Branches&quot;.</th>
</tr>
</thead>
<tbody>
<tr>
<td>After branch inactivity in repository</td>
<td></td>
<td>When a branch is inactive for provided number of days, Bamboo will delete the plan branch. If a branch in the primary source repository is inactive, Bamboo does not automatically delete the corresponding plan branch.</td>
<td></td>
</tr>
</tbody>
</table>

3. Click **Save** at the bottom of the view to apply the changes.

**Global settings - branch detection interval**

Once plan branching is enabled, Bamboo checks for new or deleted branches in the primary source code.
You can specify how often Bamboo checks for new branches in the primary source repository in the system settings. The default value is 300 seconds.

To configure the branch detection interval:

1. Open the Bamboo Administration view by clicking the cog icon and selecting a section from the list that opens.
2. In the Bamboo Administration view, scroll down the menu on the left to find the System section.
3. Click General configuration.
4. In Global system configurations, set the branch detection interval. Provide the value in seconds, the default value is 300.

Manual branch management

Use manual branching for all supported repository types. You may want to consider using automatic branch management for Git, Mercurial and Subversion repositories.

To manually create a branch of a plan:

1. Go to the Plan Configuration view: in the Plan summary view, click the Actions button and select Configure plan.
2. Click the Branches tab.
3. Click Create plan branch in the upper right of the view.
4. In the Create plan branch view, you can create branches in one of the following ways:

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select from available VCS branches</td>
<td>Select one or more branches from the list of available VCS branches. At the bottom of the list of the branches you can select the Enable branches check box, which makes all selected branches available for building and change detection.</td>
</tr>
</tbody>
</table>
| Create plan branch manually     | Provide:

- a display name (required) - overrides the VCS branch name
- a branch description - a meaningful description of the branch
- VCS branch name - the name of the branch in the VCS repository

You can select the Enable branches check box, which makes the new branch available for building and change detection.

Click Auto-detect VCS branches to go back to the list of available VCS branches.

5. Click Save.

Integrating branches with Jira applications

Check Create Remote Links from Jira Issues to have the plan branch automatically linked, using an issue key in the branch name.

When a developer begins working on a feature described in a Jira application issue, they use Git or Mercurial to branch the repository. If they use the issue key as part of the VCS branch name, Bamboo will detect the issue key and automatically link the new branch to the issue:

- The Jira application issue key needs to be in the name of the branch – ‘jb-BDEV-790’ and ‘BDEV-7691’ are valid forms.
- The link shows up right under the breadcrumb on the Build Result Summary for the plan branch, and
on the issue too.

To use Jira applications Feature Branching, Bamboo needs an application link to the Jira application server.

Branch repositories

Once the plan branch is created, automatically or manually, all repositories defined in the plan inherit settings from the master plan by default. The only exception is the default repository, which uses one of the following branches:

- branch selected by you during the manual creation of the plan,
- branch detected in VCS in case of automatically created plan.

You can change settings of all repositories defined in the plan branch in the Repositories tab. In this tab, simply put a desired branch name or enable the Change repository settings for this branch plan toggle if you need to modify more settings.

In the Branch summary tab the Repository branches section gives you a quick overview of repositories and branches configured in the plan branch. The Default repository settings changed flag indicates that this repository overrides more settings from the parent plan. The No branch support flag means that a given repository type does not support branches.

Branch notifications

You can get build notifications from branch plans just as you do for master plans.

To specify how notifications are sent by all branches created from a plan, go to the Branches tab for the plan's configuration and choose one of the following options:

- Notify committers and people who have favorited this branch.
- Use the plan's notification settings.
- Notifications should not be sent for this branch.

You can override how notifications are sent from a particular branch plan, if necessary, by going to the Notifications tab on the Plan Branch configuration.

See Configuring notifications for a plan and its jobs for information about plan notifications.

Branch dependencies

You can use build dependencies for plan branches in a similar way to that for plans: a branch plan is
triggers only when another branch plan has been successfully built. This can be used to ensure that breaking source code changes associated with one branch plan are detected before they can break the build of a dependent branch plan. Dependencies between master plans are maintained if their branch plans have the same name. See Setting up plan build dependencies for further information about dependencies.

Select Trigger Dependencies for Branches, on the Dependencies tab for the plan configuration, if you want plan branches to honor the build dependencies of their respective master plans.

Branch details configuration

Whether a plan branch is created automatically or manually, the master plan maintains the structure and configuration of its branch plans. However, you can go to the configuration pages to override the following settings in a branch plan:

**Branch clean-up**

On the Branch Details tab of the branch's configuration, you can specify that a plan branch is not cleaned up automatically.

ℹ️ Please note that 'Automatic Branch Clean-up' is supported for Mercurial, Git (Bamboo 4.1.1 and above) and Subversion (Bamboo 4.2.0 and above).

By default, plan branches are deleted automatically after:

- 7 days after the branch was deleted in the primary source repository OR
- 10 days of branch inactivity in the primary source repository

The values can be specified on the plan level.

**Trigger type**

On the Branch Details tab of the branch's configuration. See Triggering builds.

Note that you can only configure one trigger for a plan branch, and that this overrides all triggers that may be configured for the master plan.

**Merging**

On the Branch Details tab of the branch's configuration. Described below.

**Source repository**

On the Source Repository tab of the plan branch configuration. You can override the default repository settings of a plan on the branch level:
Notifications

On the **Notifications** tab of the branch's configuration. The options are:

- Notify committers and people who have favorited this branch.
- Use the plan's notification settings.
- Notifications should not be sent for this branch.

See [Configuring notifications for a plan and its jobs](#) for information about plan notifications.

Variables

On the **Variables** tab of the branch's configuration. See [Defining plan variables](#).

Automatic branch merging

Bamboo provides 2 merging models if you choose to automate your branch merging:

- **Branch Updater** — a branch repo is kept up-to-date with changes to master. Note that changes on your master branch do not trigger branch builds.
- **Gatekeeper** — the default repo is only updated with changes in the branch that have built successfully.

The automatic branch merge strategy for the master plan can be **overridden** in an individual plan branch, if required. Automatic branch merging is not available for Subversion.

**Branch updater**

**When to use**

The Branch Updater should be used when you want to:
• Automatically merge changes from the team's master branch into your feature branch, after a successful build of the master and branch merge.
• Get notified when the changes on your feature branch are no longer compatible with the team's master branch.

Change detection is available only for the branch you're currently working on.

Configuring

To have recent changes in another repo merged into your branch repo:
1. Go to the **Branch Details** tab of the branch plan's configuration pages. (Click on the branch icon beside a plan name on the All Plans tab, then choose **Actions > Configure Branch**.)

2. Under 'Merging' select **Branch Merging Enabled**, and then click **Branch Updater**.

3. Use the **Merge From** list to choose the repo from which changes should be merged with your feature branch.

4. Select **Push on** only if you want those changes merged back into your branch once the build completes successfully.

5. Click **Save**.

---

**Gatekeeper**

When to use

The Gatekeeper should be used when you want to:

- Automatically merge your feature branch back into the team's master branch, after a successful build of the merged changes from both branches.
- Get notified when a build of combined changes from both branches fails, preventing the feature branch from being merged back into the team's master branch.
Configuring

To have your successfully built changes pushed to another repo:

1. Go to the Branch Details tab of the branch plan's configuration pages. (Click on the branch icon beside a plan name on the All Plans tab, then choose Actions > Configure Branch.)
2. Under 'Merging' select Branch Merging Enabled, and then click Gate Keeper.
3. Use the Checkout list to choose the repo with which to merge your changes (and to which changes should be pushed).
4. Select Push on only if you want your changes pushed to the other repo once the build completes successfully.
5. Click Save.
Limitations with plan branches

The following limitations apply to using automated plan branching and merging:

<table>
<thead>
<tr>
<th>Action</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto plan branching</td>
<td>• Can only be used with Git, Mercurial and Subversion repositories. For other repository types, use manual branching. &lt;br&gt;• Cannot be used with the Git implementation embedded in Bamboo. (You need to have set up native Git.)</td>
</tr>
<tr>
<td>Manual plan branching</td>
<td>• Can be used for all repository types supported by Bamboo.</td>
</tr>
<tr>
<td>Auto branch merging</td>
<td>• Can only be used with Git and Mercurial repositories. &lt;br&gt;• Can only be used with branches that were configured in Bamboo. &lt;br&gt;• Cannot be used with the Git implementation embedded in Bamboo. (You need to have set up native Git.)</td>
</tr>
</tbody>
</table>

Branches wallboard

The branches wallboard displays the status of all the branches and the plan that the branches belong to. The plan’s own status always appears first. Plans shown as grey are disabled.

**To display the branches wallboard:**

1. Go to the Plan Summary for the plan that has branches you want to display.
2. Choose Actions > Branch Wallboard.
Using the branch status page

With Bamboo you can view and manage your plan branch assignments on a single page.

On this page

- Getting to the branch status dashboard
- Using the branch status dashboard
  - Picking a repository and a VCS branch
  - Viewing build plans assigned to a VCS branch
  - Managing plan branches

Getting to the branch status dashboard

You can find the page in the top menu, in Build > Branch status:

You can also find a link to the Branch status page in some other places, like screens with the details of builds or plans:

Using the branch status dashboard

Here are the most important things that you need to know about the Branch status dashboard.

Picking a repository and a VCS branch

To start working with branch statuses, you must specify a repository and a VCS branch. You can select it from a list or start typing to search by name.

The dashboard works for all linked repositories that support branches:
We've added a small **Copy** button next to the selected branch name - it copies the name of the branch in case you need to share it.

**Viewing build plans assigned to a VCS branch**

Once you pick a repository and a VCS branch, you'll see a list of plans that build the branch:

If the information about the commits is available to Bamboo, you can see the number of commits next to the build status:

Click the number to display the details of the commits:

It might happen that there aren't any build plans assigned to the VCS branch that you selected. You can associate the branch with a plan directly from the **Branch status** page (see Managing plan branches below).

**Managing plan branches**

You can manage assignments between plan branches and VCS branches directly from the **Branch status** page.
Adding a build plan to a VCS branch

On top of the list of existing plans (or on top of the empty list if there aren't any plans yet), you can find the search field and the Add button:

To assign a build plan to the selected VCS branch, click within the search field and either pick a build plan from a list or start typing to search:

Click Add to save the assignment.

Managing existing build plans

Once you've specified some plans that will build your branch, you can see them in the list on the Branch status page. Next to each plan, there's a small Actions menu that allows you to run, edit, or remove build plans assigned to a VCS branch:

Viewing pull requests

Starting from Bamboo 6.0, the branch status page also displays open pull requests outgoing from the selected VCS branch. Pull request information includes pull request name, target branch, and whether it's in conflicted state.

Currently, only the Bitbucket Server repository type is supported.

Artifact handlers

Artifact handlers Bamboo administrators can control where artifacts produced by plans are stored. This can help to optimize the utilization of network bandwidth and filesystem space. You can activate each handler for shared and non-shared artifacts separately. Additionally, you can store artifacts in multiple locations. The default artifact handler selection is configured by Bamboo administrator but can be overridden in a plan's configuration by users that have administration permission on the plan.
To configure artifact handlers, go to

> Artifact handlers.

**Types of handlers used by Bamboo:**

**AGENT-LOCAL ARTIFACT HANDLER**

This handler stores the artifact on Bamboo's remote agent's filesystem. This handler does not publish artifacts to server (in other words, the artifacts will not be downloadable from result pages if remote or S3 handlers are not enabled). It can be used to save bandwidth when exchanging artifacts between builds & deployments running on the same agent or running on different agents that share common filesystem. In the configuration you need to define the root directory in which all the artifacts will be saved.

**BAMBOO REMOTE HANDLER**

This handler makes artifacts accessible on Bamboo remote and elastic agents. It also allows remote agents to publish artifacts they produce when running builds.

**AMAZON S3**

Artifacts are stored at Amazon S3 and are downloadable from there. Amazon S3 that offers unlimited flexible storage capacity. For more information about S3, see the Amazon S3 page. You can use the AWS credentials provided in the Elastic Bamboo configuration or you can configure separate account. In either case, you need to provide a bucket name. You can also (optionally) provide a root path for all the artifacts, which can come in handy if you use the same S3 bucket for other purposes. Lastly, you can define a maximum number of files per artifact; if this threshold is exceeded the artifact is automatically zipped into a single file, which reduces the number of requests to S3 when uploading and downloading the artifacts and improves the efficiency of the whole process.

**SERVER-LOCAL ARTIFACT HANDLER**

This handler stores the artifacts directly on Bamboo server’s filesystem. It is used by Bamboo server itself and by local agents.

Related content

- Bamboo Artifact Handlers - Use Case Scenarios

**Managing plans**

A *plan* defines everything about your continuous integration build process in Bamboo. See Configuring plans for information about how to set up build plans.

You can also perform actions on one or more plans together, or make global settings that affect all plans on the Bamboo server.

See the following pages for information about managing your Bamboo plans:

- Configuring a plan’s permissions
- Disabling or deleting a plan
- Modifying multiple plans in bulk
- Moving plans to a different project
- Configuring concurrent builds
- Configuring the hanging build event
- Configuring the build queue timeout event
- Build monitoring

**Configuring a plan’s permissions**

This page describes how to change the permissions for a particular plan. For ongoing ease of management, we recommend that you grant permissions to groups rather than to individual users.

You need to have 'Admin' permission on the plan to edit its permissions.

Note that a Bamboo Admin can also set global permissions for access to Bamboo.
To change plan permissions:

1. Choose **Build > All build plans** from the Bamboo header, then click the name of the plan you want to edit.
2. Choose **Actions > Configure plan**.
3. Click the **Permissions** tab.
4. Use the ‘Grant permission to’ section to add users or groups for which you wish to set permissions.
5. Select (or clear) the check box for each permission that you wish to change for a user or group. See the table below for details.
6. Click **Save**.

### Related pages:
- Configuring plans
- Granting plan permissions in bulk
- Managing permissions
- Managing users
- Managing groups

### Plan permission

<table>
<thead>
<tr>
<th>Plan permission</th>
<th>Actions</th>
</tr>
</thead>
</table>
| View            | • View the plan and its builds  
                  • Add a comment or label to a build result |
| Edit            | • Edit the configuration for a plan and its jobs  
                  (except for plan permissions and stages)  
                  • Delete a comment or label from a build result  
                  • Add and delete plan labels |
| Build           | • Trigger a manual plan build  
                  • Pause and resume a plan build |
| Clone           | • Clone the plan |

**Related pages:**
- Configuring plans
- Granting plan permissions in bulk
- Managing permissions
- Managing users
- Managing groups

**Screenshot: Plan permissions**

**Permissions**
You can edit your plan permissions here. Permissions can be granted to specific users or groups.

**Permission types**
- **View**: User can view the plan in Bamboo, including its builds.
- **Edit**: User can view and edit the configuration of the plan and its jobs. This does not include the ability to change a plan's permissions or its stages.
- **Build**: User can trigger a manual build on the plan, as well as suspending and resuming the plan.
- **Clone**: User can clone the plan.
- **Admin**: User can administer all components of this plan, including the stages and the plan's permissions.

**Note:**
Users with the global 'admin' permission have all of the above permissions for this plan.

**Disabling or deleting a plan**
Bamboo allows you to disable or delete plans that you don’t want to be built:
- **Disabling a plan** prevents it from being built. You can re-enable the plan, if you want to build it again.
- For example, if a plan’s latest build is broken and cannot be fixed quickly, you may want to disable it.
temporarily to stop the plan from being built.

- **Deleting a plan** removes it completely from your Bamboo system. You will need to recreate a new plan from scratch, if you want to build it again. For example, if a plan is no longer relevant, you may want to delete it.

**On this page:**
- Disable a plan
- Delete a plan

**Related pages:**
- Configuring plans
- Disabling or deleting a job
- Stopping an active build
- Exporting data for backup

**Disable a plan**

1. On the **All Plans** tab of the dashboard, click on the plan’s name.
2. Choose **Actions > Disable Plan**.

You can also disable the plan using the **Plan Enabled** check box on the **Plan Details** tab of a plan’s configuration pages.

Note that disabling a plan doesn't disable it's branch plans.

**Delete a plan**

Deleting a plan deletes everything related to that plan, including the plan's configuration, all of the plan's job configurations and the plan's branch plans, job build results, artifacts, labels and comments:

- **⚠️** Deleting a plan also deletes it's branch plans. Be careful!
- The 'Admin' global permission is required to delete a plan.
- A plan that is currently being built cannot be deleted. If you need to delete such a plan, stop the plan's build first. Refer to Stopping an active build for more information.
- Bamboo 'cleans up' everything related to deleted plans every two minutes. You'll have to wait at least that long if you want to reuse the key from a deleted plan.
- If you need to keep a permanent record of the job build results for your plan, see Exporting data for backup.

There are two ways to delete a plan:

- From the dashboard:
  1. On the **All Plans** tab of the dashboard, click on the plan to delete.
  2. Choose **Actions > Configure Plan**.
  3. Choose **Actions > Delete Plan**.

- In the Administration Console:
  1. Click the icon in the Bamboo header and choose **Overview**.
  2. Click **Remove Plans** (under 'Plans') in the left navigation column.
  3. Select the plan you wish to delete.
  4. Click **Delete** at the bottom of the list. You will be prompted to confirm the deletion.

**Modifying multiple plans in bulk**

Bulk actions allow you to make changes to multiple plans at once.

You need to be a Bamboo administrator to modify plans in bulk.
To use bulk actions:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Bulk Action in the left-hand panel (under ‘Plans’).
3. Choose the required bulk action and follow the on-screen instructions to complete the 5 steps.

The following bulk actions are available:

Add new notification
See Configuring notifications for a plan and its jobs for further details.

Disable Plan
See Disabling or deleting a plan for further details.

Enable Plan

Remove all notifications
See Configuring notifications for a plan and its jobs for further details.

Replace triggers
You can select a new trigger that will replace all existing triggers for the selected plans. This change affects all branches of the selected plans.

Run manual build
You have the option to disable dependencies when running the manual builds for the selected plans.

Update CVS module
See CVS documentation for further details.

Update CVS root and credentials
See CVS documentation for further details.

Update SVN credentials
See the Subversion documentation for further details.

Update SVN repository URL
See the Subversion documentation for further details.

Update web repository
See the Subversion, CVS or Perforce documentation for further details.

Moving plans to a different project

Moving a plan to a different project involves changing the plan's project key (as well as possibly the plan name and plan key), which will also change the build key for all of the plan's build results.

Moving a plan does not affect the plan's configuration, nor any comments or labels that have been applied to job build results within the plan.

You need to be a Bamboo administrator to move a plan.

⚠️ Note that moving a plan will require Bamboo to re-index all its data, so your Bamboo system may run slowly for a few minutes.

Before you begin:

- We recommended that you back up your Bamboo build results before you move a plan. See Exporting data for backup for instructions.

To move a plan to a different project:

1. Click the icon in the Bamboo header and choose Overview.
2. Click **Move Plans** (under 'Plans') in the left-hand panel.
3. Select either an existing project or **New Project** from the **Destination Project** list. For a new project, enter a new **Project Name** and a unique **Project Key**.
4. Select one or more plans to move.
5. Click **Move** to display the 'Configure New Plan Details' page (as shown in Screenshot 2 below).
6. Edit the new name and new key for each plan, if necessary. You may need to do this if the destination project already has a plan with the same plan name or key, or if you wish to change these.
7. Click **Move**.

**Screenshot 1: ‘Moving Plans - Select Plans’**

**Move build plan wizard**

It is strongly recommended that you ensure that all agents are disabled before you perform the move. disable all agents

**Select plans**

You can move a plan to another project with this wizard. Simply select the plans you want to move and the Destination project. As names and keys may conflict, you’ll then be asked to enter new names and keys for the plans. Note that because we are changing plan keys, this operation requires some slow operations (e.g. Indexing of all Builds) and may take a few minutes.

- **Destination project**
- **New Project**

*This is the unique project key to identify a project. The key must contain only uppercase alphanumeric characters, e.g. "ITAD".*

**Select:** All, None

<table>
<thead>
<tr>
<th><em>core</em> Bamboo</th>
<th>Select: All, None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Build WAR</td>
<td></td>
</tr>
<tr>
<td>CI Tests</td>
<td></td>
</tr>
<tr>
<td>Deploy</td>
<td></td>
</tr>
<tr>
<td>Federated APIs CTK</td>
<td></td>
</tr>
<tr>
<td>Integration Branch Auto Merger</td>
<td></td>
</tr>
</tbody>
</table>

**Screenshot 2: Moving Plans - Choose new build keys and build names**

**Configure new plan details**

**Choose new build keys and build names**

The following plans will be moved to project A new project. You can update the plan names and keys below.

<table>
<thead>
<tr>
<th>Original Project</th>
<th>Original Name</th>
<th>New Name</th>
<th>Original Key</th>
<th>New Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>+core* Bamboo (BAM)</td>
<td>CI Tests</td>
<td>CI Tests</td>
<td>FC</td>
<td>FC</td>
</tr>
<tr>
<td>+core* Bamboo (BAM)</td>
<td>Integration Branch Auto Merger</td>
<td>Integration Branch Auto Merger</td>
<td>IBAM</td>
<td>IBAM</td>
</tr>
</tbody>
</table>

**Configuring concurrent builds**

Bamboo's concurrent builds feature allows you to build a plan concurrently on several agents. You might find this useful if a plan is likely to be triggered again before the current build completes.

You can configure a default value for the maximum number of builds of a plan that your Bamboo server can run concurrently, using the Bamboo administration console. This value is a default – it can be overridden on the **Miscellaneous** tab of a plan's configuration.
You need to be a Bamboo administrator to configure concurrent builds.

**To configure the number of concurrent builds of a plan allowed by Bamboo:**

1. Click the ![icon](image) in the Bamboo header and choose **Overview**.
2. Click **Concurrent Builds** in the left panel (under 'Plans'), then click **Enable**.
3. Click **Edit**.
4. Edit the value for **Default number of concurrent builds allowed**.
5. Click **Save**.

### Configuring the hanging build event

The hanging build event is thrown when Bamboo determines that a build has become unresponsive according to two criteria:

- **Expected Build Time** — defined as Build Time Multiplier x Average Build Time
  - Build Time Multiplier is a user-defined setting.
  - Average Build Time is calculated by Bamboo using an average of previous build times (in minutes).
- **Log Quiet Time** — the length of time (in minutes) between log entries for a build.

The Expected Build Time and Log Quiet Time must both be exceeded for Bamboo to throw a hanging build event.

This event is currently used by Bamboo to send notifications.

You can also disable build monitoring altogether so that the hanging build event never occurs.

### On this page:
- Configure the hanging build event
- The check interval for hung builds

### Related pages:
- Configuring notifications for a plan and its jobs
- Configuring the build queue timeout event
- Build monitoring
- Configuring tasks

### Configure the hanging build event

You can change the criteria governing when a hanging build event is thrown.

Note, the hanging build criteria can be also be set for a specific job, when specifying a job's builder. Job-level criteria will override the global criteria described on this page (including disabling this event).

**To edit the hanging build event settings:**

1. Click the ![icon](image) in the Bamboo header and choose **Overview**.
2. Click **Build Monitoring** (under 'Plans') in the left panel.
3. Click **Edit** and update the values for **Build Time Multiplier** and **Log Quiet Time** as required.
4. Click **Save**.

**Screenshot: Editing the hanging build event settings**
Build monitoring

You can configure the default settings for detecting hanging builds on this page. Hanging build detection can also be disabled altogether on this page. You can override these settings for individual plans in the executable configuration of each plan.

Bamboo determines that a build has hung, if both of the criteria below are exceeded:

- **expected build time** - calculated as the average build time * build time multiplier
- **log quiet time** - the length of time Bamboo goes without receiving any log messages for that build

### Default build monitoring criteria

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Build time multiplier</td>
<td>2.5</td>
</tr>
<tr>
<td>Log quiet time</td>
<td>30</td>
</tr>
</tbody>
</table>

You can configure also default settings for detecting build waiting in build queue longer than specified time. Bamboo determines that build time has been exceeded if build waits in the queue longer specified timeout.

- **build queue timeout** - the length of time build waits in the queue before notification

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Build queue timeout</td>
<td>60</td>
</tr>
</tbody>
</table>

To edit the build queue timeout event settings:

1. Click the icon in the Bamboo header and choose **Overview**.
2. Click **Build Monitoring** (under 'Plans') in the left panel.
3. Click **Edit** and update the value for **Build Queue Timeout** as required.
4. Click **Save**.

**Screenshot: Editing build queue timeout event settings**

---

**The check interval for hung builds**

By default, Bamboo will check whether a hanging build event has been thrown every 60 seconds.

You can change this check interval by configuring the system property, `bamboo.buildHangingMonitor.checkInterval`. (This property is specified in seconds.)

Please read [Starting Bamboo](https://confluence.atlassian.com/bamboo/starting-bamboo) for instructions on how to configure the `bamboo.buildHangingMonitor.checkInterval` system property.

### Configuring the build queue timeout event

The build queue timeout event is thrown when a build has been waiting in the build queue for longer than a specified period of time.

This event is currently used by Bamboo to send notifications.

**Configuring the build queue timeout event**

You can change the criteria governing when the build queue timeout event is thrown. You can also disable build monitoring altogether so that the build queue timeout event never occurs.

**On this page:**

- Configuring the build queue timeout event
- Disabling the build queue timeout event
- The check interval for build queue timeouts

**Related pages:**

- Configuring notifications for a plan and its jobs
- Build monitoring

---

**To edit the build queue timeout event settings:**

1. Click the icon in the Bamboo header and choose **Overview**.
2. Click **Build Monitoring** (under 'Plans') in the left panel.
3. Click **Edit** and update the value for **Build Queue Timeout** as required.
4. Click **Save**.

**Screenshot: Editing build queue timeout event settings**
Disabling the build queue timeout event

You can disable the build queue timeout event by disabling build monitoring for your Bamboo installation. See Build monitoring.

Please note, you cannot disable the build queue timeout event without disabling all build monitoring features for your Bamboo installation.

The check interval for build queue timeouts

By default, Bamboo will check whether a build queue timeout event has been thrown every 60 seconds.

You can change this by configuring the system property, `bamboo.buildQueueMonitor.checkInterval`. (This property is specified in seconds.)

Please read Starting Bamboo for instructions on how to configure the `bamboo.buildQueueMonitor.checkInterval` system property.

Build monitoring

Based on your settings Bamboo can define if a build is hanging or timed out. You can override these settings for individual plans in the executable configuration of each plan.

To enable build monitoring

Build monitoring is enabled by default. To change its options, go to

> Overview > Build Monitoring.

Screenshot: Disabling build monitoring
To disable build monitoring:

1. Click the icon in the Bamboo header and choose Overview.
2. In the left-hand panel, click Build Monitoring.
3. Uncheck Allow Bamboo to detect hanging builds.

Docker Runner

Docker Runner is a Bamboo feature that allows you to run builds and deployments in a Docker container. This isolates the build process from the rest of the environment it runs in. This increases the security of your environments by providing more strict control over resources the continuous integration (CI) process has access to. The isolation also helps with the reliability of your CI by making sure that environment it runs in can be reliably recreated each time you run your builds. This increases the reliability of your builds by minimizing the influence of external applications on the build environment and allowing a finer control of resources dedicated to the build. Moreover it allows to easily reproduce the environment at a later time and on a different environment.

Docker Runner operates at the level of Bamboo jobs. A job is the unit of distribution of work per Bamboo build agents and it is itself made of a set of tasks that run sequentially. When a job is distributed with Docker Runner to a remote / local agent a Docker container is created on the build agent that picks up the job. Then the job runs all the tasks that it is comprised of in a sequential manner inside the container and finally Bamboo copies the build results of the job and cleans up. Bamboo transparently creates, manages and cleans up the Docker container when the build has finished but there are some configuration settings that can influence this process which are explained below.

If you want to user Docker images in your Bamboo builds at a different level than jobs, you can do that with Docker tasks. See Configuring the Docker task in Bamboo.

Before you begin

- Make sure you have Docker installed. We advise to use the most recent version. Bamboo provides support for Docker for Mac, and Docker for Ubuntu in version 17 and later.
- Define a Docker capability in Bamboo. See Defining a new Docker capability
Enabling Docker Runner

Runner can be enabled for jobs and deployment environments when:

- creating or editing jobs
- creating or editing deployment environments

Enabling Docker for a job or a deployment environment disables their standard requirements which come from tasks and replaces them with a single requirement for Docker.

Custom requirements, manually configured by users, will not be erased, and will still be used for agent matching.

To enable Docker Runner, in the Isolate build section, just choose to run the job in a Docker container and provide the Docker image.

When editing a job or a deployment environment, you can also specify which directories from Bamboo agent should be mounted as additional volumes to the Docker container.
Docker Runner is also fully supported with Bamboo Specs. See our Bamboo Specs reference guide.

For more information about Bamboo and Docker integration, see Getting started with Docker and Bamboo

### Linking to source code repositories

A key part of setting up your continuous integration build process is to specify the code repositories that Bamboo will work with. You can specify repositories at the following levels in Bamboo:

- **global** – repositories are available to all plans in Bamboo.
- **plan** – repositories are available to all jobs in the Bamboo plan.
- **job** – repositories are available to all tasks in the Bamboo job.

The recommended approach is to set up linked source repositories at the global level, described below.

**Important changes to Linked Repositories that affect usage and permissions**

Linked repositories are now the preferred way to define and share repository configuration between plans in Bamboo. As a result, we've made two changes that you should be aware of:

- When users create plans, they are only given the option to **select** from Linked Repositories. This requires that users have the **Create plan global permission**.
- Users will need the **Create Repository global permission** in order to create Linked Repositories. Note that this permission alone does not permit a user to create or edit a plan.

In the long term, Atlassian plans to deprecate the repository configuration defined against the plan. These configurations can be converted to Linked repositories by clicking **Convert to linked repository** in each plan's repository configuration page.

**Link a source code repository for all Bamboo plans**

Linked repositories are available globally to all plans and jobs configured on the Bamboo server. Doing this can save you from having to reconfigure the source repositories in multiple places if these ever change - any changes to a linked repository are applied to every plan or job that uses that repository.

You need the 'Create plan' or 'Admin' **global permission** to configure linked repositories.

1. Click the 'cog' icon in the Bamboo header and then **Linked repositories**.
2. Click **Add repository**.
3. Select your repository type from the available menu options. For configuration details for a particular repository type, please refer to one of the following pages:
   - Bitbucket (for Bitbucket Cloud)
   - Stash (for Bitbucket Server)
   - Git
   - GitHub
   - Mercurial
   - Subversion
   - CVS
   - Perforce

If you need to use an unsupported type of repository, a number of third-party Source Repository plugin modules are available (e.g. the ClearCase plugin). You can also write a Source Repository Module plugin to enable Bamboo to connect to your repository.

Note that shared source repositories are no longer the preferred way to share repository configuration between plans. Use linked repositories instead!

Configure a repository for a plan

When you create a new plan, the source repository you specify becomes the default. It is used by the plan's 'Default Job' and can be used by other jobs added to this plan.

1. Navigate to the plan. See Configuring plans for instructions.
2. Choose Actions > Configure plan.
   - Click the Repositories tab to see all the repositories that have been added to the plan.
   - Click a repository name in the list to edit its configuration details.
   - Click Add repository to configure a repository to be used by the plan.

For configuration details for a particular repository type, please refer to one of the following pages:
   - Bitbucket (for Bitbucket Cloud)
   - Stash (for Bitbucket Server)
   - Git
   - GitHub
   - Mercurial
   - Subversion
   - CVS
   - Perforce

Please note that in the long term, Atlassian plans to deprecate the repository configuration defined against a plan. These configurations can be converted to linked repositories by clicking Convert to linked repository in each plan's repository configuration page.

Configure a repository for a job

You can specify additional repositories for a Bamboo plan to work with at the job level, perhaps for tasks in later stages of the build.

You add the Source Code Checkout task to a job to configure a particular repository for just that job. See Checking out code for details about configuring the Source Code Checkout task.

**Bitbucket Server**

Configure Bamboo to use a Bitbucket Server repository.

You can specify repositories at the following levels in Bamboo:
   - global – repositories are available to all plans in Bamboo.
   - plan – repositories are available to all jobs in the Bamboo plan.
   - job – repositories are available to all tasks in the Bamboo job.

The recommended approach is to set up linked source repositories at the global level – see Linking to source code repositories.
When you link a repository hosted in Atlassian's Bitbucket Server with a build plan in Bamboo, then without any further configuration:

- Bamboo will automatically run a build when changes are pushed to the Bitbucket Server repository, without needing to configure polling.
- Bamboo will automatically update plan branches when a developer pushes a new branch to the repository (or deletes a branch).
- You can click through to Bitbucket Server to see the commit diff for all files that are part of the changeset.
- Bitbucket Server commits that are part of a build are displayed in Bamboo.
- Build results are notified to Bitbucket Server (and displayed for the associated commits and pull requests).

Bitbucket Server and Bamboo only need to have been connected by creating an application link. Repositories in Bitbucket Server are then made available in Bamboo, so it is easy for you to link your Bamboo plan to a Bitbucket Server repository.

When you create a plan that uses a Bitbucket Server source repository, Bamboo will automatically use the 'Bitbucket Server repository triggers the build when changes are committed' trigger option instead of using the 'polling the repository for changes' option. This reduces the load on the Bamboo and Bitbucket servers because Bamboo doesn't need to send poll requests (for each branch of each plan) to the Bitbucket server every 3 minutes (the default polling period). Instead, Bitbucket Server will trigger Bamboo whenever there is a push to the repository.

Configuration requirements

Navigate to the source repository settings for a plan or job, as described on Linking to source code repositories, then:

1. Either click Add Repository to add a new repository, or edit an existing repository configuration.
2. Choose Stash from the Repository host list.
3. Complete the required information:

<table>
<thead>
<tr>
<th>Display name</th>
<th>A name that identifies this repository within Bamboo.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stash server</td>
<td>This menu will show all Bitbucket servers that have been linked to Bamboo via an application link.</td>
</tr>
<tr>
<td>Repository</td>
<td>The repository that will be built. This menu will show all repositories on the Bitbucket server that you have permissions to access.</td>
</tr>
<tr>
<td>Branch</td>
<td>Pick a branch if you want to check out code from a branch other than the default branch.</td>
</tr>
</tbody>
</table>

**Advanced options**

<table>
<thead>
<tr>
<th>Use shallow clones</th>
<th>Allows Bamboo to perform shallow clones (i.e. history truncated to a specified number of revisions). This should increase the speed of the initial code checkouts, however if your build depends on the full repository history, we recommend that you do not use this option. Shallow clones are enabled by default.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable repository caching on remote agents</td>
<td>Allow caching of repositories on remote agents to save bandwidth. Note that caches are always full clones of the source repository.</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Use submodules</td>
<td>Select to enable submodules support if these are defined for the repository. If native Git capability is not defined for agent submodules support will be disabled.</td>
</tr>
<tr>
<td>Command timeout</td>
<td>This helps to stop hung Bitbucket processes. On slower networks, you may consider increasing the default timeout to allow Bamboo time to make an initial clone of the Git repository.</td>
</tr>
<tr>
<td>Verbose logs</td>
<td>Turns on more verbose logs from Git commands. Use this option if you encounter problems with Git in Bamboo.</td>
</tr>
<tr>
<td>Fetch whole repository</td>
<td>Fetches whole repository instead of only one selected branch.</td>
</tr>
</tbody>
</table>
| Enable LFS support      | Enables support for Git Large File Storage (LFS), which replaces large files such as audio samples, videos, datasets, and graphics with text pointers inside Git, while storing the file contents on a remote server. To use this option you must have the following:  
  • Git version 1.8.2 or later installed locally in your environment  
  • Git LFS 1.2 or later installed.  
  To learn more about Git LFS, see [Git LFS tutorials](#).                                                                                                                                                                                                                     |
| Mirror                  | Allows you to use mirror locations for storing your repository data instead of using remote location. [Read more](#).                                                                                                                                                                                                                 |

### Change detection options

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable Quiet Period</td>
<td>Specifies a delay after a single commit is detected before the build is started. This allows multiple commits to be aggregated into a single build.</td>
</tr>
</tbody>
</table>
| Include/Exclude Files   | Allows you to specify the files that Bamboo should, or should not, use to detect changes. When you configure the Include option, it means that you want Bamboo to use only the mentioned files for change detection (by default Bamboo checks all the files). In the same way, if you configure the Exclude option, Bamboo will not consider the excluded files when detecting changes.  
  Enter into File Pattern a regular expression to match the files that Bamboo includes or excludes. The regex pattern must match the file path in the repository. See this page for examples.                                                                                                                                               |
| Exclude changesets      | Enter a regular expression to match the commit messages for changesets that should not start a build.                                                                                                                                                                                                                                      |
Web repository options

**Stash**

Specify the following details for the repository:

- **Server URL** – the URL of your Bitbucket Server instance (e.g. https://bitbucket.mycompany.com/).
- **Stash Project Key** – the key of the project in Bitbucket Server (e.g. 'CONF').
- **Repository Name** – the name of the repository in Bitbucket Server (e.g. 'conf-dev')

See [Integrating Bamboo with Bitbucket Server](#) for more information.

**Bitbucket Cloud**

This page describes how to configure Bamboo to use a Bitbucket Cloud repository.

If you set up two-factor authentication (2FA) in Bitbucket Cloud, you must configure an app password for Bamboo.

You can specify repositories at the following levels in Bamboo:

- **global** – repositories are available to all plans in Bamboo.
- **plan** – repositories are available to all jobs in the Bamboo plan.
- **job** – repositories are available to all tasks in the Bamboo job.

The recommended approach is to set up linked source repositories at the global level – see [Linking to source code repositories](#).

On this page:

- Configure a Bitbucket source repository
- Bamboo statuses in Bitbucket Cloud

Note that you will not be able to create plans or jobs that use a Bitbucket repository without first specifying the shared local Mercurial or Git capability. Read more about configuring a Version Control capability.

**Related pages:**

- Mercurial
- Git

**Configure a Bitbucket source repository**

1. Navigate to the repository configuration for a linked repository, plan or job. See [Linking to source code repositories](#).
2. Either click **Add Repository** to add a new repository, or edit an existing repository configuration.
3. Choose **Bitbucket Cloud** from the **Source Repository** list.
4. Enter a **Name** to help identify the repository in Bamboo.
5. Specify the repository access level and corresponding authentication details for loading the list of repositories:

<table>
<thead>
<tr>
<th>Step</th>
<th>Public</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## 5.1
Provide the name of the Bitbucket Cloud user who owns the repository in the **Owner** field.
To load the list of repositories available in Bitbucket Cloud you can provide a username and a password or use **shared credentials**.

## 5.2
You can configure the following settings of a public or private source repository for your plan:

- **Repository** - retrieves all repositories you have explicit permissions to access from Bitbucket Cloud when you click **Load Repositories**
- **Branch** - pick a branch if you want to check out code from a branch other than the default branch

## 5.3
For private repositories, you can specify the authentication method that Bamboo will use to connect to the repository you selected. You can choose from:

- **Username and password** - reuse the credentials provided in step 5.1
- **SSH private key** - provide an SSH key to authenticate; use **shared credentials** or upload an SSH key and type a passphrase

### Advanced Options

#### Command timeout
This is useful to stop hung Bitbucket processes. On slower networks, you may consider increasing the default timeout to allow Bamboo time to make an initial clone of the Mercurial repository.

#### Verbose logs
For Mercurial: Turns on `--verbose` and `--debug` options in Hg or Git commands and passes the output to build logs. Use this option if you encounter problems with Git or Mercurial in Bamboo.

#### Enable Quiet Period
Specifies a delay after a single commit is detected before the build is started. This allows multiple commits to be aggregated into a single build.

#### Include/Exclude Files
Allows you to specify the files that Bamboo should, or should not, use to detect changes.

Enter into **File Pattern** a regular expression to match the files that Bamboo includes or excludes. The regex pattern must match the file path in the repository. See [sub page](#) for examples.

#### Exclude Changesets
Enter a regular expression to match the commit messages for changesets that should not start a build.

#### Git LFS
Enables support for Git Large File Storage (LFS), which replaces large files such as audio samples, videos, datasets, and graphics with text pointers inside Git, while storing the file contents on a remote server.

To use this option you must have the following:

- Git version 1.8.2 or later installed locally in your environment
- Git LFS 1.2 or later installed.
Bamboo 5.15 is shipped number of images which also include the Git LFS client.

To learn more about Git LFS, see Git LFS tutorials.

Web Repository
If your repository can be viewed in a web browser, select the repository type.

This allows links to relevant files to be displayed in the 'Code Changes' section of a build result.

**Note:** This option is not available for Git repositories. See

⚠️ Unable to locate JIRA server for this macro. It may be due to Application Link configuration.

**Mercurial Web Repository** – select one of the following viewer schemes:

- Bitbucket Web Repository Scheme (if you use Bitbucket)
- Default Web Repository Scheme (hgserve) (Mercurial's own default web server)

**Stash** – specify the following details for the repository:

- **Stash URL** – the URL of your Stash (now Bitbucket Server) instance (e.g. 'https://bitbucket.mycompany.com').
- **Stash Project Key** – the key of the project in Stash (e.g. 'CONF').
- **Repository Name** – the name of the repository in Stash (e.g. 'conf-dev').

Use this option to connect to a Bitbucket Server repository.

See Integrating Bamboo with Bitbucket Server for more information.

**Fisheye** – specify the following details for the repository:

- **Fisheye URL** — the URL of your Fisheye repository (e.g. 'https://atlaseye.atlassian.com/').
- **Repository Name** — the name of your Fisheye repository (e.g. 'Bamboo'). This is effectively the alias for your repository path.
- **Repository Path** — the path for your Fisheye repository (e.g. '/atlassian/bamboo/').

See Integrating Bamboo with Fisheye for more information.

**How do I determine my Repository Path?**

If you have previously run builds with changes from your repository, the easiest way of determining your repository path is to view the code changes and copy the path from the start of the path of one of the changed files, up to (but not including) the appropriate root directory. The root directories for repositories are the ones shown by Fisheye when browsing a repository (e.g. trunk). For example, if a code change listed /atlassian/bamboo/trunk/bamboo-acceptance-test/pom.xml, the path would be /atlassian/bamboo/.

If you have not previously run builds with changes from your repository, you will need to ask your Fisheye administrator for the repository path indexed by Fisheye.

Bamboo statuses in Bitbucket Cloud

You can view the status of Bamboo builds in Bitbucket Cloud.

Bamboo URL need to be fully qualified domain name (FQDN).
The feature is set up automatically if you set up a plan in the following way:

- the repository type is **Bitbucket Cloud** or **Bitbucket Server**
- you provided Bitbucket credentials (username and password)

The automatic setup of Bamboo build statuses in Bitbucket works with private and public repositories as long as you provide valid Bitbucket credentials.

The build statuses in Bitbucket are displayed in the commit, branch, and pull request views.

For more information about Bamboo statuses in Bitbucket, see:

- Pull requests and code review
- Integrate your build system with Bitbucket Cloud
- statuses/build Resource

**Stash**

You can specify repositories at the following levels in Bamboo:

- **global** – repositories are available to all plans in Bamboo.
- **plan** – repositories are available to all jobs in the Bamboo plan.
- **job** – repositories are available to all tasks in the Bamboo job.

The recommended approach is to set up linked source repositories at the global level – see Linking to source code repositories.

When you link a repository hosted in Atlassian’s **Stash (now Bitbucket Server)** with a build plan in Bamboo, then without any further configuration:

- Bamboo will automatically run a build when changes are pushed to the Stash repository, without needing to configure polling.
- Bamboo will automatically update plan branches when a developer pushes a new branch to the repository (or deletes a branch).
- You can click through to Stash to see the commit diff for all files that are part of the changeset.
- Stash commits that are part of a build are displayed in Bamboo.
- Build results are notified to Stash (and displayed for the associated commits and pull requests).

Stash and Bamboo only need to have been connected by creating an application link. Repositories in Stash are then made available in Bamboo, so it is easy for you to link your Bamboo plan to a Stash repository.

When you create a plan that uses a Stash source repository, with Stash 3.1 and later, Bamboo will automatically use the 'Stash repository triggers the build when changes are committed' trigger option instead of using the 'polling the repository for changes' option. This reduces the load on the Bamboo and Stash servers because Bamboo doesn't need to send poll requests (for each branch of each plan) to the Stash server every 3 minutes (the default polling period). Instead, Stash will trigger Bamboo whenever there is a push to the repository.

### Configuration requirements

Navigate to the source repository settings for a plan or job, as described on Linking to source code repositories, then:

1. Either click **Add Repository** to add a new repository, or edit an existing repository configuration.
2. Choose **Stash** from the **Repository host** list.
3. Complete the required information:
Display name
A name that identifies this repository within Bamboo.

Stash server
This menu will show all Stash servers that have been linked to Bamboo via an application link.

Repository
The repository that will be built. This menu will show all repositories on the Stash server that you have permissions to access.

Branch
Pick a branch if you want to check out code from a branch other than the default branch.

Advanced Options

Use shallow clones
Allows Bamboo to perform shallow clones (i.e. history truncated to a specified number of revisions). This should increase the speed of the initial code checkouts, however if your build depends on the full repository history, we recommend that you do not use this option. Shallow clones are enabled by default.

Enable repository caching on remote agents
Allow caching of repositories on remote agents to save bandwidth. Note that caches are always full clones of the source repository.

Use submodules
Select to enable submodules support if these are defined for the repository. If native Git capability is not defined for agent submodules support will be disabled.

Command timeout
This helps to stop hung Bitbucket processes. On slower networks, you may consider increasing the default timeout to allow Bamboo time to make an initial clone of the Git repository.

Verbose logs
Turns on more verbose logs from Git commands. Use this option if you encounter problems with Git in Bamboo.

Fetch whole repository
Fetches whole repository instead of only one selected branch.

Enable Quiet Period
Specifies a delay after a single commit is detected before the build is started. This allows multiple commits to be aggregated into a single build.

Include/Exclude Files
Allows you to specify the files that Bamboo should, or should not, use to detect changes. When you configure the Include option, it means that you want Bamboo to use only the mentioned files for change detection (by default Bamboo checks all the files). In the same way, if you configure the Exclude option, Bamboo will not consider the excluded files when detecting changes.

Enter into File Pattern a regular expression to match the files that Bamboo includes or excludes. The regex pattern must match the file path in the repository. See this page for examples.

Exclude changesets
Enter a regular expression to match the commit messages for changesets that should not start a build.

Git LFS
Enables support for Git Large File Storage (LFS), which replaces large files such as audio samples, videos, datasets, and graphics with text pointers inside Git, while storing the file contents on a remote server.
To use this option you must have the following:
- Git version 1.8.2 or later installed locally in your environment
- Git LFS 1.2 or later installed.
To learn more about Git LFS, see [Git LFS tutorials](#).

**Web repository**

If your repository can be viewed in a web browser, select the repository type. This allows links to relevant files to be displayed in the 'Code Changes' section of a build result.

**Stash** — specify the following details for the repository:

- **Stash URL** — the URL of your Stash instance (e.g. `https://stash.mycompany.com`).
- **Stash Project Key** — the key of the project in Stash (e.g. 'CONF').
- **Repository Name** — the name of the repository in Stash (e.g. 'conf-dev').

See [Integrating Bamboo with Bitbucket Server](#) for more information.

**Git**

This page describes how to configure Bamboo to use a Git repository.

You can specify repositories at the following levels in Bamboo:

- **global** — repositories are available to all plans in Bamboo.
- **plan** — repositories are available to all jobs in the Bamboo plan.
- **job** — repositories are available to all tasks in the Bamboo job.

The recommended approach is to set up linked source repositories at the global level — see [Linking to source code repositories](#).

You need to have previously defined a Git capability before you can configure a Git source repository — see [Defining a new version control capability](#).

Note that Bamboo comes with its own built-in Git implementation. However, you need to use native Git to be able to use symbolic links, submodules, automatic branch detection and automatic merging - these are not supported by the built-in Git.

You can download Git from the following locations:

- **For Windows**
- **For Linux and Mac**

**Related pages:**

- Bitbucket Cloud
- GitHub
- Defining a new version control capability

Configure a Git source repository

1. Navigate to the repository configuration for a linked repository, plan or job. See [Linking to source code repositories](#).
2. Either click **Add Repository** to add a new repository, or edit an existing repository configuration.
3. Choose **Git** from the **Source Repository** list.
4. Enter a **Name** to help identify the repository in Bamboo.
5. You can configure the following settings for a Git source repository for your plan:

**Repository URL**

The full path to your Git repository (eg: `https://bitbucket.org/atlassian/bamboo-git-plugin.git`)

Valid URLs are of the form:
Branch
Type the name of the relevant branch (or tag) you want to work on. Leave empty to work on the **master** branch.

Authentication Type
- **None** – choose if you want to access the repository anonymously
- **Username and password** – use **shared credentials** or type a username and a password
- **SSH private key** – use **shared credentials** or upload an SSH key and provide the SSH passphrase

Use shallow clones
Allows Bamboo to perform shallow clones (i.e. history truncated to a specified number of revisions). This should increase the speed of the initial code checkouts, however if your build depends on the full repository history, we recommend that you do not use this option. Shallow clones are enabled by default.

Location of POM file
The path to your project's **pom.xml** file, relative to the root of your Git **Repository URL** (defined above).

(Only available when importing a Maven 2 project)

Git LFS
Enables support for Git Large File Storage (LFS), which replaces large files such as audio samples, videos, datasets, and graphics with text pointers inside Git, while storing the file contents on a remote server.

To use this option you must have the following:
- Git version 1.8.2 or later installed locally in your environment
- Git LFS 1.2 or later installed.

Bamboo 5.15 is shipped with different images which also include the Git LFS client.

Advanced Options

Use submodules
Select to enable submodules support if these are defined for the repository. If native Git capability is not defined for agent submodules support will be disabled.

Command timeout
This is useful to stop hung Bitbucket processes. On slower networks, you may consider increasing the default timeout to allow Bamboo time to make an initial clone of the Git repository.

Verbose logs
Turns on more verbose logs from Git commands. Use this option if you encounter problems with Git in Bamboo.

Enable Quiet Period
Specifies a delay after a single commit is detected before the build is started. This allows multiple commits to be aggregated into a single build.

Include/Exclude Files
Allows you to specify the files that Bamboo should, or should not, use to detect changes. When you configure the Include option, it means that you want Bamboo to use **only** the mentioned files for change detection because by default Bamboo checks all the files. The same way, if you configure the Exclude option, Bamboo will not consider the excluded files for detecting changes.

Enter into **File Pattern** a regular expression to match the files that Bamboo includes or excludes. The regex...
pattern must match the file path in the repository. See sub page for examples.

**Exclude Changesets**
Enter a regular expression to match the commit messages for changesets that should not start a build.

**Git LFS**
Enables support for Git Large File Storage (LFS), which replaces large files such as audio samples, videos, datasets, and graphics with text pointers inside Git, while storing the file contents on a remote server.

To use this option you must have the following:
- Git version 1.8.2 or later installed locally in your environment
- Git LFS 1.2 or later installed.

Bamboo 5.15 is shipped with Git LFS client image.

To learn more about Git LFS, see Git LFS tutorials.

**Web repository**
If your repository can be viewed in a web browser, select the repository type.

This allows links to relevant files to be displayed in the 'Code Changes' section of a build result.

**Stash** – specify the following details for the repository:
- **Stash URL** – the URL of your Stash (now Bitbucket Server) instance (e.g. 'https://bitbucket.mycompany.com').
- **Stash Project Key** – the key of the project in Stash (e.g. 'CONF').
- **Repository Name** – the name of the repository in Stash (e.g. 'conf-dev').

Use this option to connect to a Bitbucket Server repository.

See Integrating Bamboo with Bitbucket Server for more information.

**Fisheye** – specify the URL and other details for the repository:
- **Fisheye URL** — the URL of your Fisheye repository (e.g. 'https://atlaseye.atlassian.com/').
- **Repository Name** — the name of your Fisheye repository (e.g. 'Bamboo'). This is effectively the alias for your repository path.
- **Repository Path** — the path for your Fisheye repository (e.g. '/atlassian/bamboo/').

See Integrating Bamboo with Fisheye for more information.

**How do I determine my Repository Path?**
If you have previously run builds with changes from your repository, the easiest way of determining your repository path is to view the code changes and copy the path from the start of the path of one of the changed files, up to (but not including) the appropriate root directory. The root directories for repositories are the ones shown by Fisheye when browsing a repository (e.g. trunk). For example, if a code change listed /atlassian/bamboo/trunk/bamboo-acceptance-test/pom.xml, the path would be /atlassian/bamboo/.

If you have not previously run builds with changes from your repository, you will need to ask your Fisheye administrator for the repository path indexed by Fisheye.

**Hiding password for https Git tasks**
Starting from Bamboo 6.4, you Git username and password will be stored in a URL kept in turn in a temporary file which will be deleted. This way only Bamboo will have access to your Git credentials preventing other users on the same machine from viewing your data.

If you’re using Git Credential Manager for Windows, Gut might ask you for your credentials not at the
For more information about storing credentials in Git, see Git Tools Credential Storage.

Configuring Git SSH on Windows

**SSH overview**

You can use SSH keys to establish a secure connection between the Bamboo server and the SCM that hosts Git repositories.

- If no Git capability is configured, Bamboo will use its built-in Git implementation: the built-in Git implementation does not support symbolic links, submodules, automatic branch detection and automatic merging.
- Your SCM administrator must have already enabled SSH access to Git repositories.
- Supported key types are DSA and RSA2. Note that RSA1 is not supported. We've tested key sizes of 768, 1024, 2048, 4096 and 8192 bytes.

On this page:
- SSH overview
- Enabling SSH access to Git repositories

**Enabling SSH access to Git repositories**

**To enable SSH access:**

You need to set up SSH access when you configure your linked repositories:

1. Click the icon in the Bamboo header and choose **Overview**.
2. Click **Linked repositories** (under 'Build resources')
3. Click **Add repository**, and select Git from the Source repository menu
4. Complete the following fields:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display name</td>
<td>The name that identifies the repository when you are using multiple repositories in a plan</td>
</tr>
<tr>
<td>Repository URL</td>
<td>The URL of the Git repository</td>
</tr>
<tr>
<td>Branch</td>
<td>The name of the branch or tag containing the source code</td>
</tr>
</tbody>
</table>

5. Select **SSH private key** from the **Authentication Key** menu
6. Select the file containing your SSH key using the 'Choose File' button
7. Enter the passphrase to allow access to your SSH key
8. Click **Save repository**

Once you have enabled SSH access, you will also need to add an SSH server capability:

1. Click the icon in the Bamboo header and choose **Overview**.
2. Click **Server capabilities** and scroll to the bottom of the page
3. Click **Add** under the 'Add capability' heading
4. Complete the following fields:
<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capability type</td>
<td>Git</td>
</tr>
<tr>
<td>Executable</td>
<td>SSH</td>
</tr>
<tr>
<td>Path</td>
<td>The path to the SSH executable, for example: /usr/bin/ssh</td>
</tr>
</tbody>
</table>

5. Click **Add** to add the SSH capability.

**GitHub**

This page describes how to configure Bamboo to use a GitHub repository.

You can specify repositories at the following levels in Bamboo:

- global – repositories are available to all plans in Bamboo.
- plan – repositories are available to all jobs in the Bamboo plan.
- job – repositories are available to all tasks in the Bamboo job.

The recommended approach is to set up linked source repositories at the global level – see [Linking to source code repositories](#).

**Related pages:**
- [Git](#)

Configure a GitHub source code repository

1. Navigate to the repository configuration for a linked repository, plan or job. See [Linking to source code repositories](#).
2. Either click **Add Repository** to add a new repository, or edit an existing repository configuration.
3. Choose **GitHub** from the Source repository list.
4. Enter a **Display Name** to help identify the repository in Bamboo.
5. Enter your GitHub **Username** and **Password**.
6. Click **Load Repositories**.
7. You can configure the following advanced options for a GitHub source repository for your plan:

**Advanced Options**

**Use submodules**
Select to enable submodules support if these are defined for the repository. If native GitHub capability is not defined for agent submodules support will be disabled.

**Command timeout**
This is useful to stop hung Bitbucket processes. On slower networks, you may consider increasing the default timeout to allow Bamboo time to make an initial clone of the GitHub repository.

**Verbose logs**
Turns on **--verbose** and **--debug** options in hg commands and passes the output to build logs. Use this option if you encounter problems with GitHub in Bamboo.

**Enable Quiet Period**
Specifies a delay after a single commit is detected before the build is started. This allows multiple commits to be aggregated into a single build.

**Include/Exclude Files**
Allows you to specify the files that Bamboo should, or should not, use to detect changes.

Enter into **File Pattern** a regular expression to match the files that Bamboo includes or excludes. The regex pattern must match the file path in the repository. See [sub page](#) for examples.

**Exclude Changesets**
Enter a regular expression to match the commit messages for changesets that should not start a build.

**Web Repository**
**Stash** – specify the following details for the repository:

- **Stash URL** – the URL of your Stash (now Bitbucket Server) instance (e.g. 'https://bitbucket.mycompany.com').
- **Stash Project Key** – the key of the project in Stash (e.g. 'CONF').
- **Repository Name** – the name of the repository in Stash (e.g. 'conf-dev').

Use this option to connect to a Bitbucket Server repository.

See **Integrating Bamboo with Bitbucket Server** for more information.

**Fisheye** – specify the URL and other details for the repository:

- **Fisheye URL** — the URL of your Fisheye repository (e.g. 'https://atlaseye.atlassian.com/').
- **Repository Name** — the name of your Fisheye repository (e.g. 'Bamboo'). This is effectively the alias for your repository path.
- **Repository Path** — the path for your Fisheye repository (e.g. '/atlassian/bamboo/').

See **Integrating Bamboo with Fisheye** for more information.

**How do I determine my Repository Path?**

If you have previously run builds with changes from your repository, the easiest way of determining your repository path is to view the code changes and copy the path from the start of the path of one of the changed files, up to (but not including) the appropriate root directory. The root directories for repositories are the ones shown by Fisheye when browsing a repository (e.g. trunk). For example, if a code change listed /atlassian/bamboo/trunk/bamboo-acceptance-test/pom.xml, the path would be /atlassian/bamboo/.

If you have not previously run builds with changes from your repository, you will need to ask your Fisheye administrator for the repository path indexed by Fisheye.

**Mercurial**

This page describes how to configure Bamboo to use a Mercurial repository.

You can specify repositories at the following levels in Bamboo:

- global – repositories are available to all plans in Bamboo.
- plan – repositories are available to all jobs in the Bamboo plan.
- job – repositories are available to all tasks in the Bamboo job.

The recommended approach is to set up linked source repositories at the global level – see **Linking to source code repositories**.

**Before you start:**

- **Please use Mercurial 2.1.1 or later.** Mercurial 2.1 has a bug that makes it incompatible with Bamboo.
- You will not be able to create plans or jobs that use a Mercurial repository without specifying the shared local Mercurial capability first. Read more about configuring a version control capability.

**Related pages:**

- Bitbucket Cloud

Configure a Mercurial source repository

1. Navigate to the repository configuration for a linked repository, plan or job. See **Linking to source code repositories**.
2. Either click **Add Repository** to add a new repository, or edit an existing repository configuration.
3. Choose **Mercurial** from the **Source Repository** list.
4. Enter a **Name** to help identify the repository in Bamboo.
5. You can configure the following settings for a Mercurial source repository for your plan:

Repository URL
The full path to your Mercurial repository (eg: git://bitbucket.org/atlassian/bamboo-git-plugin.git)
Valid URLs are of the form:
- local/filesystem/path[#revision]
- file://local/filesystem/path[#revision]
- http[s]://[user[:pass]@]host[:port]/[path][#revision]
- ssh://[user[:pass]@]host[:port]/[path][#revision]
For further references visit Mercurial documentation.

Branch
The name of the relevant branch (or tag) you want to work on. Leave empty to work on default branch.

Authentication
- Username and password
  You can use shared credentials or type a username and a password.
- SSH private key
  You can use shared credentials or upload an SSH key and provide the SSH passphrase.
- SSH private key (direct connection)
  Upload an SSH Key. The passphrase is not required.
- Default Mercurial credentials
  Bamboo will rely on the default hg authentication. Use this option, for example, if you had set up the Bamboo server manually with SSH servers defined in .ssh/config, valid SSH identity files, etc.

Advanced Options

Command timeout
Type the number of minutes bamboo should wait for hg commands to finish. This is useful to stop hung Mercurial processes. On slower networks you may consider increasing default timeout to allow Bamboo to make an initial clone of the Mercurial repository.

Verbose logs
Turns on --verbose and --debug options in hg commands and passes the output to build logs. Use that option if you encounter problems with Mercurial in Bamboo.

Location of POM file
Type the path to your project's pom.xml file which is relative to the root of your Mercurial Repository URL (defined above). Only available when importing a Maven 2 project.

Disable repository caching
Select this option to enable subrepositories support.

Enable Quiet Period
Specifies a delay after a single commit is detected before the build is started. This allows multiple commits to be aggregated into a single build.

Include/Exclude Files
Allows you to specify the files that Bamboo should, or should not, use to detect changes.

Exclude Changesets
Enter a regular expression to match the commit messages for changesets that should not start a build.

Web Repository
If your repository can be viewed in a web browser, select the repository type.
This allows links to relevant files to be displayed in the 'Code Changes' section of a build result.

**Mercurial Web Repository** – select one of the following viewer schemes:

- **BitBucket Web Repository Scheme** (if you use BitBucket)
- **Default Web Repository Scheme (hgserve)** (Mercurial's own default web server)

**Stash** – specify the following details for the repository:

- **Stash URL** – the URL of your Stash (now Bitbucket Server) instance (e.g. 'https://bitbucket.mycompany.com').
- **Stash Project Key** – the key of the project in Stash (e.g. 'CONF').
- **Repository Name** – the name of the repository in Stash (e.g. 'conf-dev').

Use this option to connect to a Bitbucket Server repository.

See [Integrating Bamboo with Bitbucket Server](#) for more information.

**Fisheye** – specify the URL and other details for the repository:

- **Fisheye URL** — the URL of your Fisheye repository (e.g. 'https://atlaseye.atlassian.com/').
- **Repository Name** — the name of your Fisheye repository (e.g. 'Bamboo'). This is effectively the alias for your repository path.
- **Repository Path** — the path for your Fisheye repository (e.g. '/atlassian/bamboo/').

See [Integrating Bamboo with Fisheye](#) for more information.

---

**How do I determine my Repository Path?**

If you have previously run builds with changes from your repository, the easiest way of determining your repository path is to view the code changes and copy the path from the start of the path of one of the changed files, up to (but not including) the appropriate root directory. The root directories for repositories are the ones shown by Fisheye when browsing a repository (e.g. trunk). For example, if a code change listed /atlassian/bamboo/trunk/bamboo-acceptance-test/pom.xml, the path would be /atlassian/bamboo/.

If you have not previously run builds with changes from your repository, you will need to ask your Fisheye administrator for the repository path indexed by Fisheye.

---

**Upgrading remote agents for Mercurial**

The [remote agent installer](#) has been modified for Bamboo 2.7 to handle Mercurial source code repositories. This update only impacts Mercurial plans or jobs that use the "SSH/Keyfile with passphrase" option to access the remote repository:

*Screenshot: Choosing the 'Keyfile with passphrase' option for a plan or job*
If you need to access a Mercurial repository using the SSH protocol with a passphrase-protected keyfile, then you need to upgrade your remote agents to version 2.7 or later. Otherwise, you can keep your old agent. To upgrade your remote agents:

1. Obtain the Bamboo remote agent for version 2.7 or later (i.e. `atlassian-bamboo-agent-installer-x.x.jar` where 'x.x' is 2.7 or later). Refer to [Bamboo remote agent installation guide](https://confluence.atlassian.com/bamboo/remote-agent-installation-guide) for more information.
2. Use this file to replace your existing `atlassian-bamboo-agent-installer.x.x.jar` (where 'x.x' is 2.6 or earlier) on the computers running your Bamboo remote agents.
3. Restart the remote agent (i.e. kill it among with accompanying wrapper processes and then issue the command `java -jar atlassian-bamboo-agent-installer-2.7.jar yourBambooAgentServer`).

This procedure should prepare your agent to build Mercurial plans using passphrase-protected SSH keyfiles.

**Perforce**

This page describes how to configure Bamboo to use a Perforce repository.

You can specify repositories at the following levels in Bamboo:

- global – repositories are available to all plans in Bamboo.
- plan – repositories are available to all jobs in the Bamboo plan.
- job – repositories are available to all tasks in the Bamboo job.
The recommended approach is to set up linked source repositories at the global level – see Linking to source code repositories.

Configure a Perforce source repository

1. Navigate to the repository configuration for a linked repository, plan or job. See Linking to source code repositories.
2. Either click Add Repository to add a new repository, or edit an existing repository configuration.
3. Choose Perforce from the Source Repository list.
4. Enter a Display Name to help identify the repository in Bamboo.
5. You can configure the following settings for a Perforce source repository for your plan:

<table>
<thead>
<tr>
<th>Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type either the port to which the Perforce client will connect, or the Perforce server itself. This is the Perforce P4PORT environment variable that tells Bamboo which p4d (Perforce server) to use.</td>
</tr>
</tbody>
</table>

**Client (Workspace)**

The name of the Perforce Client Workspace which Bamboo will use. The Client Workspace determines which portions of the depot are visible in your Workspace Tree.

Do not create two Plans/Jobs that use the same client (e.g. one client set to manage, the other client set to not manage). This setup will create major issues in your builds.

**Depot View**

The client view of the depot that contains the source code files for this Plan/Job. This is typically in the form //<clientname>/<workspace_mapping>/... For details please see the Perforce User's Guide.

Bamboo sets the client root to its working directory, which means that code will be checked out to the 'working directory/<workspace_mapping>' location. Please take note of this, when specifying the 'Artifact Copy Pattern' for your Build Artifacts.

**Username**

The Perforce username that Bamboo will use when it accesses the server ('Port'). Leave this field blank if you want Bamboo to use the default Perforce user (i.e. the OS username).

**Password**

Type the password required by the Perforce username (if applicable).

**Let Bamboo manage your workspace**

This field indicates whether or not you want Bamboo to manage your workspace.

**Use Client Mapping For Change Detection**

Select this option if you use overlay mappings for your workspace. Your workspace must be available on the Bamboo Server.

**Advanced Options**

**Enable Quiet Period**

Specifies a delay after a single commit is detected before the build is started. This allows multiple commits to be aggregated into a single build.

**Include/Exclude Files**

Allows you to specify the files that Bamboo should, or should not, use to detect changes.

Enter into File Pattern a regular expression to match the files that Bamboo includes or excludes. The regex pattern must match the file path in the repository. See sub page for examples.

**Exclude Changesets**

Enter a regular expression to match the commit messages for changesets that should not start a build.

**Web Repository**
If your repository can be viewed in a web browser, select the repository type. This allows links to relevant files to be displayed in the 'Code Changes' section of a build result.

Generic Web Repository

- **Web Repository URL** – the URL of the repository.
- **Web Repository Module** — the particular repository required for this plan or job, if the Web Repository URL above points to multiple repositories.

Stash – specify the following details for the repository:

- **Stash URL** – the URL of your Stash (now Bitbucket Server) instance (e.g. 'https://bitbucket.mycompany.com')
- **Stash Project Key** – the key of the project in Stash (e.g. 'CONF')
- **Repository Name** – the name of the repository in Stash (e.g. 'conf-dev')

Use this option to connect to a Bitbucket Server repository.

See Integrating Bamboo with Bitbucket Server for more information.

Fisheye – specify the URL and other details for the repository:

- **Fisheye URL** — the URL of your Fisheye repository (e.g. 'https://atlaseye.atlassian.com/').
- **Repository Name** — the name of your Fisheye repository (e.g. 'Bamboo'). This is effectively the alias for your repository path.
- **Repository Path** — the path for your Fisheye repository (e.g. '/atlassian/bamboo/').

See Integrating Bamboo with Fisheye for more information.

**How do I determine my Repository Path?**

If you have previously run builds with changes from your repository, the easiest way of determining your repository path is to view the code changes and copy the path from the start of the path of one of the changed files, up to (but not including) the appropriate root directory. The root directories for repositories are the ones shown by Fisheye when browsing a repository (e.g. trunk). For example, if a code change listed /atlassian/bamboo/trunk/bamboo-acceptance-test/pom.xml, the path would be /atlassian/bamboo/.

If you have not previously run builds with changes from your repository, you will need to ask your Fisheye administrator for the repository path indexed by Fisheye.

**Notes**

1. **You will not be able to create plans or jobs that use a Perforce repository without specifying the shared local Perforce capability first.** Read more about configuring a VCS capability.
2. **Keep your Perforce configuration up to date** — If you are using Perforce as your repository, you must ensure your Perforce configuration in Bamboo is in sync with any changes to your Perforce repository (such as client, depot or user credential changes). If not, your Perforce repository changes may cause unexpected behavior in Bamboo when Bamboo tries to access the repository. See the notes in the configuration instructions below for further details.
3. **Issue when running Bamboo with Perforce prior to Bamboo 2.0.7** — A known issue exists when running Bamboo with Perforce prior to Bamboo 2.0.7 (See BAM-2866 and BAM-2849). If you change the name of your Perforce client (i.e. via an update) without updating your Perforce configuration in Bamboo, Bamboo will not be able to find the Perforce client to run against. Perforce will then create a default client in your running directory. This can lead to situations where Bamboo will attempt to clear out data from your running directory (e.g. force build). To avoid this problem, ensure that you update the 'Client' in your Perforce configuration whenever you change your Perforce client.
4. **Please be aware of the following implications when either letting Bamboo manage or preventing Bamboo...**
from managing your workspace:

- **If you let Bamboo manage your workspace,**
  - We recommend this configuration if your Jobs will be running on many different machines or different operating systems, as Bamboo sets the client root for you.
  - Bamboo will make configuration changes to the Client Workspace to manage builds (e.g. Bamboo will modify the `host` and `root`). You need to ensure that you enter a Client Workspace in the 'Client' field that will be used solely for Bamboo.
  - Under this configuration, you should configure one client per Job to avoid conflicts when updating the client root.

- **If you do not let Bamboo manage your workspace,**
  - We recommend this configuration if you wish to reuse your client for several Jobs, as Bamboo will retrieve the client root directory from Perforce and use it to run builds.
    
    **Setting the client root in Perforce:** We strongly recommend that you choose a directory that is dedicated for Bamboo’s use only, when you are specifying the client root in your Perforce repository. This directory may get cleaned (i.e. files and sub-directories deleted) if you choose to force clean builds.
  - Under this configuration, you need to ensure that the client root directory exists on all machines that the Job will be built on.
  - Please note that alternate roots does not currently work in Bamboo. See issue BAM-2377 for further details.

### Using Perforce with Bamboo - limitations and workarounds

There are some limitations to using Bamboo with Perforce. Please read the following information carefully before setting up a build plan to use Perforce.

**On this page:**

1. Running builds on multiple remote agents or machines
2. Using Perforce Overlay and Exclusionary Mappings in Bamboo

#### 1. Running builds on multiple remote agents or machines

**Limitation**

You will not be able to run builds on multiple remote agents and/or multiple remote machines using a Perforce repository, without using one of the workarounds described below. If you try to do so, you will run into problems with change detection that could cause your agents to build incorrect code. This problem does not affect the running of builds on multiple local agents.

**Background**

Perforce is a client/server SCM (software configuration management) system that manages your changes/files by storing the change information on its server. However, storing change information on the Perforce server can cause problems when you have clients on multiple agents/machines. If you have downloaded a particular change with a Perforce client, the change will be marked as downloaded by the Perforce server. If you use the same Perforce client on another machine, the Perforce server will incorrectly assume that you have already downloaded that particular change and will not download it. Hence, your agents may not pick up changes correctly and could build incorrect code.

**Workarounds**

There a few workarounds available for this issue, if you are using Perforce with Bamboo:

- **Restrict your plan to use a single machine** — you can use one or more remote agents to build a plan, if they are running on the same machine and you set the client root yourself (i.e. do not let Bamboo manage your workspace) so that your agents will build to the same directory.
- **Make Bamboo force a clean build every time it builds** — this will ensure that your agents are always building the correct code. However, it can be an inefficient setup for big projects.
- **Use alternate roots for different machines** — specifying alternate roots for different machines will allow you to work around the change detection issue, as long as the roots on each machine are unique. Please note however, you will be restricted to three machines (with three different roots) due to Perforce limitations.

Please see the following Jira issues for further information, BAM-2843 and BAM-2774.
2. Using Perforce Overlay and Exclusionary Mappings in Bamboo

Limitation

You will not be able to control how Bamboo detects changes using exclusionary mappings or overlay mappings. Please note, this issue does not affect you if you only trigger your builds on a schedule or manually, as Bamboo agents still build the correct code when triggered.

You may want to try the "Use Client Mapping For Change Detection" available in the Bamboo Perforce repository type.

Background

Bamboo currently uses the depot view, not the client view, when detecting changes. Hence, any exclusionary and overlay mappings will not be available during change detection.

For example, if a p4 client uses an overlay mapping like this one:

```
//depot/Prj/... //clientName/depot/Prj/...
+//depot/Dep/... //clientName/depot/Prj/Dep/...
```

and the 'Depot' specified in a plan's repository configuration is:

```
//clientName/depot/Prj/...
```

then Bamboo will lookup the corresponding depot view and detect changes by running the following command:

```
p4 changes //depot/Prj/...
```

Consequently, no changes to files in //clientName/depot/Prj/Dep/... will be picked up by change detection, despite the overlay mapping.

Hence, if you set up your build to trigger when code is updated it will not trigger correctly.

Workarounds

A partial workaround is available in Bamboo, if you wish to use exclusionary mappings for your client workspace. Specify your build plan to exclude files that match a specified pattern by choosing 'Exclude all changes that match the following pattern' from the 'Include / Exclude Files' dropdown (under the 'Common repository configuration' section). See this document for further details. Please note, this will only exclude one pattern whereas multiple exclusions can be specified in an exclusionary mapping.

Unfortunately, there is no workaround for overlay mappings in Bamboo.

Please note, we are aware of these problems and are working to address them — see the following Jira issue for further information, BAM-3323.

Subversion

This page describes how to configure Bamboo to use a Subversion repository.

You can specify repositories at the following levels in Bamboo:

- global – repositories are available to all plans in Bamboo.
- plan – repositories are available to all jobs in the Bamboo plan.
- job – repositories are available to all tasks in the Bamboo job.

The recommended approach is to set up linked source repositories at the global level — see Linking to source code repositories.
Configure a Subversion source repository

1. Navigate to the repository configuration for a linked repository, plan or job. See Linking to source code repositories.
2. Either click Add Repository to add a new repository, or edit an existing repository configuration.
3. Choose Subversion from the Source Repository list.
4. Enter a Display Name to help identify the repository in Bamboo.
5. You can configure the following settings for a Subversion source repository for your plan:

Repository URL
The location of the root of your Subversion repository. For example:

http://svn.collab.net/repos/svn

- Note that you can use global variables in this field (see Using Global or Build-specific Variables).
- If you are importing a Maven 2 Project, this location should contain your project’s pom.xml file.

Branch name
The display name of a branch or a module that you want to check out. For example My project. The name will be used in the Bamboo UI.

Branch path
The path to a branch or a module that you want to checkout. For example, trunk, branches/my_branch. The path is relative to the root URL of the repository.

- Note that you can use global variables in this field (see Using Global or Build-specific Variables).
- If you are importing a Maven 2 Project, this location should contain your project’s pom.xml file.

Username (Optional)
The Subversion username (if any) required to access the repository.

Authentication Type
- Password – choose this option if you want to authenticate with a username and password.
- SSH – if you choose to authenticate using SSH, you need to provide the following details:
  - Private Key — the absolute path of your SSH private key.
  - Passphrase — the passphrase for your SSH private key.

  If you are planning to use remote agents the ssh private key file has to be copied to the agent box into the same location as specified.

- SSL Client Certificate – if you choose to authenticate using an SSL Client Certificate, you need to provide the following details:
  - Private Key — the absolute path of your SSL client certificate.
  - Passphrase — the passphrase for your SSL client certificate.

  Please note, the client certificate has to be in PKCS12 format and the client certificate file must be passphrase protected, otherwise a runtime exception is thrown by the JDK security engine while opening the user key.

Advanced Options

Detect Changes in Externals
Select this if your Subversion repository uses `svn:externals` to link to other repositories (your externals must be in the root of the checkout directory, not in a subdirectory). Please note that you only need to select this check box if you require Bamboo to detect changes in the externals. If your externals reference a particular (static) revision, you do not need to check this box.

**Use SVN Export**
This option will speed up the first-time checkout, but updates are not supported. Implies Force Clean Build.

**Enable Commit Isolation**
Ensures that a build will only have one change, allowing you to isolate your build failures.

**Automatically detect root URL for branches**
Specifies whether the VCS Branching Task automatically determines the location of created branches.

**Automatically detect root URL for tags**
Specifies whether the VCS Tagging Task automatically determines the location of created branches.

**Enable Quiet Period**
Specifies a delay after a single commit is detected before the build is started. This allows multiple commits to be aggregated into a single build.

**Include/Exclude Files**
Allows you to specify the files that Bamboo should, or should not, use to detect changes.

Enter into **File Pattern** a regular expression to match the files that Bamboo includes or excludes. The regex pattern must match the file path in the repository. See sub page for examples.

**Exclude Changesets**
Enter a regular expression to match the commit messages for changesets that should not start a build.

**Web Repository**
If your repository can be viewed in a web browser, select the repository type. This allows links to relevant files to be displayed in the 'Code Changes' section of a build result.

**Generic Web Repository**

- **Web Repository URL** — the URL of the repository.
- **Web Repository Module** — the particular repository required for this plan or job, if the Web Repository URL above points to multiple repositories.

**Stash** — specify the following details for the repository:

- **Stash URL** — the URL of your Stash (now Bitbucket Server) instance (e.g. 'https://bitbucket.mycompany.com').
- **Stash Project Key** — the key of the project in Stash (e.g. 'CONF').
- **Repository Name** — the name of the repository in Stash (e.g. 'conf-dev').

Use this option to connect to a Bitbucket Server repository.

See Integrating Bamboo with Bitbucket Server for more information.

**Fisheye** — specify the URL and other details for the repository:

- **Fisheye URL** — the URL of your Fisheye repository (e.g. 'https://atlaseye.atlassian.com/').
- **Repository Name** — the name of your Fisheye repository (e.g. 'bamboo'). This is effectively the alias for your repository path.
- **Repository Path** — the path for your Fisheye repository (e.g. '/atlassian/bamboo/').

See Integrating Bamboo with Fisheye for more information.

**How do I determine my Repository Path?**
If you have previously run builds with changes from your repository, the easiest way of determining your repository path is to view the code changes and copy the path from the start of the path of one of the...
changed files, up to (but not including) the appropriate root directory. The root directories for repositories are the ones shown by Fisheye when browsing a repository (e.g. trunk). For example, if a code change listed /atlassian/bamboo/trunk/bamboo-acceptance-test/pom.xml, the path would be /atlassian/bamboo/.

If you have not previously run builds with changes from your repository, you will need to ask your Fisheye administrator for the repository path indexed by Fisheye.

Notes

- If you are having problems connecting to Subversion, consult our documentation on troubleshooting Subversion connections.
- If you use pre-1.5 Subversion client to access code checked out by Bamboo, you may encounter problems with your builds. This is due to the SVNKit upgrade in Bamboo 2.1.4. Please read this knowledge base article for further details.
- You can add the -Dsvnkit.http.methods=Basic,NTLM system property to SVNKit to have NTLM authentication work with Bamboo.

Configuring source code management triggers for Subversion

This page provides instructions on how to configure Subversion to send message events that trigger the execution of Bamboo plans. You only need to configure Subversion to send these message events if The repository triggers the build when changes are committed build strategy has been specified for one or more of your Bamboo plans.

Configuring Subversion to trigger a build

This section explains how to configure Subversion to trigger a build when the repository is changed. A Subversion hook script is used to perform the trigger action whenever a Subversion repository is changed.

The following commands and script files assume that your Subversion server runs on a UNIX- or Linux-based operating system. If your Subversion server runs on any other operating system, then you will need to modify the script files and if necessary, the commands below to suit that operating system.

On this page:
- Configuring Subversion to trigger a build
- Notes

Related pages:
- Subversion
- Configuring source code management triggers for CVS

Step 1. Enable the Subversion post-commit hook

To do this, run the following commands:

```
cd svn-repository-containing-the-build-source-code
cd into the hooks/ directory
```

The Subversion post-commit file is not installed by default. If it does not exist, make a copy of the post-commit.tmpl file in the hooks/ directory, name it post-commit and make it executable:

```
cp post-commit.tmpl post-commit
chmod a+rx post-commit
```

Step 2. Install the post-commit trigger

Add a line like the following to the post-commit file, for running Bamboo's build trigger script file.
/path-to-your-bamboo-installation/scripts/svn-triggers/postCommitBuildTrigger.sh base-url BUILD-KEY

where:

- **base-url** is the base URL of the Bamboo server. For example: http://<name-of-machine>:8085
- **BUILD-KEY** is the key of the Bamboo plan to be executed.

Make Bamboo's build trigger script file executable (using `chmod`) so that the Subversion user can execute it.

**Step 3. Do a test commit**

Conduct a 'test' commit. Bamboo should start building the relevant plan after a few seconds.

The Bamboo log file should contain an entry like this:

```
[INFO] com.atlassian.bamboo.build.UpdateAndBuild - Bamboo build was triggered by remote http call from 127.0.0.1
```

**Notes**

**Build Trigger Security** — Bamboo will only accept remote build triggers if the triggers originated from the Subversion server(s) identified in the Subversion **Repository URL** of any Bamboo plans. Requests originating from other Subversion servers will be rejected by Bamboo.

**CVS**

This page describes how to configure Bamboo to use a Bitbucket repository.

You can specify repositories at the following levels in Bamboo:

- **global** – repositories are available to all plans in Bamboo.
- **plan** – repositories are available to all jobs in the Bamboo plan.
- **job** – repositories are available to all tasks in the Bamboo job.

The recommended approach is to set up linked source repositories at the global level – see **Linking to source code repositories**.

**Configure a CVS source repository**

1. Navigate to the repository configuration for a linked repository, plan or job. See **Linking to source code repositories**.
2. Either click **Add Repository** to add a new repository, or edit an existing repository configuration.
3. Choose **CVS** from the **Source Repository** list.
4. Enter a **Display Name** to help identify the repository in Bamboo.
5. You can configure the following settings for a CVS source repository for your plan:

**CVS Root**

The full path to your CVS repository root (e.g. :pserver:me@cvs.atlassian.com:/cvsroot/atlassian). Bamboo supports pserver, ext (ssh) and local repository access methods. Note that you can use global variables in this field (see **Bamboo variables**).

ℹ️ If you are **importing a Maven 2 Project**, this location should contain your project's pom.xml file.

**Authentication Type**

- **Password** – choose this option if you want to authenticate with a password.
- **SSH** – if you choose to authenticate using SSH, you need to provide the following details:
  - **Private Key** — the absolute path of your SSH private key.
  - **Passphrase** — the passphrase for your SSH private key.
Quiet Period
This setting is used to avoid starting a build while someone is in mid-checkin. Bamboo will only initiate a build for this plan when no more changes are detected within the Quiet Period following the last known change. Type the number of seconds Bamboo should wait. Please note that this parameter is mandatory for CVS, as CVS allows partial checkouts.

(Only available when configuring an existing plan.)

Module
Type the name of the CVS module that contains the source-code.

Currently Bamboo has limited support for CVS ampersand modules. To use an ampersand module, you will need to define a regular module with the same name as the ampersand module (since Bamboo expects there to be a directory with the specified checkout module name). For example:

1. Create a module (e.g. allbuilds).
2. Define an ampersand module with the same name. (The ampersand module can be empty.)
3. In the Module field, enter the following: `allbuilds allbuilds &project2 &project2 &project3`

Version of module
The version of the module that Bamboo should build:

- HEAD
- Branch/Tag – supply the name of the branch or tag.

Note that you can use global variables in this field (see Bamboo variables).

Advanced Options

Include/Exclude Files
Allows you to specify the files that Bamboo should, or should not, use to detect changes.

Enter into File Pattern a regular expression to match the files that Bamboo includes or excludes. The regex pattern must match the file path in the repository. See sub page for examples.

Exclude Changesets
Enter a regular expression to match the commit messages for changesets that should not start a build.

Web Repository
If your repository can be viewed in a web browser, select the repository type.

This allows links to relevant files to be displayed in the ‘Code Changes’ section of a build result.

Generic Web Repository

- Web Repository URL – the URL of the repository.
- Web Repository Module — the particular repository required for this plan or job, if the Web Repository URL above points to multiple repositories.

Stash – specify the following details for the repository:

- Stash URL – the URL of your Stash (now Bitbucket Server) instance (e.g. 'https://bitbucket.mycompany.com').
- Stash Project Key – the key of the project in Stash (e.g. 'CONF').
- Repository Name – the name of the repository in Stash (e.g. 'conf-dev').

See Integrating Bamboo with Bitbucket Server for more information.

Use this option to connect to a Bitbucket Server repository.

Fisheye

- Fisheye URL — the URL of your Fisheye repository (e.g. 'https://atlaseye.atlassian.com').
1. Repository Name — the name of your Fisheye repository (e.g. 'Bamboo'). This is effectively the alias for your repository path.
2. Repository Path — the path for your Fisheye repository (e.g. '/atlassian/bamboo/').

See Integrating Bamboo with Fisheye for more information.

**How do I determine my Repository Path?**
If you have previously run builds with changes from your repository, the easiest way of determining your repository path is to view the code changes and copy the path from the start of the path of one of the changed files, up to (but not including) the appropriate root directory. The root directories for repositories are the ones shown by Fisheye when browsing a repository (e.g. trunk). For example, if a code change listed /atlassian/bamboo/trunk/bamboo-acceptance-test/pom.xml, the path would be /atlassian/bamboo/.
If you have not previously run builds with changes from your repository, you will need to ask your Fisheye administrator for the repository path indexed by Fisheye.

Configuring source code management triggers for CVS
This page provides instructions on how to configure CVS to send message events that trigger the execution of Bamboo plans.

You only need to configure CVS to send these message events if The repository triggers the build when changes are committed trigger has been configured for one or more of your Bamboo plans.

**Configuring CVS to trigger a build**
This section explains how to configure CVS to trigger a build when the repository is changed. This involves installing two scripts:

1. A pre-commit trigger keeps track of the last directory to be processed, so we know when the commit has completed.
2. A post-commit trigger that waits until it has processed the last directory of the commit before instructing the Bamboo server to execute the relevant plan(s).

**On this page:**
- Configuring CVS to trigger a build
- Notes

**Related pages:**
- CVS
- Configuring source code management triggers for Subversion

⚠️ The following commands and script files assume that your CVS server runs on a UNIX- or Linux-based operating system. If your CVS server runs on any other operating system, then you will need to modify the script files and if necessary, the commands below to suit that operating system.

**Step 1. Checking out the CVSROOT**
First check out your repository’s CVSROOT directory into a temporary directory:

```bash
cvs -d cvsroot-to-your-repository checkout CVSROOT
```

where:

- **cvsroot-to-your-repository** is the root directory pathname of the CVS repository.
- Using `-d cvsroot-to-your-repository` overrides the any `$CVSROOT` environment variable setting.

The following files should be checked out:
Step 2. Install the pre-commit trigger

Add a line like the following example's to the CVSROOT/commitinfo pre-commit trigger file. The CVSROOT/commitinfo file contains the list of programs to run whenever a file is about to be committed to the repository.

```
^Moo /path-to-your-bamboo-installation/scripts/cvs-triggers/preCommit.sh %r/%p
```

where:
- ^Moo is the regular expression used to identify the name of the module (called Moo) being updated.
- /path-to-your-bamboo-installation/scripts/cvs-triggers/preCommit.sh is the Bamboo shell script used to detect the last file of the check in.
  - If your Bamboo installation and CVS server are on different machines, refer to the note below.

Step 3. Install the post-commit trigger

Add a line like the following example’s to the CVSROOT/loginfo post-commit trigger file. The CVSROOT/loginfo file contains the list of programs to run whenever a file has been successfully committed into the repository.

```
^Moo
```

where:
- ^Moo is the regular expression used to identify the name of the module (called Moo) being updated.
- /path-to-your-bamboo-installation/scripts/cvs-triggers/postCommitBuildTrigger.sh is the Bamboo shell script to trigger the build.
  - If your Bamboo installation and CVS server are on different machines, refer to the note below.
- %r%p is how CVS tells the postCommitBuildTrigger.sh script which directory it is committing.
- MOO-KEY the key of the Bamboo plan to be executed.

Step 4. Save the changes back to CVS

Commit the changes you made to the CVSROOT/commitinfo and CVSROOT/loginfo files in step 2 and 3, respectively, back to the repository.

```
cvs -d cvsroot-to-your-repository commit
```
where:

- **cvsroot-to-your-repository** is the root directory pathname of the CVS repository.
  
  Using `-d cvsroot-to-your-repository` overrides the any `$CVSROOT` environment variable setting.

**Step 5. Do a test commit**

Conduct a 'test' commit. Bamboo should start building the relevant plan after a few seconds.

The Bamboo log file should contain an entry like this:

```
[INFO] com.atlassian.bamboo.build.UpdateAndBuild - Bamboo build was triggered by remote http call from 127.0.0.1
```

- The `postCommitBuildTrigger.sh` is only triggered when the last file of the commit has been committed.
- The `preCommit.sh` and `postCommitBuildTrigger.sh` must have sufficient privileges to be executed by the CVS user.
- If your Bamboo installation is not running on the same machine as the CVS server, you will also need add the Bamboo `preCommit.sh` and `postCommitBuildTrigger.sh` files to the CVSROOT directory and add the names of these files to the end of the `checkoutlist` file.

**Notes**

**Build Trigger Security** — Bamboo will only accept remote build triggers if the triggers originated from the CVS server(s) identified in the **CVS root** paths of any Bamboo plans. Requests originating from other CVS servers will be rejected by Bamboo.

**Shared credentials**

You can store credentials within Bamboo for easier access to repositories and Amazon Web Services. The access details that you provide are available to all plans on your Bamboo server.

To manage shared credentials:

1. Click the ![settings](https://example.com/settings) icon in the Bamboo header and choose **Overview**.
2. Go to **Build resources > Shared credentials**.
3. You can **add**, **edit**, or **delete** existing credentials.

**Related pages:**

- Linking to source code repositories
- Checking out code
- Configuring plans

**Adding shared credentials**

1. Click **Add shared credentials** and select the type of credentials that you want to add
2. Provide the details:

<table>
<thead>
<tr>
<th>Type</th>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
</table>

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<table>
<thead>
<tr>
<th>Credential name</th>
<th>The name of the credential set. Make the name meaningful, as Bamboo refers to the credential set by its name without quoting the details.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AWS</strong></td>
<td><strong>Access key ID</strong> Credentials assigned to each IAM user in the AWS management console. For more information, see <a href="#">AWS account for Bamboo</a>.</td>
</tr>
<tr>
<td></td>
<td><strong>Secret access key</strong></td>
</tr>
<tr>
<td><strong>SSH</strong></td>
<td><strong>SSH key</strong> The private key from the SSH key pair that you created to authenticate with a repository. You must specify the public key on the repository host side.</td>
</tr>
<tr>
<td></td>
<td><strong>SSH passphrase</strong> The passphrase for accessing the SSH private key</td>
</tr>
<tr>
<td><strong>Username and password</strong></td>
<td><strong>Username</strong> The username with which you want to authenticate</td>
</tr>
<tr>
<td></td>
<td><strong>Password</strong> The password with which you want to authenticate</td>
</tr>
</tbody>
</table>

3. Click **Save credentials** to add the credentials to the shared credentials list.

**Editing shared credentials**

You can modify the details of the existing shared credential by clicking **Edit** next to the credential name and selecting the **Change** check box.

**Deleting shared credentials**

You can delete existing shared credentials by clicking **Delete** next to the credential name.

After you click **Delete**, Bamboo displays a message with a list of repositories or plan tasks that depend on the credential and might break if you delete it.

**Smart Mirroring**

Starting with version 6.2 Bamboo provides support for Bitbucket Server Smart Mirroring functionality. Smart Mirroring allows you to use local repositories for storing your repository data to avoid having to wait when cloning a repository from a remote location.

For detailed information on Smart Mirroring, see the [Bitbucket Server documentation](#).

**Prerequisites**

- Bitbucket Server 5.0.0 or later
- Bitbucket Server Data Center license with mirrors support
- routing from Bamboo to Bitbucket Server instance
- routing between agent and mirror enabled

To enable Smart Mirroring in Bamboo:

1. Go to
   > **Overview** > **Linked repositories**.
2. Select your Bitbucket Server repository.
3. In the Edit repository section, select **Advanced options**.
4. From the **Mirror** drop-down list, select your mirror location.
Enabling webhooks

Webhooks allow your repositories other than Bitbucket Server to communicate with Bamboo. Once you set up a webhook for a repository, a repository sends the HTTP request to Bamboo with every new commit. This HTTP request, in turn, triggers Bamboo Specs scan repository to see if there are any changes to Specs. If Bamboo detects any changes in a repository, it automatically updates necessary plans and deployments.

Bamboo supports the use of Java and YAML Specs with the following repositories:

- Bitbucket Cloud
- Git
- GitHub
- Subversion

To enable webhooks in your repository:

1. In Bamboo, generate a URL used as a destination for your webhook:
   a. In the top navigation bar, click Create > Create Bamboo Specs.
   b. Select your project type.
   c. Select the repository for Bamboo Specs.
   d. Copy the URL that is generated for you as the destination for the webhook.
2. In the repository you want to use for storing Bamboo Specs, use the Bamboo URL to enable the webhook:
   a. Go to your repository settings.
   b. Find webhook-specific configuration.
   c. Paste in the URL Bamboo provided you with.

Bamboo webhook is now enabled in your repository.

Enabling webhooks 1

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**Triggering builds**

Triggering in Bamboo allows plan builds to be started automatically. Bamboo has the following trigger methods:

- **Trigger a build if code has changed:**
  - Poll the repository for changes
  - A push to the repository triggers the build

- **Trigger a build based on a schedule:**
  - Cron-based scheduling
  - Single daily build

- **Trigger a build depending on the outcome of other plans:**
  - Plan builds are triggered by preceding successful builds of other plans.
  - Plan only builds if other specified plans are building successfully.

**On this page:**
- Choosing a triggering strategy

**Related pages:**
- Running a plan build manually
- Setting up plan build dependencies

Note that a plan that has no configured triggers can only be started manually, or if it is dependent on the successful build of another plan.

From Bamboo 4.3, you can configure multiple triggers for each plan. This allows a plan to be triggered by different trigger types, and to have triggering scenarios such as "every 5 minutes between 9:00am and 10:00am, and every 20 minutes between 1:00pm and 10:00pm".

Triggers can only be configured by a Bamboo administrator.

**Choosing a triggering strategy**

This table lists the ways in which plan builds can be triggered in Bamboo.

<table>
<thead>
<tr>
<th>Triggering option</th>
<th>Description</th>
</tr>
</thead>
</table>

Created by Atlassian in 2019 Licensed under a Creative Commons Attribution 2.5 Australia License.
| **Polling the repository for changes** | Bamboo will 'poll' the selected source code repositories for code changes, using either a specified interval (that is, periodically) or a schedule. If Bamboo detects code changes, a build of the plan is triggered.  
  
  - Your VCS must service a 'check out' or 'update' command whenever it is polled, even if no code has changed in a repository.  
  
  See Polling the repository for changes. |
|----------------------------------------|--------------------------------------------------------------------------------------------------|
| **Repository triggers the build when changes are committed** | Bamboo waits to receive a message about changed code from any of the selected source code repositories. When Bamboo receives such a message, a build of the plan is triggered.  
  
  - This option minimizes server load, because message events are sent only when code changes to a repository are committed.  
  - You must configure your source code management system to send message events to Bamboo about code changes in the repositories.  
  
  - This is the default option when you use a linked Bitbucket Server repository.  
  
  See Repository triggers the build when changes are committed. |
| **Cron-based scheduling** | Bamboo will trigger scheduled builds of this plan based on a cron expression.  
  
  - This option allows you to schedule builds when server load is likely to be minimal, for example, outside office hours.  
  - Scheduled builds are triggered irrespective of any code changes in the source code repositories.  
  
  See Cron-based scheduling. |
| **Single daily build** | Bamboo will trigger a build of the plan once per day at a specified time.  
  
  - Can be set up to run at a time of your choice.  
  - This option is suitable if a build of this plan takes a long time to complete.  
  - Scheduled builds are triggered irrespective of any code changes in the source code repositories.  
  
  See Single daily build. |

**Polling the repository for changes**
You can configure Bamboo to poll the repository for source code changes, either:

- periodically (e.g. every 180 seconds), or
- based on a schedule (e.g. the second Sunday of every month at 5:00 am).
If Bamboo detects a change in the source code, a build of your plan is triggered.

**Related pages:**
- Triggering builds
- Repository triggers the build when changes are committed
- Cron-based scheduling
- Single daily build

To configure Bamboo to poll the repository for source code changes:

1. Click Dashboard and then the All Plans tab.
2. Locate the plan in the list and click the edit icon (편집) to display the plan's configuration pages.
3. Click the Triggers tab, then click either an existing trigger or Add Trigger.
4. Optionally, enter a trigger description.
5. Choose **Trigger type > Polling the Repository for changes.**
6. Bamboo displays the available repositories for the plan, as previously configured on the Source Repositories tab. Choose the repositories that this trigger should apply to.
7. Choose a polling strategy:
   a. **Periodically**
      - Enter a **Polling Frequency** value (in seconds) for the time between when Bamboo checks for repository changes.
   b. **Scheduled**
      - Click the edit icon (편집) to use the Schedule Editor to set the polling schedule.
      - Note, this is a schedule for polling your repository: a plan build will only be triggered if there are source code changes. See **Triggering builds**.
      - Note that for the **Cron Expression** option, a cron expression consists of 6 mandatory and one optional field. The fields in sequential order are: seconds, minutes, hours, day-of-month, month, day-of-week and (optional) year. For example, 0 0 1 ? * 1#2. For information on Cron expressions, see this FAQ: **Constructing a cron expression in Bamboo**.
8. Click **Save Trigger**.

**Repository triggers the build when changes are committed**

Using the source repository to trigger the build of a plan is one of the available methods for triggering builds in Bamboo.

"Repository triggers the build when changes are committed" has the advantage of placing minimal load on your Bamboo server. However, it requires that your source repository is configured to fire an event to the Bamboo server (which the configured Plan will 'listen for').

Configuring the repository to trigger the build when changes are committed requires two changes:

1. Configuring your source repository
2. Configuring Bamboo to respond to post-commit messages

The overall process is: a commit to the repository causes a post-commit message to be sent to Bamboo. Bamboo responds by checking the repository for unbuilt changes. If changes are found, Bamboo triggers a build.

**Related pages:**
- Triggering builds
- Polling the repository for changes
- Cron-based scheduling
- Single daily build
1. Configuring your source repository

Configure your source code management system's repository to send post-commit event messages to Bamboo. These messages tell Bamboo to begin building the plans that use this repository.

- **For Bitbucket Cloud**, click here to expand...
  
  Add the **Bamboo Webhook** to your repository in Bitbucket Cloud. No further action is necessary on your local repository. Each push of new commits in to Bitbucket will trigger the build based on your configuration.

- **For Bitbucket Server**, click here to expand...
  
  When you create a plan that uses a **linked Bitbucket Server repository**, Bamboo uses the 'Bitbucket repository triggers the build when changes are committed' trigger option by default.

- **For Git**, click here to expand...
  
  Edit the Git repository's `.git/hooks/post-receive` trigger file, for example with the following:

  ```
  /path/to/postCommitBuildTrigger.sh http://bambooserver
  JIRA-MAIN JIRA-BRANCH
  ```

  where:
  - Jira-MAIN and Jira-BRANCH are the Bamboo plans that you would like to trigger
  - Jira is the project key
  - BRANCH or MAIN are the plan key

  For Git, use the SVN `postCommitBuildTrigger.sh` script. See below for more information about the scripts.

- **For Mercurial**, click here to expand...
  
  Edit the Hg repository's `.hg/hgrc` settings, for example with the following:

  ```
  [hooks]
  changegroup.update = /path/to/postCommitBuildTrigger.sh
  http://bambooserver JIRA-MAIN JIRA-BRANCH
  ```

  where:
  - Jira-MAIN and Jira-BRANCH are the Bamboo plans that you would like to trigger
  - Jira is the project key
  - BRANCH or MAIN are the plan key

  See below for more information about the scripts.

- **For Subversion**, click here to expand...
  
  If you are using a remote SVN server, copy file "atlassian-bamboo/repositoryScripts/svn-triggers/postCommitBuildTrigger.sh" (.py for Windows installations) located in the Bamboo install directory to the SVN repository .../hook/post-commit folder so that the postCommitBuildTrigger file is accessible from the post-commit trigger file.

  Edit the Subversion repository's `hooks/post-commit` trigger file, for example with the following:

  ```
  /path/to/postCommitBuildTrigger.sh http://bambooserver
  JIRA-MAIN JIRA-BRANCH
  ```

  where:
  - Jira-MAIN and Jira-BRANCH are the Bamboo plans that you would like to trigger
  - Jira is the project key
  - BRANCH or MAIN are the plan key

  See below for more information about the scripts. Also, refer to Configuring source code management triggers for Subversion.
1. For Perforce, click here to expand...

Add the script as a change-commit trigger.

```shell
triggerName change-commit //myDepot/... 
"/usr/local/bin/postCommitBuildTrigger.sh
http://bambooServer/ MYPLAN-DEFAULT"
```

See below for more information about the scripts.

2. For CVS, click here to expand...

Edit two files in the CVSROOT module: commitinfo and login.info.

- For commitinfo, add a line like this:
  ```
  ^jira(/|$) /pathto/preCommit.sh
  ```
  where "jira" is your module.

- For login.info, you can add a line, for example the following:
  ```
  ^jira(/|$) /pathto/postCommitBuildTrigger.sh %{}
  http://bambooserver JIRA-MAIN JIRA-BRANCH
  ```

  where:
  - Jira-MAIN and Jira-BRANCH are the Bamboo plans that you would like to trigger
  - Jira is the project key
  - BRANCH or MAIN are the plan key

See below for more information about the scripts. Please refer to Configuring source code management triggers for Subversion.

- You can download the scripts using this link. Use the same SVN script for Git. Copy the scripts to your repository. The scripts can also been found in the /scripts folder of your Bamboo Installation Directory.

- Depending on which operating system your repository is running on, you may need to edit the scripts. The scripts assume that 'wget' is in '/usr/bin/'; if this isn’t the case for your repository (e.g. Solaris 10 has it in '/usr/sfw/bin/'), edit the scripts and change '/usr/bin/' to the appropriate location.

- Ensure that the user which Bamboo is running as has appropriate file permissions to execute the scripts, i.e. the scripts should be executable by non-root user(s).

2. Configuring Bamboo to respond to post-commit messages

Before you begin:

- Triggers a build when there is no repository update — Bamboo will ignore build triggers if the local working copy and the repository copy have the same revision numbers. When testing your build triggers, ensure that the local working copy is not the latest version - if this is the case, Bamboo will take no further action.

- If you're using the Bitbucket Cloud Bamboo post-push hook, ensure that the user you are using to authenticate triggering the build has the 'build' permission on the plan you are attempting to trigger.

To configure Bamboo to trigger a build on code check in:

1. Click Dashboard and then the All Plans tab.
2. Locate the plan in the list and click the edit icon to display the plan's configuration pages.
3. Click the Triggers tab, then Add Trigger.
5. Optionally, enter a trigger description.
6. Bamboo displays the available repositories for the plan, as previously configured on the Source Repositories tab. Choose the repositories that this trigger should apply to.

7. Only enter an IP address in Trigger IP Addresses if you want Bamboo to trigger on post-commit messages from other than the primary IP address for the repository.

If you use a Mercurial or Git repository then you must type the IP address of your repository host in Trigger IP Addresses. For Bitbucket Cloud the current outbound IP addresses can be found at Access Bitbucket Cloud from Behind a Firewall

8. Click Save Trigger.

Screenshot: Build Strategy – repository triggers the build when changes are committed

Cron-based scheduling

Using a cron-based schedule to trigger the build of a plan is one of the available methods for triggering builds in Bamboo. This schedule is configured using the Schedule Editor.

The schedule can be daily (times per day), weekly (days per week), monthly (days per month) or based on a cron expression.

Related pages:
- Triggering builds
- Polling the repository for changes
- Repository triggers the build when changes are committed
- Single daily build

To schedule a plan build using a cron expression:

1. Click Dashboard and then the All Plans tab.
2. Locate the plan in the list and click the edit icon ( 
) to display the plan's configuration pages.
3. Click the Triggers tab, then click either an existing trigger or Add Trigger.
4. Optionally, enter a trigger description.
5. Choose Trigger type > Cron Based Scheduling.
6. Click the edit icon ( 
) next to the current schedule to display the Schedule Editor.
7. Use the Schedule Editor (see screenshots below), to specify the build schedule for your plan. For
information about cron expressions, see this FAQ: Constructing a cron expression in Bamboo.

8. Click **Save Trigger**.

**Screenshots: Schedule Editor options**

### Constructing a cron expression in Bamboo

Cron is a time-based job scheduler used in Unix/Linux computer operating systems with a unique and powerful terminology. A number of scheduling features in Bamboo, such as build expiry and elastic instance scheduling, require you to specify your requirements as a cron-based expression. For example, a cron expression such as “0 0/30 9-19 ? * MON-FRI” signifies that a scheduled event will be triggered every half an hour from 9am to 7pm, Monday to Friday.

A cron expression comprises of 6 mandatory and one optional field to specify a schedule. The fields in sequential order are: seconds, minutes, hours, day-of-month, month, day-of-week and (optional) year, i.e. 

`<seconds> <minutes> <hours> <day-of-month> <month> <day-of-week> <year (optional)>`

Each field can be expressed as an integer (e.g. 1, 2, 3, etc) and special characters can be used in most fields as well (i.e. ‘, - * / ? L W #’).

Bamboo uses **OpenSymphony’s Quartz** to schedule cron tasks. The syntax it accepts may vary from other cron implementations. Please refer to the Quartz CronTrigger Tutorial documentation for further information on each of these parameters and more detailed examples.

### Single daily build

Triggering the build of a plan to run at a particular time each day is one of the available methods for triggering builds in Bamboo.

A "Single daily build" runs at a time of your choice. This is particularly suitable for builds that take a long time to complete.

**Related pages:**

- Triggering builds
- Polling the repository for changes
- Repository triggers the build when changes are committed
- Cron-based scheduling

**To schedule a plan build at a specified time each day:**

1. Click **Dashboard** and then the **All Plans** tab.
2. Locate the plan in the list and click the edit icon to display the plan's configuration pages.
3. Click the **Triggers** tab, then click either an existing trigger or **Add Trigger**.
4. Optionally, enter a trigger description.
5. Choose **Trigger type > Single daily build.**
6. Specify the time of day at which the build should run in **Build Time.** Use hh:mm format, with a 24-hour clock.
7. Click **Save Trigger.**

**Running a plan build manually**

Typically in Bamboo, your build plans are configured to be **automatically triggered** when code changes are committed to the working repository, or according to a schedule.

However, there can be scenarios where you do not want the plan to be automatically triggered:

- The plan should only ever be run manually.
- You want to choose the revision of the default repository that should be used for the build.
- You want to run a customized build, so as to override **global variables** or **plan variables.**
- You want to select particular manual stages to run.
- You want the plan to be **triggered by other plans** that build successfully first.

This page describes how to run a plan build manually, and the options available when running a customized plan build.

**Running a plan build manually**

**To start a plan build manually:**

1. Locate the relevant plan on the **Dashboard.**
2. Click the Run icon for the plan.

Alternatively, if you are viewing the plan, simply click the **Run** menu.

**On this page:**
- Running a plan build manually
- Running a customized manual build

**Related pages:**
- Triggering builds
- Setting up plan build dependencies
- Stopping an active build
- Defining plan variables

**Running a customized manual build**

If you trigger a plan build manually, you can customize the following aspects of how the plan is run (when these are available):

- Choose the revision of the default repository that should be used.
- Override any **global variables** or **plan variables** with your own parameters when triggering a build manually. This is referred to as running a 'parameterized plan build'.
- Select which **manual stages** to run, if manual stages have been configured for the plan.

**To run a customized plan build:**

1. Locate the relevant plan on the **Dashboard.**
2. Click the plan name to go to the Plan Summary.
3. Choose **Run > Run Customized.**
4. Customize the following aspects of the plan:
Choose a repository revision to use for the build.

Note that:
- You can only choose revisions from the default repository.
- The build is not included in plan statistics or telemetry.
- SVN repositories use the revision number
- Perforce projects use the changelist number
- Git repositories use the changeset number
- Mercurial repositories use the tag

**Note for Subversion repositories that make use of externals**
When running a build with a custom revision on a Subversion repository with externals, Bamboo will choose the latest revision in the external repository. This is because Subversion externals always use the latest version and cannot be fixed at a specific revision.

### Build Variables
Click **Override a variable** to choose another variable to override.

### Stages
Choose the stages that should be run.

5. Click **Run**.

---

**Rerunning a failed stage**

If a stage has failed in your build, you can choose to rerun the stage (with exactly the same data) instead of the entire plan.

**To rerun a stage:**

1. Navigate to the failed build result, as described on Viewing a build result.
2. Choose Run > **Rerun all failed Jobs** to run the stage again.

**Note that:**
- Only failing jobs will be re-run.
- Subsequent stages will be executed automatically, unless they are manual stages.
- You might want to add a comment to the build result to record the reason for failure. The existing build...
result will be overwritten (Bamboo will not create a new build) and the previous failure reason will not be retained.

- For plans based on a Subversion repository, you can only rerun the failed job or the whole plan.

**Related pages:**
- Running a plan build manually
- Configuring plans
- Configuring jobs
- Using stages in a plan

**Screenshot: Rerunning a failed stage**

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### Triggering a Bamboo build from Bitbucket Cloud using Webhooks

Webhooks provide a way to configure Bitbucket Cloud to make requests to your server (or another external service) whenever certain events occur in Bitbucket Cloud. The purpose of this guide is to help you set up a Webhook that will trigger a Bamboo build from Bitbucket Cloud after a certain event. For example, you may want Bitbucket Cloud to trigger a Bamboo build when your repository receives a commit (aka post-commit trigger).

**Procedure**

1. First configure the Bamboo plan to trigger with a **Remote trigger**: Bamboo > Plan Configuration > Triggers > Add trigger > Remote trigger.
2. Bamboo requires you to whitelist the IP addresses of the source of the request to trigger under the **Trigger IP Addresses field** (comma separated for each IP).
   a. The current list of Bitbucket Cloud IP addresses for outbound POST requests by Webhooks: [Bitbucket Cloud IP Addresses](https://bitbucket.org/site/docs/webhooks/ipaddress)
   b. CIDR Notation is only supported in Bamboo 5.14+
   c. Bamboo's IP whitelist also inspects the `X-Forwarded-For` header to determine the origin of the request. If you have a reverse proxy forwarding requests to your Bamboo instance, depending on its configuration, you may also need to whitelist the IP address of the Proxy Server.
3. Add a Webhook to your Bitbucket Cloud repository: Bitbucket Cloud > Repository > Settings > Webhooks > Add Webhook
   a. Title: Choose any title for your Webhook that aptly describes it.
   b. URL: Enter the URL of the Bamboo API to trigger a plan: `BAMBOO_URL/rest/triggers/1.0/remote/changeDetection?planKey=PLAN-KEY&skipBranches=false`
      i. Replace **BAMBOO_URL** with the URL of your Bamboo instance.
      ii. Replace **PLAN-KEY** with the key of the plan you wish to trigger. The **PLAN-KEY** is visible in the URL when browsing the plan in Bamboo. E.g. [https://bamboo.atlassian.com/browse/PLAN-KEY](https://bamboo.atlassian.com/browse/PLAN-KEY)
      iii. `skipBranches true/false` will determine whether change detection will be triggered by this event for every branch on the plan (false), or just the plan key specified (true).
   c. Triggers: Choose the event(s) you want the Webhook to activate on. E.g. Repository Push.
   d. Save.

That’s it! If you find your Webhook doesn’t appear to be working – the best place to start troubleshooting is by viewing the request and response at Bitbucket Cloud > Repository > Settings > Webhooks > View requests.

### Using stages in a plan

**Stages** group (or ‘map’) **jobs** to individual steps within a **plan’s build process**. For example, you may have an overall build process plan that comprises a compilation step, followed by several test steps, followed by a deployment step. You can create separate Bamboo stages to represent each of these steps.
A stage:

- By default has a single job but can be used to group multiple jobs.
- Processes its jobs in parallel, on multiple agents (where available).
- Must successfully complete all its jobs before the next stage in the plan can be processed.
- May produce artifacts that can be made available for use by a subsequent stage.

Each new plan created in Bamboo contains at least one stage (for the default job) and is known as the 'Default Stage'. Stages can only be configured by Bamboo administrators.

**On this page:**
- Types of stages in Bamboo
- Find, create, edit and delete a stage

Types of stages in Bamboo

**Normal stage**

Normal stage must successfully complete all its jobs before the next stage in the plan can be run. If a normal stage is not run successfully, the following normal stage can't be run.

**Manual stage**

A user has to trigger this type of stage manually to run it.

- Any stage in a plan can be configured to be a manual stage. If you run a plan with manual stages, Bamboo will pause the execution of the plan every time it reaches a manual stage. The plan build will only continue once a user has manually triggered the stage.
  - A manual stage can only be triggered if the previous stage has completed successfully.
  - Manual stages must be executed in the order that they are configured in the plan. You cannot skip a manual stage.
  - Manual stages will be displayed in the Plan Navigator with either this icon (not due to be triggered) or this icon (pending execution).
  - You need 'Build' permission on the plan to run a manual stage.
  - Not even Final stages will be run after an untriggered manual stage.
  - A manual stage can also be a final stage. In this case, the build will stop at the manual stage and wait for a user to execute it manually. You can start this particular final-manual stage whether a build is successful or not.

**Final stage**

Final stage is run regardless whether previously run stages were successful or not.

- Final stages can be useful if you want to run cleanups or aggregate results regardless whether a build succeeds or not. Any stage in a plan can be configured to be a final stage.

A final stage can also be a manual one. In this case, the build will stop at the manual stage and wait for a user to execute it manually. You can start this particular final-manual stage whether a build is successful or not.

If a final stage follows a manual stage, the final stage will not run until the manual stage is run. If the build fails and the manual stage cannot be run, you can't run the final stage.

**Find, create, edit and delete a stage**
Navigate to the stages for a plan...

1. From the Bamboo header, select **Build > All build plans.**
2. Click the name of the plan you want to edit.
3. Select **Actions > Configure Plan.**
4. Select the **Stages** tab.

Create a stage...

1. Go to the stages for your plan.
2. Click **Create Stage.**
3. Complete the form and click **Create.**
4. *(optional)* You may want to do one or more of the following with your new stage:
   - Order your new stage in the list of stages, by dragging and dropping it.
   - Add a new job to your stage.
   - Move a job from another stage to your new stage by dragging and dropping the job.

You may break artifact dependencies by moving stages, or by moving jobs between stages. Bamboo will warn you if a dependency will be broken by moving a stage or a job.

Edit a stage...

1. Navigate to the stages for the plan, as described above.
2. Edit the stage as required:
   - To edit the name and description of the stage or configure whether it is a **manual stage**, click the cog icon and choose **Configure stage.**
   - To move the stage, drag and drop the stage to the desired place in the plan.

You may break artifact dependencies by moving stages. Bamboo will warn you if a dependency will be broken by moving a stage.

Delete a stage...

- Deleting a stage will delete all job configurations, artifacts, logs and results related to the stage. These cannot be recovered after the stage is deleted.
- You may break artifact dependencies by deleting a stage.

1. Go to the stages for the plan, as described above.
2. Click the cog icon for the relevant stage and choose **Delete stage.**
3. Click **Confirm** to delete the stage. Note that a deleted stage cannot be recovered.

Jobs and tasks

The following pages contain information about configuring jobs and tasks for your Bamboo plans. If you are looking for information about Bamboo builds, please see **Working with builds.**

- Creating a job
- Configuring jobs
- Disabling or deleting a job
- Configuring tasks

Jobs

A Bamboo **job** is a single build unit within a **plan.** One or more jobs can be organized into one or more **stages.** The jobs in a stage can all be run at the same time, if enough Bamboo agents are available. A job is made up of one or more **tasks.**

A job:
• Processes a series of one or more tasks that are run sequentially on the same agent.
• Controls the order in which tasks are performed.
• Collects the requirements of individual tasks in the job, so that these requirements can be matched with agent capabilities.
• Defines the artifacts that the build will produce.
• Can only use artifacts produced in a previous stage.
• Specifies any labels with which the build result or build artifacts will be tagged.

Each new plan created in Bamboo contains at least one job known as the 'Default Job'.

Projects and plans can only be configured by Bamboo administrators (see Creating a plan).

Tasks

A task:

• Is a small discrete unit of work, such as source code checkout, executing a Maven goal, running a script, or parsing test results.
• Is run sequentially within a job on a Bamboo working directory.

Tasks may make use of an executable if required. Tasks are configured within the scope of a job. A job can be configured to execute a number of tasks, on the same working directory. For example, before executing a Maven goal, the user could substitute specific files within the working directory, substitute version numbers, check out source repositories, or execute a script.

Final tasks for a job are always executed, even if previous tasks in the job failed.

Screenshot: Configuring tasks for a job

Creating a job

This page describes how to create a Bamboo job in a stage of a plan.

• You can either create a new job, or clone an existing job.
• You must have the ‘Admin’ or ‘Create Plan’ global permission to create jobs.
• A job allows you to collect together a number of tasks that you want to be run sequentially on the same agent.
To create a new job for a plan:

1. Click Dashboard and then the All Plans tab.
2. Click the name of the plan in the list.
3. Choose Actions > Configure Plan.
4. Click on the Stages tab.
5. Click Add Job in the stage where you want the new job.
6. Click either Create a new job or Clone an existing job.
7. If cloning a job, complete the 'Job to clone from' section:
   - **Plan to clone from** — Select the plan containing the job you wish to clone. Plans are grouped by project in the list.
     - Only plans for which you have the 'Clone' and/or 'Admin' plan permission are shown.
   - **Job to clone** — Select the job you wish to clone from your selected plan. Jobs are grouped by stage in the list.
8. Provide your job details.
9. Select if you want to run your job in the agent environment or in a docker container. See Docker Runner.
10. Click Create Job.

If you wish to configure tasks for the job, such as configuring a Repository Checkout, see Configuring jobs.

**Screenshot: Creating a new job**

![Create Job](image)

**Configuring jobs**

A Bamboo job is a single build unit within a plan. One or more jobs can be organized into one or more stages. The jobs in a stage can all be run at the same time if enough Bamboo agents are available. A job allows you to collect together a number of tasks that you want to be run sequentially on the same agent.

You must have the 'Admin' or 'Create Plan' global permission to configure jobs.
To configure an existing job in a Bamboo plan:

1. From the top menu bar, choose Build > All build plans.
2. Click the edit icon ( ) for the plan you want to edit.
3. Click on the required job (under 'Stages & Jobs'):

4. Click on a selected tab to begin editing that aspect of your job:
   - **Job Details** — Note that Job Key is not editable.
   - **Docker** - see Docker Runner.
   - **Tasks** — see Configuring tasks, including Repository Checkout tasks and builder tasks.
   - **Requirements** — see Configuring a job's requirements.
   - **Artifacts** — see Configuring a job's build artifacts.
   - **Miscellaneous** — see Configuring miscellaneous settings for a job and Configuring automatic labeling of build results.

Configuring a job's requirements

This page describes how to configure the requirements of a job. A requirement is specified in a job or a task. A requirement specifies a capability that an agent must have for it to build that job or task. A job inherits all of the requirements specified in its tasks.

Together, capabilities and requirements control which agents can execute builds for particular jobs. Each job can only be built by agents whose capabilities match the job's requirements.

There are four types of capabilities in Bamboo that can be specified by job and task requirements:

- **Executable capabilities** — Define external programs that can be called by Bamboo, for example Ant, Maven, MSBuild or PHPUnit. See Defining a new executable capability.
- **JDK capabilities** — Define the JDK versions to be used by the job or task. See Defining a new JDK capability.
- **Version control capabilities** — Specify the VCS client application that Bamboo should use to check out source code. See Defining a new version control capability.
- **Custom capabilities** — Can be used to control which jobs will be built by a particular agent. For example, if the builds for a particular job should only run in a Windows environment, you could create a custom capability of 'operating.system=WindowsXP' for the appropriate agent(s), and specify it as a requirement for this job. See Defining a new custom capability.

Before you can specify a requirement in your job, you must first define that capability in your Bamboo system.
Specifying extra requirements for a job

A job will inherit the requirements of its tasks by default. However, you can specify extra requirements for a job, in addition to its task requirements.

To specify extra requirements for a job:

1. Navigate to the desired job's configuration pages, as described on Configuring jobs.
2. Click the Requirements tab (see screenshot below). This page shows a list of all the job's current requirements and the number of 'Matching Agents' and 'Matching Images' (i.e. agents/elastic images which meet the job's requirements and can run a build for this job). See Viewing current capable agents below for more information.
3. If you have previously set up an agent capability, you can select it from the Requirement list in the 'Add Extra Requirement' section. If you are setting up a new custom requirement, select New custom requirement from that list instead.
4. Complete the form for the requirement:
   a. Key (new custom requirement only) — enter a key of the new capability.
   b. Select the value for the requirement from the list:
      • exists — this job can be built by any agent that has a capability with the same key.
      • equals — this job can be built by any agent that has the capability with the same key and value.
      • matches — this job can be built by any agent that has a capability with the same key, and the value matches the regular expression. For more information about regular expressions, see Oracle’s tutorial on regular expressions.
4. Click Add. The numbers of 'Matching Agents' and 'Matching Images' will be updated, as the plan can now only be built by agents with capabilities that meet the new custom requirement you have specified.

Screenshot: Specifying requirements for a job
Viewing current capable agents

To view details about agents or elastic images that are currently able to build your job:

1. On the job's Requirements tab (described above), click the name of the requirement in the table (e.g. 'Maven 2').
2. The summary page for the capability will be displayed, showing the agents and elastic images that have the capability. See Viewing a capability's agents and jobs for more information.

Configuring a job's build artifacts

Artifacts are files created by a job build (e.g. JAR files). Artifact definitions are used to specify which artifacts to keep from a build and are configured for individual jobs.

See Sharing artifacts.

This page describes how to define the artifacts that should be kept from a job's build. For example, you may wish to keep reports, websites or files (e.g. JAR files) generated by a job build.

You can also configure artifact sharing between jobs in a plan. For example, you may want to run acceptance tests on a build, and then share the WAR from one job to another, without rebuilding the WAR each time. See Sharing artifacts.

Atlassian blog posts:

- Artifact passing for agile teams

Define the artifacts to keep for a job

You can specify which artifacts to keep by setting up an artifact definition for the job. The artifacts will be available after each build of a job.

To set up an artifact definition for a job:

1. Navigate to the desired job, as described on Configuring jobs.
2. Click the Artifacts tab, and then Create Definition.
3. Complete the fields on the screen (see screenshot below) and click Create. For example, if you want to keep the latest version of a JAR you have built, you could specify Copy Pattern to be ‘**/*.jar’ and the Location to be ‘target’.

Please note:
- The location is relative to the build directory. Do not use the absolute path to refer to the location.
- The copy pattern is relative to the location specified.
- Asterisks are not supported for Location. For this field, provide the folder name where the file would be located.
- If you want to share artifacts with other jobs in the plan, you will need to mark the artifacts as shared. See Sharing artifacts.

Screenshot: Creating an artifact definition
Create artifact

Name: Latest jar
If the artifact is shared, the name must be unique within the plan

Location: target
Specify the directory (relative path) to find your artifact, e.g. target

Copy pattern: **/*.jar
Specify the name (or Ant file copy pattern) of the artifact(s) you want to keep, e.g. **/*.jar

- Shared
  Make the artifact available to be used in other builds and deployments.

- Required
  Build fails if the artifact cannot be published.

Notes

Artifacts are copied to a subdirectory (/JOB_KEY/download-data/) under your 'Build Directory' folder (see Locating important directories and files). Artifacts which you define in the plan are listed in each build result as artifacts (see Viewing a build’s artifacts).

Configuring miscellaneous settings for a job

For each job of a plan, you can optionally specify a number of miscellaneous settings including:

- Build hanging detection
- NCover output
- Clover code coverage

To configure the miscellaneous settings for a job:

1. Navigate to the desired job, as described in Configuring jobs.
2. Edit the desired settings as follows: Override default hanging build detection

Override the default build hanging detection settings. These settings determine when a build hung event is thrown (e.g. you can configure your notifications to trigger from this event).

Build Time Multiplier — Calculate the ‘Expected Build Time’ for the build (i.e. ‘Expected Build Time’ = ‘Build Time Multiplier’ multiplied by ‘Average Build Time’). ‘Average Build Time’ is calculated by using an average of previous build times.

Log Quiet Time — The amount of time since Bamboo last recorded an entry in the build log for a build. The ‘Expected Build Time’ and ‘Log Quiet Time’ must both be exceeded for Bamboo to throw the build hung event.

Build Queue Timeout — The amount of time that a build will wait in a build queue before an timeout event is thrown. Setting this value will override the global build queue timeout setting (see Configuring the build queue timeout event).

NCover output will be produced

Do not select this option. NCover is a code coverage tool that supports .NET projects.
Use Clover to collect Code Coverage for this build
Select this check box if:
• This job will be building a Java or Groovy-based project using a builder such as Ant, Maven or Grails.
• You are running Atlassian Clover and want to collect code coverage data to view from within Bamboo (see Viewing the Clover code-coverage for a build).

Automatically integrate Clover into this build
• Generate a Clover Historical Report — shows the current coverage results compared with previous Clover code coverage reports.
• Generate a JSON report — gives the Clover results in a format ready for embedding into applications or external report views.

You will also need to insert a Clover license (evaluation licenses are available) into the field provided. See Enabling Clover for Bamboo.

Clover is already integrated into this build and a clover.xml file will be produced
Use this option when you already have Clover-for-Ant or Clover-for-Maven configured to generate a report.
• Clover XML Location — specify where the Clover XML report is generated. Include the name of the directory, including path, relative to your job build's root directory, for example: target/site/clover/clover.xml

3. Click Save.

Configuring automatic labeling of job build results
For each job of a plan, you can (as an option) specify a label that can be applied to the job's build results automatically after each build of that job.

Automatic labeling of job builds is built into Bamboo itself. There are a number of third-party plugin modules available that can provide additional 'post' actions (e.g. the Pre-Post Build Command plugin). You can also write your own plugins to provide additional post actions for a job. See the Bamboo Plugin Guide for further details. Labels can also be applied to build results manually by Bamboo users.

On this page:
• Specifying labels for a job's build results
• Regex examples

Related pages:
• Configuring jobs

Specifying labels for a job's build results:

To specify labels for a job’s build results:
1. Navigate to a job's configuration pages, as described on Configuring jobs.
2. Click the Miscellaneous tab.
3. Using Regex Pattern, you can either:
   • Specify a regular expression to match content in the log files of this job's builds. Labels will be applied to a build of this job if this regular expression matches content in the build's log files (see the examples below).
     For more information about regular expressions, please refer to the Java documentation on regular expression constructs.
   • Leave this field blank to label every build of this job.
4. In the Labels field, type the word (or multiple words, separated by commas and/or spaces) with which the plan's build results are to be labeled.
5. Click Save.

Regex examples

A simple regex example:
"There are \d+ results"

In the above regex, "\d+" represents \textit{any number with one or more digits}. (\text{'\d'} means 'any digit', and '+' means 'one or more times'. When combined, they mean 'any sequence of one or more digits'.) Therefore, positive matches would include:

- "There are 0 results"
- "There are 123 results"

\textbf{A regex example with multiple labels:}

You can use "capturing groups" with Bamboo 1.2.1 or later to create different labels for different purposes.

For example, the following settings will label your builds with \texttt{PERFORMANCE\_IMPROVED} if "PERFORMANCE\_IMPROVED" appears in the build log, and \texttt{PERFORMANCE\_DETERIORATED} if "PERFORMANCE\_DETERIORATED" appears in the build log. If both strings appear in a log, then both labels are applied to the build.

- Enter the following into the \texttt{Regex Pattern} field:
  
  \begin{verbatim}
  (PERFORMANCE\_IMPROVED|PERFORMANCE\_DETERIORATED)
  \end{verbatim}

- Enter the following into the \texttt{Labels} field:
  
  \begin{verbatim}
  \1
  \end{verbatim}

\textbf{Viewing a job's Maven dependencies}

If you have configured a job to use a Maven builder (Maven 2 or later), you can choose to have dependencies generated from your Maven pom.xml (see \texttt{documentation for setting up Maven as a builder} for instructions). After the initial build, Maven will parse the pom.xml file, determine the artifacts produced by the build and generate the dependencies. You can view these dependencies in two places:

- On the \texttt{Dependencies} tab when configuring your plan, as described in \texttt{Setting up plan build dependencies}.
- On the \texttt{Artifacts} tab when viewing a job's build result, as described below.

Before you begin:

- The Maven dependencies for a build will only become known to Bamboo after a build. If you cannot see the Maven dependencies for a build, try running it first without triggering any other dependencies. See \texttt{Modifying multiple plans in bulk} if you want to run multiple builds.

\textbf{To view the Maven dependencies for a job's build result}:

1. Navigate to the desired job, as described on \texttt{Configuring jobs}.
2. Click the desired build result number in the 'Recent History' of the Job Summary.
3. Click the \texttt{Artifacts} tab for the build results. The produced Maven artifacts and Maven artifact dependencies will be listed.

\texttt{Screenshot: Maven 2 dependencies for a job's build result}
### Disabling or deleting a job

Bamboo allows you to disable or delete jobs that you don't want to be built.

#### Disabling a job

Disabling a job prevents Bamboo from building that particular job within a plan, allowing the rest of the plan's jobs to be built. You can re-enable the job, if you want to build it again. For example, if a job's latest build is broken and cannot be fixed quickly, you may want to disable it temporarily to stop the job from being built.

#### Deleting a job

Deleting a job deletes everything related to that job, including the job's configuration, build results, artifacts, labels and comments. However, everything else related to the job's plan, and this plan's other jobs, is retained by Bamboo.

You will need to recreate a new job from scratch, if you want to build it again. For example, if a job is no longer relevant, you may want to delete it.

Note that:

- The 'Admin' global permission is required to delete a job.
- A job that is currently being built cannot be deleted. If you need to delete such a job, stop the plan's build first. Refer to Stopping an active build for more information.

- If you need to keep a permanent record of your job's build results, see Exporting data for backup.

### Related pages:

- Creating a job
- Configuring jobs
- Disabling or deleting a plan

### Disable or delete a job

1. Navigate to the job configuration, as described on Configuring jobs.
2. Choose either Actions > Disable Job or Actions > Delete Job.
Deleting a job's current working files

If you only run a single Bamboo server (i.e. with no remote or elastic agents) and:

- you need to ensure that a plan's job cleanly checks out its source code when Bamboo next executes a build of that plan
- and you do not use the Force Clean Build option when linking to the source repository for a job

then you can simply delete the current working files for that job to ensure its source code is cleanly checked out.

You need the 'Admin' global permission or the 'Admin' plan permission to delete current working files.

**Related pages:**
- Linking to source code repositories
- Disabling or deleting a job
- Deleting the results of a plan build

To delete a job's current working files:

1. Navigate to the job configuration, as described on Configuring jobs.
2. Click the Files tab. Note that the Files tab is only available if:
   - the current working files resulting from that job's previous build reside on the Bamboo server (not a remote/elastic agent) and
   - working files exist in this directory.
3. Click Delete all build files at the end of this page (scroll down if necessary).

**Configuring tasks**

A task:

- Is a small discrete unit of work, such as source code checkout, executing a Maven goal, running a script, or parsing test results.
- Is run sequentially within a job on a Bamboo working directory.

Tasks may make use of an executable if required. Tasks are configured within the scope of a job. A job can be configured to execute a number of tasks, on the same working directory. For example, before executing a Maven goal, the user could substitute specific files within the working directory, substitute version numbers, check out source repositories, or execute a script.

Final tasks for a job are always executed, even if previous tasks in the job failed.

**Create a task for a job**

When creating a new job or configuring an existing one, you need to specify the tasks that will execute the job's builds. You must specify an executable for each task. If you specify an Ant, Grails or Maven executable, you will also need to choose a JDK.

When creating a new plan, you can configure the tasks for the plan's default job.

**On this page:**
- Create a task for a job
- Order the tasks in a job
- Notes

**Related pages:**
- Checking out code
- Configuring a builder task
- Configuring a test task
- Configuring jobs
- Creating a plan
- Pattern matching reference

To create a task for a job:
1. Navigate to the tasks configuration for a job. Do this by:
   - clicking the **Tasks** tab when configuring an existing job, or
   - creating a new plan (you will be configuring tasks for the default job).

2. Click **Add task**.

3. Click a task type, or search for a task.

4. Click a particular task, such as 'SCP Task', then complete the form to configure the task. The fields in the form depend on the task you chose. See the following pages for further details:
   - Checking out code
   - Configuring a builder task
   - Configuring a test task
   - Configuring a variables task
   - Configuring a deployment task
   - Pattern matching reference
   - Configuring the Docker task in Bamboo
   - Configuring a Source Control task

5. Click **Save**.

**Screenshot: Specifying a task for a job — Task types**

Order the tasks in a job

Tasks can be designated as **build tasks** or **final tasks** in a job:

- **Build Tasks** will run sequentially in the order specified in the job. If a Build Task fails, all subsequent tests will not be executed.
- **Final Tasks** will run sequentially, once the build tasks have completed. Final Tasks will always be executed, regardless of whether any Build Tasks or other Final Tasks fail. Final Tasks will be executed even if you stopped the build manually.

To order the tasks for a job:

1. Navigate to the tasks for the desired job.
2. Drag and drop the tasks into the desired order in the table on the left. If you want to change a Build Task to a Final Task or vice versa, drag and drop it under the desired header in the table. Your changes will be saved immediately.

**Screenshot: Existing Task — Command Task**
Notes

- **Adding new executables** — At least one executable is configured automatically after installing Bamboo. You can add more executables of different types as described in Configuring a new executable.
- **Adding new JDKs** — At least one JDK is configured automatically after installing Bamboo. You can add more JDKs as described in Defining a new JDK capability.
- **About the 'Compatibility Task'** — The 'Compatibility Task' is created by Bamboo when upgrading from Bamboo 3.0 or earlier and Bamboo cannot match a builder to a task. This may occur if you are using a builder enabled by a custom plugin.

Checking out code

You use the Source Code Checkout task to check out a repository for use by just one job. By default, repositories are checked out to the Bamboo working directory.

Using Source Code Checkout task you can also:

- Check out repositories to a custom directory path in the working directory.
- Specify multiple checkouts that occur at different stages of the build. (Simply add another Source Code Checkout task to a job at any point in the plan.)

For information about specifying a repository for use by all the plan's jobs, or by all plans, see Linking to code repositories.

To configure a new Source Code Checkout task:

1. Navigate to the job that should perform the task.
2. Click the **Tasks** tab, and select an existing `Source Code Checkout` task in the tasks list, or add a new one using the **Add Task** button.
3. Configure the task:

   **Task Description**
   Enter a description of the task, for display in Bamboo.

   **Disable this task**
   Check, or clear, to selectively run this task.

   **Repository**
   Select the desired repository. If you wish to add different types of repositories, they must have been previously defined on the plan's **Source Repositories** tab. See Linking to source code repositories for a list of supported SCMs.

   **Checkout Directory**
   The location to which the contents of the selected repository will be checked out to when the task
executes.

**Force Clean Build**
Deletes the previously checked out directory and checks it out again prior to the next build. This may significantly increase build times.

4. Click **Add repository**, at the bottom of the 'Task' screen, to check out another repository using this task.
5. Click **Save**.

**Screenshot: Configuring a Source Code Checkout task**

**Notes**

- A number of source repositories are supported 'out of the box', as described on the Linking to code repositories page.

- If you need to use a type of repository that is not supported, a number of third-party Source Repository plugin modules are available (e.g. ClearCase plugin). You can also write a Source Repository Module plugin to enable Bamboo to connect to your repository.

**Configuring a builder task**

A builder task allows you to connect your Bamboo plan (or job) to a build tool such as Ant, Maven or MSBuild. The build tool uses its existing configuration when the plan (or job) is built.

You can connect Bamboo to the following build tools:

- Ant
- Custom command executable
- Grails
- Maven
- MSBuild
- NAnt
- Script
- Visual Studio
- Fastlane
- Xcode
- Configuring Build warnings parser task

**Related pages:**

- Configuring tasks
- Configuring a test task
- Checking out code

**Screenshot: Choosing a Bamboo build task**
Ant

This page describes how to configure a Bamboo task to use Ant.

See Configuring a builder task for an overview of Bamboo builder tasks.

Related pages:
- Configuring tasks
- Configuring jobs
- Pattern matching reference

To configure an Ant task:
1. Navigate to the Tasks configuration tab for the job (this will be the default job if creating a new plan).
2. Click the name of an existing Ant task, or click Add Task and then Ant to create a new task.
3. Complete the following settings:

**Task Description**
A description of the task, which is displayed in Bamboo.

**Disable this task**
Check, or clear, to selectively run this task.

**Executable**
The Ant executable that is available to perform the task. The executable that you select will become one of the task's (and so, the job's) requirements.

You can add other executables, if required.

**Build File**
The name of your existing build file (e.g. build.xml).
You can include variables (see Using Global or...
Build-specific Variables).

**Target**
The Ant target that you want this Bamboo task to execute (e.g. test).
You can use `-D` to define one or more JVM parameters (e.g.: `-Djava.awt.headless=true`). You must use double quotes around the parameter value; single quotes are considered as part of the actual value.
Multiple Ant targets can be specified with a space-delimited list.
You can also include variables (see Using Global or Build-specific Variables).

**Build JDK**
The JDKs that are available to perform the task. The JDK that you select will become one of the task’s (and so, the job’s) requirements.
You can add other JDKs, if required.

**Environment Variables** (Optional)
Additional system environment variables that you want to pass to your build. Note that existing environment variables are automatically available to the executable. You can also include Bamboo global or build-specific variables (see Using Global or Build-specific Variables).
Multiple variables should be separated with spaces.
Parameters with spaces must be quoted (e.g ANT_OPTS="-Xms200m -Xmx700m").

**Working Sub Directory** (Optional)
An alternative subdirectory, relative to the job's root directory, where Bamboo will run the executable. The root directory contains everything checked out from the job's configured source repository. If you leave this field blank, Bamboo will look for build files in the root directory. This option is useful if your task has a build script in a subdirectory and the executable needs to be run from within that subdirectory.

**The build will produce test results**
Select to specify the directory, relative to the root directory, where test results will be created. You can use Ant-style patterns such as `**/test-reports/*.xml`. Bamboo requires test results to be in JUnit XML format.

<note>
For jobs that use CVS, the root directory is `<bamboo-home>/xml-data/build-dir/JOB_KEY/<cvs-module>`.
</note>

4. Click **Save**.

**Custom command executable**

This page describes how to configure a Bamboo task that uses a command (e.g. Bash) executable.

See Configuring a builder task for an overview of Bamboo builder tasks.

**Related pages:**
- Configuring tasks
- Configuring jobs

**To configure a command task:**
1. Navigate to the **Tasks** configuration tab for the job (this will
be the default job if creating a new plan).
2. Click the name of an existing Command task, or click Add Task and then Command to create a new task.
3. Complete the following settings:

**Task Description**  
A description of the task, which is displayed in Bamboo.

**Disable this task**  
Check, or clear, to selectively run this task.

**Executable**  
The command executable that is available to perform the task (e.g. Bash). The executable that you select will become one of the task’s (and so, the job’s) requirements.

You can add other executables, if required.

**Argument** (Optional)  
The relevant argument to pass to the command. Note that arguments which contain spaces must be quoted. You can include variables (see Bamboo variables).

**Environment Variables** (Optional)  
Additional system environment variables that you want to pass to your build. Note that existing environment variables are automatically available to the executable. You can also include Bamboo global or build-specific variables (see Using global, plan or build-specific variables). Multiple variables should be separated with spaces. Parameters with spaces must be quoted (e.g ANT_OPTS="-Xms200m -Xmx700m").

**Working Sub Directory**  
(Optional) An alternative subdirectory, relative to the job’s root directory, where Bamboo will run the executable. The root directory contains everything checked out from the job’s configured source repository. If you leave this field blank, Bamboo will look for build files in the root directory. This option is useful if your task has a build script in a subdirectory and the executable needs to be run from within that subdirectory.

4. Click Save.

Grails  
This page describes how to configure a Bamboo Grails task.

Bamboo supports Grails versions 1.2.x, 1.3.x, and 2.x.

**Related pages:**  
- Configuring tasks  
- Configuring jobs  
- Defining a new JDK capability

**To configure a Grails task:**  
1. Navigate to the Tasks configuration tab for the job (this will be the default job if creating a new plan).
2. Click the name of an existing Grails task, or click Add Task and then Grails to create a new task.
3. Complete the following settings:
Task Description
A description of the task, which is displayed in Bamboo.

Disable this task
Check, or clear, to selectively run this task.

Executable
The Grails executable that is available to perform the task. The executable that you select will become one of the task's (and so, the job's) requirements.

You can add other executables, if required.

Grails Commands
The Grails commands that you want Bamboo to execute. See the Grails Command Line Reference documentation for more details on Grails commands.

- You can use `-D` to define one or more JVM parameters, e.g.: `-Djava.awt.headless=true` will pass the parameter `java.awt.headless` with a value of `true`.
- You can include variables (see Bamboo variables).

Build JDK
The JDKs that are available to perform the task. The JDK that you select will become one of the task's (and so, the job's) requirements.

You can add other JDKs, if required.

Environment Variables (Optional)
Additional system environment variables that you want to pass to your build. Note that existing environment variables are automatically available to the executable. You can also include Bamboo global or build-specific variables (see Using global, plan or build-specific variables). Multiple variables should be separated with spaces. Parameters with spaces must be quoted (e.g `ANT_OPTS="-Xms200m -Xmx700m"`).

Working Sub Directory
An alternative subdirectory, relative to the job's root directory, where Bamboo will run the executable. The root directory contains everything checked out from the job's configured source repository. If you leave this field blank, Bamboo will look for build files in the root directory. This option is useful if your task has a build script in a subdirectory and the executable needs to be run from within that subdirectory.

The build will produce test results
Choose one of the following: Look in the standard test results directory – Bamboo looks in the standard directory for the test results. Use this unless you've customized your test runner to output the results to a different location. Specify custom results directories – Specify the custom directory, relative to the root directory, where test results will be created. You can use Ant-style patterns such as `**/test-reports/*.xml`. Bamboo requires test results to be in JUnit XML format. For jobs that use CVS, the root directory is `<bamboo-home>/xml-data/build-dir/JOB_KEY/<cvs-module>`.
Maven

This page describes how to configure a Bamboo task to use a Maven executable. Apache Maven is a tool used for building and managing Java-based projects.

Related pages:

- Configuring tasks
- Configuring jobs
- Viewing a job's Maven dependencies
- Defining a new JDK capability

Atlassian blogs:

- Forgetful Maven Users, Rejoice! A new Bamboo task "releases" you from worry.

To configure a Maven task:

1. Navigate to the Tasks configuration tab for the job (this will be the default job if creating a new plan).
2. Click the name of an existing Maven task, or click Add Task and then a Maven option (e.g. Maven 2.x) to create a new task.
3. Complete the following settings:

   **Task Description**
   A description of the task, which is displayed in Bamboo.

   **Disable this task**
   Check, or clear, to selectively run this task.

   **Executable**
   The Maven executable that is available to perform the task.
   The executable that you select will become one of the task's (and so, the job's) requirements.
   
   You can add other executables, if required.

   **Goal**
   The Maven goal that Bamboo will execute.
   - You can use `-D` to define one or more JVM parameters. For example, `-Djava.awt.headless=true` will pass the parameter `java.awt.headless` with a value of `true`.
   - Multiple maven goals can be specified, separated spaces.
   - You can include variables (see Using Global or Build-specific Variables).

   **Use Maven Return Code**
   Select to have Bamboo skip log parsing.

   **Build JDK**
   The JDKs that are available to perform the task. The JDK that you select will become one of the task's (and so, the job's) requirements.
   You can add other JDKs, if required.

   **Override Project File** (Optional: Maven 2.x and later only)
   The path to your Maven project file, relative to the working
sub directory specified. If this is not specified, Maven will use the `pom.xml` in the root of the working sub directory.

**Environment Variables (Optional)**
Additional system environment variables that you want to pass to your build. Note that existing environment variables are automatically available to the executable. You can also include Bamboo global or build-specific variables (see Using Global or Build-specific Variables). Multiple variables should be separated with spaces. Parameters with spaces must be quoted (e.g. `MAVEN_OPTS=-Xms200m -Xmx700m`).

**Working Sub Directory**
(Optional) An alternative subdirectory, relative to the job’s root directory, where Bamboo will run the executable. The root directory contains everything checked out from the job’s configured source repository. If you leave this field blank, Bamboo will look for build files in the root directory. This option is useful if your task has a build script in a subdirectory and the executable needs to be run from within that subdirectory.

**The build will produce test results**
Choose one of the following: Look in the standard test results directory or Specify custom results directories – Specify the alternative directory, relative to the root directory, where test results will be created. You can use Ant-style patterns such as `**/test-reports/*.xml`. Bamboo requires test results to be in JUnit XML format. For jobs that use CVS, the root directory is `<bamboo-home>/xml-data/build-dir/JOB_KEY/<cvs-module>`.

4. Click **Save**.

**MSBuild**
This page describes how to configure a Bamboo task to use an MSBuild executable.

Note that you cannot use Clover to collect code coverage for MSBuild builds, as Clover only supports builders of Java/Groovy-based projects, such as Ant, Maven or Grails.

**To configure an MSBuild task:**
1. Navigate to the **Tasks** configuration tab for the job (this will be the default job if creating a new plan).
2. Click the name of the desired MSBuild task, or click **Add Task** and then **MSBuild** if creating a new task.
3. Complete the following settings:

**MSBuild configuration**

**Task Description**
A description of the task, which is displayed in Bamboo.
Executable
The MSBuild executable that is available to perform the task. The executable you select will become one of the task’s (and so, the job's) requirements.

You can add other executables, if required.

Project File
The name of the solution, project file or MSBuild project to execute, for example ExampleSolution.sln. You can include variables (see Bamboo variables).

Options
The MSBuild command line options that you want to include.

By default, Bamboo 5.7 (and later versions) writes the contents of the Projects File and Options fields to an MSBuild response file. See below for more information.

You can include variables (see Bamboo variables).

4. If required, specify environment variables and working directory settings:

Environment Variables (Optional)
Additional system environment variables that you want to pass to your build. Note that existing environment variables are automatically available to the executable. You can also include Bamboo global or build-specific variables (see Bamboo variables).
Multiple variables should be separated with spaces. Parameters with spaces must be quoted (e.g. ANT_OPTS="-Xms200m -Xmx700m").

Working Sub Directory (Optional)
An alternative subdirectory, relative to the job's root directory, where Bamboo will run the executable. The root directory contains everything checked out from the job’s configured source repository. If you leave this field blank, Bamboo will look for build files in the root directory. This option is useful if your task has a build script in a subdirectory and the executable needs to be run from within that subdirectory.

Run as Powershell script (Optional, Windows only)
Check the ‘Run as Powershell script’ checkbox to run the script with Powershell instead of cmd.exe which interprets .bat files. The inline editor supports Powershell syntax.

5. Click Save.
Passing options to MSBuild

By default, Bamboo 5.7 (and later versions) writes the contents of the Projects File and Options fields to an MSBuild response file:

```
# MSBuild response file generated by Atlassian Bamboo
%CONTENTS_OF_OPTIONS_FIELD%
%CONTENTS_OF_PROJECTS_FILE_FIELD%
```

and then runs the following command:

```
msbuild.exe @<full-path-to-response-file>response-file.rsp
```

This allows you to use the same settings with the Bamboo MSBuild task as you would use when calling MSBuild on the command line.

You can disable creation of the response file. In that case, Bamboo will create a .bat file instead:

```
"<full-path-to-msbuild>msbuild.exe" %CONTENTS_OF_OPTIONS_FIELD%
%CONTENTS_OF_PROJECTS_FILE_FIELD%
```

and run that.

Click here to see how to disable use of the response file...

To disable use of the MSBuild response file, set the bamboo.plugin.dotnet.msbuild.useRespons
eFile system property to false.

There are a couple of ways to do that:

- If you start the Bamboo server or remote agents manually you can set the property on the command line, as an argument to the JVM, like this:

  ```
  -Dbamboo.plugin.dotnet.msbuild.useResponseFile=false
  ```

  Do this on all Bamboo agents, and on the Bamboo server if you use local agents.

- If your agents are run as a service, set the system property in the `<Bamboo agent home directory>/conf/wrapper.conf` configuration file, like this:

  ```
  # The Bamboo Agent home configuration file
  wrapper.java.additional.1=-Dbamboo.home=/home/bamboo/bamboo-agent-home
  wrapper.java.additional.2=-Dbamboo.agent.ignoreServerCertName=false
  wrapper.java.additional.3=-Dbamboo.plugin.dotnet.msbuild.useResponseFile=false
  ```

  If your Bamboo server runs as a service, add the system property to the `<Bamboo home directory>/conf/wrapper.conf` configuration file.

---

NAnt

This page describes how to configure a Bamboo task to use a NAnt executable.

Related pages:
- Configuring tasks
- Configuring jobs

To configure a NAnt task:
1. Navigate to the Tasks configuration tab for the job (this will be the default job if creating a new plan).
2. Click the name of the desired NAnt task, or click Add Task and then NAnt if creating a new task.
3. Complete the following settings:

  **NAnt configuration**

  **Task Description**
  A description of the task, which is displayed in Bamboo.

  **Executable**
  The NAnt executable that is available to perform the task.
  The executable that you select will become one of the task’s (and so, the job’s) requirements.
  You can add other executables, if required.

  **Build File**
The relevant file name (e.g. default.build). You can include variables (see Bamboo variables).

**Targets**
The NAnt target that you want Bamboo to execute. for example: run. You can also include variables (see Bamboo variables).

**Options**
The NAnt command line options that you want to include. You can also include variables (see Bamboo variables).

4. If required, specify environment variables and working directory settings: **Environment Variables** (Optional)
Additional system environment variables that you want to pass to your build. Note that existing environment variables are automatically available to the executable. You can also include Bamboo global or build-specific variables (see Bamboo variables).

Multiple variables should be separated with spaces. Parameters with spaces must be quoted (e.g ANT_OPTS="-Xms200m -Xmx700m").

**Working Sub Directory** (Optional)
An alternative subdirectory, relative to the job's root directory, where Bamboo will run the executable. The root directory contains everything checked out from the job's configured source repository. If you leave this field blank, Bamboo will look for build files in the root directory. This option is useful if your task has a build script in a subdirectory and the executable needs to be run from within that subdirectory.

**Run as Powershell script** (Optional, Windows only)
Check the 'Run as Powershell script' checkbox to run the script with Powershell instead of cmd.exe which interprets .bat files. The inline editor supports Powershell syntax.

5. Click **Save**.

Note that you cannot use Clover to collect code coverage for NAnt builds, as Clover only supports builders of Java/Groovy-based projects, such as Ant, Maven or Grails.

**Script**
This page describes how to configure a Bamboo task to run a script. The Script task is flexible enough to allow the possibility to use: the default shells on Linux (/bin/sh) or Windows (cmd.exe), a more modern shell on Windows (Powershell), and an arbitrary shell in Linux by using the shebang on the first line of the script file. This can be controlled by the Interpreter field explained below.

**Related pages:**
- Configuring tasks
- Configuring jobs

**To configure a script task:**

1. Navigate to the **Tasks** configuration tab for the job (this will be the default job if creating a new plan).
2. Click the name of the desired script task, or click **Add Task** and then **Script** if creating a new task.
3. Complete the following settings:

**Script configuration**
Task Description
A description of the task, which is displayed in Bamboo.

Interpreter
You can select from the following interpreters:

- **Shell**
  This option selects the interpreter based on the first line of the script, typically using the shebang.
- **Windows PowerShell**
  This option uses the Powershell on Windows.
- **/bin/sh or cmd.exe**
  This option uses the default shell of the operating system (sh for Linux, cmd.exe for Windows).

Script location
Select the location of the script file.

- **File** — enter the location of the file in the **Script file** field. This can be either relative to the repository root of the plan, or absolute. You can include variables (see Bamboo variables).
- **Inline** — enter the script in the **Script body** field.

Argument
Specify an argument to pass to the script. Arguments that contain spaces must be quoted. You can include variables (see Bamboo variables).

4. If required, specify environment variables and working directory settings:

Environment Variables (Optional)
Additional system environment variables that you want to pass to your build. Note that existing environment variables are automatically available to the executable. You can also include Bamboo global or build-specific variables (see Bamboo variables).

Multiple variables should be separated with spaces. Parameters with spaces must be quoted (e.g. `ANT_OPTS="-Xms200m -Xmx700m"`).

Working Sub Directory (Optional)
An alternative subdirectory, relative to the job's root directory, where Bamboo will run the executable. The root directory contains everything checked out from the job’s configured source repository. If you leave this field blank, Bamboo will look for build files in the root directory. This option is useful if your task has a build script in a subdirectory and the executable needs to be run from within that subdirectory.

5. Click **Save**.
This page describes how to configure a Bamboo task to use a Visual Studio (devenv.exe) executable.

To configure a Visual Studio task:

1. Navigate to the Tasks configuration tab for the job (this will be the default job if creating a new plan).
2. Click the name of the desired MSBuild task, or click Add Task and then Visual Studio if creating a new task.
3. Complete the following settings:

   **Visual Studio configuration**

   **Task Description**
   A description of the task, which is displayed in Bamboo.

   **Executable**
   The Visual Studio executable that is available to perform the task. The executable that you select will become one of the
task's (and so, the job's) requirements.
You can add other executables, if required.

Solution
The name of the Visual Studio solution file that you want
Bamboo to execute. For example: RegexDemo/RegexDemo
.sln. You can also include variables (see Bamboo
variables).

Options
Specify any Visual Studio command-line options that you
want to include (e.g. /build Debug). You can also include
variables (see Bamboo variables).

Platform
Select the platform toolset required to compile your solution.
This is provided as an argument to Vcvarsall.bat (see th
is MSDN article for more details).

4. If required, specify environment variables and working
directory settings: Environment Variables (Optional)
Additional system environment variables that you want to
pass to your build. Note that existing environment variables
are automatically available to the executable. You can also
include Bamboo global or build-specific variables (see Bamb
oo variables).
Multiple variables should be separated with spaces.
Parameters with spaces must be quoted (e.g
ANT_OPTS="-Xms200m -Xmx700m").

Working Sub Directory (Optional)
An alternative subdirectory, relative to the job's root
directory, where Bamboo will run the executable. The root
directory contains everything checked out from the job's
configured source repository. If you leave this field blank,
Bamboo will look for build files in the root directory. This
option is useful if your task has a build script in a
subdirectory and the executable needs to be run from within
that subdirectory.

Run as Powershell script (Optional, Windows only)
Check the 'Run as Powershell script' checkbox to run the
script with Powershell instead of cmd.exe which interprets
.bat files. The inline editor supports Powershell syntax.

5. Click Save.

Fastlane

This page describes how to configure a Bamboo task to use Fastlane.

To configure a Fastlane task:

1. Go to the Tasks configuration tab for the job.
2. Click the Add task button.
   From the list of task types, select Fastlane.
3. Provide the Fastlane settings:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tasks Description</td>
<td>A description of the task, which is displayed in Bamboo.</td>
</tr>
</tbody>
</table>
Disable this task | Check, or clear, to selectively run this task.
---|---
Executable | The executable that is available to perform the task. The executable that you select will become one of the task's (and so, the job's) requirements.
Lane | The lane you want to execute. This field also allows you to define Fastlane properties such as param:paramValue.
Environment variables | Extra parameter variables. You can define multiple variables.
Working sub-directory | An sub-directory which can be used as an alternative for the task.

1. Click **Save**.

**Test result parsing:**

Bamboo supports test report in the JUnit XML format. To allow Bamboo to recognise tests from the Fastlane process you must:

1. Configure the Fastlane Scan to produce test output in the JUnit format:
   a. Create ScanFile in your Fastlane directory with the following content:

   ```
   output_types "junit"
   ```

2. Add the **JUnit Parser task** to parse the results and point it to the Fastlane test output directory.

**Xcode**

- **Prerequisites**
- **Testing iOS applications**
  - Configuring your Xcode project automated simulator tests
  - Configuring the Xcode task for testing
- **Updating the available SDKs when Xcode is upgraded**

**Prerequisites**

- **Apple Xcode 4** – or later version
- **Certificates and provisioning profiles** – You must install all required developer certificates and provisioning profiles on every machine that Bamboo will use to run your build. See the [App Distribution Guide](#) for more information.
- **Bamboo Xcode support plugin** – The latest Xcode plugin installed in your Bamboo server.
- **ios-sim** (optional when building Mac applications) – a command line utility used to launch the iOS Simulator from the command line. If you have homebrew installed, you can install it by running `brew install ios-sim`. For other installation methods, see the [ios-sim website](#).
- **Cocoapods** (optional if you do not have a Podfile in your project) – Cocoapods is the library dependency manager for Mac OS X. In order for Bamboo to install dependencies from your Podfile (if you have created one), Bamboo will need it installed on all systems where the build should run.

**Testing iOS applications**

To have tests automatically run on the iOS Simulator and reported within Bamboo you must make some changes to your Xcode project's test bundles and add the Xcode build task to your Job within Bamboo.

**Configuring your Xcode project automated simulator tests**

Without modifications, Apple does not support running unit tests in the simulator using the `xcodebuild` terminal utility which Bamboo uses to automate builds and tests.
Using ios-sim and a small modification to the RunUnitTests script phase in the test bundle it is possible to overcome this limitation.

Change the content of the script to:

```bash
if [ "$RUN_UNIT_TEST_WITH_IOS_SIM" = "YES" ]; then
test_bundle_path="$BUILT_PRODUCTS_DIR/$PRODUCT_NAME.$WRAPPER_EXTENSION"
ios-sim launch "$(dirname "$TEST_HOST")" --setenv
DYLD_INSERT_LIBRARIES="/../../Library/PrivateFrameworks/IDEBundleInjection.framework/IDEBundleInjection" --setenv
XCInjectBundle="$test_bundle_path" --setenv
XCInjectBundleInto="$TEST_HOST" --args -SenTest All "$test_bundle_path"
else
"$(SYSTEM DEVELOPER_DIR)/Tools/RunUnitTests"
fi
```

Configuring the Xcode task for testing

To configure an Xcode to test an iOS project task:

1. Navigate to the Tasks configuration tab for the job (this will be the default job if creating a new plan).
2. Click the name of an existing Xcode task, or click Add Task then Xcode to create a new task.
3. Complete the following settings:

   **Task Description**
   A description of the task, which is displayed in Bamboo.

   **Disable this task**
   Check, or clear, to selectively run this task.

   **Apple SDK**
The Apple SDK to target during the build.

**Report test results**
Report and store any OCUnit/SenTestKit results run during the build.

**Run tests in iOS simulator**
Provides the RUN_UNIT_TEST_WITH_IOS_SIM variable used in the custom build phase to run the unit tests on the simulator.

4. Click **Save**.

**Updating the available SDKs when Xcode is upgraded**

When you upgrade Xcode you may need to update Bamboo with the correct SDK information.

If you use local agents:

1. Login as an administrator
2. Go to Administration -> Server Capabilities
3. Click **Detect server capabilities**

If you are using remote agents:

1. Run `xcode-build -showsdks` from the command line

2. Login as an administrator
3. In Administration -> Agents, pick the agent you wish for the new SDK capability to be present on
4. Click **Add Capability** and pick **Xcode SDK** from the **Capability Type** field
5. Set a name for the SDK (e.g. OS X 10.9)
6. Set a SDK label (e.g. macOSx10.9)
Configuring Build warnings parser task

Use Build warnings parser tasks to scan build logs and output files for compiler warning. Warnings are aggregated into a build artifact and the summary of the warnings is displayed in the build result page.

To create a Build warnings parser task:

1. In your job configuration screen, click the **Tasks** tab.
2. Click **Add task**.
3. From the Builder type group, select **Build warnings parser**.
4. Configure the following settings:

**Task Description**
A description of the task, which is displayed in Bamboo.

**Disable this task**
Check, or clear, to selectively run this task.

**Parser**
Type of parser used by the task. Pick the one that matches the compiler (or other tools) used in previous steps of the build.

**Associate warnings with a repository**
Warnings can be associated with a repository containing your sources. This information can be later used to notify the source control system about the amount and severity of warnings found by this task. By default, the warnings are linked to the default repository of the build.

**Repository**
Pick the correct source repository to associate the warnings with.

**Input**
Where Bamboo should look for warnings. You can choose between parsing the output logs (default) or the file matching a *glob pattern*.

**Custom files**

---

Example of a Build warnings parser task configuration.
A glob pattern defining which files should be scanned for compiler warnings.

**Fail build if too many warnings are found**
Switch this option of causes build to fail if number of warnings exceed defined threshold.

**Severity of warnings being counted**
The severity level of warnings counting towards build failure threshold. There are 3 severity levels: low, normal and high.

**Fail build threshold**
If number of warnings (taking into account their severity) exceeds this number the build fails.

Configuring a test task
Test tasks in Bamboo parse test data, and may run tests, using a particular testing framework.

Please note:

- Java builder tasks in Bamboo (e.g. Maven) parse test information as part of the task. You do not need to configure a test task, if you have specified that test results will be produced as part of the builder task. However, you can configure a builder task to not produce test results and use a test task to parse the test data instead. For example, you may want to set up one JUnit Parser task to parse test data for a number of Maven tasks after they have executed.

- .Net builder tasks in Bamboo (e.g. NAnt) do not parse test information as part of the task. You must configure a test task (e.g. NUnit Parser), if you want test results from the builder task to be parsed.

**Related pages:**
- Configuring a builder task

See the following pages for more information on configuring specific test tasks:

- JUnit Parser
- MBUnit Parser
- MSTest Parser
- MSTest Runner
- NUnit Parser
- NUnit Runner
- PHPUnit
- TestNG

**Community test task plugins**
There are numerous test task plugins available on the Atlassian Marketplace. These plugins are unsupported by Atlassian for the time being but the source code has been made freely available.

<table>
<thead>
<tr>
<th>Bamboo plugin</th>
<th>Testing framework</th>
<th>Languages and Platforms</th>
<th>Supported by Atlassian?</th>
<th>Source code</th>
<th>Issue tracking adding official support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bamboo Xcode Task</td>
<td>OCUnit</td>
<td>Objective-C, Apple iOS, Cocoa and Mac OS X</td>
<td>NO</td>
<td>Available on Bitbucket</td>
<td>BAM-6149 - Provide official support for the Bamboo Xcode plugin</td>
</tr>
</tbody>
</table>
JUnit Parser

This page describes how to configure a Bamboo task to parse JUnit test results.

Because TestNG uses the JUnit XML format, the JUnit Parser task is also able to parse TestNG test results.

Before you begin:

- Java builder tasks in Bamboo (e.g. Maven) parse test information as part of the task. You do not need to configure a test task, if you have specified that test results will be produced as part of the builder task.

**Related pages:**
- Configuring tasks
- Configuring jobs
- Configuring a test task

**Atlassian blogs:**
- So you want to run tests in parallel... now what?

To configure a JUnit Parser task:

1. Navigate to the Tasks configuration tab for the job (this will be the default job if creating a new plan).
2. Click the name of an existing JUnit Parser task, or click Add Task and then JUnit Parser to create a new task.
3. Update the task settings:

   **Task Description**
   Enter a description of the task, for display in Bamboo.

   **Disable this task**
   Check, or clear, to selectively run this task.

   **Specify custom results directories**
   Enter the name of the test results directory (or multiple directories, separated by commas). You can also use Ant-style patterns such as `${**/test-reports/**.xml}` where the base directory is the "working directory" – this can be found at the start of your build log. Do not specify an absolute path.
   For jobs that use CVS, the job build's root directory is `<bamboo-home>/xml-data/build-dir/JOB_KEY/<cvs-module>`.

4. Click Save.

MBUnit Parser

This page describes how to configure a Bamboo task to parse MBUnit test results.

Before you begin:
.NET builder tasks in Bamboo (e.g. NAnt) do not parse test information as part of the task. You must configure a test task (e.g. MBUnit Parser), if you want test results from the builder task to be parsed.

To configure a MBUnit Parser task:
1. Navigate to the Tasks configuration tab (this will be the default job if creating a new plan).
2. Click the name of an existing MBUnit Parser task, or click Add Task and then MBUnit Parser to create a new task.
3. Update the task settings:
   - Task Description
     Enter a description of the task, for display in Bamboo.
   - Disable this task
     Check, or clear, to selectively run this task.
   - MBUnit Test Results File
     Enter the name of the test results file. The test file must be in MBUnit XML format. For more information on MBUnit, see http://www.mbunit.com/.
4. Click Save.

To configure a MSTest Parser task:
1. Navigate to the Tasks configuration tab for the job (this will be the default job if creating a new plan).
2. Click the name of an existing MSTest Parser task, or click Add Task and then MSTest Parser to create a new task.
3. Update the task settings:
   - Task Description
     Enter a description of the task, for display in Bamboo.
   - Disable this task
     Check, or clear, to selectively run this task.
   - MSTest Test Results File
     Enter the name of the test results file. The test file must be in MSTest format. For more information on MSTest, see this MSDN page.
4. Click Save.
MSTest Runner

This page describes how to configure a Bamboo MSTest Runner task. The MSTest Runner task runs and parses tests for .NET builds.

Before you begin:

- .NET builder tasks in Bamboo (e.g. NAnt) do not parse test information as part of the task. You must configure a test task (e.g. MSTest Parser), if you want test results from the builder task to be parsed.

- If Bamboo is running as a Windows service, ensure that the Service is running as a local user instead of a System User (Bamboo will install itself as the SYSTEM user on Windows).

To configure a Bamboo MSTest Runner task:

1. Navigate to the Tasks configuration tab for the job (this will be the default Job if creating a new plan).
2. Click the name of an existing MSTest Runner task, or click Add Task and then MSTest Runner to create a new task.
3. Update the task settings:

   Related pages:
   - Configuring tasks
   - Configuring jobs
   - Configuring a test task

Task Description
A description of the task, for display in Bamboo.

Disable this task
Check, or clear, to selectively run this task.

Executable
The MSTest Runner executable that you wish to use for this task (e.g. “Visual Studio 2010”). The executable that you select will become one of the task's capability requirements (and hence, one of the job's requirements). For details, please see Configuring a job's requirements.

<table>
<thead>
<tr>
<th>Executable path</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C:\Program Files (x86)\Microsoft Visual Studio 10.0\Common7\IDE\</td>
<td>Specifically for MSTest, we recommend that the executable be defined with the Visual Studio IDE folder path. Example:</td>
</tr>
<tr>
<td>This will allow Bamboo to find the necessary resources.</td>
<td></td>
</tr>
</tbody>
</table>

Environment Variables
Any extra environment variables you want to pass to your build. e.g. JAVA_OPTS="-Xmx256m -Xms128m".

Container
The test container, i.e. the file that contains the tests you want to run. For example, tests.dll. The value of this field is passed to the MSTest.exe as the /testcontainer parameter. See MSTest.exe Command-Line Options (MSDN).

Test Metadata
The path to the Test Metadata file relative to the working directory. For example, "MyApp\MyApp.vsmdi"

Result Filename
The file that you want to save the test results to. For example, testResults.trx. The value of this field is
passed to the MSTest.exe as the /resultsfile parameter. See MSTest.exe Command-Line Options (MSDN).

Run Configuration
The run configuration that you want to use. For example, localtestrun.Testrunconfig. The value of this field is passed to the MSTest.exe as the /runconfig parameter. See MSTest.exe Command-Line Options (MSDN).

NUnit Parser
This page describes how to configure a Bamboo NUnit Parser task.

Before you begin:

- .NET builder tasks in Bamboo (e.g. NAnt) do not parse test information as part of the task. You must configure a test task (e.g. MSTest Parser, NUnit Parser), if you want test results from the builder task to be parsed.

Related pages:
- Configuring tasks
- Configuring jobs
- Configuring a test task

To configure a NUnit Parser task:
1. Navigate to the Tasks configuration tab for the job (this will be the default job if creating a new plan).
2. Click the name of an existing NUnit Parser task, or click Add Task and then NUnit Parser to create a new task.
3. Update the task settings:
   
   **Task Description**
   Enter a description of the task, for display in Bamboo.

   **Disable this task**
   Check, or clear, to selectively run this task.

   **NUnit Test Results File/Directory**
   Enter the name of the test results file/directory. The test files must be in NUnit XML format. For more information on NUnit, see http://www.nunit.org/.
4. Click Save.

NUnit Runner
This page describes how to configure a Bamboo task to run NUnit tests, and then parse the test results.

Before you begin:

- .NET builder tasks in Bamboo (e.g. NAnt) do not parse test information as part of the task. You must configure a test task (e.g. MSTest Parser, NUnit Parser), if you want test results from the builder task to be parsed.

Related pages:
- Configuring tasks
- Configuring jobs
- Configuring a test task

To configure a NUnit Runner task:
1. Navigate to the Tasks configuration tab for the job (this will be the default job if creating a new plan).
2. Click the name of an existing NUnit Runner task, or click Add Task and then NUnit Runner to create a new task.
3. Update the task settings:

   **Task Description**
   A description of the task, which gets displayed in Bamboo.
<table>
<thead>
<tr>
<th><strong>Disable this task</strong></th>
<th>Check, or clear, to selectively run this task.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Executable</strong></td>
<td>The NUnit Runner executable that is available to perform the task. The executable that you select will become one of the task's (and so, the job's) requirements. You can add other executables, if required.</td>
</tr>
<tr>
<td><strong>NUnit Test Files</strong></td>
<td>The name of an assembly (.dll), Visual Studio project (.csproj), or NUnit Test Suite (.nunit) to test. See <a href="http://www.nunit.org/">http://www.nunit.org/</a>.</td>
</tr>
<tr>
<td><strong>Result Filename</strong></td>
<td>The name to be used for the XML results file.</td>
</tr>
<tr>
<td><strong>Tests to Run</strong></td>
<td>The name of the test case, test fixture or namespace to run.</td>
</tr>
<tr>
<td><strong>Test Categories to Include</strong></td>
<td>Specify one or more test categories, separated by commas, to be included in the test run.</td>
</tr>
<tr>
<td><strong>Test Categories to Exclude</strong></td>
<td>Specify one or more test categories, separated by commas, to be excluded from the test run. Exclusions take precedence over inclusions.</td>
</tr>
<tr>
<td><strong>Command Line Options</strong></td>
<td>Specify any command line options or switches you wish to include when running NUnit.</td>
</tr>
<tr>
<td><strong>Environment Variables</strong></td>
<td>Any extra environment variables you want to pass to your build. e.g. JAVA_OPTS=&quot;-Xmx256m -Xms128m&quot;.</td>
</tr>
</tbody>
</table>

4. Click **Save**.

For more information on NUnit, see [http://www.nunit.org/](http://www.nunit.org/).
PHPUnit

This page describes how to configure a **PHPUnit** task.

Before you begin:

- To use this task, you will need to install **PHPUnit** and reference the path to your PHP command-line interpreter, (e.g. `/usr/bin/phpunit` on Ubuntu).

**Related pages:**

- Configuring tasks
- Configuring jobs

**To configure a PHPUnit task:**
1. Navigate to the **Tasks** configuration tab for the job (this will be the default job if creating a new plan).
2. Click the name of an existing task, or click **Add Task** and then **PHPUnit** (or another option, such as **PHPUnit 3.3.X**) to create a new task.
3. Update the task settings:

   **Task Description**
   Enter a description of the task, for display in Bamboo.

   **Disable this task**
   Check, or clear, to selectively run this task.

   **Executable**
   Select the PHPUnit executable that you wish to configure for this task (e.g. "PHPUnit 3.3.x" or "PHPUnit"). The executable that you select will become one of the task’s capability requirements (and hence, one of the job’s requirements). For details, please see [Configuring a job’s requirements](#).

   **Arguments**
   Type the name of the directory/files that will be analyzed recursively by PHPUnit. The default value is "." (i.e. the working subdirectory, if specified). You must specify at least one argument.

   **Environment Variables** (Optional)
   Additional system environment variables that you want to pass to your build. Note that existing environment variables are automatically available to the executable. You can also include Bamboo global or build-specific variables (see [Using global, plan or build-specific variables](#)). Multiple variables should be separated with spaces. Parameters with spaces must be quoted (e.g. `ANT_OPTS="-Xms200m -Xmx700m"`).

   **Working Sub Directory** (Optional)
   An alternative subdirectory, relative to the job’s root directory, where Bamboo will run the executable. The root directory contains everything checked out from the job’s configured source repository. If you leave this field blank, Bamboo will look for build files in the root directory. This option is useful if your task has a build script in a subdirectory and the executable needs to be run from within that subdirectory.

   **Log test execution to XML file**
   Select if you want PHPUnit to record test results in JUnit format. This format is also used by TestNG.

   **Test Result File** — the relative location, and name, of the file to record PHPUnit test results.

   **Generate code coverage report in HTML format**
   Select if you want PHPUnit to generate code coverage data in HTML format (e.g. for PHPUnit HTML Code Coverage reports).

   **HTML Code Coverage Directory** — the relative location of the directory to store the code coverage report.

4. Click **Save**.
TestNG
This page describes how to configure a Bamboo task to parse TestNG test results.

Before you begin:

- Java builder tasks in Bamboo (e.g. Maven) parse test information as part of the task. You do not need to configure a test task, if you have specified that test results will be produced as part of the builder task.

To configure a TestNG Parser task:

1. Navigate to the Tasks configuration tab for the job (this will be the default job if creating a new plan).
2. Click the name of an existing TestNG task, or click Add Task and then TestNG to create a new task.
3. Update the task settings:

   Task Description
Enter a description of the task, for display in Bamboo.

**Disable this task**
Check, or clear, to selectively run this task.

**Specify custom results directories**
Enter the name of the test results directory (or multiple directories, separated by commas). You can also use Ant-style patterns such as */test-reports/*.xml. Please specify file path relative to your job build's root directory. Do not specify an absolute path. For jobs that use CVS, the job build's root directory is `<bamboo-home>/xml-data/build-dir/JOB_KEY/<cvs-module>`.

4. Click **Save**.

**Configuring a variables task**

Variables tasks in Bamboo allow you to:

- pass a value between stages.
- pass a value from a plan to a deployment project.
- read variables from a file using a 'key=value' format.
- print to file the current values of the available variables in your build.

**Inject Bamboo variables task**
The 'Inject Bamboo variables' task allows you to read the values for variables from a file, and create those variables in your build plan.

The file should use a 'key=value' format. Note that starting from Bamboo version 5.14, you must provide relative paths to the property file.

You can choose if those variables should have a local scope (in which case they cease to exist when the job finishes) or result scope (in which case they are persisted and passed into subsequent stages or related deployment releases).

See [Configuring tasks](#) for help in creating a task.

**Dump variables to log task**
The 'Dump variables to log' task simply writes out the current values of all variables used in the build.

See Configuring tasks for help on creating a task.

### FAQ

Q. What happens if the same key is used twice?

A. The last assignment will prevail. If you set the scope to local variable with the same key as an existing result variable, the value of the result variable will be restored when the job finishes.

Q. What if I manually set a variable with the same key as a result variable?

A. Same as above – the last assignment wins.

Q. Can I manually override a result variable in a subsequent manual stage?

A. Yes.

Q. What if 2 jobs in the same stage create the same variable?

A. The variable will exist but it is undefined which value will ultimately be assigned to it.

Q. Is restarting builds, re-running failed jobs or continuing from a manual stage supported?

A. Of course! One caveat though: if you restart a build which has an associated deployment release, the variable in the release will not be refreshed. We're working on that...

**Configuring a deployment task**

Deployment tasks in Bamboo allow you to set up plans that can manage the continuous deployment and delivery of your application.

See the following pages for more information on configuring specific deployment tasks in Bamboo:

- Using Tomcat with Bamboo for continuous deployment
- Using the SCP task in Bamboo
- Using the SSH task in Bamboo
- Using the Heroku task in Bamboo
- Using the AWS CodeDeploy task

**Using the SCP task in Bamboo**

You can use the Bamboo SCP task to upload files from Bamboo directly to a remote server as part of a Bamboo job. The SCP task is able to copy multiple files and preserves the directory structure for the copied files.

See Configuring a deployment task for an overview of Bamboo deployment tasks.

**Related pages:**

- Configuring a deployment task
- Using the SSH task in Bamboo

**To configure an SCP task:**

1. Navigate to the Tasks configuration tab for the job (this will be the default job if creating a new plan).
2. Click the name of an existing SCP task, or click Add Task and then SCP Task to create a new task.
3. Complete the following settings:

**Task Description**
Helps you identify the purpose of the task.

**Disable this task**
Check, or clear, to selectively run this task.

**Host**
The hostname or IP address of the remote server to which the files will be copied.

**Verify remote host fingerprint on connect**
Enter the host fingerprint to be verified. See below for more details.

**Port**
The port number of the remote host that is used for the SSH connection. The default value is 22.

**Username**
The username to use to connect to the remote host.

**Authentication Type**
- **Password** – the password associated with Username.
- **Key without passphrase** – browse to the SSH private key with which to authenticate with the remote host.
- **Key with passphrase** – browse to the SSH private key, and supply the passphrase, to use to authenticate with the remote host.

**Local Path**
The local path (relative to the Bamboo working directory) to the files you want to copy. Use commas to separate files and directories. You can also use Ant-style pattern matching to include multiple files, such as */target/*.jar.

**Remote Path**
The path to the destination directory on the remote server.

4. Click **Save**.
Host fingerprint

You can determine the fingerprint for a host by running:

```
ssh-keygen -l -F <HOSTNAME>
```
The fingerprint is the part of the response shown in the screenshot below:

![SSH fingerprint screenshot](image)

Using the SSH task in Bamboo

You can use the Bamboo SSH task to execute a SSH command on a remote computer as part of a Bamboo job. You can use the SSH task to do such things as:

- Calling database migration scripts
- Starting and stopping services
- Anything you can run on the command line on a remote machine

See Configuring a deployment task for an overview of Bamboo deployment tasks.

### Related pages:
- Configuring a deployment task
- Using the SCP task in Bamboo

To configure an SSH task:

1. Navigate to the **Tasks** configuration tab for the job (this will be the default job if creating a new plan).
2. Click the name of an existing SSH task, or click **Add Task** and then **SSH Task** to create a new task.

![SSH task configuration](image)

3. Complete SSH task configuration settings.

Starting from Bamboo version 6.3, you can choose shared credential as your authentication method. See
4. The shell command to execute on the remote host. You can only enter a single command here.
5. Click **Save**.

**Host fingerprint**

You can determine the fingerprint for a host by running:

```
ssh-keygen -l -F <HOSTNAME>
```

The fingerprint is the part of the response shown in the screenshot below:

Using Tomcat with Bamboo for continuous deployment

You can use Bamboo to deploy and manage your Java web application with Tomcat 6 or 7, without having to directly interact with Maven, Ant or write special scripts.

Bamboo provides tasks that use the HTTP-based scripting interface to the Tomcat Manager application that ships with Tomcat. You can use the Bamboo tasks to perform the following Tomcat operations:

- Deploy an application to a Tomcat instance
- Start an application in a Tomcat instance
- Stop an application in a Tomcat instance
- Reload an application to a Tomcat instance
- Undeploy an application from a Tomcat instance

Each of these tasks run as part of a Bamboo job.

**On this page:**
- Setting up Tomcat
- Deploying an application from Bamboo
  - Configuring the Tomcat tasks

**Related pages:**
- Configuring a deployment task

**Atlassian blogs:**
- Continuous deployment with Bamboo and Tomcat

**Setting up Tomcat**

You will need to prepare the Tomcat server before Bamboo can manage and deploy applications to it.

1. Download the Tomcat 7 distribution and unzip it on your file system.
2. Add a new Tomcat user for Bamboo to use the **Tomcat Application Manager** by adding the following line in `conf/tomcat-users.xml` between the `<tomcat-users>` tags:
3. Start Tomcat by running `bin/startup.sh` on Linux or Mac, or `bin/startup.bat` on Windows.
4. Test this setup by browsing to `http://localhost:8080/manager` and using the username and password you configured in the step above. You should see the “Tomcat Web Application Manager” page, and a list of the running applications on your instance.

For more information about the Tomcat Application Manager and its authentication and authorization configuration see the Tomcat documentation.

### Deploying an application from Bamboo

You use Tomcat deployment tasks in the context of a job in a build plan in Bamboo. This plan should generate a deployable artifact, such as a WAR file. To deploy the artifact, you add a Tomcat deploy task to the plan, as follows:

1. Navigate to the task configuration for the job (this will be the default job if you are creating a new plan).
2. Click **Add Task** and then **Deploy Tomcat Application**.
3. Configure the Tomcat task settings, as described below.
4. Click **Save**.
5. To deploy the application, simply run the plan.

You can check that the deployment has been successful by:

1. Navigating to the logs for the job. Towards the end you should see something like:

```
> Deploying application with war file ‘target/tomcat-test-0.1.war’
to context ‘/myapp’ to server [http://localhost:8080/manager/](http://localhost:8080/manager/)
> Application was successfully deployed.
```

This indicates that Bamboo completed the task successfully.
2. Now, browse to the expected address for your application. You should see the welcome page.

### Configuring the Tomcat tasks

The Tomcat Deploy, Start, Stop, Undeploy and Reload tasks each make use of some or all of the following configuration settings:

**Task Description**
To help you to identify the task.

**Disable this task**
Check, or clear, to selectively run this task.

**Tomcat Manager URL**
The URL for the Tomcat Manager e.g. `http://localhost:8080/manager/`

**Target Tomcat server is version 6.x**
Choose this if deploying to a Tomcat 6.x server.

**Tomcat Manager Username and Password**
These should match the credentials set in `conf/tomcat-users.xml` when you configured Tomcat, as described above.

**Application Context**
Specifies where the application should sit on the Tomcat server once deployed.
WAR File
The path to the WAR file, relative to the Bamboo working directory, for example “target/tomcat-test-0.1.war”

Deployment Tag
The value used to tag the deployment within the Tomcat Manager. You can use Bamboo variables to build the tag value.

For example, using the value ${bamboo.buildResultKey} will tag the deployment with the build number of the build that was used to deploy the application.

Using the AWS CodeDeploy task
With the AWS CodeDeploy task for Bamboo you can deploy applications to EC2 instances automatically, reliably, and rapidly. Additionally, AWS CodeDeploy keeps track of the whole deployment process.

On this page:
- Overview
- Before you begin
- Adding an AWS CodeDeploy task to a Bamboo plan
- AWS CodeDeploy configuration for Bamboo
- Preparing files for deployment
  - Examples of revisions

Overview
The AWS CodeDeploy task compresses the specified directory with an AppSpec file into a .zip file, uploads the file to Amazon S3, and starts the deployment according to the configuration provided in the CodeDeploy application.

Before you begin
There are several requirements that must be met before you can start using the AWS CodeDeploy task. In short, you must configure the following in your AWS Management Console:
- an EC2 instance with a tagged deployment group
- a CodeDeploy application
- an IAM user
- an S3 bucket

For more guidelines about your AWS configuration, see AWS CodeDeploy configuration for Bamboo.

The content that you want to be zipped and deployed requires a specific structure. For more information, see Preparing files for deployment.
Adding an AWS CodeDeploy task to a Bamboo plan

To use the CodeDeploy task:

1. Go to the plan configuration.
2. Click **Add task**.
3. Select **AWS CodeDeploy**.
4. Provide the following details:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task description</td>
<td>A short description of the task.</td>
</tr>
<tr>
<td>Disable this task</td>
<td>Select the check box to skip this task in the build.</td>
</tr>
<tr>
<td>AWS credentials</td>
<td>You can select existing AWS credentials from the list or add new AWS credentials. The newly created AWS credentials are added to the shared credentials list in Bamboo. To make existing AWS credentials available for selection within the AWS CodeDeploy task in Bamboo, add them to Shared credentials.</td>
</tr>
<tr>
<td>Region</td>
<td>A region in which the application is deployed.</td>
</tr>
<tr>
<td>Deployable content directory</td>
<td>Location of the directory that contains the deployable content and an AppSpec file. By default, it is the root build directory. The content of the directory is compressed into a .zip file and sent to Amazon S3 bucket for deployment. For more information, see Preparing files for deployment.</td>
</tr>
<tr>
<td>Amazon S3 bucket</td>
<td>The name of an S3 bucket from which the deployable content (your app and the AppSpec file) is deployed. Start typing to open a selection list of the existing S3 buckets that are available for the AWS credentials provided in the task configuration. For more information, see Amazon S3 bucket.</td>
</tr>
<tr>
<td>Application name</td>
<td>The name of the CodeDeploy application that you created in the AWS management console. For more information, see AWS CodeDeploy application.</td>
</tr>
<tr>
<td>Deployment group</td>
<td>Start typing to open a list of deployment groups available for the Application name specified in the previous step.</td>
</tr>
</tbody>
</table>

**AWS CodeDeploy configuration for Bamboo**

The infrastructure setup is described in detail by AWS. For more information, see [Getting Started with AWS CodeDeploy](#).

Atlassian provides guidelines for the following:

- IAM user
- AWS CodeDeploy application
- Amazon S3 bucket

**IAM user**

We recommend creating a dedicated CodeDeploy IAM user or group.

The following policy gives full permissions to Amazon S3 buckets, CodeDeploy application and deployment group:
For more examples of policies, see Bucket Policy Examples.

**AWS CodeDeploy application**

Each CodeDeploy application holds information about the deployment configuration.

For more information, see Create an Application with AWS CodeDeploy.

**Amazon S3 bucket**

An Amazon S3 bucket must exist. We recommend creating a dedicated CodeDeploy S3 bucket that is located in the same region as the instances to which you want to deploy the application.

For more information about how to grant access to S3 buckets, see IAM user.

**Preparing files for deployment**

The deployable content that is compressed and sent to an Amazon S3 bucket is called a revision and it consists of the application and an AppSpec (Application Specification) file.

**Examples of revisions**

- simple
- advanced

**Further reading**

- AWS CodeDeploy
- User Access Permissions Reference
- Create IAM Instance Profile and Service roles
- Bucket Policy Examples
- IAM user

**Pattern matching reference**
Bamboo supports a powerful type of regular expression for matching files and directories (as with pattern matching in Apache Ant).

These expressions use the following wildcards:

<table>
<thead>
<tr>
<th></th>
<th>Matches one character (any character except path separators)</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>Matches zero or more characters (not including path separators)</td>
</tr>
<tr>
<td>**</td>
<td>Matches zero or more path segments.</td>
</tr>
</tbody>
</table>

Remember that Ant globs match paths, not just simple filenames.

- If the pattern does not start with a path separator i.e. / or \\, then the pattern is considered to start with /** /.
- If the pattern ends with / then ** is automatically appended.
- A pattern can contain any number of wild cards.

Also see the Ant documentation.

Examples

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>*.txt</td>
<td>Matches /foo.txt and /bar/foo.txt but not /foo.txt or /bar/foo.txt</td>
</tr>
<tr>
<td>/*.txt</td>
<td>Matches /foo.txt but not /bar/foo.txt</td>
</tr>
<tr>
<td>/dir1/**</td>
<td>Matches all files under /dir1/</td>
</tr>
</tbody>
</table>

Configuring the Docker task in Bamboo

The Docker task in Atlassian Bamboo allows you to use Docker images and containers in your Bamboo builds and deployments.

**Before you begin**

- Make sure you have Docker installed. We advise to use the most recent version.
- Define a Docker capability in Bamboo. See Defining a new Docker capability
- If you're using Bamboo on Windows, you can't run Docker commands directly from the Windows command line. To use Docker tasks with Bamboo Windows, run Docker Machine.
The Docker task supports the following Docker actions:

- **Build a Docker image**
- **Run a Docker container**
- **Push a Docker repository to a Docker registry**

### Build a Docker image

Builds a Docker image based on the specified Dockerfile. The Dockerfile may be provided as an existing file in the task's working directory or defined in the task configuration. The image is stored in Docker's local image installation directory and can be used by subsequent Docker tasks in the job. You can optionally save the image to a file in the working directory which can then be packaged as a build artifact.

To build a Docker image in Bamboo:

1. Create a new Docker task for the relevant job. See [Configuring tasks](#).
2. **Add a Task description.**
3. Use the **Disable this task** checkbox to control whether the task gets run.
4. Choose the **Build a Docker image** command and complete the settings. Click below to see more information about the settings:

   - **Build a Docker image...**
### Repository

The repository name (and optionally a tag) to be applied to the resulting image, following this pattern:

```markdown
registry.address:port/namespace/repository:tag
```

Only `repository` is mandatory.

### Dockerfile

Use either an existing Dockerfile (located in the working directory for the task), or specify the contents of the Dockerfile.

### Do not use cache when building the image

By default, Docker will reuse a cached build during the next build. See the Docker documentation.

Select **Do not use cache...** to ensure that the new image will include changes since the last build. Note that this may incur a performance penalty.

### Save the image as a file

Specify the directory location and file name. Optionally configure a **job artifact** to pass it to next stages and deployments.

If required, specify advanced options:

#### Environment variables

*(Optional)* Additional system environment variables that you want to pass to your build. Note that existing environment variables are automatically available to the executable. You can also include Bamboo global or build-specific variables (see **Bamboo variables**). Multiple variables should be separated with spaces. Parameters with spaces must be quoted (e.g `JAVA_OPTS=-Xms200m -Xmx700m`).

#### Working sub directory

*(Optional)* An alternative subdirectory, relative to the job’s root directory, where Bamboo will run the executable. The root directory contains everything checked out from the job’s configured source repository. If you leave this field blank, Bamboo will look for build files in the root directory. This option is useful if your task has a build script in a subdirectory and the executable needs to be run from within that subdirectory.

### Save your changes!

---

**Run a Docker container**

Starts a Docker container based on the specified image.
By default, the task's working directory is mounted and used as the Docker container's working directory, but you can specify your own settings.

By default, the container is removed on completion of the task, but you can choose Detach container to have the container continue to run after a deployment project completes. Containers can be linked to detached containers started by preceding tasks in a job by selecting the 'Link to detached containers' option.

Note that a non-detached container that fails to start will not be removed when the Bamboo task completes. See this KB article for more details.

To run a Docker container in Bamboo:

1. Create a new Docker task for the relevant job. See Configuring tasks for details.
2. Add a Task description to help remind you why you created the task.
3. Use the Disable this task checkbox to control whether the task runs.
4. Choose the Run a Docker container command and complete the settings. Click below to see more information about the settings:

   Run a Docker container...

   Docker image
   The image you want to use to instantiate the Docker container

   Detach container
   Allows you to run the container in the background, after a deployment project completes

   Specify a Container name that isn't used by other containers in this job.

   Click Add port mapping to specify mappings that bind ports inside the container to ports on the host.

   Wait for service to start
   Allows you to specify how long Bamboo should wait for the service to become available.

   You need to specify a pattern for the URL that Bamboo should check, and a timeout period.

   Link to detached containers
   Allows you to link containers to detached containers started by preceding tasks in a job.

   Container environment variables
   Allows you to specify parameters to pass to the container, for example `JAVA_OPTS=-Xmx256m -Xms128m`.

   Separate multiple parameters with spaces. Parameters with spaces must be quoted.

   Container command
The command to run in the Docker container.

**Container working directory**

The working directory for the container.

**Additional arguments**

Additional Docker run options.

Argument strings that have values which contain spaces require the entire argument string be contained within quotes, that is, the parameter marker, the parameter, the equals sign, and the value containing spaces. For example:

```
"--health-cmd=mysqladmin ping || exit 1"
```

**Volumes**

You can mount additional host directories as data volumes inside the container.

If required, specify advanced options:

**Environment variables**

(Optional) Additional system environment variables that you want to pass to your build. Note that existing environment variables are automatically available to the executable. You can also include Bamboo global or build-specific variables (see Bamboo variables). Multiple variables should be separated with spaces. Parameters with spaces must be quoted (e.g. `JAVA_OPTS=-Xms200m -Xmx700m`).

**Working sub directory**

(Optional) An alternative subdirectory, relative to the job's root directory, where Bamboo will run the executable. The root directory contains everything checked out from the job's configured source repository. If you leave this field blank, Bamboo will look for build files in the root directory. This option is useful if your task has a build script in a subdirectory and the executable needs to be run from within that subdirectory.

Save your changes!

**Push a Docker image to a Docker registry**

Pushes a Docker image to a Docker registry. This may be the central Docker Hub registry or a custom registry.

To push a Docker repository from Bamboo to a registry:

1. Create a new Docker task for the relevant job. See Configuring tasks for details.
2. Add a Task description to help remind you why you created the task.
3. Use the Disable this task checkbox to control whether the task gets run.
4. Choose the Push a Docker image to a Docker registry command and complete the settings. Click below to see more information about the settings:
Push a Docker image to a Docker registry...

Registry

Choose to push to either Docker Hub or a custom registry.

Repository

For Docker Hub you must specify the repository name and optionally a tag, for example: namespace/repository:tag. For a custom registry you must specify the registry address, repository name and optionally a tag, for example: registry.address:port/namespace/repository:tag.

Authentication type

Select how you'd like to authenticate:

- use agents' dockercfg file
- use username and password
- select predefined shared credentials from the drop-down list

If required, specify advanced options:

Environment variables

(Optional) Additional system environment variables that you want to pass to your build. Note that existing environment variables are automatically available to the executable. You can also include Bamboo global or build-specific variables (see Bamboo variables). Multiple variables should be separated with spaces. Parameters with spaces must be quoted (e.g. JAVA_OPTS="-Xms200m -Xmx700m").

Working sub directory

(Optional) An alternative subdirectory, relative to the job's root directory, where Bamboo will run the executable. The root directory contains everything checked out from the job's configured source repository. If you leave this field blank, Bamboo will look for build files in the root directory. This option is useful if your task has a build script in a subdirectory and the executable needs to be run from within that subdirectory.

Save your changes!

Advanced authentication

The push task allows you to define username, password and email for authentication purposes.

If the other tasks require authentication, or if you want to share credentials between all builds for certain agents, it's possible to create the docker configuration file on the agent itself, named ~/.dockercfg.
When using the push task, leave authentication fields empty in order to use dockerconfig instead.

Docker command updates ~/.dockercfg file; if you have any configuration management tool in place updating this file (like puppet, chef or ansible), make sure it’s not executing while you are running a docker build.

**Troubleshooting**

No space left on device

Docker stores it's images in a local image installation directory. Over time this directory may grow to consume all of the available disk space. When this occurs you should remove unused images by running the `docker rm` command.

The following Docker issues affecting disk space may provide further information:

- Device-mapper does not release free space from removed images
- Graph deletes are non-atomic, db refs deleted without deleting on-disk entities

Permission denied on files created within a Docker container

Docker runs processes inside containers as the root user. This means files created on mounted volumes are owned by the root user and not by the user running the Docker command (the bamboo agent user). This may cause an issue if a subsequent task requires access to those files on the host.

Docker plans to allow mapping between container and host users in the future. Until then, you can work around this issue by changing the owner of the files in the mounted volume to the host user:

- Supply the host user's id and group id to the container by setting the following environment variables in the Docker run task configuration:
  - HOST_UID=$UID
  - HOST_GID=$GID
- Run a script inside the container to change the owner of the files in the mounted volume:

  ```bash
  chown -R $HOST_UID:$HOST_GID /<path_to_mounted_volume>
  ```

Permission denied when running Docker

When attempting to run a Docker container you may see a 'permission denied' issue:

```
2015/02/10 06:35:31 Post http:///var/run/docker.sock/build?rm=1&t=docker-toy-demo: dial unix /var/run/docker.sock: permission denied
```

The solution is to add the Bamboo user agent to the Docker group on the agent.

Getting execution errors for valid docker files or unable to start docker container
Example build output:

Driver devicemapper failed to get image rootfs 511136ea3c5a64f264b78b5433614aec563103b4d4702f3ba7d4d2698e22c158: Error mounting '/dev/mapper/docker-202:16-17252355-511136ea3c5a64f264b78b5433614aec563103b4d4702f3ba7d4d2698e22c158' on '/mnt/docker/devicemapper/mnt/511136ea3c5a64f264b78b5433614aec563103b4d4702f3ba7d4d2698e22c158': invalid argument

simple 12-Feb-2015 12:12:14 Failing task since return code of ['/usr/bin/docker build --no-cache=true --tag="docker.atlassian.io/dk:9.3" /home/bamboo/bamboo-agent-home/xml-data/build-dir/dkr-build-JOB1'] was 1 while expected 0

error 12-Feb-2015 12:12:14 Error occurred while running Task 'Build docker image(5)' of type com.atlassian.bamboo.plugins.bamboo-docker-plugin:task.docker.cli.

error 12-Feb-2015 12:12:14 com.atlassian.bamboo.task.TaskException: Failed to execute task

error 12-Feb-2015 12:12:14 at com.atlassian.bamboo.plugins.docker.service.BuildService.execute(BuildService.java:53)


error 12-Feb-2015 12:12:14 at com.atlassian.bamboo.task.TaskExecutorImpl.executeTaskWithPrePostActions(TaskExecutorImpl.java:198)

error 12-Feb-2015 12:12:14 at com.atlassian.bamboo.task.TaskExecutorImpl.executeTasks(TaskExecutorImpl.java:278)

error 12-Feb-2015 12:12:14 at com.atlassian.bamboo.task.TaskExecutorImpl.execute(TaskExecutorImpl.java:105)


error 12-Feb-2015 12:12:14 at com.atlassian.bamboo.v2.build.agent.DefaultBuildAgent.build(DefaultBuildAgent.java:188)

error 12-Feb-2015 12:12:14 at com.atlassian.bamboo.v2.build.agent.BuildAgentControllerImpl.waitAndPerformBuild(BuildAgentControllerImpl.java:112)

error 12-Feb-2015 12:12:14 at com.atlassian.bamboo.v2.build.agent.DefaultBuildAgent$1.run(DefaultBuildAgent.java:110)

error 12-Feb-2015 12:12:14 at com.atlassian.bamboo.v2.build.agent.BuildAgentControllerImpl$1.run(BambooRunnables.java:49)

elper.java:31)
error 12-Feb-2015 12:12:14        at
com.atlassian.bamboo.security.ImpersonationHelper.runWithSystemAuthority
(ImpersonationHelper.java:20)
error 12-Feb-2015 12:12:14        at
com.atlassian.bamboo.security.ImpersonationHelper$1.run(ImpersonationHel
per.java:52)
error 12-Feb-2015 12:12:14        at
java.lang.Thread.run(Thread.java:745)
error 12-Feb-2015 12:12:14        Caused by:
com.atlassian.bamboo.plugins.docker.client.DockerException: Error
running Docker build command
error 12-Feb-2015 12:12:14        at
com.atlassian.bamboo.plugins.docker.client.DockerCmd.build(DockerCmd.jav
a:149)
error 12-Feb-2015 12:12:14        at
com.atlassian.bamboo.plugins.docker.service.BuildService.execute(BuildSe
vice.java:40)
error 12-Feb-2015 12:12:14        ... 15 more
error 12-Feb-2015 12:12:14        Caused by:
com.atlassian.utils.process.ProcessException: Error executing
/usr/bin/docker build --no-cache=true --tag="docker.atlassian.io/dk:9.3"
/home/bamboo/bamboo-agent-home/xml-data/build-dir/DDT-REP-JOB1
error 12-Feb-2015 12:12:14        at
com.atlassian.bamboo.plugins.docker.process.DockerTaskProcessService.exe
cute(DockerTaskProcessService.java:57)
error 12-Feb-2015 12:12:14        at
If the agent consistently fails executing docker run commands, either when building an image or running an instance there is a risk that you've run into https://github.com/docker/docker/issues/4036 To help diagnose this you can SSH to the agent and look at the kernel messages by running:

```
dmesg
```

There are several possible messages that indicate this problem. Some of those are listed here:

```
[83471099.881879] JBD2: no valid journal superblock found
[83471099.881883] EXT4-fs (dm-2): error loading journal
[88401612.723018] EXT4-fs (dm-1): warning: mounting fs with errors, running e2fsck is recommended
[88401612.724764] EXT4-fs (dm-1): mounted filesystem with ordered data mode. Opts: discard
```

There is a big risk that the device mapper is corrupt. This means that you need to stop Docker and remove the files used by devicemapper, then restart Docker. If running on an elastic agent, terminating the agent and starting a new one is also a viable option.

To stop Docker and remove the files, run the following:

```
sudo -i
#stop the docker daemon
service docker stop
#remove the broken devicemapper files
rm -rf /var/lib/docker
service docker start
```

The location of the devicemapper files may differ from the example above. Run the following to find the exact path:

```
docker info
```

Building a Docker image in Bamboo

In Bamboo, you can build a Docker image based on the specified Dockerfile. The Dockerfile may be provided as an existing file in the task's working directory or defined in the task configuration.

The image is stored in Docker's local image installation directory and can be used by subsequent Docker tasks in the job. You can optionally save the image to a file in the working directory which can then be packaged as a build artifact.

Before you begin
• Make sure you have Docker installed. We advise to use the most recent version.
• Define a Docker capability in Bamboo. See Defining a new Docker capability
• If you're using Bamboo on Windows, you can't run Docker commands directly from the Windows command line. To use Docker tasks with Bamboo Windows, run Docker Machine.

To build a Docker image in Bamboo:

1. In you job configuration screen, click Add task.
2. Search for the Docker tasks type and select it.
3. (optional) For future reference, add a Task description.
4. (optional) Use the Disable this task checkbox to control whether your task gets run.
5. From the Repository drop-down list, choose the Build a Docker image.
6. Complete the task settings.
    - ∨ Build a Docker image...
7. Click **Save**.

**Pulling a Docker image from a registry**

You can pull a Docker image from a Docker registry. This may be the central Docker Hub registry or a custom
Before you begin

- Make sure you have Docker installed. We advise to use the most recent version.
- Define a Docker capability in Bamboo. See Defining a new Docker capability
- If you’re using Bamboo on Windows, you can’t run Docker commands directly from the Windows command line. To use Docker tasks with Bamboo Windows, run Docker Machine.

To pull a Docker image from a registry

1. In you job configuration screen, click Add task.
2. Search for the Docker tasks type and select it.
3. (optional) For future reference, add a Task description.
4. (optional) Use the Disable this task checkbox to control whether your task is run.
5. From the Repository drop-down list, choose Pull a Docker image from a Docker registry.
6. Complete the settings:
   - Pull a Docker image to a Docker registry...

   - Registry
     Choose to push to either Docker Hub or a custom registry.

   - Repository
     For Docker Hub you must specify the repository name and optionally a tag, for example: namespace/repository:tag
     For a custom registry you must specify the registry address, repository name and optionally a tag, for example:
     registry.address:port/namespace/repository:tag

   - Authentication type
     Select how you’d like to authenticate:
     - use agents' dockercfg file
     - use username and password
     - select predefined shared credentials from the drop-down list

   - Advanced options (optional)
     - Environment variables
       Additional system environment variables that you want to pass to your build. Note that existing environment variables are automatically available to the executable. You can also include Bamboo global or build-specific variables (see Bamboo variables). Multiple variables should be separated with spaces. Parameters with spaces must be quoted (e.g JAVA_OPTS="-Xms200m -Xmx700m").

     - Working sub directory
       An alternative subdirectory, relative to the job’s root directory, where Bamboo will run the executable. The root directory contains everything checked out from the job’s configured source repository. If you leave this field blank, Bamboo will look for build files in the root directory. This option is useful if your task has a build script in a subdirectory and the executable needs to be run from within that subdirectory

   - Click Save.

Pushing a Docker image to a registry

You can push a Docker image to a Docker registry. This may be the central Docker Hub registry or a custom registry.
Before you begin

- Make sure you have Docker installed. We advise to use the most recent version.
- Define a Docker capability in Bamboo. See Defining a new Docker capability
- If you're using Bamboo on Windows, you can't run Docker commands directly from the Windows command line. To use Docker tasks with Bamboo Windows, run Docker Machine.

To push a Docker repository from Bamboo to a registry:

1. In you job configuration screen, click **Add task**.
2. Search for the Docker tasks type and select it.
3. *(optional)* For future reference, add a **Task description**.
4. *(optional)* Use the **Disable this task** checkbox to control whether your task gets run.
5. From the **Repository** drop-down list, choose the **Push a Docker image to a Docker registry**.
6. Complete the settings
   - **Push a Docker image to a Docker registry**...
**Registry**

Choose to push to either Docker Hub or a custom registry.

**Repository**

For Docker Hub you must specify the repository name and optionally a tag, for example: `namespace/repository:tag`.

For a custom registry you must specify the registry address, repository name and optionally a tag, for example: `registry.address:port/namespace/repository:tag`.

**Authentication type**

Select how you'd like to authenticate:

- use agents' dockercfg file
- use username and password
- select predefined shared credentials from the drop-down list

If required, specify advanced options:

<table>
<thead>
<tr>
<th><strong>Environment variables</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(Optional)</em> Additional system environment variables that you want to pass to your build. Note that existing environment variables are automatically available to the executable. You can also include Bamboo global or build-specific variables (see Bamboo variables). Multiple variables should be separated with spaces. Parameters with spaces must be quoted (e.g. <code>JAVA_OPTS=&quot;-Xms200m -Xmx700m&quot;</code>).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Working sub directory</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(Optional)</em> An alternative subdirectory, relative to the job's root directory, where Bamboo will run the executable. The root directory contains everything checked out from the job's configured source repository. If you leave this field blank, Bamboo will look for build files in the root directory. This option is useful if your task has a build script in a subdirectory and the executable needs to be run from within that subdirectory.</td>
</tr>
</tbody>
</table>

**Save** your changes!

**Running a Docker container in Bamboo**

By default, the task's working directory is mounted and used as the Docker container's working directory, but you can specify your own settings.

By default, the container is removed on completion of the task, but you can choose **Detach container** to have the container continue to run after a deployment project completes. Containers can be linked to detached containers started by preceding tasks in a job by selecting the 'Link to detached containers' option.

Note that a non-detached container that fails to start will not be removed when the Bamboo task completes. See this KB article for more details.
Before you begin

- Make sure you have Docker installed. We advise to use the most recent version.
- Define a Docker capability in Bamboo. See Defining a new Docker capability
- If you’re using Bamboo on Windows, you can’t run Docker commands directly from the Windows command line. To use Docker tasks with Bamboo Windows, run Docker Machine.

To run a Docker container in Bamboo:

1. In your job configuration screen, click Add task.
2. Search for the Docker tasks type and select it.
3. (optional) For future reference, add a Task description.
4. (optional) Use the Disable this task checkbox to control whether your task gets run.
5. Choose the Run a Docker container command and complete the settings. Click below to see more information about the settings:
   - Run a Docker container...

<table>
<thead>
<tr>
<th>Docker image</th>
</tr>
</thead>
<tbody>
<tr>
<td>The image you want to use to instaniate the Docker container</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Detach container</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allows you to run the container in the background, after a deployment project completes</td>
</tr>
<tr>
<td>Specify a Container name that isn’t used by other containers in this job.</td>
</tr>
<tr>
<td>Click Add port mapping to specify mappings that bind ports inside the container to ports on the host.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wait for service to start</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allows you to specify how long Bamboo should wait for the service to become available.</td>
</tr>
<tr>
<td>You need to specify a pattern for the URL that Bamboo should check, and a timeout period.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Link to detached containers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allows you to link containers to detached containers started by preceding tasks in a job.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Container environment variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allows you to specify parameters to pass to the container, for example JAVA_OPTS = &quot;-Xmx256m -Xms128m&quot;.</td>
</tr>
<tr>
<td>Separate multiple parameters with spaces. Parameters with spaces must be quoted.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Container command</th>
</tr>
</thead>
</table>

Created by Atlassian in 2019 Licensed under a Creative Commons Attribution 2.5 Australia License.
| The command to run in the Docker container. |
| **Container working directory** |
| The working directory for the container. |
| **Additional arguments** |
| Additional Docker run options. |
| Argument strings that have values which contain spaces require the entire argument string be contained within quotes, that is, the parameter marker, the parameter, the equals sign, and the value containing spaces. For example: |
| "--health-cmd=mysqladmin ping || exit 1" |
| **Volumes** |
| You can mount additional host directories as data volumes inside the container. |

If required, specify advanced options:

| **Environment variables** |
| *(optional)* Additional system environment variables that you want to pass to your build. Note that existing environment variables are automatically available to the executable. You can also include Bamboo global or build-specific variables (see Bamboo variables). Multiple variables should be separated with spaces. Parameters with spaces must be quoted (e.g JAVA_OPTS="-Xms200m -Xmx700m"). |

| **Working sub directory** |
| *(optional)* An alternative subdirectory, relative to the job's root directory, where Bamboo will run the executable. The root directory contains everything checked out from the job's configured source repository. If you leave this field blank, Bamboo will look for build files in the root directory. This option is useful if your task has a build script in a subdirectory and the executable needs to be run from within that subdirectory. |

**Save** your changes!

### Configuring a Source Control task

Source Control tasks is an umbrella term for all Repository tasks available in Bamboo. Source Control tasks allow you to quickly apply your changes to repositories. Source Control tasks work in deployment and build
plans and they are fully configurable using Bamboo Specs.

Bamboo provides support for Source Control tasks in the following repositories:

- Bitbucket Cloud
- Bitbucket Server
- Git

**Git LFS is supported** for Source Code Checkout, Repository Commit, and Repository Push tasks.

- Mercurial

Here is a list of Source Control tasks available in Bamboo:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Task</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Source Code Checkout</strong></td>
<td>Task for <strong>checking out</strong> (cloning) a remote repository. You can read more about this task in <a href="#">Checking out code</a>.</td>
</tr>
<tr>
<td></td>
<td><strong>Repository Commit</strong></td>
<td>Available in Bamboo 6.7.1 and later.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Task capable of <strong>committing and pushing</strong> changes to a remote repository.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This task will take all modified files in repository directory, commit them with a given message, and then push them to the remote location. In Bamboo 6.7.1 changes made through <strong>Repository Commit</strong> tasks were recorded by Bamboo and they triggered a plan. In 6.7.2 changes made through this task type are still recorded but they don’t trigger any plan. Change detection simply ignores them.</td>
</tr>
</tbody>
</table>
| Repository Push | Available in Bamboo 6.7.1 and later.  
Task capable of **pushing** commits to a remote repository.  
To be used in place of the VCS Commit task if the commits were already created and only the 'push' part is needed. The concept of 'push' only exists in DVCS repositories.  
Here are some use examples of the Repository Push task:  
- pushing commits created by other tasks over which the user has no control,  
- pushing custom commits (e.g. cryptographically signed or with a custom author),  
- pushing merge results,  
- transactional processing through your build (multiple commits with a single push at the end). |

| Repository Branch (previously known as: VCS Branching) | Task capable of **creating a branch and pushing** it to a remote repository.  
This task will create a new branch with specified name from the latest commit in the checkout directory. For Mercurial, it will create a new commit "Creating branch...".  
**Cannot be used with the Git implementation embedded in Bamboo.** (You need to have set up native Git). |
Sharing artifacts

This page describes how to keep and share artifacts produced by a job, such as reports, websites or .jar files. Bamboo allows artifact sharing between:

- Jobs
- Build plans
- Build plans to deployment environments.

Define an artifact to keep for a job

You can specify which artifacts to keep by setting up an artifact definition for the job. The artifacts will be available after each build of the job.

To set up a new artifact definition:

1. Navigate to the job, as described on Configuring jobs.
2. Click the Artifacts tab, and then Create definition:
   a. Specify a Name for the artifact.
   b. Use Location to specify the folder, relative to the build directory, where the artifact will be located. Do not use the absolute path to the artifact. Wild cards are not supported.
   c. Copy pattern is relative to Location. For example, if you want to keep the latest version of a .jar file, you could specify Copy pattern to be ‘/*.jar’ and the Location to be ‘target’.
   d. Select the Shared check box if you want to share artifacts with other jobs in the plan.
3. Click Save.

Artifacts are copied to a subdirectory (/JOB_KEY/download-data/) under your ‘Build Directory’ folder – see Locating important directories and files.

Sharing artifacts between jobs

You can share artifacts between jobs in different stages using artifact dependencies. For example, you may want to run acceptance tests on a build, sharing the same WAR from one job to another without rebuilding it each time.

Each time the artifact is shared with a subsequent job, it is copied to the job’s agent.

To share an artifact between two jobs in different stages:

Repository Tag (previously known as: VCS Tagging)

Task capable of creating a tag and pushing it to a remote repository.

This task will create a new tag with specified name for the latest commit in the checkout directory. For Mercurial, it will create a new commit “Adding tag...”.

Cannot be used with the Git implementation embedded in Bamboo. (You need to have set up native Git).
1. Navigate to the configuration pages for the job that will produce the artifact, as described on Configuring jobs, and click the Artifacts tab (see Configuring a job’s build artifacts).
2. Either click Share for an existing artifact, or create a new artifact definition, as described above.
3. Navigate to the job in a subsequent stage that will consume the artifact, and click the Artifacts tab.
4. Click Create dependency, then:
   - Choose from the Artifact list.
   - Specify the Destination directory, then click Create.

Sharing artifacts between build plans

You can share artifacts between different build plans, however you need to use the 'Artifact downloader task' to do so. For example, you may want to run acceptance tests on a particular build from a different plan by sharing the same WAR from one plan to another without rebuilding it each time.

To share an artifact between two build plans:

1. Locate the build plan that you wish to associate an artifact with.
   a. Select Configure plan from the 'Actions' drop down menu.
   b. Click on Stages & jobs and select a job or create a new job if one does not already exist.
   c. Click on the Tasks tab for the selected job.
2. Click the Add task button. The 'Task types' window will appear. Select Artifact Downloader Task to open the 'Artifact downloader task' configuration pane:
Complete the configuration using the following options:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Optional?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task description</td>
<td>A brief description of the artifact downloader task</td>
<td>✓</td>
</tr>
<tr>
<td>Disable this task</td>
<td>Check this box to disable the task</td>
<td>-</td>
</tr>
<tr>
<td>Source Plan</td>
<td>The build plan that is the source of the artifact you need to download</td>
<td>✗</td>
</tr>
</tbody>
</table>

3. Click on **Add another artifact** to add another artifact to the download list. Alternatively, use the grey cross icon to delete an artifact from your configuration.

4. Click on **Save** to save your artifact download configuration.

1. The **Artifact** drop down menu only shows artifacts from jobs in previous stages that have been marked as shared. This is described in Configuring a job’s build artifacts.
2. **Destination directory** is relative to the build directory. Do not use the absolute path to refer to the destination directory.

Sharing artifacts from a build plan to a deployment environment

You can also share artifacts from a build plan into a deployment environment. For example, you may wish to share a particular build result from a plan with a deployment environment. To do this, you need to add the 'Artifact downloader task' to a deployment environment during or after the environment creation process.

**To share an artifact from a build plan to a deployment environment:**

1. Open your deployment project and expand the relevant environment panel. In the Other settings section, click on the **Tasks** button. The ‘Set up tasks’ screen will display:
2. Click **Add task**. The 'Task type' selection window will display. Select **Artifact Downloader Task** to open the 'Artifact downloader task configuration' pane:

**Complete the configuration using the following options:**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Optional?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Task description</strong></td>
<td>A brief description of the artifact downloader task.</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Disable this task</strong></td>
<td>Check this box to disable the task.</td>
<td>-</td>
</tr>
<tr>
<td><strong>Artifact Name</strong></td>
<td>Use the drop down menu to locate the name of the artifact that you want to download.</td>
<td>✗</td>
</tr>
<tr>
<td><strong>Destination Path</strong></td>
<td>The location of the working directory into which you want the artifact downloaded.</td>
<td>✓</td>
</tr>
</tbody>
</table>
3. Click **Add another artifact** to add another artifact to the download list.
4. Click **Save** to save your artifact download configuration.

---

1. The **Artifact** drop down menu only shows artifacts from jobs in previous stages that have been marked as shared. This is described in Configuring a job's build artifacts.
2. **Destination directory** is relative to the build directory. Do not use the absolute path to refer to the destination directory.

---

### Working with builds

The following pages contain information on working with your Bamboo **builds**.

- Working with build results
- Working with comments
- Working with labels
- Quarantining failing tests
- Setting up plan build dependencies
- Viewing test statistics for a job
- Reordering jobs in the build queue
- Stopping an active build

### Working with build results

#### About builds

A build is the execution of either a plan or a job. The execution of a plan is referred to as a 'plan build' and that of a job is a 'job build'.

**Related pages:**

- Viewing a build result
- Deleting the results of a plan build
- Working with comments
- Working with labels
- Assigning responsibility for build failures
- Configuring build results expiry for a plan

#### About build results

Every completed build has a **build result**:

- 'Successful' — the code compiled, with or without errors, and all tests completed successfully.
- 'Failed' — either the code did not compile, or at least one test failed.
- 'Incomplete' — the build was not completed, e.g. it may have been stopped manually.

Additionally,

- if the build result is 'Failed', and the previous build result was 'Successful', the build is said to be 'Broken'.
- if the build result is 'Successful', and the previous build result was 'Failed', the build is said to be 'Fixed'.

The latest build result for every plan is listed on the **Dashboard**. Bamboo can also send notifications and generate RSS feeds about build results.

#### Viewing a build result

The instructions on this page describe how to view the build results for a plan.

Every completed build has a **build result**:

- 'Successful' — the code compiled, with or without errors, and all tests completed successfully.
- 'Failed' — either the code did not compile, or at least one test failed.
- 'Incomplete' — the build was not completed, e.g. it may have been stopped manually.

Additionally,

- if the build result is 'Failed', and the previous build result was 'Successful', the build is said to be 'Broken'.
- if the build result is 'Successful', and the previous build result was 'Failed', the build is said to be 'Fixed'.

**Viewing the most recent build result for a plan**

**To view the most recent job build result of a plan:**

1. Click **Dashboard** in the top menu.
2. Locate the plan on the **All Plans** tab, then click the build number.

**On this page:**
- Viewing the most recent build result for a plan
- Viewing all build results for a plan
- Viewing all build results for a job

**Related pages:**
- Viewing test results for a build
- Viewing the code changes that triggered a build
- Viewing a build's artifacts
- Viewing a build log
- Viewing the metadata for a build result
- Viewing linked Jira application issues
- Reporting

**Screenshot: Build Result Summary**
1. **Status ribbon**: Did the build succeed or fail?
2. **Details**: Scan details of the build easily.
3. **Stages and jobs in the plan**: Scan the success of job builds. Click an icon to see details.
4. **Test summary**: Quickly see how many tests are failing and how many were fixed in this build.
5. **Shared artifacts**: See the artifacts shared from this build. Download them with a single click.
6. **History**: Scan the status of recent builds.
7. **Who is responsible?**: Users who commit code are automatically assigned.
8. **Code changes**: See the code changes associated with this build.
9. **Jira issues**: See the JIRA issues related to this build. Click through to the issue in Jira for details.

<table>
<thead>
<tr>
<th>Tab</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Build Summary</strong></td>
<td>Displays a snapshot of the build result.</td>
</tr>
</tbody>
</table>
- Indicates a successful build.

- Indicates a build that was not completed. For example, it may have been stopped manually.

- Indicates a failed build. If a build has failed, you can run the entire build again or rerun just the failed stage.
<table>
<thead>
<tr>
<th>Tests</th>
<th>Provides details of the build's test results.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes</td>
<td>Provides details of the code changes that triggered this build (if applicable).</td>
</tr>
<tr>
<td>Artifacts</td>
<td>Shows any artifacts relating to this build.</td>
</tr>
<tr>
<td>Logs</td>
<td>Displays a complete build log.</td>
</tr>
<tr>
<td>Metadata</td>
<td>Displays any metadata that relates to this build.</td>
</tr>
<tr>
<td>Build Times</td>
<td>Displays a histogram of build times for jobs, and a list of which agents were used to build each job.</td>
</tr>
<tr>
<td>Issues</td>
<td>Provides details of the Jira issues linked to this build (if applicable). Availability depends on Bamboo's configuration.</td>
</tr>
<tr>
<td>Clover</td>
<td>Displays the Clover code-coverage that relates to this build (if applicable). The clover tab is located on the job level because a build can have more than one jobs, and each job might have different Clover results or not have clover tab at all. That's why in order to see the Clover tab, you need to drill down to the individual job that contains the clover report.</td>
</tr>
</tbody>
</table>

- You can assign responsibility for a broken build, either to yourself (click Claim full responsibility) or to someone else in your team (click Assign responsibility).

**Viewing all build results for a plan**

To view all build results for a plan:

1. Click Dashboard in the top menu.
2. Click the plan on the All Plans tab. The ten most recent builds will be displayed in the 'Recent History' section on the Plan Summary tab. See Viewing a plan's build information.
3. Click the History tab to view all builds for the plan.

**Viewing all build results for a job**

To view all build results for a job:

1. Navigate to the desired job, as described on Configuring jobs. The ten most recent builds will be displayed in the 'Recent History' section of the Job Summary tab.
2. Click the History tab to view all builds for the job.

**Viewing test results for a build**

Bamboo provides a convenient summary of all the tests that were run when a particular build was executed — as well as full details of any errors. This is useful when you are investigating what caused a build to fail.

Note that for more meaningful display of test names within Bamboo, the word 'test' is stripped out of test case name names if it occurs at the beginning, and capitals and underscores are treated as word separators.

**Related pages:**

- Viewing a test's history

**To view the test results for a particular build:**

1. Navigate to the build results for the plan or job, as described in Viewing a build result, and click the desired build result.
2. Click the Tests tab.
   - Click the test name to see a particular test's results for other builds.
Viewing a test’s history

A test’s history shows you:

- The occasions when the test has failed. This can be useful when investigating what code changes were related to a failed test (see below).
- The test’s average duration (running time), and whether the duration is increasing or decreasing across builds.

Related pages:

- Viewing test results for a build

To view a test’s history:

1. Navigate to the build results for the Plan/Job, as described in Viewing a build result, and click the desired build result.
2. Click the Tests tab.
3. Click the name of the test in which you are interested. The test’s latest result will be displayed.
4. Click View test case across builds. The ‘Test History’ will be displayed, as shown below.
Viewing the code changes that triggered a build

If a build was triggered by a code change, the updated files will be listed in the build result.

When Atlassian’s Fisheye is connected to your Bamboo server, you can view the code changes that triggered a build. When a build fails due to a compilation error or failed test, you can explore the failed build in Fisheye and jump directly into the changeset that broke the build. You can view the history of that changeset to see what the author was trying to fix, take advantage of the side-by-side diff view to analyze the change and then open the correct files in your IDE.

**Related pages:**
- Linking to source code repositories
- Triggering builds

**To view the code changes that triggered a particular build result:**

1. Navigate to the build results for the plan, as described in Viewing a build result, and click the desired build result.
2. Click the **Changes** tab. A list of updated files will be shown.
   - Click the link to the source file to view the changes.
   - Click the version number to view the entire file.
   - Click the **diffs** link to view the differences between the current and previous version of each file.

Links to individual source-code files will only be available if your Bamboo administrator has connected the plan to the source repository, as specified in the 'Advanced Options' on the 'Source Repositories' tab for the plan. For details, see Integrating Bamboo with Fisheye.

Viewing a build’s artifacts

After a build has run, you can view the artifacts that were produced by all of the jobs in the plan. You can also view the latest version of an artifact from the most recent build.

**Artifacts** are files created by a **job build** (e.g. JAR files). Artifact definitions are used to specify which artifacts to keep from a build and are configured for individual **jobs**.

**Viewing the artifacts for a build**

**To view a build’s artifacts:**

1. Go to the build result. See Viewing a build result for instructions.
2. Click the **Artifacts** tab. The artifacts produced by the jobs in the plan will be displayed. The **artifact definitions** for a job determine which artifacts are kept and which artifacts are shared with other jobs in the plan.
To view the latest version of an artifact from the most recent build, you can manually edit the build artifact URL to retrieve it.

To view the latest version of an artifact from the most recent build:

1. Copy the URL for the build artifact.
2. Paste the URL for the build artifact in your browser and replace the build number in the URL with ‘/latest’.
   - If you need to log in to view the artifacts, you can append `os_username` and `os_password` parameters to the URL to access the files.

For example, if the URL for your artifact is:

```
http://server/bamboo/browse/MYBUILD-254/artifact/logs/sample-log.log
```

You would replace ‘254’ with ‘latest:

```
http://server/bamboo/browse/MYBUILD/latest/artifact/logs/sample-log.log
```

**Viewing the latest version of an artifact from the latest build**

You can share artifacts between jobs in different stages via artifact dependencies. Each time the artifact is shared with a subsequent job, it is copied to the job’s agent.

**Job artifacts**

An artifact is something created by a job (e.g. Java files). Artifact definitions are used to specify which artifacts to keep from a build and are configured for individual jobs.

<table>
<thead>
<tr>
<th>Produced in job</th>
<th>Artifact</th>
<th>File size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extras Export Import Testing</td>
<td>Cargo Log</td>
<td>409 bytes</td>
</tr>
<tr>
<td></td>
<td>Bamboo Server Logs</td>
<td>734 KB</td>
</tr>
<tr>
<td>Extras REST Testing</td>
<td>Cargo Log</td>
<td>409 bytes</td>
</tr>
<tr>
<td></td>
<td>Bamboo Server Logs</td>
<td>579 KB</td>
</tr>
<tr>
<td>Extras Remote Testing</td>
<td>PerformanceStats</td>
<td>2 MB</td>
</tr>
<tr>
<td></td>
<td>Cargo Log</td>
<td>547 bytes</td>
</tr>
</tbody>
</table>

**Viewing a build log**

Every build has a build log. A build log is a permanent record of all the output generated by compiling the job’s source-code and executing the tests.
To view a build log:

1. Navigate to the build results for the plan or job, as described in Viewing a build result, and click the desired build result.
2. Click the Log tab.
   - Click View for the desired log.
   - Click Download to download a text file of the log.

Screenshot: Build Log

Viewing the metadata for a build result

If your source-code repository provides metadata (i.e. key-value properties that are used to describe your build) for your build results, Bamboo will display it.

Related pages:
- Working with build results

To view the metadata for a build result:

1. Navigate to the build results for the plan or job, as described in Viewing a build result, and click the desired build result.
2. Click the Metadata tab.

Screenshot: Metadata for a Build Result
Assigning responsibility for build failures

Bamboo automatically alerts the people who are assigned as responsible for a broken build, and lets other members of the team know that someone is looking at the problem. As you investigate the build failure, you can revise who is responsible, or claim all the responsibility for yourself!

People are assigned as being responsible for fixing a broken build in two ways:

- When a build fails, Bamboo automatically assigns all those who committed code to the failing build as responsible.
- You can manually assign people as being responsible.

Bamboo then sends notifications to whoever is assigned. Once the build is successful, Bamboo removes the responsible people from the build – they’re off the hook!

Note that notifications need to have been configured first, using the 'Change of Responsibilities' Event and the 'Responsible User' Recipient Type. See Configuring notifications for a plan and its jobs for more information.

To assign responsibility for a broken build manually:

1. Go to the Build Result Summary for a plan.
2. Click Assign responsibility to make another member of your team responsible for fixing the build.
3. Click Claim full responsibility if you want to shoulder all the blame yourself.

People who are responsible for the broken build are displayed on the Build Result Summary.

Broken builds that are assigned to you are displayed on your My Bamboo page, available from the Dashboard.
Configuring build results expiry for a plan

By enabling build expiry for a particular plan (described below), you override the global expiry settings that affect all plans in Bamboo. If you disable build expiry for a plan, that plan’s build result data will never be automatically deleted from your Bamboo server.

You can choose the build result data that will be kept for a plan and for how long this data will be kept (e.g. for reporting purposes), before Bamboo automatically deletes it.

Note that the build expiry event is a global event that runs periodically, regardless of whether you disable or enable build expiry in your plans. When this event occurs, the build results for your plan will be expired according to the settings below, or globally. To configure the global event and global build expiry settings, please refer to Configuring global expiry.

You can also delete the results of a plan build manually — see Deleting the results of a plan build.

Configure the expiry of build results for a plan

Ensure that you back up your build results data before its expiry date is reached.

Configure build expiry as follows:

1. Navigate to the configuration for the desired plan, as described on Configuring plans.
2. Click the Miscellaneous tab.
3. Select the Override global build expiry configuration checkbox. Configure expiry using the following settings:

   **Do not expire anything for this plan**
   Select to disable expiry for all build results and artifacts for this plan – these will never be deleted automatically.

   **Build results**
   All build results data (including artifacts and build logs) are deleted.

   **Build artifacts**
   Only user-defined artifacts are deleted from the build results.

   **Build logs**
   Only build logs are deleted from the build results.

   **Expiry after**
   Specifies the period (days, weeks or months) for which you want to keep build results. E.g. specify ‘24 months’ to keep all build results for the last two years.

   **Minimum builds to keep**
   Specifies the minimum number of build results you want to keep. For example, specify ‘50’ to keep the latest 50 build results, even if they are older than the period specified with Expiry period.

   **Keep builds with the following labels**
Specifies the build labels (not plan labels or job labels) applied to builds for which you want to keep build results, regardless of the Expiry period and Minimum builds to keep settings. Note that builds can be labeled either manually or automatically.

4. Click Save.

Screenshot: Configuring build expiry

Deleting the results of a plan build

If the results of a plan builds are no longer required, you can completely remove them from your Bamboo system. The results include all the results of all job builds that were processed as part of an individual plan build (with a specific build number). Note that you can also remove job build result data that reaches a particular age. See Configuring global expiry or Configuring expiry of a plan's job build results for more information.

Before you begin:

- The 'Admin' global permission or 'Admin' plan permission is required to delete plan build results.
- The result of a plan build cannot be deleted if that plan is currently being built. If you need to delete the result of a plan build, stop the plan's build first. Refer to Stopping an active job build for more information.

To delete the result of a plan build:

1. Click Dashboard and then the All Plans tab.
2. In the list of plans, click the name of the desired plan.
3. Click the History tab. A table of completed plan build results will be displayed, with the most recent builds at the top.
4. Locate the desired build result and click Delete. (see screenshot below).
5. Confirm the deletion. The plan build result and any artifacts generated as a result of the plan build's execution will be deleted.

Screenshot: Build history of a plan showing individual plan build results
Working with comments

Comments are a useful way to record and share information about builds. There are two types of comments in Bamboo:

- **Comments you make about a build result** — these are comments that you make about a particular build result.
- **Comments you make when you commit code** — these comments are automatically copied into Bamboo when you commit code from your source-code repository.

When you include Jira issue keys in your build and commit comments, Bamboo will automatically convert these into hyperlinks to the respective Jira issues, if Bamboo is integrated with Jira. The issue key must be of the default Jira issue key format (that is, two or more uppercase letters ([A-Z][A-Z]+), followed by a hyphen and the issue number, for example BAM-123).

Comment on a build result

When you are logged in to Bamboo, you can comment on a build result to record relevant information for future reference, and to collaborate with your team. You can see other's comments there too, of course.

Simply navigate to a build result and enter your comment on the 'Build summary' tab:

Commit comments

If a build was triggered by a code change, the commit comment (or check-in comment) will be shown on the
'Build summary' tab of the build result:

You can see more details of the commit on the **Commits** tab of the build summary.

**Working with labels**

A **label** is a convenient way to tag and group **build results** that are logically related to each other. Labels can also be used to define **RSS feeds** and to control **build expiry**. With Bamboo, you can label your build results in whatever way works best for your team. Labels are not restricted to a particular **plan**, so you can apply the same label to build results from different plans.

For example, it might not be practical for your QA team to review every build, and you need to know which builds they have reviewed. By using labels such as "qa_passed" and "qa_failed", Bamboo allows them to simply indicate which builds have passed and failed QA.

You can include Jira a issue key in the label, as long as the key is of the default Jira issue key format (that is, two or more uppercase letters \([A-Z]\)\([A-Z]\)+, followed by a hyphen and the issue number, for example BAM-123).

Bamboo administrators can also configure automatic labeling of job build results.

**Label a build result**

You must be logged in to Bamboo before you can label a build result.

To label a particular build result, simply click the pencil icon (📝), beside **Labels** in the 'Details' section of the 'Build summary' tab. You can also label a build result using **Instant Messaging**. Click the 'x' at the right of a label if you need to remove it.

Click **Labels** on the 'Build summary' tab to see the other labels that have been used for the plan's builds. Click a label there to see all the projects, plans and build results where that label is used.

**Label a plan**

Bamboo allows you to label plans. Labeling a plan allows you to filter the plans displayed on the Dashboard or Wallboard. You may want to do this if you have set up a large number of plans in your Bamboo instance and want to highlight specific plans for attention.

For example, you may want to label all builds related to the release with a 'release' label. You can then filter your wallboard during your release, to display only these builds.

You must be logged in to Bamboo before you can label a plan.

Simply go to the plan you want to label and choose **Actions > Modify plan label**.

See also these Atlassian blog posts:

- Making your Bamboo dashboard quicker and more relevant using plan labels
- Get to know Bamboo's build expiry and labels

**Quarantining failing tests**

There may be times when you want to prevent a failing test from causing the whole build to fail.

Possible scenarios where this may be useful include:
- You want to build an artifact despite there being a failing test, but can't do this while the plan build is failing.
- In test-driven development (TDD), a test will fail until the functionality is implemented - you want to quarantine all but the relevant tests.
- A test may give unpredictable results, perhaps because of infrastructure issues or dependencies.
- You want to remove a test from a build, but don't want to alter or delete the test source code because doing so could affect another Bamboo plan.

In Bamboo, you can temporarily disconnect any test's results from the plan build results by quarantining the test. The test is still run whenever the plan is built, but the test's results do not affect the plan's build results.

You can always restore a test's results to the build results when required, for example if the test is now passing.

All the quarantined tests for a plan are displayed on the Quarantined Tests tab of the plan summary. The status bar for each test shows the recent build history of the test.

**On this page:**
- To quarantine a failing test
- To restore a quarantined test to a build

**Related pages:**
- Working with builds
- Viewing a plan's build information
- Viewing test results for a build
- Viewing a build result
- Configuring plans

To quarantine a failing test

Quarantine needs to be enabled in Bamboo administration under Quarantine settings before you are able to use this feature.

You need plan administrator or build permission to quarantine a test.

1. Choose Dashboard > All Plans > #buildresult to go to the build result where the test is failing.
2. Click Quarantine for the failing test (in the 'Build Result Summary' screen).

To restore a quarantined test to a build

You need plan administrator permission to restore a test.

1. Choose Dashboard and click on a plan to go to the plan's summary.
2. Click the Quarantined Tests tab.
3. Click Unleash for the test to be restored.

Screenshot: The quarantined tests for a plan, showing the Status bar.
Setting up plan build dependencies

You may want to trigger a plan build when another plan's build has successfully completed. This ensures that changes to any job's source code associated with one plan does not break the build of another dependent plan (known in this context as a 'child' plan).

For example, there could be two plans in Bamboo:

1. **Acme – Core** — which contains the core code for an application.
2. **Acme – Plugin** — which contains code for a plugin to the application.

In this scenario, the **Acme – Plugin** plan is a child of **Acme – Core**. Any changes to source code associated with the **Acme – Core** plan should trigger a build of **Acme – Plugin**.

**On this page:**
- Triggering dependent plans
- Automatic dependency management with Maven 3
- Dependency blocking
- Notes

### Triggering dependent plans

To trigger a child plan to build when this plan builds successfully:

1. Click **Dashboard** and then the **All Plans** tab.
2. Locate the plan in the list and click the edit icon to display the plan's Configuration pages.
3. Click the **Dependencies** tab
4. Under 'Child Plans', begin typing a plan name in **Search for plan** to select child plans to trigger. You can set multiple plans to be triggered.
5. Click **Save**.

### Automatic dependency management with Maven 3

Automatic Dependency Management is a feature for users who use Maven 3 and wish for their parent and child dependencies to be set up according to the dependencies in the Maven pom.xml. Every time the plan is run, the Bamboo Automatic Dependencies are updated to reflect any additions or removals of Maven dependencies.

To setup automatic dependency management:

1. Click **Dashboard** and then the **All Plans** tab.
2. Locate the plan in the list and click the edit icon to display the plan's configuration pages.
3. Locate the job that contains the pom.xml you wish to use to automatically update plan dependencies by analyzing a Maven pom file.
4. Choose **Actions > Configure Job**.
5. Click on the **Tasks** tab.
6. Click **Add Task** and add the **Maven Dependency Processor** task to the job. For best results, ensure that the task runs last by dragging it to the bottom of the task list. For more information on configuring tasks, see **Configuring tasks**.

**Override Project File**
Optional. The location relative to the working directory or sub-working directory where the project file (pom.xml) is located.

**Working Sub Directory**
Optional. The sub directory from which the Task should look for the project file (pom.xml)

**Alternate location of settings.xml**
Optional. Specify an alternate settings.xml to be used if the Task needs to resolve dependencies from specific Maven repositories.

**Path to Maven local repository**
Optional. Specify a full path to a local Maven repository for the Task to use to resolve dependencies.

7. Click **Save**.
8. Use the Plan Navigator to return to the plan.
9. Click the **Dependencies** tab.
10. Select **Automatic Dependency Management**. You should see the name of the job for which you configured the **Maven Dependency Processor** appear.
11. Click **Save**.

**Dependency blocking**

Dependency blocking is an advanced feature of dependent build triggering that can be used to manage plan builds with parent build dependencies. This ensures that a "tree" of dependent builds always runs in tree hierarchy order, even if child plan builds are triggered independently of their parents. For more information, see **Dependency blocking strategies**. Please note, dependency blocking only works when the plan build is triggered because of source repository code updates.

**Notes**

Build dependencies work together with the trigger configuration of plans to trigger builds of these plans. For example, you can set up Plan A to poll its repository for changes as well as to be dependent on a parent plan (Plan B). In this case, builds of Plan A will be triggered when code changes are detected in its repository and also when builds of Plan B complete successfully.

If you want your builds to only be triggered by successful parent builds from your build dependencies, don’t configure triggering for your child plans at all. See **Running a plan build manually**.

- If the child build uses the same source as the parent build (for example, the Subversion URL is the same), the child build will be forced to check out the same revision of source code as the parent build. This ensures that builds are consistent when triggering one build from another.
- Take care not to create circular dependencies, where your child build triggers one of its parent builds. Otherwise your plans may build continuously. See **Running a plan build manually**.

**Dependency blocking strategies**

Dependency blocking is an advanced feature of dependent build triggering that can be used to manage the builds of plans that have parent plans. This ensures that a ‘tree’ of dependent builds always runs in tree hierarchy order, even if child plan builds are triggered independently of their parents.

The three dependency blocking strategies are:

**Do not block**
When triggered by a source code update, the plan will always be built, regardless of any parent plan build dependencies.

**Block build if parent builds are queued or in progress**
When triggered by a source code update, the plan will not be built if its parent plans are building or are waiting in the build queue.
Block build if parent plans have unbuilt changes
When triggered by a source code update, the plan will not be built if its parent plans are building, are waiting in the build queue, or have changes.

When Bamboo finds parent plans with source repository changes, those plans will be triggered and your plan will be blocked.

Note that for the Block build if parent plans have unbuilt changes option, only the repositories of parent plans that are specified by triggers (that is, by the Polling the repository for changes or Repository triggers the build when changes are committed trigger types) are scanned for unbuilt changes; if there are repository changes (for parent plans), then the parent plans are triggered and the current plan is blocked.

⚠️ Dependency blocking only works when the plan uses a trigger configuration based on source code updates (i.e. Polling the repository for changes or Repository triggers the build when changes are committed). This feature will not work when a plan uses a trigger configuration based on a schedule or triggered via a parent build (when there are multiple parent plan builds in progress).

These dependence blocking strategies are illustrated in the flowchart below:

Viewing test statistics for a job
Bamboo provides a summary of test results across all of a job's builds. This helps you to:

- **Troubleshoot** by identifying which tests fail most frequently, and which tests take longest to fix.
- **Manage your build duration** by identifying the plan's slowest running tests.
- **Ensure quality** by monitoring the number of tests over time: are your test cases growing with your code base?

**Related pages:**
- Reporting
To view the test statistics for all of a job's builds:

1. Navigate to the desired build result page, as described in Viewing a build result.
2. Click the Tests tab.
3. Click the sub-tabs to filter the rest statistics (see screenshots below).
   - To view a test's history, click the test name.

Screenshot: Test statistics for a job

<table>
<thead>
<tr>
<th>Test</th>
<th>Times broken</th>
<th>Job</th>
<th>Most recent build</th>
</tr>
</thead>
<tbody>
<tr>
<td>GrailsTask</td>
<td>2</td>
<td>Unit and Functional Tests</td>
<td>#758, #756</td>
</tr>
<tr>
<td>GrailsTask</td>
<td>2</td>
<td>Unit and Functional Tests</td>
<td>#758, #756</td>
</tr>
<tr>
<td>Capability</td>
<td>1</td>
<td>Unit and Functional Tests</td>
<td>#741</td>
</tr>
<tr>
<td>Configuration</td>
<td>1</td>
<td>Unit and Functional Tests</td>
<td>#758</td>
</tr>
<tr>
<td>Artifex</td>
<td>1</td>
<td>Unit and Functional Tests</td>
<td>#749, #945</td>
</tr>
<tr>
<td>GrailsTask</td>
<td>1</td>
<td>Unit and Functional Tests</td>
<td>#760</td>
</tr>
<tr>
<td>GrailsTask</td>
<td>1</td>
<td>Unit and Functional Tests</td>
<td>#751</td>
</tr>
<tr>
<td>GrailsTask</td>
<td>1</td>
<td>Unit and Functional Tests</td>
<td>#746</td>
</tr>
<tr>
<td>Clover</td>
<td>1</td>
<td>Unit and Functional Tests</td>
<td>#746</td>
</tr>
<tr>
<td>BuildTest</td>
<td>1</td>
<td>Unit and Functional Tests</td>
<td>#741</td>
</tr>
</tbody>
</table>

Reordering jobs in the build queue

Bamboo automatically assigns a plan's jobs to the build queue when the plan is triggered and no agents are available to run them. The build queue is displayed on the Build Activity tab of the Dashboard.

If you want to prioritize one job build over another in the build queue, you can manually reorder these jobs in the build queue. This will not force a job build to run immediately, but will promote it in the build queue. Your job build will still require an agent (which has the capabilities to meet the job's requirements) to become available. Similarly, you can demote a job build in the build queue if you do not need it to run urgently.

Bamboo administrators can reorder plans in the queue. To do this, use the ↓ icon to move the plan to its new position in the queue.

Stopping an active build

The instructions on this page describe how to stop a plan or job build that is running.

Note that if your Bamboo server runs on Windows, it may only be possible to stop an active build by going to the Windows Task Manager and ending the relevant processes.

To start a building a plan manually, see Running a plan build manually.

On this page:
- Stopping an active plan build
- Stopping an active job build

Related pages:
- Running a plan build manually
- Disabling or deleting a plan
- Disabling or deleting a job
Stopping an active plan build

To prevent Bamboo submitting a plan to the build queue, refer to Disabling or deleting a plan.

To stop an active plan build:

1. Click Dashboard and then the All Plans tab.
2. Click the ‘Stop’ icon next to the active plan you want to stop.

Stopping an active job build

To prevent Bamboo submitting a job to the build queue, refer to Disabling or deleting a job.

To stop an active job build:

1. Click Dashboard and then the All Plans tab.
2. Click the name of the plan.
3. Click the ‘Stop’ icon next to the active job you want to stop (in the ‘Current Activity’ section).

Deployment projects

What are deployment projects?

A deployment project in Bamboo is a container for holding the software project you are deploying: releases that have been built and tested, and the environments to which releases are deployed. Teams typically have QA, staging and production environments.

Why use deployment projects?

Continuous Integration was not designed for Continuous Delivery. Continuous Integration is designed to keep developers informed about the state of the latest code changes.

In Continuous Integration, historical build results (along with information such as issue and commits) are de-emphasized as more changes are made, since only the latest build is important to the developer.

Using a traditional Continuous Integration server for Continuous Delivery is less than ideal because:

- **Deployed builds are difficult to find** – Builds that were deployed only a few days ago are de-emphasized by the system. While this is good for a Continuous Integration workflow, the behavior makes it difficult for team members to identify which builds have been deployed and when, versus which have not. Teams can work around this with a system that uses labeling but it’s not immediately obvious how it should work unless team members are trained to use it correctly.

- **Difficult to find what changes were made between deployments** – Build results report commit and issue data between a specific build result and the one immediately before it. There can be many build results between two different deployments. Often the entire history has to be navigated between the two deployments to build a complete view of the changes between them. Sometimes, even other tools have to be used, such as version control systems.

- **Difficult to know what was deployed, and when and where it was deployed** – Builds do not have visibility of where code is deployed or what was previously deployed to an environment.

- **Lack of insight into the QA process** – Given a list of deployment candidates, builds offer no clear way (other than commenting or labeling) for QA to ‘sign off’ on a tested release or mark a release as broken or unreleasable.

- **Poor control over who can deploy** – While it can be controlled by permissions who can run, view or edit a build, they do not give enough fine grained control over which people in the team can deploy to production or other sensitive environments. In essence, if someone has permission to run the build they can deploy the software any time they wish.

To solve these issues Bamboo provides the following concepts:

- **Deployment project** – Represents the software you are deploying (such as a web application), the releases of the software deployed and the environments that they will be deployed to throughout the lifecycle.

- **Environment** – Represents the servers or groups of servers where the software release has been deployed to, and the tasks that are needed for the deployment to work smoothly. Example environments could be named Development, QA, Staging or Production. Environments have permissions that allow fine
grained control of who can deploy, edit or view an environment and record the full history of releases deployed to it.

- **Release** – Identifies a snapshot of artifacts and its associated data such as commits, Jira issues and the builds that were used to test it. As a release contains the information of the difference between itself and the release beforehand, it’s very easy to see the changes between releases or to show the difference between the software deployed on two different environments. Releases also track what environments they have been deployed to.

How do deployment projects work?

Consider the following diagram:

**On this page:**
- What are deployment projects?
- Why use deployment projects?
- How do deployment projects work?

**Related pages:**
- Understanding deployment releases
- Deployment projects workflow
- A sample deployment project
- Creating and configuring a deployment project
- Creating a deployment environment
- Managing deployment projects
- Manually starting a deployment
- Deployments from branches
- Configuring project permissions

**What is Continuous Delivery?**
Continuous Delivery is the practice where all changes made to a software project are automatically built, tested and made ready for deployment to users. In practice, once the project has been built and tested it is 'staged' somewhere where it can be manually verified and then made available to users.

Unlike Continuous Deployment (the process where code changes are automatically built, tested and deployed without human intervention), typically there is a decision made by a human being to whether or not the software is of sufficient quality or if it is the correct time for the business to make the software available to its users.
Artifacts
Create and test deployable artifacts with build plans. Ensure any artifacts you wish to deploy with Bamboo are flagged as "shared" to make them available to the deployment instructions of the environment.

Releases
Any artifact that has been successfully tested can be used to create a release; you can create as many releases as you like. Bamboo will add other metadata such as related commits and Jira issues to each release which enable reporting and tracking as it moves through your environments.

Environments
Environments in Bamboo reflect the development, testing and production environments in your IT infrastructure – hostnames and authentication credentials for each environment reside at the task level inside your deployment jobs. At any point in time, you will be able to see which release is running in each environment, which release it replaced, when it was deployed and who deployed it. You will also be able to see any associated Jira issues.

Understanding deployment releases
Key to getting the most out of deployment projects is understanding what releases are, and how you should be
It is also important to understand the difference and relationship between 'artifacts' - the results of a build plan - and 'releases' - a snapshot of artifacts at a specific time that can be deployed somewhere.

What are artifacts?

When the continuous integration process is triggered by a developer committing code, the first stage of the process compiles the code, runs tests and then assembles the code into binaries. These assembled binaries are known as 'artifacts'. The build process can produce build artifacts at any stage of the build that can then be shared with other builds or deployment projects.

Since Bamboo manages artifacts, any artifacts that are needed by builds or deployments are automatically transferred by Bamboo to a remote server as needed, so long as that build or deployment project declares that it needs the artifact to complete its work.

For more information, see Sharing artifacts.

What are deployment releases?

Releases are used to track exactly what software was deployed to an environment. In essence, a release is a snapshot of any number of artifacts that will be used in the deployment process and their associated metadata, such as Jira issues, code changes and any test metadata that might be relevant to what is being deployed.

A release is created from the result of a single build. When you view a release, you can see all the code changes, Jira issues and other metadata that were used when making the artifact for that build. This information can be used for purposes such as release notes, quality control and infrastructure planning, and allows you to compare any two releases to see the changes between them.

Why use releases?

In Bamboo, releases are tracked against environments, which represent a server or group of servers that you wish to deploy your software to. Because each environment can only host a single active release at any one time, Bamboo gives a unique release name to the software being deployed. By checking the environments for our project, we can quickly identify:

- Where releases have been deployed
- Which release is currently deployed
- The release deployment history
- The release deployment status.

Another key feature of releases is that as well as providing a deployable snapshot of your artifacts, they also collate the Jira issues, commit record and test & build metadata for the specific series of changes associated with the release. This enables much smoother reporting and tracking as the release moves through your environments, and allows you to easily track changes between releases.

How artifacts and deployment releases work together

The relationship between artifacts and releases shows the 'hand-over point' between Bamboo builds and Bamboo deployments.
As the diagram shows, a developer who is responding to Jira issues, commits a code change and triggers a build. This build produces a number of artifacts. In a deployment, these artifacts are assembled into a release, and the Jira issue, commits and test/build metadata are added. This release then gets a unique identification name which serves as an identifier throughout the system. You can define the unique identifier according to your needs using the release naming system.

Once a release has been created, it is now ready to be deployed to an environment.

The next step

The next step is to examine and understand the deployment project workflow. Learn more about the deployment project workflow.

Deployment projects workflow

Deployment projects are an important feature of the continuous deployment philosophy. Identifying and understanding the key configuration steps for a deployment project will help you to gain a better insight into how a deployment project functions.

On this page:

- Deployment project prerequisites
- Step 1: Create a new deployment project
- Step 2: Decide on a release naming scheme
- Step 3: Decide who can view and edit the project
- Step 4: Create a deployment environment
- Step 5: Customize your deployment environment
- Step 6: Start deploying!

Deployment project prerequisites

There are a number of prerequisites that must be in place before you can start using deployment projects. The prerequisites are:

1. A build plan
2. Artifacts to deploy (these are produced by the build plan and shared)
Step 1: Create a new deployment project

Creating the deployment project is the first step. Here we will give the project a name and a description, but most importantly we associate the deployment project with an existing Bamboo build plan. This is why we must have a build plan available to associate with our new deployment project.

Learn more about creating a deployment project here.

Step 2: Decide on a release naming scheme

The next step is to configure the release naming scheme for the deployment project. The release naming scheme will define how Bamboo names the releases that you create from your build artifacts for deployment. You can use either a simple release naming scheme, or a scheme that uses global or plan variables already defined in Bamboo.

Learn more about release naming schemes here.

Step 3: Decide who can view and edit the project

You need to decide who can view and edit the deployment project: This is done using the permission scheme. You can add or remove individuals or groups from the scheme, and give them access to either view and/or edit the project.

Learn more about the permissions scheme here.

Step 4: Create a deployment environment

The next step is to create a deployment environment. A deployment environment represents the servers or groups of servers where the software has been deployed, and any tasks needed for the deployment to go smoothly. You can call the deployment environment anything you like, though typical names are QA, Staging and Production.

Learn more about creating a deployment environment here.

Step 5: Customize your deployment environment

Once you have created your deployment environment, you need to set it up to reflect the needs of your project. You can control most aspects of the deployment environment, including:

- **Tasks** - Run executable tasks during the deployment process, for example downloading a needed artifact from a different plan
- **Triggers** - Decide which events or schedule points will trigger off deployment of your project to an environment
- **Permissions** - Decide who can view and edit your deployment environment
- **Agents** - Control which agents you will use to support your deployment process
- **Notifications** - Create a notification scheme to keep you informed about your deployment progress
- **Variables** - Assign variables for your deployment projects

Step 6: Start deploying!

Once you have set up your deployment project, you’re ready to start the deployment process.

A sample deployment project

On this page we will examine a sample deployment project, and work through the steps required to get a deployment project up and running.
On this page:

- Step 1: Create a deployment project
- Step 2: Define the release naming scheme
- Step 3: Create a deployment environment
- Step 4: Add some environment tasks
- Step 5: Let's deploy!
- Step 7: Additional deployment environment options

Step 1: Create a deployment project

The first step in creating a deployment project is to associate the project with an existing build plan. This is done at the same time as creating the deployment project. To create a new deployment project, and associate an existing build plan with it:

1. Click Create > Create deployment project in the drop down menu from the header bar. The 'Set up deployment project' screen will appear.
2. Use the Source build plan to select an existing build plan. Bamboo will identify any relevant build plans in the menu:

   ![Set up deployment project](image)

   In this example we can see that the associated build plan is the one for project Bonsai.

3. Complete the Name and Description fields as required
4. Click Create deployment project. Your deployment project will be created, and will automatically be associated with the build plan you selected above.

Step 2: Define the release naming scheme

The next step is to provide a version naming strategy for the deployment project. This will define how the deployment project will ascribe names to current and subsequent artifact bundles that it generates. See Naming versions for deployment releases for more information. To configure your version naming scheme:

1. From the deployment project configuration screen, click Release versioning to display the deployment project release versioning screen:
2. Complete the required fields according to your naming scheme. In this example we can see that a simple naming scheme has been adopted - the next name will be 1.0, and the subsequent 1.1 etc
3. Click Save to save your naming scheme.

Step 3: Create a deployment environment

Once we have defined our naming scheme, we need to create a deployment environment for the artifact(s) to be deployed into. Typically, deployment environments include Test, Staging, QA and Production, however there's no limit to creating useful deployment environments. Lets look at how it's done:

1. From the deployment project configuration screen, click Add environment to open the Set up environment screen:

2. Enter the name of the deployment environment, and a brief description. In this example we will call our environment Dev Sandbox, and give it a suitable description
3. Click either Create and back or Continue to task setup to create the environment. The next stage will be to add some tasks, so clicking Continue to task setup will take us straight to the next step.

Step 4: Add some environment tasks

Tasks are activities that the deployment project will perform in order to run. These could be checking out some code from a repository, downloading an artifact from a server or running a script. Let's have a look at how to add a couple of tasks to the deployment environment:

1. If you continued to task setup from the environment creation process, then you will already be at the Set up tasks screen. alternatively, From the deployment project configuration screen, click Set up tasks:
2. Click **Add task** to display the list of tasks that are available to you:

In this example, we will add a simple script task to run as part of our build. Clicking on the task we wish to add adds it to the set up tasks screen, and allows us to configure the individual task:
3. Click **Save** to save the individual task configuration, and then on **Finish deployment project** to complete configuration of the script task for the deployment environment. In reality, we would require a number of tasks, not least one to obtain an artifact for use in the deployment. The following task configuration for a production environment includes an artifact download, DB change script, a Tomcat deployment, source code checkout and a Maven 3.x task:

Step 5: Let's deploy!

Our sample deployment project now has all of the elements required to run. We can trigger the deployment project manually by clicking on the appropriate deploy icon on the projects page:
But deployments don’t end here. This simple example is just a snapshot of how a deployment project is configured and works. Bamboo deployment projects feature a host of additional features to help you manage your development and deployment processes. These include:

- **Automated triggering** - choose to automatically deploy after a successful build plan completes, or at a scheduled time
- **Agents** - Assign specific agents, elastic agents or image configurations to execute the deployment for the environment
- **Variables** - Incorporate variables for use when deploying versions to environments
- **Permissions** - Define what users are allowed to view, edit and deploy in the environment
- **Notifications** - Define who and how notifications about events for the environment are made.

### Creating and configuring a deployment project

Creating a deployment project from a plan is easy with Bamboo.

A deployment is a container that holds:

- Environments that represent the physical environments, such as QA, Staging and Production
- Releases which represent the actual software artifacts being deployed - these include the issues and commits which make up the release.

To create a new deployment project you must:

1. Provide a name and a description that represents your project
2. Associate the project with a build plan. The build plan will produce the artifacts you will snapshot into a release and deploy to the environment. Associating the deployment project with a build plan tells the deployment project which set of artifacts to use for the deployment.

If you are using plan branches, you will also need to associate the deployment with the plan branch. The plan branch represent a build for a branch within the version control system that inherits the configuration defined by the parent plan. Any new branch created is automatically built and tested using the same build configuration as the parent. When the plan branch build succeeds, it can be merged back into master.

Learn more about [Deployments from branches](#).
Creating a new deployment project

To create a new deployment project:

1. Click **Create > Create deployment project** in the drop down menu from the header bar. The ‘Setup deployment project’ screen will appear:

   ![Create deployment project](image1)

   If your build plan has a plan branch, Bamboo will detect it and offer an additional field for completion:

   ![Create deployment project](image2)

   2. Complete the ‘Setup deployment project’ screen using the following fields:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Optional?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>The name of your deployment project</td>
<td>✗</td>
</tr>
</tbody>
</table>

Related pages:
- Naming versions for deployment releases
- Deployments from branches
## Description
A brief description of your deployment project

## Source Build Plan
The name of the plan you wish to associate with the deployment project **Hint**: This field identifies the source of your deployment artifacts

## Default plan branch
The plan branch that you wish to deploy. Bamboo will auto detect available plan branches for you. Choose a plan from the drop down menu.

3. Click **Create deployment project**. The deployment project configuration screen will display:

   ![Deployment Project Configuration Screen](image)

   Your deployment project has been created with the build plan relation, name and description you specified. It is now ready for configuration.

### Editing the details of an existing deployment project

Bamboo allows you to edit the details of an existing deployment project.

**To edit the details of an existing deployment project:**

1. From the deployment project configuration screen, click on ... and then click the **Edit details** button. The **Update deployment project** screen will display:

   ![Update Deployment Project Screen](image)

   2. Complete the 'Update deployment project' screen using the following fields:

   ![Update Deployment Project Fields](image)
<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Optional?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Related Build Plan</td>
<td>The name of the plan you wish to associate with the deployment project <strong>Hint:</strong> This field identifies the source of your deployment artifacts</td>
<td>✗</td>
</tr>
<tr>
<td>Name</td>
<td>The name of your deployment project</td>
<td>✗</td>
</tr>
<tr>
<td>Description</td>
<td>A brief description of your deployment project</td>
<td>✓</td>
</tr>
<tr>
<td>Default plan branch</td>
<td>The plan branch that you wish to deploy. This option will only display if your plan has a valid branch, as described above</td>
<td>✗</td>
</tr>
</tbody>
</table>

3. Click on **Save deployment project** to save your changes.

**Configuring release naming**

Bamboo's release naming configuration allows you to control:

- What Bamboo will call the next release the deployment project generates
- Automatic incrementing of the release number each time a new release is created
- Automatic incrementing of the release number as specified by a global variable each time a new release is created.

See [Naming versions for deployment releases](#) for more information.

**Configuring deployment project permissions**

Bamboo gives you control over who has permission to **View** and **Edit** aspects of your deployment project.

**To configure your permission strategy:**

1. Click the **Project Permissions** button on the 'Deployment project configuration' screen to display the 'Edit permissions' screen:
2. Click the Add User or Add Group button to search for and add, users or groups.
3. Check the relevant 'View' and 'Edit' permission boxes to assign your desired permission scheme.
4. Click Save to save your permission scheme.

Viewing a Bamboo deployment project as Java Specs

Bamboo instance administrators can view the deployment configuration as Java Specs in Deployment project configuration > ... > View Project as Java Specs:

Naming versions for deployment releases

Bamboo provides a range of options that allow you to control your release naming scheme. You can specify how Bamboo handles release versioning, and control automatic incrementing between releases.

Bamboo allows you to use:

- Advanced numbering based upon Bamboo variables
- Simple incremental numbering

Bamboo also allows you to manually override automatic release settings when you create a new release.

On this page:

- Simple release versioning
- Release versioning using variables
Simple release versioning

Simple release versioning allows you to specify a starting release number, for example, 1.0, which Bamboo will automatically increment. When using simple release versioning, Bamboo will increment the final number in the release name. For example:

<table>
<thead>
<tr>
<th>Release name</th>
<th>Incremented release name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1.1</td>
<td>1.2</td>
</tr>
<tr>
<td>1.11</td>
<td>1.12</td>
</tr>
<tr>
<td>1.0.1</td>
<td>1.0.2</td>
</tr>
</tbody>
</table>

To configure simple release naming:

1. Click the Release versioning button on the 'Deployment project configuration' screen to display the 'Release versioning' screen:

2. Complete the 'Release versioning' screen using the following fields:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Optional?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Next release</td>
<td>The identification for the next release name that Bamboo will create. In simple release naming, you should use something straightforward like 1.0.</td>
<td>✗</td>
</tr>
</tbody>
</table>
If you want the naming scheme for the release to be applied to branches, select 'Apply the same naming scheme to versions create from branches'.

Automatically increment with each new release
Check the 'Numbers' checkbox to automatically increment the release number according to the 'Next release' field, as defined above. If you leave this box unchecked, no release number incrementing will occur.

Preview
This field allows you to preview what the next release name will look like. To view the preview, click on the Generate preview button next to the 'Create release name' field.

Note: In some cases, a preview may not be available.

3. Click Save to save your changes.

Release versioning using variables
Release versioning using variables allows you to develop more complex naming schemes, based upon variables set up within Bamboo. You can use global, plan and build variables in your releasing scheme.

For security reasons, you can’t use password variables in version names.

Example
You may have a plan variable called 'planvar' with a value of 'm6'. By including this variable key within the 'Next release' field, Bamboo will automatically add the variable value to the next release name, and increment it accordingly:

<table>
<thead>
<tr>
<th>Variable key</th>
<th>Variable value</th>
<th>Next release</th>
<th>Next release version</th>
<th>Subsequent Release version</th>
</tr>
</thead>
<tbody>
<tr>
<td>planvar</td>
<td>m6</td>
<td>1.0-$(bamboo.planvar)</td>
<td>1.0-m6</td>
<td>1.1-m7</td>
</tr>
</tbody>
</table>

To configure release naming using variables:

1. Click the Release versioning button on the 'Deployment project configuration' screen to display the 'Release naming' screen:
2. Complete the 'Create release name' field using the following data:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Optional?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version</td>
<td>The identification for the next release name that Bamboo will create. In simple release versioning, you should use something straightforward like 1.0.</td>
<td></td>
</tr>
</tbody>
</table>

Click on the Add variable to release name link to display the Variables selection screen:

- myvar: WHATEVER2
- zip: 5.0.0
- planvar: m8

3. Click on the Add variable to release name link to display the Variables selection screen:

4. Click Add variable to include the variable in your release naming scheme. Click on Close to return to the 'Release naming' screen.

5. Complete the 'Release name' field using the following fields:
<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Optional?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Automatically increment with each new release</strong></td>
<td>1. Check the 'Numbers' checkbox to automatically increment the release number according to the 'Next release' field, as defined above. If you leave this box unchecked, then no release number incrementing will occur. 2. Check the 'Variables' checkbox to automatically increment selected variable(s) when a new release is created. If matching plan variable exists, its value is incremented, otherwise matching global variable is incremented. Additionally, if a release is created from a branch while 'Apply the same naming scheme to versions create from branches' option is on, the branch variable is incremented (as long as it exists)</td>
<td>✓</td>
</tr>
</tbody>
</table>

**Preview**

This field allows you to preview what the next release name will look like. To view the preview, click on the **Generate preview** button next to the 'Create release name' field.

**Note:** In some cases, a preview may not be available.

6. Click **Save** to save your changes.

**Example release versioning schemes**

Bamboo also allows you to use combinations of simple and variable release naming. The following table provides examples of combined naming schemes and demonstrates how careful control of the Numbers and Variables checkboxes can be used to customize your scheme.

<table>
<thead>
<tr>
<th>Naming scheme</th>
<th>Next release field</th>
<th>Numbers checkbox</th>
<th>Variables checkbox</th>
<th>Variable value</th>
<th>Next release name</th>
<th>Subsequent release name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static naming</td>
<td>1.0</td>
<td>✗</td>
<td>✗</td>
<td>-</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Naturally unique variable</td>
<td>1.0-$(bamboo.buildNumber)</td>
<td>✗</td>
<td>✗</td>
<td>13</td>
<td>1.0-13</td>
<td>1.0-13</td>
</tr>
<tr>
<td>Number incrementing</td>
<td>1.0</td>
<td>✓</td>
<td>✗</td>
<td>-</td>
<td>1.0</td>
<td>1.1</td>
</tr>
</tbody>
</table>
Creating a deployment environment

Once you have created and configured your new deployment project, you can create environments for it to deploy to. Bamboo allows you to create multiple deployment environments and also allows you to manage:

- Environment details such as name and description
- Tasks
- Triggers
- Permissions
- Agents
- Notifications
- Variables

To create a new deployment environment you will need to:

1. Provide a name that represents your environment e.g. Test or Production
2. Provide a description that describes the function of your environment.

On this page:

- Creating a new deployment environment
- Using the deployment environment panel
- Editing the environment details

Related pages:

- Tasks for deployment environments
- Triggers for deployment environments
- Agents for deployment environments
- Notifications for deployment environments
- Variables for deployment environments
- Permissions for deployment environments
- Requirements for deployment environments 

Deployment environments are added from the Deployment project configuration screen:
Creating a new deployment environment

1. From the Bamboo menu bar, click **Deploy > All Deployment Projects**.
2. Click the **edit icon** ( indemnity ) for the deployment project you want to edit.
3. In the 'Deployment project configuration' screen, click **Add environment**.

4. Provide your deployment environment details.
5. Select if you want to run your deployment in the agent environment or in a docker container. See [Docker Runner](#).
6. Click on **Create**.

Your newly created environment appears with a red exclamation mark because no tasks have been defined for this environment yet.
See Tasks for deployment environments for more information on task configuration.

Using the deployment environment panel

All deployment environments are managed from the Deployment project configuration screen. By default, when the screen loads, each environment panel is displayed in its collapsed state. Click Edit to expand the deployment environment panel:

When expanded, the environment panel shows three separate sub-panels:

The three sub-panels provide the following functionality:

<table>
<thead>
<tr>
<th>Sub-panel</th>
<th>Functionality</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>• Deploy</td>
<td>• Manually deploys to the environment</td>
</tr>
<tr>
<td></td>
<td>• Actions</td>
<td>• Allows the user to View, Delete or Move down the environment</td>
</tr>
<tr>
<td></td>
<td>• Minimize</td>
<td>• Minimize the environment panel back to its collapsed state</td>
</tr>
</tbody>
</table>
How you want to deploy

- **Edit tasks**
  - Allows the user to edit the tasks associated with the environment

Other settings

- **Triggers**
- **Environment permissions**
- **Agents assignment**
- **Notifications**
- **Variables**
  - A set of optional settings that make your Bamboo deployments run more smoothly

### Editing the environment details

Bamboo allows you to change both the environment name and the description. To edit these details:

1. **Expand the environment panel and click the pencil icon next to the environment name.** The 'Update environment' screen will display:

   ![Update environment screen](image)

2. **Complete the 'Update deployment project' screen using the following fields:**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Optional?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment name</td>
<td>The name of the environment</td>
<td>✗</td>
</tr>
<tr>
<td>Description</td>
<td>A brief description of your deployment project</td>
<td>✓</td>
</tr>
</tbody>
</table>

3. **Click Save environment to save your changes.**

### Tasks for deployment environments

Once you have created and configured your new deployment project and deployment environments, you can set up associated tasks for the deployment process. Bamboo allows you to execute a range of different tasks upon deployment including:

- Bash and other shell commands
- Bespoke written scripts
- SCP, SSH and Artifact handler tasks
- Ant executables
- Maven 1.x, 2.x & 3.x executables
- Tomcat executables
- Heroku deployments
Add an environment task

You can add tasks to a deployment environment either while you create the environment or afterwards. You can modify tasks any time after creating them.

1. Open your deployment project and expand the relevant environment panel.
2. Click Edit tasks (under ‘How you want to deploy’).
   The ‘Clean working directory’ and ‘Artifact download’ tasks are included by default:

   3. Click Add task and choose a task. Only tasks applicable to the deployment environment will be available for selection.
4. Configure the task according to the needs of your deployment project. Different tasks will have different requirements.

Remember that capability and requirement matching is still in effect for deployment environments. If your task does not have the right capabilities it will not be executed, even if the relationship has been defined.

5. Click **Save** when you have finished.
6. Click **Back to deployment project** to return to the deployment project page.

**Some useful deployment tasks**

**Deploying with Tomcat**

You can use Bamboo to deploy and manage your Java web application with Tomcat 6 or 7, without having to directly interact with Maven, Ant or write special scripts.

See [Using Tomcat with Bamboo for continuous deployment](#).

**Copying and moving files with SCP**

You can use the Bamboo SCP task to upload files from Bamboo directly to a remote server as part of a Bamboo job. The SCP task is able to copy multiple files and preserves the directory structure for the copied files.

See [Using the SCP task in Bamboo](#).

**Integrating with Heroku**

You can use Bamboo to deploy your Java web application to the [Heroku](#) cloud platform.

See [Using the Heroku task in Bamboo](#).

**Deploying ASP.NET applications with MSDepoy**


**Assign a final task**

Once all of your tasks have been configured, you may assign some or all of them to be Final Tasks. Final Tasks are always executed at the end of the build.

1. Open your deployment project and expand the relevant environment panel.
2. Click **Edit tasks** (under ‘How you want to deploy’).
3. To make a task final, simply drag the task below the ‘Final tasks’ bar:

![Edit tasks](image)

4. Click **Back to deployment project** to return to the deployment project page.

**Triggers for deployment environments**

Use deployment triggers for automatic management of how and when Bamboo starts deployment projects.

Deployments can be triggered automatically based on:

- a successful build of a plan branch
- a successful deployment to some other environment
- a successful build of a plan stage
- a schedule (specific time and date, at an interval, or Crone-based)

**Note:** You can also start deployments manually.

When an automatic deployment starts, Bamboo creates a new release based on the latest successful build of the plan branch that is defined in the deployment trigger. If there is only one branch in the plan, it is selected by default.

On this page:

- Configuring Bamboo deployment triggers
  - Common parameters
  - Trigger-specific parameters
    - After successful build plan
    - After successful deployment
    - After successful stage
    - Scheduled
- How to find deployment triggers configuration in Bamboo

**Configuring Bamboo deployment triggers**

You can customize the deployment by specifying the details of each trigger. Triggers configuration lives in the environment settings of a deployment project.

If you don’t know where to find the trigger configuration in Bamboo, see **How to find deployment triggers configuration in Bamboo**.
The list of parameters that are the same for all deployment triggers.

**Trigger description** (Optional)
A meaningful name of a trigger by which you can identify the trigger in the GUI.

**Disable this trigger** (Optional)
Select the check box to ignore the trigger in deployments.

**Trigger-specific parameters**
The list of parameters that are specific for each deployment trigger type.

**After successful build plan**
The trigger starts a deployment after a successful build of the specified plan branch. If there is only one existing plan branch, it is selected by default and the branch selection options are hidden.

**Branch to trigger this deployment** (Required)
Specifies the branch that must be successfully built before the deployment.

You can specify the following:

- **use main plan branch**: displays the name of the plan branch set as the main plan branch
- **use a custom plan branch**: displays a selection list that is pre-filled with all branches in the deployment project

**After successful deployment**
Starts a deployment after a successful deployment on another environment.

**Triggering environment** (Required)
Specifies the environment on which a successful deployment must be performed to start the new deployment.

**After successful stage**
Starts a deployment after a successful build of the specified stage of a plan. If there is only one existing stage, it is selected by default.

**Plan stage to trigger this deployment** (Required)
Specifies the stage on which a successful deployment must be performed to start the new deployment.

**Scheduled**
Starts a deployment according to a customized schedule with artifacts from a specific branch.

**Schedule** (Required)
Click the pencil icon to open the schedule editor. You can select from:

- Daily
- Days per week
- Days per month
- Cron expression

and provide the further details in the fields displayed following to the selection.

**Branch to provide artifacts for this deployment** (Required)
Specifies the branch from which Bamboo provides artifacts for the deployment.

You can specify the following:

- **use main plan branch**: displays the name of the plan branch set as the main plan branch
- **use a custom plan branch**: displays a selection list that is pre-filled with all branches in the deployment project

*How to find deployment triggers configuration in Bamboo*
Deployment triggers are set as part of the environment configuration for a deployment project.

To get to the environment configuration details view:

1. Click **Deploy** in the top main Bamboo menu and select **All deployment projects**.
2. Click the name of an environment to display the environment details view.
3. Click the ellipsis (...) in the upper right corner of the view and select **Edit environment**:

4. Once you are in the environment edit view, a list of all existing environments is displayed with expanded information about the environment that you want to edit.

   If you want to edit an environment that is different from the expanded one, you can click **Edit** next to the name of the environment:

5. In the **Other environment settings** section, click **Triggers**:

6. In the **Edit triggers** you can add, remove, or configure triggers.

**Agents for deployment environments**

Bamboo offers a range of optional settings to make your deployment project function more smoothly. Bamboo allows you to assign specific agents, elastic agents or image configurations to execute the deployment for the environment.

**Important Note**

Assigning agents to deployment tasks may reduce your build capacity. When an agent is assigned, no other builds or deployments can run on it unless they are also explicitly assigned to use that agent or image configuration.
Configuring deployment agents

Deployment environment agents are configured as part of the Other settings section of the environment panel.

To configure your deployment agent:

1. Open your deployment project and expand the relevant environment panel. In the Other settings section, click on the Agents button. The ‘Assigned agents’ screen will display:

   ![Assigned agents screen](image)

   Only agents applicable to the deployment environment will be available for selection.

   ```plaintext
   Remember that capability and requirement matching still applies for deployment environments. If your agent does not have the right capabilities it will not be assigned at runtime even if the relationship has been defined.
   ```

2. Enter an agent name, or use the drop down menu to select an appropriate agent:

   ![Select agent](image)

   Click on Save to save your agent scheme

3. You can remove an unwanted agent by clicking the associated cross on the right hand side of the screen.

Notifications for deployment environments

Bamboo offers a range of optional settings to make your deployment project function more smoothly. Notifications allow you to assign a specific notification scheme to events triggered by the deployment environment. Notification events include start and finish of a deployment, and may be delivered by any of:

- User or group notification
- Email
- Hipchat
• Instant Messaging

To set up a notification you will need to:

1. Select a triggering event
2. Configure a mechanism for delivering notifications

On this page:
- Configuring deployment notifications

**Configuring deployment notifications**

Deployment environment notifications are configured as part of the Other settings section of the environment panel.

**To configure your deployment notifications:**

1. Open your deployment project and expand the relevant environment panel. In the Other settings section, click on the **Notifications** button. The 'Edit notifications' screen will display:

   ![Edit environment notifications](image)

   - **Event**:
     - Deployment Started and Finished
     - Notifications issued when a deployment is started or finished
   - **Recipient type**:
     - User

2. Click the Add notification button. The 'Add a new notification' window will display:

   ![Add a new notification](image)

   - **Event**:
     - Deployment Started and Finished
   - **Recipient type**:
     - User

3. Complete the 'Edit notifications' screen by selecting the event to trigger the notification:

   **Deployment started and finished**
   - Notification is issued when a deployment is started and finished
**Deployment finished**
Notification is issued only when deployment is finished

And configuring the notification delivery system:

<table>
<thead>
<tr>
<th>Recipient Type</th>
<th>Data requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>User</td>
<td>Username of the user</td>
</tr>
<tr>
<td>Hipchat</td>
<td>Hipchat API token, Hipchat room name, Room participants notification</td>
</tr>
<tr>
<td>Group</td>
<td>Groupname</td>
</tr>
<tr>
<td>Email Address</td>
<td>Email address</td>
</tr>
<tr>
<td>IM Address</td>
<td>Instant messaging address</td>
</tr>
</tbody>
</table>

**Note:** If you have not done so, you may need to set up an IM server for IM notifications to work correctly.
4. Click the **Add** button to add your notification
5. You can edit or remove notifications by clicking on the associated **Edit** or **Remove** link on the right hand side of the screen

---

**Variables for deployment environments**

**Deployment variables**

Bamboo manages a number of standard reserved variables that are available when deploying a project.

Variables later in the following list override the previous ones in case of repeating names:

- global variables
- release variables as defined below
- user variables defined at environment level
- the autogenerated variables in the following table:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bamboo.agentId</td>
<td>The id of the agent that the deployment is executed on.</td>
</tr>
<tr>
<td>bamboo.agentWorkingDirectory</td>
<td>The path to the working directory on the agent. This is not the same as the Bamboo working directory.</td>
</tr>
<tr>
<td>Bamboo Variable</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>bamboo.build.working.directory</td>
<td>The path to the working directory for Bamboo. This is used by both the build plan and the deployment project.</td>
</tr>
<tr>
<td>bamboo.deploy.environment</td>
<td>The name of the environment that the release is to be deployed to.</td>
</tr>
<tr>
<td>bamboo.deploy.project</td>
<td>The name of the deployment project.</td>
</tr>
<tr>
<td>bamboo.deploy.rollback</td>
<td>True if the release being deployed is older than the release being replaced.</td>
</tr>
<tr>
<td>bamboo.deploy.release</td>
<td>The name of the release that is being deployed. Either .release or .version can be used - both return the name of the release being deployed.</td>
</tr>
<tr>
<td>bamboo.deploy.version</td>
<td>The name of the release that is being deployed. Either .release or .version can be used - both return the name of the release being deployed.</td>
</tr>
<tr>
<td>bamboo.deploy.release.previous</td>
<td>The name of the release that is being replaced (if available). Either .release or .version can be used - both return the name of the release being replaced.</td>
</tr>
<tr>
<td>bamboo.deploy.version.previous</td>
<td>The name of the release that is being replaced (if available). Either .release or .version can be used - both return the name of the release being replaced.</td>
</tr>
<tr>
<td>bamboo.resultsUrl</td>
<td>The URL to the screen in Bamboo that displays build results.</td>
</tr>
</tbody>
</table>

For Bamboo variables to do with build plans, and releases, see Bamboo variables.

**Configuring variables for deployment environments**

Deployment environment variables are configured as part of the Other settings section of the environment panel.

To configure an environment variable:

1. Open your deployment project and expand the relevant environment panel. In the Other settings section, click Variables:
2. Enter a valid key and value into the relevant fields in the Variables screen.
3. Click on Add to add the variable scheme.
4. You can remove unwanted variables by clicking the relevant cross icon on the right of the Variables screen.
5. Click Back to deployment project to return.

Permissions for deployment environments

Bamboo offers a range of optional settings to make your deployment project function more smoothly. Deployment environment permissions allow you to configure which groups or individuals can view, edit or deploy a project.

Note that the global Bamboo permissions still take precedence. Where a user has environment permissions enabled but project permissions disabled, they will still be unable to access a deployment environment. Please see Bamboo permissions and Creating and configuring a deployment project for more information on managing deployment project permissions.

On this page:
- Configuring deployment environment permissions

Configuring deployment environment permissions

Deployment environment permissions are configured as part of the Other settings section of the environment panel.

To configure your permission strategy:

1. Open your deployment project and expand the relevant environment panel. In the Other settings section, click on the Permissions button. The ‘Edit permissions’ screen will display:

2. Click the Add User or Add Group button to search for and add, users or groups
3. Check the relevant ‘View’, ‘Edit’ or ‘Deploy’ permission boxes to assign your desired permission scheme
4. Click Save to save your permission scheme.

Requirements for deployment environments

Specify requirements for deployment environments to route the deployment plan execution to agents with matching capabilities. This way, agents that aren’t executing dedicated deployments will be available for other jobs.

To view and manage requirements for deployment environments:

1. Click Deploy in the top main Bamboo menu and select All deployment projects.
2. Click the name of an environment to display the environment details view.
3. Click the ellipsis (…) in the upper right corner of the view and select Edit environment:
4. Once you are in the environment edit view, a list of all existing environments is displayed with expanded information about the environment that you want to edit.

If you want to edit an environment that is different from the expanded one, you can click **Edit** next to the name of the environment.

5. To manage and view existing requirements, click **Agents assignment**:

   ![Agents assignment](image)

   In the **Agents assignment** view you can:
   
   - add and remove capabilities required from an agent to deploy an environment
   - check which agents and/or elastic images meet the requirements of your deployment environment
   - view capabilities that are required based on the requirements of the deployment tasks specified for the environment

   ![Agents assignment table](image)

   **Managing deployment projects**

   Bamboo makes it easy to monitor and manage your deployment projects.
A single dashboard allows you to monitor deployment environments, deployment status, releases and time/date stamps. It also allows you to edit and deploy your projects.

On this page:

- Manage deployment projects
- View a particular deployment project
- Project summary
- Releases

Manage deployment projects

Deployment projects are viewed and managed from the 'All deployment projects' screen. Think of this as a dashboard for all your deployment projects.

Choose **Deploy > All deployment projects** from the Bamboo header:

<table>
<thead>
<tr>
<th>Deployment project</th>
<th>Environment</th>
<th>Release</th>
<th>Result</th>
<th>Completed</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bamboo OnDemand</td>
<td>bdog.atlassian.net</td>
<td>bamboo-5.4.0-0.196-36</td>
<td>Logs</td>
<td>30 Jan 2014 05:36 AM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>master test</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bamboo Release Old</td>
<td>WWW</td>
<td>5.1-nt1_(5)</td>
<td>Logs</td>
<td>20 Nov 2013 12:41 PM</td>
<td></td>
</tr>
<tr>
<td>Basia 2.0 -</td>
<td>Planet Earth</td>
<td>Paltorje</td>
<td>Logs</td>
<td>22 Nov 2013 11:13 AM</td>
<td></td>
</tr>
<tr>
<td>Demo - Deployment for Atlassian Plugins</td>
<td>Dogfodging 2.12 branch</td>
<td>atlassian-plugins-release-5.7</td>
<td>Logs</td>
<td>25 Sep 2013 07:07 AM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dogfodging 2.13 branch</td>
<td>Atlassian Plugins 2.13-3_(108)</td>
<td>Logs</td>
<td>30 Jan 2014 01:19 AM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Staging</td>
<td>atlassian-plugins-release-5.7</td>
<td>Logs</td>
<td>26 Sep 2013 07:15 AM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Production</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The project list includes the following useful information:

**Name**
The name of the deployment project.

**Environment**
The environment the release was deployed to.

**Release**
The release artifact that Bamboo deployed, or attempted to deploy, to that environment.

**Result**
The result of the deployment, and a link to the associated logs.

**Completed**
The time and date stamp of the deployment, or the time spent deploying so far.

**Actions**
Actions you can perform: *Edit and Deploy*

Broken deployments are indicated by a vertical red line beside the environment name and a red deployment icon.

View a particular deployment project

You can drill down into an individual deployment project from the 'All deployment projects' screen (described above) by clicking on the name of a project. You can check on the following:
• Associated environments
• Release history
• Project artifacts details

**Project summary**

The **Project summary** tab shows the status of the environments associated with the deployment project:

<table>
<thead>
<tr>
<th>Environment</th>
<th>Release</th>
<th>Result</th>
<th>Completed</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dogfooding 2.12 branch</td>
<td>atlassian-plugins-release-5.7</td>
<td>Logs</td>
<td>25 Sep 2013 07:07 AM</td>
<td></td>
</tr>
<tr>
<td>Dogfooding 2.13 branch</td>
<td>Atlassian Plugins 2.13-3 (_108)</td>
<td>Logs</td>
<td>30 Jan 2014 01:18 AM</td>
<td></td>
</tr>
<tr>
<td>Staging</td>
<td>atlassian-plugins-release-5.7</td>
<td>Logs</td>
<td>25 Sep 2013 07:15 AM</td>
<td></td>
</tr>
<tr>
<td>Production</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Details include:

- **Environment**
  The environment the release was deployed to.

- **Release**
  The release artifact that Bamboo deployed, or attempted to deploy, to that environment.

- **Result**
  The result of the deployment, and a link to the associated logs.

- **Completed**
  The time and date stamp for the deployment, or the time spent deploying so far.

- **Actions**
  Actions you can perform: Edit and Deploy

**Releases**

The **Releases** tab provides details of the currently deployed release and the history of previous releases associated with the deployment project:

<table>
<thead>
<tr>
<th>Currently deployed</th>
<th>Release branch</th>
<th>Flagged</th>
<th>Created</th>
<th>Deployed on</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlassian Plugins 2.13-3 (_108)</td>
<td>atlassian-plugins-release-5.7</td>
<td></td>
<td>30 Jan 2014 01:16 AM</td>
<td>Dogfooding 2.13 branch</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>25 Sep 2013 07:06 AM</td>
<td>Staging, Dogfooding 2.12 branch</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>History</th>
<th>Release branch</th>
<th>Flagged</th>
<th>Created</th>
<th>Was deployed on</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlassian Plugins 2.13-3 (_107)</td>
<td>Atlassian Plugins Z</td>
<td></td>
<td>29 Jan 2014 01:00 AM</td>
<td>Dogfooding 2.13 branch</td>
</tr>
<tr>
<td>Atlassian Plugins 2.13-3 (_106)</td>
<td>Atlassian Plugins Z</td>
<td></td>
<td>28 Jan 2014 01:00 AM</td>
<td>Dogfooding 2.13 branch</td>
</tr>
<tr>
<td>Atlassian Plugins 2.13-3 (_105)</td>
<td>Atlassian Plugins Z</td>
<td></td>
<td>27 Jan 2014 01:00 AM</td>
<td>Dogfooding 2.13 branch</td>
</tr>
</tbody>
</table>

Release details include:

- **Version**
  The name of the release artifact.
Manually starting a deployment

Bamboo can start deployments either by automated triggers, or by starting the process manually.

Manually executing the deployment gives you the ability to start the process at your convenience, without having to wait for a scheduled event or trigger to take place.

On this page:

- Manually starting a deployment

Manually starting a deployment

Deployment projects can be viewed and managed from the 'All deployment projects' screen. Think of this as a dashboard view of all of your deployment projects. You can also start deployments from this screen.

To manually start a deployment

1. From the 'All deployment projects' screen, click on the associated Deploy icon:

   ![Deploy icon]

   The 'Deployment preview' screen will display:

   ![Deployment preview screen]

   The deployment preview screen comprises a left hand 'settings' side and a right hand preview and information side. Bamboo will attempt to display a preview or information to reflect the choices made on the settings side.

2. Using the radio buttons, decide if you wish to create a new release from a build result or promote an existing release to the deployment environment.

3. If creating a new release from a build result:
a. Check the **Create new release from build result** radio button
b. Select the **Plan branch** you wish to use:

c. Select the **Build result** you wish to use:

You can only choose results from successful builds, and since (and including) the last release created on this particular branch.
d. Check that the name of your release is correct:

If you need more information about where the default name comes from, click on the 'i' icon.
e. Click **Start deployment**

4. If promoting an existing release:
a. Check the **Promote existing release to this environment** radio button
b. Select the **Plan branch** you wish to promote (optional):

c. Select the release that you wish to promote:
d. Click **Start deployment**

**Deployments from branches**

What are branch deployments?

Branching is an important tool in your development process, as it offers a very powerful way to let developers work in isolation on different aspects of a software project.

**Plan branches** represent a build for a branch in the version control system. The plan branch inherits all of the configuration defined by the parent plan, and any new branch created is automatically built and tested using the same build configuration as the parent. When the plan branch build succeeds, it can be automatically or manually merged back into master.

Branch deployments extend plan branches by allowing users to create a deployment release from any plan branch.

Learn more about branching strategies: Bamboo Best Practice - Branching and DVCS

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**On this page:**

- What are branch deployments?
- Why should we use branch deployments?
- Branch deployment use cases
  - Manual branch deployment
  - Automated branch deployment

**Related pages:**

- Understanding deployment releases
- Creating and configuring a deployment project
- Manually starting a deployment
- Triggers for deployment environments

Why should we use branch deployments?

Bamboo deployments allow a plan branch to be deployed to a non-critical test environment before the feature code is merged back to master. This means that the feature code can be thoroughly tested and evaluated in a real server environment before the developer merges back the changes to master.

Developers should consider using branch deployments whenever they want to keep their in-progress
development code separate from the master code, but want to test it within a deployable environment. Learn more about deployment releases and how deployment releases work.

The following diagram shows a typical deployment branch example.

1. The developer creates a new branch off of the master and a plan branch is automatically created for the new branch in Bamboo
2. The developer commits code against the branch and the plan branch automatically builds the changes
3. Following a successful build, they then deploy the results of builds #3 and #4 into a test environment for thorough testing
4. When satisfied that all of the tests have been passed, the developer manually merges their feature branch back into master
5. Now that the changes are in master – sporting the new feature – a new release can be created and deployed to the mainline environments (e.g. QA, Staging and Production).

Branch deployment use cases

Branch deployments should only ever be triggered into safe testing environments - they should never be triggered into production-like environments such as Staging, QA or Production. Learn more about Creating and configuring a deployment project.

There are two typical strategies for managing branch deployments:

1. Manual branch deployment
2. Automated branch deployment

Let's examine each strategy in more detail.

Manual branch deployment

Let's assume a developer is using a plan branch to work on a new feature for a product. They reach a point in development where the new code needs testing in a server environment.

1. The developer successfully builds and tests the code using Bamboo. Let's call this Build #1
2. When a successful build occurs, it's ready to deploy by creating a new release for Build #1 and deploying it to the testing environment
3. When deployed, the developer thoroughly tests their new code. When satisfied that all of the tests have been passed, the developer can merge the changes back into master.

Learn more about Manually starting a deployment.

Automated branch deployment

Let's consider another developer who is also using a plan branch to work on a new feature for the product. They decide to automate the branch deployment so that it isn't triggered manually.

1. The developer successfully builds the code, including the new code they have been working on. Let's call this Build #2
2. The developer doesn't want to deploy manually, so uses Bamboo's automated triggering to set up a strategy to deploy the plan branch into a deployment test environment. Two options are available:

   a. use Bamboo's cron based scheduling to deploy at a specified time and date:

   b. use Bamboo to trigger a deployment upon the successful completion of a build plan:
3. The developer sets up the triggering strategy to best match working practices. Once the trigger is reached, the plan branch build is deployed to the test environment.
4. When deployed, the developer thoroughly tests their new code. When satisfied that all of the tests have been passed, the developer can merge the changes back into master.

Remember: Plan branch code should only be merged back to master AFTER testing of the branch feature code is complete AND successful.

Learn more about Triggers for deployment environments.

Configuring project permissions

Starting from version 6.2, Bamboo allows you to set up permission on the project-level.

You must be an Administrator or Project administrator to be able to edit permissions on the project-level.

To change project permissions:

1. From the header bar, click Projects.
2. Click the project you want to set permissions for.
3. In the upper-right corner, click Project settings > Project permissions.
4. Search for a user or a group you want to grant permissions.
5. From the Select permissions drop-down, select the permission type and click Add.
**Getting feedback**

Getting immediate feedback about build results is the essence of continuous integration. Furthermore, getting reports on activity of your development team can give you deep insights into your process efficiencies and schedule risks.

### Notifications

Bamboo can send notifications to your team about the success or failure of their builds in a number of ways:

- The Wallboard
- Email
- RSS feeds
- Instant messaging

### Reports

Bamboo provides various reports about the build activity of your development team:

- Summary statistics for all users
- Build results for an author
- Comparison charts for authors
- Comparison charts for plans
- Clover code-coverage for a job
- Clover code-coverage for a build

### Notifications

Bamboo can send notifications about build results so that you can find out immediately about the success or failure of your builds.

You can get notifications in different ways:

- **Bamboo Wallboard**
  
  Show build results on a dedicated monitor.
  
  See Displaying the wallboard.

- **Email (e.g. GMail)**
  
  Get build results in your inbox.
  
  See Configuring notifications.
Instant messaging (e.g. Hipchat, Google Talk)
Send notifications to your dev chat room.

See Configuring notifications.

RSS feeds
Get aggregated key information about your builds.

See Subscribing to RSS feeds.

Displaying the wallboard
A development team can benefit from setting up a dedicated monitor to display Bamboo’s latest build results using the Bamboo wallboard.

The Bamboo wallboard can display the latest results for:
- all plans that you have permission to see.
- just your favorite plans.
- plans filtered by plan label.

The branches wallboard displays the status of all the branches and the plan that the branches belong to.

On this page:
- How do I do that?
- Notes

Related pages:
- Getting feedback
- Using the Bamboo Dashboard

How do I do that?
Log in to Bamboo, if necessary.
Go to the Dashboard.

<table>
<thead>
<tr>
<th>Task</th>
<th>Action</th>
<th>Notes</th>
</tr>
</thead>
</table>
| All plans  | Wallboard > All Plans | Alternatively, use the following URL in your browser, replacing ’bambooserver’ with the real name of your Bamboo server:  
http://bambooserver:8080/bamboo/telemetry.action |
### Favorite plans

**Wallboard > Favorite Plans**

Only users who have logged in to Bamboo can specify and access favorites.

Alternatively, use the following URL in your browser, replacing 'bambooserver' with the real name of your Bamboo server:


### Filtered plans

**Wallboard > Filtered Plans**

You need to have set up a plan filter first. See Using the Bamboo Dashboard.

### Notes

- You will only be able to display those plans that you have permission to see.
- Once you are viewing the wallboard in your browser window, set your browser to 'full screen' mode to make the wallboard fill your entire screen. (Use F11 for common browsers on Windows and UNIX/Linux-based systems and Shift+Cmd+F for Firefox on Mac OS X.)
- If you are going to display the wallboard permanently, you may want to ask your Bamboo administrator to create a user who has only a limited set of permissions.
- If your wallboard is displayed on a touchscreen (such as an iPad) or its content can be accessed with a 'human interface device', such as a mouse, then touching or clicking a build result on the wallboard shows more information about that build.

**Screenshot: More information from a build result on the wallboard**

**Acceptance Test JDK 1.6**

- **Bamboo**: 12 hours ago
- **Tests**: 203 passed
- **Duration**: 71 minutes
- **Changes**:
  - **Who**: Marcin Gardias
  - **Why**: BAM-7227 - Not Built Chains should be shown on the build history tab
  - **Who**: Przemyslaw Bruski
  - **Why**: BAM-6835 - Performance degradation with EC2 agents

### Configuring notifications for a plan and its jobs

Notifications in Bamboo are triggered by a range of events involving a plan and its jobs, including build completion, build outcomes and comments being posted against build results. You can configure whether notifications are sent for a particular event for each plan and job, and who they are sent to.

Bamboo users can choose whether to receive their notifications via email, IM, both or neither. In general, recipients do not require Bamboo user accounts.

**Adding notifications for a plan or job**

Before you begin:
You must have the 'Edit' permission for a plan, to add or remove notifications for it.

You need to configure Bamboo's SMTP email and/or instant messaging capabilities before Bamboo can send notifications. If you have not configured either or both of these, a note will display on the page prompting you to set up the appropriate server(s):

- To configure an email server for Bamboo, click Add an Email Server in the note and enter the email server details in the window that displays. See Configuring Bamboo to send SMTP Email for more information.
- To configure an instant messaging server for Bamboo, click Add an Instant Messaging Server in the note and enter the instant messaging server details in the window that displays. See Configuring Bamboo to use Instant Messaging for more information.

To add a notification for a plan or its jobs:

1. Navigate to the configuration for the desired plan, as described on Configuring plans.
2. Click the Notifications tab.
3. Set up a new notification in the 'Add Build Notification' section as follows:
   a. Event
      Select the event type you want to be notified about. Refer to the list of events (below) for details.
   b. Recipient Type
      i. User — Enter the username of the appropriate Bamboo user, or click the icon to select from a list of users.
      ii. Hipchat — Enter the Hipchat API Token and Room Name. See Integrating Bamboo with Hipchat for more information.
      iii. Group — Enter the name of the appropriate Bamboo group(s).
      iv. Email Address — You can use email to send notifications to a person who is not a Bamboo user. Type the appropriate email address. Note that:
         • If you specify the email address of an existing Bamboo user, the user will receive notifications even if they have elected not to receive notifications in their user preferences.
      v. IM Address — This is useful if you need to send Instant Messenger (IM) notifications to a person who is not a Bamboo user. Type the appropriate IM address. Note that:
         • If you specify a broadcast address (e.g., 'project-x@broadcast.chat.mycompany.com'), Bamboo will not know the context of related IM responses.
         • If you specify the IM address of an existing Bamboo user, the user will receive notifications even if they have elected not to receive notifications in their user preferences.
      vi. Responsible Users — The Bamboo users who have been assigned as being responsible for a broken build. See Assigning responsibility for build failures.
      vii. Committers — The Bamboo users who have committed code to a particular build since build was last checked out by Bamboo.

Committers are notified based on the notification preferences of a Bamboo user associated with the commit's author and email, also known as source repository alias. If there's no user linked to the source repository alias, Bamboo will not be able to send notifications.
viii. **Watchers** — The Bamboo users who have marked this plan as one of their favorites.

4. Click **Add**, then configure further notifications if required.

5. Click **Save** when you have finished.

**Screenshot: Plan build notifications**

![Plan build notifications](image)

**Notification events**

**Plan Events**

**All Builds Completed**
Bamboo will send a notification whenever the plan build finishes, regardless of the plan build's result. This notification is recommended for any plans whose latest build activity is critical for people to be informed about.

- This is a good plan-based notification to use if you are new to Bamboo. You can change it to a less obtrusive notification option as you become more confident with continuous integration and Bamboo’s build processes.

**Change of Build Status**
Bamboo will send a notification only when there has been a change in status of the plan's build activity over consecutive plan builds — for example, only whenever a plan's latest build changes from successful to failed or vice versa (i.e. 'fixed').

- This notification option is less obtrusive than the other plan notifications mentioned above.

**Failed Builds And First Successful**
Bamboo will send a notification whenever:
- a build of this plan fails.
- the plan is ‘fixed’ (that is, the plan’s latest build is successful and the previous plan build failed).

- This notification is generally suitable for the majority of plans.

**After X Failed Builds**
This notification allows you to specify the **Number Of Failures** (i.e. number of failed builds of this plan), after which Bamboo will send a notification.

- This notification option minimizes the number of messages sent by Bamboo if the plan’s builds fail on a frequent basis. You can also use this event to escalate plan build problems, for example, to notify a manager when a plan build fails five times.

**Comment Added**
Bamboo will send a notification whenever a comment is added to a build result. The email notification will contain all comments against the plan build, whereas IM notifications will only contain the comment that triggered this notification event.

- This notification can help improve collaboration between team members. Be aware that you will not receive notifications for any comments which you post yourself.

**Change of Responsibilities**
Bamboo will send a notification whenever someone is added to, or removed from, the list of those responsible for a broken build.

- This notification can help improve collaboration between team members.
Job Events

All Jobs Completed
Bamboo will send a notification whenever a job build of the plan finishes, regardless of the job build's result. This notification is recommended if the latest build activity of all jobs in this plan are critical for people to be informed about.

This is a good job-based notification to use if you are new to Bamboo. You can change it to a less obtrusive notification option as you become more confident with continuous integration and Bamboo's build processes.

Change of Job Status
Bamboo will send a notification only when there has been a change in build activity status of the jobs within this plan over consecutive plan builds — for example, only whenever the latest build of any job in this plan changes from successful to failed or vice versa (i.e. 'fixed').

This notification option is less obtrusive than the other job notifications mentioned above.

Failed Jobs And First Successful
Bamboo will send a notification whenever:
- a build of this job fails.
- the job is 'fixed' (that is, the job's latest build is successful and the previous job build failed).

First Failed Job For Plan
If multiple jobs fail in a plan, Bamboo will only send a notification for the first failing job detected by the Bamboo system.

This is a less obtrusive notification option that informs about a failing job (and hence, plan) in the shortest possible time.

Job Error
Bamboo will send a notification whenever an error occurs in one of the plan's job build processes (i.e. the activities that Bamboo performs to run a job build). This event is not related to failures of the actual build itself (see the Failed Jobs And First Successful and Failed Builds And First Successful events above). For example, a notification will be sent if Bamboo encounters an error when connecting to the repository, or detecting changes.

Job Hung
Bamboo will send a notification whenever it determines that one of the plan's job builds has hung, according to the hung job build criteria (read more about configuring your hung job build settings).

Use this notification to ensure that the relevant people are informed when a job build becomes unresponsive.

Job Queue Timeout
Bamboo will send a notification whenever one of the plan's job builds has been waiting in the queue for longer than the build queue timeout criteria (read more about configuring your job's Build Queue Timeout settings).

Use this notification to ensure that the relevant people are informed when a job build is stuck in the build queue for too long.

Job Queued Without Capable Agents
Bamboo will send a notification whenever one of the plan's job builds is queued and there are no agents capable of building it.

Use this notification to ensure that people are notified when changes to agents adversely affect your job's builds.

Removing notifications from a plan or job
You must have the 'Edit' permission for a plan, to add or remove notifications for it.

1. Navigate to the configuration for the desired Plan, as described on Configuring plans.
2. Click the Notifications tab.
3. Click Remove for each of the notifications that you wish to remove.

Configuring Bamboo to send SMTP Email
Bamboo can send email notifications about its build results. There are two steps to setting this up:

1. Configure Bamboo to send SMTP email (see below).
2. Configure a plan to send SMTP email notifications about build results (see Configuring notifications for a plan and its jobs).
To configure Bamboo to send SMTP email:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Mail Server in the left navigation column (under 'Communication'). This will display the 'Mail Server Details' page (see screenshot below).
3. Edit the mail server settings as necessary:
   - **Name**: A display-name for the email address e.g. 'SMTP Server'
   - **From Address**: The email address from which Bamboo notifications will be sent.
   - **Subject Prefix**: The text (if any) which will be added to the start of the email subject line. For example '[Bamboo]' will result in emails with subjects like:
     - [Bamboo] TEST build 1,001 has FAILED (77 tests failed, no failures were new) : Change made by jsmith
     - [Bamboo] TEST build 1,002 was SUCCESSFUL (with 77 tests) : Change made by jsmith

   **Email Settings**
   Choose either SMTP or JNDI. See the Notes about JNDI below.

   **SMTP Server**
   The address of the email server that Bamboo will use to send notifications e.g. 'mail.myserver.com'.

   **Username**
   The login name of the account that Bamboo will use to login to the SMTP server.

   **JNDI Location**
   Depends on your application server, and on the location of the 'mail' resource within the JNDI tree you specify. E.g. 'java:comp/env/mail/BambooMailServer'.

4. Type a test email address in the Test Recipient Address box.
5. Click Test, and verify that a test email is received.
6. Click Save.
Configuring email notifications for Gmail

Gmail.com uses TLS (SSL). A JNDI connector needs to be configured. Unfortunately Bamboo does not yet support JNDI with TLS.

To enable Gmail as your mail server:

1. Install Bamboo.
2. Make sure that the following files are copied to and exists only in `<Bamboo-Install> /lib`:
   - `javax.mail-X.X.X.jar`
   - `javax.mail-api-X.X.X.jar` (only if you're using Bamboo 6.0 or later)

   - If the `javax.mail-X.X.X.jar` and `javax.mail-api-X.X.X.jar` files don't exist in the `<Bamboo-Install> /lib` directory, you must move the `javax` files installed at `<Bamboo-Install>/atlassian-bamboo/WEB-INF/lib` to `<Bamboo-Install> /lib`.
   - If the `javax.mail-X.X.X.jar` and `javax.mail-api-X.X.X.jar` files already exists in the `<Bamboo-Install> /lib` directory, simply delete the `javax` files shipped with Bamboo in `<Bamboo-Install>/atlassian-bamboo/WEB-INF/lib`.

In Bamboo 5.9 the `mail-X.X.jar` and `activation-X.X.jar` files were included in the download archive. Starting with Bamboo 5.10:
3. Add the following configuration to your BambooInstall/conf/server.xml file:

```xml
  <Context path="/bamboo" docBase="${catalina.base}/atlassian-bamboo"
    reloadable="true">
    <Resource name="mail/GmailSmtpServer"
      auth="Container"
      type="javax.mail.Session"
      mail.smtp.host="smtp.gmail.com"
      mail.smtp.port="465"
      mail.smtp.auth="true"
      mail.smtp.user="<your-name>@gmail.com"
      password="<your-pw>"
      mail.smtp.starttls.enable="true"
      mail.smtp.socketFactory.class="javax.net.ssl.SSLSocketFactory"
    />
  </Context>
```

Configure Bamboo to use a JNDI Location of java:comp/env/mail/GmailSmtpServer. Note that the JNDI Location is case sensitive and must match the resource name specified in server.xml.

Notes

You can use a mail session as an alternative to specifying mail details directly in Bamboo. You configure the mail session in your application server (e.g. in the server.xml file — see Locating important directories and files), and then use JNDI to look up the preconfigured mail session. JNDI has the following advantages:

- **Centralized management** - mail details are configured in the same place as database details, and may be configured through your application server administration tools.
- **Better security** - mail details are not available to Bamboo administrators through the Bamboo interface, and aren't stored in Bamboo backup files.
- **More SMTP options** - e.g. SSL. If you want to use SMTP over SSL you will need to use JNDI.

Configuring Bamboo to use Instant Messaging

Bamboo can send Instant Messaging (IM) notifications about its build results. There are two steps to setting this up:

1. Configure Bamboo to use Instant Messaging (see below).
2. Configure a plan to send IM notifications about its build results (see Configuring notifications for a plan and its jobs).

Please note, Bamboo supports XMPP protocol for messaging. This means Bamboo can be used with Gtalk or your enterprise XMPP server.

Related pages:

- Configuring notifications for a plan and its jobs
- Configuring Bamboo to use Google Talk for Instant Messaging

To configure Bamboo to use Instant Messaging:

1. Click the icon in the Bamboo header and choose Overview.
2. Click IM Server in the left navigation panel (under 'Communication').
3. Click **Edit**.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Host</strong></td>
<td>The address of your IM server (for example, 'chat.atlassian.com').</td>
</tr>
<tr>
<td><strong>Port</strong></td>
<td>The TCP port that your organization uses for IM traffic (or leave this field blank to have Bamboo either perform a DNS lookup or use the default port).</td>
</tr>
<tr>
<td><strong>Username</strong></td>
<td>The login name of the IM account from which Bamboo notifications will be sent.</td>
</tr>
<tr>
<td><strong>Change password</strong></td>
<td>Select this if you have specified a username different from the currently logged-in user.</td>
</tr>
<tr>
<td><strong>Resource</strong></td>
<td>An identifying name for the connection if multiple clients use the same jabber account.</td>
</tr>
<tr>
<td><strong>Requires a TLS/SSL connection</strong></td>
<td>Select this if your IM server uses SSL.</td>
</tr>
<tr>
<td><strong>Force legacy SSL</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Test Recipient Address</strong></td>
<td>You can test this configuration by entering an address and clicking <strong>Test</strong>.</td>
</tr>
</tbody>
</table>

4. Click **Save**.

**Screenshot: Instant Messaging server details**

**Configuring Bamboo to use Google Talk for Instant Messaging**

If your Bamboo server has access to the internet, it can use **Google Talk** to send IM notifications about build
Before you begin:

- Google Talk does not allow IM messages to be received unless the receiver has approved the sender. Please ensure that the Gmail user specified below is approved by each Google Talk recipient. That is, ensure that the 'Host' and 'Username' have previously sent messages to each other via Google Talk.
- The Google Talk service is hosted at talk.google.com. The default port is 5222. (Note: be aware that your firewall might be blocking traffic to this port.)
- TLS is required.
- The only supported authentication mechanism is SASL PLAIN. For additional information, please see: [https://code.google.com/apis/talk/open_communications.html](https://code.google.com/apis/talk/open_communications.html)

To configure Bamboo to use Google Talk for Instant Messaging:

1. Click the ![icon](image) icon in the Bamboo header and choose **Overview**.
2. Click **IM Server** in the left navigation panel (under 'Communication').
3. Click **Edit**. Modify the settings as required.

**Host**
Type 'talk.google.com'. (If your IM Server uses an '@googlemail.com' account, type 'googlemail.com'.)

**Port**
Leave blank. Bamboo will perform a DNS lookup to figure out which port to use.

**Username**
Type the login name of the Google account from which IM notifications will be sent. Starting with Bamboo 3.4, you need to include the domain name, e.g. `atlassianbamboo@gmail.com` NOT `atlassianbamboo`.

**Change password**
Select this if you have specified a username different from the currently logged-in user.

**Resource**
An identifying name for the connection if multiple clients use the same jabber account.

**Requires a TLS/SSL connection**
Select this.

**Force legacy SSL**

**Test Recipient Address**
You can test this configuration by entering an address and clicking **Test**.

4. Click **Save**.

**Modifying notification templates**
If you want to customize the layout and content of your Bamboo notifications, you can customize the templates for each of the notification types (i.e. HTML email, text email, instant message) and events (e.g. Build Commented). The notification templates are written in Freemarker.

Some content in notifications can also be configured via system properties, such as the number of log lines to include in email notifications that display log information.

⚠️ Changes to notification templates only take effect after a Bamboo restart.
Modifying a notification template

To modify a notification template:

1. Locate the default notification templates in `WEB-INF/classes/notification-templates/` folder of your Bamboo home directory, e.g. `HOME/templates/notification-templates`.

   The filename will have formatted as: `<event name><notification type>.ftl`, e.g. `AfterXFailedHTMLEmail.ftl`.

2. Copy the notification template that you wish to modify into the `templates/notification-templates` folder of your Bamboo home directory, e.g. `Bamboo home directory, e.g. HOME/templates/notification-templates`.

3. Modify the copied template, as desired. Please see the section on Working with Freemarker below for tips on updating templates.

4. Save your changes to the template. You need to restart your Bamboo server for the template changes to take effect.

Working with Freemarker

The Bamboo notification templates are written in Freemarker. The Freemarker engine allows for dynamic content generation based on the Freemarker markup tags that are used in templates. This document does not describe the Freemarker language in detail. Please see the [Freemarker Online Manual](#) for full information on using this markup language.

Generating content via Freemarker involves merging a template (*.ftl file) with a context map. You can access any data in the context map from within the template using the Freemarker markup. For the notifications we have provided a specific subset of Bamboo objects that you can access. For example,

```freemarker
[#if buildSummary.successful]
${buildSummary.buildResultKey} was successful.
[/if]
```

If you had a successful Bamboo build with build result, BAM-1234-1, the above markup would return the following text in your notification:

BAM-1234-1 was successful.

You can find more information on working with Freemarker, including Bamboo objects available from Freemarker templates, tips on writing Freemarker templates and examples in the [Freemarker and notification templates](#) document.

Configuring notifications content via system properties

The following system properties can be configured to control some of the content that is included in notifications (e.g. the number of log lines to include in email notifications that display log information). For instructions on how to configure a system property, please refer to the [Starting Bamboo](#) page.

Before you begin:

The system properties below do not add content to notifications. You still need to ensure that your notification templates contain the relevant entities to display the content. For example, changing the `bamboo.notifications.logLinesToInclude` property will not add log information to your notifications. It only modifies the number of log lines displayed in notification templates that already include logs.

<table>
<thead>
<tr>
<th>System Property</th>
<th>Description</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>bamboo.notifications.logLinesToInclude</td>
<td>Specifies the number of log lines to include in email notifications that display log information.</td>
<td>100</td>
</tr>
</tbody>
</table>
**Notes**

- **Bamboo does not validate notification templates.** If you have incorrectly formatted the markup text in the template, Bamboo will still use the template to send out notifications. If this happens, your users may receive notifications with unreadable or missing information, as well as error messages. Errors will also be posted to your logs.

**Freemarker and notification templates**

Notification templates in Bamboo can be modified to customize the format and content of your notifications. The templates are written in **Freemarker**. This page is intended to complement the **Modifying notification templates** page and contains information on the Bamboo objects available from Freemarker templates, tips on writing Freemarker templates and examples.

**Changes to notification templates only take effect after a Bamboo restart.**

**On this page:**
- Accessing Bamboo data
- Special considerations when working with Freemarker
- Freemarker examples

**Related pages:**
- Configuring Bamboo to use Instant Messaging
- Modifying notification templates

**Accessing Bamboo data**

Each individual notification has a different subset of data that can be accessed from the Freemarker templates. You can find information on the objects available in our javadocs below.

- Build Completed Notification ("All Completed Builds" and "Failed and First Success")
- After X Failed Builds Notification
- Build Commented Notification
- Build Hung Notification
- Build Error Notification

**Special considerations when working with Freemarker**

**Never assume data exists**

Unfortunately Freemarker is not very forgiving if data does not exist or is null. Hence, you will need to check whether information exists before adding it to a page. The sample code below shows how you can validate for non-existent data.

```freemarker
[#if issue.jiraIssueDetails.summary?has_content][#/if]
[#if issue.jiraIssueDetails.summary??][#/if]
${issue.jiraIssueDetails.summary?if_exists}
${issue.jiraIssueDetails.summary!}
```

**Check the encoding of your information**

Freemarker has built-in utilities for escaping special characters. These could be characters that you deliberately do not want to be interpreted as HTML, or data that could potentially contain malicious content. The sample code below shows how you can escape characters in Freemarker.

```freemarker
${commit.comment?html} // for data to be encoded to be displayed as html
${commit.author?url} // for data to be encoded for a url
```

You can find more information on these utilities in the **official Freemarker documentation**.

**Use white space carefully**

When editing text email content and instant message content, you need to be very careful with spacing and line
breaks. Any spaces and line breaks that you have entered in the Freemarker template will also exist in the evaluated content. Freemarker provides you with some utilities to remove white space, so that you can still retain some formatting in the templates.

More information can be found the official Freemarker documentation.

**Freemarker examples**

Below are some raw examples of additional information that you can add to your emails.

Please note, these examples are intended to demonstrate the use of Freemarker and how to access Bamboo objects. You will need to modify these examples to include your desired formatting and make it work with your data.

**List files in a commit**

```
[#if buildSummary.commits.size() > 0]
  [#list buildSummary.commits as commit]
    [#if commit_index gte 3][#break]//only shows 3 commits
    Author:  <a href="[@ui.displayAuthorOrProfileLink commit.author/]">${commit.author.fullName?html}
    </a>
    Comment:  ${commit.comment?html}
    <br/>
    [#if commit.guessChangeSetId()?has_content]
    Revision:  ${commit.guessChangeSetId()?html}
    <br/>[/#if]
   [#if commit.files?has_content]
    Files:
      [#list commit.files as file]
        ${file.cleanName}  [#if file.revision?has_content](${file.revision})
        <br/>
      [/#list]
    [/#if]
  [/#list]
[#else]
  This build does not have any commits.
[/#if]
```

Provide test error details
Working with Instant Messenger (IM) notifications

Bamboo can send you notifications about build results for a particular plan. Each plan's recipients are specified by a Bamboo administrator, but you can choose whether you would like to receive your Bamboo notifications via email and/or an instant messenger (IM) service such as Atlassian's Hipchat. See Integrating Bamboo with Hipchat.

As well as receiving IM notifications, you can interact with Bamboo using IM, as described on this page.

On this page:
- Labeling a build result using IM
- Commenting about a build result using IM

Related pages:
- Changing your notification preferences
- Configuring Bamboo to use Instant Messaging
- Getting feedback

Labeling a build result using IM

To label a build result using IM:
In your Instant Messenger client, type your comment in the following format:

```
label [build key] <labels>
```

Entering a build key is optional. If none is specified, Bamboo will look up the last time it corresponded with you and the build that was in context. The context gets updated when you specify a build key in your command, and when Bamboo sends you a notification about a particular build.

Commenting about a build result using IM

To comment on a build result using IM:
In your Instant Messenger client, type your comment in the following format:

```
comment [build key] <comment message>
```

Entering a build key is optional. If none is specified, Bamboo will look up the last time it corresponded with you and the build that was in context. The context gets updated when you specify a build key in your command, and when Bamboo sends you a notification about a particular build.

Screenshot: Interacting with Bamboo using IM

Subscribing to RSS feeds

Bamboo aggregates key information about your builds into RSS feeds. You can subscribe to these feeds using any feed reader.

<table>
<thead>
<tr>
<th>RSS feed scope</th>
<th>Options</th>
<th>Set up</th>
</tr>
</thead>
<tbody>
<tr>
<td>All plans</td>
<td>• All build results</td>
<td>1. Go to the Dashboard's All Plans tab.</td>
</tr>
<tr>
<td></td>
<td>• Failed build results</td>
<td>2. Locate the RSS icon at the bottom of the screen.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Right-click either all builds or all failed builds, and copy its URL.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Paste the URL into your RSS reader.</td>
</tr>
</tbody>
</table>
A specific plan

- All build results
- Failed build results

1. Go to the plan.
2. Locate the RSS icon at the bottom of the screen.
3. Right-click either all builds or all failed builds, and copy its URL.
4. Paste the URL into your RSS reader.

Build results with a particular label

1. Go to the Dashboard.
2. Go to any plan that has a label (this may involve trial and error).
3. Click on any label, near the top of the screen.
4. Click All Labels.
5. Click the label of interest.
6. Locate the RSS icon at the bottom of the screen.
7. Right-click Feed for builds labeled and copy its URL.
8. Paste the URL into your RSS reader.

System level notifications

System level notifications in Bamboo are triggered by a small range of system level events. This means that you don't need to configure these notifications for each plan you are running, as they are applied globally across the Bamboo platform.

Bamboo users can choose whether to receive their notifications via email, IM, both or neither. In general, recipients do not require Bamboo user accounts.

On this page:

- Add system level notifications
- Change system notifications

**Related pages:**

- Notifications
- Configuring plans
- Changing your notification preferences

**Add system level notifications**

1. Click the icon in the Bamboo header and choose Overview.
2. Select System notifications to display the System notification configuration screen
3. Click Add notification to add a new notification:
a. Complete the Event and Recipient type fields using the following table:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Event Type</strong></td>
<td><strong>Agent online</strong> — Bamboo will send a notification whenever an agent goes online.</td>
</tr>
<tr>
<td></td>
<td><strong>Agent offline</strong> — Bamboo will send a notification whenever an agent goes offline. Notifications include data on 3 last executed jobs.</td>
</tr>
<tr>
<td></td>
<td><strong>Job Hung</strong> — Bamboo will send a notification whenever it determines that one of the plan’s job builds has hung, according to the hung job build criteria (read more about configuring your hung job build settings). Use this notification to ensure that the relevant people are informed when a job build becomes unresponsive.</td>
</tr>
<tr>
<td></td>
<td><strong>Job queued without capable agents</strong> — Bamboo will send a notification whenever one of the plan’s job builds is queued and there are no agents capable of building it. Use this notification to ensure that people are notified when changes to agents adversely affect your job’s builds.</td>
</tr>
<tr>
<td></td>
<td><strong>Job queue timeout</strong> — Bamboo will send a notification whenever one of the plan’s job builds has been waiting in the queue for longer than the build queue timeout criteria (read more about configuring your job’s Build Queue Timeout settings). Use this notification to ensure that the relevant people are informed when a job build is stuck in the build queue for too long.</td>
</tr>
</tbody>
</table>

| Recipient Type               | **User** — Enter the username of the appropriate Bamboo user, or click the icon to select from a list of users.                        |
4. Click **Add** to confirm your configuration.

**Change system notifications**

1. Click the icon in the Bamboo header and choose **Overview**.
2. Select **System notifications**:
   - Click the pencil symbol in the Actions column to edit the notification.
   - Click the cross symbol in the Actions column to remove the notification.

**Reporting**

You are able to get reports about various kinds of activity in Bamboo:

**Summary statistics for all users**
A list of summary build statistics for all Bamboo users, showing such things as the number of builds triggered, broken and fixed.

See Viewing build statistics for all users.

**Build results for an author**
Build results summaries for someone who has committed code to projects in Bamboo, including the last 10 builds, the last 10 broken and the last 10 fixed.

See Viewing build results for an author.

**Comparison charts for authors**
Create comparison charts of build activity for selected authors.

See Generating reports on selected authors.

**Comparison charts for plans**
Create comparison charts of build results for selected plans.

See Generating reports across multiple plans.

**Clover code-coverage reports**

See Viewing the Clover code-coverage for a plan.

See Viewing the Clover code-coverage for a build.

---

**Viewing build statistics for all users**

The build statistics summary gives you an overview of the activity of Bamboo users.

**To view summary statistics for all users:**

1. Click **Reports > Authors** in the top menu bar
2. Click the **List Users** tab.

**Related pages:**

- Reporting
- Viewing build results for an author

**Screenshot: Users Summary**
Viewing build results for an author

An author’s source-code repository login must have been associated with their Bamboo user profile before you can see their build results in Bamboo.

To view build results for a particular author:

1. Click Reports in the top menu bar, then Authors.
2. Click the List Authors tab.
3. Click an author’s name to see statistics and recent build results for the author:

   **User Details**
   The author’s user details.

   **Builds Summary**
   A statistical summary of all the author's builds.

   **Last 10 Builds**
   The last 10 builds that were triggered by this author.

   **Last 10 Broken**
   The last 10 builds that were triggered by this author, where the build failed and the previous build for the same plan was successful.

   **Last 10 Fixed**
   The last 10 builds that were triggered by this author, where the build was successful and the previous build for the same plan failed.
Generating reports on selected authors

An author is any person who checks in code to a repository that is associated with a Bamboo plan. An author need not be a Bamboo user.

Generating a report on selected authors

To generate a report on selected authors:

1. Click Reports in the top menu bar, then Authors.
2. Click the Statistics tab.
3. Set the report parameters:
   - **Report**: Choose from the available reports, shown below. Additional reports may have been added through custom plugins.
   - **Authors**: Choose the authors on whom you want to report. Use the <Ctrl> key to select multiple authors.
   - **Group By**: Choose the time scale for the horizontal axis.
4. Click Submit.

Selected author report types

The following standard report types are available.

Build activity
Build Activity

Number of build failures

Number of builds broken
Number of builds fixed

Percentage of successful builds
Generating reports across multiple plans

Bamboo provides a report generator that enables you to compare build statistics across one or more plans, using a variety of different metrics.

Generating plan reports

To report on build statistics per plan:

1. Click Reports in the top menu bar.
2. Set the report parameters:

   Report
   Choose from the available reports, shown below. Additional reports may have been added through custom plugins.

   Build plans
   Choose the plans on which you want to report. You can use the <Ctrl> key to select multiple plans.

   Group By
   Choose the time scale for the horizontal axis.

   Date Filter
   Choose the time period on which to report. Use Select Range to set a custom range.

3. Click Submit.
**On this page:**
- Generating plan reports
- Plan report types
  - Build activity
  - Build duration
  - Percentage of successful builds
  - Time to fix
  - Number of tests
  - Number of build failures
  - Clover lines of code
  - Clover code coverage

**Related pages:**
- Generating reports on selected authors
- Viewing build results for an author
- Getting feedback

**Plan report types**

Some of the standard plan report types are illustrated below.

**Build activity**

*Build Activity*

How many builds are triggered in a given time period? This indicates the level of activity for the plan.

<table>
<thead>
<tr>
<th>Chart</th>
<th>Data Table</th>
<th>Builds</th>
</tr>
</thead>
</table>

![Graph showing build activity over time]

**Build duration**
Build Duration

The report shows how long your build takes over time. Is it getting slower or faster?

<table>
<thead>
<tr>
<th>Chart</th>
<th>Data Table</th>
<th>Builds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Duration

<table>
<thead>
<tr>
<th>11-Feb</th>
<th>12-Feb</th>
<th>13-Feb</th>
<th>14-Feb</th>
<th>15-Feb</th>
</tr>
</thead>
<tbody>
<tr>
<td>4h</td>
<td>3h 40m</td>
<td>3h 20m</td>
<td>3h</td>
<td>3h 20m</td>
</tr>
<tr>
<td>2h 40m</td>
<td>2h</td>
<td>1h 40m</td>
<td>1h</td>
<td>1h 20m</td>
</tr>
<tr>
<td>1h 20m</td>
<td>1h</td>
<td>46m</td>
<td>46m</td>
<td>26m</td>
</tr>
<tr>
<td>20m</td>
<td>11-Feb</td>
<td>12-Feb</td>
<td>13-Feb</td>
<td>14-Feb</td>
</tr>
</tbody>
</table>

- Bamboo Main - Extras
- Bamboo Main - CI Tests
- Bamboo Main - Stable Extras
- Bamboo Main - Stable CI Tests

Percentage of Successful Builds

Comparing success percentages gives you an idea of how stable a plan is compared to one another. 100% means your plan is always rock solid. 0% means something is seriously wrong.

<table>
<thead>
<tr>
<th>Chart</th>
<th>Data Table</th>
<th>Builds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

% Build Successful

<table>
<thead>
<tr>
<th>11-Feb</th>
<th>12-Feb</th>
<th>13-Feb</th>
<th>14-Feb</th>
<th>15-Feb</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>90</td>
<td>80</td>
<td>70</td>
<td>60</td>
</tr>
<tr>
<td>60</td>
<td>50</td>
<td>40</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>10</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>11-Feb</td>
<td>12-Feb</td>
<td>13-Feb</td>
<td>14-Feb</td>
<td>15-Feb</td>
</tr>
</tbody>
</table>

- Bamboo Main - Extras
- Bamboo Main - CI Tests
- Bamboo Main - Stable Extras
- Bamboo Main - Stable CI Tests

Time to fix
Time to Fix

How long does it take on average to fix problems? This provides an indication of how quickly breakages are resolved for the plan.

Number of Tests

How many tests does your build have? This provides a rough indication of the level of testing over time for the plan.

Number of build failures
**Number of Build Failures**

How many builds are being broken? A high value indicates a relatively unstable plan that tends to be broken often.

![Number of Build Failures Chart](chart_1.png)

**Clover Lines of Code**

Provides an indication of the size of the code base for the build.

![Clover Lines of Code Chart](chart_2.png)
1. Viewing the Clover code-coverage for a plan

If you use Atlassian's Clover and your job specifies a Clover directory (see Enabling Clover for Bamboo), you will be able to view the Clover coverage summary for the plan.

**Related pages:**

- Enabling Clover for Bamboo
- Viewing the Clover code-coverage for a build
- Generating reports across multiple plans

To view the Clover coverage summary for a plan:

1. Locate the plan summary on the Bamboo Dashboard.
2. Click the Clover tab. The Code Coverage Summary information includes:

   - Latest coverage from the most recent build as a percentage and bar representation (aggregated results from all Clover-enabled jobs).
   - A link to detailed HTML reports.
   - Coverage History chart showing changes in percentage Code Coverage over time.
   - Lines of Code History chart showing changes in LOC over time.

**Screenshot:** the Clover tab for Bamboo 5.6.1 and later.
Screenshot: the **Clover** tab up to Bamboo 5.6.0.

**Code Coverage Summary**

![Coverage History](image)

![Lines of Code History](image)

**Note:**
1. Charts are only generated when build results from at least a 2-day span are available. Where shorter time spans are available, the user will receive a warning stating "Insufficient data in range to draw the chart."

2. Where your plan contains multiple jobs with Clover, then Code Coverage and Lines of Code values are aggregated from all these jobs.

3. **Bamboo 5.6.0 and older**: If your plan contains multiple jobs with Clover, the View latest Clover HTML report link will point to the default job only. In order to see other reports, you must go to the specific job summary, as described in Viewing the Clover code-coverage for a build.

**Viewing the Clover code-coverage for a build**

If your organization uses the Atlassian Clover code-coverage tool, Bamboo can record code-coverage details (i.e. the percentage of code covered by tests) for each build result.

This is only available if the build's plan specifies a Clover directory (for details please refer to the Enabling Clover for Bamboo).

Bamboo also provides data on code-coverage trends for a plan over a period of time. For details see the Related pages at right.

- **Related pages:**
  - Working with build results
  - Enabling Clover for Bamboo
  - Generating reports across multiple plans

**Clover HTML report for a job**

Where Clover generates an HTML report (created by default in automatic integration), you can examine the report in the build job summary page. To view the report:

1. Go to the plan summary.
2. Select the relevant build number.
3. Select the appropriate job.
4. Click the Clover tab to open the report. If a job produces more than one report, a list is shown and you can switch between them.

**Clover statistics report for a job**

If your build generates a Clover XML report but not the HTML report, then the Clover Report artifact is not available on the Artifacts tab, however the build job summary page will contain a few code coverage statistics:

1. Go to the plan summary.
2. Select the relevant build number.
3. Select the appropriate job.
4. Click the Clover tab to open the report.

⚠️ TIP: This usually happens for manual Clover integration. In case you want to see full Clover report, configure it as described on Enabling Clover for Bamboo page.

**References**

The content of the Clover HTML report is discussed in detail on the Clover Documentation Home - 4. Understanding Reports page. For completeness, an example Clover Code Coverage HTML report is shown below.
Troubleshooting

The Clover tab shows the directory listing instead of the HTML report

Please check which artifact handler you use. The Amazon S3 Artifact Handler serves files on a one-by-one basis, instead of exposing all files as a static website. To change this, open Configure plan and on the Miscellaneous tab select the Use custom artifact handler settings check-box. Then select Server-Local Artifact Handler for shared and non-shared artifacts and finally re-run the build. See this bug report: CLOV-1560.

Integrating Bamboo with Atlassian applications

You can integrate Bamboo with the following Atlassian applications:

When Bamboo is integrated with a Jira application, you can:

- See Bamboo development activity in Jira applications. Learn more...
- View detailed Bamboo build result information
- View detailed Bamboo deployment information
- Run a Bamboo build when releasing a Jira Software Server version
- Have Bamboo automatically link a plan branch with an issue
- View the Jira application issues linked to a build result
- View the Bamboo builds that relate to a Jira application project or version
<table>
<thead>
<tr>
<th><strong>Hipchat</strong></th>
<th>When Bamboo is integrated with Hipchat, you can get notifications from Bamboo for things like:</th>
</tr>
</thead>
</table>
|  | • when a build passes or fails  
|  | • when you are assigned responsibility for a breaking build  
|  | • when a build you are responsible for has been fixed  
|  | • when a manual stage of a build is ready to be run  
|  | • when a deployment starts, and completes  
|  | ...and many other notification events. |

<table>
<thead>
<tr>
<th><strong>Bitbucket</strong></th>
<th>When Bamboo is integrated with Bitbucket Server:</th>
</tr>
</thead>
</table>
|  | • Bamboo will automatically run a build when changes are pushed to the Bitbucket repository, without needing to configure polling.  
|  | • Bamboo will automatically update plan branches when a developer pushes a new branch to the repository (or deletes a branch).  
|  | • You can click through to Bitbucket to see the commit diff for all files that are part of the changeset.  
|  | • Bitbucket commits that are part of a build are displayed in Bamboo.  
|  | • Build results are notified to Bitbucket (and displayed for the associated commits and pull requests). |

<table>
<thead>
<tr>
<th><strong>Confluence</strong></th>
<th>When Bamboo is integrated with Confluence, you can add the following Bamboo gadgets to a Confluence wiki page:</th>
</tr>
</thead>
</table>
|  | • Bamboo Charts  
|  | • Bamboo Plan Summary Chart  
|  | • Bamboo Plan Status |

<table>
<thead>
<tr>
<th><strong>Fisheye</strong></th>
<th>When Bamboo is integrated with Fisheye, you can:</th>
</tr>
</thead>
</table>
|  | • view the code changes that triggered a build  
|  | • explore a failed build in Fisheye and jump directly into the changeset that broke the build  
|  | • view the history of the changeset to see what the author was trying to fix  
|  | • analyze the change using the side-by-side diff view  
|  | • open the relevant files in your IDE. |

<table>
<thead>
<tr>
<th><strong>Clover</strong></th>
<th>When Bamboo is integrated with Clover, you can:</th>
</tr>
</thead>
</table>
|  | • View code-coverage details (i.e. the percentage of code covered by tests) for each build result  
|  | • View code-coverage trends for a job over a period of time  
|  | • View the code-coverage summary for the job. |

See [The big list of Atlassian gadgets](#).
Linking to another application

Application Links (sometimes called "app links") is a bundled app that allows you to set up links, share information, and provide access to certain resources or functionality across multiple Atlassian products. We recommend using OAuth authentication for application links because of the greater security inherent with that protocol. We no longer recommend the Trusted Applications and Basic authentication types.

Linking Bamboo to other applications allows you to include information from other applications in Bamboo builds. For example, if you link Jira and Bamboo, you can create actionable Jira issues from a Bamboo build, view the Jira issues linked to a build result, and add Bamboo gadgets to a Jira dashboard.

Create an application link

1. Click the icon in the Bamboo header and choose Overview.

2. Choose Application Links in the left navigation bar. You'll see any application links that have already been set up.

3. Enter the URL of the application you want to link to, then click Create new link.
   - If you check The servers have the same set of users... then this link will be configured using OAuth (with impersonation) authentication.
   - If you are not an admin on both servers you won't be able to set up a 2-way (reciprocal) application link. If you want to go ahead and create a 1-way link anyway, clear the I am an administrator on both instances checkbox.

4. Use the wizard to finish configuring the link. If the application you are linking to does not have the Application Links plugin, you must supply additional information to set up a link with OAuth authentication.

When you complete the wizard, the Application Links plugin will create the link between your applications using the most secure authentication method that is supported between the two applications. See the Application Links User Guide for more information.

The new link will appear on the "Configure Application Links" page, where you can:

- Edit the settings of the application link (for example, to change the authentication type of the link) using the Edit icon.
- Specify the default instance if you have multiple links to the same type of application (for example, to multiple Jira servers) using the Make Primary link. See Making a primary link for links to the same application type for more information.

Impersonating and non-impersonating authentication types

OAuth authentication

OAuth authentication redirects a user to log in to the remote application, after which tokens generated on their behalf are used to authorize requests made from the local application. The remote application handling the request uses the access permissions of the account with which the user logged in on that remote application.

Typical scenarios include:

- You are setting up an application link between two applications that do not share the same set of users.
- You want to continue using a link to an application that now allows public sign-on and the link was previously configured with a shared userbase. You can update your application link by changing OAuth (impersonation) to OAuth when editing the application link.

See OAuth security for application links for more information.

OAuth with impersonation

Atlassian OAuth with impersonation makes it easy for your users to benefit from the deep integrations between Atlasssian applications:

- they're automatically authenticated on the other application and don't get asked to authorize requests.
• they'll only see the information that they have permission to see.

Impersonating authentication makes requests on behalf of the user who is currently logged in.

Note that Atlassian OAuth with impersonation can only be used for application links between Atlassian applications. Furthermore, it should only be used when the two applications share the same userbase, typically managed with an external directory using LDAP.

A typical scenario is:

• You’ve set up an application link but your users still have to authenticate regularly. This can occur when the application link has been configured to not share the same userbase. If those applications do share the same userbase, you can update your application link by selecting **OAuth (impersonation)** when editing the application link.

See [OAuth security for application links](#) for more information.

**Troubleshooting**

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**Having trouble integrating your Atlassian products with application links?**

We’ve developed a [guide to troubleshooting application links](#), to help you out. Take a look at it if you need a hand getting around any errors or roadblocks with setting up application links.

---

**Integrating Bamboo with Jira applications**

Integrating Bamboo with Atlassian's [Jira applications](#) combines Bamboo’s continuous integration capabilities with your issue tracker to give you a unified view of your software development project.

Configuring Bamboo and Jira applications to work together simply requires you to set up an application link (two-way) between a Jira application and Bamboo.

Note that application links have nothing to do with using a Jira application as a user directory for Bamboo; these 2 configurations can exist separately. See also [Linking to another application](#).

---

**On this page:**

- Benefits
- Requirements
- Configuration
- Notes

---

**Benefits**

See [Viewing Bamboo activity in a Jira application](#) for a full description of the benefits of integrating Jira applications with Bamboo.

Briefly, these are:

<table>
<thead>
<tr>
<th>Integration feature</th>
<th>Description</th>
<th>Compatibility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Development info in issue search</strong></td>
<td>See <a href="#">Jira 7.7 release notes</a></td>
<td>7.7 +</td>
</tr>
<tr>
<td><strong>Development panel</strong></td>
<td>See <a href="#">Bamboo development activity</a></td>
<td>6.2 +</td>
</tr>
<tr>
<td><strong>Build result dialog</strong></td>
<td>View detailed Bamboo build result information</td>
<td>6.2 +</td>
</tr>
<tr>
<td><strong>Deployment dialog</strong></td>
<td>View detailed Bamboo deployment information</td>
<td>6.2 +</td>
</tr>
</tbody>
</table>
If you are using an earlier version of Bamboo and/or a Jira application, you can also download an older version of the Jira Bamboo plugin from the Atlassian Plugin Exchange. However, we strongly advise you to upgrade Jira to version 6.2 or later and Bamboo to version 5.4 or later, to get the most out of Bamboo - Jira applications integration.

### Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jira 6.2+</td>
<td>Earlier versions of Jira do not support the Development panel feature.</td>
</tr>
<tr>
<td>Bamboo 5.4+</td>
<td></td>
</tr>
<tr>
<td>Jira/Bamboo Applink</td>
<td>See below for details about application links.</td>
</tr>
<tr>
<td>Permissions</td>
<td>Users will require the 'View development tools' permission in Jira applications.</td>
</tr>
<tr>
<td>Issue key</td>
<td>The issue key must be included in the commit message, and must use the default issue key format.</td>
</tr>
</tbody>
</table>

### Configuration

Integration of Bamboo and a Jira application requires an application link between them. The application link needs both 2-legged (2LO) and 3-legged OAuth (3LO) authentication:

- 2LO is required for information from Bamboo to be included in the summaries in the Development panel.
- 3LO checks that a user has authenticated with Bamboo before they get to see the information in any of the details dialogs. Users who can see summarized data in the Development panel may not have permission to see all the information that contributed to those summaries and which is visible in the details dialogs. That is, the details dialogs respect the access permissions that users have in the connected Bamboo server.

When you create a new link between a Jira application and Bamboo, both 2-legged (2LO) and 3-legged OAuth (3LO) are enabled by default.

- You will need to set up a two-way link. That is, select the **Create a link back to this server** option when adding the application link.

An existing application link between Jira and Bamboo may need to have 2LO authentication explicitly enabled. *(Click here to see how to enable 2-legged OAuth...)*

An existing application link between a Jira application and Bamboo (that perhaps used Trusted Apps...)*
authentication) needs to have 2-legged authentication (2LO) enabled for both outgoing and incoming authentication, so that information from the application can be included in the Development panel summaries.

When updating an older application link to use OAuth, 3-legged authentication is applied by default, but you need to explicitly enable 2LO. Enable 2-legged authentication for the application link from within Jira as follows:

1. Go to the Jira admin area and click **Applications > Application Links**.
2. Click **Edit** for the app link with the other application.
3. For both **Outgoing Authentication** and **Incoming Authentication**:
   a. Click **OAuth**
   b. Check **Allow 2-legged OAuth**.
   c. Click **Update**.

The application link update process will involve logging you into the other application for a short time to configure that end of the link, before returning you to Jira application.

Note that:

- Application links must have Trusted Applications and Basic Access authentication disabled. The Development panel in Jira only supports OAuth authentication.
- You will need to configure 2-legged OAuth enabled for both incoming and outgoing authentication in both Jira application and Bamboo for your application link.
- See **Configuring authentication for an application link** for more information.
- If you are running Bamboo behind a proxy, you may need to configure the AJP connector.

**Notes**

**Known issues**

- Jira applications and Bamboo cannot run in the same Tomcat instance due to a known issue with the Bamboo plugin for Jira applications (see JRA-19662).
- When integrating Bamboo with a Jira application, you should not change the Jira application project key format from the default, as Bamboo only supports the default project key format.

If you need further help, please raise a support request in our support system, in the Bamboo project. You may also want to view articles in the Bamboo Knowledge Base and browse our forums.

**Viewing linked Jira application issues**

If your organization uses Atlassian's Jira application and your administrator has integrated Bamboo with a Jira application, you will be able to view the issues that have been linked to a build. This provides an easy way to jump to relevant issues in the Jira application to see details about what the code is intended to achieve.

Linked issues can be viewed on:

- the Issues tab of the Plan Summary page, for all issues linked to the plan
- the Build Result Summary page, for just 2 of the issues linked to a build
- the Issues tab of the Build Result Summary page, for issues linked to a build.

Issue links can be created automatically by Bamboo when you specify an issue key in your build comments, labels or commit messages, or they can be added manually.

**On this page:**

- Viewing the Jira issues linked to a plan's builds
- Viewing issues for a build result

**Related pages:**

- Creating Jira issues from a build
- Linking Jira application issues to a build

**Viewing the Jira issues linked to a plan’s builds**
To view the issues linked to all builds for a plan:

1. Navigate to the desired plan, as described on Configuring plans.
2. Click the Issues tab. A list of all of the issues linked to builds for the plan are displayed, sorted by build date. You can constrain the list using the build filter (e.g. 'Showing last 25 builds') next to the tabs.

   - Click the issue key to view the issue in the Jira application.
   - Click the N related builds link (where N is a number of builds) to view the builds linked to that issue on the Builds tab in the Jira application.

### Screenshot: Issues for a build result — Issues tab

#### Viewing issues for a build result

To view the issues linked to a particular build result:

1. Navigate to the build results for the plan, as described in Viewing a build result.
2. Click the build number for the desired build result.

   - **Build Summary** tab — the 'Jira Issues' section displays up to two of the issues linked to the build.
   - **Issues** tab — displays all of the Jira issues linked to the build. Click Add linked issue to link this build to an issue in a Jira application.

### Screenshot: Issues for a build result — Build Summary tab

#### Build Result Summary

**Details**

- **Trigger**
- **Revision** b935f5e...
- **Completed** 25 May 2012, 8:21:29 PM – 2 days ago
- **Duration** 41 minutes
- **Successful since** #111 (12 hours before)
- **Labels** None

**Test Summary**

- New Failures: 0
- Existing Failures: 0
- Fixed: 0
- Quarantined: 3
- 4,020 tests in total

**Code Changes**

- **Ashwin Srinivasan**
  - **BDEV-327, CR-BAM-4225**: Changed wording of EC2 must be enabled warning message

**JIRA Issues**

- **BDEV-327**
  - Home page pointing to EC2 config

**Comments**

No comments on this Build.
Linking Jira application issues to a build

If your organization uses Atlassian's Jira and your administrator has integrated Bamboo with Jira:

- Bamboo will automatically link Jira issues to builds.
- You can manually link an issue to a build.

**Automatically linking issues to a build**

Bamboo will automatically link an issue to a build if you specify a Jira issue key in a Bamboo build comment or label, or in a code commit message.

The issue key must be of the default Jira issue key format (that is, two or more uppercase letters ([A-Z][A-Z]+), followed by a hyphen and the issue number, for example BAM-123).

**On this page:**

- Automatically linking issues to a build
- Manually linking issues to a build

**Related pages:**

- Creating Jira application issues from a build
- Integrating Bamboo with Jira applications

**Manually linking issues to a build**

If an issue has not been linked automatically to your build, you can manually create a link from that issue to your build.

**To manually link a Jira Issue to a build result:**

1. Go to the plan in Bamboo.
2. Click on the build number for a build result.
3. Click the Issues tab in the 'Build Result Summary'. All of the Jira issues linked to your build will be listed.
4. Click Add linked issue.
5. Enter the Jira issue key of the issue you want to link to this build. Please note, the issue key must be of the default Jira issue key format (that is, two or more uppercase letters ([A-Z][A-Z]+), followed by a hyphen and the issue number, for example BAM-123).
6. Click Save.

**Screenshot: Adding a new Jira issue link to a build**
Creating Jira application issues from a build

When Bamboo is integrated with Jira Software Server, you can create new issues right from your Bamboo build result. You can easily:

- Capture critical infrastructure failures that are keeping your build from passing.
- Request that a successful build be deployed to the next environment.
- Create a searchable knowledge base of failure causes and solutions.
- Log time spent on build failures and use Jira Software dashboard gadgets to discover trends over time.

When you create an issue from Bamboo, the issue in Jira Software links back to the build result it was created from.

A link to the new issue is displayed in the 'Jira Issues' section of the Build Result Summary, and on the Issues tab, in Bamboo.

To take advantage of Jira Software issue creation in Bamboo:

- You require Jira 5.0, or higher.
- There must be an application link already set up between Jira Software and Bamboo.
- Your Jira application administrator needs to have enabled fully reciprocal issue linking in Jira Software Server.

**Related pages:**

- Linking Jira application issues to a build

**To create a new Jira Software issue from a Bamboo build:**

1. On the Build Result Summary, choose Actions > Create Issue.
2. Complete the form.
3. Click Create.
Viewing Bamboo activity in Jira applications

Overview

When Bamboo is integrated with Jira applications, Bamboo can pass important development information back to a Jira application. Currently Bamboo can pass Jira application information relating to:

- Build results
- Deployment statuses

With supported versions of Bamboo and a Jira application, this information is collated within the Development Panel. This panel summarizes the status of all work related to an issue, and can assist in identifying where an issue's build is failing, and where it has been deployed.

Example

- If you are working on issue BAM-12443, then you can see if it has been deployed to a development server yet
- A QA can also check to see if it's on their QA server and ready for testing
- A manager can see if a bug has made it to production.

Linking Jira applications and Bamboo has the benefit of improved information exchange during your development process.

See Integrating Bamboo with Jira applications for information about permissions and configuration.

Related pages:
- Linking issues to a build

On this page:
- Overview
- The development panel
- Viewing build result information
- Viewing deployment information

The development panel
The Development panel provides an 'at-a-glance' development information resource, and is visible to anyone with the "View development tools" project permission. The panel replaces the Builds tab and Issue deployment panel, and summarizes an assortment of development data passed to Jira applications from Bamboo and other Atlassian products. Examples include:

- Feature branch creation from Jira applications
- Viewing repository branches in Bitbucket Cloud or Bitbucket Server
- Viewing commits and pull requests to Git repositories managed by Bitbucket Cloud or Bitbucket Server
- Viewing commits, branches and reviews in Fisheye/Crucible
- Viewing build result and deployment information in Bamboo

**Viewing build result information**

The Development panel shows the status of the latest Bamboo builds related to your linked issue. Using simple status icons builds are reported as:

all the different builds (for example, unit tests, functional tests, deploy to staging) succeeded

at least one run failed for any build by any linked instance of Bamboo.

A build is automatically linked to an issue if one of the build's commits includes the issue key in its commit message. The issue key must be included in the commit to activate this feature.

Click the associated **builds** link to see additional build details including the name of the plan branch and how many tests passed or failed:

<table>
<thead>
<tr>
<th>Plan</th>
<th>Latest build</th>
<th>Result</th>
<th>Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI JIRA DevStatus Plugin Webdriver Qunit Func Tests</td>
<td>#15</td>
<td>1068 tests passed in 32 minutes</td>
<td>10/Dec/13 2:20 AM</td>
</tr>
<tr>
<td>FUSE-38, <em>create_deployments_renderer</em> DISABLED</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Viewing deployment information**

A deployment to an environment, such as Production or testing, is linked to an issue if a commit associated with
the deploy contains the issue key in its commit message. The Development panel details the environments that associated Bamboo builds have been deployed to.

The issue key must be included in the commit to activate this feature.

Click the **Deployed** link to see deployment details including the deployment status, release date, and click through to view a particular deployment:

<table>
<thead>
<tr>
<th>Issue Key</th>
<th>Deployments</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUSE-113</td>
<td>1 deployment</td>
</tr>
</tbody>
</table>

Note the 'Deployment Panel' is no longer displayed on an issue when the 'Development Panel' is available.

### Integrating builds with your issues workflow

You can configure a workflow in Jira applications, so that the workflow is **actioned** when a build completes successfully. For example, you can configure a workflow to automatically progress an issue from 'Building' to 'Resolved' status. You could also configure the same workflow to progress an issue from 'Building' to 'Build Broken' status if a build related to that issue fails. A build is related to an issue if the build involves a commit that had the issue key added to commit message.

A **Builds Workflow** exists in Jira applications and it incorporates the common statuses and transitions (see the Understanding the 'Builds Workflow' section below).

- If you are new to Jira applications and Bamboo, we recommend that you **use the 'Builds Workflow'** as modifying an existing workflow is not a trivial task.
- If you have an existing workflow that you would like to modify to include build statuses and transitions, we recommend that you **take a copy of the 'Builds Workflow' and modify it**.
- If you want to integrate Bamboo transitions into your existing workflow, you can **edit your workflow** to add the transitions. We recommend that you avoid doing unless you have a good understanding of the workflows.

### Diagram: The default Builds Workflow

<table>
<thead>
<tr>
<th>#</th>
<th>Transition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Start Progress</td>
</tr>
<tr>
<td>2</td>
<td>Stop Progress</td>
</tr>
<tr>
<td>3</td>
<td>Resolve Issue</td>
</tr>
<tr>
<td>4</td>
<td>Close Issue</td>
</tr>
<tr>
<td>5</td>
<td>Reopen Issue</td>
</tr>
<tr>
<td>6</td>
<td>Wait for Build</td>
</tr>
</tbody>
</table>
1. Creating a workflow scheme that uses the Builds Workflow
   
   1. Log in as an admin for your site.
   2. In the administration console of a Jira application, go to Workflows > Workflow Schemes. The 'Workflow Schemes' page will display.
   3. Click Add workflow scheme.
   4. Enter a Name and Description for your workflow scheme and click Add. Your workflow scheme will be created and you will see the page for editing the workflow.
   5. Click Assign a workflow.
   6. In the Issue Type dropdown, select the issue types that you want the 'Builds Workflow' to apply to. In the Workflow drop-down list, select Builds Workflow. Click Add.

2. Associating the workflow scheme with your project
   
   1. Log in as a user with the 'Jira application Administrators' global permission.
   2. Go to the 'Project Summary' page. Keyboard shortcut: g + g + start typing 'projects'.
   3. Click Workflows on the left of the 'Project Summary' page (you can also click the More link in the 'Workflows' section in the middle of the screen). The 'Workflows' page is displayed, indicating the current workflow scheme used by the project.
4. Click **Switch Scheme** to display the 'Associate Workflow Scheme to Project' page.
5. Select the relevant workflow scheme from the **Scheme** list and click **Associate** to begin the migration process. The 'Builds Workflow' will be associated with your project via your workflow scheme.
6. Click **Acknowledge** to finish the process.
7. Select the project you wish to use the 'Builds Workflow' with.

Issues (of the issue types specified in your workflow scheme) will now use the 'Builds Workflow'. If you add the issue key of an issue to the commit message when committing, the issue will be automatically transitioned along the workflow when the build starts/succeeds/fails.

**Modifying the 'Builds Workflow'**

You cannot modify the 'Builds Workflow' itself because it is non-editable. However, you can copy it and edit the copy if the original 'Builds Workflow' doesn't suit the needs of your project. You can then activate the new (copied) workflow by adding it to a workflow scheme and then associating that scheme with your projects.

**Copying and editing the 'Builds Workflow'**

1. Log in as an admin for your site.
2. In the Jira administration console of a Jira application, go to **Schemes > Workflow Schemes**. The 'Workflow Schemes' page will display.
3. Click **View all workflows**.
4. Locate the 'Builds Workflow' and click **Copy** in the 'Operations' column.
5. Enter a **Name** and **Description** for the new (copied) workflow scheme and click **Copy**. The new workflow will be created and displayed on the 'View Workflows' page.
6. You can now edit and activate your new workflow as needed. See [Configuring Workflow and Activating workflow](#) in the Jira Server Administration documentation for more information on how to do this.

**Integrating build transitions into your custom workflow**

If modifying a copy of the 'Builds Workflow' is not feasible for your projects, it is possible to manually modify your existing workflow to include the Bamboo transitions. It is recommended that you avoid doing so unless you have a good understanding of the workflows.

To integrate build transitions into your existing custom workflow, edit your workflow and configure appropriate issue statuses and issue transitions as described below.

**Configuring your issue statuses**

We recommend that you set up issue statuses for your workflow to indicate when a build related to an issue is building or the build is broken (e.g., 'Building', 'Build Broken'). There is no technical restriction preventing you from incorporating Bamboo-specific build transitions into a workflow without these intermediate states, however, in practice it will cause problems.

For example, a developer may work on an issue, and commit several times over the course of a few days for that issue. Even if earlier commits cause the build to pass, the developer may not have finished working on the issue and will need to commit more code without successful builds resolving the issue. Hence, an intermediate state (e.g., 'Building') is required which a developer will only transition the issue into (i.e. using the #build commit command), if they want the issue to be resolved from that particular build.

**Configuring your issue transitions**

Automatic issue transitioning via builds is controlled by both commit commands and Bamboo-specific transition properties in Jira applications, as described below:

- **Commit Command** — Commit commands are mapped to transition names. Hence, if you add the 'Waiting for Build' transition to your workflow, your users will be able to automatically trigger the transition by using the `#wait` or `#wait-for-build` commit command in their commit messages.
- **Bamboo-specific transition properties** — The Bamboo-specific transition properties on the transitions that you want to be triggered when a Bamboo build passes or fails. The following properties are supported:

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="#">Table</a></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Integrating Bamboo with Hipchat

Bamboo can send notifications about build results to Hipchat so you can find out immediately about the success or failure of your builds.

You get Bamboo notifications in your chat room for events such as:

- when a build passes or fails
- when you are assigned responsibility for a breaking build
- when a build you are responsible for has been fixed
- when a manual stage of a build is ready to be run
- when a deployment starts, and completes

...and many other notification events.

You can configure Bamboo to send notifications to rooms whether they’re hosted by Atlassian on hipchat.com, or by your own organization’s Hipchat Server instance:

- Configure Bamboo plans to send notifications to a room in hipchat.com
- Configure Bamboo plans to send notifications to your Hipchat server

Configure Bamboo plans to send notifications to a room in hipchat.com

To get notifications in rooms hosted by Atlassian on hipchat.com:

1. Sign up for a Hipchat account.
2. Set up plan notifications in Bamboo that use the 'Hipchat' Recipient type.

Note that Bamboo does not yet support using Hipchat as a global IM server. Hipchat can only be used in the plan notifications area as shown here:
Configure Bamboo plans to send notifications to your Hipchat server

You can get Bamboo plan notifications in rooms hosted by your own organization’s Hipchat Server instance:

1. Install the HipChat Server's SSL root or primary certificate in `<JAVA_HOME>/jre/lib/security/cacerts` key store on the Bamboo host machine and restart Bamboo. Applicable if you're using a self-signed or internally signed SSL certificate.
2. Specify the `hipchat.api.url` system property that is used when Bamboo is starting, by adding `-Dhipchat.api.url=<my_hipchat_url>` to your JVM arguments as per Configuring system properties.

   Please be sure to include the protocol in the `<hipchat.api.url>` value, for example:
   - `Dhipchat.api.url=http://hipchat.mydomain.com`
   - `Dhipchat.api.url=https://hipchat.mydomain.com`

3. Set up plan notifications in Bamboo that use the 'Hipchat' Recipient type.
4. Use a Hipchat V1 token in the API Token field.
5. Choose your Room Name or ID.
6. Check the Notify flag to send pop-up notification to the room.

For more information about setting up your own Hipchat server, see System Requirements for Hipchat Server.

Integrating Bamboo with Confluence

Integrating Bamboo with Atlassian's Confluence combines Bamboo's continuous integration capabilities with your wiki to give you a unified view of your software development project.

When Bamboo is integrated with Confluence, you can add the following Bamboo gadgets to a Confluence wiki page:

- Bamboo Charts
- Bamboo Plan Summary Chart
- Bamboo Plan Status
Configuring Bamboo and Confluence to work together simply requires you to set up an application link (two-way) between Confluence and Bamboo.

### Before you begin

#### Version Requirements

<table>
<thead>
<tr>
<th>Application</th>
<th>Version Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bamboo</td>
<td>Version 5.2 or later</td>
</tr>
<tr>
<td>Confluence</td>
<td>Version 3.5.9 or later</td>
</tr>
</tbody>
</table>

### Set up an application link

#### Before you begin:

- **Security Considerations** — The instructions below recommend setting up authentication for the application link between Confluence and Bamboo. Please ensure that you read the Security implications for each authentication type (Applinks documentation). For example, if you use basic HTTP authentication for the Confluence to Bamboo link, you must specify a user that Confluence uses to log in to Bamboo. Hence, this user's Bamboo permissions will be used (not the Bamboo permissions of the user who is currently logged into Confluence).

Follow the [Linking to Another Application instructions](#) to configure the application link in Confluence.

- You will need to set up a two-way link, i.e. select the ‘Create a link back to this server’ option when adding the application link.
- You will need to configure either OAuth or Trusted Apps authentication for your application link. See [Linking to Another Application](#) for instructions.

**Congratulations! You have successfully integrated Bamboo and Confluence.**

### Try your new configuration

You may wish to read about how to use these two applications together in the following pages:

- Add Bamboo gadgets to Confluence, see [Registering External Gadgets](#) (Confluence documentation).

### Notes

If you need further help, please raise a support request in our support system, in the Bamboo project. You may also want to view articles in the Bamboo Knowledge Base and browse our forums.

#### Integrating Bamboo with Stash

When you integrate Bamboo with Atlassian's Bitbucket Server (formerly Stash) Git repository management solution, commit, branch, build and deployment information is shared for users of both applications.

On this page:

- Benefits of integration
- Configuration
Benefits of integration

We recommend integrating with Bitbucket Server.

Stash tells Bamboo when to build

- When a developer pushes to a repository the build is automatically started.

Stash tells Bamboo when to update plan branches to match changes in repository branches

- When a developer pushes a new branch to a repository a branch plan is automatically created.
- When a developer deletes a branch in a repository, the branch plan is automatically deleted or disabled.

Stash commits are displayed in the relevant Bamboo builds

- In Bamboo, you can view all of the commits involved in the build, allowing you to accurately track changes:

  ![Stash committing](image)

  Simply click on a changeset to go to Stash, where you can see the commit diff for all of the files that are part of the build.

Bamboo notifies Stash automatically about build results

- Build notifications are automatically enabled when you link a build plan to a Stash repository.
- Notifications are sent to all linked Stash servers.
- You see the build results status for a commit when viewing any commit or pull request in Stash, so you can easily check the build status of a branch when deciding whether to merge changes:

  ![Build status](image)

  Click a build status icon in Stash to see further details:
Stash displays the overall status of the build results. The status is 'passed' if all the different builds (for example, unit tests, functional tests, deploy to staging) have succeeded, and 'failed' if at least one run failed for any of those.

For example, when viewing the Commits tab for a Stash project, you will see icons that indicate the status of the latest build results. The red 'fail' icon is displayed if there is at least one failed build run for the commit.

Note that the legacy Stash notification type is deprecated – it is still available in Bamboo 5.6 but will be removed in Bamboo 5.7.

Configuration

There are just a few simple configuration steps to get the integrations described above with Bamboo (versions 5.6 and later) and Stash (versions 3.1 and later).

Bamboo will be automatically configured to respond to repository events published by Stash, and to notify Stash about build results – you don’t have to configure repository polling for new commits anymore in Bamboo, or set up dedicated web hooks in your Stash instance.
1. **Create an Application Link**

You only need to do this once for each pair of Stash and Bamboo instances.

See [Linking to another application](#). Once linked, all the Stash repositories are available to your plans in Bamboo.

2. **Choose the Stash repository for the Bamboo plan**

Create a build plan (if necessary) and specify the repository in the plan (or job) configuration.

See [Bitbucket Server](#) (formerly [Stash](#)) for more information about using Bitbucket Server source repositories in Bamboo.

3. **Build!**

**Integrating Bamboo with Fisheye**

When Bamboo is integrated with Atlassian's [Fisheye](#), you can:

- view the code changes that triggered a build
- explore a failed build in Fisheye and jump directly into the changeset that broke the build
- view the history of the changeset to see what the author was trying to fix
- analyze the change using the side-by-side diff view
- open the relevant files in your IDE.

A Bamboo administrator can make links to individual source-code files available by connecting the plan to the source repository, as described below.
You can specify repositories at the following levels in Bamboo:

- global – repositories are available to all plans in Bamboo.
- plan – repositories are available to all jobs in the Bamboo plan.
- job – repositories are available to all tasks in the Bamboo job.

The recommended approach is to set up linked source repositories at the global level – see Linking to source code repositories.

**Related pages:**
- Integrating Bamboo with Atlassian applications
- Linking to Another Application

To integrate Bamboo with Fisheye:

1. Navigate to the repository configuration for a linked repository, plan or job. See Linking to source code repositories.
2. Click on a repository name, and then click Advanced Options.
3. Choose Web Repository > Fisheye.
4. Specify the Fisheye URL, Repository Name and Repository Path.

**Screenshot: Specifying a Fisheye project in Bamboo**

If links to Fisheye are broken in Bamboo builds, make sure that the Repository Path configured in Bamboo matches the Repository Location (under ‘SCM Details’) in Fisheye, for the specific repository.

**Integrating Bamboo with Bitbucket Server**

When you integrate Bamboo with Atlassian's Bitbucket Server Git repository management solution, commit, branch, build and deployment information is shared for users of both applications.

On this page:
- Benefits of integration
- Configuration

**Benefits of integration**

When Bamboo (versions 5.6 and later) and Bitbucket Server are integrated, you and your team get all the following advantages:

- Bitbucket Server tells Bamboo when to build
  - When a developer pushes to a repository the build is automatically started.
Bitbucket Server tells Bamboo when to update plan branches to match changes in repository branches

- When a developer pushes a new branch to a repository a branch plan is automatically created.
- When a developer deletes a branch in a repository, the branch plan is automatically deleted or disabled.

Bitbucket Server commits are displayed in the relevant Bamboo builds

- In Bamboo, you can view all of the commits involved in the build, allowing you to accurately track changes:

```
<table>
<thead>
<tr>
<th>Build summary</th>
<th>Tests</th>
<th>Commits</th>
<th>Artifacts</th>
<th>Logs</th>
<th>Metadata</th>
<th>Build Times</th>
<th>Issues</th>
<th>Sandbox</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code commits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bamboo Master</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marek Went</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Merge branch 'mw_BAM-3491_agent_assignments'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marcin Oleś</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Merge branch 'BDEV-4116-fixup'</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 Jun 2014</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>98e9d73...</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 Jun 2014</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>3a81041...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

- Simply click on a changeset to go to Bitbucket Server, where you can see the commit diff for all of the files that are part of the build.

Bamboo notifies Bitbucket Server automatically about build results

- Build notifications are automatically enabled when you link a build plan to a Bitbucket Server repository.
- Notifications are sent to all linked Bitbucket servers.
- You see the build results status for a commit when viewing any commit or pull request in Bitbucket Server, so you can easily check the build status of a branch when deciding whether to merge changes.
- Click a build status icon in Bitbucket Server to see further details:

```
Builds

- Windows Rest and Hosting Tests 6 days ago
  228 passed (duration: 72 minutes)

- Git Version Matrix 6 days ago
  4464 passed (duration: 5 minutes)

- Master 6 days ago
  3471 passed (duration: 17 minutes)
```

Bitbucket Server displays the overall status of the build results. The status is 'passed' if all the different builds (for example, unit tests, functional tests, deploy to staging) have succeeded, and 'failed' if at least one run failed for any of those.

For example, when viewing the Commits tab for a Bitbucket Server project, you will see icons that indicate the status of the latest build results. The red 'fail' icon is displayed if there is at least one failed build run for the commit.

Note that the legacy Bitbucket Server notification type is deprecated – it is still available in Bamboo 5.6 but will be removed in Bamboo 5.7.

Bamboo provides support for Pull Request
Starting from version 6.0, Bamboo can create plan branches by pull requests. Create a pull request when ready to share your work with teammates and the CI system. Bamboo will detect new pull requests and create plan branch.

Note that Bamboo doesn't provide pull request support for forked repositories yet.

Configuration

There are just a few simple configuration steps to get the integrations described above with Bamboo (versions 5.6 and later) and Bitbucket Server.

Bamboo will be automatically configured to respond to repository events published by Bitbucket Server, and to notify Bitbucket Server about build results – you don't have to configure repository polling for new commits anymore in Bamboo, or set up dedicated web hooks in your Bitbucket Server instance.

1. **Create an Application Link**

   You only need to do this once for each pair of Bitbucket Server and Bamboo instances.

   See [Linking to another application](#).

   Once linked, all the Bitbucket Server repositories are available to your plans in Bamboo.
2. Choose the Bitbucket Server repository for the Bamboo plan

Create a build plan (if necessary) and specify the repository in the plan (or job) configuration.

To connect to a Bitbucket Server repository, select Bitbucket Server / Stash and provide the Bitbucket Server details.

You must enable the SSH access on Bitbucket Server, otherwise the integration features won't work and you will have to provide an alternative HTTP repository type to connect to the Bitbucket Server repository.

BAM-15464: Provide HTTP(S) authentication method option for Bitbucket Server type repository

See Bitbucket Server for more information about using Bitbucket Server source repositories in Bamboo.

3. Build!

Managing your user profile

You can manage your user details, password, notifications preferences and other preferences using your user profile.

To change your personal details:

1. Go to your name (the 'Profile' menu) at the top of the page and choose Profile.
2. Click Edit Profile.
3. Update your personal details as required.

Note that if your user profile is managed using a single sign-on application, like Atlassian's Crowd, you will only be able to edit your Instant Messaging Address and Source Repository Alias.

Related pages:

- Changing your password
- Changing your notification preferences
- Associating your author name with your user profile

Changing your password

To change your Bamboo password:

1. Go to your name (the 'Profile' menu) at the top of the page and choose Profile.
2. Click Change Password.
3. Complete the form.

If your password is managed via a single sign-on application, like Atlassian's Crowd, this function will not be available.

Changing your notification preferences

Notifications in Bamboo are triggered by a range of events for a plan, including build completion, build outcomes and comments being posted against build results. You can choose whether to receive notifications by email, IM, both or neither.

You can see which notifications are currently applicable to you, in your user profile: go to your avatar (the 'Profile' menu) at the top of the page, choose Profile, and then click the Notifications tab.

You must have the 'Edit' permission for a plan to add or remove notifications for it.
To change your notification preferences:

1. Go to your avatar (the 'Profile' menu) at the top of the page and choose Profile.
2. Click Notifications, then Edit notification preferences, on the right.
3. Choose an option from How would you like Bamboo to send you notifications. If you choose one of the IM options, you also need to specify an Instant messaging address on the Personal Details tab.
4. Choose an Email format option.
5. Click Save.

Screenshot: User profile

Associating your author name with your user profile

An author is any person who checks in code to a repository that is associated with a Bamboo plan. An author need not be a Bamboo user.

Your Author Name is your login name for the source-code repository. This is the identity that the SCM associates with tasks you perform on the repository. However, if this is not the login you use for Bamboo, then Bamboo may not be able to make the connection between your SCM login and your Bamboo login. See also Managing authors.

When your Bamboo user profile is associated with your author name, then Bamboo is able to:

- match your SCM activity with your Bamboo activity.
- show information about your recent builds on your 'My Bamboo' tab.
- show a User Details tab in your 'Author' information.

To associate your author name with your user profile:

1. Go to your name (the 'Profile' menu) at the top of the page and choose Profile.
2. Click Edit Profile.
3. Select your author name from the Source Repository Aliases list. If your name does not appear in the list, click Add Alias. Note that your author name (alias) need not be identical to your user name.
4. Click Save.

You can link more than one author name to a Bamboo user name.
Bamboo variables

Variables can be used to make values available when building plans in Bamboo.

- **Build-specific variables** are evaluated by Bamboo dynamically at build time. The source of a build-specific variable can either be a Bamboo property or one of the default plugins (assuming it is enabled).

- **Deployment variables** are available when deploying a project.

- **System variables** also apply across your entire Bamboo instance and inherit their values from system or environment variables of the same name.

- **Global variables** are defined across your entire Bamboo instance, and have the same (static) value for every plan that is built by Bamboo. See Defining global variables.

- **Plan variables** are similar to global variables, but are defined for specific plans. Plan variables override global variables with the same name. You can also override a plan variable for a build if you trigger the build manually. See Defining plan variables.

Using variables

Variables can be used in all fields of a task or deployment, with the exception of password fields. Use the following format when referencing a variable:

```
${bamboo.variableName}
```

You can override a plan variable for a build, if you trigger the build manually. See Triggering a plan build manually.

You can reference a variable from another variables, e.g. consider having the following variables:

- `var1 = Hello`
- `var2 = world`

You can create another variable which references the two other ones

```
greet
${bamboo.var1} ${bamboo.var2}!
```

Bamboo will resolve the variable as *Hello World!*

You can:

- reference a global or context specific variable in a build plan or deployment project
- reference a variable which references another one, deep recursion is allowed

There are couple of limitations:

- referencing a variable which isn't defined is an error, whole build or deployment will fail if you reference such variable
- cycles are not allowed and are considered as build or deployment project error.

Defining custom variables

You can define your own custom variables, using a similar format to that above, however you cannot create a variable name that is already in use by Bamboo.

For information on how to define your own variables in Bamboo, see:

- Defining global variables
- Defining plan variables
- Defining deployment environment variables
## Build-specific variables

The following build-specific variables are available by default:

- **System variables** apply across your entire Bamboo instance and inherit their values from system or environment variables of the same name.
- In the variable names from the table, `<position>` is an optional parameter that specifies the position of the repository in the plan's repository list. If omitted, the first repository in the list is used.
- Third-party repository plugins can expose their own variables.

<table>
<thead>
<tr>
<th>Build-specific variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bamboo.buildKey</td>
<td>The job key for the current job, in the form PROJECT-PLAN-JOB, e.g. BAM–MAIN–JOBX</td>
</tr>
<tr>
<td>bamboo.planKey</td>
<td>The key of the current plan, in the form PROJECT-PLAN, e.g. BAM–MAIN</td>
</tr>
<tr>
<td>bamboo.shortPlanKey</td>
<td>The short key of the current plan (without project part), e.g. MAIN</td>
</tr>
<tr>
<td>bamboo.shortJobKey</td>
<td>The short key of the current job (without project and plan parts), e.g. JOBX</td>
</tr>
<tr>
<td>bamboo.buildResultKey</td>
<td>The result key when this job executes, in the form PROJECT-PLAN-JOB-BUILD e.g. BAM–BOO–JOB1–8, where '8' is the build number. For deployment projects this variable will not have the JOB component e.g. PROJ–TP–6.</td>
</tr>
<tr>
<td>bamboo.buildResultsUrl or bamboo.resultsUrl</td>
<td>The URL of the result in Bamboo once the job has finished executing.</td>
</tr>
<tr>
<td>bamboo.buildNumber</td>
<td>The Bamboo build number, e.g. 123</td>
</tr>
<tr>
<td>Variable</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><code>bamboo.buildPlanName</code></td>
<td>The Bamboo job name e.g. Some Project name - Some plan name - Some job name</td>
</tr>
<tr>
<td><code>bamboo.planName</code></td>
<td>The current plan's name e.g. Some project name - Some plan name</td>
</tr>
<tr>
<td><code>bamboo.shortPlanName</code></td>
<td>The current plan's name without project part, e.g. Some plan name</td>
</tr>
<tr>
<td><code>bamboo.shortJobName</code></td>
<td>The current job's name without project and plan parts, e.g. Some job name</td>
</tr>
<tr>
<td><code>bamboo.buildTimeStam</code></td>
<td>The time when build was started in ISO 8601 format e.g. 2010-01-01T01:00:00.000+01:00</td>
</tr>
<tr>
<td><code>bamboo.agentId</code></td>
<td>The ID of the agent that the deployment is executed on.</td>
</tr>
<tr>
<td><code>bamboo.agentWorkingDirectory</code></td>
<td>The path to the working directory on the agent, for example &lt;HOME&gt;/xml-data/build-dir.</td>
</tr>
<tr>
<td></td>
<td>The agent working directory is not the same as the build working directory described below.</td>
</tr>
<tr>
<td><code>bamboo.build.working.directory</code></td>
<td>The working directory on which the build is being executed, for example &lt;HOME&gt;/xml-data/build-dir/AV-AVT-JOB1.</td>
</tr>
<tr>
<td><code>bamboo.ManualBuildTriggerReason.userName</code></td>
<td>The user who triggered the manual build.</td>
</tr>
</tbody>
</table>

**Generic repository variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>bamboo.planRepository.&lt;position&gt;.branchName</code></td>
<td>The name of the branch in the repository (depends on availability from the VCS used) e.g. default</td>
</tr>
<tr>
<td><code>bamboo.planRepository.&lt;position&gt;.name</code></td>
<td>The name of the repository, as shown in the repository for the plan e.g. Mercurial</td>
</tr>
<tr>
<td><code>bamboo.planRepository.&lt;position&gt;.revision</code></td>
<td>The revision use to build this release. Format depends on the VCS used.</td>
</tr>
<tr>
<td><code>bamboo.planRepository.&lt;position&gt;.previousRevision</code></td>
<td>The previous revision number (this might not exist, for example for the initial build).</td>
</tr>
<tr>
<td><code>bamboo.planRepository.&lt;position&gt;.type</code></td>
<td>The type of the repository, as defined by a repository plugin e.g. hg, svn, git</td>
</tr>
<tr>
<td><code>bamboo.repository.pr.key</code></td>
<td>Pull request key if plan branch was created from pull request</td>
</tr>
<tr>
<td><code>bamboo.repository.pr.sourceBranch</code></td>
<td>Pull request source branch name if plan branch was created from pull request</td>
</tr>
<tr>
<td><code>bamboo.repository.pr.targetBranch</code></td>
<td>Pull request destination branch name if plan branch was created from pull request</td>
</tr>
</tbody>
</table>

**Subversion**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>bamboo.planRepository.&lt;position&gt;.username</code></td>
<td>User name, used for repository authentication.</td>
</tr>
<tr>
<td><code>bamboo.planRepository.&lt;position&gt;.repositoryUrl</code></td>
<td>The repository URL.</td>
</tr>
<tr>
<td>Repository</td>
<td>Variable</td>
</tr>
<tr>
<td>------------</td>
<td>----------</td>
</tr>
<tr>
<td>CVS</td>
<td>bamboo.planRepository.&lt;position&gt;.last.update.time</td>
</tr>
<tr>
<td></td>
<td>bamboo.planRepository.&lt;position&gt;.last.update.time.label</td>
</tr>
<tr>
<td>Perforce</td>
<td>bamboo.planRepository.&lt;position&gt;.revision.number</td>
</tr>
<tr>
<td></td>
<td>bamboo.planRepository.&lt;position&gt;.username</td>
</tr>
<tr>
<td></td>
<td>bamboo.planRepository.&lt;position&gt;.port</td>
</tr>
<tr>
<td></td>
<td>bamboo.planRepository.&lt;position&gt;.client</td>
</tr>
<tr>
<td>Git</td>
<td>bamboo.planRepository.&lt;position&gt;.branch</td>
</tr>
<tr>
<td></td>
<td>bamboo.planRepository.&lt;position&gt;.repositoryUrl</td>
</tr>
<tr>
<td>Mercurial</td>
<td>bamboo.planRepository.&lt;position&gt;.repositoryUrl</td>
</tr>
<tr>
<td></td>
<td>bamboo.planRepository.&lt;position&gt;.branch</td>
</tr>
<tr>
<td></td>
<td>bamboo.planRepository.&lt;position&gt;.username</td>
</tr>
</tbody>
</table>

- System variables also apply across your entire Bamboo instance and inherit their values from system or environment variables of the same name.
- In the variable names from the table above, <position> is an optional parameter that specifies the position of the repository in the plan's repository list. If omitted, the first repository in the list is used.
- Third-party repository plugins can expose their own variables.

Build dependency variables

The following build dependency variables are also available:

<table>
<thead>
<tr>
<th>Build-specific variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bamboo.dependency.parent.#</td>
<td>Allows a child build to query the build key of the triggering parent build, where # represents the position in the build tree - 0 at the top, 1 the following, and so on. The ${bamboo.dependency.parent.0} variable can be viewed in the child plan's metadata tab.</td>
</tr>
<tr>
<td>bamboo.dependency.parent.total</td>
<td>The total # of parent builds.</td>
</tr>
</tbody>
</table>

Deployment variables

Bamboo manages a number of standard reserved variables that are available when deploying a project.

Variables later in the following list override the previous ones in case of repeating names:

- global variables
- release variables as defined below
- user variables defined at environment level
- the autogenerated variables in the following table:
<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bamboo.agentId</td>
<td>The id of the agent that the deployment is executed on.</td>
</tr>
<tr>
<td>bamboo.agentWorkingDirectory</td>
<td>The path to the working directory on the agent. This is not the same as the Bamboo working directory.</td>
</tr>
<tr>
<td>bamboo.build.working.directory</td>
<td>The path to the working directory for Bamboo. This is used by both the build plan and the deployment project.</td>
</tr>
<tr>
<td>bamboo.deploy.environment</td>
<td>The name of the environment that the release is to be deployed to.</td>
</tr>
<tr>
<td>bamboo.deploy.project</td>
<td>The name of the deployment project.</td>
</tr>
<tr>
<td>bamboo.deploy.rollback</td>
<td>True if the release being deployed is older than the release being replaced.</td>
</tr>
<tr>
<td>bamboo.deploy.release</td>
<td>The name of the release that is being deployed. Either .release or .version can be used - both return the name of the release being deployed.</td>
</tr>
<tr>
<td>bamboo.deploy.version</td>
<td>The name of the release that is being replaced (if available). Either .release or .version can be used - both return the name of the release being replaced.</td>
</tr>
<tr>
<td>bamboo.resultsUrl</td>
<td>The URL to the screen in Bamboo that dispays build results.</td>
</tr>
</tbody>
</table>

You can generate variables of your own, using a similar format, however you cannot create a variable that is already in use by Bamboo. See Defining deployment environment variables for more information.

Releases variables

Bamboo makes the following types of variables available for deployment releases:

- Snapshots of values for global variables.
- Snapshots of values for plan variables.
- Snapshots of values of repository variables.
- The autogenerated release variables in the following table:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bamboo.buildNumber</td>
<td>The build result from which the release is created.</td>
</tr>
<tr>
<td>bamboo.buildResultKey</td>
<td>The key of the build result from which the release is created e.g. KUNG-FOO-35</td>
</tr>
<tr>
<td>bamboo.planKey</td>
<td>The key of the plan related to the release e.g. KUNG-FOO</td>
</tr>
<tr>
<td>bamboo.planName</td>
<td>The name of the plan related to the release e.g. Kung - Foo</td>
</tr>
<tr>
<td>bamboo.shortPlanKey</td>
<td>The short key of the plan related to the release (without project part), e.g. MAIN</td>
</tr>
<tr>
<td>bamboo.shortPlanName</td>
<td>The plan’s name without project part, e.g. Some plan name</td>
</tr>
</tbody>
</table>
Note that several of the variables in the above table are actually those associated with the build plan.

System variables

The usage format for all system variables is:

```
${system.<variable>}
```

For example, if you have a system variable `MYPATH=C:\MyPath`; you can use a Bamboo system variable `system.MYPATH` which will inherit the same value as the system variable.

In older Bamboo versions using 'PATH' in the Environment Variables field (of a Script task) doesn’t set the windows PATH variable, whereas using 'Path' sets Path and PATH in cmd shell.

Using variables in bash

Bamboo variables are exported as bash shell variables. All full stops (periods) are converted to underscores. For example, the variable `bamboo.my.variable` is `$bamboo_my_variable` in bash. This is related to File Script tasks (not Inline Script tasks).

Jira applications variables

Note that these variables can be accessed from a Bamboo build only when that build was triggered by releasing a version in Jira Software Server.

<table>
<thead>
<tr>
<th>Jira variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>${bamboo.jira.baseUrl}</code></td>
<td>The URL of your Jira application server.</td>
</tr>
<tr>
<td><code>${bamboo.jira.projectKey}</code></td>
<td>The key of the triggering Jira application project.</td>
</tr>
<tr>
<td><code>${bamboo.jira.projectName}</code></td>
<td>The name of the triggering Jira application project.</td>
</tr>
<tr>
<td><code>${bamboo.jira.version}</code></td>
<td>The release version of the triggering Jira application project.</td>
</tr>
<tr>
<td><code>${bamboo.jira.username}</code></td>
<td>The username of the user who triggered the release build.</td>
</tr>
</tbody>
</table>

Examples

Maven examples

For example, you may want your Maven 2 version to be determined by Bamboo. In Maven 2 `pom.xml` you may have:

```xml
...  
  <groupId>com.atlassian.boo</groupId>  
  <artifactId>boo-test</artifactId>  
  <packaging>jar</packaging>  
  <version>1.1.${bambooBuildNumber}-SNAPSHOT</version>  
...  
```

You can then specify the following in the Goal field of your build plan:
clean package -DbambooBuildNumber=${bamboo.buildNumber}

When the command runs, Bamboo will replace the `buildNumber` with the actual number (e.g. 1102), which will be passed to the underlying Maven build to use. The command will then produce a jar that looks like this: `boo-t est-1.1.1102-SNAPSHOT.jar`.

Ant examples

You can then specify the following in the Target field of your build plan:

```
-f build.xml -DbambooBuildNumber=${bamboo.buildNumber}
```

When the command runs, Bamboo will replace the `buildNumber` with the actual number (e.g. 1102), which will be passed to the underlying Ant build to use.

Specifying capabilities as variables

You can also specify a capability to be used in a similar way to a global variable.

The format of the capability should be as follows:

```
${bamboo.capability.<capability_key>}
```

For example,

- **Custom**
  ```
  ${bamboo.capability.<capability_key>}
  ```

- **JDK**
  ```
  ${bamboo.capability.system.jdk.<jdk_label>}
  ```

- **Builder**
  ```
  ${bamboo.capability.system.builder.<builder_type>.<builder_label>}
  ```
  e.g. `${bamboo.capability.system.builder.maven.Maven1}`

- **Perforce**
  ```
  ${bamboo.capability.system.p4Executable}
  ```

If you click on a capability, the specific capability key will be contained in the URL.

Please note, the space characters in the URL will be replaced with '<Props' characters. We recommend that you do not use capability labels with space characters, if you wish to use them as variables. A possible solution for space characters is to format them with `${}` symbols, however, this does not work in all cases.
**Using capabilities**

Global and Build-Specific Variables can be used in a specific fields of your build plan, as specified above. For capabilities,

- **System Capabilities** are available to all of these fields, (i.e. global and build-specific).
- **Agent Capabilities** (i.e. agent-specific and shared/server capabilities) are available only to the build-specific fields. (i.e. not available to Repository URL, CVS Root or Branch name.)

For example,

If you wanted to specify a system variable, but have it set to different values on each agent, do the following:

- Set the following as a system environment variable field on the **Builder** tab:

  ```
  ${bamboo.capability.thatsystemvariable}
  ```

- Specify the system environment variable as a custom capability on each of your agents, and set to the capability to the different values, as desired.

**Deprecated variables**

The following variables are deprecated and are subject for removal in future Bamboo releases:

<table>
<thead>
<tr>
<th>Generic repository variables</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bamboo.repository.revision.number</td>
<td>The revision number.</td>
</tr>
<tr>
<td>bamboo.repository.branch.name</td>
<td>The repository branch name (for Bamboo version 4.2 or later).</td>
</tr>
<tr>
<td>bamboo.repository.previous.revision.number</td>
<td>The previous revision number (might not exist, for example for the initial build).</td>
</tr>
</tbody>
</table>

**Subversion**

<table>
<thead>
<tr>
<th>Subversion</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bamboo.custom.svn.revision.number</td>
<td>The revision number.</td>
</tr>
<tr>
<td>bamboo.custom.svn.lastchange.revision.number</td>
<td>The last changed revision number.</td>
</tr>
<tr>
<td>bamboo.custom.svn.username</td>
<td>User name used for repository authentication.</td>
</tr>
<tr>
<td>bamboo.repository.svn.repositoryUrl</td>
<td>The repository URL.</td>
</tr>
<tr>
<td>bamboo.planRepository.&lt;position&gt;.revision.number</td>
<td>The revision number.</td>
</tr>
<tr>
<td>bamboo.planRepository.&lt;position&gt;.lastchange.revision.number</td>
<td>The last-changed revision number.</td>
</tr>
</tbody>
</table>

**CVS**

<table>
<thead>
<tr>
<th>CVS</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bamboo.custom.cvs.last.update.time</td>
<td>The last updated timestamp.</td>
</tr>
<tr>
<td>bamboo.custom.cvs.last.update.time.label</td>
<td>The last updated timestamp to be used as a label for post build result labeling. The spaces in the CVS version string are replaced with '_'.</td>
</tr>
</tbody>
</table>

**Perforce**

<table>
<thead>
<tr>
<th>Perforce</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bamboo.custom.p4.revision.number</td>
<td>The change set number.</td>
</tr>
<tr>
<td>bamboo.custom.p4.username</td>
<td>User name used for repository authentication.</td>
</tr>
</tbody>
</table>
Defining global variables
When configuring a plan, you may want to specify variables to be used in the build process. For details on how variables are used, see Bamboo variables.

Global variables are one type of variable that is available to you. Global variables are defined across your entire Bamboo instance, and have the same value for every plan that is built by Bamboo. If you want to define a variable for a specific plan rather than across all plans, define a plan variable as described in Defining plan variables.

Global variables can be accessed by using `${bamboo.globalVarName}`. Global variables can also be overridden at runtime when running a manual build. For more information, see Running a plan build manually.

**Related pages:**
- Bamboo variables
- Defining plan variables
- Running a plan build manually

To access the global variables page:

1. Click the 
   ![icon](image)
   icon and select **Global Variables**.
2. Add, update or delete the global variables, as desired:
   - Click **Add** to add a new variable once you have entered the key and value for it.
   - Updates to existing rows will be saved as you move between cells in the table.
   - Click the cross icon to delete a variable. Bamboo will ask you to confirm its deletion.

**Screenshot: Global variables**
Note that if your new global variable contains the word ‘password’ then the value field will be automatically encrypted. If you change a variable to include the word ‘password’, then the value field will change from viewable text to an asterisk string.

### Defining plan variables

When configuring a plan, you may want to specify variables to be used in the build process. For details on how variables are used, see [Bamboo variables](#).

**Plan variables** are one type of variable that is available to you. A plan variable is defined for one specific plan, and has the same value every time that plan is built. If you want to define a variable across all plans rather than a single plan, define a global variable as described in [Defining global variables](#).

Plan variables can be accessed by using `$bamboo.varName`. Plan variables can also be overridden at runtime when running a manual build. For more information, see [Running a plan build manually](#).

**Related pages:**
- Bamboo variables
- Defining global variables
- Running a plan build manually

### Before you begin:

- Note that plan variables override global variables with the same name.

### To define a plan variable:

1. Click **Dashboard**, then the **All Plans** tab, then the name of the plan in the list, to get to the plan you want to edit.
2. Choose **Actions > Configure Plan**.
3. Click the **Variables** tab.
4. Add, update or delete plan variables, as desired:
   - Click **Add** to add a new variable once you have entered the key and value for it.
   - Updates to existing rows will be saved as you move between cells in the table.
   - Click the cross icon to delete a variable. Bamboo will ask you to confirm deletion.
Passing Bamboo variables to a build script

Bamboo global and build specific variables can be referred to in build scripts or maven pom.xml. Bamboo variables are not directly available in the builder execution context however. They can be passed as parameters to the builder.

**Maven**

For example, you may want your Maven 2 version to be determined by Bamboo. In Maven 2 pom.xml you may have:

```xml
... 
<groupId>com.atlassian.boo</groupId>
<artifactId>boo-test</artifactId>
<packaging>jar</packaging>
.VERSION>
<version>1.1.${bambooBuildNumber}-SNAPSHOT</version>
... 
```

You can then specify the following in the **Goal** field of your build plan:

```bash
clean package -DbambooBuildNumber=${bamboo.buildNumber}
```

When the command runs, Bamboo will replace the **buildNumber** with the actual number (e.g. 1102), which will be passed to the underlying Maven build to use. The command will then produce a jar that looks like this: *boo-test-1.1.1102-SNAPSHOT.jar*.

**Ant**

You can pass Bamboo variables as ant parameters along with ant targets like:

```bash
clean test -Dbuild.key=${bamboo.buildKey}
```

In your ant build script just refer to this variable:

```xml
... 
<echo message="bamboo.buildKey = ${build.key}"/>
... 
```

**Bamboo permissions**
Bamboo provides the following types of permissions to allow fully customizable control of access to the continuous delivery workflow:

- Global permissions
- Build plan permissions
- Project permissions
- Deployment permissions
  - Deployment project permissions
  - Deployment environment permissions

Permissions key:
- ✓ - Permission is set by default
- ★ - Permission is available as an option
- ✗ - Permission not available, even as an option

On this page:
- Global permissions
- Build plan permissions
- Project permissions
- Deployment permissions
  - Deployment projects
  - Deployment environments
- Permission dependencies

Starting from Bamboo version 6.2, permissions become additive. Once you’re assigned permissions on any level, you’ll automatically have permissions on lower levels. You can’t override or remove permissions on lower levels. For example, if you have Create permission of a global level, you can create plans on all levels. Another example, if you have Build permission assigned to you on a project level and none assigned on the plan level explicitly, you will still have build permissions for that plan anyhow.

Global permissions

Global permissions level control the ability to view the system, create a new build plan and use administration tools. Global application permissions are accessed from the Global permissions page within the Bamboo administration pages.

<table>
<thead>
<tr>
<th>User type</th>
<th>Access</th>
<th>Create</th>
<th>Create repository</th>
<th>Restricted admin</th>
<th>Admin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anonymous</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Logged-in</td>
<td>✓</td>
<td>✗</td>
<td>★</td>
<td>★</td>
<td>★</td>
</tr>
<tr>
<td>Administrator</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>★</td>
<td>✓</td>
</tr>
</tbody>
</table>

Key:
- Access - log in to Bamboo; this permissions does not give you any additional permission.
- Create - create new plans, projects and deployment projects in Bamboo.
- Create repository - create and manage linked repositories.
- Restricted admin - perform some administration operations and view all plans in Bamboo; this role excludes permissions that directly influence the host on which the Bamboo Server is located, however, all plan administration and agent administration is available to restricted admins.
- Admin - perform all operations and view all plans in Bamboo.

Build plan permissions

Build plan permissions allow a user to control access to the functions of the build plan. These include viewing, editing, building, cloning and administering a build plan. Build plan level permissions are accessed from the build
plan configuration page.

<table>
<thead>
<tr>
<th>User</th>
<th>View</th>
<th>Edit</th>
<th>Build</th>
<th>Clone</th>
<th>Admin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anonymous</td>
<td>⭐</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Logged-in</td>
<td>⭐⭐</td>
<td>⭐⭐</td>
<td></td>
<td>✗</td>
<td></td>
</tr>
<tr>
<td>Administrator</td>
<td>⚫⭐</td>
<td>⚫⭐</td>
<td>⚫⭐</td>
<td>⚫⭐</td>
<td>⚫⭐</td>
</tr>
</tbody>
</table>

Key:
- **View** - view the plan and its builds; when creating a new plan, check the **Allow all users to view this plan** to allow anonymous and logged-in users view your plan.
- **Edit** - view and edit the configuration of the plan and its jobs, not including permissions or stages.
- **Build** - trigger a manual build, or suspend and resume the plan.
- **Clone** - clone the plan.
- **Admin** - edit all aspects of the plan including permissions and stages.

Project permissions

Project permissions allow you to control access to project permissions and settings. See Configuring project permissions.

<table>
<thead>
<tr>
<th>User</th>
<th>Create plan</th>
<th>Admin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anonymous</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Logged-in</td>
<td>⭐⭐</td>
<td></td>
</tr>
<tr>
<td>Administrator</td>
<td>⚫⭐</td>
<td>⚫⭐</td>
</tr>
</tbody>
</table>

Key:
- **Create plan** - create plans for the project
- **Admin** -
  - manage permissions for the project
  - manage permissions for all plans in a project
  - change project settings

Deployment permissions

Bamboo's deployments features allow you to control permissions for both deployment projects and deployment environments.

Deployment projects

<table>
<thead>
<tr>
<th>User</th>
<th>View</th>
<th>Edit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anonymous</td>
<td>⚫⭐</td>
<td>✗</td>
</tr>
<tr>
<td>Logged-in</td>
<td>⚫⭐</td>
<td>⭐</td>
</tr>
<tr>
<td>Administrator</td>
<td>⚫⭐</td>
<td>⚫⭐</td>
</tr>
</tbody>
</table>

Key:
- **View** - view the project and its associated environments.
- **Edit** - edit the project, its related plan and environment configuration, and create releases.
Deployment environments

<table>
<thead>
<tr>
<th>User</th>
<th>View</th>
<th>Edit</th>
<th>Deploy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anonymous</td>
<td>✔</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Logged-in</td>
<td>✔</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Administrator</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

Key:
- **View** - view the project and its associated environments. You must also have view permission on the deployment project.
- **Edit** - edit the environment.
- **Deploy** - deploy releases to this environment and create releases for this project.

Permission dependencies

To ensure the consistency of Bamboo permissions, starting with Bamboo 6.3, we provide an update mechanism which will fix all inconsistencies for all permissions in your Bamboo environment. We have also modified all the pages where you can edit permissions in a way which won’t allow granting inconsistent or clashing permissions in the future.

If you want to revoke a lower-level permission for a user, you must revoke the higher-level permissions first. Also, when granting a higher-level permission to a user, all relevant lower-level permissions will be granted automatically to that user.

Permission consistency might still be broken when using third-party plugins.

Quick filters for Bamboo

Use quick filters for handy search shortcuts in your Bamboo build dashboard. Create filters based on configurable rules and never miss a build plan again.

Quick filters work only with plans displayed in Bamboo dashboard, which means that they don’t include plan branches.

Configuration

Administrators can add, edit, and delete quick filters in Administration

> Plans > Quick filters.

If you already have at least one filter, you can also click the cog icon in the quick filters menu:

Quick filters are available in the build dashboard for all users of a Bamboo instance.

Types of rules
Click a filter name in the build dashboard to display plans that match the rules assigned to the filter.

A plan is displayed only if it matches all the rules specified for a filter.

You can create filters with combinations of the following rules:

**By completion date**
Displays plans that completed within a specific time frame. For example, you can display plans that completed in the last three days.

**By label**
Displays plans with a specific label. You can define multiple labels. The plan is display when it has at least one label specified in the rule.

To assign a label to a plan, click the name of a plan to display the plan summary and go to Actions > Modify plan label.

**By name**
Displays plans with a specific name or plans that match a regular expression.

**By project**
Displays plans that are assigned to a specific project. You can select one or more projects.

**By result status**
Displays plans that have completed with a specific result. You can select from:

- Successful
- Failed

**By status**
Displays plans based with a specific status. You can select from:

- Enabled
- Disabled

**Bamboo Best Practice**

Bamboo is a fantastic tool for continuous integration and deployment. It offers a powerful tool for automating software development, however knowledge of some of the tips and tricks that our Bamboo masters use can help reduce friction within your own development cycles.

This user guide has information about how to get the best out of Bamboo, and includes a number of scenarios and best practice approaches. Please see Using Bamboo for more information on specific Bamboo installation, configuration and usage.

**Best practice topics**

- Using stages
- Branching & DVCS
- System Requirements
- Sharing artifacts
- Using Agents
Bamboo Best Practice - System Requirements

The recommendations in this guide may not fit all situations and your mileage may vary.

System requirements & considerations

Note that Atlassian currently only supports Bamboo on x86 and 64 bit x86 derived hardware platforms.

Hardware considerations

CPU and memory

For Bamboo, the minimum CPU and memory requirements depend on the size and complexity of your plans. You need to consider:

- Will your builds have functional tests as part of the plans?
- Are your plans executed simultaneously? If so, how many plans will be running at any given time?
- What are the requirements for your running builds, for example do they need large amounts of memory/disk/swap space?
- How many users will be using Bamboo at any given time? Like any web application, the system resource needed is proportional to the load experienced by the server.
- How many local agents do you plan on running?

<table>
<thead>
<tr>
<th>User scenario</th>
<th>Usage profile</th>
<th>Bamboo server</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual user/ Small team</td>
<td>10 - 20 plans</td>
<td>4 core, 4 GB RAM</td>
</tr>
<tr>
<td></td>
<td>Little concurrent building</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Light server use</td>
<td></td>
</tr>
<tr>
<td>Medium team</td>
<td>10 - 20 plans</td>
<td>8 core, 8 GB RAM, remote agent use</td>
</tr>
<tr>
<td></td>
<td>Medium concurrency</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Light server use</td>
<td></td>
</tr>
<tr>
<td>Multiple small teams/ Large team</td>
<td>20 - 100s plans</td>
<td>8 core, 16 GB RAM, more remote agents</td>
</tr>
<tr>
<td></td>
<td>Plan branches</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High concurrency</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medium server use</td>
<td></td>
</tr>
</tbody>
</table>
Multiple large teams/Department/Division

- 1000s of plans
- Frequent plan branches
- High concurrency
- High server use
- 16 core, 16 GB RAM, all remote agents

Storage

The Bamboo installation size is approximately 140MB, however, Bamboo's storage requirements depend upon its usage pattern during use. The usage pattern depends on factors such as:

- How many plans you will run
- How many tests each plan will execute
- How many artifacts you are going to have and their size

Atlassian recommends that you allocate about 20GB on top of the Bamboo installation size, and evaluate your usage patterns. Where usage is likely to grow, consider adding additional storage.

Software requirements

Bamboo is a pure Java application and should run on any platform, provided all the JDK requirements are satisfied.

The Supported Platforms page lists the server and client software, and their versions, supported by Bamboo 6.9.

Browser

Disabling JavaScript in your browser, or using a script blocking tool like NoScript, will limit access to Bamboo's full functionality. JavaScript should be enabled.

Java

Bamboo requires the full Java Developers Kit (JDK) platform to be installed on your server's operating system.

Application server

Bamboo is a web application that requires an application server. Currently Apache Tomcat is supported. Tomcat is a stable, lightweight and fast performing application server, however, please note the following:

1. Deploying multiple Atlassian applications in a single Tomcat container is **not supported**. We do not test this configuration and upgrading any of the applications (even for point releases) is likely to break it. There are also a number of known issues with this configuration (see this FAQ for more information).
2. We also do not support deploying multiple Atlassian applications to a single Tomcat container for a number of practical reasons. Firstly, you must shut down Tomcat to upgrade any application and secondly, if one application crashes, the other applications running in that Tomcat container will be inaccessible.
3. Finally, we recommend not deploying **any other applications** to the same Tomcat container that runs Bamboo, especially if these other applications have large memory requirements or require additional libraries in Tomcat's lib subdirectory.

Database

Bamboo requires a relational database to store its data. Bamboo supports most popular relational database servers, so we suggest using the one that you are most comfortable with administering. Bamboo ships pre-configured with an integrated HSQL database for evaluation purposes only. Since HSQLDB is prone to database corruption, we recommend configuring an external database for production environments.

Hence, if you intend to use Bamboo in a production environment, we **strongly recommend** that you connect Bamboo to a supported enterprise database system.
Other considerations

Bamboo also requires a number of services for efficient operation. You need to consider:

- The database connection pool size.
- The number of local agents.
- The number of remote or elastic agents.

Database connection pool size

The number of database connections available to Bamboo is the lower of two values: your DBMS connection limit and the configured Bamboo connection pool size. From Bamboo 4.2 and later, the Bamboo connection pool size has a default value of 100. For a small to medium instances (~5 concurrent users, ~5 busy/building local agents, 20 remote agents, 50 plans), the default values are sufficient.

You should increase the connection limit if you notice UI freezes or general sluggish UI performance. Do not decrease the number of available connections below 25.

Note: having too many connections available to Bamboo carries no performance penalty as long as your DBMS can handle the load.

Example: How to estimate the number of db connections

The following formula gives a rough estimate of the number of database connections that will be required:

\[(\text{Concurrent users}) / 5 + (\text{Busy remote agents}) / 5 + (\text{Local agents}) \times 1.1 + (\text{Amount of concurrent change detections})\]

For example, an instance with:

- 5 concurrent users
- 30 busy remote (or elastic) agents
- 30 busy local agents
- 60 plans with repository polling set to 60 second intervals (assume 3 seconds per change detection)

would require \(1 + 6 + 33 + 3 = 43\) connections.

Bamboo ships with a pre-configured connection limit, however this can be modified by editing the following value in your bamboo.cfg.xml file:

```
<property name="hibernate.c3p0.max_size">100</property>
```

Local agents considerations

If you run more than 5 concurrently building local agents, you'll probably need to adapt the connection limit because each busy local agent requires a live database connection.

Also, note that large amounts of busy (building) local agents can negatively influence the performance of a Bamboo server (and other services running on that host).

Remote and elastic agent considerations

Remote and elastic agents do not require special database connection settings.

Bamboo Best Practice - Using stages

Overview
The basic process for continuous delivery is Build > Test > Publish, which can be repeated multiple times before a release candidate is identified and shipped.

This page describes two approaches to using stages in Atlassian Bamboo. Many people will find that the first approach, 'Continuous integration', will meet their requirements, and we recommend that as a starting point. When you have that operating, you can build on it using more advanced methodologies.

### Overview

- Fail fast – detect failures as early as possible
- Artifact promotion – ship the tested binary

### See also:

- Bamboo Best Practice - Sharing artifacts
- Bamboo Best Practice - Branching & DVCS

### Fail fast – detect failures as early as possible

'Fail fast' is used here in the context of 'continuous integration'. It's a development paradigm that emphasizes the early detection, notification and correction of build failures. Early detection allows early correction, so reducing impact on the project. Furthermore, if we detect problems early, we won't need to execute the rest of the build process, so saving time and resources.

**Example Scenario**

Let's consider the following simple scenario that uses a series of tasks within a single job. We only need a single stage for this. Typically, unit tests exist in close association with the source files, and are run at, or soon after, compile time.

**Task 1 – Check out:** We need to check out the relevant code from the repository. Best practice with Bamboo is to set up a linked repository that can be referenced by several plans and that can be updated in just one place. See [Checking out code](#).

**Task 2 – Compile:** We can configure a 'builder' task to compile the code. If syntax errors are detected, there is no point in performing the unit tests. See [Configuring a builder task](#).

**Task 3 – Run unit tests:** Unit tests rapidly identify problems with how code runs. This quickly identifies semantic errors. See [Configuring a test task](#).

**Task 4 – Create artifact:** Often, you will want Bamboo to keep build artifacts, such as reports and binaries, that can be used later. See [Sharing artifacts](#).
Artifact promotion – ship the tested binary

The promotion of build artifacts, especially binaries for use in later phases of the pipeline, is a key concept in continuous integration. Not only can this save time and resources, but crucially, it ensures that a release candidate that could potentially ship to customers contains exactly the code that was tested throughout the pipeline.

In Bamboo, artifact sharing between stages is the mechanism used to promote artifacts.

**Example scenario**

Let's consider the following scenario that adds further stages compared with the Fail Fast scenario above. These extra stages are used to add functional and integration testing, and to provide a manual stage to provide control over when publishing happens.

**Stage 1 – Fail fast:** This is just the continuous integration stage described in the earlier scenario. The generated artifacts are marked for sharing in later stages. See [Sharing artifacts](#).

**Stage 2 – Run functional and integration tests:** We can split these tasks into multiple jobs so they will run in parallel, so reducing the time taken. Each job uses the same artifacts generated in Stage 1. If any job fails, then later stages will not be run.

**Stage 3 – Publish:** We introduce a manual stage here for this example, but this could an automated stage. A manual stage gives us a control point that pauses the pipeline, to allow us, for example, to make a business decision about whether the release candidate should be published, and when. We only run this stage when it has been approved.
Bamboo Best Practice - Branching and DVCS

General overview

No matter how scary it may seem, branching your code is unavoidable - and also a very powerful way to let developers work in isolation on different aspects of your project.

The simplest branching model is that of a master branch and a development branch. The master (or mainline) branch contains the production versions for release. Parallel to master runs the development branch, where developers work on features that will be merged back into master. When sufficient new features have been developed, they will be merged back into master and form the next production release.

The simple model can be extended with other branches to make development work more flexible. These include:

- Feature branches
- Release branches
- Hotfix branches

See also:

- Bamboo Best Practice - Sharing artifacts
- Bamboo Best Practice - Using stages
But because a developer isn't constantly merging changes from master into their development branch, there may be uncertainty about whether the code will work when it is eventually merged back into master. The last thing you want is to pollute your master with non-functioning code from the branch.

Bamboo offers a number of useful tools for tackling branches. This best practice guide explores some of the ways that Bamboo handles branching to improve your development practices.

You may also want to refresh your Git knowledge with the Atlassian Git tutorials page before you read any further.

Best practice approaches

Feature branching with Bamboo plan branches

Objectives and learning outcomes

Understand what feature branching is, and how it can be useful as a development process. After completing this section, you will understand:

1. How feature branching works
2. How feature branches improve quality by eliminating risky merges

What is feature branching?

Feature branching is a lightweight way for a developer to make changes to a software project without having to worry about sharing those changes if they are uncompleted.

The main reasons to use feature branching are to ensure accurate conflict mitigation and to reduce the possibility of pushing code into the master branch or to other people until you are ready to do so. Utilizing rapid, regular code merges assists in reducing code drift across the development process.

Bamboo uses a concept called plan branches to help teams easily test branches using continuous integration and to avoid "merge hell".

Example scenario

Let's examine the following scenario for traditional feature branching:

1. A developer assigns an issue to themselves and creates a new branch (the feature branch) from master.
2. The developer works on the code, makes regular local commits to the feature branch, reaches a finishing point and pushes the commits to the repository.
3. When the issue is completed, the feature branch is merged back into master.

So, what's wrong with this? The developer hasn't run their builds on the feature branch and it is unknown whether the tests pass or not and any defective code from the feature branch will reach the rest of the team when it's merged to master.

Now let's see how it works using Jira and Bamboo plan branches:

1. A developer assigns the issue to themselves in Jira and creates a new branch from master. The name of the branch starts with the issue key so that it can be easily identified and tracked by both Bamboo and Jira.
2. Bamboo detects the new feature branch and creates a new plan branch. A plan branch is created automatically for any build that has plan branching enabled.
3. The developer works on the code, makes regular local commits and pushes the commits to the repository.
4. Optionally, to ensure that the branch and master will work together when merged, Bamboo can then merge the contents of master (including any new changes the team has made) into the the feature branch and have the build run.
5. If the tests pass, Bamboo pushes the updated feature branch back to the repository.
6. When the issue is completed, the feature branch is merged back into master with the knowledge that their new feature will not break on master.

We can already see that the Bamboo plan branch helps us by running build plan tests against the newly merged
code. Only if the tests are passed is the code pushed, which prevents incorporating defective code. If the build fails, the merge is thrown away and the developer is notified.

**Extending feature branching**

We can usefully extend the concept of feature branching to include an integration branch workflow. This concept mirrors the approach of feature branching in that it also advocates frequent merging. However, it provides an integration branch during development of a particular story. When the story is completed, it is merged into master, but offers two different approaches to working around the integration branch:

1. Some teams merge their code into the integration branch while the story development is in progress; when the story is complete, it is then merged directly into master and closed
2. Other teams may work exclusively around the integration branch during their code development, but will wait until the very end when their stories are tested and validated before merging integration onto master.

**Conclusion**

Feature branching offers a flexible and accurate conflict mitigation tool for developers. By using frequent and regular code merges, code drift and defective code implementation across the project is minimized. Feature branching works particularly well when developers have permission to toggle auto merging on and off to suit their individual development cycle. And of course, Bamboo provides an ideal environment to give developers access to these permissions.

**Approaches to branching**

**Objectives and learning outcomes**

Identify and describe how Bamboo can use feature and plan branches. After completing this section, you will understand:

1. The two mechanisms for merging branched code back into the master branch
2. A high level concept view of the branching process

**Overview**

Feature (or topic) branches are used to develop new features for an upcoming or future release. A feature branch exists only as long as the feature is being developed, and will eventually be merged back into the development branch.

Plan branches represent a branch in the version control system for development of a specific feature. The plan branch inherits all of the configuration defined by the parent plan, but may be built against any other specified plan. Any new branch created can be automatically built and tested using the same build configuration as that of the parent plan. Alternatively you can override the parent plan and individually configure the branch plan. When the branch succeeds, it is merged back into master.

There are two ways in which plan branches can be merged with the master branch.

**Example scenario**

Let's consider the following branch scenarios:

**Scenario 1: Gatekeeper**

The gatekeeper method works in the following way:

1. Both master and feature branch are checked out from the repository
2. Changes are merged into master from the feature branch
3. The build plan is run against the merged code, and held in memory by Bamboo
4. If successful, the merged code is pushed to master
You should use the Gatekeeper strategy when you want to:

1. Automatically merge your feature branch back into the master branch after a successful build of the merged changes
2. Quickly identify when a build of combined changes fails, preventing the feature branch from being merged back into the master branch

**Scenario 2: Build Updater**

The build updater is an alternative approach where changes flow in the opposite direction. It works in the following way:

1. Both master and a feature branch are checked out from the repository
2. Changes are merged into the plan branch from master
3. The build plan is run against the merged code and held in memory by Bamboo
4. If successful, the merged code is pushed to the feature branch
You should use the Build Updater strategy when you want to:

1. Automatically merge changes from the team's master branch into your feature branch, either after a successful build of the master branch, or at the start of builds against the feature branch.
2. Get notified when the changes on your feature branch are no longer compatible with the team's master branch.

Now we know how plan branching works, but how do we implement it using Bamboo? Bamboo actually makes it very easy for us. Let's have a look at another example:

**Scenario 3: Plan branching in DVCS**

This is a typical high level DVCS plan branching scenario:

**Step 1: Create branch** - Use your version control system's branching feature to create a new branch in your repository

**Step 2: Branch detection** - Bamboo will auto detect the new branch for Git, Mercurial and SVN. Perforce and CVS users will have to manually create the branch on Bamboo's behalf. This can be done from the Branches tab in your build plan's configuration screen.

**Step 3: Plan cloning** - Bamboo automatically clones all plans associated with the repository and connects the clones to the new branch

**Step 4: Configure plan variables** - The configuration of plans pointing to the master branch will be inherited by the plan branches. Jobs, stages, and artifact sharing work exactly as defined in the original plan. Variables, notifications and triggers may be customized for each plan branch. Other configuration options for plan branches include:

1. Merge strategies (see gatekeeper and build updater above)
2. Toggling auto cleanup on/off
3. Branch removal after a defined inactivity period

**Step 5: Branch build** - The feature branch is built in accordance with its triggers. The optional merge strategies are applied at build time.

**Conclusion**

Feature and plan branching offers a range of flexible methods for developers to branch and work on different
code segments during the development process. The Gatekeeper and Branch Updater methods allow alternative approaches to branching your code, while plan branching in DVCS allows Bamboo to automatically detect new branches in Git, Mercurial and SVN repositories.

Branching with Jira integration

Objectives and Learning Outcomes

Understand how Jira integration can be used to track development changes branching, and how it improves oversight of a development project. After completing this section, you will understand:

1. What Jira integration is
2. How it can be used to track changes within the code development

Overview

Jira integration in plan branches relies on including a Jira issue key as part of the branch name. Bamboo and Jira work together to ensure that Jira issues are attached to development branches, allowing developers and other interested parties to examine which issue has informed the code development within the branch.

Example Scenario

Let's examine the following scenario for Jira integration:

1. A developer picks up a Jira issue and creates a feature branch for it
2. Bamboo creates a link between the issue and the branch, and all the branch's builds
3. The developer works on the issue, making regular pushes to the feature branch, which are built by the corresponding plan branch/es in Bamboo
4. The Jira issue shows the current build status of the feature branch
5. When work on the feature branch is complete, it can be merged to master manually through the version control system, or automatically, by enabling Bamboo's gatekeeper merge strategy

Why use Jira integration?

By including a related Jira issue as part of the branch name, Bamboo can link the issues to the related builds and to the branch itself. This makes oversight of individual stories much easier:

- Product owners can view the development of user stories from within the Jira issue
- QA can select an artifact for testing from within Jira, and identify which issues have informed its development
- Developers can examine builds and artifacts, and see which Jira issues have informed the development process.

The Jira Bamboo plugin

The Jira Bamboo plugin provides enhanced information sharing between Jira and Bamboo, allowing you to view the status of all builds and branches associated with an issue from within the issue itself. Apart from DVCS and branching, the plugin also surfaces deployment information for issues when Bamboo's deployment projects are used.
Learn more about the Jira Bamboo plugin here.

**Conclusion**

Jira integration with branching provides an effective mechanism for tracking changes in code development and identifying what issues have informed the process. Jira integration also provides an effective way for interested parties to track progress and locate relevant artifacts.

**Bamboo Best Practice - Sharing artifacts**

**General overview**

We've already had a look at techniques such as 'fail fast' and 'artifact promotion' as ways of improving your Bamboo processes in the using stages Best Practice guide, but here we're going to dig a little deeper and look at some ways that you can get artifact sharing to work for you.

- General overview
- Sharing build artifacts with downstream processes
- Sharing artifacts between plans

See also:

- Sharing artifacts between jobs
- Sharing artifacts between build plans
- Sharing artifacts from a build plan to a deployment environment

**Best practice approaches**

**Sharing build artifacts with downstream processes**

See Artifact promotion for a description of this technique.

*How do I configure artifact sharing between jobs?*
In Bamboo, artifact sharing between jobs is configured using the Artifacts tab on the plan's configuration:

![Artifacts tab](image)

Check out [Sharing artifacts between jobs](#) to learn how to configure your Bamboo server to take advantage of artifact sharing between jobs.

---

### Sharing artifacts between plans

**Objective**

Identify and describe how artifact sharing between plans can be achieved.

**Learning Outcomes**

After completing this section, you will understand how to share an artifact between plans.

**Overview**

We discussed above how we can achieve significant time benefits from capturing and sharing artifacts to downstream processes rather than checking out and compiling each time the artifact is required. Generating an artifact at the top of the development pipeline, and passing it to successive downstream processes also has the benefit of ensuring the integrity of the code is maintained throughout the pipeline, because we know it is the exact same code that we tested earlier on. We also discussed how we can manage passing artifacts within a build plan, but let's suppose that we want to pass artifacts between two plans? Easy: We use the download artifact task to make the artifact available from one plan to another.

**Example scenario**

Let's consider the following artifact sharing example:

Imagine that we have a build plan that creates and uses an artifact - Artifact A. Now let's suppose that we also have a child plan, and we would like to use Artifact A in this plan for some other purpose. Bamboo doesn't technically allow you to share artifacts between plans (but watch this space), so we can use a work around to get our artifact shared into the child plan: We copy it from the parent plan to a remote storage location, then use the artifact download task to obtain it for the new plan. **Note:** This approach differs significantly to the process for sharing artifacts between jobs.

**Parent Plan**

**Step 1: Checkout & compile** - We need to check out the relevant code from the repository and compile it into an artifact. Our artifact is now defined and available for use by downstream jobs. Let's give it a name - Artifact A - and specify its location, so downstream jobs can find it, though of course only jobs in downstream stages can consume it.

**Step 2: Testing** - We can use some Fail Fast methodology and run some tests on our artifact before we go any further. We can conduct short and rapid unit tests and longer functional testing on our artifact. But we already know that artifact sharing can be used to increase testing speed in both cases.

**Step 3: Deployment** - When testing is complete, the artifact can be deployed to a QA environment by a consuming job that runs a deployment script against it, but we still need to share it with the child plan.

**Step 4: Copy artifact out** - The final step of this plan is to use a task to copy the artifact out to a remote location such as Nexus or Artifactory, using the applicable Bamboo plugins. Alternatively, simply run a script task to copy the artifact to a remote file server location on your own network.
Child Plan

**Step 1: Copy artifact in** - The first step of the child plan is to use a task to copy the artifact in from where the parent plan left it. Depending on the method you used to copy it out, you may require a task that utilizes a Bamboo plugin.

**Step 2: Business as usual** - Now that we have copied the artifact in, we can perform regular Bamboo operations as part of an ongoing build plan. These could be additional tests, or deployments into different environments.

---

**Extending artifact sharing**

And of course, once we have our artifact neatly stored in remote storage, the artifact download task means that it can associated with any build plans that we may want to run.

**Conclusion**

Artifact sharing is a powerful technique for making single artifacts available. Artifact sharing across plans allows us to make artifacts available for different build plans from one checkout and compile. We know that we will always be using a consistent artifact which reduces the time overhead of multiple checkout and compile steps.

**How do I configure artifact sharing between jobs?**

Artifact sharing between jobs is configured using the artifact downloader task:
Check out Sharing artifacts between build plans to learn how to configure your Bamboo server to take advantage of artifact sharing between plans.

**Bamboo Best Practice - Using Agents**

**General overview**

We’ve already had a look at how we can improve Bamboo’s efficiency in the Using stages and Sharing artifacts best practice guides, so here we’re going to have a look at how we can improve raw build speeds using Bamboo agents.

Let’s consider this simple Bamboo scenario:

Imagine a set of plans that we have developed and are queued, awaiting a build agent to become available to execute the build. This is great, and exactly what Continuous Integration is all about, but we notice that certain plans seem to sit and wait consistently longer than others. This has the effect of slowing our progress, and may be felt later down our development streamline. But why is it happening? And what can we do about it?
Let's examine exactly what's going on.

Each build agent offers a set of capabilities, and each plan will have capability requirements that the build agent must meet. These could include a range of executables, tasks and JDKs. Build agents are tailored to match specific plan requirements and as a result not all agents can build all plans. Often, only a small subset of agents will meet all of the requirements for a specific plan. Typically, plans that demonstrate consistently long wait times, are the ones that are waiting for a specific combination of capabilities to become available.

The Build Queued Duration report tells us the average time that a plan sits in the queue until build agents become available to execute it. By examining the report, we can identify which builds are too slow, and also if we are sporting wasted capacity on our systems. So how does this help us, and how can we even out our wait times? Adding required capabilities to a greater number of agents helps to improve parallel builds and even out our build loading. We can achieve this in a number of ways.

Best practice approaches

Using remote agents

**Why use remote agents?**

Adding popular capabilities to more agents is one way to tackle our wait time problem, however we can also take advantage of remote agents to boost our capabilities. By increasing the number of remote agents to the maximum allowed by our license tier, we can add significant amounts of available build capability which will in turn lead to reduced wait times. We could also consider using elastic agents on AWS.

The following graph shows how adding additional remote agents helped the Bamboo team to reduce build wait times for building Bamboo itself:
When build wait times approached 27 minutes in late 2011, adding additional remote agents with well defined capabilities reduced wait times to less than 10 minutes. The same is also true when wait times approached 33 minutes - additional remote agents ultimately reduced wait times back to less than 10 minutes.

**Unknown capabilities**

Sometimes remote agents have capabilities that are unknown, so Bamboo will not automatically utilize these when it’s looking for agents for a build. Luckily, even if Bamboo doesn’t know about these capabilities, we can quickly and easily detect them. Simply:

**Bamboo admin > Agents > $(AGENT) > Detect Server Capabilities**

to identify the capabilities available on a remote agent.

**Adding remote agents**

Add remote agents using the Agents panel of the Bamboo Admin page:

**Bamboo admin > Agents > Install remote agent**

### Agents

An agent is a service that executes Bamboo builds and deployments. You can use this page to view, add and delete agents. You can also use this matrix to determine which agents can execute which build plans.

#### Local agents

Local agents run on the Bamboo server.

**Select:** All, None, Idle, Disabled  **Action:** Delete, Disable, Enable

<table>
<thead>
<tr>
<th>Agent</th>
<th>Status</th>
<th>Operations</th>
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</thead>
<tbody>
<tr>
<td>Local Agent</td>
<td>Idle</td>
<td>View</td>
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<tr>
<td>Release</td>
<td>Idle</td>
<td>View</td>
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<tr>
<td>Reporting agent</td>
<td>Building - BAM-DPL-JOB1-1314</td>
<td>View</td>
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</table>

#### Remote agents

Remote agents run on computers other than the Bamboo server.

**Select:** All, None, Idle, Disabled  **Action:** Delete, Disable, Enable

There are currently 83 remote agents online (1 non-elastic and 82 elastic). Start elastic agents here. A maximum of 100 agents are supported by your license.

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<tr>
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<td>agent-03-01.buildeng.atlassian.com (2)</td>
<td>Idle</td>
<td>View</td>
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</table>
Learn more about adding additional remote agents in the remote agent installation guide.

Using local agents

**Why use local agents?**

If your license doesn't allow the addition of any more remote agents, then adding a small number of local agents can also help. A sound strategy is to add one or two local agents in the first instance, then evaluate the effect they have had on your build wait times.

**Remember:** too many local agents can start to impact Bamboo’s performance because local agents run inside the same JVM as Bamboo itself. Unless you have 8 cores and 64GB RAM, ~3 local agents is about as many as you can accommodate comfortably.

Bamboo Server share permissions and accesses rights with with local agents. Keep in mind that by using local agents in your environment, you’re giving other Bamboo users access to potentially sensitive information you might be storing on the server.

**Adding local agents**

Add local agents using the Agents panel of the Bamboo Admin page:

**Bamboo admin > Agents > Add Local Agent**

**Agents**

An agent is a service that executes Bamboo builds and deployments. You can use this page to view, add and delete agents. You can also use this matrix to determine which agents can execute which build plans.

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Learn more about adding additional local agents in the Creating a local agent guide.

**Monitoring agents**

**Build Queued Duration**

The Build Queued Duration report shows how long each build is spending in the build queue, and is an important tool for evaluating build wait times. The build queued duration report also allows you to compare build wait time between different plans.

You can access the report by clicking Reports > Reports > Build Queued Duration and selecting the appropriate build plan for analysis.
Custom Reports and Statistics

Compare trends between different plans. You can choose the different reports and the plans you wish to compare in the form below.

Report parameters

- Build Queued Duration
  - The report shows how long your build is spending in the queue over time.

Build plans

- *core* Bambo
- Build WAR
- CI Tests
- Deploy
- Federation APIs CTK
- Integration Branch A
- JDN 7 Acceptance Te
- License check
- MERCU:
- MERCURIAL Bamboo
- OpenJDK CI Tests
- REST Docs
- Sanity Checks
- Security Checks
- WebDriver Tests
- *core* Bambo Datab
- Microsoft SQL Server
- MySQL
- Oracle
- PostgreSQL
- *core* Bambo On

Build times plugin

Atlassian doesn't provide support for the plugin in any Bamboo version.

The plugin is available only for Bamboo Server in versions 4.0 - 4.4.3.

The Build Times for Bamboo plugin provides a visual representation of the relative build times of each job in a build, as well as which agent each job was built by:

- A bar graph of relative build and queue times of jobs in a build
- Which agent each job ran on
- Each job's status (red or green)
- Jobs that didn't run

The visualization display can report:

The Build Times plugin is an official Atlassian Labs production, and is available from the Atlassian Marketplace.

Learn more, and obtain the plugin here.

Agent utilities plugin
The Agent Utilities plugin for Bamboo allows the ability to use Server Notifications to monitor Bamboo Agents. The plugin can be configured to generate notifications when agents:

- Go offline
- Are disabled/enabled
- Have capabilities changed

The Build Times plugin is a third party production by ProNetBeans.com, and is available from the Atlassian Marketplace.

Learn more, and obtain the plugin here.

Bamboo integrations

Add my product to this page

BrowserStack

BrowserStack is a cross-browser testing tool, used to extensively test public websites and protected servers, on real mobile and desktop browsers. The infrastructure consists of servers and mobile device cloud across the globe which can be used for interactive, Selenium and JavaScript testing.

Integrate Bamboo with BrowserStack
GitLab

GitLab is a web-based Git repository manager with wiki and issue tracking features, using an open source license, developed by GitLab Inc.

Integrate Bamboo with GitLab

JFrog

JFrog provides solutions to automate software package management from development to distribution. JFrog Artifactory is an artifact repository manager that fully supports software packages created by any language or technology. JFrog Bintray gives developers full control over how they store, publish, download, promote and distribute software with advanced features that automate the software distribution process. With JFrog, build managers can push their build info and artifacts directly to Artifactory and Bintray.

Integrate Bamboo with JFrog

Octopus Deploy

Octopus is a deployment and automation tool that works with your build server to enable reliable, secure, automated releases of ASP.NET applications and Windows Services into test, staging and production environments, whether they are in the cloud or on-premises.

Integrate Bamboo with Octopus Deploy
**Sauce Labs**
Sauce Labs provides a cloud based platform for the automated testing of web and mobile applications. Optimized for Continuous Integration (CI) and Continuous Delivery (CD), Sauce Labs eliminates the time and expense of maintaining an in house testing infrastructure, freeing development teams of any size to innovate and release better software, faster.

*Integrated Bamboo with Sauce Labs*

---

**Sonatype**
With more than 100,000 installations, companies around the globe use Sonatype’s Nexus solutions to manage reusable components and improve the security, quality and speed of their software supply chains.

*Integrate Bamboo with Sonatype*

---

**SourceClear**
SourceClear provides automatic vulnerability detection for your open source dependencies that fits perfectly into your workflow. Detection is available for Java, Python, Ruby, Node, and JavaScript projects.

*Integrated Bamboo with SourceClear*

---

**Visual Studio**
Visual Studio is a complete set of development tools for building ASP.NET Web applications, XML Web Services, desktop applications, and mobile applications. Visual Basic, Visual C#, and Visual C++ all use the same integrated development environment (IDE), which enables tool sharing and eases the creation of mixed-language solutions. In addition, these languages use the functionality of...
the .NET Framework, which provides access to key technologies that simplify the development of ASP Web applications and XML Web Services.

Integrate Bamboo with Visual Studio

---

**Zephyr**

Zephyr's real-time test management products enable development and QA teams to ship high quality software on time in 100 countries.

Integrate Bamboo with Zephyr

---

**Administering Bamboo**

*Bamboo is a continuous integration (CI) and deployment server*. Bamboo assists software development teams by providing:

- automated building and testing of software source-code status.
- updates on successful/failed builds.
- reporting tools for statistical analysis.
- visibility into, and control over, release artifacts and environments.

This administration guide has information about managing the Bamboo server itself. Please see Using Bamboo for help with setting up CI builds and deployments.
Administering

System settings
Configuring the Bamboo server.

Agents and capabilities
Setting up services, including Elastic Bamboo, to perform builds.

Users and permissions
Managing users, groups and their permissions.

Apps
Extending Bamboo.

Data and backups
Managing databases, data and backups.

Security
Managing security for agents and Elastic Bamboo.
Installing

Installing Bamboo on Linux

Bamboo installation guide for Mac OS X

Installing Bamboo on Windows

Connecting Bamboo to an external database

Bamboo remote agent installation guide

Supported platforms

See also

Getting started

Using Bamboo

Release notes

2019-04-25_11-56-52_Bamboo security advisories

System settings

You can view system information for Bamboo from the administration console.

The system information contains useful data for you to send to Atlassian when requesting support.

See Locating important directories and files for more information.

Viewing your Bamboo system information

1. Click the icon in the Bamboo header and choose Overview.
2. Click System Information (under ‘System’) in the left navigation panel.

Screenshot: Bamboo system information (cropped)
System properties

- System date: Tuesday, 07 Jan 2014
- System time: 10:10:18
- Up time: 14 minutes, 28 seconds (since Tue Jan 07 09:55:49 EST 2014)
- Username: atlassian
- User timezone: Australia/Sydney
- User locale: English (United States)
- System encoding: Mac Roman
- Operating system: Mac OS X 10.8.5
- Operating system architecture: x86_64
  - Available processors: 8
- Application server container: Apache Tomcat/6.0.33

Java / JVM information

- Java version: 1.6.0_65
- Java vendor: Apple Inc.
- JVM spec. version: 1.0
- JVM spec. vendor: Sun Microsystems Inc.
  - JVM version: 20.65-b04-462
  - JVM vendor: Apple Inc.
  - JVM name: Java HotSpot(TM) 64-Bit Server VM
  - JRE version: 1.6.0_65-b14-462-11M4609
  - JRE name: Java(TM) SE Runtime Environment

Network

- Host name: tardigrade.sydney.atlassian.com
- IP address: 172.22.200.226

Memory statistics

- Total memory: 609 MB
- Free memory: 139 MB
- Used memory: 471 MB

Bamboo version information

- Version: 5.4-SNAPSHOT
- Build number: 4205
- Build date: 1/7/14
Configuring system settings

For information on configuring system settings, see the following topics:

- Updating your Bamboo license details
- Specifying Bamboo's title
- Specifying Bamboo's URL
- Logging in Bamboo
- Enabling GZIP compression
- Enabling Bamboo's Remote API
- Starting Bamboo
- Configuring your system properties
- Configuring Gravatar support
- Tracking changes to your Bamboo server

**Updating your Bamboo license details**

When you upgrade or renew your Bamboo license, you will receive a new license key. You will need to update your Bamboo server with the new license key.

Please see the Licensing FAQ if you have questions to do with licensing.

**Related pages:**

- System settings

**To update your Bamboo license key:**

1. Click the ☰ icon in the Bamboo header and choose Overview.
2. Click License Details (under 'System') in the left navigation panel. This will display your existing Bamboo license details.
3. Paste your new license into License Key.
4. Click Save New License.

**Specifying Bamboo’s title**

Bamboo's name is the displayed title of this installation of Bamboo. It will appear throughout Bamboo (e.g. on the Dashboard), and in the window title of your users’ browsers.

**Related pages:**

- System settings

**To specify Bamboo’s title:**

1. Click the ☰ icon in the Bamboo header and choose Overview.
2. Click General Configuration (under 'System') in the left navigation column.
3. Type the display title for your Bamboo server (e.g. "MyCompany's Bamboo") into the Name field.
4. Click Save.

**Specifying Bamboo’s URL**

This is the base URL of this installation of Bamboo. All links created (for links in Bamboo email notifications etc.) will be prefixed by this URL.

**To specify Bamboo’s URL:**

1. Click the ☰ icon in the Bamboo header and choose Overview.
2. Click General Configuration (under 'System'), in the left navigation panel.
3. In the Base URL field, type the URL address of your Bamboo server (for example, "http://keg:8080/bamboo").
4. Click Save.
Related pages:
- System settings

Notes

- Accessing Bamboo from Outside a Firewall — When accessing Bamboo through a web browser, most Bamboo URL links (which provide navigation throughout the product) will use the base URL that was originally entered into your browser's URL field. For example, to access Bamboo through a web browser on the same machine running Bamboo itself, you may have entered the base URL:

  \[
  \text{http://localhost:8085/...}
  \]

  into your browser's URL field. Consequently, most Bamboo URL links will use the base URL:

  \[
  \text{http://localhost:8085/...}
  \]

  However, URL links to a Bamboo instance that are provided in Bamboo email notifications and by some Bamboo plugins, will use the base URL set on this 'General Configuration' page. Hence, if you configure the Base URL field above to one that can only be accessed internally, behind a firewall, then you may have problems accessing this Bamboo instance externally.

Logging in Bamboo

Bamboo generates the following sets of logs:

Build logs
The build logs are generated each time a plan is executed. All information specific to the build is stored in these logs, which can be downloaded as an artifact (see Viewing a build's artifacts). You cannot change the logging configuration for the build logs.

The build logs are located in the `<Bamboo-Home>/xml-data/builds/` sub-directories.

On this page:
- Configuring the level of logging on the Bamboo server
- Configuring the level of logging on remote agents
- Configuring the location of the atlassian-bamboo logs

Related pages:
- System settings
- Viewing a build's artifacts
- Locating important directories and files

Bamboo server logs

Bamboo records all server activity in the `atlassian-bamboo.log`. The location of the `atlassian-bamboo.log` file can be viewed in Bamboo's System Information under the 'Bamboo Paths' section.

In case of a Tomcat webapp deployment, the logs are piped out to catalina.out file.

atlassian-bamboo logs for elastic agents

Elastic agent activity is logged inside the elastic instance where the elastic agent runs. To access the elastic agent logs (`atlassian-bamboo.log` and `bamboo-elastic-agent.out`) use ssh to log in to your elastic instance as described in Viewing an elastic instance and retrieve the logs.

atlassian-bamboo logs for remote agents

All agent activity is recorded in `atlassian-bamboo-agent.log` file stored on the agent machine. These are generated in the running directory of the agent. The running directory can be viewed in the remote agent's system properties under the 'Bamboo Paths' section.
See Locating important directories and files for information on where to find other important files in Bamboo.

Configuring the level of logging on the Bamboo server

Bamboo uses the log4j library for logging during runtime. The logging levels can be changed by editing the `<Bamboo-Install>/atlassian-bamboo/WEB-INF/classes/log4j.properties` file. There are five logging levels available: 'DEBUG', 'INFO', 'WARN', 'ERROR' and 'FATAL'. Each logging level provides more logging information than the level after it:

```
DEBUG > INFO > WARN > ERROR > FATAL
```

i.e. DEBUG provides the most verbose logging and FATAL provides the least verbose logging.

You can adjust the logging levels for the different Bamboo packages on the fly, using the runtime log4j configuration tool in the Bamboo administration console. The default log settings are still stored in the `log4j.properties` file. When you view the log settings page for the first time you will see the default log settings as defined in `log4j.properties`. All changes to the log settings via the runtime log4j configuration tool will not be persisted and are valid during Bamboo runtime only.

Before you begin:

- Note, you do not need to restart your Bamboo server for any logging changes to take effect.

**Change the level of logging on your Bamboo server**

1. Click the icon in the Bamboo header and choose **Overview**.
2. Click **Log Settings** (under 'System') in the left navigation panel. The 'Bamboo Log Settings' page will display showing the Bamboo packages being logged (see screenshot below).
   - To change the logging level of a package that is already being logged, locate the Bamboo package, select the desired logging level from the list next to it and click **Save**.
   - To start monitoring a package in the Bamboo logs, enter the class name in the text box at the top of the page, select the desired logging level from the list next to it and click **Add**.
   - To stop logging a package, locate the Bamboo package and click **Delete** next to it.

*Screenshot: Bamboo log settings*
Configuring the level of logging on remote agents

The runtime log4j configuration tool in the Bamboo administration console can only be used to modify the logging levels for the Bamboo server. To configure the logging levels for your remote agents, you will need to update the log4j.properties file manually.

You can control the logging for each of remote agents separately from the Bamboo server. To do this, simply repeat the process described below for multiple remote agents, so that each remote agent has a log4j.properties file that overrides the log4j.properties file on the Bamboo server.

Change the level of logging on your remote agent

1. Configure a log4j.properties file for your remote agent. This can be any log4j.properties file. If you do not already have a log4j.properties file, you can take a copy of the log4j.properties file from the server, copy it to your remote agent and configure it as desired.

   log4j.properties file example:
log4j.rootLogger=INFO, console
log4j.appender.console=org.apache.log4j.ConsoleAppender
log4j.appender.console.layout=org.apache.log4j.PatternLayout
log4j.appender.console.layout.ConversionPattern=%d %p [%t] [%c{1}] %m%n
log4j.category.com.atlassian.bamboo=DEBUG

- The `rootLogger` property in the `log4j.properties` file controls the verbosity of logs being generated at the top level. By default, the root level logging is set to 'INFO'. To change the root level logging, find the following lines in `<Bamboo-Install>/webapp/WEB-INF/classes/log4j.properties` file and update the value of `log4j.rootLogger` to the desired logging level:

```
# Change the following line to configure the bamboo logging levels (one of INFO, DEBUG, ERROR, FATAL)
#
log4j.rootLogger=INFO, console, filelog
```

- Modify the logging level for any of the individual packages in the `log4j.properties` as desired, e.g. `log4j.category.webwork=WARN`

2. Save changes to the file.
3. Update the `log4j.configuration` system property on your remote agent to point to the `log4j.properties` file. To do this, add the following line to the `<bamboo-agent-home>/conf/wrapper.conf` file:

   `wrapper.java.additional.3=-Dlog4j.configuration=/full/path/to/log4j.properties`

   where `/full/path/to/log4j.properties` is the absolute path of your `log4j.properties` file.
4. Restart your remote agent.

Configuring the location of the atlassian-bamboo logs

To change the directory that the atlassian-bamboo logs are generated to, you must set the environment variable for the target location of the logs, as seen below:

```
log4j.appender.fileLog.file=/my/path/to/atlassian-bamboo.log
```

Note that the new log file location applies to both the server and remote agents. If using an absolute path this may result in aggregated logs.

Enabling GZIP compression

You can enable GZIP compression in order to reduce the size of Bamboo's web pages. This is useful if Bamboo is being run over slow networks. There is a slight performance penalty, and note that GZIP may not work for languages other than English.

**Related pages:**
- **System settings**

To enable GZIP compression:

1. Click the ⚙ icon in the Bamboo header and choose Overview.
2. Click General Configuration (under 'System') in the left navigation panel.
3. Select Apply gzip compression to reduce the size of Bamboo's web pages?.

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Enabling Bamboo’s Remote API

Please note, the Bamboo Remote API has been deprecated in favor of the new Bamboo REST API.

You can access Bamboo’s data from an external program by using Bamboo’s REST-style remote API.

Starting Bamboo

Configuring Bamboo system properties

The default settings on a number of Bamboo functions can be configured by setting the appropriate system properties.

Bamboo on UNIX-based operating systems (such as Solaris, Linux or Mac OS X) can be started by using the `setenv.sh` script.

Bamboo on Windows-based operating systems can be started by running the `setenv.bat` file from the command line (which is the same as running the ‘Start in Console’ option from the Windows Start menu) or as a Windows Service.

On this page:
- Configuring Bamboo system properties

Related pages:
- System settings
- Configuring your system properties

Please see Configuring your system properties for more information on configuring your Bamboo system properties.

Configuring your system properties

This page describes how to set Java properties and options on startup for Bamboo.

On this page:
- Linux
- Windows (starting from .bat file)
- Windows service
- Changing the Bamboo start port
- List of startup parameters

Linux

To configure system properties in Linux installations

1. From `<bamboo-install>/bin`, open `setenv.sh`.
2. Find the section `JVM_SUPPORT_RECOMMENDED_ARGS=`
3. Refer to the list of parameters below.

   Add all parameters in a space-separated list, inside the quotations.

Windows (starting from .bat file)

To configure system properties in Windows installations when starting from the .bat file

1. From `<bamboo-install>/bin`, open `setenv.bat`.
2. Find the section `set JVM_SUPPORT_RECOMMENDED_ARGS=`
3. Refer to the list of parameters below.

   Add all parameters in a space-separated list, inside the quotations.

Windows service
There are two ways to configure system properties when starting Bamboo as a service, either via the command line or in the Windows registry.

Setting properties for Windows services from the command line

1. Identify the name of the service that Bamboo is installed as in Windows (Control Panel > Administrative Tools > Services):

2. Open a command prompt from Start > Run > type 'cmd' > Enter.
3. Change directory to the bin directory of your Bamboo installation directory.
4. Run:

   **tomcat8w //ES//%SERVICENAME%**

   (In the above example, it would be **tomcat8w //ES//Bamboo**)

5. Click on the Java tab to see the list of current start-up options:
6. Append any new option on its own new line by adding to the end of the existing Java Options. Refer to the list of parameters below.

If you want to change the heap size configured for the JVM, use the `Initial memory pool` and `Maximum memory pool` fields instead of adding the `-Xms` and `-Xmx` parameters to the list of Java options.

**Setting properties for Windows services using the Windows registry**

In some versions of Windows, there is no option to add Java variables to the service. In these cases, you must add the properties by viewing the option list in the registry.

To set properties for Windows services using the Windows registry

1. Go to Start > Run, and run "regedit32.exe".

2. Find the Services entry:
   - **32-bit**: `HKEY_LOCAL_MACHINE >> SOFTWARE >> Apache Software Foundation >> Procrun 2.0 >> Bamboo`
   - **64-bit**: `HKEY_LOCAL_MACHINE >> SOFTWARE >> Wow6432Node >> Apache Software Foundation >> Procrun 2.0 >> Bamboo`
3. To change existing properties, especially increasing Xmx memory, double-click the appropriate value.

4. To change additional properties, double-click options.

5. Refer to the list of parameters below. Enter each on a separate line.

Changing the Bamboo start port

1. Stop Bamboo.
2. Edit `<Bamboo install directory>/conf/server.xml`
3. Update the following so that `Connector port` is set to the port value you require:

```
<Service name="Catalina">
  <Connector port="8085"
    maxThreads="150"
    minSpareThreads="25"
    connectionTimeout="20000"
    enableLookups="false"
    maxHttpHeaderSize="8192"
    protocol="HTTP/1.1"
    useBodyEncodingForURI="true"
    redirectPort="8443"
    acceptCount="100"
    disableUploadTimeout="true"/>
```
4. Restart Bamboo.

List of startup parameters

<table>
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</thead>
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<tr>
<td>-Xmx</td>
<td>These properties are pre-existing. See related pages for instructions.</td>
<td>Tuning the Java heap</td>
</tr>
<tr>
<td>-Xms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>XX:MaxPermSize</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-XX:+PrintGCTimeStamps</td>
<td>Set these for Garbage Collection tuning.</td>
<td>Tuning Java VM garbage collection</td>
</tr>
<tr>
<td>-verbose:gc -Xloggc:gc.log</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-XX:+HeapDumpOnOutOfMemoryError</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Configuring Gravatar support

Bamboo is configured to support Gravatars by default. This means that Bamboo will attempt to use user’s emails to retrieve profile pictures from the Gravatar service. The profile pictures will be displayed against user activity, e.g. comments, in Bamboo.

**Related pages:**
- System settings

Enabling Gravatar support:

You must have set up an external Gravatar server if you want to specify your own server.

1. Click the  
   icon in the Bamboo header and choose Overview.
2. Click General Configuration in the left navigation panel
3. Select the Enable Gravatar Support checkbox
4. Enter the URL of your Gravatar server in the URL field, or leave as default if you wish to use the default Gravatar service
5. Click Save.

Disabling Gravatar support:

1. Click the  
   icon in the Bamboo header and choose Overview.
2. Click General Configuration in the left navigation panel
3. Uncheck the Enable Gravatar Support checkbox
4. Click Save.

Tracking changes to your Bamboo server

Tracking configuration changes

You can track changes to the configuration of your Bamboo server, as well as track changes to any plans it may be running.

To track changes, you must enable Audit logging. To enable Audit logging:

1. Click the  

1. Icon in the Bamboo header and choose Overview.
2. Select Audit Log (under ‘System’) in the left navigation column.
3. Select Enable audit logging

The Audit log will record details of changes made to the configuration of the Bamboo server. It will record:

- the time and date
- the user
- the changed field
- the old value and
- the new value

The Audit log does not record change of permissions.

Audit logging will also record details of changes made to any plans, including:

- Plan branch creation
- Plan deletion

Deleting Audit Logs

You may wish to delete audit logs, particularly when the plans or configuration changes have expired.

To delete your configuration change history, select Delete all global audit logs.

To delete all audit logs, including any plan audit logs, select Delete all audit logs.

Screenshot: Audit logging

Agents and capabilities

An agent can run a job if its capabilities match the requirements of a job. Each job inherits the requirements from individual tasks that it contains.

On this page:

- Capabilities
- Viewing the agents and plans related to a capability

Related pages:

- Configuring agents
- Configuring capabilities
- Remote agents
Capabilities

You can define the following capabilities for an agent:

- an executable (e.g. Maven)
- a JDK
- a Version Control System client application (e.g. Git)
- a custom capability. This is a key-value property which defines a particular characteristic of an agent (e.g. 'operating.system=WindowsXP' or 'fast.builds=true').

Capabilities typically define the path to an executable that has already been installed, and must be defined in Bamboo before Bamboo or its agents can make use of those.

Capabilities can be defined specifically for an agent, or they can be shared between all remote agents. Note that the value of an agent-specific capability overrides the value of a shared capability of the same name (if one exists).

See also:

- Configuring capabilities
- Viewing a capability's agents and jobs
- About capabilities and requirements

Viewing the agents and plans related to a capability

To view the agents and plans related to a capability, see Viewing a capability's agents and jobs.

Configuring agents

A Bamboo agent is a service that can run job builds. There are the following types of Bamboo agents:

- local agents run as part of the Bamboo server.
- remote agents run on computers, other than the Bamboo server, that run the remote agent tool.
- elastic agents run in the Amazon Elastic Compute Cloud (EC2).

Local agents run in the Bamboo server's process, i.e. in the same JVM as the server. Each remote agent runs in its own process, i.e. has its own JVM.

Each agent has a defined set of capabilities and can only run builds for jobs whose requirements match the agent's capabilities.

If you are looking for information on elastic agents, please refer to the documentation on Working with Elastic Bamboo.

On this page:

- Creating a new agent
- Configuring an agent's capabilities
- Disabling or deleting an agent
- Notes

Creating a new agent

To create a new agent, see:

- Creating a local agent, or
- Creating a remote agent.

Configuring an agent's capabilities

To configure an existing agent's capabilities, see:
- Configuring capabilities
- Configuring remote agent capabilities

Disabling or deleting an agent

To disable or delete an agent, see Disabling or deleting an agent.

Notes

- A capability is a feature of an agent. A capability can be defined on an agent for:
  - an executable (e.g. Maven)
  - a JDK
  - a Version Control System client application (e.g. Git)
  - a custom capability. This is a key-value property which defines a particular characteristic of an agent (e.g. 'operating.system=WindowsXP' or 'fast.builds=true').

Capabilities typically define the path to an executable that has already been installed, and must be defined in Bamboo before Bamboo or its agents can make use of those.

Capabilities can be defined specifically for an agent, or they can be shared between either all local agents or all remote agents. Note that the value of an agent-specific capability overrides the value of a shared capability of the same name (if one exists).

Viewing a Bamboo agent's details

A Bamboo agent is a service that can run job builds. There are the following types of Bamboo agents:

- local agents run as part of the Bamboo server.
- remote agents run on computers, other than the Bamboo server, that run the remote agent tool.
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Local agents run in the Bamboo server's process, i.e. in the same JVM as the server. Each remote agent runs in its own process, i.e. has its own JVM.

Each agent has a defined set of capabilities and can only run builds for jobs whose requirements match the agent's capabilities.

On this page:

- Viewing an agent's details
- Viewing the agents that can build jobs
- Editing an agent's name or description

Viewing an agent's details

To view an agent's details:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Agents in the left panel to display the ‘Agents’ page, which lists all local and remote agents that currently exist in your Bamboo system.
3. Click the name of the desired agent. The agent's page will be displayed.
4. Click one of the following tabs to see corresponding details for the agent:

   **Capabilities**
   Displays a list of all agent-specific and shared capabilities'. The capabilities in each of those sections are grouped into the following subsections:
   - Custom — custom capabilities.
   - Executable — executable capabilities.
   - JDK — JDK capabilities.
• Perforce, Mercurial, Git — VCS capability.
  You’ll only see a subsection if a capability of that type is defined in Bamboo. To define a new capability, see Configuring capabilities.

Executable jobs
Displays a list of jobs, arranged by plan, that the agent can build.

System properties
Displays information about the agent.

Audit logs
Displays a record of changes that have been made to the agent.

Viewing the agents that can build jobs

To view which agents can build which jobs:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Agent Matrix in the left navigation panel.

Editing an agent’s name or description

To edit an agent’s name or description:

1. Navigate to the desired agent, as described above.
2. Click Edit Details.
3. Update the details for the agent.
Creating a local agent

A Bamboo agent is a service that can run job builds. There are the following types of Bamboo agents:

- **local agents** run as part of the Bamboo server.
- **remote agents** run on computers, other than the Bamboo server, that run the remote agent tool.
- **elastic agents** run in the Amazon Elastic Compute Cloud (EC2).

Local agents run in the Bamboo server's process, i.e. in the same JVM as the server. Each remote agent runs in its own process, i.e. has its own JVM.

Each agent has a defined set of capabilities and can only run builds for jobs whose requirements match the agent's capabilities.

Note that one local agent, with the default name of 'Default Agent', is automatically created after installing Bamboo.

**Related pages:**
- Configuring agents
- Bamboo remote agent installation guide

To create a new local agent:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Agents in the left panel (under 'Build Resources') to display a list of all local and remote agents that currently exist in your Bamboo system.
3. Click Add Local Agent.
4. Enter details for the agent. The name is displayed on the dashboard. The description is only visible to dashboard administrators.
5. Click Add.

Note that your new local agent:

- will be enabled by default.
- will inherit all local server capabilities that are defined in your Bamboo system.
- will be able to run builds for all jobs whose requirements are met by the agent's capabilities (see Configuring a job's requirements).

Disabling or deleting an agent

Bamboo allows you to disable or delete an agent, to prevent that agent from running any further builds.
- **Disabling an agent** lets you keep the agent in Bamboo, but stops it from running builds. If you need to prevent Bamboo from building any plans at all (e.g. while you re-index Bamboo), you can disable all agents. By doing so, all builds will wait in the queue until you re-enable the agents.

- **Deleting an agent** removes it from Bamboo altogether. If you need to use the agent again in future, you will need to recreate it (see [Creating a local agent](#) and [Creating a remote agent](#) for more information).

Note that you can also delete/disable individual plans and/or their jobs. This prevents the plans and/or their jobs from being submitted to the build queue. See [Disabling or deleting a plan](#) and [Disabling or deleting a job](#).

### Related pages:
- Disabling or deleting a plan
- Disabling or deleting a job
- Creating a remote agent
- Creating a local agent

### To disable (or delete) an agent:

1. Click the ![agent icon](image) in the Bamboo header and choose **Overview**.
2. Click **Agents** in the left panel to display the ‘Agents’ screen, which lists all agents that currently exist in your Bamboo system. The ‘Status’ column indicates which agents are currently enabled or disabled. Scroll down if you require remote agents.
3. Select the check box for the agent (or agents) you wish to disable or delete.
4. Click the **Delete** (or **Disable**) button above the table.

### Screenshot: Agent — Delete or Disable Remote agent

#### Remote agents

<table>
<thead>
<tr>
<th>Action</th>
<th>Status</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delete</td>
<td>Idle</td>
<td>View</td>
</tr>
</tbody>
</table>

**Screentip**: Remote agents run on computers other than the Bamboo server. There are currently 2 remote agents online (1 non-elastic and 1 elastic). Start [elastic agents here](#). A maximum of 100 agents are supported by your license.

### Dedicating an agent

Bamboo allows you to dedicate an agent, to run, for example, only specific build projects, deployment projects or associated activities. You must dedicate an agent to a type of activity and a specific entity of that type.

Note that when you dedicate an agent, then no other activity will be able to use it, unless it is dedicated to that activity as well. Similarly, no other agent will be able to build this plan other than the agent(s) that are dedicated to build it.

### Related pages:
- [Disabling or deleting a plan](#)

### To dedicate an agent:

1. Click the ![agent icon](image) in the Bamboo header and choose **Overview**.

---

Created by Atlassian in 2019 Licensed under a [Creative Commons Attribution 2.5 Australia License](#).
2. Click **Agents** in the left panel to display the 'Agents' screen. This displays all local and remote agents currently available to your Bamboo system. The ‘Status’ column indicates which agents are currently enabled or disabled.

   Click **Image configurations** for EC2 elastic agents

3. Select the agent you wish to dedicate, and click on the **Dedicate agent** tab.

4. Using the menu, select the type of activity you wish to dedicate the agent to. Available choices are:
   - Build project
   - Build plan
   - Build job
   - Deployment project
   - Deployment environment

5. Select an entity to assign the dedicated agent to. This will be a specific project, plan, job or environment. Use the menu or type-ahead field to locate a suitable entity.

6. If required, click **Add** to add an additional entity dedication.

7. Click **Save** to dedicate your agent.

### Monitoring agent status

You can monitor your agents’ status to check that all agents are functioning as expected.

**Online versus Offline agents:**

- A ‘Online’ agent is an agent which is currently available for use by Bamboo. Local agents are always online, although remote agents may be either online or offline.
- A ‘Offline’ agent is a remote agent which has been registered with the Bamboo server, was online, but is now unavailable for builds because:
  - The Bamboo remote agent process (running on the remote hardware) was stopped.
  - The Bamboo server (for whatever reason) cannot communicate with the remote hardware that is running the Bamboo remote agent process.

Bamboo administrators can manually ‘disable’ an online agent to prevent it from being used in build generation. The agent will still be online and it can be 'enabled' at a later point in time. It is not possible to disable offline agents.

**Related pages:**

- Bamboo remote agent installation guide

**To monitor the status of your agents:**

1. Click the **icon in the Bamboo header and choose Overview.**

2. Click **Agents** in the left panel. This will display the ‘Agents’ screen, showing lists of all local agents and all remote agents that currently exist in your Bamboo system (see screenshot below). Agents can have one of the following statuses:

   - **Idle**
     Available to execute builds.

   - **Building**
     Currently executing a build.
Canceling
Currently canceling a Job build.

Disabled
Not available to execute builds (see Disabling or deleting an agent).

Disabled - Building
Currently executing a build, but disabled so cannot execute further builds.

Disabled - Canceling
Currently canceling a build, and disabled so cannot execute further builds.

Note that to see the jobs that are currently being built, look at the Current Activity tab on the dashboard.

Configuring capabilities
A capability is a feature of an agent. A capability can be defined on an agent for:

- an executable (e.g. Maven)
- a JDK
- a Version Control System client application (e.g. Git)
- a custom capability. This is a key-value property which defines a particular characteristic of an agent (e.g. 'operating.system=WindowsXP' or 'fast.builds=true').

Capabilities typically define the path to an executable that has already been installed, and must be defined in Bamboo before Bamboo or its agents can make use of those.

Capabilities can be defined specifically for an agent, or they can be shared between either all local agents or all remote agents. Note that the value of an agent-specific capability overrides the value of a shared capability of the same name (if one exists).

See also Configuring agents.

On this page:
- Defining a new capability
- Editing and deleting a capability
- Renaming a capability
- Notes

Defining a new capability
To define a new capability, see:

- Defining a new executable capability
- Defining a new JDK capability
- Defining a new custom capability
- Defining a new version control capability
- Defining a new Docker capability

Editing and deleting a capability
To edit an existing capability, see Modifying and deleting capabilities.

Renaming a capability
To rename an existing capability, see Renaming a capability.

Notes
- A requirement is specified in a job or a task. A requirement specifies a capability that an agent must have for it to build that job or task. A job inherits all of the requirements specified in its tasks.

Together, capabilities and requirements control which agents can execute builds for particular jobs. Each job can only be built by agents whose capabilities match the job's requirements.

See Configuring a job's requirements for more information.

About capabilities and requirements
A capability is a feature of an agent. A capability can be defined on an agent for:

- an executable (e.g. Maven)
- a JDK
- a Version Control System client application (e.g. Git)
- a custom capability. This is a key-value property which defines a particular characteristic of an agent (e.g. 'operating.system=WindowsXP' or 'fast.builds=true').

Capabilities typically define the path to an executable that has already been installed, and must be defined in Bamboo before Bamboo or its agents can make use of those.

Capabilities can be defined specifically for an agent, or they can be shared between either all local agents or all remote agents. Note that the value of an agent-specific capability overrides the value of a shared capability of the same name (if one exists).

See Configuring capabilities for more information.

On this page:
- How do capabilities work with requirements?
- How are builds distributed to agents?
- How do capabilities affect the distribution of builds to agents?

Related pages:
- Configuring capabilities
- Configuring agents
- Remote agents
- Working with Elastic Bamboo

How do capabilities work with requirements?

A requirement is specified in a job or a task. A requirement specifies a capability that an agent must have for it to build that job or task. A job inherits all of the requirements specified in its tasks.

Together, capabilities and requirements control which agents can execute builds for particular jobs. Each job can only be built by agents whose capabilities match the job's requirements.

See Configuring a job's requirements for more information.

How are builds distributed to agents?

An agent will consume a single job at a time and will block any other Bamboo jobs from being processed until that job build is complete. If you would like to build multiple jobs simultaneously on the Bamboo server, then simply set up multiple local agents. If the agents are remote, then you will need to install that number of agent instances on the machine. Separate installations are required because each remote agent will need its own home and log directories.
How do capabilities affect the distribution of builds to agents?
Modifying and deleting capabilities

Depending on the capability type, you can edit parameters such as **Path**, **Java Home** and **Value** for the capability.

Note that:

- Because each agent can only run builds for jobs whose **requirements** are met by the agent's capabilities (see **Configuring a job's requirements**), modifying or deleting a capability may mean that some plans can no longer be built.
- Renaming a capability involves changing its key. See **Renaming a capability**.
On this page:
- Modifying an agent-specific capability
- Modifying a local server capability
- Modifying a shared remote capability

Related pages:
- Configuring capabilities
- Renaming a capability

Modifying an agent-specific capability

To delete an agent-specific capability:
1. Navigate to the desired agent.
2. Click either Edit or Delete for the capability you wish to modify.

Modifying a local server capability

To delete a local server capability:
1. Click the icon in the Bamboo header and choose Overview.
2. Click Server Capabilities in the left navigation panel.
3. Click either Edit or Delete for the capability you wish to modify.

Modifying a shared remote capability

To delete a shared remote capability:
1. Click the icon in the Bamboo header and choose Overview.
2. Click Agents in the left navigation column.
3. Click Shared Remote Capabilities in the top right of the 'Remote Agents' section.
4. Click either Edit or Delete for the capability you wish to modify.

Renaming a capability

To rename a capability you have to change its key value.

Renaming an agent-specific capability

To rename a capability:
1. Click the icon in the Bamboo header and choose Overview.
2. Click Agents in the left panel (under 'Build Resources').
3. Click View for the agent that has the capability you wish to rename. A list of agent-specific capabilities and shared capabilities for that agent is displayed.
4. Click View for the capability you wish to rename.
5. Click Rename Capability. The 'Rename Capability' page will display.
6. Enter a value for New key and click Rename Capability.
Renaming a local server capability

**To rename a local server capability:**

1. Click the **Overview** icon in the Bamboo header and choose **Overview**.
2. Click **Server Capabilities** in the left panel (under 'Build Resources').
3. Click **View** for the capability you wish to rename.
4. Click **Rename Capability**. The 'Rename Capability' page will display.
5. Enter a value for **New key** and click **Rename Capability**.

Renaming a shared remote capability

**To rename a shared remote capability:**

1. Click the **Overview** icon in the Bamboo header and choose **Overview**.
2. Click **Agents** in the left panel (under 'Build Resources').
3. Click **Shared Remote Capabilities** in the 'Remote Agents' section.
4. Click **View** for the capability you wish to rename.
5. Click **Rename Capability**. The 'Rename Capability' page will display.
6. Enter a value for **New key** and click **Rename Capability**.

**Screenshot: Renaming a custom capability**

**Viewing a capability's agents and jobs**

You can view a capability to see the following information about it:

- which **agents** have/inherit the capability. Click one of the listed agents to show further information about that agent:
  - **Executable Jobs** tab — all the jobs whose requirements match the capabilities of this agent
  - **Capabilities** tab — the capabilities of the agent itself
  - **System Properties** tab — system information about this agent
  - **Recent Activity** link — recent builds for the agent
- which **jobs** have the capability specified as a **requirement**.
- which elastic images have this capability and the Bamboo plans that rely on this capability. See also **Viewing an elastic image**.

**On this page:**

- Viewing an agent-specific capability
- Viewing a local server capability
- Viewing a shared remote capability
Viewing an agent-specific capability

To view an agent-specific capability:

1. Navigate to the desired agent.
2. Click the **Capabilities** tab.
3. Click **View** for the capability you wish to view.

Viewing a local server capability

To view a local server capability:

1. Click the **icon** in the Bamboo header and choose **Overview**.
2. Click **Server Capabilities** in the left navigation panel.
3. Click **View** for the capability you wish to view.

Viewing a shared remote capability

Before you begin:

- Shared remote capabilities are **not shared** with elastic agents.

To view a shared remote capability:

1. Click the **icon** in the Bamboo header and choose **Overview**.
2. Click **Agents** in the left navigation column.
3. Click **Shared Remote Capabilities** in the top right of the ‘Remote Agents’ section.
4. Click **View** for the capability you wish to view.

Defining a new executable capability

An **executable** is an external program that Bamboo uses during the build process. Bamboo supports the following executables:

- Ant
- Maven
- Grails
- NAnt
- devenv.com
- msbuild.exe
- PHPUnit
- Custom command (e.g. ‘make’)
- Script

Executables must be defined as capabilities (that is, ‘registered’) in Bamboo before they can be used by
tasks in a Bamboo job. At least one capability was automatically defined when you installed Bamboo, but you can define additional capabilities for other executables.

You can define an executable capability that is:

- for a specific local or remote agent
- shared by all local agents
- shared by all remote agents.

Once you have defined a new executable capability in your Bamboo system, its label (e.g. ‘Ant’) will appear in the Executable list when you use the executable in a task (see Configuring tasks). The executable you select will be used every time the task is run during a build. That is, the task can only be run by agents which have a capability that matches the executable specified in the task’s Executable list.

Note that agent-specific capabilities override any shared capability of the same name.

### Defining an agent-specific executable capability

An agent-specific capability applies to one agent only. Note that the value of an agent-specific capability will override the value of a shared capability of the same name (if one exists).

#### To define a new agent-specific executable capability:

1. Navigate to the desired agent.
2. In the ‘Agent-Specific Capabilities’ section of the Capabilities tab, click Add Capability. The ‘Add Capability’ page is displayed.
3. Choose Capability Type > Executable.
4. Select the appropriate executable from the Type list.
5. In the Executable Label field, type a name/label for the executable. Bamboo uses this name in the Executable list whenever a task’s executable is configured.
6. In the Path field, type the path to the installed executable. This will vary depending on the Type you selected in the previous step.
   - For Ant and Maven, Bamboo requires the path to be the location of the executable installation folder.
7. Click Add. This will verify whether the executable and path you have specified are valid.

### Defining a local server executable capability

Local server capabilities are inherited by all local agents. This means that local agents can all make use of the executables installed on the Bamboo server machine.

#### Before you begin:

- If you want to run multiple Maven agents on your local server, you will need to configure repository isolation for your Maven executables. See Configuring repository isolation for Maven executables for details.

#### To define a new local server executable capability:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Server Capabilities in the left navigation panel.
3. Choose Capability Type > Executable in the ‘Add Capability’ section at the end of the page.
4. Select the appropriate type of executable from the Type list.
5. In the Executable Label field, type a name/label for the executable, which Bamboo presents in the Executable list whenever a Task’s executable is configured.
6. In the Path field, type the appropriate path. This will depend on the Type you selected in the previous step.
   - Note that for Ant and Maven, Bamboo requires the path to be the location of the executable installation folder.
7. Click Add.

### Defining a shared remote executable capability

...
Shared remote capabilities are inherited by all remote agents. However, Bamboo remote agents inherit only the paths of the shared executable capabilities, not the actual executable files. This means that every time you define a capability for an agent, you must make sure that the executable (for example, Ant or Maven) has actually been installed in that location on the remote server on which the remote agent will run.

Note that the value of a shared capability will be overridden by the value of an agent-specific capability of the same name (if one exists).

Shared remote executable capabilities are not shared with elastic agents.

To define a shared remote executable capability:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Agents in the left navigation panel.
3. In the 'Remote Agents' section, click Shared Remote Capabilities at the right.
4. Choose Capability Type > Executable in the 'Add Capability' section.
5. Select the appropriate type of executable from the Type list.
6. In the Executable Label field, type a name/label to help you identify this executable.
7. In the Path field, type the appropriate path. This will depend on the Type you selected in the previous step.
   Note that for Ant and Maven, Bamboo requires the path to be the location of the executable installation folder.
8. Click Add.

Notes

- **Pre-defined executables** — The executable that was automatically defined when you installed Bamboo depends on the system environment variables (e.g. 'ANT_HOME=/opt/java/ant') that were present on the machine that Bamboo was installed on.
  - On the Bamboo server, environment variables that were present during installation were saved as local server capabilities in Bamboo.
  - On remote agents, environment variables that were present during installation were saved as agent-specific capabilities in Bamboo.
- **Using other executables** — If you need to use an executable that is not natively supported by Bamboo, a number of third-party plugin modules are available (e.g. NoseXUnit). You can also create your own executable plugin (see the Bamboo Plugin Guide for details).
  - **msbuild.exe** — You will need to install the .NET framework SDK and reference the default path for msbuild.exe, (e.g. C:\Windows\Microsoft.NET\Framework\v2.0.50727), to use this executable.
  - **PHPUnit** — You will need to install PHPUnit and reference the path to your PHP command-line interpreter, (e.g. /usr/bin/phpunit on Ubuntu), to use this executable.

Viewing your executable capabilities

You can view all of the executable capabilities that have been defined in Bamboo on the 'Executables' page. These include local server capabilities, local agent-specific capabilities and remote agent-specific capabilities. An executable is an external program that Bamboo uses during the build process. Generally, executables compile source code to generate compiled executable files (referred to as artifacts in Bamboo). Ant, Maven, MS Build or PHPUnit are just some examples of executables that can be used as part of your build process.

New executables can be defined as capabilities in Bamboo. Once an executable has been defined in Bamboo, it can be configured as part of a task.

**On this page:**
- Viewing and configuring executable capabilities
- Notes

**Related pages:**
- Configuring capabilities

Viewing and configuring executable capabilities

To view and configure the executable capabilities defined in Bamboo:
1. Click the icon in the Bamboo header and choose **Overview**.
2. Click **Executables** in the left navigation panel.
3. Click a specific executable's tab to see the agents and jobs related to this executable capability.
   - **View more details about an agent with this executable capability** — click the linked name of the agent in the 'Agent' column. This will show you the complete list of capabilities and jobs associated with that agent.
   - **Edit the executable path of an agent with this capability** — click **Edit** in the 'Operations' column for the agent you wish to configure. See **Defining a new executable capability**.
   - **Remove this executable capability from an agent** — click **Delete** in the 'Operations' column for the agent that currently possesses this executable capability.
     - Be aware that you can only remove a executable capability from **all** local agents, not from individual local agents. See the note below for more information.
   - **View details about (and configure) an elastic image with this executable capability** — click the linked name of the elastic image in the 'Elastic Image Configuration' column.
   - **Configure a job that relies on or requires this executable capability** — click the linked name of the job in the 'Plan' column.
   - **If you are currently viewing a Maven (2.x or later) executable capability, you can configure repository isolation for it by clicking **Edit Capability Configuration**. Please refer to **Configuring repository isolation for Maven executables** for more information.
   - **To add a new executable as a local server capability** , click **Add executable to server capabilities** to navigate to the 'Server Capabilities' page.

*Screenshot: Executables*
Bamboo’s automatic detection of executables — When you install the Bamboo server application or the Bamboo Remote Agent application on another machine, either of these applications will automatically look for existing executables installed on the same machine (based on a combination of the machine’s environment variables and other conditions). A ‘executable capability’ will be created for each executable that either of these Bamboo applications find.

The environment variables and conditions that Bamboo uses to automatically detect and create executable capabilities are listed below. With the exception of the ‘Command’ executable, the paths for each automatically detected executable are based on the path 'string' values found within these environment variables.

- **Ant** — the `ANT_HOME` environment variable
- **Maven** — the `MAVEN_HOME` environment variable (Maven 1), `M2_HOME` or `MAVEN2_HOME` environment variable (Maven 2.x)
- **Grails** — `GRAILS_HOME` environment variable
- **Command** — the existence of the `/bin/bash` file
- **PHPUnit** — the existence of the `phpunit` file anywhere within the machine’s `PATH` environment variable value

- **Local agents and executable capabilities** — Since Bamboo automatically looks for executables
installed on the same machine and creates a 'executable capability' for each executable installation it finds, all existing and subsequent local agents that you create will possess these executable capabilities. Hence, when you access the 'Executables' page and view these executable capabilities, all local agents will be grouped together in the 'All local agents' category and you will only be able to remove these executable capabilities from all local agents, not from individual local agents.

Configuring repository isolation for Maven executables

Bamboo allows you to isolate Maven (2.x or later only) executables on an agent-specific basis. If you configure repository isolation for a particular Maven executable capability, each agent that uses this executable will have its own private Maven 2.x artifacts directory, thereby allowing you to avoid these jar and dependency file corruptions. Each isolated repository directory has the path:

```
$BAMBOO_HOME/.m2/AGENT-${bamboo.agentId}/repository
```

You may want to configure repository isolation for Maven executables, if you run multiple Maven executables on one server machine which run under the same user account on that server, but belong to different Bamboo agents. In this case, the agents will use the same default Maven artifacts directory: $HOME/.m2/repository (or %USERPROFILE%\m2\repository for Windows-based servers). This is the directory to which Maven dependency jars are downloaded and where project artifacts are installed during the "install" phase of a Maven build.

Hence, problems can arise if Bamboo uses these multiple Maven executables simultaneously. For example, if multiple agents on a single computer, each with a different Maven executable capability, start to run Maven builds simultaneously from the queue, the different Maven executables may attempt to download the same dependency to the same artifacts directory location, resulting in corruption of the downloaded jar and dependency files.

Before you begin:

- This feature is not available for Maven 1.x executables.
- When configuring any Maven executables in Bamboo in which you want to force local repository isolation, ensure that the executable label you use is one that identifies it as such — for example, 'Maven 2.x with local repository isolation'.

To configure a new local server Maven capability with repository isolation:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Server Capabilities in the left navigation panel.
3. In the 'Add Capability' section, choose your executable and enter its details as described:

   **Capability Type**
   - Select Executable

   **Type**
   - Select one of the Maven options (2.x or later).

   **Executable Label**
   - Enter ‘Maven with local repository isolation’
   - You can use any label you wish. However, it will help you and your Bamboo users if you enter an appropriate executable label that identifies this Maven 2.x executable as one that uses local repository isolation.

   **Path**
   - Enter the path for your Maven executable.
4. Click Add.
5. Click the label for the executable you have just added. The executable capability summary screen will be
displayed (see 'Maven 2.x Executable' screenshot below).
6. Click Edit Capability Configuration. The 'Configure Capability' screen will be displayed (see 'Maven 2.x Repository Isolation' screenshot below).
7. Select the Local repository isolation check box.
8. Click Save.

Screenshot: Maven Executable

**Maven 2 with local repository isolation**

The screen shows the summary of a capability. You can see which jobs have a requirement on this capability and which agents have the capability.

**Agents with capability**

The following agents have this capability.

<table>
<thead>
<tr>
<th>Agent</th>
<th>Path</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>All local agents</td>
<td>/Volumes/Pharlap/opt/dev/tools/maven</td>
<td>Edit</td>
</tr>
<tr>
<td>bambooperf-sydney.atlassian.com</td>
<td>C:\Program Files\Javacake-maven-2.1.0</td>
<td>Edit</td>
</tr>
</tbody>
</table>

**Elastic Image Configurations with capability**

3 elastic image configurations have this capability.

<table>
<thead>
<tr>
<th>Elastic Image Configuration</th>
<th>Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>KBTEST</td>
<td>/opt/maven-2.0</td>
</tr>
<tr>
<td>Default</td>
<td>/opt/maven-2.0</td>
</tr>
<tr>
<td>Maven 2.1 Image</td>
<td>/opt/maven-2.0</td>
</tr>
</tbody>
</table>

**Jobs with requirement**

28 jobs rely on this capability.

<table>
<thead>
<tr>
<th>Plan</th>
<th>Path</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artifact Sharing Dogfooding › Artifact sharing › Consumer</td>
<td>exists</td>
<td></td>
</tr>
<tr>
<td>Artifact Sharing Dogfooding › Artifact sharing › Final</td>
<td>exists</td>
<td></td>
</tr>
</tbody>
</table>

**Capability Configuration**

Local repository isolation Yes

Rename Capability | Edit Capability Configuration

Screenshot: Maven Repository Isolation
Defining a new JDK capability

A JDK must be installed, and defined in Bamboo as a capability, before Bamboo can make use of it when building jobs.

At least one JDK was automatically defined when you installed Bamboo. You can define additional JDK capabilities that are:

- for a specific local or remote agent
- shared by all local agents
- shared by all remote agents.

Once you have defined a new JDK capability in your Bamboo system, its label (e.g. ‘1.5’) will appear in the Build JDK list when you configure a job’s builder (see Configuring tasks). The JDK you select will be used for every one of that job’s builds. That is, the job can only be built by agents which have a JDK capability whose label is specified in the job’s Build JDK field.

Note that if an agent has its own specific JDK capability, that value will override the value of a shared JDK capability of the same name (if one exists).

Defining a JDK capability on an agent

To define a new agent-specific JDK capability:

1. Click the icon and select Overview.
2. Click Agents in the left panel.
3. Click the name of the required agent.
4. Click the Capabilities tab, and then Add capability (to the right of ‘Agent-Specific capabilities’).
5. Choose Capability type > JDK.
6. In the JDK label field, type a name/label for the JDK. Bamboo displays this in the Build JDK list whenever a job’s builder is configured.
7. In the Java home field, type the location of the JDK Home Directory.
8. Click Add.
Defining a local server JDK capability

Local server capabilities are inherited by all local agents.

To define a new local server JDK capability:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Server Capabilities in the left navigation panel.
3. Choose Capability Type > JDK in the 'Add Capability' section at the end of the page.
4. In the JDK Label field, type a name/label for the JDK. Bamboo displays this in the Build JDK list whenever a job's builder is configured.
5. In the Java Home field, type the location of the JDK Home Directory.
6. Click Add.

Defining a shared remote JDK capability

Shared remote JDK capabilities are not shared with elastic agents.

To define a new shared remote JDK capability:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Agents in the left navigation panel.
3. In the 'Remote Agents' section, click Shared Remote Capabilities at the right.
4. Choose Capability Type > JDK in the 'Add Capability' section at the end of the page (see screenshot below).
5. In the JDK Label field, type a name/label for the JDK. Bamboo displays this in the Build JDK list whenever a job's builder is configured.
6. In the Java Home field, type the location of the JDK Home Directory.
7. Click Add.

Notes

- Configuring generic JDK capabilities — If you want to indicate that an agent is capable of running builds for a set of related JDKs (e.g. all point versions of JDK 1.5), you set up generic JDK capabilities to encompass these JDKs.
  
  For example, you can set up the following JDK capabilities for your Bamboo agent(s):
  - JDK (where 'JDK Label' = 'JDK' and 'Java Home' = '/usr/java/jdk1.5.0_07') — this JDK capability indicates that an agent(s) is capable of running builds with any JDK requirement.
  - JDK 1.5 (where 'JDK Label' = 'JDK 1.5' and 'Java Home' = '/usr/java/jdk1.5.0_07') — this JDK capability indicates that an agent(s) is capable of running builds with a JDK 1.5 requirement or any point version of JDK 1.5, e.g. 1.5.0_07, 1.5.0_08, etc.
- JDK 1.5.0_07 (where 'JDK Label' = 'JDK 1.5.0_07' and 'Java Home' = '/usr/java/jdk1.5.0_07') — this JDK capability indicates that an agent(s) is only capable of running builds with a JDK 1.5.0_07 requirement.

- If you wish to find redundant JDK capabilities, you can view the list of JDK capabilities set up in Bamboo and delete any unwanted JDK capabilities.

- Automatically defined capabilities – This depends on the system environment variables (e.g. 'JAVA_HOME=/opt/java/java_sdk1.5') that were present on the machine on which Bamboo was installed:
  - On the Bamboo server, environment variables that were present during installation were saved as shared local capabilities in Bamboo.
  - On remote agents, environment variables that were present during installation were saved as agent-specific capabilities in Bamboo.

Viewing your JDK capabilities

You can view all the JDK capabilities that have been defined in your Bamboo system on the JDKs page. These include local server capabilities, local agent-specific capabilities and remote agent-specific capabilities.

Note the following:

- **Bamboo’s automatic detection of JDKs** — When you install either Bamboo or the Bamboo Remote Agent, it will automatically look for an existing JDK installed on the same machine (based on the machine’s JAVA_HOME environment variable) and create a ‘JDK capability’ for that JDK installation, with its path being the value of JAVA_HOME.

- **Local agents and JDK capabilities** — Since Bamboo automatically looks for an existing JDK installed on the same machine and creates a ‘JDK capability’ for it, all existing and subsequent local agents that you create will possess this JDK capability. Hence, when you access the ‘JDKs’ page and view this JDK capability, all local agents will be grouped together in the ‘All local agents’ category and you will only be able to remove this JDK capability from all local agents, not from individual local agents.

### Related pages:
- Defining a new JDK capability

### To view and configure the JDK capabilities defined in Bamboo:

1. Click the [ ] icon in the Bamboo header and choose **Overview**.
2. Click **JDKs** (under 'Build Resources') in the left navigation panel.
3. Click the tab for a specific JDK to see the agents and jobs related to this JDK capability.

   - View the capabilities and jobs associated with an agent with this JDK capability — click the linked name of the agent in the ‘Agent’ column. See Viewing a capability’s agents and jobs.
   - Edit JAVA_HOME for an agent — click **Edit** in the ‘Operations’ column for the agent you wish to configure. See Defining a new JDK capability.
   - Remove this JDK capability from an agent — click **Delete** in the ‘Operations’ column for the agent that currently possesses this JDK capability. Be aware that you can only remove a JDK capability from all local agents, not from individual local agents. See the note above for more information.
   - View details about (and configure) an elastic image with this JDK capability — click the name of the elastic image in the ‘Elastic Image Configuration’ column. See Viewing an elastic image.
   - Configure a job that relies on this JDK capability — click the name of the job in the ‘Plan’ column.
   - To add a new JDK as a local server capability, click **add a JDK as a server capability** at the top of the page. This opens the ‘Server Capabilities’ page at the ‘Add Capability’ section, with the JDK selected as the Capability Type.

![Screenshot: Viewing the JDKs in Bamboo](image-url)
Defining a new version control capability

Version control capabilities let Bamboo know where the client application for a version control system is located, so that Bamboo can perform a checkout while building. Bamboo requires that a capability for at least one of the following version control repositories be set so that Bamboo can check out source code from that repository type:

- Bitbucket Cloud
- Git

If no capability is provided, Bamboo will use its built-in Git implementation. Note that the built-in Git implementation does not support symbolic links, submodules, automatic branch detection or automatic
merging.

- Mercurial

- Perforce

Note that there is no need to create a SVN capability as SVN support is built into every Bamboo agent.

**Example version control executable paths**

For the version control systems that require capabilities to be set on agents, the following table offers example paths for both Linux and Windows systems.

Note that these paths may differ on your actual system's configuration.

<table>
<thead>
<tr>
<th>Capability type</th>
<th>Example paths</th>
</tr>
</thead>
</table>
| Git             | • /usr/bin/git  
|                 | • C:\Program Files\Git\git.exe  
| Mercurial       | • /usr/local/bin/hg  
|                 | • C:\Program Files\Mercurial\hg.exe  

To define a new version control capability

1. Navigate to the desired agent.
2. Select either a local or remote agent.
3. Choose the version control type you require from **Capability Type**.
4. Provide the full path to client executable on the agent machine.

If you install a new agent on a machine that has Git already installed, the agent will find the Git client automatically.

**Defining a new custom capability**

Custom capabilities can be used to control which jobs will be built by a particular agent, since agent capabilities are required to match job requirements. For example, if the builds for a particular job should only run in a Windows environment, you could create a custom capability 'operating.system=WindowsXP' for the appropriate agent(s), and specify it as a requirement for this job.(See **Configuring a job's requirements**.)

You can define a custom capability that is:

- for a specific local or remote agent
- to be shared by all local agents
- to be shared by all remote agents.

Note that the value of an agent-specific capability overrides the value of a shared capability of the same name (if one exists).

On this page:

- Defining an agent-specific custom capability
- Defining a local server custom capability
- Defining a shared remote custom capability

**Defining an agent-specific custom capability**

To define a new agent-specific custom capability:
1. Navigate to the desired agent.
2. Click **Add capability** in the top right of the 'Agent-Specific Capabilities' section.
3. Choose **Capability type > Custom**.
4. Specify values for **Key** and **Value**.
5. Click **Add**.

### Defining a local server custom capability

Local server capabilities are inherited by all local agents.

**To define a new local server custom capability:**

1. Click the 
   ![icon] icon in the Bamboo header and choose **Overview**.
2. Click **Server Capabilities** in the left navigation panel (under 'Build Resources').
3. Locate the 'Add Capability' section at the bottom of the screen (see screenshot below).
4. Choose **Capability Type > Custom**.
5. Specify values for **Key** and **Value**.
6. Click **Add**.

### Defining a shared remote custom capability

Shared remote custom capabilities are **not shared** with elastic agents.

**To define a new shared remote custom capability:**

1. Click the 
   ![icon] icon in the Bamboo header and choose **Overview**.
2. Click **Agents** in the left navigation panel (under 'Build Resources').
3. Locate the 'Remote Agents' section.
4. Click **Shared Remote Capabilities**.
5. Locate the 'Add Capability' section at the bottom of the screen (see screenshot below).
6. Choose **Capability Type > Custom**.
7. Specify values for **Key** and **Value**.
8. Click **Add**.

### Defining a new Docker capability

A capability typically defines the path to a module or executable that has already been installed, and must be defined in Bamboo before Bamboo or its agents can make use of that. That is why you need to define a Docker capability in Bamboo before you can use a **Docker task** or the Docker Runner feature in Bamboo builds and deployments.

**Before you begin**
• Make sure you have Docker installed. We recommend using the latest version of Docker. If you have restrictions on the version of Docker that you can run, review the Supported platforms page for your Bamboo version.
• For Bamboo 5.8, and later versions, Stock images already provide Docker, but you might still need to add the capability manually if you have upgraded from Bamboo 5.7 or an earlier version. See Existing stock images require manual update if new capabilities are needed for more details.

Define a Docker capability on an elastic image

1. Click the icon in the Bamboo header and choose Overview.
2. Click Image configurations in the left navigation panel (under 'Elastic Bamboo').
3. Click Capabilities (under ‘Operations’) for the relevant elastic image.
4. Use the 'Add Capability' panel at the end of the page to add the new Docker capability to the image:
   • From Capability type, choose Docker.
   • For Path, enter the path to the Docker executable, for example /usr/bin/docker.
5. Click Add.

Define a Docker capability on an agent

1. Click the icon in the Bamboo header and choose Overview.
2. Click Agents in the left panel.
3. Click the name of the required agent.
4. Click the Capabilities tab, and then Add capability (to the right of 'Agent-Specific capabilities').
5. In the 'Add Capability' panel:
   • From Capability type, choose Docker.
   • For Path, enter the path to the Docker executable, for example /usr/bin/docker.
6. Click Add.

Define a Docker capability on the Bamboo server

1. Click the icon in the Bamboo header and choose Overview.
2. Click Server capabilities in the left navigation panel.
3. Use the 'Add Capability' panel at the end of the page to add the new Docker capability to the server:
   • From Capability type, choose Docker.
   • For Path, enter the path to the Docker executable, for example /usr/bin/docker.
4. Click Add.

For more information about Bamboo and Docker integration, see Getting started with Docker and Bamboo

Remote agents

For information about installing and using remote agents, see the following pages:

• Bamboo remote agent installation guide
• Configuring remote agent capabilities using bamboo-capabilities.properties
• Disabling and enabling remote agents support

Disabling and enabling remote agents support
Remote agent support

Disabling remote agent support in Bamboo will disable all remote agents and prevent any users from creating new remote agents. This function will not delete any remote agents that you have already created. To delete a remote agent, see Disabling or deleting an agent.

Note that remote agent support must be enabled to use Elastic Bamboo. Disabling remote agent support will disable Elastic Bamboo.

To enable, or disable, remote agent support:

1. Click the icon in the Bamboo header and choose **Overview**.
2. Click **Agents** (under ‘Build Resources’)
3. Click either **Enable Remote Agent Support** or **Disable Remote Agent Support**.

### Remote agents

<table>
<thead>
<tr>
<th>Shared remote capabilities</th>
<th>Disable remote agent support</th>
<th>Disable remote agent authentication</th>
</tr>
</thead>
</table>

Remote agents run on computers other than the Bamboo server.

- Online remote agents
- Offline remote agents
- Agent authentication

There are currently 4 remote agents online (1 non-elastic and 3 elastic). Start elastic agents here. A maximum of 100 agents are supported by your license.

**Related pages:**
- Configuring agents
- Agents and capabilities
- Configuring a job’s requirements

**Additional remote agent options**

This page describes additional options for running a Bamboo remote agent. Additional options can be found in *How to extend the Remote agent installation command using JVM parameters*.

- **Changing where the remote agent stores its data**
  By default, the remote agent will store its data in a USER_HOME/bamboo-agent-home. If you wish to specify a different directory, add the following command line parameter before the JAR file name:

  ```
  -Dbamboo.home=RemoteAgentHome
  ```

  where *RemoteAgentHome* is the path to the Bamboo agent home directory you created in step 1.1.

  Your command line will look something like this:

  ```
  ```

  The name of the jar file (e.g. atlassian-bamboo-agent-installer-2.2-SNAPSHOT.jar) will vary depending on the version of Bamboo you are running.

- **Disabling auto-capability detection for the remote agent**
  There may be situations where you want to prevent Bamboo from automatically detecting and adding capabilities (such as JDKs) to the remote agent, or where you don’t want to run the remote agent with default capabilities.
Elastic agents don’t support the `DISABLE_AGENT_AUTO_CAPABILITY_DETECTION` system property.

The `DISABLE_AGENT_AUTO_CAPABILITY_DETECTION` system property is handled only from the `wrapper.conf` file, not from the command line.

To update the property for a remote agent, add the following line to the `<bamboo-agent-home>/conf/wrapper.conf` file:

```
wrapper.java.additional.3=-DDISABLE_AGENT_AUTO_CAPABILITY_DETECTION=true
```

Then restart the agent with regular command `java -jar agent.jar URL_TO_SERVER SECURITY_TOKEN`

**Specifying a custom log4j file for the remote agent**

You can specify a custom log4j file in the `wrapper.conf` file. The file is located in `<bamboo-agent-home>/conf/`.

Find the `#wrapper.java.additional.3=-Dlog4j.configuration= line, uncomment it and provide path to log4j.properties file at your disk. Then restart the agent with regular command `java -jar agent.jar URL_TO_SERVER SECURITY_TOKEN`.

Changing the logging on the remote agent

By default, the remote agent will use the same logging level as the Bamboo server. However, you can control the level of logging of your remote agent independently of your Bamboo server by setting up a separate logging configuration file.

Please see [Logging in Bamboo](#) for further details.

**Accepting self-signed certificates installed on the server**

Use the text-based keytool utility or GUI-based Portecle to add the self-signed certificate to the trusted certificates in your keystore.

Add "socket.verifyHostName=false" settings to Client Broker URL at Bamboo general configuration.

**Disabling hostname verification for certificates**

If you are connecting to your Bamboo server via https (SSL is enabled) using a hostname or IP address that does not match the Common Name of your Bamboo server’s certificate (or any of its Subject Alternative Names) you need to disable hostname verification:

Add the following parameter to the remote agent’s command line:

```
-Dbamboo.agent.ignoreServerCertName=true
```

Your command line will look something like this:

```
```

⚠️ Please note that this reduces the security of your configuration, as the identity of your Bamboo server will not be authenticated by the remote agent.

**Running Bamboo without the Remote Agent Supervisor**
The remote agent supervisor is included in the remote agent JAR bundled with Bamboo. The appropriate remote agent supervisor for the operating system of your remote machine, will be automatically installed when you run the default remote agent start-up command line.

The remote agent supervisor cannot be installed on a small number of operating systems (i.e. the remote agent will start without the remote agent supervisor). If the remote agent supervisor fails to install, please check the operated systems list on the remote agent supervisor page. If your operating system is on the list and the remote agent supervisor still fails to install, please raise a support request in the Bamboo project.

If you need to run the remote agent without running the remote agent supervisor, you can execute the 'classic' version of the remote agent JAR.

The 'classic' agent jar is available from Bamboo's agent installation page for download. Follow the steps below to run the 'classic' version of the remote agent:

1. Browse to:

   http://<host>:8085/admin/agent/addRemoteAgent.action

2. Click the link and save 'classic' agent JAR.
3. Start the agent with:

   java -jar bamboo-agent-2.2.2.jar http://<host>:8085/agentServer/

   i The name of the jar file (e.g. bamboo-agent-2.2.2.jar) will vary depending on the version of Bamboo you are running

   v Running the remote agent with different start-up commands

   The remote agent supervisor is executed by default when you run the default remote agent start-up command line. The remote agent supervisor is implemented via a Java Service wrapper. The wrapper allows you to execute a number of general start-up commands when the remote agent is run. These commands are appended to the end of the default remote agent start-up command line:

   java -jar atlassian-bamboo-agent-installer-2.2-SNAPSHOT.jar
   http://bamboo-host-server:8085/agentServer <wrapper_command>

   where <wrapper_command> is one of the keywords described below:

   - console — runs the remote agent in the foreground, i.e. display all of the commands on the screen. The agent home directory will be populated only if it is empty. This parameter is used by default.
   - start — runs the remote agent in the background, i.e. no commands are displayed on screen. If you have installed the remote agent as a Windows service, this command will work with the service.
   - stop — stops a remote agent that is running. If you have installed the remote agent as a Windows service, this command will work with the service.
   - status — (non-Windows OS only) returns the status of the remote agent, e.g. "Remote agent is not running."
   - install — installs the files for the remote agent, but does not start it. This will overwrite any changes that have been made to the wrapper.conf file. The agent home directory will be populated, regardless of whether it is empty or not, i.e. existing files will be overwritten. You may wish to use this option, if you want to customize the remote agent files before starting it.

   i The name of the jar file (e.g. atlassian-bamboo-agent-installer-2.2-SNAPSHOT.jar) will vary depending on the version of Bamboo you are running.
Installing the remote agent as a Windows service (Windows only)

The remote agent supervisor is executed by default when you run the default remote agent start-up command line. The remote agent supervisor is implemented via a Java Service wrapper. The wrapper allows you to install or uninstall the remote agent as a service in Windows (i.e. start the Bamboo remote agent automatically when the machine boots). This is done by appending the appropriate wrapper commands to the end of the default remote agent start-up command line:

```
java -jar atlassian-bamboo-agent-installer-2.2-SNAPSHOT.jar
http://bamboo-host-server:8085/agentServer <wrapper_command>
```

where `<wrapper_command>` is one of the keywords described below:

- `installntservice` — (Windows only) installs the remote agent as a Windows service.
- `uninstallntservice` — (Windows only) uninstalls the remote agent as a Windows service.

The name of the jar file (e.g. atlassian-bamboo-agent-installer-2.2-SNAPSHOT.jar) will vary depending on the version of Bamboo you are running.

If you have installed the NT service, you will be able to use the `start` and `stop` start-up console commands with the service.

- The remote agents connect to the Bamboo server on the normal `http/https` port and `54663`. You need to ensure that the network firewall isn't blocking these ports. If you're having issues connecting the remote agent with the Bamboo server, please this Troubleshooting Guide
- On Windows, when the Bamboo remote agent is installed as a service under the Local System user account. The temporary folder created by the agent isn't accessible by any other application. To allow enable to that folder, configure the agent to use a commonly accessible temporary folder by defining a new Java property in the service wrapper:
  1. Go to: `<BAMBOO_AGENT_HOME>/conf/wrapper.conf`
  2. Add the following line using the next property number as X:
     ```
     wrapper.java.additional.X=-Djava.io.tmpdir=C:\path\to\temp
     ```
  3. Restart the agent.

Working with Elastic Bamboo

Elastic Bamboo allows you to use computing resources from the Amazon Elastic Compute Cloud (EC2) to run builds. Elastic Bamboo uses a remote agent AMI (Amazon Machine Image) to create instances of remote agents in the Amazon EC2.

The following pages and sub-pages describe how to work with Elastic Bamboo:

- Getting started with Elastic Bamboo — setting up Elastic Bamboo for the first time. It contains instructions on enabling Elastic Bamboo for your Bamboo installation and running your first build.
- Configuring Elastic Bamboo — changing settings for Elastic Bamboo. This includes instructions on how to use Amazon's Elastic Block Storage to persist build information for your builds on Elastic Bamboo.
- Managing your elastic images
- Managing your elastic instances
- Managing your elastic agents
- Elastic Bamboo Security — setting up secure communication between Bamboo and the EC2.
Elastic Bamboo Conceptual Overview

Elastic Bamboo allows you to use computing resources from the Amazon Elastic Compute Cloud (EC2) to run builds. Elastic Bamboo uses a remote agent AMI (Amazon Machine Image) to create instances of remote agents in the Amazon EC2.

A Bamboo build job can be run on an elastic agent, provided that the capabilities of the elastic agent meet the requirements of the job. Bamboo will assign the relevant job to an available elastic agent from the build queue automatically. The elastic agent must already be running for a job to be assigned to it.

An elastic agent is started by creating a new instance of an elastic image. Creating this new elastic instance automatically runs an elastic agent process in the instance. The agent inherits the capabilities of the image it was created from. Only one agent process can be run in an instance, although multiple instances can be created from the same image.

Once a job has completed running on an elastic agent, its results are made available (like those of any other job executed on a non-elastic agent). The elastic agent and instance will continue to run until they are shut down. Shutting down an elastic instance will terminate the agent, not take it offline. However, Bamboo will store historical information about the terminated elastic agent, such as the job which it has run.

An Amazon Web Services (AWS) account is required to use Elastic Bamboo. Elastic Bamboo Costs are charged by Amazon, separate to Bamboo license costs, as Elastic Bamboo is powered by Amazon resources.
Did you know you can configure Bamboo to start and shut down elastic instances automatically, based on build queue demands? Please refer to Configuring Elastic Bamboo for more information.

Key Terms

Elastic Image
An elastic image is an Amazon Machine Image (AMI) that is stored in one of Amazon data centers for use with the Elastic Bamboo feature. An elastic image is used to create elastic instances, which in turn create elastic agents. Conceptually, an elastic image is equivalent to an operating system running on a computer's boot hard drive and elastic instances would be the software that runs on this operation system.

Each elastic image registered with the Amazon Web Services (AWS) has its own unique identifier, known as an AMI ID.

You can associate multiple elastic images with a Bamboo server. One default shared image is maintained by Atlassian in AWS, and is available to all Elastic Bamboo users.

You can also create your own custom elastic images.

Elastic Instance
An elastic instance is a running instance of an elastic image. One elastic instance is created whenever an elastic image is started. Hence, starting one elastic image multiple times, results in the creation of multiple elastic instances. Each time an elastic instance is created, one elastic agent is created on that instance.

Conceptually, an elastic instance can be thought of as a computer. The elastic agent's processes are run on this computer and the elastic image is the boot hard drive. Unlike computers, however, elastic instances are temporary and stateless. When an elastic instance is shut down:

- Any changes that an elastic instance makes to the boot hard drive (e.g. agent log file) will not persist
- Any customizations to the instance itself will also be lost.

The Amazon Elastic Block Store can provide persistent storage for your elastic instances.

Elastic Agent
An elastic agent is an agent that runs in the Amazon Elastic Compute Cloud (EC2). An elastic agent process runs in an elastic instance of an elastic image. An elastic agent inherits its capabilities from the elastic image that it was created from.

Setting Up Elastic Bamboo

If you would like to set up Elastic Bamboo for your Bamboo installation, please read Getting started with Elastic Bamboo. This document guides you through the initial configuration of Elastic Bamboo and running your first Job build.

Elastic Bamboo Costs

This page provides high level guidelines to Elastic Bamboo costs. As usage patterns vary from user to user, these guidelines are only intended to provide a picture of how Elastic Bamboo operates, not to make definitive pricing statements.

The Bamboo pricing page on the Atlassian website details the costs for Elastic Bamboo. This page is intended to complement that information.

Amazon EC2 Pricing Information

You can use Elastic Bamboo to run remote agents on elastic instances in the Amazon Elastic Compute Cloud (EC2). If you choose to do this, you will be charged by Amazon for your EC2 compute usage. These charges
will be billed to the AWS account that you provide.

Please note, if you do not have an AWS account, you must register for one on the AWS registration page before you can enable Elastic Bamboo.

Full details on Amazon EC2 pricing is available on the Amazon EC2 pricing page. Please also note the following important information, which is relevant to EC2 usage by Elastic Bamboo:

- **You are responsible for all EC2 usage costs incurred on your AWS account.**
- Elastic Bamboo creates “High-CPU Medium” Instances by default, however you can configure the EC2 instance type. Read Managing your elastic image configurations for instructions on how to change your default instance type. Please note the different costs for different instance types.
- You are responsible for creating and shutting down resources required to run agents in EC2.
- You can track your EC2 usage in near real-time on the AWS Account page.
- Your Elastic Bamboo compute usage will not be distinguishable from your non-Bamboo EC2 compute usage in your AWS billing.

**General Notes about EC2 Usage and Costs**

The following information is based on our usage of Elastic Bamboo at Atlassian. These points are intended to be guidelines to EC2 usage and costs only.

- The bulk of EC2 costs from using Elastic Bamboo is for the uptime of EC2 instances. We strongly recommend that you shut down your instances when not in use.
- The costs for storing and moving data in and out of the EC2 will vary. However these costs are minimal (e.g. storing image) compared to instance uptime costs. Using the Amazon Elastic Block Store (EBS) with Elastic Bamboo can significantly reduce the data transfer (and associated costs) in and out of the EC2. Read more about configuring elastic instances to use EBS.
- The costs for using the Amazon Elastic Block Store (EBS) is minimal, relative to instance uptime costs.

**Elastic Bamboo Security**

**Elastic Bamboo** is a feature in Bamboo that allows Bamboo to dynamically source computing resources from the Amazon Elastic Compute Cloud (EC2).

All traffic sent between the agents located in EC2 and the Bamboo server is tunnelled through an SSL-encrypted tunnel. The tunnel will be initiated from the Bamboo Server to the EC2 instance, which means that you don’t need to allow any inbound connections to your server. You will need to permit outbound traffic from the server on the tunnel port, however - the default port number is 26224. On the EC2 instance, only the tunnel port needs to be open for inbound traffic.

SSL tunneling is not implemented for VCS (Version Control System) to EC2 traffic though. You will need to make your VCS available for access from EC2 to use Elastic Bamboo. Please see the section on setting up your VCS for Elastic Bamboo, which contains guidelines on securing your VCS.

Please be warned that just as with a regular host accessible from the Internet, if one of your remote agent instances is compromised, your Bamboo installation may be exposed to number of security vulnerabilities. These include confidential data (e.g. source code, VCS credentials) being stolen, malicious code being injected into elastic agents, unauthorized access to build queues and false information being submitted to Bamboo servers. Given that all Bamboo-related traffic is sent through a single encrypted connection, the risk of that happening is not high and can be further mitigated by setting up a VPC (Amazon Virtual Private Cloud). In a VPC, your elastic instances typically have no public IPs which means they are inaccessible from the internet other than through a regular, industry-standard VPN connection.

The sections below explain the default access rules for remote agent instances and how to change these rules, if desired.
Diagram above: Elastic Bamboo security architecture

Default EC2 Access Rules

When you first use Elastic Bamboo, i.e. start an elastic instance, an 'elasticbamboo' security group will be set up for you on your AWS account. This security group is essentially a set of IP addresses that are permitted access to the EC2. By default, the security group will contain two rules — one to allow connections for Elastic Bamboo itself, and another to allow connections via SSH.

The EC2 security groups can be accessed via the AWS management console (see 'Security Groups' in the left-hand menu under 'Configuration').
Changing the Default EC2 Access Rules

If you wish to permit additional connections to your EC2 instance, you can do this by adding entries to the 'Allowed Connections' section for the 'elasticbamboo' security group. See the previous section on 'Default EC2 Access Rules' for instructions on how to access your EC2 security groups.

Using VPCs with Elastic Bamboo

VPC functionality is available with Bamboo 4.3. Amazon Virtual Private Cloud (Amazon VPC) lets you provision a private, isolated section of the Amazon Web Services (AWS) Cloud where you can launch AWS resources in a virtual network. By default, the instances running in that network will have no public IPs and will not be accessible to the computers outside of your VPC. You can also create a Hardware Virtual Private Network (VPN) connection between your company datacenter and your VPC and leverage the AWS cloud as an extension of your company datacenter. You can read more about VPCs on Amazon Web Services VPC page.

Using a VPC means that your agents (and other instances launched in the VPC) will not be available on the Internet. There are several basic scenarios that can be realised using a VPC:
• Secure access to your company datacenter - agents can securely access resources from your internal network through a VPN connection. In this way, you can safely use your Version Control System or other internal resources such as databases from your Elastic Agents - without making them publicly accessible.

• Hiding some EC2 instances from the Internet - agents can communicate with your other hosts on the VPC using the internal network. This lets you e.g. set up an agent with a Windows-based DBMS and another one that runs tests against that DBMS from a different platform. Computers from outside of the VPC will not be able to access the DBMS because it will have no external IP. You don't need to use VPN for that use case, it's enough to assign an Elastic IP to the agent.

• Full-cloud deployment - you can host your Bamboo server in an Amazon's VPC and hide all your agents in a VPC. This will also let you access your other resources located in a VPC. The Bamboo Server can be accessed using VPN or an Elastic IP.

Setting up your Version Control System (VCS) for Elastic Bamboo

We recommend that you take the following steps to ensure that your Version Control System is set up securely for Elastic Bamboo:

1. Make your Version Control System accessible to the public internet
2. Use VCS authentication and access control
3. Use encrypted connections to VCS

You only need to do this if you are not using a VPC for agent connectivity. See using Bamboo with VPCs for more information.

As SSL tunnelling is not implemented for VCS to EC2 connections, you will need to make your VCS accessible to the public internet to use Elastic Bamboo. If your VCS is behind a firewall this will involve configuring an access point in your firewall. Please consult the documentation for your firewall software for details on how to do this.

2. Use VCS authentication and access control

We highly recommend that you secure access to your VCS by enabling the authentication and access control features on your VCS. Please consult the documentation for your VCS for details.

3. Use encrypted connections to VCS

We also highly recommend that you use encrypted connections for your VCS (e.g. SSL). Please consult the documentation for your VCS for details.

Getting started with Elastic Bamboo

Elastic Bamboo allows you to use computing resources from the Amazon Elastic Compute Cloud (EC2) to run builds. Elastic Bamboo uses a remote agent AMI (Amazon Machine Image) to create instances of remote agents in the Amazon EC2.

On this page:
1. Read important documents
2. Enable and configure Elastic Bamboo
3. Start an Elastic Instance
4. Run a plan build
5. Shut down your Elastic instance
Further information

1. Read important documents

If you are using Elastic Bamboo for the first time, we highly recommend that you start by reading the following important documents:

• About Elastic Bamboo — This high-level overview explains the key concepts behind the Elastic Bamboo feature.
• Elastic Bamboo Security — We strongly recommend that you read this document to understand the

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security implications of enabling Elastic Bamboo. This includes important information on securing your version control system (VCS) for use with Elastic Bamboo.

- **Elastic Bamboo Costs** — Elastic Bamboo sources resources from the Amazon Elastic Compute Cloud (EC2) which are charged separately to your Bamboo license fee. We recommend that you read this document to understand how you will be charged for using Elastic Bamboo.

2. Enable and configure Elastic Bamboo

Once you have understood the concepts, security implications and costs of Elastic Bamboo, you can enable and configure Elastic Bamboo for your Bamboo installation. You will also need to make your version control system (VCS) available to Amazon for Elastic Bamboo to work correctly.

2.1. Enabling Elastic Bamboo

**To enable Elastic Bamboo:**

1. Enable remote agent support in Bamboo — if you have disabled remote agent support, you must enable it before you can enable Elastic Bamboo. The Disabling and enabling remote agents support documentation also contains instructions on how to enable remote agent support.
2. In Bamboo, click **Administration** in the top menu bar.
3. Click **Configuration** in the left navigation panel (under 'Elastic Bamboo'). The 'Elastic Bamboo Configuration' screen will display.
4. Click **Enable**.

2.2. Configuring Elastic Bamboo

Before you can use Elastic Bamboo, you must configure it as detailed in the 'Configuring Elastic Bamboo' document. This is a simple three-step process:

1. **Provide your Amazon Web Services account details**
2. **Configure your Elastic Bamboo global settings**
3. **Configure your elastic instance settings**

- **Read the Configuring Elastic Bamboo document.**

2.3. Providing access to your VCS

You need to make your version control system available to Amazon to run job builds using Elastic Bamboo. This has security implications, particularly if your VCS is behind a firewall.

- **Read the Elastic Bamboo Security document for further instructions,** if you have not read it already.

3. Start an Elastic Instance

Now that you have enabled and configured Elastic Bamboo for your Bamboo installation, you can try building a plan with Elastic Bamboo. You can manually start an elastic instance using the Bamboo administration console. Starting an elastic instance will automatically start an elastic agent process on it.

- **Read about starting an elastic instance**

4. Run a plan build

To run a plan build on your elastic agent, you must set up a plan with its Default Job (plus any other optional jobs) all of whose requirements can meet your elastic agent's capabilities. Elastic agents inherit the capabilities of the image they are started from. We recommend that you use the Bamboo default image to start with.

- **Read about the capabilities of the default image.**

For the purposes of this guide, you should set up your plan so that its jobs' requirements can only be met by the elastic agent's capabilities. This will ensure that the jobs' builds run on your elastic agent. If you cannot set up
your jobs' requirements to meet your elastic agent's capabilities, you can customize your elastic agent's capabilities to add a unique custom capability, e.g. 'elastic=true').

- Read about configuring the capabilities of elastic agents.

Job builds on elastic agents are run just like job builds on any other agent. You will see the progress of your build on your dashboard and can view the build result when it has completed.

**Tip:** You can significantly reduce the costs and time taken to run a job build by configuring Elastic Bamboo to use Amazon's Elastic Block Store (EBS).

5. Shut down your Elastic instance

When your job builds successfully, shut down your elastic instance. As described in Elastic Bamboo Costs, the bulk of your Elastic Bamboo costs are from instance uptime. We strongly recommend that you shut down your elastic instances when not in use.

- Read about shutting down an elastic instance.

Please note, that when you shut down an elastic instance, the agent process it is running is terminated. This means that elastic agents are not present on the 'Agents' page in Bamboo unless they are online. If you wish to view information about a terminated elastic agent, you can find the agent in the elastic agent usage history.

- Read about viewing your elastic agent usage history.

Congratulations! You have successfully set up and run a job build with Elastic Bamboo.

Further information

You may be interested in reading the following related topics below to help you manage and improve Elastic Bamboo's handling of job builds:

- Managing your elastic images, Managing your elastic instances, Managing your elastic agents — information hubs for managing Elastic Bamboo images, instances and agents.
- Configuring elastic instances to use the EBS — information on configuring Elastic Bamboo to use the Amazon Elastic Block Store (EBS) to improve job build times.

Configuring Elastic Bamboo

Elastic Bamboo allows you to use computing resources from the Amazon Elastic Compute Cloud (EC2) to run builds. Elastic Bamboo uses a remote agent AMI (Amazon Machine Image) to create instances of remote agents in the Amazon EC2.

Builds run on these 'elastic agents' in a similar way to how they run on local and remote agents.

⚠️ If you have disabled remote agent support, you must enable it before you can enable Elastic Bamboo. Refer to Disabling and enabling remote agents support for instructions on how to enable remote agent support.

To configure your Amazon Web Services (AWS) account details or settings for Elastic Bamboo:

1. Click the ![Settings](https://example.com/settings.png) icon in the Bamboo header and choose **Overview**.
2. In the left navigation panel, go to **Elastic Bamboo > Configuration**.
3. Click **Edit configuration**.
4. Configure settings as described in the sections below.
5. Click **Save** when finished.
On this page:
- AWS account settings
- Global settings
- EC2 spot instances
- AWS settings
- Automatic elastic instance management

Related pages:
- AWS account for Bamboo
- Configuring elastic instances to use the EBS
- Disabling Elastic Bamboo

AWS account settings

Before you use Elastic Bamboo for the first time in your Bamboo instance, you must enter your Amazon Web Services (AWS) account details into the Bamboo application. If you do not have an AWS account, you must register for one on the AWS registration page before you can enable Elastic Bamboo.

Before you begin:
- Please note, Elastic Bamboo dynamically creates and runs remote agents in the Amazon Elastic Compute Cloud (EC2). Hence, if you choose to use Elastic Bamboo, you will be charged by Amazon for your EC2 compute usage (separately to your Bamboo license fee). These charges will be billed to the AWS account that you provide. Please read Elastic Bamboo Costs for more details.
- Please note, if you change your AWS account details, Bamboo will stop all elastic agents that are currently running.

To set your AWS account details:

You can enter or update your AWS Access Key ID and AWS Secret Access Key as follows:

1. Go to your account: choose My account/console from your user menu at the top right.
2. Click Security credentials.
3. Enter, or update, your AWS Access Key ID.
4. Select the Change AWS Secret Access Key? checkbox, and enter or update your AWS Secret Access Key.
5. Click Save.

Note that your AWS Access Key ID and AWS Secret Access Key are used together to identify you when accessing Amazon EC2 services. If you are unsure what your AWS Account ID and AWS Secret Access Key are, please refer to the Amazon documentation on AWS access identifiers.

Global settings

Elastic Bamboo provides you with a number of global configuration options to help you optimize EC2 usage for your Bamboo job builds. These settings control how the Bamboo server operates and how it manages its elastic instances and agents.

Maximum Number of Elastic Instances

The number of elastic instances that can be running at any one time. You may wish to decrease this value if you are concerned about EC2 compute costs, and you have a large number of concurrent job builds that cannot be supported by your non-elastic agents.

Automatically terminate elastic instance when elastic agent process ends

Controls whether your elastic instances will automatically shut down after the elastic agent processes running on them terminate.

- Shutdown Delay —controls how long an elastic instance will wait before shutting down, after its elastic agent process terminates.
EC2 spot instances

Elastic Bamboo provides support for Amazon EC2 Spot Instances. Amazon spot instances allow you to bid on unused EC2 capacity and use it, as long as your bid exceeds the current "Spot price". You can configure Elastic Bamboo to bid for a spot instance of a particular type, and fall back to a regular instance after a set amount of time if no instances are available.

Enable support for spot instances
Select this checkbox to enable support for spot instances.

Fallback to a regular instance after
The time (in minutes) after which Elastic Bamboo will fall back to using a regular instance, if a spot instance has not become available.

Your current bid levels (per hour)
Fill out this table with your bids. The bids are categorized by EC2 instance type and operating system.

AWS settings

These settings allow you to specify your AWS configuration settings in Bamboo so that Bamboo can operate elastic instances through your AWS account. This section includes settings that are used to configure elastic instances to work with the Amazon Elastic Block Store (EBS).

Using EBS with your elastic instances can significantly reduce the amount of data transfer required to run a job build, compared with starting a clean elastic instance. To find out more about this feature and how to set it up in Elastic Bamboo, read Configuring elastic instances to use the EBS.

Upload AWS account identifiers to new elastic instances
Select to upload the AWS Account Private Key File and Account Certificate File to all new elastic instances started. This is mandatory if you wish to use EBS to store job build information in a snapshot. However, you can also check this option if you are not using EBS (e.g. if you wish upload the AWS account identifiers in order to use Amazon's AWS command line tools).

Key files location
Choose how private key and certificate will be provided.

Account Private Key File
You must specify the location of this file to use the Amazon EBS with Elastic Bamboo. This file is generated by Amazon.

Account Certificate File
You must specify the location of this file to use the Amazon EBS with Elastic Bamboo. This file is generated by Amazon.

If you haven't downloaded an AWS private key file or certificate file to your Bamboo server yet, see IAM best practices on the Amazon page.

Automatic elastic instance management

The Automatic Elastic Instance Management feature allows Bamboo to start and shut down elastic instances automatically (based on build queue demands), so that you do not have to perform these action manually. This feature reduces Bamboo administration overhead and can help minimize your overall elastic instance usage costs.

If a job’s requirements cannot be met by any available online agents, this feature will start any elastic instance whose elastic agent has the capabilities to execute the job, so that the job's build can be generated. Regardless of how an elastic instance was started, all elastic instances will be shut down based on the settings specified below.

Elastic Instance Management
Choose from the following elastic instance management presets. Each of these presets define values for the five criteria described in the 'Custom' user-defined options (below). (Bear in mind that both the 'Aggressive' and 'Passive' presets have trade-offs.)
• **Default** — Balances build queue clearance rates with elastic instance usage costs.
• **Aggressive** — Favors higher build queue clearance rates but with higher elastic instance usage costs.
• **Passive** — Favors lower instance usage costs but with lower build queue clearance rates.
• **Custom** — Choose your own settings, as described below.
• **Disabled** — Disables Bamboo's automatic elastic instance management feature.

**Idle Agent Shutdown Delay**
Specify the number of minutes that an elastic agent must be idle before Bamboo shuts down the elastic instance running that agent.

*Elastic instances running in the Amazon EC2 compute cloud are charged in hourly blocks from the time they are started. To maximize usage of elastic instances in a cost-effective manner, Bamboo only performs these checks just prior to the expiry of each hourly block.*

**Allowed non-Bamboo instances**
The maximum number of elastic instances allowed on your AWS account that are not controlled by this Bamboo instance. When this limit is exceeded, Bamboo will not start any new instances.

**Maximum Number of Instances to Start at Once**
The maximum number of elastic instances that Bamboo can start in one go. Bamboo only starts this maximum number of elastic instances on a 'per minute' basis.

**Number of Builds in Queue Threshold**
The total number of builds in a queue. When this and all other thresholds have been reached, new elastic instances will be started.

**Number of Elastic Builds in Queue Threshold**
The number of builds in the queue that can be executed on elastic instances. When this and all other thresholds have been reached, new elastic instances will be started.

**Average Queue Time Threshold**
The average number of minutes that job builds have been waiting in a queue. When this and all other thresholds have been reached, new elastic instances will be started.

**Generating your AWS Private Key File and Certificate File**
There are several security mechanisms associated with Amazon Web Services (AWS) and EC2:

- The AWS Access Key ID and Secret Access Key that are used by the Bamboo server to authenticate with AWS.
- A login key pair that you can use to log in to EC2 instances that have been started by Bamboo. The key pair is automatically generated, either the first time you use Elastic Bamboo, or if you delete the key pair. The key pair is listed as 'elasticbamboo' in your AWS console. Bamboo does not use this key pair.
- The AWS private key file and certificate file that are generated by Amazon and used together to allow Elastic Bamboo to securely access some of the AWS services, such as EBS for elastic instances and the Amazon command line tools. These are described below.

---

On this page:
- AWS private key file and certificate file
  - Generating the files
  - Downloading the files
  - Notes

Related pages:
- Configuring Elastic Bamboo

---

**AWS private key file and certificate file**

These settings were used for older Bamboo setup. Since then, we've introduced a simplified mechanisms for working with instances as described above.

The Amazon Web Services (AWS) private key file and certificate file are generated by Amazon and work
together to allow Elastic Bamboo to securely access your AWS account. These are required to enable certain features, such as EBS for elastic instances and the Amazon command line tools.

- The **certificate file** contains the public key associated with your AWS account. This file is kept by Amazon, (not on your Bamboo server).
- The **private key file** contains the private key that is used to authenticate requests to AWS. This file must be stored on your Bamboo server, if you are using EBS for elastic instances or the Amazon command line tools.
- The public key and private key from these files together form an **X.509 certificate**.

**Generating the files**

The certificate file will be kept by Amazon (to inject into your elastic instances) and the private key file will be downloaded to your Bamboo server in your Bamboo Home directory. If you are setting up Elastic Bamboo on multiple Bamboo servers using the same AWS account, you can simply copy the private key file across from the original Bamboo server. You should not need to regenerate the private key file and certificate file unless your private key file is lost or corrupted.

If you do need to regenerate the private key file and certificate file, please follow the instructions in the Amazon X.509 Certificates documentation. The Amazon documentation also contains instructions on using your own certificate, if you wish.

**Downloading the files**

We recommend that you store the files in the Home directory of your Bamboo server.

**Notes**

- If you wish to use this security mechanism with multiple Bamboo installations using the same AWS account (e.g. you have configured your elastic instances on each installation to use EBS), you will need to copy the AWS private key file and certificate file to each Bamboo server.
- You can only download the AWS private key file at the time it is generated. If the private key file has already been generated for your AWS account, you will not be able to download it from AWS again (for security purposes). You will have to copy it from wherever it was previously downloaded to. Otherwise you will have to generate a new private key file and certificate file to go with it. **If you regenerate a new private key file and certificate file, any Bamboo servers using the old private key file and certificate file will no longer be able to access the Amazon EC2, as only one X.509 certificate can be associated with your AWS account.**
- You can download the AWS certificate file as many times as you want. This file does not need to be regenerated.

**Configuring elastic instances to use the EBS**

The Amazon Elastic Block Store (EBS) provides 'EBS volumes' which can attach to EC2 instances. EBS volumes (and the 'EBS snapshots' created from these volumes) provide persistent storage for your elastic instances.

If you have relatively static resources required for building your Bamboo jobs (such as, source code checkouts and Maven repository artifacts), you can add these to an EBS volume. From this volume, you can create an EBS snapshot, which effectively records the 'state' of an EBS volume at a given point in time.

After setting up an EBS snapshot, you can then associate it with an elastic image configuration. When this elastic image is started:

- its elastic instance will be started, along with the EBS volume (derived from the EBS snapshot associated with the elastic image) and
- this EBS volume will be attached to this elastic instance
- any build resources (added to the EBS volume prior to creating its snapshot) will be available to this elastic instance.

**Why should I use the EBS with Elastic Bamboo?**

Because an elastic instance is stateless, so also is the elastic agent that runs on it. Hence, every time an elastic instance is restarted from the same image:

- Any resources that its elastic agent must retrieve externally (for example, Maven repository artifacts), must be downloaded in their entirety.
- Full checkouts must be performed by elastic agents when new Jobs are built.
Therefore, you can use the EBS to store these external resources in an EBS volume and snapshot so that they do not have to be downloaded or source code checked out each time you start up an elastic instance from an image. If your jobs rely heavily on downloading such resources and/or you are not performing clean builds each time, the EBS may significantly improve your build times.

Additionally, the EBS provides an easy mechanism for customizing elastic agents, rather than you having to create a custom elastic image from scratch (with your own elastic agent capabilities). For example, you could upload files and scripts to your EBS volume that would install resources such as PostgreSQL databases for your elastic agents, which will be available when the agent’s elastic instance is started.

On this page:
- Creating your first EBS snapshot
- Configuring an elastic image to use an EBS snapshot
- Updating your EBS snapshot
- Important EBS directories and files

Related page:
- Configuring Elastic Bamboo
- Populating your EBS volume

Creating your first EBS snapshot

To create your first EBS snapshot:

1. Download Amazon Web Services (AWS) account identifiers to your Bamboo server — You will need to store the AWS private key file and certificate file on your Bamboo server to use Elastic Bamboo with EBS. If you haven’t downloaded an AWS private key file or certificate file to your Bamboo server yet, please see Generating your AWS Private Key File and Certificate File for instructions.

2. Update your Bamboo configuration settings with the location of the AWS account identifier files you have downloaded. This will ensure that these files are uploaded to any new elastic instances started. See the Elastic Instance Settings section on the Configuring Elastic Bamboo for instructions (you will need to update the Upload AWS account identifiers to new elastic instances (mandatory if EBS Snapshot ID specified) checkbox and Account Private Key File and Account Certificate File fields described on this page).


4. Access your elastic instance via SSH (see Accessing an elastic instance for instructions).

5. Log in as and administrator, such as root in Linux and, in Linux, make sure to load the root user’s environment as below:

   ```
   sudo su -
   ```

   In this case, the '-' or the '-l' or the '-login' parameters is required, otherwise some of the scripts may fail.

6. Follow the steps below to create an EBS volume and attach it to the elastic instance (steps a & b), upload content to the EBS volume (step c & d), and generate the snapshot (step e & f):

   - All the scripts mentioned below are available in /opt/bamboo-elastic-agent/bin on Bamboo stock images. You can also download them from here (choose the latest version).
   - Run `createInitialVolume.sh <volume size>` — This script creates a EBS volume (where `<volume size>` is the size of the volume), attaches the volume and mounts it on the elastic instance. For example, `createInitialVolume.sh 100` will create a 100GB EBS volume and attach and mount it on the elastic instance.
   - Run `rewarmEbsSnapshot.sh` — This script sets up the standard structure for Elastic Bamboo on the EBS volume. The directories and files for this standard volume structure are detailed in the Important EBS Directories and Files section below.
   - (optional) Populate your EBS volume — Your EBS volume can now be populated with any files and scripts that you wish to make available to the elastic instances that use the EBS volume. For example, you may want to upload maven repository data, source code, scripts and files to install databases on your elastic agents, etc. You must upload your files to the `/mnt/bamboo-ebs` folder.
or its subfolders, if you want them to be included in the snapshot. We recommend that you read Populating your EBS volume for guidelines on how to populate your EBS volume effectively.

The EBS volume is attached to the elastic instance, so accessing your elastic instance via SSH will give you full access to the EBS volume (see Important EBS Directories and Files below).

d. Ensure all uploaded content has the owner bamboo:bamboo — You can set the owner of a file by executing the following command: chown -R bamboo:bamboo <filename>

e. Execute the killall java command — This command kills all processes on the instance, such as agent processes, so that the volume can be unmounted to be snapshotted.

f. Run generateSnapshot.sh — This script unmounts and detaches the volume, before creating a snapshot based on the volume. The time taken to create the snapshot will vary depending on the amount of content that you have uploaded to the EBS volume. The Snapshot ID for the snapshot will be available in the logs for the elastic instance. See Accessing an Elastic Instance for instructions on how to access the logs for your elastic instance.

    The device can not unmount if any terminals are currently in the mounted volume.

7. Shut down your elastic instance. See Shutting down an elastic instance for instructions.

Configuring an elastic image to use an EBS snapshot

Once you have set up an EBS snapshot, the final step is to add the snapshot details to an elastic image configuration, so that any instances started from that image will have EBS volumes attached to them. You can associate different snapshots with different elastic image configurations.

To configure Elastic Bamboo to use an EBS snapshot:

1. Determine the Snapshot ID of the EBS snapshot you have just created. The Snapshot ID should be recorded in the logs of the elastic instance you created it on. You can also view your EBS snapshots in the AWS Console by clicking the Snapshots menu item.

2. Click the icon in the Bamboo header and choose Overview.

3. In the menu on the left, go to Elastic Bamboo > Image Configurations.

4. Click Edit in the 'Operations' column for the elastic image configuration that you would like to add your EBS snapshot to. The 'Edit Elastic Image Configuration - <imagename>' screen will display (see screenshot below).

5. Check Automatically attach an Amazon Elastic Block Store (EBS) volume to new elastic instances.

6. Enter the Snapshot ID of your EBS snapshot in the EBS Snapshot ID field.

7. Check Use legacy EBS handling to resolve EBS issues for images older than two years.

8. Click Save. A new EBS volume will be created from the specified snapshot and attached to any new elastic instances started from that image.

Updating your EBS snapshot

If you are currently using EBS with Elastic Bamboo and want to update your snapshot, follow the instructions below. These are similar to the instructions for creating a new EBS snapshot.
To update your EBS snapshot:

2. **(optional)** Run a build on the elastic agent of the instance to populate the attached EBS volume. We recommend that you read Populating your EBS volume for guidelines on how to populate your EBS volume effectively.
3. Access your elastic instance via SSH (see Accessing an elastic instance for instructions) and do the following:
   
   All the scripts described below are bundled with Bamboo.
   
   a. Log in as an administrator, such as `root` in Linux and, in Linux, make sure to load the root user's environment as below:

   ```
   sudo su -
   ```

   In this case, the `-l` or the `-login` parameters is required, otherwise some of the scripts may fail.

   b. **(optional)** Upload any additional content to the attached EBS volume via Secure Copy (SCP). You must upload your files to the `/mnt/bamboo-ebs` folder or its subfolders, if you want them to be included in the snapshot.
   c. Execute `killall java` — This command kills all agent processes, so that nothing is using the mounted volume.
   d. Execute `jps -vl` — This command displays a list of all java processes running on your instance. There should be no java processes running.
   e. Run `generateSnapshot.sh` — This script unmounts and detaches the volume, before creating a snapshot based on the volume.
      
      The device can not unmount if any terminals are currently in the mounted volume.
   f. Check the elastic instance logs for the Snapshot ID of the snapshot you just created. See Accessing an Elastic Instance for instructions on how to access the logs for your elastic instance.
   g. Update the new Snapshot ID in your Elastic Bamboo configuration, as described in Configuring an Elastic Image to use an EBS snapshot above.

**Important EBS directories and files**

By convention, Bamboo will attach an EBS device at `/dev/sdh`. This will be mounted at `/mnt/bamboo-ebs`. The contents of the standard structure are:

- `bin/customiseInstance.sh` - This script is run on startup of an elastic instance. We recommend that you do not customize this script, as it is overwritten when `rewarmEbsSnapshot.sh` is run.
- `bin/customise-extras.sh` - This script is run on startup of an elastic instance as the root (as opposed to being run as the Bamboo user). This script is safe to customize, as it will never be overwritten. You can customize this script to automate processes such as setting up your database, move files to custom locations on the instance, etc.
- `profile-extras.sh` - This script gets appended to the profile that is run under the Bamboo user (as opposed to being run as the root). It is useful for setting up environment variables.
- `bamboo-agent/bamboo-agent.cfg.xml` - This configuration file modifies the build working directory to point to build working directory on the EBS volume.
- `bamboo-agent/build-dir` - This is the build working directory.
- `maven/build.properties` - This properties file is copied to `/home/bamboo` on startup of an elastic instance. It points the Maven 1 default repository to `/mnt/bamboo-ebs/maven/.maven
- `maven/.m2/settings.xml` - This configuration files is copied to `/home/bamboo/.m2` on startup of an elastic instance. It points the Maven 2 default repository to `/mnt/bamboo-ebs/maven/.m2/repository.
- `tmp-extras` - The contents of this directory is copied to `/tmp` on startup of an elastic instance.

-----
2. Access your elastic instance via SSH (see Accessing an elastic instance for instructions).

```
    sudo su -
```

   a. In this case, the '-' or the '-l' or the '-login' parameters is required, otherwise some of the scripts may fail.

4. Follow the steps below to create an EBS volume and attach it to the elastic instance (steps a & b), upload content to the EBS volume (step c & d), and generate the snapshot (step e & f):

   All the scripts mentioned below are available in `/opt/bamboo-elastic-agent/bin` on Bamboo stock images. You can also download them from here (choose the latest version).

   a. Run `createInitialVolume.sh <volume size>` — This script creates a EBS volume (where `<volume size>` is the size of the volume), attaches the volume and mounts it on the elastic instance. For example, `createInitialVolume.sh 100` will create a 100GB EBS volume and attach and mount it on the elastic instance.

**Populating your EBS volume**

This page is intended to complement the instructions for Configuring elastic instances to use the EBS. It lists different methods of for populating your EBS volume, depending on the data you wish to have available in your snapshot.

**On this page:**
- Uploading Maven 2 repository data
- Uploading Ant repository data
- Setting up PostgreSQL for elastic agents
- Setting up Selenium on elastic agents

**Related pages:**
- Configuring elastic instances to use the EBS

**Uploading Maven 2 repository data**

You can upload Maven 2 repository data to your EBS volume, so that it does not have to be downloaded every time an elastic agent (running on an instance which uses the EBS volume) is started.

To populate your EBS snapshot with your Maven repository data, we recommend that you upload it via SCP (see step 5c of the 'Creating your first EBS snapshot' section in Configuring elastic instances to use the EBS). In most cases, you will have a modified `settings.xml` file if you are using Maven 2. This means that you will need to upload this file and Maven repository data to your EBS volume, rather than populating your volume by running a build.

**Uploading Ant repository data**

You can upload Ant repository data to your EBS volume, so that it does not have to be downloaded every time an elastic agent (running on an instance which uses the EBS volume) is started.

To populate your EBS snapshot with your Ant repository data, we recommend that you run a build on an elastic agent with a blank EBS volume attached to the elastic instance (see step 2 of the 'Updating your EBS snapshot' section in Configuring elastic instances to use the EBS). This is a faster and more reliable method of populating your volume, if you are using Ant.

**Setting up PostgreSQL for elastic agents**

You can upload scripts to your EBS volume so that the elastic agent started on any elastic instances which use this EBS volume, will have PostgreSQL automatically installed.

   *These elastic instances must be started from an elastic image which is associated with an EBS snapshot derived from this EBS volume.*

To set up the automatic installation of PostgreSQL on your EBS volume for elastic agents, you will need to
create the following script:

setupPostgreSQL.sh

```bash
#!/bin/sh
yum install -y postgresql-server
service postgresql initdb
cat > /var/lib/pgsql/data/pg_hba.conf << EOF
local all all trust
host all all 127.0.0.1/32 trust
EOF
/etc/init.d/postgresql start
EOF/init.d/postgresql start
```

This script uses the package management tools provided by Fedora to install and configure PostgreSQL on the agent when its started.

1. Uses `yum` to install the PostgreSQL server packages. Details on the yum tool can be found in the Fedora Software Management Guide.
2. Initializes the PostgreSQL server environment by creating the database directories and default config files.
3. Creates a new pg_hba.conf file which trusts all local connections and all connections coming from localhost.
4. Starts PostgreSQL.

You then need to update the `customise-extras.sh` file on your EBS volume (see Important EBS Directories and Files) to invoke this script.

Finally, you need to add a custom capability (e.g. postgres=true) to the elastic agents with PostgreSQL installed. You can do this by updating the elastic image configuration that the agents inherit their capabilities from. Read Configuring elastic agent capabilities for detailed instructions.

Setting up Selenium on elastic agents

You can upload scripts to your EBS volume so that the elastic agent started on any elastic instances which use the EBS volume, will be able to run Selenium tests.

ℹ️ These elastic instances must be started from an elastic image which is associated with an EBS snapshot derived from this EBS volume.

To set up elastic agents to support Selenium test, you will need to create the following script:

setupSelenium.sh
#!/bin/sh

centosMajorVersion=5
centosVersion=${centosMajorVersion}

cat >/etc/yum.repos.d/centos-$centosVersion.repo <<EOF
[centos-base]
name=CentOS - Base
mirrorlist=http://mirrorlist.centos.org/?release=${centosVersion}&arch=\$basearch&repo=os
gpgcheck=1
gpgkey=http://mirror.centos.org/centos/RPM-GPG-KEY-CentOS-$centosMajorVersion
enabled=0

[centos-update]
name=CentOS - Updates
mirrorlist=http://mirrorlist.centos.org/?release=${centosVersion}&arch=\$basearch&repo=updates
gpgcheck=1
gpgkey=http://mirror.centos.org/centos/RPM-GPG-KEY-CentOS-$centosMajorVersion
enabled=0

EOF

yum -y --enablerepo=centos-base install firefox

yum -y install xorg-x11-server-Xvfb xterm xorg-x11-server-utils twm xorg-x11-fonts-ISO8859-1-75dpi xorg-x11-fonts-Type1

/usr/bin/killall Xvfb

#Start virtual screen
Xvfb :100 -ac -screen 0 1024x768x24 &

This script uses the package management tools provided by Fedora to install Mozilla’s Firefox and enough of X to get a VNC (Virtual Network Computing) server running.

1. Uses **yum** to install the following packages. Details on the yum tool can be found in the [Fedora Software Management Guide](#).
   - vnc-server — the vnc server used by the selenium test server.
   - xorg-x11-server-Xvfb xterm xorg-x11-server-utils twm xorg-x11-fonts— these packages cover the xorg dependencies to get Firefox to run.

2. The script then copies some prepared VNC authentication files into the bamboo home directory and sets their permissions accordingly. These files are:
   - vncpasswd — this is the password file used by the VNC server (copied to `/home/bamboo/.vnc/passwd`)
   - vncxstartup — this is the script executed by the VNC server when a connection is made (copied to `/home/bamboo/.vnc/xstartup`)

3. The last step of this script is to manually install Firefox into `/opt/firefox` (*we manually install Firefox because the package that would be installed by the Fedora 8 package management appears to be outdated*).
   - The tar is extracted to the appropriate directory
   - The `.bashrc` file is customized to include the Firefox directory when searching for libraries. This is so Firefox will be able to find its libraries.
You then need to update the `customise-extras.sh` file on your EBS volume (see Important EBS Directories and Files) to invoke this script.

Finally, you need to add a custom capability (e.g. `selenium=true`) to the elastic agents with PostgreSQL installed. You can do this by updating the elastic image configuration that the agents inherit their capabilities from. Read Configuring elastic agent capabilities for detailed instructions.

Managing Elastic Bamboo

The following pages and the related sub-pages contain information on managing your elastic image, instances and agents.

- **Managing your elastic images** — please see this page and the related sub-pages for detailed information about Elastic Bamboo images in Bamboo. This includes instructions on how to view and customize the capabilities of your Elastic Bamboo images.
- **Managing your elastic instances** — please see this page and the related sub-pages for detailed information about Elastic Bamboo instances in Bamboo. This includes instructions on how to view, start, stop and access an elastic instance.
- **Managing your elastic agents** — please see this page and the related sub-pages for detailed information about Elastic Bamboo remote agent instances in Bamboo. This includes instructions on how to view and disable an elastic instance.

Managing your elastic images

An **elastic image** is an Amazon Machine Image (AMI) that is stored in one of Amazon data centers for use with the Elastic Bamboo feature. An elastic image is used to create **elastic instances**, which in turn create elastic agents. Conceptually, an elastic image is equivalent to an operating system running on a computer's boot hard drive and elastic instances would be the software that runs on this operation system.

Each elastic image registered with the Amazon Web Services (AWS) has its own unique identifier, known as an **AMI ID**.

You can **associate multiple elastic images** with a Bamboo server. One **default shared image** is maintained by Atlassian in AWS, and is available to all Elastic Bamboo users.

You can also **create your own custom elastic images**.

If you haven't provided your AWS details in Bamboo, you must set them before you can work with elastic instances. For more information, see Configuring Elastic Bamboo.

- To view an elastic image, including the image properties, capabilities and the jobs that an image can build, see Viewing an elastic image.
- To associate an elastic image with your Bamboo installation, see Managing your elastic image configurations.
- To customize the capabilities of an elastic image, see Configuring elastic agent capabilities.
- To create your own custom elastic image, see Creating a custom elastic image.

Viewing an elastic image

An **elastic image** is similar to an agent, so the 'Image' page closely resembles the 'Agent' page. A number of functions available for agents are also available for images.

- **Viewing an elastic image's capabilities** — your image has capabilities, similar to how agents have capabilities. Read more about viewing an agent's capabilities.
- **Viewing the jobs that an image can build** — you can also view the jobs that an image is capable of building (using the elastic agent created from the image), in a similar way to how you view the jobs that an agent is capable of building. Read more about viewing the jobs that an agent can build and determining which agents can build which jobs.

**Related pages:**
- Managing your elastic images

**To view an image:**

1. Click the
1. Click the icon in the Bamboo header and choose **Overview**.
2. Click **Image Configurations** in the left navigation panel (under 'Elastic Bamboo').
3. Click the name, or **View**, for the image that you want to view.

### Name
The name of the image.

### AMI ID
The Amazon Machine Image identifier that uniquely identifies the image.

### EBS Snapshot ID
The ID of the EBS Snapshot that you have associated with this image. See [Configuring elastic instances to use the EBS](#) and [Managing your elastic image configurations](#) for more information on how to use EBS with Elastic Bamboo.

### Instance Type
The instance type of new instances started from this image. Read more about [Amazon instance types](#).

### Availability Zone Preference
New instances started from this image will be run in the Amazon availability zone named here.

### Active Instances
The number of currently active instances that were started from this image.

---

### Manage Elastic Image Configurations  
**Maven 2.1 Image**

<table>
<thead>
<tr>
<th><strong>Elastic Image Configuration</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
<td>Maven 2.1 Image</td>
</tr>
<tr>
<td>Contains Maven 2.1 and the necessary bits for Selenium 2</td>
<td></td>
</tr>
<tr>
<td><strong>AMI ID</strong></td>
<td>ami-0ab64563</td>
</tr>
<tr>
<td><strong>EBS Snapshot ID</strong></td>
<td>snap-68204c00</td>
</tr>
<tr>
<td><strong>Instance Type</strong></td>
<td>High-CPU Medium</td>
</tr>
<tr>
<td><strong>Availability Zone Preference</strong></td>
<td>Default (chosen by EC2)</td>
</tr>
<tr>
<td><strong>Active Instances</strong></td>
<td>13</td>
</tr>
</tbody>
</table>

Start Instances | Disable | Edit

#### Elastic Image Capabilities

A capability is a feature of an agent. There are 3 types of capabilities: builders, JDKs and custom. You can use this page to view, add and delete capabilities associated with this Elastic Image Configuration. Any existing elastic instances will need to be restarted to pick up these changes.

The following capabilities exist on Elastic Agents running on an instance of this Image:

- **Custom**
  - Custom capabilities are key-value pairs that define particular characteristics of an agent (e.g. `operating.system=Windows\XP`, `fast.builds=true`). For an agent to be able to build a job, both the 'Key' and 'Value' must match the values configured for this image.

---

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Managing your elastic image configurations

An elastic image is an Amazon Machine Image (AMI) that is stored in one of Amazon data centers for use with the Elastic Bamboo feature. An elastic image is used to create elastic instances, which in turn create elastic agents. Conceptually, an elastic image is equivalent to an operating system running on a computer’s boot hard drive and elastic instances would be the software that runs on this operation system.

Each elastic image registered with the Amazon Web Services (AWS) has its own unique identifier, known as an AMI ID.

You can associate multiple elastic images with a Bamboo server. One default shared image is maintained by Atlassian in AWS, and is available to all Elastic Bamboo users.

You can also create your own custom elastic images.
Associating custom elastic images with Bamboo

Associating a custom elastic image with your Bamboo installation allows you to start elastic instances with capabilities that are different from those inherited from the default image. For example, you may wish to associate a Ubuntu operating system-based elastic image with your Bamboo installation, so that you can run Ubuntu-related tests on the instances started from that image.

Once you have associated a custom elastic image with Bamboo, the settings for your elastic image are stored as an elastic image configuration.

To associate a custom image with Bamboo:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Image Configurations in the left navigation panel (under 'Elastic Bamboo').
3. Enter the details of your custom elastic image in the panel under 'Create Elastic Image Configuration':

   **Name**
   The name of your custom elastic image. If you created your own custom image, you should have named it in step 6 of the Creating a custom elastic image instructions. You can also view the image name via the AWS console.

   **Description**
   A description for your image, which is used in Bamboo only.

   **AMI ID**
   The AMI ID obtained as an output from step 6 of the Creating a custom elastic image instructions. You can also view the AMI IDs of elastic images via the AWS console.

   **Automatically attach an Amazon Elastic Block Store (EBS) volume to new elastic instances**
   Select this option if you want the elastic instances started from this image to use the EBS. Read more about Configuring elastic instances to use the EBS.

   **EBS Snapshot ID** — Specify the EBS Snapshot ID of the EBS volume that you wish to attach to new instances.

   **Instance Type**
   The instance type for new instances started from this image. Amazon offers a number of instance types that provide different computing capacity. Read more about Amazon EC2 instance types.

   **Virtual Private Cloud Subnet**
   The Subnet of the Virtual Private Cloud where your Elastic Bamboo agent will start up. Choose multiple subnets from the list to enable Bamboo to automatically switch between Availability Zones when starting agents. This reduces the chance of a build failing because of a lack of available resources in a particular zone. For more about VPC, see the Amazon VPC FAQ.

   **Availability Zone**
   The availability zone used to start your new instances from this image in (e.g. if you wish to use Elastic Bamboo with reserved instances). We recommend that you select "Default (chosen by EC2)" to allow Amazon to select the best zone for your instance. Read more about Amazon EC2 availability zones.

   **Product**
   The EC2 product name.
Creating elastic images with custom agent capabilities

You can customize the agent capabilities of an elastic image that is already associated with Bamboo. The initial process is similar to that of associating a custom elastic image with Bamboo (above). Here, however, you use the AMI ID of an image already associated with Bamboo — most commonly the default image.

To create an elastic image with customized agent capabilities:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Image Configurations in the left navigation panel (under ‘Elastic Bamboo’).
3. Click the name, or View, for the image that you want to view.
4. Enter the details of your custom elastic image in the panel (under ‘Create Elastic Image Configuration’). See the section above for details.
5. You now have a new elastic image configuration based on an existing elastic image. Follow the procedure on Configuring elastic agent capabilities to customize this elastic image's agent capabilities.

Creating a custom elastic image

Atlassian doesn't provide support for customized images. Bamboo provides flexibility to use customized machine images, but it's impossible for us to support all individual configurations.

Use Bamboo stock images as the base for all image customizations to ensure a minimal level of consistency of your Elastic Bamboo setup.

An elastic image is an Amazon Machine Image (AMI) that is stored in one of Amazon data centers for use with the Elastic Bamboo feature. An elastic image is used to create elastic instances, which in turn create elastic agents. Conceptually, an elastic image is equivalent to an operating system running on a computer's boot hard drive and elastic instances would be the software that runs on this operation system.

Each elastic image registered with the Amazon Web Services (AWS) has its own unique identifier, known as an AMI ID.

You can associate multiple elastic images with a Bamboo server. One default shared image is maintained by Atlassian in AWS, and is available to all Elastic Bamboo users.
At a high level, the process for creating a custom elastic image consists of taking one of the existing Amazon Machine Images (AMIs) available on Amazon EC2, starting an instance of the AMI, customizing the instance and then creating an image from the customized instance. This image can then be used as an elastic image in your Bamboo installation.

Instead of creating a custom image (Linux/UNIX only) consider:

- Using the "Instance setup script" feature to run commands (executed as the root user) before the agent is started. This field is available for every image from the Administration > Image Configurations page. Click the "Edit" link under Operations for the image you want to use.
- Customizing an existing Bamboo image by using Amazon's Elastic Block Store (EBS), as described in Configuring elastic instances to use the EBS.

The options above are much simpler than creating a new custom image. If you are having problems, please don't hesitate to contact us for further help.

Before you begin:

- This is not a trivial procedure and chances are you don't need it.
- Please note, Atlassian does not support custom elastic images. Consider customizing the elastic agents started from your stock images instead.
- A number of the EC2 commands in the steps below can be completed using the AWS console rather than command line tools (e.g. registering an image). You should use the method you feel most comfortable with.

On this page:
1. Requirements
2. Selecting an existing AMI
3. Starting an instance
4. Accessing your instance
5. Customizing your instance
6. Creating an image of your customized instance
7. Next steps
8. Need more help?

1. Requirements

First ensure that you have set up the following:

- Amazon Web Services (AWS) account with EC2 — if you are already using Elastic Bamboo, you should already have an AWS account with EC2 set up. If not, please read Getting started with Elastic Bamboo.
- Amazon EC2 API Tools — you must install the EC2 API tools on your local machine, otherwise you will not be able to start and access your AMI instance. Note: you need Java Runtime Environment to run these tools. You can install the EC2 API tools by executing the following commands:

```
wget http://s3.amazonaws.com/ec2-downloads/ec2-api-tools.zip
unzip ec2-api-tools.zip
```

- Environment Variables — you must set up the following environment variables on your local machine before creating a custom elastic image:
  - `EC2_HOME` — set this to the path to the installed EC2 API Tools
  - `EC2_CERT` — set this to the path to the certificate assigned to EC2 account
  - `EC2_PRIVATE_KEY` — set this to the path to the private key assigned to your AWS account
- Registered Key Pair — you need a registered EC2 key pair, which consists of a private key file and certificate file, to use the EC2 API tools with your AMI instance. If you have previously generated and registered an EC2 key pair (e.g. to use the EC2 API tools), you can re-use it. If you need to generate a new key pair, you can use the following command to do so:
ec2-add-keypair <key_pair_name>

The content of the private key will be displayed in the command-line output on your console. Save this content in a file, starting with the line:
"--BEGIN RSA PRIVATE KEY--"

and ending with the line:
"--END RSA PRIVATE KEY--"

This private key file will be used to access your AMI instance. Set up the appropriate permissions on the private key file by executing the following command:

chmod 600 <private_key_file>

2. Selecting an existing AMI

We strongly recommend that you select an existing Linux/UNIX AMI to customize, rather than starting with a blank AMI. When choosing an AMI, decide whether you want to launch 32-bit or 64-bit instances from your custom elastic image and select an existing AMI matching your choice.

We recommend the following existing Linux/UNIX AMIs for customization (in order of preference):

<table>
<thead>
<tr>
<th>Source</th>
<th>Description</th>
<th>AMI list</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlassian</td>
<td>One of the Stock images provided by Atlassian. It is an Amazon image, for either Linux or Windows, updated and prepared for Bamboo, i.e. you will not have to install any Bamboo prerequisites.</td>
<td>Available on your Bamboo instance under Administration/Image Configurations</td>
</tr>
<tr>
<td>Amazon</td>
<td>CentOS-based image provided by Amazon. It does not have any Bamboo prerequisites installed. Typically, you will be better off using the Atlassian AMI.</td>
<td>Amazon's site</td>
</tr>
<tr>
<td>Canonical(Ubuntu)</td>
<td>An official Ubuntu image provided by Canonical (the company behind the Ubuntu Linux project). It does not have any Bamboo prerequisites installed.</td>
<td>Canonical's site</td>
</tr>
</tbody>
</table>

Atlassian's AMIs (and hence, their IDs) may change with each release of Bamboo, including both major and minor releases. To quickly access Atlassian's AMI IDs for your currently-running version of Bamboo, open that Bamboo site in a web browser and access its 'Image Configurations' page (see Managing your Elastic Image Configurations for more information). The AMI IDs of Atlassian's AMIs are labeled with "(stock image)".

If you want to find out the AMI IDs for a version of Bamboo you don't have running or you're starting an image from scratch and you need the image baseline:

2. On the resulting directory page, click the link that represents the version of Bamboo you are currently running. For example, if you are running Bamboo 5.9.7, click on the 5.9.7 link. Another directory page opens, listing a .pom and some additional checksum files.
   ! Warning: Do not click on a version number link that contains 'mX', 'rcX' or 'betaX' (where 'X' is a number), since these relate to publicly available developmental releases of Bamboo.
3. Open the atlassian-bamboo-x.x.x.pom file (where x.x.x is your version of Bamboo). The image version/baseline is stored in the elastic-image.version tag. For example, this value is "4.2" for Bamboo version 5.9.4.
3. Starting an instance

After you have selected an existing AMI to customize, the next step is to start an instance of the AMI.

3.1 Starting an instance of Atlassian's default AMI

If you chose to customize Atlassian's default AMI, you will have to start the instance from the admin section of Bamboo. See Starting an elastic instance.

Note that Atlassian's default AMI cannot be started using the command line ec2 tools. This is because, on start up, the Bamboo agent on Atlassian's AMI checks to see if it was started from a Bamboo server, and immediately shuts itself down if it was not.

Once started, see Accessing an elastic instance for details on how to access the running instance.

3.2 Starting an instance from the command line

Use the `ec2-run-instances` command to start your instance, as follows:

```
ec2-run-instances <image_name> -k <key_pair_name>
```

where `<image_name>` is the name of the AMI selected in the previous step and `<key_pair_name>` is the name of the registered key pair generated in 1. Requirements. The public certificate of this key will be injected into your instance.

For example, if you wanted to start an instance of image `ami-e55bbd8c` using key pair `my-keypair`, you would run the following command:

```
ec2-run-instances ami-e55bbd8c -k my-keypair
```

This command would produce the following command-line output:

```
INSTANCE        i-25b86743   ami-e55bbd8c     running   my-keypair
```

`i-25b86743` is the name of the new instance in the above example. You should note down the name of your new instance, as you will need that to access your instance in the next step.

3.3 Starting an instance from Bamboo

You can also start a fresh, uncustomized image from Bamboo and begin customization. The drawback of this approach is that you have only 40 minutes before Bamboo shuts down your instance. The advantage is that you can customize the agent in a single step (as opposed to having to customize/create image/start from Bamboo/save image again).

4. Accessing your instance

Don't forget to shut down unused instances

Please note that once you start an instance, you will be billed by Amazon for instance uptime. If you decide to abandon the setup of a custom elastic image after this step, please ensure that you shut down your instance via the AWS console.
Once your instance is running, you will need to obtain the address of the instance so you can access it. To do this, use the following command:

```
ec2-describe-instances <instance_name>
```

For example, if you wanted to find the address of instance `i-25b86743`, you would enter:

```
ec2-describe-instances i-25b86743
```

This command would produce the following command-line output similar to this:

```
RESERVATION r-790f7210 121852097033 default
INSTANCE i-25b86743 ami-e55bbd8c
domU-12-31-39-04-38-87.compute-1.internal running elasticbamboo 0
m1.small
2009-06-24T12:36:20+0000 us-east-1c aki-a71cf9ce ari-a51cf9cc
monitoring-disabled
```

The address of the instance in the above example is `ec2-174-129-94-241.compute-1.amazonaws.com`

You can then use this address to access the instance via SSH. See Accessing an elastic instance for instructions. If you are using the example command text from that document, you will need to adjust it as follows:

- replace `/opt/bamboo/home/xml-data/configuration/elasticbamboo.pk` in the example command text with the private key file you generated in ‘1. Requirements’.
- replace `ec2-68-111-185-197.compute-1.amazonaws.com` in the example command text with the address of your instance.

5. Customizing your instance

Now that you have a running instance, customization steps heavily depend on the operating system you’re using. We’ve prepared separate pages with Linux-specific instructions and Windows-specific instructions.

6. Creating an image of your customized instance

The process of creating a new image varies depending whether you based your image on an instance-store or EBS-root image. You can check your image type via AWS console or using `ec2-describe-images`.

Creating an image from EBS-root instances

See here for instructions: Amazon Tutorial

Creating an image from instance-store (S3) instances

The final step is to create an image from your customized instance. To do this, you will require the following information:

- Amazon Account Number
- Access Key ID
- Secret Access Key
- Amazon S3 bucket name that will be used to store image (if you don’t have access to Amazon S3, you can sign up on this page.)
1. **Transfer Amazon private key file and certificate to your instance**
   Transfer the key files to your instance by running these commands on your local machine:
   
   ```
   scp -i <private_key_file> $EC2_PRIVATE_KEY
   root@<instance_address>:/mnt
   scp -i <private_key_file> $EC2_CERT root@<instance_address>:/mnt
   ```
   
   where `<private_key_file>` is the private key file from your local machine created in step ‘Registered Key Pair’ of 1. Requirements and the `<instance_address>` is the address of your instance from ‘4. Accessing your Instance’.

2. **Set up EC2_HOME and JAVA_HOME environment variables**
   Set up these environment variables by running the following commands on your instance:
   
   ```
   export EC2_HOME=<location of your EC2 tools installation>
   export EC2_PRIVATE_KEY=/mnt/<ec2_private_key_file>
   export EC2_CERT=/mnt/<ec2_certificate_file>
   export JAVA_HOME=<path to JRE used to start the agent>
   ```

3. You can create an image of your customized instance by using the `ec2-bundle-vol` command, as follows:
   
   ```
   ec2-bundle-vol -c $EC2_CERT -k $EC2_PRIVATE_KEY -u
   <amazon_account_number> -p <elastic_image_name> --batch --debug
   ```
   
   where `<elastic_image_name>` is the name that you want to assign to your custom image (e.g. ‘CustomImage1’)

4. Once the image is created, you need to upload it to Amazon S3 by running the command below:
   
   ```
   ec2-upload-bundle -b <s3_bucket_name> -m
   /tmp/<elastic_image_name>.manifest.xml -a <access_key_id> -s
   <secret_access_key> --retry --debug
   ```
   
   where `<s3_bucket_name>`, `<access_key_id>` and `<secret_access_key>` are the Amazon S3 bucket name, Access Key ID and Secret Access Key described previously, and `<elastic_image_name>` is the name that you want to assign to your custom image (e.g. ‘CustomImage1’).

   You will then need to register your image with Amazon EC2 by using the `ec2-register` command:
   
   ```
   ec2-register <s3_bucket_name>/<elastic_image_name>.manifest.xml
   ```
   
   where `<s3_bucket_name>` is the Amazon S3 bucket name described previously and `<elastic_image_name>` is the name that you want to assign to your custom image (e.g. ‘CustomImage1’). The output of this command will show the AMI ID of your custom image.

7. **Next steps**

   Now that you have created a custom elastic image, there are **two more steps** that you will need to complete before you can use it.
First, you will need to **associate your custom elastic image with your Bamboo installation** by creating an Elastic Image Configuration. Please note the AMI ID of your new custom image and read **Managing your Elastic Image Configurations** for further instructions.

Secondly, you will need to **configure the capabilities of the elastic agents** that will run on instances started from your image. This is done by adding the appropriate builder, JDK, Perforce and custom capabilities to your elastic image configuration, so that it reflects what your custom elastic image actually can do. For example, if you have created a custom elastic image with JDK 1.6 and Maven 2 installed, you will need to add capabilities for JDK 1.6 and Maven 2 to the elastic image configuration. Read **Configuring Elastic Agent Capabilities** for further instructions.

8. Need more help?

If you need **more help**, there are a number of resources that you can take advantage of:

- **AWS Support Center** — if you are having problems with any of your Amazon services, not specifically related to Bamboo, you can obtain basic support from the AWS Support Center. Note, you will need to sign up for Premium Support to get access to web/phone support.
- **AWS Resource Center** — the AWS Resource Center has links to online documentation, code samples and tools for AWS services.
- **Bamboo Developer Forums** — please feel free to discuss any useful tips or issues regarding this process in the Bamboo Developer Forums.

---

**Creating a custom elastic image - Linux**

Atlassian doesn't provide support for customized images. Bamboo provides flexibility to use customized machine images, but it's impossible for us to support all individual configurations.

Use Bamboo stock images as the base for all image customizations to ensure a minimal level of consistency of your Elastic Bamboo setup.

5. Customizing your instance

Customizing your instance is the most complicated part of creating a custom elastic image. You need to **install the packages** that are prerequisites for Bamboo onto your instance (if you didn't choose the Elastic Bamboo Stock images as your base AMI), **add your customizations**, deploy Bamboo onto your instance and **set up an EC2 environment** on your instance.

5.1 Installing Bamboo prerequisite packages

If you selected Atlassian's AMI as your base AMI in '2. Selecting an Existing AMI', you can skip this step and go to '5.2 Adding Customizations' as this image has been pre-configured for Bamboo. If you have selected a different AMI, you will need to install the following packages onto your instance using the commands shown below:

**Amazon EC2 API tools**

```
wget http://s3.amazonaws.com/ec2-downloads/ec2-api-tools.zip
unzip ec2-api-tools.zip
mv ec2-api-tools-* /opt/ec2-api-tools
```

Note: if your distribution already contains ec2-api-tools package, you can install it instead.

**Java JRE**

You need to install a JRE (or JDK) on your instance to be able to run the agent. The preferred way of doing this is to install a package that came with your distribution. For a list of supported JREs, see **supported platforms**.

5.2 Adding user customizations to your instance
Adding your own customizations is quite a simple process, once you have made it this far.

**To add user customizations to your instance:**

1. Log into your elastic instance (as previously described in '4. Accessing your Instance').
2. Once you have logged into your elastic instance, you can treat it as a standalone machine and install anything you want. For example, if you want to install Tomcat on an Ubuntu instance you would run `sudo apt-get install tomcat6`, configure it, ensure that your startup scripts are in place, etc, just as you would when installing Tomcat on a standalone machine. **Please note however, you cannot customize the operating system of a running instance. If you want to create an instance with a customized operating system (e.g. Ubuntu), you will need to select an AMI with that operating system installed (as previously described in '2. Selecting an Existing AMI').**
3. Everything that you install will be saved in snapshot image created at the end of these instructions (see '6. Creating an Image of your Customized Instance'). Any instances started from this image will have all of your user customizations automatically installed.

5.3 Deploying Bamboo onto your instance

Once you have installed the Bamboo pre-requisites on you instance and added your customizations, you can deploy Bamboo elastic bootstrap files onto your instance.

5.3.1 Creating Bamboo user

First, you need to create a `bamboo` user on your instance by running the following command:

```
useradd -m bamboo
```

5.3.2 Downloading agent installer to the instance

Then, install Bamboo Agent binaries as described below. In this case we're using image version 2.2, you should use the latest version available at [https://maven.atlassian.com/content/repositories/atlassian-public/com/atlassian/bamboo/atlassian-bamboo-elastic-image/](https://maven.atlassian.com/content/repositories/atlassian-public/com/atlassian/bamboo/atlassian-bamboo-elastic-image/).

```
imageVer=2.2
wget https://maven.atlassian.com/content/repositories/atlassian-public/com/atlassian/bamboo/atlassian-bamboo-elastic-image/${imageVer}/atlassian-bamboo-elastic-image-${imageVer}.zip
sudo mkdir -p /opt/bamboo-elastic-agent
sudo unzip -o atlassian-bamboo-elastic-image-${imageVer}.zip -d /opt/bamboo-elastic-agent
sudo chown -R bamboo /opt/bamboo-elastic-agent
sudo chmod -R u+r+w /opt/bamboo-elastic-agent
```

5.4 Instance configuration

At this stage, you should have a customized instance with Bamboo deployed onto it. The last step in creating a customized instance is to set up an EC2 environment on your instance. Carry out the following steps to set this up:

1. Run the following command on your instance to set permissions on the bamboo user directory:

```
chown -R bamboo:bamboo /home/bamboo/
```

2. **Configure path variables**

   Create a file `profile.sh` in your instance's `/mnt` directory. This file contains the default Elastic Bamboo path configuration settings, as seen below:
export JAVA_HOME=<path to JRE used to start the agent>
export EC2_HOME=<location of your EC2 tools installation>
export EC2_PRIVATE_KEY=/root/pk.pem
export EC2_CERT=/root/cert.pem
export PATH=/opt/bamboo-elastic-agent/bin:$EC2_HOME/bin:$JAVA_HOME/bin:$M2_HOME/bin:$MAVEN_HOME/bin:$ANT_HOME/bin:$PATH

If all of the tools on this page were installed in recommended locations, no changes are required. Otherwise, you can update the file as required.

Once profile.sh is correctly customized for your instance, you need to copy it to the /etc/profile.d directory by running the following command on your instance in the /mnt directory:

mv profile.sh /etc/profile.d/bamboo.sh

3. Configure automatic startup of the Bamboo agent
You will need to configure your instance to start the Bamboo agent automatically when the instance is started. You can do this by sourcing Bamboo rc.local file in /etc/rc.local file:

. /opt/bamboo-elastic-agent/etc/rc.local

Make sure you add this line before the "exit 0" line in your /etc/rc.local.

4. Final settings and cleanup
Finally, create a Bamboo welcome screen and clean up keys on your instance by running the following command:

cmp /opt/bamboo-elastic-agent/etc/motd /etc/motd
echo bamboo-<x.x.x>  >> /etc/motd
rm -f /root/firstlogin /etc/ssh/ssh_host_dsa_key /etc/ssh/ssh_host_dsa_key.pub /etc/ssh/ssh_host_key /etc/ssh/ssh_host_key.pub /etc/ssh/ssh_host_rsa_key /etc/ssh/ssh_host_rsa_key.pub /root/.ssh/authorized_keys
 touch /root/firstrun

where <x.x.x> is the Bamboo version you are running (e.g. 4.1.2).

5. Now, follow the instructions from section "Creating an image of your Customized Instance" to create an AMI.
6. Start the image from Bamboo. The agent should come up and download all necessary data to the EC2 instance.
7. Run /opt/bamboo-elastic-agent/bin/prepareInstanceForSaving.sh.
8. Now, follow the instructions from section "Creating an image of your Customized Instance" to create an AMI. That's it, the newly created AMI contains everything you need to start Bamboo Agents.

Note: if you started your instance from Bamboo right at the start, instead of steps 5 & 6, you can just run:
su -c /opt/bamboo-elastic-agent/bin/bamboo-elastic-agent - bamboo

Creating a custom elastic image - Windows
To perform the tasks listed below, log in to your instance with an Administrator account using Remote Desktop Client.

**Setting up the user account**

Create the user account that will be used by the Bamboo agent. The account name is up to you, I will use Bamboo in the examples below. All builds running on your machine will use this account. It can be a regular user (i.e. it does not need to be a Power User or Administrator, unless your builds require it). Set up a password for that user. The default user on a Windows image has a user name of Bamboo with a password of Atlassian1.

Important: by default, a newly created user should be denied remote login rights (which is as we want it to be). To be on the safe side, please make sure that you indeed *cannot* log in using that user’s credentials (unless you change the credentials to non-default ones).

> If your builds are not headless (i.e. they show/manipulate windows, like Selenium does), click here for additional instructions

You’ll need to set up autologin for your Bamboo account (don’t worry, this will not let remote users in). To do this, run `control userpasswords2` and uncheck **User must enter a user name and password to enter this computer**.

**Setting up the firewall**

Reconfigure the Windows firewall to accept TCP connections on port 26224. No other inbound connections are necessary for Bamboo.

You don’t need to worry about changing the EC2 security group setting for this port. Bamboo will set it up automatically:
Installing the required software

1. Install a supported Oracle Java version. See Supported platforms.
2. Download the latest version of agent installer zip from this [this location](at the time this guide was written, the latest version was [this](this)). Unpack it to a desired location, we suggest using C:\opt\bamboo-elasti c-agent to match stock images distributed with Bamboo.
3. A batch file should launch with your Windows instance startup. In order to do this, use the Windows Task Scheduler ([Start > Administrative Tools > Task Scheduler](Start > Administrative Tools > Task Scheduler)), and set up a new Action task of “Start a program” with the `<PATH TO YOUR BATCH FILE>` as the Details:
Remember to select **Run whether user is logged on or not** in the “General” tab:

![Task Manager Configuration](image)

And appropriately define the Trigger task so that the agent starts up only after the network connection is up and running:

![Trigger Task Configuration](image)

The task manager will warn you that the account needs to be able to log in as a batch job. Make sure the “Log on as batch job” policy is set for the user. This policy is accessible by opening the **Control Panel > Administrative Tools > Local Security Policy**. In the Local Security Policy window, click **Local Policies > User Rights Assignment > Log on as a batch job**:

![Local Security Policy](image)

**Enabling EBS usage on the instance**

Starting with Bamboo 5, you'll be able to use custom Elastic Block Storage with your Windows instances. To do that, you need to change the SAN policy on your instance, otherwise the disks will be attached in 'Offline' state with status text "the disk is offline because of policy set by an administrator".
You can change the SAN policy using the Diskpart utility. Run `Diskpart`, type
```
    san policy=OnlineAll
```
and press Enter. You can then quit `Diskpart`; the new policy will now be active.

![Diskpart output](https://example.com/diskpart_output.png)

**Testing**

The easiest way to check if everything is set up correctly is to run the task you've defined using Windows Task Scheduler (Start > Administrative Tools > Task Scheduler). Right-click on the task and select Run. Always test the script using the Task Scheduler; if you run the script manually, you'll use Administrator account, which is not what we want.

Look for the `%USERPROFILE%/bamboo-elastic-agent.out` file. If it exists and contains an error message stating that agent was not run within an EC2 instance started by Bamboo Server, you've successfully completed the customization.

Run `c:\opt\bamboo-elastic-agent\bin\prepareInstanceForSaving.bat`

Bundle your instance. Make a note of the AMI id of the new image.

**Start your image from Bamboo**

If you fail to complete the following steps within ~40 minutes, Bamboo will shut down your instance, so remember to save your work if you're running out of time (i.e. create an interim image).

In Bamboo, define an image configuration for the image you've just created, and start it from Bamboo. If everything went well, the agent will start together with the instance. It will perform the following steps:

- Update/create `/opt/bamboo-elastic-agent` directory structure by creating additional directories. If they appeared, Java is working correctly on that machine and the connection to S3 is working.
- Start the agent, which will create the Bamboo Agent Home directory and populate it with data pulled from the Bamboo server.

If everything went well, you should see the agent appear in the Bamboo instance list. Congratulations, you have a working Bamboo agent.
Because the agent has just synchronized itself with the Bamboo server (because it has downloaded all the jars exactly matching what you have on your server), as an extra step, you may want to save that state to speed up future instance startup and reduce bandwidth usage.

To do that, run

```
c:\opt\bamboo-elastic-agent\bin\prepareInstanceForSaving.bat
```

save the image, define a new image configuration, kill the instance, and try running it from Bamboo.

Upgrading the agent for your custom elastic image

The instructions below are valid if you were using Bamboo 3.4 or newer. If you're upgrading from an earlier version, you should first reinstall the agent installer (see Creating a custom elastic image).

If you customized your instance according to Creating a custom elastic image, your instance will keep itself updated across Bamboo. The synchronization process takes a while and the time required increases as your image gets older. If you notice slow startup, you may want to refresh your image. You can either customize the instance from scratch, as when you created your customized image, or update just the agent data, which is much faster.

### Related pages:
- Managing your elastic image configurations
- Creating a custom elastic image

To refresh your agent data:

1. Start your instance from Bamboo.
2. Log into your instance.
3. Run `/opt/bamboo-elastic-agent/bin/prepareInstanceForSaving.sh`.
4. Create an Image of your Customized Instance.

The final step is to create an image from your customized instance. To do this, you will require the following information:

- Amazon Account Number
- Access Key ID
- Secret Access Key
- Amazon S3 bucket name that will be used to store image (if you don't have access to Amazon S3, you can sign up on [this page](#)).

You can create an image of your customized instance by using the `ec2-bundle-vol` command, as follows:

```
/usr/local/bin/ec2-bundle-vol -c $EC2_CERT -k $EC2_PRIVATE_KEY -u <amazon_account_number> -p <elastic_image_name> --batch --debug
```

where `<elastic_image_name>` is the name that you want to assign to your custom image (e.g. 'CustomImage1')

Once the image is created, you need to upload it to Amazon S3 by running the command below:

```
/usr/local/bin/ec2-upload-bundle -b <s3_bucket_name> -m /tmp/<elastic_image_name>.manifest.xml -a <access_key_id> -s <secret_access_key> --retry --debug
```

where `<s3_bucket_name>`, `<access_key_id>` and `<secret_access_key>` are the Amazon S3 bucket name, Access Key ID and Secret Access Key described previously, and `<elastic_image_name>` is the name that you want to assign to your custom image (e.g. 'CustomImage1')
You will then need to register your image with Amazon EC2 by using the `ec2-register` command:

```
$EC2_HOME/bin/ec2-register
<s3_bucket_name>/<elastic_image_name>.manifest.xml
```

where `<s3_bucket_name>` is the Amazon S3 bucket name described previously and `<elastic_image_name>` is the name that you want to assign to your custom image (e.g. 'CustomImage1')

The output of this command will show the AMI ID of your custom image.

5. Associate the new Custom Image with Bamboo.
   Finally, you will need to associate your custom elastic image with your Bamboo installation by creating an Elastic Image Configuration. Please note the AMI ID of your new custom image and read Managing your elastic image configurations for further instructions.

Updating elastic images for Bamboo upgrades

Various updates to default packages and capabilities are made to the default image with each major release of Bamboo.

Therefore, if you are using either a:

- custom elastic image, or
- an elastic image with customized agent capabilities

then to ensure this elastic image acquires these package/capability updates, use the flowchart below to update your elastic image.

⚠️ Use this flowchart only after Bamboo has been upgraded. For each elastic image you wish to update, follow this flow chart from the start.
Elastic Images with Customized Capabilities:
This flow chart assumes that all elastic images with customized agent capabilities are based off the default image. Please check the default image page to identify the packages and related capabilities available in the default image for Bamboo 6.9.

Viewing the list of Bamboo stock images
Bamboo provides a collection of Amazon Machine Images (AMIs) that are ready for use or further customization. Each AMI is identified by its unique ID. For more information about the parameters of the stock images, see Stock images.

- Atlassian AMIs and their IDs may change with each minor or major Bamboo release.
- Viewing a list of AMI IDs available for a release
- Troubleshooting
Viewing a list of AMI IDs available for a release

To generate a list of AMI IDs for a Bamboo version:

1. Save the following script as a .sh file:

```bash
if [ $# -eq 0 ]; then
    echo "Usage: `basename $0` [5.8.3] (Your Bamboo version)"
    exit 0
fi

BAMBOO_VERSION=$1
echo For Bamboo version: $BAMBOO_VERSION
ELASTIC_VERSION="$(curl -L -v --silent
https://maven.atlassian.com/content/groups/public/com/atlassian/
bamboo/elastic-image/5.8.3/5.8.3.pom 2>&1 | grep "<elastic-image.version>\)| sed -e 's/<[^>]*>//g' -e 's/^[[:space:]]*//' -e 's/^[[:space:]]*$//'"

echo "Elastic bamboo version is $ELASTIC_VERSION"

curl -L --silent
https://maven.atlassian.com/content/groups/public/com/atlassian/
bamboo/elastic-image/5.8.3/5.8.3.ami 2>&1 | grep image.
echo "REMEMBER: Use the image from the appropriate region!"
```

You can also get the script file from this repo.

2. In the terminal, go to the directory where you saved the file and run it with the following command:

`./<name-of-your-file>.sh <your-bamboo-version>`

**Example**

`./amis.sh 5.9.3`

If you get the "Permission denied" error, you can modify the permissions of the .sh file with the following:

`chmod +x <name-of-the-file>.sh`

**Results**

Click the example to see the full script output.

**Example**

For Bamboo 5.9.3, the results can be the following:
For Bamboo version: 5.9.3

Elastic bamboo version is 4.2

> GET
/content/repositories/atlassian-public/com/atlassian/bamboo/atlassian-bamboo-elastic-image/4.2/atlassian-bamboo-elastic-image-4.2.ami HTTP/1.1
image.US_EAST_1.EBS.i386.linux.Amazon\ Linux=ami-489bd620
image.US_EAST_1.EBS.x86_64.linux.Amazon\ Linux=ami-949bd6fc
image.US_EAST_1.S3.i386.linux.Amazon\ Linux=ami-b69dd0de
image.US_EAST_1.S3.x86_64.linux.Amazon\ Linux=ami-889dd0e0
image.EU_CENTRAL_1.EBS.x86_64.linux.Ubuntu=ami-fac5f7e7
image.US_WEST_2.EBS.x86_64.linux.Ubuntu=ami-f7a686c7
image.US_EAST_1.EBS.x86_64.linux.Ubuntu=ami-1c247d74
image.ASIA_PACIFIC_SE_1.EBS.x86_64.linux.Ubuntu=ami-f6a691a4
image.EU_WEST_1.EBS.x86_64.linux.Ubuntu=ami-ddf969aa
image.ASIA_PACIFIC_NE_1.EBS.x86_64.linux.Ubuntu=ami-8946a989
image.US_WEST_1.EBS.x86_64.linux.Ubuntu=ami-95c92dd1
image.ASIA_PACIFIC_SE_2.EBS.x86_64.linux.Ubuntu=ami-0f0c7d35
image.SOUTH_AMERICA_1.EBS.x86_64.linux.Ubuntu=ami-e3972efe
image.US_EAST_1.EBS.x86_64.windows.Windows\ 2008=ami-976edafe
image.ASIA_PACIFIC_SE_1.EBS.x86_64.windows.Windows=ami-c21a2390
image.SOUTH_AMERICA_1.EBS.x86_64.windows.Windows=ami-f550d6e8
image.US_EAST_1.EBS.x86_64.windows.Windows=ami-50697038
image.EU_CENTRAL_1.EBS.x86_64.windows.Windows=ami-e0f4cafd
image.EU_WEST_1.EBS.x86_64.windows.Windows=ami-1f750268
image.US_WEST_2.EBS.x86_64.windows.Windows=ami-77764b47
image.ASIA_PACIFIC_NE_1.EBS.x86_64.windows.Windows=ami-b4f520b4
image.ASIA_PACIFIC_SE_2.EBS.x86_64.windows.Windows=ami-fb81ffcl
image.US_WEST_1.EBS.x86_64.windows.Windows=ami-6b3bd22f

Troubleshooting

If the script above doesn't work, you can also find the list of Bamboo stock images in the following way:

1. In the following URL:

   https://maven.atlassian.com/content/groups/public/com/atlassian/bamboo/atlassian-bamboo/$BAMBOO_VERSION/atlassian-bamboo-$BAMBOO_VERSION.pom

   change $BAMBOO_VERSION to the Bamboo version number for which you want to list the AMIs.

   Example

   For Bamboo 5.9.3:

   https://maven.atlassian.com/content/groups/public/com/atlassian/bamboo/atlassian-bamboo/5.9.3/atlassian-bamboo-5.9.3.pom

2. Open the URL in a browser.
3. In the atlassian-bamboo-$BAMBOO_VERSION.pom file (where $BAMBOO_VERSION is your version
of Bamboo), find the elastic image version for the release. The image version (baseline) is stored as an `elastic-image.version` property.

**Example**
For the version 5.9.7 (atlassian-bamboo-5.9.7.pom), the elastic image version was 4.2:

```xml
<elastic-image.version>4.2</elastic-image.version>
```

4. In the following URL:

```url
https://maven.atlassian.com/content/groups/public/com/atlassian/bamboo/atlassian-bamboo-elastic-image/$ELASTIC_VERSION/atlassian-bamboo-elastic-image-$ELASTIC_VERSION.ami
```

change `$ELASTIC_VERSION` to the Bamboo elastic version number from Step 3.

**Example**
For Bamboo elastic version 4.2, which is the baseline for Bamboo 5.9.3:

```url
https://maven.atlassian.com/content/groups/public/com/atlassian/bamboo/atlassian-bamboo-elastic-image/4.2/atlassian-bamboo-elastic-image-4.2.ami
```

5. Open the URL in a browser.
6. The `.ami` file that opens contains the list of all stock AMI IDs available for the selected version of Bamboo.

Make sure you choose the image from the correct region. For example:

```text
image.US_EAST_1.EBS.x86_64.linux.Ubuntu=ami-1c247d74
```

**Related topics**
- Creating a custom elastic image
- Stock images

**Managing your elastic instances**

An elastic instance is a running instance of an elastic image. One elastic instance is created whenever an elastic image is started. Hence, starting one elastic image multiple times, results in the creation of multiple elastic instances. Each time an elastic instance is created, one elastic agent is created on that instance.

The following list directs you to details on managing elastic instances manually in Bamboo. However, you can configure Bamboo to automatically manage your elastic instances. Please refer to Automatic Elastic Instance Management for more information.

- To view a running elastic instance, see Viewing an elastic instance.
- To access your elastic instance via a client, see Accessing an elastic instance.
- To start one or more elastic instances, see Starting an elastic instance.
- To shut down one or more elastic instances, see Shutting down an elastic instance.
- To configure your Elastic Bamboo settings for elastic instances, see the Elastic Instance Settings section in the Configuring Elastic Bamboo document.

Viewing an elastic instance
An elastic instance is a running instance of an elastic image. One elastic instance is created whenever an elastic image is started. Hence, starting one elastic image multiple times, results in the creation of multiple elastic instances. Each time an elastic instance is created, one elastic agent is created on that instance.

Conceptually, an elastic instance can be thought of as a computer. The elastic agent’s processes are run on this computer and the elastic image is the boot hard drive. Unlike computers, however, elastic instances are temporary and stateless. When an elastic instance is shut down:

- Any changes that an elastic instance makes to the boot hard drive (e.g. agent log file) will not persist
- Any customizations to the instance itself will also be lost.

The Amazon Elastic Block Store can provide persistent storage for your elastic instances.

You can also view information about your elastic instances on the AWS Management Console. Please note, we strongly recommend that you use the console for viewing instance information only. You may experience errors if you attempt to manage your instances outside of Bamboo.

To view an elastic instance:

1. Click the icon and select Elastic Instances.
2. Click the name of the instance that you want to view, e.g. 'i-05ff716c'.

   **Current status**
   The status of the elastic instance. Values include, 'Pending' (instance starting up), 'Running' and 'Shutting down'.

   **Public DNS**
   The public DNS address of the elastic instance. The IP address of the elastic instance is displayed here.

   **Start Time**
   The start time of the instance, based on the Amazon EC2 timezone (US Eastern Time for Elastic Bamboo). Start time is the time when you sent the request to start an instance, not the time when the instance progresses to 'Running' status. Up time of the instance (including the time taken for the instance to start up) is shown in brackets after the start time.

   **Elastic Agent**
   The elastic agent process currently running on your elastic instance. Currently, Elastic Bamboo only supports one elastic agent per elastic image. Click the link to view the elastic agent. If the agent is running a job, the job's key will be shown in brackets after the elastic agent name.

   **Current Availability Zone**
   The availability zone that your elastic instance is running in. Read more about Amazon EC2 availability zones.

   Your availability zone preference is shown in brackets after the current availability zone. For instructions on how to set the availability zone for your instances, please see Managing your elastic image configurations.

   **Attached Volumes**
   The IDs of the attached EBS volumes, if you have configured your elastic instances to use EBS.

   **Configuration**
   The name of the elastic image configuration that was used to create this elastic instance. Click the name to configure the elastic image.

   **AMI ID**
   The ID of the elastic image (i.e. Amazon Machine Image) that the elastic instance was created from (as part of the elastic image configuration).

   **EBS Snapshot ID**
   The ID of the EBS snapshot that was used to create the EBS volumes attached to your instance, if
you have configured your elastic instances to use EBS.

ℹ️ Bamboo polls the EBS volumes for an elastic instance every 60 seconds by default. If you want to change this interval, you need to modify the following system property: `bamboo.agent.elastic.ebsVolumeSupervisionIntervalInSeconds`

### Instance Type
The instance type of your instance.

### SSH Access
Please see Accessing an elastic instance for information on using this function.

### Accessing Logs
Please see Accessing an elastic instance for information on using this function.

**Screenshot: Viewing an elastic instance**

#### Elastic Bamboo » Instances » i-07ec936b

### Information

This is an instance running on the Amazon EC2 compute cloud. You can get more extensive information about this instance from the Amazon AWS Web Console.

- **Current status**: Running
- **Public DNS**: ec2-184-72-81-22.compute-1.amazonaws.com
- **IP**: 184.72.81.22
- **Start Time**: 14/02/11 10:57 AM (41 minutes ago)
- **Elastic Agent**: Elastic Agent on i-07ec936b (Idle)
  This is the Bamboo agent that is running in this instance in EC2.

- **Current Availability Zone**: us-east-1c (chosen by EC2)

#### Attached Volumes

- vol-fe3c5395

#### Configuration

- **Configuration**: Maven 2.1 Image
  Contains Maven 2.1 and the necessary bits for Selenium 2
- **AMI ID**: ami-0aab64563
- **EBS Snapshot ID**: snap-56204c00
- **Instance Type**: High-CPU Medium

### SSH Access

You can SSH into this instance in the EC2. To do this, simply execute the following command from the bamboo server home directory. Bamboo can not find the elasticbamboo.pl file on the server. For more information on where to find your elasticbamboo.pl file see our online documentation.

```
ssh -i elasticbamboo.pl root@ec2-184-72-81-22.compute-1.amazonaws.com
```
Accessing an elastic instance

It is possible to connect directly to a running elastic instance to access logs or upload files. Access is available via SSH (secure shell) and file transfer is enabled via SCP (secure copy).

Please note, you can only access elastic instances that are running. You may need to configure the automatic termination of elastic instances.

**On this page:**
- Using SSH
- Using SCP
- Notes

**Related pages:**
- Managing your elastic instances

**Using SSH**

To access your elastic instance using SSH:

1. Navigate to the desired elastic instance, as described on Viewing an elastic instance.
2. Copy the command text listed under the 'SSH Access' section. It will be similar to the following example command text:
   ```
   ssh -i /opt/bamboo/home/xml-data/configuration/elasticbamboo.pk root@ec2-68-111-185-197.compute-1.amazonaws.com
   
   Please note, you can also download the private key via the link in the 'SSH Access' section to access your elastic instance via SSH. Click 'here' in the following text on screen to download the key: You can also download the SSH private key file from here and use the private key to access the EC2 instance.'
   ```
3. Execute the text in your terminal and you will have full SSH access to the Elastic Instance.

**Using SCP**

Note, you can also use SCP to upload files to your elastic instance.

To access your elastic instance using SCP:

1. Navigate to the desired elastic instance, as described on Viewing an elastic instance.
2. Copy the command text listed under the ‘Accessing Logs’ section. It will be similar to the following example command text:
   `scp -i /opt/bamboo/home/xml-data/configuration/elasticbamboo.pk root@ec2-68-111-185-197.compute-1.amazonaws.com:/home/bamboo/bamboo-elastic-agent.out ./`
   
3. Execute the text in your terminal to download the logs from your elastic instance.

Notes

- **Permission issues for SSH access** — If you are experiencing permission issues when attempting to access your elastic instance via SSH, you may need to use the root user or modify permissions on your Elastic Bamboo private key file. See this FAQ for further details.

### Starting an elastic instance

An elastic agent process runs in an elastic instance and will automatically start when an instance is started. If you want to run a Job build on an elastic agent, you can start an elastic instance for the agent to run in. The elastic agent will inherit the capabilities of the image that the instance is started from.

Limitations on the number of elastic instances — An elastic agent is counted as a remote agent for licensing purposes. Hence, if starting an elastic instance (and hence an elastic agent) causes you to exceed the total number of remote agents allowed under your license, you will not be able to start the instance.

#### Related pages:
- Managing your elastic instances

### To start an elastic instance:

1. Click the icon and select Elastic Instances.

2. Click **Start New Elastic Instances**.
   - Use **Number of instances** to specify the number of new instances you would like to start.
   - Use **Elastic Image Configuration Name** to select the elastic image configuration that you would like your instances to use.

3. Click **Submit**. The 'Manage Elastic Instances' page will be displayed, showing your new instances starting:
   a. A note will display stating that the elastic instances (and corresponding agents) are starting.

   ![1 new elastic instance is pending. New instances and corresponding elastic agents may take a few minutes to start up.]

   b. Your elastic instances will then display with a status of 'Pending' while they start up. This generally takes a few minutes.

<table>
<thead>
<tr>
<th>Instance</th>
<th>Agent</th>
<th>Status</th>
<th>Up Time</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>instance</td>
<td></td>
<td>Pending</td>
<td>8 seconds</td>
<td>View</td>
</tr>
</tbody>
</table>

   c. Once your elastic instances have started up, they will progress to 'Running' status. An elastic agent process will then start up for each instance. They will display a status of 'Pending' while they start.

<table>
<thead>
<tr>
<th>Instance</th>
<th>Agent</th>
<th>Status</th>
<th>Up Time</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>instance</td>
<td></td>
<td>Running</td>
<td>1 minute</td>
<td>View</td>
</tr>
</tbody>
</table>

   d. Once the elastic agents have started, they will display a status of 'Online'.
Notes

What if my elastic agent doesn't start? Bamboo has a set period of time that it waits for the agent to start on an elastic instance. If no response is received by the end of this time period, Bamboo will shut down the elastic instance.

You can configure this time period by modifying the following system property (default is 600):
bamboo.agent.elastic.startupTimeoutSeconds
Read Starting Bamboo for instructions on how to set a system property.

Scheduling your elastic instances

You can schedule the startup and shutdown of elastic instances in Bamboo. For example, you may wish to shut down all elastic instances on weekends or start up additional instances to help cope with job builds during regular busy periods.

Managing your elastic instance schedules

To manage your elastic instance schedules:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Instance Schedules in the left navigation panel (under 'Elastic Bamboo').
3. Do any of the following:

<table>
<thead>
<tr>
<th>Task</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add a new schedule</td>
<td>Click Add Elastic Instance Schedule to create a schedule from new.</td>
</tr>
<tr>
<td></td>
<td>Click Copy to use an existing schedule as a template.</td>
</tr>
<tr>
<td></td>
<td>See the Adding a New Elastic Instance Schedule section below for further instructions.</td>
</tr>
<tr>
<td>Edit an existing schedule</td>
<td>Click Edit for an existing schedule. You can also Delete existing schedules.</td>
</tr>
<tr>
<td>Enable existing schedules</td>
<td>Click Enable for a particular schedule, or click Enable All.</td>
</tr>
<tr>
<td>Disable existing schedules</td>
<td>Click Disable for a particular schedule, or click Disable All.</td>
</tr>
</tbody>
</table>

You can also view the configuration for the elastic image that the instances will be created from, by clicking the image configuration name (e.g. 'Default') in the table of schedules.

Time displayed in Elastic Instance Schedules pages refers to the server time.

Screenshot: Viewing elastic instance schedules
View Elastic Instance Schedules

Configure when to start up or shut down elastic instances of a particular elastic image.

<table>
<thead>
<tr>
<th>Next Scheduled Run</th>
<th>Cron Expression</th>
<th>Image Config</th>
<th>Active Instances</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trigger disabled</td>
<td>Each Saturday at 4:30 am</td>
<td>Stop all elastic instances</td>
<td>Edit</td>
<td>Enable</td>
</tr>
<tr>
<td>Trigger disabled</td>
<td>Each Monday at 9:00 am</td>
<td>Stop all elastic instances</td>
<td>Edit</td>
<td>Enable</td>
</tr>
</tbody>
</table>

Adding a new elastic instance schedule

1. Click the icon in the Bamboo header and choose Overview.
2. Click Instance Schedules in the left navigation panel (under 'Elastic Bamboo').
3. Click either Add Elastic Instance Schedule to create a schedule from new, or Copy for an existing schedule to use it as a template.

Enabled
Clear if you do not want this schedule to be enabled when you create it.

Trigger On
Choose when this schedule should start:

- **Next Bamboo startup**
- **A cron schedule** — edit Schedule as required. For information on constructing cron expressions, see this FAQ.

On Trigger Bamboo Should
Choose the action Bamboo should perform:

- **Stop all elastic instances**
- **Adjust number of active instances**

Image Config
Choose which image the elastic instances should be started from. The elastic agents running on the instances will inherit the capabilities from the image.

Active Instances
Choose the logical operator and specify a value for the number of active instances.

Screenshot: Adding an elastic instance schedule
### Shutting down an elastic instance

We recommend that you shut down any elastic instances that are not being used. Amazon EC2 charge for the period of time that you have an instance running, so you can minimize your costs simply by shutting down instances with inactive agents. You should also shut down your elastic instances if you are going to restart your Bamboo server, otherwise you will orphan them from your Bamboo server.

If you have set up automated procedures using the Bamboo REST API to terminate agents (e.g. cron jobs), you can also configure Elastic Bamboo to automatically shut down instances after the agent processes terminate.

#### Before you begin:

- Please ensure that the agent on an elastic instance is not running a job build, before shutting down the instance. Any job builds running on the agent **will be abandoned** when you shut down the elastic instance.

#### To shut down an elastic instance:

<table>
<thead>
<tr>
<th><strong>On this page:</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Shutting down an elastic instance</td>
<td></td>
</tr>
<tr>
<td>Shutting down all elastic instances</td>
<td></td>
</tr>
<tr>
<td>Configuring automatic shutdown of instances after agent termination</td>
<td></td>
</tr>
<tr>
<td>Shutting down elastic instances using the AWS Console</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Related pages:</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Managing your elastic instances</td>
<td></td>
</tr>
</tbody>
</table>
1. Click the 
icon and select **Elastic Instances**.
2. Click **Shut Down** for the instance that you wish to shut down (in the 'Operations' column).
3. Click **Confirm**. In the 'Manage Elastic Instances' screen, the elastic instance that you have shut down will show a 'Shutting down' status for a few minutes, before it shuts down and disappears from this screen.

### Shut Down Instance

- **Confirmation Message:** You are attempting to shut down elastic instance i-211f14d. If you continue, all builds running on the elastic agent for this instance will be abandoned.

---

### Shutting down all elastic instances

**Before you begin:**

- Please ensure that the agent on an elastic instance is not running a Job build, before shutting down the instance. Any Job builds running on the agent **will be abandoned** when you shut down the elastic instance.

**To shut down all elastic instances:**

1. Click the 
icon in the Bamboo header and choose **Overview**.
2. Click **Instances** in the left navigation panel. The 'Manage Elastic Instances' screen will display.
3. Click **Shut Down All Instances**. The 'Shut Down All Instances' screen will display.
4. Click **Confirm**. The 'Manage Elastic Instances' screen will display again. The elastic instances will display 'Shutting down' status' for a few minutes, before they shut down and disappear from this screen.

### Configuring automatic shutdown of instances after agent termination

**To configure Elastic Bamboo to automatically shut down instances when agents are terminated:**

Please refer to [Configuring Elastic Bamboo](#) and follow the instructions for setting the **Automatically shut down elastic instance when elastic agent process ends** option in the 'Elastic Bamboo Global Settings' section.

### Shutting down elastic instances using the AWS Console

We strongly recommend that you manage your instances using the Elastic Bamboo user interface. If your elastic instances become orphaned from your Bamboo server, you may need to shut down your elastic instances down directly in the Amazon Web Services (AWS) console.

Your elastic instances can become orphaned from your Bamboo server, for example if you restart your Bamboo server without shutting down your elastic instances first.

Please refer to [How do I shut down my elastic instances if I have restarted my Bamboo server](#) for further details.

### Managing your elastic agents

An **elastic agent** is an agent that runs in the Amazon Elastic Compute Cloud (EC2). An elastic agent process runs in an **elastic instance** of an elastic image. An elastic agent inherits its capabilities from the elastic image that it was created from.

- **To view your elastic agents**, see [Viewing your elastic agents](#).
- **To view elastic agents that have terminated**, see [Viewing your elastic agent usage history](#).
- **To configure your elastic agent's capabilities**, see [Configuring elastic agent capabilities](#).
- **To disable an elastic agent**, see [Disabling an elastic agent](#).
Viewing your elastic agents

An elastic agent is an agent that runs in the Amazon Elastic Compute Cloud (EC2). An elastic agent process runs in an elastic instance of an elastic image. An elastic agent inherits its capabilities from the elastic image that it was created from.

An elastic agent will always have an 'Online' status, (i.e. 'Online' or 'Online (Disabled)'). If you disable an elastic agent, the elastic instance will remain online. However, if you shut down the elastic instance, then the elastic agents process is killed and will not appear in the remote agents list. Hence, an elastic agent will never have an 'Offline' status.

**Related pages:**
- Managing your elastic agents

To view your elastic agents:

1. Click the 
   icon in the Bamboo header and choose Overview.
2. Click Agents in the left navigation panel.

The agents for your Bamboo instance will be displayed (see screenshot below). Any elastic agents that are running will be listed in the 'Remote Agents' section. The elastic agent name will be prefixed with 'Elastic Agent', e.g. 'Elastic Agent on i-2204914b'

Viewing your elastic agent usage history

When you shut down an elastic instance, the agent process for that instance is killed. Consequently, the elastic agent will not display an offline status, but will be removed altogether from your available elastic agents in Bamboo.

However, information about these elastic agents is recorded in Bamboo and can be viewed on the 'Elastic Agent History' page.

**Related pages:**
- Managing your elastic agents

To view the history of an elastic instance that has been shut down:

1. Click the 
   icon in the Bamboo header and choose Overview.
2. Click Agent History in the left navigation panel.
3. To view the usage history of the elastic agent, click the agent name, or View next to the agent. The 'Elastic Agent History' page (see screenshot) will show the following information:
   - Elastic instance — the elastic instance that the elastic agent ran in.
   - Last startup time — the last time that the elastic agent was started. This is based on the Bamboo server time.
   - Last shutdown time — the last time that the elastic instance was stopped. This is based on the Bamboo server time.
   - Up time — the total time that the elastic agent was online.
   - Build History — this table lists the job builds run by the elastic agent and information about the job build, such as the status, duration, test results, etc. You can access the full results by clicking the build number.

**Screenshot: Elastic agent history**
Configuring elastic agent capabilities

An elastic agent is an agent that runs in the Amazon Elastic Compute Cloud (EC2). An elastic agent process runs in an elastic instance of an elastic image. An elastic agent inherits its capabilities from the elastic image that it was created from.

You can customize the capabilities of your elastic agents by configuring the capabilities on the relevant elastic image.

You may want to configure the capabilities on your elastic image to force your job builds to run on particular elastic agents (e.g. running slow acceptance tests on your most powerful elastic agents). You may also need to configure the capabilities on any custom elastic images that you have created and/or associated with your Bamboo installation.

Please note that adding a builder, JDK or version control capability to the image does not install the actual builders, JDKs or VCS modules on the image. Please take particular note of this, if you are adding capabilities to a custom image.

Related pages:
- Managing your elastic agents

To configure the capabilities on an elastic image:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Image configurations in the left navigation panel (under ‘Elastic Bamboo’).
3. Click **Capabilities** (under 'Operations') for the relevant elastic image.
4. Use the 'Add Capability' panel at the end of the page to add new capabilities to the image. Please see the following pages for further information:
   - Defining a new executable capability
   - Defining a new JDK capability
   - Defining a new version control capability
   - Defining a new custom capability
   - Defining a new Docker capability

You can also edit, rename or delete a capability from an elastic image. Please see the following pages for further information:
   - Configuring capabilities
   - Renaming a capability

You can also view the agents and elastic image configurations with a particular capability and the jobs with the related requirement by clicking **View** for the capability.

Any changes that you have made to elastic image capabilities will only be reflected in new agents started after the changes were made. You will need to restart any existing agents, if you want them to pick up your changes.

**Screenshot: Configuring elastic agent capabilities**

<table>
<thead>
<tr>
<th>Elastic Image Capabilities</th>
<th>Executable Jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Elastic Image Capabilities</strong></td>
<td>Add Capability</td>
</tr>
</tbody>
</table>

A capability is a feature of an agent. There are 3 types of capabilities: builders, JDKs and custom. You can use this page to view, add and delete capabilities associated with this Elastic Image Configuration. Any existing elastic instances will need to be restarted to pick up these changes.

The following capabilities exist on Elastic Agents running on an instance of this Image:

**Custom**

'Custom' capabilities are key-value pairs that define particular characteristics of an agent (e.g. `operating system=WindowsXP, fast builds=true`). For an agent to be able to build a job, both the 'Key' and 'Value' must match the job's requirements.

<table>
<thead>
<tr>
<th>Key</th>
<th>Value</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>bamboo.functionalTest</td>
<td>true</td>
<td>View</td>
</tr>
</tbody>
</table>

**Builder**

'Builder' capabilities define the builders which are available to your build plans.

<table>
<thead>
<tr>
<th>Builder Label</th>
<th>Path</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ant (Ant)</td>
<td>/opt/apache-ant-1.7.1</td>
<td>View</td>
</tr>
<tr>
<td>Maven 2 (Maven 2.x)</td>
<td>/opt/maven-2.0</td>
<td>View</td>
</tr>
<tr>
<td>Maven 2.1 (Maven 2.x)</td>
<td>/opt/maven-2.1</td>
<td>View</td>
</tr>
<tr>
<td>Maven 2.2 (Maven 2.x)</td>
<td>/opt/maven-2.2</td>
<td>View</td>
</tr>
</tbody>
</table>

**JDK**

'JDK' capabilities define the JDKs which are available to your build plans.

<table>
<thead>
<tr>
<th>JDK Label</th>
<th>Java Home</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>JDK</td>
<td>/opt/jdk-5</td>
<td>View</td>
</tr>
</tbody>
</table>

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Disabling an elastic agent

An elastic agent is an agent that runs in the Amazon Elastic Compute Cloud (EC2). An elastic agent process runs in an elastic instance of an elastic image. An elastic agent inherits its capabilities from the elastic image that it was created from.

If you would like to stop an elastic agent, you can disable it in Bamboo. This will abandon any job build it is running and prevent it from running any further job builds.

Please note, disabling an elastic agent will not shut down the elastic instance it is running on (i.e. you will still be charged for the instance uptime). You can permanently stop an elastic agent and instance by shutting down the elastic instance.

The Bamboo server also "supervises" your elastic agents. If the Bamboo server detects that an elastic agent is offline, it will automatically terminate the elastic instance.

### Related pages:
- Managing your elastic agents

### To disable an elastic agent:

1. Navigate to the desired elastic agent, as described in Viewing your elastic agents.

2. Click Disable in the 'Operations' column for the elastic agent. The elastic agent will display with a status of 'Online (Disabled)'.
   - Re-enable the elastic agent by clicking Enable.
Elastic Bamboo FAQ

This page provides answers to common questions about running builds using Elastic Bamboo. If you are using Elastic Bamboo for the first time, we highly recommend that you read Getting started with Elastic Bamboo for instructions on setting up Elastic Bamboo and running your first build.

What job builds can I run on Elastic Bamboo?

You can run any of your job builds on any elastic agent (which in turn runs on an elastic instance), provided that the elastic agent's capabilities meet the job's requirements. An elastic agent inherits the capabilities of the elastic image it was created from. Hence, you can see which of your jobs can run on elastic agents by checking that your job's requirements match your elastic image's capabilities.

✅ You can view your elastic image and the job builds that meet its requirements on the Agents and plans matrix.

On this page:

- What job builds can I run on Elastic Bamboo?
- How do I run a plan build and its jobs on an elastic agent?
- How do I automatically start or shut down elastic instances for job builds?
- How do I know whether my job build was run on an elastic agent?
- How do I customize the capabilities of my elastic agents?
- How much does it cost to run a build?
- What is EBS and how does it affect my job builds?

How do I run a plan build and its jobs on an elastic agent?

An elastic agent operates in a similar way to a non-elastic agent. The Bamboo server will determine if any job builds in the queue can be built on any of the available agents (including elastic agents), based on whether or not the capabilities of these agents meet the requirements of these jobs.

If an available elastic agent (like any other available agent) has capabilities which meet the requirements of a build in the build queue, the Bamboo server will assign the job build to that elastic agent.

If you do not have any free elastic agents running, you can configure Bamboo to automatically start up elastic instances whose elastic agents are capable of running job builds in the queue, or you can start up an appropriate elastic instance manually. (When an elastic instance is started, its elastic agent is also started, automatically.) For more information about starting elastic instances manually, refer to Starting an elastic instance.

If you do not use Bamboo's Automatic Elastic Instance Management feature and prefer to manage your elastic instances manually, then we strongly recommend that you shut down any elastic instances (running your elastic agents), when they are not in use. Minimizing unutilized elastic instance uptime will help reduce costs. Read Shutting down an elastic instance for instructions on how to shut down an elastic instance.

How do I automatically start or shut down elastic instances for job builds?

Bamboo can automatically start elastic instances based on demand from the build queue and shut them down once the elastic agents running on them have been idle for a specified period of time. For more information, please refer to the Automatic Elastic Instance Management section of the Configuring Elastic Bamboo topic.

While Bamboo's Automatic Elastic Instance Management feature is the easiest and most effective method of
managing elastic instances in Bamboo, you can also manage elastic instances using the Bamboo REST API. For example, you could implement cron jobs to intelligently start and stop elastic instances, so that elastic agents are available at key times for your job builds.

How do I know whether my job build was run on an elastic agent?

The name of the image and elastic agent that ran a job build can be viewed as part of the build result. Please see the Viewing a build result page for more information.

How do I customize the capabilities of my elastic agents?

You may want to customize the capabilities of your elastic agents to suit certain jobs in your plans. For example, if you want to force certain job builds to only run on elastic agents, you can add a custom capability of `elastic =true` to your elastic agents and add the same requirement to these jobs.

To customize the capabilities for your elastic agents, you need to customize the capabilities of the image that they are created from. Read Configuring elastic agent capabilities for instructions.

How much does it cost to run a build?

As Elastic Bamboo usage varies from customer to customer, we cannot provide a definitive cost estimate for running a job build using Elastic Bamboo. We do provide high level guidelines for Elastic Bamboo costs, based on our own experience of using Elastic Bamboo at Atlassian, on the Elastic Bamboo Costs page.

You can significantly reduce the costs and time taken to run a job build by configuring Elastic Bamboo to use Automatic Elastic Instance Management and Amazon's Elastic Block Store (EBS).

What is EBS and how does it affect my job builds?

The Amazon Elastic Block Store (EBS) provides persistent storage volumes that can be attached to EC2 instances. Elastic Bamboo can use the EBS to store snapshots of relatively static build information, such as checkouts of source code and Maven repository data. You can choose a snapshot to create EBS volumes from. These volumes can then be attached to your elastic instances when they start up.

Disabling Elastic Bamboo

If you do not want to execute Plan builds and their Jobs in the Amazon EC2 anymore, you can disable Elastic Bamboo for your Bamboo installation. Your AWS account details will be preserved when you disable Elastic Bamboo, so you can just enable it if you want to start using it again.

Before you begin:

- Please ensure that you do not require your elastic agents before disabling Elastic Bamboo, as they will be stopped immediately.

To disable Elastic Bamboo:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Configuration in the left navigation panel (under ‘Elastic Bamboo’).
3. Click Disable. Elastic Bamboo will be disabled and a confirmation message will be displayed.

Quick filters

Use quick filters for handy search shortcuts in your Bamboo build dashboard. Create filters based on configurable rules and never miss a build plan again.

Quick filters work only with plans displayed in Bamboo dashboard, which means that they don't include plan branches.
Configuration

Administrators can add, edit, and delete quick filters by clicking the cog icon in the quick filters menu:

![Build Dashboard](image)

The configuration view is also available from Administration > Plans > Quick filters.

Quick filters are available on the build dashboard for all users of a Bamboo instance.

Types of rules

Click a filter name in the build dashboard to display plans that match the rules assigned to the filter.

A plan is displayed only if it matches all the rules specified for a filter.

You can create filters with combinations of the following rules:

<table>
<thead>
<tr>
<th>Rule type name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>By completion date</td>
<td>Displays plans that completed within a specific time frame. For example, you can display plans that completed in the last three days.</td>
</tr>
<tr>
<td>By label</td>
<td>Displays plans with a specific label. You can define multiple labels. The plan is displayed when it has at least one label specified in the rule. To assign a label to a plan, click the name of a plan to display the plan summary and go to Actions &gt; Modify plan label.</td>
</tr>
<tr>
<td>By name</td>
<td>Displays plans with a specific name or plans that match a regular expression.</td>
</tr>
<tr>
<td>By project</td>
<td>Displays plans that are assigned to a specific project. You can select one or more projects.</td>
</tr>
<tr>
<td>By result status</td>
<td>Displays plans that have completed with a specific result. You can select from:</td>
</tr>
<tr>
<td></td>
<td>• Successful</td>
</tr>
<tr>
<td></td>
<td>• Failed</td>
</tr>
<tr>
<td>By status</td>
<td>Displays plans based with a specific status. You can select from:</td>
</tr>
<tr>
<td></td>
<td>• Enabled</td>
</tr>
<tr>
<td></td>
<td>• Disabled</td>
</tr>
</tbody>
</table>

Users and permissions

There are several options for managing your Bamboo users and groups:

- Manage locally in Bamboo
Choose a user management option

To choose how you want to manage users in Bamboo:

1. Click the
   icon in the Bamboo header and choose Overview.
2. Navigate to User repositories (under 'Security').
3. Choose one of the user management options:

   Manage locally in Bamboo
   Managing users
   Managing groups

   Manage with Atlassian's Jira applications
   Allowing Other Applications to Connect to Jira applications for User Management

   Manage with Atlassian's Crowd
   Integrating Bamboo with Crowd

   Manage in a custom external user directory
   Integrating Bamboo with LDAP

4. Click Save.

About users and authors

An author is any person who checks in code to a repository that is associated with a Bamboo plan. An author need not be a Bamboo user.

Depending on your organization's requirements, you can configure Bamboo to grant access to non-users. However, only Bamboo users can:

- view the My Bamboo tab on the Dashboard.
- belong to a group.

About groups

Bamboo groups are used to specify which users will have global permissions and plan permissions. They can also be used to specify which users will receive notifications about a plan's build results. You can create and delete as many groups as you need. You will typically create at least one group per project.

A special group called bamboo-admin is automatically created when you install Bamboo. Members of this group have Bamboo administration rights.

Bamboo permissions

Bamboo permissions control access to plans, builds and administration functions. See Managing permissions.

A plan permission is the ability to perform a particular operation on a plan and its jobs. For each plan, different
permissions can be granted to particular groups and/or users. A global permission is the ability to perform a particular operation in relation to Bamboo as a whole.

Managing users

This page describes procedures for managing your Bamboo users locally in Bamboo.

For a brief overview of other options for managing your Bamboo users, see Users and permissions.

If you store a user's data in an external user directory like Crowd or LDAP, you should manage such users in these external directories and not in Bamboo.

Deleting or deactivating a user

Follow this process if you store the user's data in Bamboo. If the user data is stored in an external user directory like Crowd or LDAP, go to that directory to perform this action.

Deleting a user removes their Bamboo user account. Deactivating a user prevents them from logging in to Bamboo.

Deleting a Bamboo user

Before you begin:

- Deleting a Bamboo user will not delete their author data — that is, their author statistics and code check-in comments will still exist in Bamboo.
- You cannot delete a user who has created labels or comments about build results. You may want to deactivate them instead.
- You cannot delete the user account with which you are currently logged in to Bamboo.

To delete a Bamboo user:

1. Click the icon in the Bamboo header and choose Overview.
2. Select Users in the left navigation panel.
3. Use the Delete link in the 'Operations' column.
Deactivating a Bamboo user

You can deactivate a user, which means that they won’t receive any email or IM notifications and they won’t be able to log in to your Bamboo instance.

Deactivated users can’t recover their passwords, but they can still can trigger builds by committing to repositories.

To deactivate a Bamboo user:

1. Go to Administration > User management.
2. Find the user that you want to deactivate.
3. Click Edit.
4. Unselect the Active user check box:

<table>
<thead>
<tr>
<th>Username</th>
<th>Full name</th>
<th>Groups</th>
<th>Source repository aliases</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>admin</td>
<td>Paul</td>
<td>bamboo-admin</td>
<td>Paul Watson <a href="mailto:pwatson@atlassian.com">pwatson@atlassian.com</a></td>
<td>Edit</td>
</tr>
<tr>
<td>npye</td>
<td>Nathan Pye</td>
<td>bamboo-admin</td>
<td>Nathan Pye <a href="mailto:npye@atlassian.com">npye@atlassian.com</a></td>
<td>Edit</td>
</tr>
<tr>
<td>tw-user</td>
<td>Docs</td>
<td>Tech Writer User</td>
<td>bamboo-admin</td>
<td>Edit</td>
</tr>
</tbody>
</table>

5. Click Save.

Alternative scenario:

1. Go to Administration > User management.
2. Find the user that you want to deactivate.
3. Click Edit.
4. Enter a new password for the user.
   - If you have configured SMTP email on your Bamboo server, the user will automatically receive an email containing their new password.
5. To get around the email problem, enter an invalid email address in the Email field, for example foobar@foobaremailaddress.foobar.
6. Delete the user's Instant Messaging Address so that he or she does not receive notifications on build events.
7. Click Save.

Creating new user account

Follow this process if you store the user's data in Bamboo. If the user data is stored in an external user directory like Crowd or LDAP, go to that directory to perform this action.

Bamboo users can:

- view the My Bamboo tab on the Dashboard.
- belong to a group.

Depending on your organization’s requirements, you can also configure Bamboo to grant access to non-users.
To create a Bamboo user:

1. Click the icon in the Bamboo header and choose Overview.
2. In the left-hand navigation panel, click Users.
3. Click Create user.
4. Complete the ‘Add User’ form:

   - **Username**
     Username cannot be changed after the user is created.

   - **Full name**
     User’s full name.

   - **Email**
     The address to which notifications will be sent.

   - **Password**
     The user can easily change their password later.

   - **Instant Messaging Address**
     If no IM address is specified, Bamboo will not be able to recognize the user’s context when interacting using IM.

5. Click Save.

Granting administration rights to a user

Follow this process if you store the user’s data in Bamboo. If the user data is stored in an external user directory like Crowd or LDAP, go to that directory to perform this action.

In Bamboo, there are two types of administrators:

- **Global administrators** — that is, people with the ‘Admin’ global permission. These people can access the Bamboo Administration menu. They can also administer every plan.

- **Plan administrators** — that is, people with the ‘Admin’ and ‘Edit’ plan permissions. These people can administer a particular plan.

Grant global administration rights

To grant global administration rights to a user:

- Either grant the ‘Admin’ global permission to the user explicitly (as described in Granting global permissions to users or groups);
  OR:
- Add the user to a group which has the ‘Admin’ global permission (as described in Changing group members).

On this page:

- Grant global administration rights
- Grant plan administration rights

Related pages:

- Managing users
- Granting global permissions to users or groups
- Changing group members
- Granting plan permissions in bulk
Grant plan administration rights

- Either grant the 'Admin' and 'Edit' plan permissions to the user explicitly (as described in Granting plan permissions in bulk);
- OR:
- Add the user to a group which has the 'Admin' and 'Edit' plan permissions (as described in Changing group members).

Changing users' passwords or details

Follow this process if you store the user's data in Bamboo. If the user data is stored in an external user directory like Crowd or LDAP, go to that directory to perform this action.

To change a user's password or details:

1. Click the icon in the Bamboo header and choose Overview.
2. In the left-hand navigation panel, click Users.
3. Locate the user by typing part of their username, full name or email, and clicking Search.
4. Next to the user you want to modify, click Edit.
5. Edit the user's details or password as necessary.
   - If you have configured SMTP email on your Bamboo server, the user will automatically receive an email containing their new password.
   - The user can easily change their password later.
6. Click Save.

Note that:

- Users who have forgotten their passwords can click the Forgotten your password? link on the Bamboo login screen. This will automatically generate a new password and email it to them (provided the Bamboo server has been configured to send SMTP email).
- Logged-in users can change their own password and details, as described in Managing your user profile.
- See Associating your author name with your user profile for information about Source Repository Aliases.

Managing groups

Bamboo groups are used to specify which users will have global permissions and plan permissions. They can also be used to specify which users will receive notifications about a plan's build results. You can create and delete as many groups as you need. You will typically create at least one group per project.

A special group called bamboo-admin is automatically created when you install Bamboo. Members of this group have Bamboo administration rights.

Read more about managing groups for your users:

- Creating a group
- Deleting a group
- Changing group members

Creating a group

Bamboo groups are used to specify which users will have global permissions and plan permissions. They can also be used to specify which users will receive notifications about a plan's build results. You can create and delete as many groups as you need. You will typically create at least one group per project.

A special group called bamboo-admin is automatically created when you install Bamboo. Members of this group have Bamboo administration rights.
To create a group:

1. Click the icon in the Bamboo header and choose **Overview**.
2. In the left-hand navigation panel, click **Groups**.
3. Type a name for your new group into **Group Name**.

   Group name cannot be changed after the group is created.

   In Bamboo, a group name can only contain characters from the following set: a-z, @, ., _, -, 0-9. You can't create groups that contain invalid character. Similarly, if you try to import of groups that contain invalid characters from an external source, the import of that group will fail.

4. From the **Users to add** list, select your users. Hold <Ctrl> to select multiple users. You can also add or remove users from the group later if required.
5. Click **Save**.

**Screenshot: Creating a Bamboo group**

Deleting a group

To delete a group:

1. Click the icon in the Bamboo header and choose **Overview**.
2. Click **Groups** in the left navigation panel. The 'Manage Groups' screen will be displayed.
3. Click **Delete** for the relevant group, in the 'Operations' column.

Note that the **bamboo-admin** group cannot be deleted.
Changing group members

Bamboo groups are used to specify which users will have global permissions and plan permissions. They can also be used to specify which users will receive notifications about a plan's build results. You can create and delete as many groups as you need. You will typically create at least one group per project.

A special group called bamboo-admin is automatically created when you install Bamboo. Members of this group have Bamboo administration rights.

To change the members of a group:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Groups in the left navigation panel. The 'Manage Groups' screen will be displayed.
3. Click Edit for the relevant group, in the ‘Operations’ column. The ‘Edit Group Details’ screen will be displayed. Users who already belong to the group are shown in blue; users who do not currently belong to the group are shown in white.
4. Press the <Ctrl> key and hold it while you select (or deselect) the users whom you want to add to (or remove from) the group.
5. Click Save.

Related pages:
- Managing groups

Connecting to external user directories

You can connect Bamboo to external user directories. This allows you to use existing users and groups stored in an enterprise directory, and to manage those users and groups in one place.

User management functions include:

- **Authentication**: determining which user identity is sending a request to Bamboo.
- **Authorization**: determining the access privileges for an authenticated user.
- **User management**: maintaining profile information in user's accounts.
- **Group membership**: storing and retrieving groups, and group membership.

It is important to understand that these are separate components of a user management system. You could use an external directory for any or all of the above tasks.

There are several approaches to consider when using external user directories with Bamboo, described briefly below:

- LDAP
- Crowd
- Multiple directories

Bamboo provides a "read-only" connection to external directories for user management. This means that users and groups, fetched from any external directory, can only be modified or updated in the external directory itself, rather than in Bamboo.

Bamboo comes with an internal user directory, already built-in, that is enabled by default at installation.

LDAP

You should consider connecting to an LDAP directory server if your users and groups are stored in an enterprise directory.

There are two common ways of using an external LDAP directory with Bamboo:

- For full user and group management, including for user authentication — see Connecting to an existing LDAP directory for instructions.
For delegated user authentication only, while using Bamboo's internal directory for user and group management — see Delegating authentication to an LDAP directory for instructions.

Bamboo is able to connect to the following LDAP directory servers:

- Microsoft Active Directory
- Apache Directory Server (ApacheDS) 1.0.x and 1.5.x
- Apple Open Directory (Read-Only)
- Fedora Directory Server (Read-Only Posix Schema)
- Novell eDirectory Server
- OpenDS
- OpenLDAP
- OpenLDAP (Read-Only Posix Schema)
- Generic Posix/RFC2307 Directory (Read-Only)
- Sun Directory Server Enterprise Edition (DSEE)
- Any generic LDAP directory server

Crowd

You can connect Bamboo to Atlassian Crowd for user and group management, as well as for user authentication.

Crowd is an application security framework that handles authentication and authorization for your web-based applications. With Crowd you can integrate multiple web applications with multiple user directories, with support for single sign-on (SSO) and centralized identity management. See the Crowd Administration Guide.

You should consider connecting to Crowd if you want to use Crowd to manage existing users and groups in multiple directory types, or if you have users of other web-based applications.

See Connecting to Crowd for configuration instructions.

Multiple directories

When Bamboo is connected directly to multiple user directories, where duplicate user names and group names are used across those directories, the effective group memberships that Bamboo uses for authorization can be determined using either of these two schemes:

- 'aggregating membership'
- 'non-aggregating membership'.

See Effective memberships with multiple directories for more information about these two schemes.

Note that:

- Aggregating membership is used by default for new installations of Bamboo.
- Authentication, for when Bamboo is connected to multiple directories, only depends on the mapped groups in those directories — the aggregation scheme is not involved at all.
- The directory order is significant during the authentication of the user, in cases where the same user exists in multiple directories. When a user attempts to log in, the application will search the directories in the order specified, and will use the credentials (password) of the first occurrence of the user to validate the login attempt.
- For inactive users, Bamboo only checks if the user is active in the first (highest priority) directory in which they are found for the purpose of determining authentication. Whether a user is active or inactive does not affect how their memberships are determined.
- When a user is added to a group, they are only added to the first writeable directory available, in priority order.
- When a user is removed from a group, they are only removed from the group in the first directory the user appears in, when non-aggregating membership is used. With aggregating membership, they are removed from the group in all directories the user exists in.
- When using Single Sign-On with Crowd and multiple Crowd directories:
  - signed-in users will be validated against the first Crowd directory the user is in
  - users that haven't signed in yet, but have a valid Crowd SSO cookie will be validated against all configured Crowd directories in order
A Bamboo admin can change the membership scheme used by Bamboo using the following commands:

- To change to **aggregating membership**, substitute your own values for `<username>`, `<password>` and `<base-url>` in this command:

  ```
  curl -H 'Content-type: application/json' -X PUT -d '{"membershipAggregationEnabled":true}' -u <username>:<password> <base-url>/rest/crowd/latest/application
  ```

- To change to non-**aggregating membership**, substitute your own values for `<username>`, `<password>` and `<base-url>` in this command:

  ```
  curl -H 'Content-type: application/json' -X PUT -d '{"membershipAggregationEnabled":false}' -u <username>:<password> <base-url>/rest/crowd/latest/application
  ```

Note that these operations are different from how you make these changes in Crowd. Note also that changing the aggregation scheme can affect the authorization permissions for your users, and how directory update operations are performed.

**Connecting Bamboo to JIRA for user management**

⚠️ *This page does not apply to JIRA Software Cloud; you can’t use JIRA Software Cloud to manage your Bamboo users.*

You can connect Bamboo to an existing Atlassian JIRA Software instance to delegate Bamboo user and group management, and authentication. Bamboo provides a "read-only" connection to JIRA Software for user management. This means that users and groups, fetched from JIRA Software, can only be modified or updated in that JIRA Software server, rather than in Bamboo.

Choose this option, as an alternative to Atlassian Crowd, for simple configurations with a limited number of users. Note that Bamboo can only connect to an instance running JIRA Software 4.3 or later.

Connecting Bamboo and JIRA Software is a 3-step process:

1. **Setup JIRA Software to allow connections from Bamboo**
2. **Set up Bamboo to connect to JIRA Software**
3. **Set up Bamboo users and groups in JIRA Software**

Also on this page:
- Server settings
- JIRA Software server permissions
- Advanced settings

⚠️ You need to be an administrator in JIRA Software and a system administrator in Bamboo to perform the following tasks.

1. **Setup JIRA Software to allow connections from Bamboo**
   1. Log in as a user with the ‘JIRA Software Administrators’ global permission.
   2. For JIRA 4.3.x, select **Other Application** from the ‘Users, Groups & Roles’ section of the ‘Administration’ menu.
      For later versions, choose **Administration > Users > JIRA User Server**.
   3. Click **Add Application**.
   4. Enter the **application name** (case-sensitive) and **password** that Bamboo will use when accessing JIRA Software.
5. Enter the **IP address** of your Bamboo instance. Valid values are:
   - A full IP address, e.g. 192.168.10.12.
   - A wildcard IP range, using CIDR notation, e.g. 192.168.10.1/16. For more information, see the introduction to [CIDR notation on Wikipedia](https://en.wikipedia.org/wiki/CIDR_notation) and [RFC 4632](https://tools.ietf.org/html/rfc4632).

6. Click **Save**.

7. Define the directory order, on the ‘User Directories’ screen, by clicking the blue up- and down-arrows next to each directory. The directory order has the following effects:
   - The order of the directories is the order in which they will be searched for users and groups.
   - Changes to users and groups will be made only in the first directory where the application has permission to make changes.

---

**2. Setup Bamboo to connect to JIRA Software**

1. Log in to Bamboo as a user with 'Admin' permission.
2. In the Bamboo administration area click **User Directories** (under 'Security').
3. Click **Add Directory** and select **Atlassian JIRA**.
4. Enter settings, as described below.
5. Test and save the directory settings.
6. Define the directory order, on the ‘User Directories’ screen, by clicking the arrows for each directory. The directory order has the following effects:
   - The order of the directories is the order in which they will be searched for users and groups.
   - Changes to users and groups will be made only in the first directory where the application has permission to make changes.

---

**3. Set up Bamboo users and groups in JIRA Software**

In order to use Bamboo, users must be a member of the **Bamboo-users** group or have Bamboo global permissions. Follow these steps to configure your Bamboo groups in JIRA Software:

1. Add the **bamboo-users** and **bamboo-administrators** groups in JIRA Software.
2. Add your own username as a member of both of the above groups.
3. Choose one of the following methods to give your existing JIRA Software users access to Bamboo:
   - Option 1: In JIRA Software, find the groups that the relevant users belong to. Add those groups as members of one or both of the above Bamboo groups.
   - Option 2: Log in to Bamboo using your JIRA Software account and go to the administration area. Click **Global permissions** (under 'Security'). Assign the appropriate permissions to the relevant JIRA Software groups. See [Global permissions](https://confluence.atlassian.com/display/JIRAADMIN/Global+permissions).

---

Connecting Atlassian Bamboo to JIRA Software for user management is not sufficient, by itself, to allow your users to log in to Bamboo. You must also grant them access to Bamboo by using one of the above 2 options.

We recommend that you use groups instead of individual accounts when granting permissions.

---

**Server settings**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>A meaningful name that will help you to identify this Jira server in the list of directory servers. Examples:</td>
</tr>
<tr>
<td></td>
<td>- Jira Service Desk Server</td>
</tr>
<tr>
<td></td>
<td>- My Company Jira</td>
</tr>
<tr>
<td>Server URL</td>
<td>The web address of your Jira server. Examples:</td>
</tr>
<tr>
<td></td>
<td>- <a href="http://www.example.com:8080">http://www.example.com:8080</a></td>
</tr>
<tr>
<td></td>
<td>- <a href="http://jira.example.com">http://jira.example.com</a></td>
</tr>
</tbody>
</table>

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## Application Name

The name used by your application when accessing the Jira server that acts as user manager. Note that you will also need to define your application to that Jira server, via the 'Other Applications' option in the 'Users, Groups & Roles' section of the 'Administration' menu.

## Application Password

The password used by your application when accessing the Jira server that acts as user manager.

### Advanced settings

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable Nested Groups</td>
<td>Enable or disable support for nested groups. Before enabling nested groups, please check to see if nested groups are enabled on the JIRA server that is acting as user manager. When nested groups are enabled, you can define a group as a member of another group. If you are using groups to manage permissions, you can create nested groups to allow inheritance of permissions from one group to its sub-groups.</td>
</tr>
<tr>
<td>Enable Incremental Synchronization</td>
<td>Enable or disable incremental synchronization. Only changes since the last synchronization will be retrieved when synchronizing a directory.</td>
</tr>
<tr>
<td>Synchronization Interval (minutes)</td>
<td>Synchronization is the process by which the application updates its internal store of user data to agree with the data on the directory server. The application will send a request to your directory server every x minutes, where 'x' is the number specified here. The default value is 60 minutes.</td>
</tr>
</tbody>
</table>

### Integrating Bamboo with Crowd

You can configure Bamboo to use Atlassian Crowd for user and group management, and for authentication and authorization.

Atlassian Crowd is an application security framework that handles authentication and authorization for your web-based applications. With Crowd you can integrate multiple web applications and user directories, with support for single sign-on (SSO) and centralized identity management. See the [Crowd Administration Guide](#).

Connect to Crowd if you want to use Crowd to manage existing users and groups in multiple directory types, or if you have users of other web-based applications.

### To connect Bamboo to Crowd:

1. Log in as a user with 'Admin' permission.
2. In the Bamboo administration area, click User Directories (under 'Security').
3. Click Add Directory and select Atlassian Crowd.
4. Enter settings, as described below.
5. Test and save the directory settings.
6. Define the directory order, on the **Directories** tab, by clicking the blue up- and down-arrows next to each directory. The directory order has the following effects:
   - The order of the directories is the order in which they will be searched for users and groups.
   - Changes to users and groups will be made only in the first directory where the application has permission to make changes.

**Server settings**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>A meaningful name that will help you to identify this Crowd server amongst your list of directory servers. Examples:</td>
</tr>
<tr>
<td></td>
<td>• Crowd Server</td>
</tr>
<tr>
<td></td>
<td>• Example Company Crowd</td>
</tr>
<tr>
<td>Server URL</td>
<td>The web address of your Crowd console server. Examples:</td>
</tr>
<tr>
<td></td>
<td>• <a href="http://www.example.com:8095/crowd/">http://www.example.com:8095/crowd/</a></td>
</tr>
<tr>
<td></td>
<td>• <a href="http://crowd.example.com">http://crowd.example.com</a></td>
</tr>
<tr>
<td>Application Name</td>
<td>The name of your application, as recognized by your Crowd server. Note that you will need to define the application in Crowd too, using the Crowd administration Console. See the Crowd documentation on adding an application.</td>
</tr>
<tr>
<td>Application Password</td>
<td>The password which the application will use when it authenticates against the Crowd framework as a client. This must be the same as the password you have registered in Crowd for this application. See the Crowd documentation on adding an application.</td>
</tr>
</tbody>
</table>

**Crowd permissions**

Bamboo offers **Read Only** permissions for Crowd directories. The users, groups and memberships in Crowd directories are retrieved from Crowd and can only be modified from Crowd. You cannot modify Crowd users, groups or memberships using the Bamboo administration screens.

**Advanced settings**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable Nested Groups</td>
<td>Enable or disable support for nested groups. Before enabling nested groups, please check to see if the user directory or directories in Crowd support nested groups. When nested groups are enabled, you can define a group as a member of another group. If you are using groups to manage permissions, you can create nested groups to allow inheritance of permissions from one group to its sub-groups.</td>
</tr>
<tr>
<td>Enable Incremental Synchronization</td>
<td>Enable or disable incremental synchronization. Only changes since the last synchronization will be retrieved when synchronizing a directory. Note that full synchronization is always executed when restarting Fisheye.</td>
</tr>
</tbody>
</table>
Synchronization Interval (minutes)

Synchronization is the process by which the application updates its internal store of user data to agree with the data on the directory server. The application will send a request to your directory server every x minutes, where ‘x’ is the number specified here. The default value is 60 minutes.

**Single sign-on (SSO) with Crowd**

Proper tutorial how to enable SSO in Bamboo:
https://confluence.atlassian.com/crowd/integrating-crowd-with-atlassian-bamboo-198785.html#IntegratingCrowdwithAtlassianBamboo-SSO

**Using multiple directories**

When Bamboo is connected to Crowd you can map Bamboo to multiple user directories in Crowd.

For Crowd 2.8, and later versions, there are two different membership schemes that Crowd can use when multiple directories are mapped to an integrated application, and duplicate user names and group names are used across those directories. The schemes are called ‘aggregating membership’ and ‘non-aggregating membership’ and are used to determine the effective group memberships that Bamboo uses for authorization. See Effective memberships with multiple directories for more information about these two schemes in Crowd.

Note that:

- **Authentication**, for when Bamboo is mapped to multiple directories in Crowd, only depends on the mapped groups in those directories – the aggregation scheme is not involved at all.
- For inactive users, Bamboo only checks if the user is active in the first (highest priority) directory in which they are found to determine authentication. The membership schemes described above are not used when Crowd determines if a user should have access to Bamboo.
- When a user is added to a group, they are only added to the first writeable directory available, in priority order.
- When a user is removed from a group, they are only removed from the group in the first directory the user appears in, when non-aggregating membership is used. With aggregating membership, they are removed from the group in all directories the user exists in.

An administrator can set the aggregation scheme that Bamboo uses when integrated with Crowd. Go to the **Directories** tab for the Bamboo instance in Crowd, and check **Aggreate group memberships across directories** to use the ‘aggregating membership’ scheme. When the checkbox is clear ‘non-aggregating membership’ is used.

Note that changing the aggregation scheme can affect the authorization permissions for your Bamboo users, and how directory update operations are performed.

**Integrating Bamboo with LDAP**

You can connect Bamboo to an existing LDAP user directory, so that your existing users and groups in an enterprise directory can be used in Bamboo. The LDAP directory is used for both user authentication and Bamboo account management.

Bamboo is able to connect to the following LDAP directory servers:

- Microsoft Active Directory
- Apache Directory Server (ApacheDS) 1.0.x and 1.5.x
- Apple Open Directory (Read-Only)
- Fedora Directory Server (Read-Only Posix Schema)
- Novell eDirectory Server
- OpenDS
- OpenLDAP
- OpenLDAP (Read-Only Posix Schema)
- Generic Posix/RFC2307 Directory (Read-Only)
On this page:

- Synchronization when Bamboo is first connected to the LDAP directory
- Authentication when a user attempts to log in
- Connecting Bamboo
- Server settings
- LDAP schema
- LDAP permission
- Advanced settings
- User schema settings
- Group schema settings
- Membership schema settings

**Synchronization when Bamboo is first connected to the LDAP directory**

When you first connect Bamboo to an existing LDAP directory, the Bamboo is synchronized with the LDAP directory. User information, including groups and group memberships, is copied across to the Bamboo database.

Note that when Bamboo is connected to an LDAP directory, you cannot update user details in Bamboo. Updates must be done directly on the LDAP directory, perhaps using a LDAP browser tool such as Apache Directory Studio.

Option - Use LDAP filters to restrict the number of users and groups that are synchronized

You can use LDAP filters to restrict the users and groups that are synchronized with the Bamboo internal directory. You may wish to do this in order to limit the users or groups that can access Bamboo, or if you are concerned that synchronization performance may be poor.

For example, to limit synchronization to just the groups named "Bamboo_user" or "red_team", enter the following into the **Group Object Filter** field (see **Group Schema Settings** below):

```
(&(objectClass=group)(|(cn=Bamboo_user)(cn=red_team)))
```

For further discussion about filters, with examples, please see How to write LDAP search filters. Note that you need to know the names for the various containers, attributes and object classes in your particular directory tree, rather than simply copying these examples. You can discover these container names by using a tool such as Apache Directory Studio.

**Authentication when a user attempts to log in**

When a user attempts to log in to Bamboo, the username and password are passed to the LDAP directory for confirmation. If the password matches that stored for the user, LDAP passes a confirmation back to Bamboo, and Bamboo logs in the user. During the user's session, all authorizations (i.e. access to Bamboo resources such as repositories, reviews and administration screens) are handled by Bamboo, based on permissions maintained by Bamboo.

**Connecting Bamboo**

**To connect Bamboo to an LDAP directory:**

1. Log in as a user with 'Admin' permission.
2. In the Bamboo administration area, click **User Directories** (under 'Security').
3. Click **Add Directory** and select either **Microsoft Active Directory** or **LDAP** as the directory type.
4. Configure the directory settings, as described in the tables below.
5. Save the directory settings.
6. Define the directory order by clicking the arrows next to each directory on the 'User Directories' screen. The directory order has the following effects:
   - The order of the directories is the order in which they will be searched for users and groups.
   - Changes to users and groups will be made only in the first directory where the application has permission to make changes.

**Server settings**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
</table>
| Name             | Enter a meaningful name to help you identify the LDAP directory server. Examples:  
  - Example Company Staff Directory  
  - Example Company Corporate LDAP |
| Directory Type   | Select the type of LDAP directory that you will connect to. If you are adding a new LDAP connection, the value you select here will determine the default values for many of the options on the rest of screen. Examples:  
  - Microsoft Active Directory  
  - OpenDS  
  - And more. |
| Hostname         | The host name of your directory server. Examples:  
  - ad.example.com  
  - ldap.example.com  
  - opensds.example.com |
| Port             | The port on which your directory server is listening. Examples:  
  - 389  
  - 10389  
  - 636 (for example, for SSL) |
| Use SSL          | Check this if the connection to the directory server is an SSL (Secure Sockets Layer) connection. Note that you will need to configure an SSL certificate in order to use this setting. |
## Username

The distinguished name of the user that the application will use when connecting to the directory server. Examples:

- `cn=administrator,cn=users,dc=ad,dc=example,dc=com`
- `cn=user,dc=domain,dc=name`
- `user@domain.name`

By default, all users can read the `uSNChanged` attribute; however, only administrators or users with relevant permissions can access the Deleted Objects container. The specific privileges required by the user to connect to LDAP are "Bind" and "Read" (user info, group info, group membership, update sequence number, deleted objects), which the user can obtain by being a member of the Active Directory's built-in administrators group.

Note that the incremental sync will fail silently if the Active Directory is accessed by a user without these privileges. This has been reported as CWD-3093.

## Password

The password of the user specified above.

**Note:** Connecting to an LDAP server requires that this application log in to the server with the username and password configured here. As a result, this password cannot be one-way hashed - it must be recoverable in the context of this application. The password is currently stored in the database in plain text without obfuscation. To guarantee its security, you need to ensure that other processes do not have OS-level read permissions for this application's database or configuration files.

## LDAP schema

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Base DN</strong></td>
<td>The root distinguished name (DN) to use when running queries against the directory server. Examples:</td>
</tr>
<tr>
<td></td>
<td>- <code>o=example,c=com</code></td>
</tr>
<tr>
<td></td>
<td>- <code>cn=users,dc=ad,dc=example,dc=com</code></td>
</tr>
<tr>
<td></td>
<td>- For Microsoft Active Directory, specify the base DN in the following format: <code>dc=domain1,dc=local</code>. You will need to replace the <code>domain1</code> and <code>local</code> for your specific configuration. Microsoft Server provides a tool called <code>ldp.exe</code> which is useful for finding out and configuring the the LDAP structure of your server.</td>
</tr>
</tbody>
</table>
Additional User DN

This value is used in addition to the base DN when searching and loading users. If no value is supplied, the subtree search will start from the base DN. Example:

- `ou=Users`

Additional Group DN

This value is used in addition to the base DN when searching and loading groups. If no value is supplied, the subtree search will start from the base DN. Example:

- `ou=Groups`

If no value is supplied for Additional User DN or Additional Group DN this will cause the subtree search to start from the base DN and, in case of huge directory structure, could cause performance issues for login and operations that rely on login to be performed.

**LDAP permission**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read Only</td>
<td>LDAP users, groups and memberships are retrieved from your directory server and can only be modified via your directory server. You cannot modify LDAP users, groups or memberships via the application administration screens.</td>
</tr>
<tr>
<td>Read Only, with Local Groups</td>
<td>LDAP users, groups and memberships are retrieved from your directory server and can only be modified via your directory server. You cannot modify LDAP users, groups or memberships via the application administration screens. However, you can add groups to the internal directory and add LDAP users to those groups.</td>
</tr>
</tbody>
</table>

**Advanced settings**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable Nested Groups</td>
<td>Enable or disable support for nested groups. Some directory servers allow you to define a group as a member of another group. Groups in such a structure are called nested groups. Nested groups simplify permissions by allowing sub-groups to inherit permissions from a parent group.</td>
</tr>
<tr>
<td>Manage User Status Locally</td>
<td>If true, you can activate and deactivate users in Crowd independent of their status in the directory server.</td>
</tr>
<tr>
<td>Filter out expired users</td>
<td>If true, user accounts marked as expired in ActiveDirectory will be automatically removed. For cached directories, the removal of a user will occur during the first synchronization after the account’s expiration date.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> This is available in Embedded Crowd 2.0.0 and above, but not available in the 2.0.0 m04 release.</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Use Paged Results</td>
<td>Enable or disable the use of the LDAP control extension for simple paging of search results. If paging is enabled, the search will retrieve sets of data rather than all of the search results at once. Enter the desired page size – that is, the maximum number of search results to be returned per page when paged results are enabled. The default is 1000 results.</td>
</tr>
<tr>
<td>Follow Referrals</td>
<td>Choose whether to allow the directory server to redirect requests to other servers. This option uses the node referral (JNDI lookup <code>java.naming.referer</code>) configuration setting. It is generally needed for Active Directory servers configured without proper DNS, to prevent a <code>javax.naming.PartialResultException: Unprocessed Continuation Reference(s)</code> error.</td>
</tr>
<tr>
<td>Naive DN Matching</td>
<td>If your directory server will always return a consistent string representation of a DN, you can enable naive DN matching. Using naive DN matching will result in a significant performance improvement, so we recommend enabling it where possible. This setting determines how your application will compare DNs to determine if they are equal.</td>
</tr>
<tr>
<td></td>
<td>- If this checkbox is selected, the application will do a direct, case-insensitive, string comparison. This is the default and recommended setting for Active Directory, because Active Directory guarantees the format of DNs.</td>
</tr>
<tr>
<td></td>
<td>- If this checkbox is not selected, the application will parse the DN and then check the parsed version.</td>
</tr>
<tr>
<td>Enable Incremental Synchronization</td>
<td>Enable incremental synchronization if you only want changes since the last synchronization to be queried when synchronizing a directory. Please be aware that when using this option, the user account configured for synchronization must have read access to:</td>
</tr>
<tr>
<td></td>
<td>- The <code>uSNCchanged</code> attribute of all users and groups in the directory that need to be synchronized.</td>
</tr>
<tr>
<td></td>
<td>- The objects and attributes in the Active Directory deleted objects container.</td>
</tr>
<tr>
<td></td>
<td>If at least one of these conditions is not met, you may end up with users who are added to (or deleted from) the Active Directory not being respectively added (or deleted) in the application.</td>
</tr>
<tr>
<td></td>
<td>This setting is only available if the directory type is set to &quot;Microsoft Active Directory&quot;.</td>
</tr>
</tbody>
</table>
Synchronization Interval (minutes) | Synchronization is the process by which the application updates its internal store of user data to agree with the data on the directory server. The application will send a request to your directory server every x minutes, where 'x' is the number specified here. The default value is 60 minutes.

Read Timeout (seconds) | The time, in seconds, to wait for a response to be received. If there is no response within the specified time period, the read attempt will be aborted. A value of 0 (zero) means there is no limit. The default value is 120 seconds.

Search Timeout (seconds) | The time, in seconds, to wait for a response from a search operation. A value of 0 (zero) means there is no limit. The default value is 60 seconds.

Connection Timeout (seconds) | This setting affects two actions. The default value is 0.
- The time to wait when getting a connection from the connection pool. A value of 0 (zero) means there is no limit, so wait indefinitely.
- The time, in seconds, to wait when opening new server connections. A value of 0 (zero) means that the TCP network timeout will be used, which may be several minutes.

User schema settings

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
</table>
| User Object Class | This is the name of the class used for the LDAP user object. Example:  
  - user |
| User Object Filter | The filter to use when searching user objects. Example:  
  - (& (objectCategory=Person) (sAMAccountName=*))  
  More examples can be found in our knowledge base. See [How to write LDAP search filters](#). |
| User Name Attribute | The attribute field to use when loading the username. Examples:  
  - cn  
  - sAMAccountName  
  NB: In Active Directory, the 'sAMAccountName' is the 'User Logon Name (pre-Windows 2000)' field. The User Logon Name field is referenced by 'cn'. |
| User Name RDN Attribute | The RDN (relative distinguished name) to use when loading the username. The DN for each LDAP entry is composed of two parts: the RDN and the location within the LDAP directory where the record resides. The RDN is the portion of your DN that is not related to the directory tree structure. Example:  
  - cn |
User First Name Attribute | The attribute field to use when loading the user's first name. Example:
  - givenName

User Last Name Attribute | The attribute field to use when loading the user's last name. Example:
  - sn

User Display Name Attribute | The attribute field to use when loading the user's full name. Example:
  - displayName

User Email Attribute | The attribute field to use when loading the user's email address. Example:
  - mail

User Password Attribute | The attribute field to use when loading a user's password. Example:
  - unicodePwd

User Unique ID Attribute | The attribute used as a unique immutable identifier for user objects. This is used to track username changes and is optional. If this attribute is not set (or is set to an invalid value), user renames will not be detected — they will be interpreted as a user deletion then a new user addition.

This should normally point to a UUID value. Standards-compliant LDAP servers will implement this as 'entryUUID' according to RFC 4530. This setting exists because it is known under different names on some servers, e.g. 'objectGUID' in Microsoft Active Directory.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Object Class</td>
<td>This is the name of the class used for the LDAP group object. Examples:</td>
</tr>
<tr>
<td></td>
<td>- groupOfUniqueNames</td>
</tr>
<tr>
<td></td>
<td>- group</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group Object Filter</th>
<th>The filter to use when searching group objects. Example:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- (&amp;(objectClass=group)(cn=*))</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group Name Attribute</th>
<th>The attribute field to use when loading the group's name. Example:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- cn</td>
</tr>
<tr>
<td>Group Description Attribute</td>
<td>The attribute field to use when loading the group’s description. Example:</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>• description</td>
</tr>
</tbody>
</table>

**Membership schema settings**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Members Attribute</td>
<td>The attribute field to use when loading the group’s members. Example:</td>
</tr>
<tr>
<td></td>
<td>• member</td>
</tr>
<tr>
<td>User Membership Attribute</td>
<td>The attribute field to use when loading the user’s groups. Example:</td>
</tr>
<tr>
<td></td>
<td>• memberOf</td>
</tr>
<tr>
<td>Use the User Membership Attribute, when finding the user’s group membership</td>
<td>Check this if your directory server supports the group membership attribute on the user. (By default, this is the ‘memberOf’ attribute.)</td>
</tr>
<tr>
<td></td>
<td>• If this checkbox is selected, your application will use the group membership attribute on the user when <strong>retrieving the list of groups to which a given user belongs</strong>. This will result in a more efficient retrieval.</td>
</tr>
<tr>
<td></td>
<td>• If this checkbox is not selected, your application will use the members attribute on the group (‘member’ by default) for the search.</td>
</tr>
<tr>
<td></td>
<td>• If the <strong>Enable Nested Groups</strong> checkbox is selected, your application will ignore the <strong>Use the User Membership Attribute</strong> option and will use the members attribute on the group for the search.</td>
</tr>
<tr>
<td>Use the User Membership Attribute, when finding the members of a group</td>
<td>Check this if your directory server supports the user membership attribute on the group. (By default, this is the ‘member’ attribute.)</td>
</tr>
<tr>
<td></td>
<td>• If this checkbox is selected, your application will use the group membership attribute on the user when <strong>retrieving the members of a given group</strong>. This will result in a more efficient search.</td>
</tr>
<tr>
<td></td>
<td>• If this checkbox is not selected, your application will use the members attribute on the group (‘member’ by default) for the search.</td>
</tr>
</tbody>
</table>

**Testing LDAP or Active Directory connectivity with Paddle**

Paddle is a tool that will test the LDAP or Active Directory settings in your `atlassian-user.xml`.

**Using Paddle**

You do not need to have Bamboo running to run this tool. The steps are:

1. **Download** into a directory where you have permissions to create files.
2. Copy your `atlassian-user.xml` into that directory - this is found in your `.../{BAMBOO-HOME}/xml-data/configuration/` directory.
3. Run `java -jar paddle-x.x.jar` (where `x.x` is the version of Paddle you downloaded).
Parameters

Paddle currently supports the following parameters:

<table>
<thead>
<tr>
<th>Name</th>
<th>Example</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>debug</td>
<td>java -jar paddle-x.x.jar debug</td>
<td>Prints DEBUG messages to the console as well as paddle.log.</td>
</tr>
<tr>
<td>limit</td>
<td>java -jar paddle-x.x.jar limit=100</td>
<td>Sets the limit on the number of results returned by user and group queries. Defaults to 10.</td>
</tr>
</tbody>
</table>

Sample output

This is an example of a successful run:

```
########################################################################
###################################################
LDAP Support Tool version 1.1
########################################################################
###################################################
Connection to LDAP/Active Directory Server at ldap://192.168.0.86:389 SUCCESSFUL.
-----------------------------------------------------------------
TEST 1: Search and list 10 users
-----------------------------------------------------------------
User: CN=Administrator
  Member of:
    (1) CN=Schema Admins
    (2) CN=Enterprise Admins
    (3) CN=Domain Admins
    (4) CN=Group Policy Creator Owners

User: CN=Guest
  Does not belong to any LDAP groups.

User: CN=SUPPORT_388945a0
  Member of:
    (1) CN=HelpServicesGroup

User: CN=IUSR_MALTSHOVEL
  Does not belong to any LDAP groups.

User: CN=IWAM_MALTSHOVEL
  Member of:
    (1) CN=IIS_WPG
```
User: CN=ASPNET
Does not belong to any LDAP groups.

User: CN=krbtgt
Does not belong to any LDAP groups.

User: CN=John\, Smith
Member of:
(1) CN=Domain Users
(2) CN=Sales and Marketing

User: CN=Matt Ryall
Member of:
(1) CN=Enterprise Admins
(2) CN=Domain Admins

User: CN=Justin Koke
Member of:
(1) CN=Domain Controllers
(2) CN=Enterprise Admins

Found more than 10 results.

-----------------------------------------------------------------
TEST 2: Search and list 10 groups
-----------------------------------------------------------------

Group: CN=HelpServicesGroup
Members:
(1) CN=SUPPORT_388945a0,CN=Users,DC=ad,DC=atlassian,DC=com

Group: CN=TelnetClients
No members in this group.

Group: CN=IIS_WPG
Members:
(1) CN=S-1-5-20,CN=ForeignSecurityPrincipals,DC=ad,DC=atlassian,DC=com
(2) CN=S-1-5-6,CN=ForeignSecurityPrincipals,DC=ad,DC=atlassian,DC=com
(3) CN=S-1-5-18,CN=ForeignSecurityPrincipals,DC=ad,DC=atlassian,DC=com
(4) CN=IWAM_MALTSHOVEL,CN=Users,DC=ad,DC=atlassian,DC=com

Group: CN=SQLServer2005SQLBrowserUser$MALTSHOVEL
Members:
(1) CN=S-1-5-18,CN=ForeignSecurityPrincipals,DC=ad,DC=atlassian,DC=com

Group: CN=SQLServer2005MSSQLServerADHelperUser$MALTSHOVEL
Members:
(1) CN=S-1-5-20,CN=ForeignSecurityPrincipals,DC=ad,DC=atlassian,DC=com

Group: CN=SQLServer2005SQLAgentUser$MALTSHOVEL$MSSQLSERVER
Members:
(1) CN=S-1-5-18,CN=ForeignSecurityPrincipals,DC=ad,DC=atlassian,DC=com

Group: CN=SQLServer2005MSSQLUser$MALTSHOVEL$MSSQLSERVER
Members:
(1) CN=S-1-5-18,CN=ForeignSecurityPrincipals,DC=ad,DC=atlassian,DC=com
Group: CN=SQLServer2005MSFTEUser$MALTSHOVEL$MSSQLSERVER
Members:
   (1) CN=S-1-5-18,CN=ForeignSecurityPrincipals,DC=ad,DC=atlassian,DC=com

Group: CN=SQLServer2005MSOLAPUser$MALTSHOVEL$MSSQLSERVER
Members:
   (1) CN=S-1-5-18,CN=ForeignSecurityPrincipals,DC=ad,DC=atlassian,DC=com

Group: CN=SQLServer2005NotificationServicesUser$MALTSHOVEL
No members in this group.
You can use global permissions to control the users and groups that have access to build plans, and the actions they can perform.

Common global permissions tasks are:

- **Granting plan permissions in bulk** — control the users and groups that can perform actions on plans (e.g. edit, build, clone).
- **Granting global permissions to users or groups** — control the users and groups that can create plans, delete plans, and administer Bamboo.
- **Allowing anonymous access to Bamboo** — allow people not logged in to Bamboo to generate reports, and view plans and build results.

You can also change the permissions for an individual plan: see Configuring a plan's permissions.

Controlling access to build plans

Controlling access to the Bamboo server

Global security and permission properties allow a Bamboo system administrator to configure security- and permission-related properties that apply to Bamboo at a site-wide level.

Read more about configuring Bamboo's global security and permission properties:

- **Allowing public signup**
- **Displaying full details about users**
- **Using Captcha for failed logins**

Granting plan permissions in bulk

A **plan permission** is the ability to perform a particular operation on a plan and its jobs. For each plan, different permissions can be granted to particular groups and/or users.

- People who have the 'Admin' global permission can 'bulk edit' permissions for multiple plans at the same time, as described below. Note that this will overwrite any pre-existing plan permissions.
- People who have the 'Admin' plan permission for one or more plans, but do not have the 'Admin' global permission, can only edit one plan at a time, as described in Configuring a plan's permissions.

Note that it is recommended that you grant permissions to groups rather than to individual users.

**To grant bulk plan permissions to a user or group:**

1. Click the icon in the Bamboo header and choose **Overview**.
2. In the **Plans** section of left navigation panel, click **Bulk Edit Plan Permissions**.
3. Select the plans whose permissions you wish to edit, then click **Next** (at the bottom of the screen).
4. You can set plan permissions for the categories of users in the table below.
5. Select the check box for each permission that you wish to grant to the user or group.
6. Click **Save**.
Logged in Users
Users who are logged in to Bamboo.

Anonymous Users
Users who are not logged in to Bamboo.

User
A user already created in the Bamboo system.

To edit plan permissions for an existing user:

1. In the Grant permission to list, select User.
2. Type the username into the box, or click the icon to select from a list.
3. Click Add. The user will be added to the list on the screen, and you can then select permissions for them.

Group
A group already created in the Bamboo system.

To edit plan permissions for an existing group:

1. In the Grant permission to list, select Group.
2. Type the group name into the box.
3. Click Add. The group will be added to the list on the screen, and you can then select permissions for the group.

Screenshot: Bulk Edit Plan Permissions Wizard

Granting global permissions to users or groups
Global permissions control which users and groups have access to build plans and the Bamboo server, and what actions they can perform.

Note that if you remove all permissions for a user or group, that user or group will disappear from the Permissions tab for all plans.
To change global permissions:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Global Permissions in the left navigation panel, and then Edit Global Permissions.
3. You can set plan permissions for the categories of users in the table below.
4. Select (or clear) the check box for each permission that you wish to change for a user or group.
5. Click Save.

**Logged in Users**  
Users who are logged in to Bamboo.

**Anonymous Users**  
Users who are not logged in to Bamboo.

**User**  
A user already created in the Bamboo system.

To edit plan permissions for an existing user:

1. In the Grant permission to list, select User.
2. Type the username into the box, or click the icon to select from a list.
3. Click Add. The user will be added to the list on the screen, and you can then select permissions for them.

**Group**  
A group already created in the Bamboo system.

To edit plan permissions for an existing group:

1. In the Grant permission to list, select Group.
2. Type the group name into the box.
3. Click Add. The group will be added to the list on the screen, and you can then select permissions for the group.

You can grant the following global permissions:

<table>
<thead>
<tr>
<th>Global permission</th>
<th>Description</th>
<th>Can be granted to</th>
</tr>
</thead>
</table>
| **Access**        | Permission to view the Bamboo system. The ability to view build plans and build results is subject to individual plan permissions. | • a particular user  
• a particular group  
• all logged-in users  
• anonymous users |
| **Create Plan**   | Permission to:  
• create new build plans  
• configure linked repositories | • a particular user  
• a particular group  
• all logged-in users |

Related pages:
- Configuring a plan's permissions
- Managing users
### Create repository

<table>
<thead>
<tr>
<th>Permission to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• create new repositories</td>
</tr>
</tbody>
</table>

Only users with **Admin** permissions on the *global* level can create repositories by default. **Plan** administrators can only select from linked repositories or must be granted the **Create repository** permission explicitly. See also: [plan permissions](#).

### Admin

<table>
<thead>
<tr>
<th>Permission to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• access the Bamboo Administration menu</td>
</tr>
<tr>
<td>• create plans</td>
</tr>
<tr>
<td>• delete plans</td>
</tr>
<tr>
<td>• configure linked repositories</td>
</tr>
</tbody>
</table>

The ‘Admin’ global permission also includes all **plan permissions** for every plan.

### Screenshot: Global Permissions

#### Global permissions

You can edit your global application level permissions here. Permissions can be granted to specific users or groups. Please note these are global application permissions. For plan level permissions, please go to the plan configuration page.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Access</th>
<th>Create plan</th>
<th>Create repository</th>
<th>Admin</th>
</tr>
</thead>
<tbody>
<tr>
<td>bamboo-admin</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All logged in users</td>
<td>✔️</td>
<td>×</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>Anonymous users</td>
<td></td>
<td></td>
<td></td>
<td>✔️</td>
</tr>
</tbody>
</table>

#### Allowing anonymous access to Bamboo

Allowing *anonymous users* to access your Bamboo system means that people who aren't logged in to Bamboo will be able to perform functions such as generating reports, and viewing plans and build results — subject to individual **plan permissions**.

Note that people who aren't logged in to Bamboo do not have a 'My Bamboo' tab on their Dashboard.
To allow anonymous users to access Bamboo:

1. Click the icon in the Bamboo header and choose **Overview**.
2. Click **Global permissions** (under ‘Security’)
3. Check in the **Access** column for ‘Anonymous users’.

Anonymous users will now be able to access your Bamboo system. However, they will only be able to view plans and build results for plans where the ‘Access’ plan permission has been granted to ‘Anonymous users’.

Allowing public signup

If you enable signup for your Bamboo system, visitors can create their own Bamboo user accounts. Public signup is enabled on your Bamboo site if you see the ‘Signup’ link at the top-right of the Bamboo user interface.

To enable (or disable) signup:

1. Click the icon in the Bamboo header and choose **Overview**.
2. Click **Security Settings** (under ‘Security’) in the left navigation panel to open the ‘Global Security and Permission Properties’ page.
3. Click **Edit** on this page.
4. Select, (or clear) the **Enable Signup?** check box.
5. Select **Enable Captcha On Signup** if you require an additional security measure to prevent brute force attacks.
6. Click **Save**.
7. Log out of Bamboo and verify that the top menu bar now contains (or does not contain) a **Signup** link.
Displaying full details about users

If you enable the display of contact details on your Bamboo system, the full contact details for all users, including email address, IM address, and group membership, will be visible to any visitors to Bamboo. The email addresses of administrators on the 'Contact Administrators' page will also be visible.

To enable (or disable) the display of contact details:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Security Settings (under 'Security') in the left navigation panel to open the 'Global Security and Permission Properties' page.
3. Click Edit on this page.
4. Select (or clear) the Enable contact details to be displayed? check box.
5. Click Save.

Using Captcha for failed logins

Captcha is a tool that prevents brute force attacks on the Bamboo login screen. A brute force attack occurs when an attacker uses malicious code to make automated, repeated login attempts on a Bamboo site with the aim of gaining access to that Bamboo site.
A Bamboo system administrator can configure Bamboo to block automated login attempts. Once a certain number of failed login attempts has been reached (the default is three) Bamboo’s Captcha feature will be activated. When Captcha is activated, users will need to recognize a distorted picture of a word and must type the word into a text field. This is easy for humans to do, but very difficult for computers.

To enable (or disable) Captcha for Bamboo:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Security Settings (under ‘Security’) in the left navigation panel to open the ‘Global Security and Permission Properties’ page.
3. Click Edit on this page.
4. Select (or clear) the Enable Captcha check box.
5. If required, specify the number of failed login attempts permitted by Bamboo before Captcha is activated. (This field is mandatory and requires a value of 1 or more.)
6. Click Save.

Managing authors

An author is any person who contributes to a build by checking-in code to a repository that is associated with a Bamboo plan. Bamboo extracts the author name from the code repository; an author need not be a Bamboo user.

Bamboo allows you to associate an author with a user. Association is with either the username or email address, and can be automatically or manually configured. This is useful for identifying who has made a particular commit, providing system notifications and apportioning blame. Author association also allows a user to quickly identify their commits on the MyBamboo tab.
To manage Bamboo authors

1. Click the icon in the Bamboo header and choose **Overview**.

2. Select Authors from the side panel. The Manage Authors screen will display:

   **Manage authors**

<table>
<thead>
<tr>
<th>Author name</th>
<th>Email</th>
<th>Linked user</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>mscroek</td>
<td></td>
<td></td>
<td>Unlink user</td>
</tr>
<tr>
<td>&quot;Adrien Ragot&quot;</td>
<td></td>
<td></td>
<td>Link with user</td>
</tr>
<tr>
<td>&quot;Chris Fuller&quot;</td>
<td>cfuller</td>
<td></td>
<td>Unlink user</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Link with user</td>
</tr>
<tr>
<td>[unknown]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>aatkins</td>
<td>aatkins</td>
<td></td>
<td>Unlink user</td>
</tr>
<tr>
<td>abhalla</td>
<td>abhalla</td>
<td></td>
<td>Unlink user</td>
</tr>
<tr>
<td>abutfield</td>
<td>abutfield</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adam Jakubowski</td>
<td><a href="mailto:ajakubowski@atlassian.com">ajakubowski@atlassian.com</a></td>
<td><a href="mailto:ajakubowski@atlassian.com">ajakubowski@atlassian.com</a></td>
<td>Unlink user</td>
</tr>
<tr>
<td>Adam Jakubowski <a href="mailto:ajakubowski@atlassian.com">ajakubowski@atlassian.com</a></td>
<td><a href="mailto:ajakubowski@atlassian.com">ajakubowski@atlassian.com</a></td>
<td><a href="mailto:ajakubowski@atlassian.com">ajakubowski@atlassian.com</a></td>
<td>Unlink user</td>
</tr>
<tr>
<td>adecco</td>
<td>adecco</td>
<td></td>
<td>Unlink user</td>
</tr>
<tr>
<td>Administrator</td>
<td>Administrator@csilap</td>
<td></td>
<td>Link with user</td>
</tr>
<tr>
<td>Administrator <a href="mailto:Administrator@csilap">Administrator@csilap</a></td>
<td>Administrator@csilap</td>
<td>Administrator@csilap</td>
<td>Link with user</td>
</tr>
</tbody>
</table>

3. On the 'Manage Authors' page you can perform any of the following actions:

   **Search for author**
   Search for a particular author using their repository author name

   **Search for user**
   Search for a particular author by their linked user name to see their author association

   **Link user**
   Link an author with their Bamboo user

   **Unlink user**
   Unlink an author from their Bamboo user

   **Unlink all authors**
   Remove all existing author and user associations

   **Auto-link unlinked authors**
   Automatically associate any unlinked authors with a Bamboo user based on their Bamboo username or Email address

To associate an author with a user
1. From the Manage Authors screen, use the search tool to locate the author in question
2. Select the unlinked author and click **Link with user**
3. Enter the user's name in the field, or use the drop down menu to select a user:

![Link with user](image)

4. Click **Add**

**Note:** You can link more than one author name to a Bamboo user name.

To disassociate an author with a user

1. From the Manage Authors screen, use the search tool to locate the author or username in question
2. Click **Unlink user**

## Connecting Bamboo to an external database

Bamboo can be connected to an external database. For details and instructions please see:

- **PostgreSQL**
- **MySQL**
  - Tomcat and External MySQL Datasource Example
- **Oracle**
- **Microsoft SQL Server**
  - Transitioning from jTDS to Microsoft's JDBC driver
- **Viewing your database connection details**
- **Moving your Bamboo data to a different database**
- **Troubleshooting Databases**

### PostgreSQL

This page describes how to connect Bamboo to a PostgreSQL database.

Note that the JDBC driver for PostgreSQL is bundled with Bamboo. You do not have to download and install the driver.

See **Supported platforms** for other information about the versions of PostgreSQL supported by Bamboo.

On this page:

1. Configuring PostgreSQL
2. Connecting Bamboo to PostgreSQL

### Related pages:

- **Troubleshooting Databases**

1. Configuring PostgreSQL

**Accept remote TCP connections (remote PostgreSQL server only)**

If you are connecting Bamboo to a remote PostgreSQL server (i.e. if your PostgreSQL server is not installed locally on your Bamboo server host system), you will need to configure your `data/postgresql.conf` and `data/pg_hba.conf` files to accept remote TCP connections from your Bamboo server's IP address.
The following PostgreSQL documentation contains information on the appropriate listen_addresses value in the postgresql.conf file as well as the pg_hba.conf file:

- PostgreSQL 8.2 documentation — Connections and Authentication

Once you have modified your data/postgresql.conf and data/pg_hba.conf files, you will need to restart PostgreSQL for your changes to take effect.

Creating a Bamboo database

```bash
sudo -s -H -u postgres
# Create the Bamboo user:
/opt/PostgreSQL/8.3/bin/createuser -S -d -r -P -E bamboouser
# Create the bamboo database:
/opt/PostgreSQL/8.3/bin/createdb -O bamboouser bamboo
exit
```

Creating a completely empty Bamboo database is recommended. Avoid using templates to create the database as some may insert default tables which can lead to conflicts when setting up Bamboo.

2. Connecting Bamboo to PostgreSQL

Bamboo provides two ways to connect to a PostgreSQL database — using JDBC or using a datasource. JDBC is generally simpler and is the recommended method.

Run the Setup wizard

For both methods, run the Setup Wizard and choose the Custom Installation option.

On the 'Choose a Database Configuration' page, choose External Database, select PostgreSQL 8.2 and above from the list and click Continue.

Choose one of the following:

Connecting using JDBC

On the 'Database Configuration' page of the Setup Wizard, ensure that Direct JDBC connection has been selected and make the following settings:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver Class Name</td>
<td>Type org.postgresql.Driver (if different from the default).</td>
</tr>
<tr>
<td>Driver Class Name</td>
<td>Type the URL where Bamboo will access your database (if different from the default). For details about syntax, please refer to the Postgres JDBC driver documentation.</td>
</tr>
<tr>
<td>User Name</td>
<td>Type the username that Bamboo will use to access your database.</td>
</tr>
<tr>
<td>Password</td>
<td>Type the password (if required) that Bamboo will use to access your database.</td>
</tr>
<tr>
<td>Overwrite existing data</td>
<td>Select if you wish Bamboo to overwrite any tables that already exist in the database.</td>
</tr>
</tbody>
</table>

Screenshot 1: Setup JDBC Connection (PostgreSQL)

Creating a completely empty Bamboo database is recommended. Avoid using templates to create the database as some may insert default tables which can lead to conflicts when setting up Bamboo.

2. Connecting Bamboo to PostgreSQL

Bamboo provides two ways to connect to a PostgreSQL database — using JDBC or using a datasource. JDBC is generally simpler and is the recommended method.

Run the Setup wizard

For both methods, run the Setup Wizard and choose the Custom Installation option.

On the 'Choose a Database Configuration' page, choose External Database, select PostgreSQL 8.2 and above from the list and click Continue.

Choose one of the following:

Connecting using JDBC

On the 'Database Configuration' page of the Setup Wizard, ensure that Direct JDBC connection has been selected and make the following settings:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver Class Name</td>
<td>Type org.postgresql.Driver (if different from the default).</td>
</tr>
<tr>
<td>Driver Class Name</td>
<td>Type the URL where Bamboo will access your database (if different from the default). For details about syntax, please refer to the Postgres JDBC driver documentation.</td>
</tr>
<tr>
<td>User Name</td>
<td>Type the username that Bamboo will use to access your database.</td>
</tr>
<tr>
<td>Password</td>
<td>Type the password (if required) that Bamboo will use to access your database.</td>
</tr>
<tr>
<td>Overwrite existing data</td>
<td>Select if you wish Bamboo to overwrite any tables that already exist in the database.</td>
</tr>
</tbody>
</table>
Connecting with a datasource

Configure a datasource in your application server (consult your application server documentation for details).

For details about the syntax to use for the JDBC database URL, please see the Postgres JDBC driver documentation.

On the 'Database Configuration' page of the Setup Wizard, choose Connect via a datasource (configured in the application server) and make the following settings:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>JNDI name</td>
<td>Type the JNDI name of your datasource, as configured in your application server. If ( java:comp/env/jdbc/DataSourceName ) does not work, try ( jdbc/DataSourceName ) (and vice versa).</td>
</tr>
<tr>
<td>Overwrite existing data</td>
<td>Select if you wish Bamboo to overwrite any tables that already exist in the database.</td>
</tr>
</tbody>
</table>

Screenshot 2: Setup Datasource Connection
MySQL

This page describes how to connect Bamboo to a MySQL database.

On this page:

1. Creating and Configuring the MySQL database
2. Connecting Bamboo to the MySQL database
   - Connect using JDBC
   - Connect using a datasource

Related pages:
- Troubleshooting Databases

The JDBC driver for MySQL 5.1 (JDBC Connector/J 5.1) is no longer bundled with Bamboo. You must download and install the driver yourself.

See Supported platforms for other information about the versions of MySQL supported by Bamboo.

1. Creating and Configuring the MySQL database

To connect Bamboo to an external MySQL database, you must first create and configure it. This database must be configured to use:

- utf8 character set encoding, instead of latin1
- utf8_bin collation
- the InnoDB storage engine
- (recommended, not required) lower_case_table_names=1

Setting lower_case_table_names=1 might break other Atlassian applications. For more information, see the steps.

- global transaction isolation level as READ_COMMITTED

If your MySQL database server is configured to use a storage engine other than InnoDB by default (such as MyISAM), then if possible change it to use InnoDB. Otherwise, you can configure Bamboo's JDBC connection to your MySQL database so that any tables which Bamboo creates in this database will be done using the InnoDB database engine.

A MySQL database administrator can easily create and configure a MySQL database for Bamboo by running the following MySQL commands:
This creates an empty MySQL database for Bamboo named `bamboo`, where:

- `bamboouser` — the user account name for the Bamboo MySQL database
- `localhost` — the host name of the MySQL database server
- `password` — the password for this user account

With Bamboo 5.14, we’re dropping the lowercase table names requirement for the external database configuration introduced in Bamboo 5.13

See See Bamboo 5.13 Release Notes

However, we still recommend setting `lower_case_table_names=1`

Important

Changing the value of the `lower_case_table_names` parameter requires an export/import of all MySQL databases, and might affect functionality of other applications that use the same MySQL installation.

To change the value of the `lower_case_table_names` parameter:

1. Create a database dump for every database in your MySQL server:
   
   ```
   mysql> CREATE DATABASE bamboo CHARACTER SET utf8 COLLATE utf8_bin;
   mysql> GRANT ALL PRIVILEGES ON bamboo.* TO 'bamboouser'@'localhost'
   IDENTIFIED BY 'password';
   mysql> FLUSH PRIVILEGES;
   mysql> QUIT
   ```

   ```
   mysql> CREATE DATABASE bamboo CHARACTER SET utf8 COLLATE utf8_bin;
   mysql> GRANT ALL PRIVILEGES ON bamboo.* TO 'bamboouser'@'localhost'
   IDENTIFIED BY 'password';
   mysql> FLUSH PRIVILEGES;
   mysql> QUIT
   ```

2. Use DROP DATABASE to drop the database that you're recreating.
3. Stop your MySQL DB system. You must stop all applications that are using the MySQL instance.
5. Restart the MySQL service.
6. Reload the `mysqldump` for each database to convert the database and table names to lowercase:

   ```
   mysql < db1.sql
   mysql > db2.sql
   ```

More information can be found in the MySQL documentation.

For more information about configuring character set encoding and collation for Bamboo MySQL databases, refer to the MySQL 5 documentation — Specifying Character Sets and Collations.

2. Connecting Bamboo to the MySQL database

Bamboo provides two ways to connect to a MySQL database — by using either JDBC or a datasource. JDBC is generally simpler and is the recommended method.

Connect using JDBC

1. Download and install the JDBC driver
The JDBC drivers for MySQL Enterprise Server are no longer bundled with Bamboo (due to licensing restrictions). You need to download and install the driver yourself.

1. Download the MySQL Connector/J JDBC driver 5.1 from the download site.
2. Expand the downloaded zip/tar.gz file.
3. Copy the mysql-connector-java-5.1.XX-bin.jar file from the extracted directory to the <Bamboo installation directory>/lib directory (create the lib/ directory if it doesn't already exist). If you are using the Java Service Wrapper to start your Bamboo instance (Bamboo/wrapper/run-bamboo o start), copy the mysql-connector-java-5.1.XX-bin.jar file to <Bamboo installation directory>/wrapper/lib directory.
4. Stop Bamboo, on Windows, Linux or Mac.
5. Restart Bamboo, on Windows, Linux or Mac.

2. Connect Bamboo to a MySQL database using JDBC

1. Run the Setup Wizard and choose the Custom Installation method.
2. On the ‘Choose a Database Configuration’ page, choose External Database > MySQL 5.1 and click Continue.
3. Ensure that Direct JDBC connection is selected and complete the following fields (as shown in the screenshot below):

   **Driver Class Name**
   Type com.mysql.jdbc.Driver (if different from the default).

   **Database URL**
   Type the URL where Bamboo will access your database (if different from the default). Your URL must include the autoReconnect=true flag.
   - If you intend to use non-Latin characters in Bamboo, ensure that your URL includes the useUnicode and characterEncoding=utf8 flags.
   - If your MySQL database server is configured to use a storage engine other than InnoDB by default, ensure that your URL includes the sessionVariables=storage_engine=InnoDB flag.
   - If you include all of these flags, your Database URL should look similar to:
     `jdbc:mysql://localhost/bamboo?autoReconnect=true&useUnicode=true&characterEncoding=utf8&sessionVariables=storage_engine=InnoDB`
   - If the autoReconnect=true flag is not specified, the MySQL JDBC driver will eventually time out and Bamboo will no longer be able to communicate with the database.
   - For more information on the URL syntax, see the MySQL documentation.

   **User Name**
   Type the username that Bamboo will use to access your database. This is bamboouser defined in section 1 (above).

   **Password**
   Type the password (if required) that Bamboo will use to access your database. This is password defined in section 1 (above). Leave this field blank if a password for the database user account was not specified.
4. Select Overwrite existing data if you wish Bamboo to overwrite any tables that already exist in the database.
5. Click Continue.

Screenshot: Setup JDBC Connection (MySQL)
Connect using a datasource

1. Configure a datasource in your application server (consult your application server documentation for details). Please note the following:
   - Ensure that the JDBC URL which you configure in your application server includes the `autoReconnect=true`, `useUnicode=true` and `characterEncoding=utf8` flags, such that your database URL should look similar to: `jdbc:mysql://localhost/bamboo?autoReconnect=true&useUnicode=true&characterEncoding=utf8`.
   - If your MySQL database server is configured to use a storage engine other than InnoDB by default, also include the `sessionVariables=storage_engine=InnoDB` flag in this URL.
   - If the `autoReconnect` flag is not set, the MySQL JDBC driver will eventually time out, and Bamboo will no longer be able to communicate with the database.
   - For more information on the URL syntax, see the MySQL documentation.
   - Datasource example: You can see an example of using Tomcat with a MySQL database as a datasource in the following document: Tomcat and External MySQL Datasource Example.

2. Run the Setup Wizard and choose the Custom Installation method.
3. Choose External Database > MySQL 5.1 from the list and click Continue.
4. Choose Connect via a datasource (configured in the application server) (as shown in the screenshot below).
5. In the JNDI name field, type the JNDI name of your datasource, as configured in your application server.
   - If `java:comp/env/jdbc/DataSourceName` does not work, try `jdbc/DataSourceName` (and vice versa).
6. Select Overwrite existing data if you wish Bamboo to overwrite any tables that already exist in the database.
7. Click Continue.
Oracle

This page describes how to connect Bamboo to an Oracle database.

Bamboo provides two ways to connect to an Oracle database — using JDBC or using a datasource. JDBC is generally simpler and is the recommended method.

See Supported platforms for other information about the versions of Oracle supported by Bamboo.

On this page:
- Configuring Oracle
- Connecting using JDBC
- Connecting using a datasource

Important
- For JDBC or JNDI connections, please ensure that the user connecting to the database will have total permissions over it. This includes DBMS_LOB package and other resources available.
Configuring Oracle

1. Ensure that you have a database instance available for Bamboo (either create a new one or use an existing one).
2. Within that database instance, create a user which Bamboo will connect as (e.g. bamboo-user). Remember this database user name, as it will be used to configure Bamboo’s connection to this database. When you create a user in Oracle, Oracle will create a ‘schema’ automatically.

   ```sql
   create user bamboo-user identified by password;
   ```

3. Ensure that the user has the following permissions:

   ```sql
   grant connect, resource, create table to bamboo-user;
   ```

Connecting using JDBC

1. Run the Setup Wizard and choose the Custom Installation method.
2. At the ‘Choose a Database Configuration’ step, choose External Database > Oracle.
3. Select Direct JDBC connection and complete the form:

   **Driver Class Name**
   Type: oracle.jdbc.driver.OracleDriver

   **Database URL**
   Type the URL where Bamboo will access your database, e.g. `jdbc:oracle:thin:@localhost:1521:SID`. For syntax, please see the Oracle documentation.

   **Username**
   Type the username that Bamboo will use to access your database.

   **Password**
   Type the password that Bamboo will use to access your database.

4. Select Overwrite existing data if you wish Bamboo to overwrite any tables that already exist in the database.
5. Click Continue.

Screenshot: Setup JDBC Connection (Oracle)
Connecting using a datasource

1. Configure a datasource in your application server (consult your application server documentation for details). For the syntax of the JDBC URL to use, please see the Oracle documentation.
2. Run the Setup Wizard and choose the Custom Installation method.
3. At the 'Choose a Database Configuration' step, choose External Database > Oracle.
4. Select Connect using a datasource (configured in the application server).
5. In the JNDI name field, type the JNDI name of your datasource, as configured in your application server. If `java:comp/env/jdbc/DataSourceName` doesn't work, try `jdbc/DataSourceName` (and vice versa).
6. Select Overwrite existing data if you wish Bamboo to overwrite any tables that already exist in the database.
7. Click Continue.

Microsoft SQL Server

This page describes how to connect Bamboo to a Microsoft SQL Server database.

See Supported platforms for other information about the versions of SQL Server supported by Bamboo.

Note that the JDBC driver for SQL Server is bundled with Bamboo. You do not have to download and install the driver.

On this page:

1. Configuring SQL Server
2. Creating your database
3. Connecting Bamboo to SQL Server
   - Connect to SQL Server using JDBC
   - Connect to SQL Server using a datasource
1. Configuring SQL Server

Before you connect Bamboo to a SQL Server, you need to configure SQL Server appropriately.

- **Change server authentication to ‘SQL Server and Windows Authentication mode’** — On a typical SQL Server installation, Windows Authentication mode is the default security mode. However, if you try to connect to the database with a database user using this authentication mode, SQL Server will throw an error. You need to change the server authentication mode to SQL Server and Windows Authentication mode in SQL Server before you can connect Bamboo to SQL Server. See this MSDN article for instructions on how to do this.

  ![Screenshot: Changing the SQL Server authentication mode](image)

- **Configure your firewall to allow SQL Server access** — If you need to access SQL server through a firewall, you will need to configure your firewall appropriately. The following MSDN article describes how to configure a Windows firewall to allow SQL Server access, however the instructions are applicable to other firewalls: Configuring the Windows Firewall to Allow SQL Server Access.

- **Enable the TCP/IP protocol for your database instance** — You must enable the TCP/IP protocol for your SQL Server database instance by following the instructions in this MSDN article.
2. Creating your database

After configuring the SQL Server, you need to create the SQL database.

- **Create the database for Bamboo** — see the MSDN article for instructions.
- **Assign the 'db-owner' role on the database for the user that will access the Bamboo database** — the 'db_owner' fixed database role allows the user to perform all configuration and maintenance activities on the database. You need to add this role to the Bamboo user used to access your database by updating the login properties for your database user in SQL Server. Read more about login properties for SQL Server.

![Screenshot: Adding the 'db_owner' database role to a database user in SQL Server](image)

*Please ensure that you use a SQL Server user account to log into your database, not a Windows user account.*

- **Configure the database to use case-sensitive collation** — to make the SQL Server database respect case differences in the data it stores (which is required for Bamboo), ensure that you configure it using a case-sensitive collation option such as 'Latin1_General_CS_AS'. To access this feature in SQL Server Management Studio, right-click on the database name, select Properties from the resulting menu, then select the Options page.

![Screenshot: Configuring the Bamboo database to use 'Latin1_General_CS_AS' collation](image)
1. **Configure the database to use the correct isolation level**— Ensure that the new database was set to use Read Committed with Row Versioning as its isolation level. You can apply the new isolation by executing the following query:

```
ALTER DATABASE <database name>
SET READ_COMMITTED_SNAPSHOT ON
WITH ROLLBACK IMMEDIATE;
```

To verify the changes, use this query which should result in '1':

```
SELECT sd.is_read_committed_snapshot_on
FROM sys.databases AS sd
WHERE sd.[name] = '<database name>';```

3. **Connecting Bamboo to SQL Server**

Bamboo provides two ways to connect to a Microsoft SQL Server database — using JDBC or using a datasource. JDBC is generally simpler and is the recommended method.

**Connect to SQL Server using JDBC**

1. Run the **Setup Wizard** and choose the **Custom Installation** method.
2. On the **Choose a Database Configuration** page, choose **External Database > Microsoft SQL Server** and click **Continue**.
3. Ensure that **Direct JDBC connection** has been selected and complete the following fields (as shown in [image notice: the setup wizard interface with database properties and connection options]).
the screenshot below):

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Driver Class Name</strong></td>
<td>Type <code>com.microsoft.sqlserver.jdbc.SQLServerDriver</code> (if different from the default)</td>
</tr>
<tr>
<td><strong>Database URL</strong></td>
<td>The URL where Bamboo will access your database, e.g. <code>jdbc:sqlserver://localhost:1433;databaseName=bamboo</code></td>
</tr>
<tr>
<td></td>
<td>If you are connecting to a <strong>Named Instance</strong>, you will need to append <code>instance=mssqlnamehere</code> to the connection string, where <code>mysqlnamehere</code> is the name of your named instance. For more details about syntax, please refer to the <a href="https://docs.microsoft.com/en-us/sql/relational-databases/connections/">Microsoft SQL Server documentation</a>.</td>
</tr>
<tr>
<td><strong>Username</strong></td>
<td>The username that Bamboo will use to access your database.</td>
</tr>
<tr>
<td><strong>Password</strong></td>
<td>The password that Bamboo will use to access your database.</td>
</tr>
</tbody>
</table>

4. Select **Overwrite existing data** if you wish Bamboo to overwrite any tables that already exist in the database.
5. Click **Continue**.

**Screenshot: Set up JDBC connection**

Connect to SQL Server using a datasource

1. Configure a datasource in your application server (consult your application server documentation for details).
   - For details about the syntax to use for the SQL Server database URL, please refer to the [Microsoft SQL Server documentation](https://docs.microsoft.com/en-us/sql/relational-databases/connections/).
2. Run the **Setup Wizard** and choose the **Custom Installation** method.
3. On the ‘Choose a Database Configuration’ page, choose External Database > Microsoft SQL Server and click Continue.
4. Choose Connect via a datasource (configured in the application server), as shown in the screenshot below.
5. In the JNDI name field, type the JNDI name of your datasource, as configured in your application server.
   - If java:comp/env/jdbc/DataSourceName does not work, try jdbc/DataSourceName (and vice versa).
6. Select Overwrite existing data if you wish Bamboo to overwrite any tables that already exist in the database.
7. Click Continue.

Screenshot: Set up Datasource connection

Choose how you wish Bamboo to connect to your database

<table>
<thead>
<tr>
<th>Connection type</th>
<th>Direct JDBC connection</th>
<th>Connect via a datasource (configured externally in an application server)</th>
</tr>
</thead>
</table>

If java:comp/env/jdbc/DataSourceName doesn't work, try jdbc/DataSourceName (or vice versa)

JNDI name

- Overwrite existing data
  - If you wish Bamboo to overwrite any existing tables that may exist in the database.

Continue

Transitioning from jTDS to Microsoft's JDBC driver

This page describes how to change from using jTDS to using the Microsoft SQL Server JDBC driver to access Microsoft SQL Server.

What do I have to do?

Bamboo will try to automatically migrate the database configuration during upgrade. If that fails, the system will lock on startup. To resolve this, you need to manually update the driver class and URL.

How to proceed

In the Bamboo server home directory, bamboo.cfg.xml must be edited to change the JDBC driver and URL. The existing configuration should look similar to this:
The JDBC URL above is in the format constructed by Bamboo when connecting to SQL Server and will automatically be updated to a URL compatible with Microsoft’s driver, with no change required on the administrator’s part. If the URL contains additional properties, such as domain=, it will need to be manually updated.

To use Microsoft’s SQL Server driver, the settings above would be updated to this:

```xml
<property name="hibernate.connection.driver_class">com.microsoft.sqlserver.jdbc.SQLServerDriver</property>
<property name="hibernate.connection.password">your_password</property>
<property name="hibernate.connection.url">jdbc:sqlserver://localhost:1433;databaseName=bamboo</property>
<property name="hibernate.connection.username">username</property>
<property name="hibernate.dialect">com.atlassian.bamboo.hibernate.SQLServerIntlDialect</property>
```

The exact values to use in the new URL are beyond the scope of this documentation; they must be chosen based on the jTDS settings they are replacing.

**Additional Information for the curious**

The new JDBC driver class is: `com.microsoft.sqlserver.jdbc.SQLServerDriver`

The JDBC URL format for the jTDS driver is documented on SourceForge at [http://jtds.sourceforge.net/faq.html#urlFormat](http://jtds.sourceforge.net/faq.html#urlFormat).


**Why change drivers?**

- Click here to find all the technical details...

Recent releases of Hibernate, which Bamboo uses to simplify its persistence layer, have introduced a requirement that the JDBC drivers and connection pools used be JDBC4-compliant. JDBC4 was introduced with Java 6.

The jTDS driver used by releases prior to Bamboo Server 6.0 is a JDBC3 driver, compatible with Java 1.3, and therefore cannot be used with newer versions of Hibernate. While jTDS 1.3.0 and 1.3.1 claim to implement JDBC4, and JDBC4.1, they actually don’t. The new methods have been “implemented”, but their implementations are all throw new AbstractMethodError(), which means they can’t actually be used. (See an example here, on GitHub.)

Since jTDS 1.3.1 does not provide a functioning JDBC4 implementation, the decision was made to replace...
jTDS with Microsoft's own SQL Server driver. Microsoft's driver is actively maintained, where jTDS hasn't been updated since 2014 (and prior to the small round of updates done in 2014 it hadn't been updated for multiple years). Microsoft offers a full JDBC4.2 (Java 8) driver and supports all the features of SQL Server, including SQL Server 2016.

Bamboo attempts to automatically update jTDS JDBC URLs to values compatible with Microsoft's JDBC driver. However, for installations using custom JDBC URLs—for example, to use domain authentication—such automatic updating is not possible; the URL, which was manually entered, must be manually updated.

**Viewing your database connection details**

When you installed Bamboo, you would have set up a database connection by following one of these processes:

Once Bamboo is running, you can view the database configuration details as follows.

**Related pages:**

- Data and backups

**To view your database connection details:**

1. Click the icon in the Bamboo header and choose **Overview**.
2. Click **Database Configuration** in the left navigation column, under 'System'.

![Database configuration details](image)

**Moving your Bamboo data to a different database**

You can move data to a different database by installing a new Bamboo instance and updating the settings. Alternatively, if the database systems are the same or compatible, you can move the data manually.

In the initial Bamboo configuration, the database can be set to:

- an internal H2 database (not recommended for production environments) OR
- an external database.

**Related pages:**

- Data and backups

**To move your Bamboo data to a different database:**

The data import part of the process can take many hours for large instances. Please test the process to ensure Production outage windows are well-known for planned migration activities.

1. Export the data of the original Bamboo instance as described in **Exporting data for backup**.
2. Stop the original Bamboo instance.
3. Install a new Bamboo instance as described in **Installing and upgrading Bamboo**.

**Important**

If you are installing a Bamboo instance on the same server, make sure that the new Bamboo instance doesn’t have the same

<bamboo-install> or <bamboo-home> paths as the original Bamboo instance. Using the same paths may result in data loss. For more information, see [Locating important directories and files](#).

The import process performed in later steps later can be very memory intensive depending on the size of your import. New installations of Bamboo will come with default Java heap allocation configurations which may not be sufficient to perform the import at an appropriate speed.

If your Bamboo instance has been in use for long while before migrating and has become quite large, please be sure to tune / increase your Bamboo Java heap allocation before continuing: [Configuring your system properties](#).

4. Start the new Bamboo instance.
5. In the **Setup Wizard**:
   a. Make sure that the new **Configuration Directory**, **Build Data Directory** and **Build Working Directory** are not located in the same place as the original Bamboo instance directories.
   b. Select a new database:
      - **PostgreSQL**
      - **MySQL**
         - Tomcat and External MySQLDatasource Example
      - **Oracle**
      - **Microsoft SQL Server**
         - Transitioning from jTDS to Microsoft's JDBC driver
      - **Viewing your database connection details**
      - **Moving your Bamboo data to a different database**
   c. Select **Import existing data** and specify the path to the file that you exported at the beginning of the procedure.
6. Once the data is ready, restart the new Bamboo instance.
7. Reindex the data as described in [Reindexing data](#).
8. Verify that your build results and system settings are correct.

**Alternative DB migration**

If the database systems are:

- the same (for example, you are moving from PostgreSQL to another PostgreSQL) OR
- compatible (for example, you are moving from SQL Server 2005 to SQL Server 2008),

you can move the data manually. To migrate the data:

1. Stop the Bamboo instance that is using the source database.
2. Manually transfer the data.
3. Go to `<bamboo-home>` and open the `bamboo.cfg.xml` file.
4. Provide the properties of the new database.
5. Start the Bamboo instance.

**Apps**

An app is an installable component that supplements or enhances the functionality of Bamboo in some way. For example, the **Jira Bamboo Plugin** is an app that integrates Jira and Bamboo. Other apps are available for integrating Bamboo into the Visual Studio IDE, running arbitrary commands before or after builds, and accessing...
Atlassian support from the Bamboo interface.

Bamboo comes with many pre-installed apps called system apps. You can install more apps, either by acquiring them from the Atlassian Marketplace or by uploading them from your file system. This means that you can install apps that you have developed yourself. For information about developing your own apps for Bamboo, see the Bamboo Developer documentation.

### On this page:

- About the Universal Plugin Manager (UPM)
- Administering apps in Bamboo

Error rendering macro 'includeplus': The connection between BAMBOO and UPM does not exist anymore.

#### About the Universal Plugin Manager (UPM)

You administer apps for Bamboo using the Universal Plugin Manager (UPM). The UPM is itself an app that exposes app administration pages in the Bamboo Administration Console. UPM works across Atlassian applications, providing a consistent interface for administering apps in Bamboo, Jira, Confluence, Crucible, Fisheye or Bitbucket.

UPM comes pre-installed in recent versions of all Atlassian applications, so you do not normally need to install it yourself. However, like other apps, the UPM software is subject to regular software updates. For that reason before administering apps in Bamboo you should verify your version of the UPM and update it if needed.

#### Administering apps in Bamboo

You can update UPM, or any app, from the UPM's own app administration pages. Additionally, you can perform these tasks from the UPM administration pages:

- Install or remove apps
- Configure apps settings
- Discover and install new apps from the Atlassian Marketplace
- Enable or disable apps and their component modules

For information on performing these app administration tasks, see the Universal Plugin Manager documentation.

For app information specific to Bamboo, see these pages:

- Apps blacklist
- Enabling Clover for Bamboo

#### Apps blacklist

Outdated apps may break certain functionality in Bamboo. If Bamboo detects the presence of a non-working app, it will print a warning to its logs during startup and ask you to refer to this page.

For more information about why Bamboo printed a particular warning, please refer to a section below that is relevant to the app in question.

#### Experimental Bamboo Git Plugin

Since version 3.0, Bamboo is distributed with a fully supported version of the Bamboo Git Plugin.

The experimental Bamboo Git Plugin that was available before Bamboo 3.0 (and was not distributed with Bamboo) does not work with Bamboo 3.0 and later.

If you were using the experimental Bamboo Git Plugin, please remove the app from your Bamboo installation, and manually reconfigure each plan that was using it to use the Bamboo Git Plugin that is distributed with Bamboo.

#### Hung Build Killer

Starting from version 6.4, Bamboo is shipped with a built-in mechanism for monitoring builds. As a result, the
Hung build killer becomes deprecated. If you’re using the Hung build killer plugin and you want to upgrade to Bamboo 6.4 or higher, the Hung build killer is going to be disabled after the upgrade.

Enabling Clover for Bamboo

This page describes how to enable and configure Atlassian Clover or OpenClover app for a job in Bamboo.

When Bamboo is integrated with Clover, you can:

- View code-coverage details (i.e. the percentage of code covered by tests) for each build result
- View code-coverage trends for a job over a period of time
- View the code-coverage summary for the job.

**Atlassian Blogs:**

- Aggregated code coverage using Maven, Clover and Bamboo

As Clover integration (automatic and manual) produces instrumented classes, we recommend that you ensure that your job does not install them to production (for instance: ‘mvn deploy’ to public repository, ‘scp’ to an application server running on production, etc ...). Having instrumented code in such locations is usually not desired.

Common practices to ensure proper separation of instrumented and non-instrumented classes are:

- create a dedicated plan or job with Clover integration enabled
- enable automatic Clover integration for jobs running tests only (e.g. "mvn verify")
- use different location of local artifact cache if you need to install artifacts (e.g. ~/.m2/repository-clover and "mvn install")
- use different URL for uploading artifacts if necessary (e.g. a separate repository for "mvn deploy")

Enabling automatic code coverage integration

Automatic integration works with Ant, Maven and Grails tasks.

1. Go to your job. See Configuring jobs.
2. Click the Other tab.
3. In the ‘Would you like to view code coverage for this plan?’ setting, check Collect code coverage data for this job.
4. Select Automatically integrate a code coverage tool into this job.
5. In the Code coverage tool option, select Atlassian Clover (you will need to provide a Clover license in A management > Manage Apps > Clover for Bamboo) or OpenClover (no license is required).
6. Click Save

By default, HTML and XML reports are generated. Additionally, you can:

- Select Generate a historical report to compare the current coverage results with previous code coverage reports.
- Select Generate a JSON report to get the results in a format ready for embedding into applications or external report views.

What happens during automatic integration...
When automatic code coverage integration is enabled, Bamboo:

- Creates an artifact named **Clover Report (System)**, which is visible on the 'Artifacts' tab for the job.

And during every build:

- Extracts the Clover license (if set in the administration panel) into a temporary file and passes it to:
  - an Ant task as `-Dclover.license.path=/<bamboo-home>/xml-data/build-dir/<your-job>/clover/clover.license`
  - a Maven task as `-Dmaven.clover.licenseLocation=/<bamboo-home>/xml-data/build-dir/<your-job>/clover/clover.license`
- Enhances tasks by adding
  - Ant - targets like "with.clover", "clover.report"
  - Maven - goals like "clover2:setup", "clover2:aggregate", "clover2:clover", "clover2:save-history"; it also adds "verify" phase if original command does not call "compile" or later phase
  - Grails - options like "-clover.on"
- Generates XML and HTML reports
- Generates statistics and charts for a plan summary

In order to protect you against publishing instrumented code, automatic Clover integration **will not** run if the Maven task runs the "install" or "deploy" phases. In such case, you will find no Clover report and a build log will contain an appropriate warning message. In order to get coverage reports for such job, either edit the Maven task to run the build till the "verify" phase *(or earlier)* or configure Clover manually. An alternative is to add `-Dmaven.clover.repositoryPollutionProtection=false` property to your Maven task.

Enabling manual code coverage integration

Manual code coverage integration works with any kind of task in which Clover can be called (Ant, Maven, Command, Grails). Use it when you already have Atlassian Clover or OpenClover integration configured to generate a report in your build scripts:

1. Go to your job. See Configuring jobs.
2. Click the Other tab.
3. In the 'Would you like to view code coverage for this plan?' settings, check **Collect code coverage data for this job.**
4. Select **I already integrated a code coverage tool in this job.**
5. In **Coverage report**, specify where Bamboo shall look for the XML report file generated. Specify the file path `relative to your plan's root directory`, e.g.:

   ```
   target/site/clover/clover.xml
   ```

6. Click **Save**.
7. In the **Artifacts** tab, click **Create artifact** and complete the form as follows

   **Name**
   This should begin with with "Clover Report".

   **Location**
   This should point to the HTML report directory (e.g. `target/site/clover`)

   **Copy Pattern**
   Use `**/*.xml`

8. Configure Atlassian Clover or OpenClover in your build script so that it generates both XML and HTML reports. See quick start guides how to do this:
   - **Ant**: for Atlassian Clover and for OpenClover
9. For Atlassian Clover configure the license in your build script or pass it as a proper task parameter in the job configuration:
   a. Save the license key in a file (for example in /opt/bamboo/clover.license).
   b. Pass the location of the license key to the build task:
      - Define it in the build script, or
      - Pass it as a Java property for the Ant/Maven task in the plan configuration.

   **Example for Ant ...**

   ```xml
   <project>
     <property name="clover.license.path" location="/opt/bamboo/clover.license"/>
   </project>
   
   or
   
   clean with.clover test clover.report
   -Dclover.license.path=/opt/bamboo/clover.license
   
   **Example for Maven ...**

   ```xml
   <plugin>
     <groupId>com.atlassian.maven.plugins</groupId>
     <artifactId>maven-clover2-plugin</artifactId>
     <configuration>
       <licenseLocation>/opt/bamboo/clover.license</licenseLocation>
     </configuration>
   </plugin>
   
   or
   
   mvn clean clover2:setup verify clover2:aggregate clover2:clover
   -Dmaven.clover.licenseLocation=/opt/bamboo/clover.license
   ```
After every build, Bamboo will parse the Clover XML file and generate statistics and charts for a plan summary. The Plan summary and job summary pages will contain a Clover tab.

Browsing code coverage results

For more information on Clover HTML report and Clover statistics for a job, see Viewing the Clover code-coverage for a plan.

For more information on Clover code coverage summary for a plan, see Viewing the Clover code-coverage for a build.

For more information on Clover code coverage statistics across multiple plans, see Generating reports across multiple plans.

Limit the machines that Atlassian Clover runs on

If you have more remote agents than the number of machines for which Atlassian Clover is licensed, you can restrict the machines on which Clover runs by using capabilities:

1. For each of the EC2 images on which you would like to run builds with Atlassian Clover, add a capability such as `clover=true` to the configuration for the image.
   To do this, go to Administration > Elastic Bamboo > Configuration. Select the elastic image and click Add Capability.
2. Add a matching requirement, such as `clover=true` to the configuration for each job.
   To do this, go to Actions > Configure Plan > Jobs. Select the job where Clover runs and click Requirements and then Add Extra Requirement.

Troubleshooting

- **NoClassDefFoundError during execution ...**
  Using automatic Clover integration or adding a dependency to the `maven-clover2-plugin` manually is usually sufficient.

  However, if your build spawns another JVM process (for example: unit tests executed in a forked JVM, tests in the container instantiated on the fly, tests calling code deployed on another server), you must manually add the dependency to the Clover JAR for these spawned processes.
  
  See [NoClassDefFoundError com_atlassian_clover/CoverageRecorder](KB) article.

- **Automatic integration and building in a subdirectory...**
  In case you perform a build in a subdirectory (for instance, in the Maven Task configuration you have the "Working sub directory" field set) and you have automatic Clover integration, you may need to correct the Location in the "Clover Report (System)" artifact. Otherwise, an HTML report may be empty as automatic Clover integration uses the default path (for instance, the "target/site/clover" in case of integration with Maven).

  This issue has been fixed in Bamboo 5.7.

- **Automatic integration and multi-module Maven projects...**
  If you have a multi-module Maven project with dependencies between modules and use Automatic Clover integration, it can happen that an instrumented JAR of the dependent artifact will be taken for test execution in a build phase where Clover was not enabled yet. See [BAM-13208](KB) for more details. In such case, we recommend the following:

  - create a separate Job in which automatic Clover integration is enabled
  - create a Maven task in this job, which will do nothing (call the "clean" goal, for instance)
  - Bamboo will automatically add Clover-related goals (clover2:setup verify clover2:aggregate clover2:clover)

  This issue has been fixed in Bamboo 5.9.

- **Clover Results Collector is unable to find the XML report file...**
  In the build log you may see a warning like:
Failed to execute plugin 'Clover Results Collector' with error: No file matches the specified pattern ...

The are several possible reasons, see this article for more details: Failed to execute plugin 'Clover Results Collector'.

Data and backups

For information on managing data and backups, see the following topics:

- Locating important directories and files
- Specifying Bamboo's working directory
- Reindexing data
- Specifying a backup schedule
- Exporting data for backup
- Importing data from backup
- Configuring global expiry
- Importing data from Jenkins
- Plan directory information REST API

Locating important directories and files

The information on this page describes how to find important Bamboo directories and files.

**On this page:**
- Bamboo server installation directory
- Bamboo server home directory
- Bamboo agent home directory

Bamboo server installation directory

When you installed your Bamboo server, you specified the location for the Bamboo installation directory — this is the directory where the Bamboo application files are installed. (The default location depends on your operating system: Windows, Unix/Linux, Solaris or Mac OS.)

*atlassian-bamboo/WEB-INF/classes/bamboo-init.properties*

This file tells Bamboo where to find the Bamboo home directory. The location of this directory is specified by the Bamboo administrator as described in the Bamboo installation guide.

See Starting Bamboo.

*bin/start-bamboo.sh*

This is the startup file for Bamboo under Unix/Linux, Solaris and Mac OS.

*bin/start-bamboo.bat*

This is the startup file for the Bamboo under Windows.

**scripts/Triggers**

This directory contains operational scripts (used when configuring the repository to trigger a Bamboo build).

**logs/**

This directory contains logs unless you have used the Installer for Windows. (Note: The Bamboo server logs are written to the root of the installation directory. Build logs are stored in the `<BambooHome>/xml-data/builds` sub-directories.)

⚠️ If you used the Installer for Windows, log files will be located at `%USERPROFILE%\bamboo.log`. For Bamboo running as a Windows service it can be found at `%WINDIR%\System32\Config\systemprofile\b
amboo.log

atlassian-bamboo/WEB-INF/lib/
This directory is used when deploying Bamboo apps. It also contains other libraries required by Bamboo.

atlassian-bamboo/WEB-INF/classes/log4j.properties
This is Bamboo's logging configuration file. Also the logging can be configured from the Bamboo UI by navigating to Administration -> Log Settings page, but the changes made on that page will be reverted by a Bamboo restart; however, changes made in the log4j.properties file will stay even if Bamboo gets restarted.

Bamboo server home directory

When you installed your Bamboo server, you specified the location for the Bamboo home directory — This is the directory where your Bamboo configuration data and build results are stored. (The default location depends on your operating system: Windows, Unix/Linux, Solaris or Mac OS.) This directory can grow quite large when managing large quantities of plans and builds.

The structure of the home directory will change in an upcoming Bamboo release, potentially breaking any tools or scripts that rely on the current structure. You can future-proof your tools by using the Plan directory information REST API.

artifacts/PLAN_KEY/shared/build-BUILD_NUMBER/
This is a folder shared by all the stages of a certain plan. Stages will place Artifacts here so that other stages from the same plan can have access to them. The BUILD_NUMBER will always have a minimum of 5 digits, having the number completed with zeros when necessary. For instance, for build "42" the number will be "00042".

bamboo.cfg.xml
This is Bamboo’s core configuration file. It includes the configuration information for connecting to Bamboo’s database.

xml-data/
This directory contains all files relating to source repositories and build results.

xml-data/build-dir/JOB_KEY
This is known as the Working Directory. This is where Bamboo temporarily puts the checked-out files it is building. The location of this directory can be changed as described in Specifying Bamboo’s Working Directory.

xml-data/builds/
This is known as the Build Directory. This is where Bamboo stores build results (note that they will be deleted as described in Configuring global expiry). Its contents can be backed up as per Exporting data for backup.

xml-data/builds/JOB_KEY/results
Contains the build results for all the builds belonging to the JOB_KEY plan. Each build result is an individual XML file. Do not edit these files or the corresponding information in the database may become corrupt.

xml-data/builds/JOB_KEY/download-data
Contains the logs for each build belonging to the JOB_KEY plan.

xml-data/configuration/
This is known as the Configuration Directory. It contains server-wide configuration information. Its contents can be backed up as per Exporting data for backup.

database/
This directory contains Bamboo’s embedded H2 database. The database contains plan configurations and some build results data. This directory is not present if an external database is used instead of the embedded H2.

H2 is not recommended for production Bamboo instances.

index/
This directory contains the build results index. Removing or modifying files in this directory may corrupt build history. Rebuilding the search index from Bamboo's global administration screen (see Reindexing data) will completely regenerate the contents of this directory.

logs/*
Bamboo server home directory:
This directory contains logs unless you have used the Installer for Windows. (Note: The Bamboo server logs are written to the root of the installation directory. Build logs are stored in the xml-data/builds/ sub-directories.)

⚠️ If you used the Installer for Windows, log files will be located at %USERPROFILE%\bamboo.log. For Bamboo running as a Windows service it can be found at %WINDIR%\System32\Config\systemprofile\bamboo.log.

Bamboo agent home directory

When you installed your remote agents (if any), you specified the location for the Agent home directory — this is the directory where the agent's configuration data is stored. The default name of this directory is bamboo-agent-home. This directory can grow quite large when managing large numbers of plans and builds. The default bamboo-agent-home location depends on your operating system: Windows, Unix/Linux, Solaris or Mac OS.

The contents of the agent home directory are:

- **bamboo-agent.cfg.xml**
  This contains configuration information about this remote agent. Most notably, it stores the agent id, which gets generated the first time this agent connects to the Bamboo server.

- **xml-data/build-dir/**
  This is where the agent will check out the files and perform builds (similar to the Bamboo server's xml-data/build-dir/ directory)

Specifying Bamboo’s working directory

The Working Directory is where Bamboo temporarily puts the checked-out files it is building. The location of this directory was specified using the Setup Wizard, can be viewed as described in Bamboo's system information, and can be changed as described below.

By default, this directory is located under the xml-data directory in the Bamboo home directory.

Each build's jobs have their own working directory relative to this configured working directory:

```
xml-data/build-dir/JOB_KEY
```

If Concurrent Builds are enabled, local agent builds will use the format:

```
xml-data/build-dir/AGENT_ID/JOB_KEY
```

To change the location of Bamboo’s working directory:

1. Shut down Bamboo.
2. Open the <Bamboo-Home>/bamboo.cfg.xml file in a text editor. Find the following line -

   ```xml
   ....
   <property
   name="buildWorkingDir">/home/Bamboo-home/xml-data/build-dir</property>
   ....
   ```

3. Edit the Bamboo working directory to point to a new folder on disk.
4. **Save** the changes and restart Bamboo.

   Note: Bamboo will do a fresh checkout and perform a clean build of all your plans, once the directory is
Reindexing data

About re-indexing

You will need to re-index your Bamboo build results data whenever you perform a data import. Re-indexing your data can also be helpful if your reports appear to be out-of-sync with your data. This may take a few minutes to complete (see System settings for an estimate of how long it will take).

To re-index Bamboo's build results data:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Indexing in the left navigation column, under ‘System’.
3. Click Perform a full reindex.

Specifying a backup schedule

You can configure Bamboo to automatically create a backup each night, rather than doing a manual export every time.

Before you begin,

- Bamboo will be unavailable while the backup process completes. The export itself may take a long time to complete, depending on the number of builds and test. We recommend running your backups at a time of day or night when usage is low.
- Backups may require large amounts of disk space, depending on the number of builds and tests. Please make sure you have enough disk space in your desired backup location before proceeding.
- Bamboo will not export if plans are currently being built (see Using the Bamboo dashboard).

For large instances we recommend using native database and filesystem backup tools instead of the built in backup/export functionality. For more details, see Automating Bamboo backup operations. Reserve the use of the built-in tools for database type migrations only (e.g. MySQL to Postgre).

Specifying a backup schedule

To specify a backup schedule:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Scheduled Backups in the left navigation column (under ‘System’).
3. Click Edit to modify the schedule settings.
Disable scheduled backups
This check box must be cleared for automatic backups to be performed.

Backup Artifacts
Select if you want to include build artifacts in your scheduled backups.

Backup path
Specify the directory where you want to store your backups. Each backup will be stored as a single file. It may be necessary to modify the Bamboo `bamboo.paths.set.allowed` system property to do this.

Note that:
Bamboo restricts the editing of certain file path settings for security reasons (see Bamboo Security Advisory 2010-05-04). If you must configure Bamboo to permit modification to its file path settings, start Bamboo with the system property `bamboo.paths.set.allowed=true`. The procedure for configuring a Bamboo system property is described on Starting Bamboo.

Once you have configured your file path setting, we recommend removing or disabling the `bamboo.paths.set.allowed` system property and restarting Bamboo. If your Bamboo instance is accessible to anyone outside your organization, then this will minimize the risk of Bamboo being compromised by security-related attacks.

Backup file prefix
Specify the first part of the filename for all your backup files.

Backup file date pattern
Specify the date/time format for identifying your individual backup files. This will be appended to Backup file prefix to form the complete filename for your backup files.

Schedule
Use the Schedule Editor to choose the frequency with which backups will be performed. See Cron-based scheduling for more information about the Schedule Editor.

4. Click Save. Your first backup will run when your server's clock matches the specified time.

Disabling a backup
If you disable schedule backups, your schedule details will be retained but no automatic backups will be performed.

To disable a scheduled backup:

1. Click the icon in the Bamboo header and choose Overview.
2. Click Scheduled Backups in the left navigation column. The 'Scheduled Backup Details' page will be displayed, showing details about the status of scheduled backups or any currently configured backup.
3. Click Edit to edit the current 'Scheduled Backup Details'.
4. Select the Disable scheduled backups check box.
5. Click Save.
Exporting data for backup

The instructions on this page describe how to export Bamboo data for backup.

Before you begin:

- Bamboo will be unavailable while the backup process completes. The export itself may take a long time to complete, depending on the number of builds and tests. We recommend running your backups at a time of day or night when usage is low.
- Backups may require large amounts of disk space, depending on the number of builds and tests. Please make sure you have enough disk space in your desired backup location before proceeding.
- Bamboo will not export if plans are currently being built.
- User management settings for Bamboo will be saved as part of the export. For information on user management in Bamboo, see Connecting to external user directories.
- **Export Directory Path** setting: Bamboo restricts the editing of certain file path settings for security reasons (see Bamboo Security Advisory 2010-05-04). If you must configure Bamboo to permit modification to its file path settings, start Bamboo with the system property `bamboo.paths.set.allowed=true`. The procedure for configuring a Bamboo system property is described on Starting Bamboo. Once you have configured your file path setting, we recommend removing or disabling the `bamboo.path.s.set.allowed` system property and restarting Bamboo. If your Bamboo instance is accessible to anyone outside your organization, then this will minimize the risk of Bamboo being compromised by security-related attacks.

For large instances we recommend using native database and filesystem backup tools instead of the built in backup/export functionality. For more details, see Automating Bamboo backup operations. Reserve the use of the built-in tools for database type migrations only (e.g. MySQL to Postgre).

### Related pages:

- Data and backups
- Specifying a backup schedule
- Importing data from backup

### To export data for backup:

1. Click the
   ![](image)
   icon in the Bamboo header and choose **Overview**.
2. Click Export in the left navigation column (under 'System').
3. Complete the following settings:

   **Export Directory Path**
   This can be configured – see the note above.

   **File Name**
   Edit the default name of the file to which Bamboo will export, if necessary.

   **Export Results**
   Clear this to export only the plan configurations.

   **Export Artifacts**
   Select to have Bamboo export build artifacts.

   **Export Build Logs**
   Select to have Bamboo export build logs.

4. Click the Export. Bamboo creates the export file in the location shown for Export Directory Path.

---

Importing data from backup

The instructions on this page describe how to import data from a Bamboo backup.

Before you begin:

- Bamboo will be unavailable until the import process is complete, which may take some time.
- The import process will delete your Bamboo installation and restore data from a previous export of Bamboo. This includes login data, so you will need to know an administration login in the Bamboo data to be imported.
- If you created your backup file using Bamboo 3.2 or later, importing the file will restore your user management settings. If you created your backup file using Bamboo 3.1 or earlier, importing the file will default your user management settings to 'Local users and groups' (i.e. user/group management in Bamboo). You may need to change your settings after the import.
- If you manage users externally (using LDAP or Crowd) and the Bamboo internal user repository (in the backup file) contains user names that duplicate user names in the external repository, you will not be able to import from the backup file.
- **Backup Directory Path**: Bamboo restricts the editing of certain file path settings for security reasons (see Bamboo Security Advisory 2010-05-04). If you must configure Bamboo to permit modification to its file path settings, start Bamboo with the system property `bamboo.paths.set.allowed=true`. The procedure for configuring a Bamboo system property is described on Starting Bamboo.

Once you have configured your file path setting, we recommend removing or disabling the `bamboo.path`
s.set.allowed system property and restarting Bamboo. If your Bamboo instance is accessible to anyone outside your organization, then this will minimize the risk of Bamboo being compromised by security-related attacks.

Related pages:
- Data and backups
- Specifying a backup schedule
- Exporting data for backup

To import data from backup:
1. Click the icon in the Bamboo header and choose Overview.
2. Click Import in the left navigation column (under ‘System’).
3. Complete the following settings:

   **File Path**
   The absolute path to the data file that Bamboo should import. For example, "/opt/bamboo/bamboo-home/export.zip" on UNIX-based operating systems.

   **Backup data**
   *Highly recommended.* Bamboo will not import data unless it is able to successfully export data first.

   **Backup Directory Path**
   This can be configured – see the note above.

   **File Name**
   The file to which Bamboo will export its data.

   **Clear artifact directory**
   Delete all existing build artifacts before the import.

   **Apply imported data without server shutdown**
   *Not recommended in a production environment.*

4. Click Import.
5. After the import is complete,
   - check the paths of your builders and JDK.
   - index your data.
Configuring global expiry

Global expiry allows you to manage the timing for when build and deployment artifacts should be deleted from your Bamboo system.

You may want to consider doing this for the following reasons:

- Build and deployment artifacts can be large, and so consume storage on your system. Your system may run out of disk space if artifacts no longer in active use are retained indefinitely.
- Large numbers of builds and deployments clutter the Bamboo user interface, and may reduce performance, making it slower to work with Bamboo.

See this [Atlassian blog post](https://confluence.atlassian.com/display/BAM/Using+Build+Expiry+and+Labels) for a discussion of using build expiry and labels.

Global expiry applies to all build plans and deployment projects, and is generally the easiest way to manage artifacts expiry in Bamboo.

However, note that:

- You can configure [build expiry for individual build plans](https://confluence.atlassian.com/display/BAM/Using+Build+Expiry+and+Labels) to override the global expiry settings. You can *not* yet override the global expiry configuration for particular deployment projects.
- You can also [delete the results of a plan build manually](https://confluence.atlassian.com/display/BAM/Using+Build+Expiry+and+Labels).

A Bamboo administrator can configure global expiry for both build and deployment artifacts as described below.

Configure global expiry

Ensure that you back up any build results data before their expiry date is reached.

To enable and configure global expiry:

1. Click the ![](https://confluence.atlassian.com/display/BAM/Configure+global+expiry) icon in the Bamboo header and choose **Overview**.
2. Click **Expirey** (under ‘Plans’) in the left-hand navigation panel.
3. If necessary, enable deployment expiry. *Note that this can not be reversed – see the Bamboo 5.7 upgrade notes.*
4. Click **Edit**.
5. Configure global expiry using the following settings:
Complete build & deployment results...
All build results data (including artifacts and build logs), and deployment results and release artifacts, are deleted.

Build and release artifacts
Only user-defined artifacts are deleted.

Build and deployment result logs
Only build logs and deployment result logs are deleted. Note that logs can be excluded from expiry based on size.

Expire after
Specifies the age (days, weeks or months) that build and deployment results must reach before they are deleted.
For example, specify '24 months' to keep results created in the last two years.

Minimum builds to keep
Specifies the minimum number of results you want to keep.
For example, specify '50' to keep the latest 50 build results, even if they are older than the age specified with Expire after.

Keep builds with the following labels
Specifies the build labels (not plan labels or job labels) applied to builds for which you want to keep build results, regardless of the Expire after and Minimum builds to keep settings. Note that builds can be labeled either manually or automatically.

Minimum deployments to keep
Specifies the minimum number of successful deployments to keep, even if they are older than the age specified with Expire after. The minimum value is 2.
6. Click the icon to the right of 'Schedule' to set when the expiry event will be triggered. You can specify a cron expression if required. See this FAQ for help constructing cron expressions.
7. Click Save.

The global expiry event runs periodically (as determined by the expiry Schedule), regardless of whether you disable or enable expiry for your build and deployment results. When this event occurs, your build and deployment results will be expired according to the global and plan settings you have made.

Calculating the expiry date
This section outlines how the ages of build or deployment results are calculated so as to determine when they should be expired.

Build results and all logs
The ages of build results, build logs, and deployment logs are simply calculated from their respective creation dates.

If the age of the build result or log is equal to or greater than the Expire after age, then it is deleted when the expiry event occurs (assuming build results or logs are configured for deletion).

Note that logs can be excluded from expiry based on size.

Build and deployment artifacts
The ages of build and deployment artifacts are calculated as follows:

- If there is no release associated with the build result, then use the build result creation date.
- Otherwise, if the build result has never been deployed, then use the creation date for the latest release that refers to it.
- Otherwise, use the creation date for the latest deployment.

If the age of the build or deployment artifact is equal to or greater than the Expire after age, then it is deleted when the expiry event occurs (assuming artifacts are configured for deletion).

Importing data from Jenkins
The Jenkins Importer helps you to migrate projects deployed in Jenkins to Bamboo. On this page:

- Requirements & supported configurations
- Using the Jenkins importer
- Getting Help

Related pages:

- Getting started with Java and Bamboo
- Getting started with .NET and Bamboo
- Using Bamboo
- Installing and upgrading

Requirements & supported configurations

<table>
<thead>
<tr>
<th>Jenkins Version</th>
<th>Required Dependencies*</th>
<th>Jenkins Project Types</th>
<th>Repository Types</th>
<th>Build Steps</th>
<th>Notifications</th>
<th>Parameter Types</th>
<th>Other plugins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jenkins 1.581</td>
<td>Jenkins built-in job dependencies</td>
<td>Freestyle</td>
<td>Git 1.1.25</td>
<td>Maven</td>
<td>Email</td>
<td>Boolean</td>
<td>EnvInject plugin 1.73</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maven</td>
<td>SVN 1.43</td>
<td>Ant 1.1</td>
<td>Choice</td>
<td>Choice</td>
<td>JavaDoc 1.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Matrix</td>
<td>Mercurial</td>
<td>Script</td>
<td>String</td>
<td>String</td>
<td>Wall Display plugin</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CVS</td>
<td></td>
<td>Password</td>
<td>Password</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Perforce</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Required Dependencies are the functional Jenkins plugins that the Bamboo Jenkins Importer requires to be present. These must be present in your Jenkins instance.

Using the Jenkins importer

1. **Start the importer**

   You must have administration privileges to run the Jenkins Importer.

The Jenkins Importer is accessed from the welcome screen or Administration panel. To start the Jenkins Importer:

   **If running Bamboo for the first time**

   From the Bamboo Welcome screen:

   1. Click **Import from...**
   2. Select **Import from Jenkins**.
If already running Bamboo

From anywhere within the Bamboo interface:

1. Click on the Administration tab at the top of the Bamboo interface
2. Scroll down to the System side panel
3. Click on Import from Jenkins.

The Locate Jenkins screen will appear.

2. Select Jenkins data for importing

You may either import Jenkins data from its home location on the Bamboo server, or you may import from a zipped archive of your Jenkins home:

Importing from the Jenkins home location

From the Locate Jenkins interface:

1. Click the Source of Jenkins home dropdown menu
2. Select Location on the Bamboo server
3. Enter the path to your Jenkins home directory in the text field
4. Click Next.

You must specify the path to your Jenkins home directory.

Importing from an archived Jenkins home

From anywhere within the Bamboo interface:

1. Click the Source of Jenkins home dropdown menu
2. Select Upload a zip archive
3. Click Choose Files. A file manager window will open. Use it to locate your zipped Jenkins home directory
4. Click Next.

When creating your Jenkins zip archive, you need to remove or exclude the userContent and builds directory for each job from the archive before zipping:

1. Make a copy of Jenkins home
2. Remove/exclude the userContent directory
3. Remove/exclude the builds directory
4. Zip the archive.

Bamboo Jenkins Importer supports only ZIP file archives. Other archive formats such as tar...
Once you have selected your Jenkins data and clicked Next, the Jenkins job and pipeline selector will open.

3. Configure Jenkins data for import

The Job and Pipeline selector screen allows you to select and configure which Jenkins import items you would like to import into Bamboo. Import items include Jenkins pipelines and jobs, and the importer will identify how many items were found for processing:

The Jenkins Importer processes both Jenkins pipelines and jobs, but handles each differently:

<table>
<thead>
<tr>
<th>Jenkins Import Item</th>
<th>Description</th>
<th>Bamboo Equivalent</th>
<th>Jenkins Importer Process</th>
</tr>
</thead>
</table>
| Pipeline            | A group of associated jobs linked using a Jenkins pipeline | Plan | • Creates a new Bamboo plan  
• Imports individual pipeline jobs as Bamboo jobs into the new plan |
| Job                 | A stand alone build job | Job | • Imports job into a Bamboo plan with a single associated job within the plan |

Importing a Jenkins job

To import a Jenkins job:

1. Locate the relevant Jenkins Import item on the selector screen
2. Ensure the Import Jobs check box is checked
3. Enter a Bamboo Job Name (or leave to accept the default name from Jenkins)
4. Check the Enabled in Bamboo? check box. To disable an imported job, leave the box unchecked.

By default, all jobs are selected for importing. To reject a Jenkins job for importation:

1. Locate the relevant Jenkins Import item on the selector screen
2. Uncheck the Import Jobs check box
Importing a Jenkins pipeline

To import a Jenkins pipeline, all of the associated jobs must be imported. The importing of individual jobs is described above.

Changing the imported Bamboo plan or job name

By default, the Jenkins Importer uses the Jenkins import item name as the default for the Bamboo name. To change the default name:

1. Locate the relevant Jenkins Import item on the selector screen
2. Enter a new name in the **Bamboo Plan Name** text field

Existing Bamboo plans

Existing Bamboo plans are not overwritten when you use the Jenkins Importer. When importing Jenkins data, Bamboo creates a new project called 'Imported from Jenkins' to contain all of the newly imported plans.

Starting the import

When you have identified and selected all of the Jenkins import items that you require, click **Next** at the bottom of the screen. Bamboo will start to import the specified plans and a progress indicator screen will display:

![Jenkins Importer](image)

Once importing has finished, the importer results screen will display.

4. Review the importer results

The Importer Results screen shows the success outcome of the import activity for each import item. The three possible success outcomes are:

- **Success**
- **Partial**
- **Fail**

An example of Importer results is seen below.

<table>
<thead>
<tr>
<th>Jenkins Item</th>
<th>Outcome</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPLAN_DOCS</td>
<td>PARTIAL</td>
<td>Imported with warnings. See Import log for details.</td>
</tr>
<tr>
<td>DLINK_CODE_CHECK</td>
<td>FAIL</td>
<td>Could not import due to fatal error. See Import log for details.</td>
</tr>
<tr>
<td>SPLAN_DEPLOY</td>
<td>SUCCESS</td>
<td></td>
</tr>
</tbody>
</table>

**Success**

A `success` result indicates that the Jenkins item was successfully imported into Bamboo. No additional work is required.

**Partial**

A `partial` result indicates that the import was partially successful, however there may be unmapped configuration or other issues that require attention.
Fail

A ‘fail’ result indicates that the importer was unable to import the Jenkins job or pipeline if the repository type is unsupported, none of the build steps could be converted to tasks or another unknown error occurred.

The Import log

In the case of a fail or partial, additional information can be obtained from the Import log, which provides the following:

- The name of the attempted job import
- The severity if the problem/issue. Severity is rated as:
  - Low – warning that might be interesting to the administrator such as how dependencies were imported
  - Medium – unsupported publishers or other configurations that are non-critical to running the build
  - High – unsupported repository or none of the build steps could be imported
  - Fatal – un-handled error that prevents the job from importing at all
- A brief description of the problem/issue.

An example Import Log entry can be seen below:

```
-------------------------------------------------
--                                      --
Job name: SPLAN_DOCS
SEVERITY: HIGH
Unsupported configuration for plugin 'ClearCase UCM Plugin'
-------------------------------------------------
```

It is possible that an import item has multiple problems/issues. Where this is the case, the Import Log will identify the severity and brief description for each problem/issue associated with an import item. An example Import Log entry detailing multiple problems/issues can be seen below:

```
-------------------------------------------------
--                                      --
Job name: DLINK_CODE_CHECK
SEVERITY: HIGH
Unsupported configuration for plugin 'ClearCase Plugin'
SEVERITY: HIGH
Requested plugin parameterized-trigger but we don't support it
SEVERITY: HIGH
Requested plugin downstream-ext but we don't support it
SEVERITY: FATAL
Scm cannot be imported
-------------------------------------------------
```

The import log is accessed by clicking on the Import Log link associated with an import issue, or by clicking on the Download import log file button at the base of the Import Results screen.

Missing or incompatible plugins

From time to time, Bamboo may not support particular Jenkins functionality. When this occurs, a great place to look is the Atlassian Marketplace. The Marketplace contains over 120 add-ons and plugins for Bamboo, and you will more than likely find a plugin for your functionality there. If you can't find what you need in the Marketplace, then consult the 'Getting help' section below.

5. View the imported plans
Once you have completed examining the importer results, click on View Plans to examine the imported plans in the Bamboo dashboard. An example of plans imported from Jenkins is seen below:

![Imported from Jenkins](image)

Imported plans can now be configured and managed using existing Bamboo methods.

Getting Help

Support

Help with the Jenkins importer is never far away. The best way to get help is to raise a support ticket directly via the Atlassian support site.

To create a support ticket:

1. Download the import log
2. Go to [https://support.atlassian.com](https://support.atlassian.com) and select Create New Issue
3. Enter a detailed description of your problem within the support ticket
4. Attach the import log and lodge your support ticket
5. Wait to be notified of updates by Email

Plan directory information REST API

An upcoming Bamboo release will make changes to the on-disk directory structure for BAMBOO_HOME. The changes are required for the improvement of the robustness of some Bamboo features.

As the use cases for this endpoint are somewhat different to the typical usage of Bamboo REST API functionality and the information disclosed is relatively low-risk, we have decided to make the access control strategy configurable using a system property.

For more information about system properties, see Starting Bamboo.

Plan directory information property details

The `bamboo.plan.directory.info.rest` is a system property with the following settings:

disabled (default)
The plan directory information REST API is disabled and all requests will be rejected

**local**

The plan directory information REST API is available without authentication to any request originating from localhost

**anonymous**

The plan directory information REST API is accessible anonymously

**authenticated**

The plan directory information REST API is accessible to any authenticated request

**authenticated-admin**

The plan directory information REST API is accessible to any request authenticated as an administrator

---

### API Usage

The API is available at `/rest/api/latest/planDirectoryInfo/{planKey}`. For example:

```
GET /rest/api/latest/planDirectoryInfo/PROJ-PLAN
```

```
{"results":
 [{
 "planName": "Plan name",
 "isBranchBuild": false,
 "artifact_plan_roots": ["/opt/bamboo-home/artifacts/PROJ-PLAN"],
 "build_log_job_roots": {
 "PROJ-PLAN-JOB1": ["/opt/bamboo-home/xml-data/builds/PROJ-PLAN-JOB1"],
 "PROJ-PLAN-JOB2": ["/opt/bamboo-home/xml-data/builds/PROJ-PLAN-JOB2"]
 }
 ]
 }
```

If no build exists that matches the provided key, an empty list is returned for the results.

**artifact_plan_roots** contains a list of directories that contain artifacts for the plan.

**build_log_job_roots** returns a map of job keys to the directory arrays. That is, each job in the plan is mapped to a list of directories that contain logs and build results for that build.

**Bamboo 5.9 will only ever return single-item lists, but future versions of Bamboo will make changes to the on-disk directory layout and may return lists with multiple entries.**

### Security

As a distributed application, Bamboo's security is important. This page contains links to security-related information in the Bamboo documentation.

#### Security advisories

For information on how to report a security vulnerability in Bamboo and our policy on security advisories and patches, please read 2019-04-25_11-56-52_Bamboo security advisories. A full list of security advisories that we have previously issued is also available on that page.

---

### Bamboo permissions
Remote agent security considerations

Note the following security implications when enabling remote agents for Bamboo:

- Encryption needs to be enabled on JMS and HTTP connections. The following data is encrypted:
  - login credentials for version control repositories (JMS)
  - build logs (JMS)
  - build artifacts (HTTP)
  See **Securing your remote agents**.

- Agent authorisation should be enabled, see **Agent authentication** for more information. If it’s not enabled, unauthorized parties will be allowed to install new remote agents, compromising the version control repository credentials.

- Agent secure token should be enabled. If it’s not enabled, malicious users can send multiple approval requests for rogue agents which could lead to one of them being mistakenly accepted by a Bamboo administrator. See **Security token verification**.

As with all services, we strongly recommend that you do not open up agent JMS communication port on a public or untrusted network unless you want to use it. Creating remote agents is **Disabling and enabling remote agents support** by default.

Bamboo configuration

The following pages contain information on how to configure Bamboo features that can permit/forbid access to the Bamboo application.

- **Agent authentication**
- **Bamboo cookies**
- **Best practices for Bamboo security**
- **Securing your remote agents**
- **Serialization protection methods**
- **Configuring XSRF protection**
- **Managing trusted keys**
- **System-wide encryption**
- **Repository-stored Bamboo Specs security**

Other security resources

- **Security**
- **Bamboo security advisories**
- **Users and permissions**
- **Securing your repository connection**
- **Securing your remote agents**
- **Elastic Bamboo Security**
- **Configuring a plan’s permissions**

Agent authentication

Bamboo provides ways to verify that remote agents are allowed to connect to the Bamboo server. This provides improved security for sensitive information in Bamboo.

- Bamboo prevents unknown remote agents from connecting to the Bamboo server.
- Remote agents need to be manually approved by an administrator before they can communicate with the Bamboo server in any way.
- You can enable security token verification for additional level of safety.

Remote agent authentication (the manual agent approval) doesn’t interfere with security token verification an
both features can be enabled or disabled independently.

Note that Elastic agents do not have to be approved.

On this page:
- Authenticating remote agents
- Security token verification
- Notes

Related pages:
- Bamboo remote agent installation guide
- Disabling and enabling remote agents support
- Configuring agents

Authenticating remote agents

To enable agent authentication:

1. Click the icon in the Bamboo header and choose Overview.
2. Then select Agents (under 'Build Resources').
3. Click Enable Remote Agent Authentication, and then Confirm.

Now you can approve access for a particular remote agent. To do this, click on the Agent Authentication tab (under 'Remote Agents').

See Bamboo remote agent installation guide for details about installing a remote agent.

Security token verification

Enable token verification to ask all remote agents to provide the token during the initial contact with the Bamboo server. Once you enable the verification, all agents that try to connect to Bamboo without the token are rejected before leaving any trail in Bamboo. By default, the feature is disabled for Bamboo Server.

This feature doesn’t affect elastic agents.

Enabling security token verification

To enable security token verification, go to Bamboo administration > Build resources > Agents.

When you enable the verification, all agents that already authenticated and connected continue to work. In other words, no running builds should be stopped or broken when the feature gets enabled. However, on server
restart or agent restart each agent is required to have a correct token.

There are problems with backwards compatibility. If the feature is enabled, old agents (from older Bamboo versions) will not be able to connect. Users need to download the new agent JAR.

**Viewing the current security token**

To view the current token, go to Bamboo administration > Build resources > Agents > Install remote agent page.

Each time the feature gets enabled, a new security token is generated, which means that disabling and re-enabling security token verification can be used to reset the token.

**Notes**

- If the agent's IP address changes, perhaps because DHCP is being used, then you will have to reapprove the agent when it next tries to connect using that different IP address.
- If you revoke access for a connected agent, the agent will remain connected and will continue to run. However, if the agent is subsequently restarted, it will not be able to connect.
- If you enable remote agent authentication, having previously revoked access for connected agents and disabled remote agent authentication, then you get the option to approve access for all connected agents at once. If you don't approve this, the agents stay connected and continue to run, but you will need to manually approve them when they next try to connect.

**Bamboo cookies**

Bamboo uses Seraph, an open source framework, for HTTP cookie authentication.

**Authentication cookies**

Bamboo uses two cookies:

- The JSESSIONID cookie is created by the application server and used for session tracking purposes.
- The 'remember me' cookie, seraph.bamboo, is generated by Bamboo when the user selects the Remember me checkbox on the login page.

You can read about cookies on the [Wikipedia page](https://en.wikipedia.org/wiki/Cookie_(computing)).

**On this page:**

- Authentication cookies
- The 'Remember Me' cookie
  - Cookie key and value
  - Use of cookie for authentication
  - Life of 'Remember Me' cookies
- Other cookie usage

The 'Remember Me' cookie

The 'remember me' cookie is a long-lived HTTP cookie. This cookie can be used to authenticate an unauthenticated session. Bamboo generates this cookie when the user selects the Remember me checkbox on the login page.

**Cookie key and value**

By default, the cookie key is seraph.bamboo. This key is defined in the BAMBOO-INSTALLATION/webapp/WEB-INF/classes/seraph-config.xml file, in the login.cookie.key parameter.

The cookie contains a unique identifier plus a securely-generated random string.
**Use of cookie for authentication**

When a user requests a web page, if the request is not already authenticated via session-based authentication or otherwise, Bamboo will match the 'remember me' cookie (if present) against the token stored for the user in the Bamboo database (if present).

If the random string matches the value stored in the database and the cookie has not expired, the user is authenticated.

**Life of 'Remember Me' cookies**

You can configure the maximum age of the cookie. To do that you will need to modify the `BAMBOO-INSTALLATION/webapp/WEB-INF/classes/seraph-config.xml` file and insert the following lines below the other `init-param` elements:

```xml
<init-param>
    <param-name>autologin.cookie.age</param-name>
    <param-value>2592000</param-value><!-- 30 days in seconds -->
</init-param>
```

**Other cookie usage**

There are several cookies in Bamboo that are used for storing basic presentation states, such as the number of log lines to show, which tab was previously selected etc. They are:

<table>
<thead>
<tr>
<th>Cookie</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>AJS.conglomerate.cookie</td>
<td>Track which general tabs are open and closed</td>
</tr>
<tr>
<td>BAMBOO-AGENT-FILTER</td>
<td>Date range to show the builds for agents</td>
</tr>
<tr>
<td>BAMBOO-BUILD-FILTER</td>
<td>Date range to show the builds</td>
</tr>
<tr>
<td>BAMBOO-LOG-REFRESH</td>
<td>Log refresh interval in seconds</td>
</tr>
<tr>
<td>BAMBOO-MAX-DISPLAY-LINES</td>
<td>Maximum # of lines to show on the live logs page</td>
</tr>
<tr>
<td>atlassian.bamboo.dashboard.tab.selected</td>
<td>Which tab is selected on the dashboard</td>
</tr>
<tr>
<td>bamboo.author.view</td>
<td>Which tab is selected on the Authors tab</td>
</tr>
<tr>
<td>bamboo.build.groupby.type</td>
<td>Which time group-by period is used in the reports</td>
</tr>
<tr>
<td>bamboo.dash.display.toggle</td>
<td>The ids of the projects that are expanded on the dashboard</td>
</tr>
</tbody>
</table>

**Best practices for Bamboo security**

The best way to harden a system is to look at each of the involved systems individually. Contact your company's security officer or department to find out what security policies you should be using. There are many things to consider, such as the configuration of your underlying operating systems, application servers, database servers, network, firewall, routers, etc. It would be impossible to outline all of them here.

This page contains guidelines on good security practices, to the best of our knowledge.

**On this page:**
- Configuring the web server
- Configuring the application server
• Configuring the application
• Configuring system admin access
• Further precautions

Configuring the web server

Please refer to the following guides for system administrators:

• How to configure Apache to lock down the administration interface to those people who really need it. See Using Apache to limit access to the Confluence administration interface for guidance.
• How to reduce the risk of brute force attacks: Enabling or Disabling Captcha for Failed Logins.

Configuring the application server

See the following system administrator guide for general hints on the application server level:

• Tomcat security best practices

Configuring the application

The way you set up Bamboo roles, permissions and processes makes a big difference in the security of your Bamboo site.

Below are some more Bamboo-specific items to consider. None of these provides 100% security. They are measures to reduce impact and to slow down an intruder in case your system does become compromised.

• Restrict the number of users with powerful roles or group memberships. If only one department should have access to particularly sensitive data, then do restrict access to the data to those users. Do not let convenience over-rule security. Do not give all staff access to sensitive data when there is no need.
• Put documented procedures in place for the case of employees leaving the company.
• Perform security audits regularly. Know who can help in case a security breach occurs. Perform 'what if' planning exercises. ('What is the worst thing that could happen if a privileged user's password were stolen while he's on vacation? What can we do to minimize damage?').
• Make sure the Bamboo database user (and all datasource database users) only has the amount of database privileges it really needs.
• Monitor your binaries. If an attacker compromises an account on your system, he will usually try to gain access to more accounts. This is sometimes done by adding malicious code, such as by modifying files on the system. Run routine scripts that regularly verify that no malicious change has been made.
• Disable Bamboo from serving HTML and JavaScript artifacts. Allowing Bamboo to do this creates an XSS vulnerability where HTML and JavaScript artifacts can be executed on the user’s browser. Go to Security settings (under ‘Security’) in the Bamboo admin area, and clear the Resolve artifacts content type by extension checkbox. Such artifacts will then be returned as plain text resources and the user’s browser will handle them as simple text.
• Bamboo Server share permissions and accesses rights with with local agents. Keep in mind that by using local agents in your environment, you’re giving other Bamboo users access to sensitive information you might be storing on the server.

Configuring system admin access

Below are some things to consider specifically related to the system admin role:

• Keep the number of Bamboo administrators extremely low. For example, 3 system administrator accounts should be the maximum.
• The administrators should have separate Bamboo accounts for their administrative roles and for their day to day roles. If John Doe is an administrator, he should have a regular user account without administrator access to do his day to day work (such as configuring build plans). This could be a ‘john.doe’ account. In addition, he should have an entirely separate account (that cannot be guessed by an outsider and that does not even use his proper name) for administrative work. This account
could be 'jane smith' – using a username that is so obscure or fake that no outsider could guess it. This way, even if an attacker singles out the actual person John Doe and gets hold of his password, the stolen account would most likely be John's regular user account, and the attacker cannot perform administrative actions with that account.

- Lock down administrative actions as much as you can. If there is no need for your administrators to perform administrative actions from outside the office, then lock down access to those actions to known IP addresses, for example. See Using Apache to limit access to the Confluence administration interface for guidance.

Further precautions

As another precaution:

- Regularly monitor the above requirements. There are many things that could start out well, but deteriorate over time:
  - A system may start out with just 3 administrators, but over the course of a year this could grow to 30 administrators if no one prevents expansion.
  - Apache administration restrictions may be in place at the start of the year, but when the application server is migrated after a few months, people may forget to apply the rules to the new system.

Again, keep in mind that the above steps may only be a fraction of what could apply to you, depending on your security requirements. Also, keep in mind that none of the above rules can guarantee anything. They just make it harder for an intruder to move quickly.

Securing your remote agents

This page applies to remote agents and not elastic agents. Elastic agents are secured automatically by the Bamboo server and no additional steps are required.

We strongly recommend that you do not enable remote agent installation without securing them on any Bamboo instance accessible from a public or untrusted network. Creating remote agents is disabled by default. If you choose to enable your remote agents without securing them, read Bamboo Security Advisory to understand the security implications.

You can secure your remote agents by configuring them to use SSL (Secure Sockets Layer). This protocol provides a secure mechanism for communication between your Bamboo server and remote agents. The information below describes how to configure your remote agents to use SSL.

On this page:
- Configure your Bamboo server to use SSL
- Special considerations/troubleshooting

Related pages:
- Security
- Agent authentication
- Bamboo remote agent installation guide
- Disabling and enabling remote agents support
- Configuring agents
- Knowledge Base articles

Configure your Bamboo server to use SSL

To instruct your Bamboo server to start using SSL so that agents will be able to authenticate the server, you need to modify the addresses used for communication between the agent and the server.

To configure your Bamboo server to use SSL:
If you are setting up Bamboo for the first time,

1. Launch the Bamboo Setup Wizard and change the protocol of the ‘Broker URL’ to ‘SSL’.
   i.e. `ssl://host:port/`

   Setting up Broker URL during the installation doesn't change the Broker Client URL to the same protocol. You can change the Broker Client URL either directly in the Bamboo GUI (Bamboo administration > Overview > System > General Configuration) or in the bamboo.cfg.xml file. Restart Bamboo to run it with the updated setup.

Or, if you are configuring an existing installation of Bamboo,

1. Shut down your Bamboo server and agents.
2. Change the protocol of your Broker URL and Broker client URL in the bamboo.cfg.xml file to ‘SSL’. Note, do not change the address of this URL.
   `<property name="bamboo.jms.broker.uri">ssl://myhost:myport</property>`
   `<property name="bamboo.jms.broker.client.uri">failover:(ssl://myhost:myport)</property>`
3. Start up the Bamboo server.
4. Start up the Bamboo agents. If your agents do not start up, please check that you have set up your certificates correctly.

Special considerations/troubleshooting

On a standard Bamboo installation, the above steps are sufficient to secure your agents. After they're done, Bamboo will automatically set up the key/trust stores and distribute certificates to the agents the moment the first time the agent connects to the server.

If you're using custom SSL setup (e.g. you're running Bamboo with `-Djavax.net.ssl.keyStore=SOMEPATH`), you need to follow the guidelines in Manually securing your remote agents.

The automatic keystore management can be enabled or disabled by adding `-Dbamboo.manage.jms.ssl=true/false` to the server command line. When this variable is present, Bamboo will not decide whether to run automatic key management.

The following files are used by automatic key management:

- The Agent stores the keystore and truststore in `BAMBOO_AGENT_HOME/xml-data/configuration/jmsclient.ks` and `BAMBOO_AGENT_HOME/xml-data/configuration/jmsclient.ts`, respectively.
- Server stores the keystore in `BAMBOO_HOME/xml-data/configuration/broker.ks`

To force generation of new keystores and truststores, simply remove these files. They will be regenerated on the next restart.

Serialization protection methods

For security/compatibility reasons, you can control the way Java classes are filtered during deserialisation. This is particularly important for agent-server communication.

The filtering can be either whitelist- or blacklist-based.

The whitelist is the only recommended option for XStream serialisation. Blacklist (the former default) is scheduled for removal and should only be considered as a temporary fix in case of problems with the whitelist.

You can disable serialization security completely by setting the `bamboo.security.serialization.disable` system property. This is not recommended for security reasons.

You can set up the serialization protection methods in Bamboo administration > Security > Security settings.
### Serialization

<table>
<thead>
<tr>
<th>Serialization</th>
<th>Description</th>
<th>Options</th>
</tr>
</thead>
</table>
| XStream       | Agent - server messaging | • whitelist (default)  
                      • blacklist (insecure)  
                      • strict blacklist (insecure) |
| Bandana       | Bamboo custom storage mechanism that can be used by plugins | • blacklist  
                      • strict blacklist (default) |

#### Overview of options

The recommended option: whitelist

Whitelist has three sources:

- **bundled with Bamboo** (can't be modified),
- a list of whitelisted classes can be added into Bamboo home directory,  
- **plugin vendors** can define certain classes as allowed.

A whitelist has higher priority than a blacklist. If a class is blacklisted by Bamboo, but is whitelisted anywhere (by a plugin or via bamboo home directory settings), then even if we're using the blacklist security setting, the class will still be allowed to be serialized/deserialized.

For more information about how to add classes to the whitelist or implement a plugin module, see Bamboo developer documentation.

Blacklist (insecure)

Blacklists are provided by Bamboo and can't be modified by plugin vendors or administrators.

Strict blacklist (insecure)

Strict blacklist restricts a bit more classes than the blacklist. Nevertheless, it's still considered insecure and it can cause problems with some of the plugins.

#### Configuring XSRF protection

To prevent users being tricked into unintentionally submitting malicious data, Bamboo uses XSRF security protection.

Atlassian supported plugins have been updated to support XSRF. XSRF protection is enabled by default for Atlassian Cloud customers and new customers for Bamboo Server, however, if you are using a plugin that is not yet compatible with this security feature, you can disable it.

Read more about **XSRF (Cross Site Request Forgery)** at wikipedia.

**To configure XSRF protection:**

1. Click the icon in the Bamboo header and choose **Overview**.
2. Choose **Security settings** in the left-hand panel.
3. Choose **Edit**.
4. Uncheck **Enable XSRF protection** to disable XSRF protection or check it to enable XSRF protection.
5. Choose **Save**.

Related pages:

- Security
- Best practices for Bamboo security

---

Please carefully consider the security risks before you disable XSRF protection in your Bamboo installation.
XSRF protection was introduced in Bamboo 5.3, and is enabled automatically for all existing and new Atlassian Cloud users. Existing Bamboo Server users can enable XSRF protection by following the instructions above and checking Enable XSRF protection.

Is my Bamboo server already protected against XSRF attacks?

<table>
<thead>
<tr>
<th>Customers upgrading...</th>
<th>XSRF protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>... an existing installation of Bamboo 5.2, and earlier, to Bamboo 5.3, and later.</td>
<td>XSRF protection is NOT enabled by default. You can enable XSRF protection using the instructions on this page.</td>
</tr>
<tr>
<td>... a new installation of Bamboo Server 5.3, and later.</td>
<td>XSRF protection IS enabled by default.</td>
</tr>
</tbody>
</table>

Managing trusted keys

By default, Bamboo accepts communication from all repository hosts that authenticate with SSH. You can secure communication between Bamboo and repositories by setting up trusted key management.

- Prevent Bamboo from connecting to unauthorized services via SSH.
- Manually authorize SSH key of the repository hosts upon first connection.
- Automatically authorize repository hosts that were added to the trusted keys list.

Managing trusted keys is available only for restricted administrators.

Enabling trusted keys management in Bamboo

To enable SSH key management:

1. Go to Administration > Security > Security settings > Global security and permission properties.
2. Select the Manage trusted keys check box:

Results

- The Trusted keys configuration page is now available in Administration > Security:
When Bamboo initiates the SSH connection with a repository host for the first time, you can decide whether to authorize the connection:

Adding and deleting trusted keys in Bamboo

You can manage the authorized public SSH keys in the **Trusted keys** page.

To add a trusted key:

1. Go to **Administration > Security > Trusted keys**.
2. Specify the host URL, for example:

   bitbucket.org

3. Paste the **public** key that you generated for your repository host and click **Add**.

System-wide encryption

As a CI/CD system, Bamboo stores sensitive data used to authenticate to external systems, such as VCS's, issue trackers and deployment targets. To protect this data, Bamboo uses a central encryption service.

Data encrypted at rest

The following data is encrypted:

- variables that include keywords such as "secret" and "password". These variables will also be obfuscated
in the UI,
- shared credentials,
- credentials stored in the repository configuration (keys, passwords and passphrases).

This data is encrypted in the database and in the backups.

Encryption of data in transit

Bamboo relies on transport-level encryption for security of data in transit.

In the case of remote agents, this means that Bamboo must be configured with SSL for the JMS and web interfaces. In case of elastic agents, the encrypted tunnel (automatically set up by Bamboo) provides security out of the box.

Manual encryption

Bamboo 6.9 and later allows you to manually encrypt your sensitive data and later use it in repository-stored Bamboo Specs. For more information see Bamboo Specs encryption.

If you’re a Bamboo administrator, you can enable/disable and configure the sensitive data encryption feature by going to

> Security > Security settings and changing the **System-wide encryption** section.

Encryption algorithm

The data is encrypted with AES algorithm using a key length of 256 bits. Both the key and the initialization vector are automatically generated using a secure random source when first used.

Key storage

The encryption key is stored in the database and on the filesystem. Both the filesystem and the database key parts are required to perform successful decryption.

The key part stored on your filesystem is located under `BAMBOO-HOME/xml-data/configuration/cipher`.

Data recovery

In case a part of your key is lost, your credentials will no longer be available and nothing can be done to recover them.

**Repository-stored Bamboo Specs security**

To modify security setting for repository-stored Bamboo Specs:

1. Go to

   ![Security Settings](image)

   > Security Settings.

2. Choose from the following settings:

<table>
<thead>
<tr>
<th><strong>Enable Repository Stored Specs</strong></th>
<th>This is a global toggle to enable/disable processing of Bamboo Specs projects stored in Bitbucket Server repositories. This feature allows to manage plans and deployments using configuration stored as code in your VCS. Once you enable this feature, you can select which repositories contain Bamboo Specs to be processed, see Enabling repository-stored Bamboo Specs.</th>
</tr>
</thead>
</table>
**Process Bamboo Specs in Docker**

This is a global toggle to enable/disable processing of Bamboo Specs in Docker containers. This feature isolates the Bamboo Specs process from your Bamboo instance. By default, this will use the `atlassian/bamboo-specs-runner` image matching your version of Bamboo.

**Notes:**
- The default Docker Image will be downloaded from Docker Hub
- Docker needs to be installed and running as the Bamboo user on the Bamboo server for this feature to function

---

**Advanced actions**

This section describes the administrative actions that are performed from outside of the Bamboo administration console.

- Integrating Bamboo with Apache HTTP server
- Securing Bamboo with Apache using SSL
- Securing Bamboo with Tomcat using SSL
- Running Bamboo as a Windows Service
- Disabling SSH access to elastic instances

**Related pages:**
- Administering Bitbucket Server
- Supported platforms

---

**Integrating Bamboo with Apache HTTP server**

Error rendering macro 'viewport-redirect' : null

This page explains how to establish a network topology in which Apache HTTP Server acts as a reverse proxy for Bamboo. Typically, such a configuration would be used when Bamboo is installed in a protected zone 'behind the firewall', and Apache HTTP Server provides a gateway through which users outside the firewall can access Bamboo.

Be aware that Bamboo does not need to run behind a web server, since it is capable of serving web requests directly; to secure Bamboo when run in this way see Securing Bamboo with Tomcat using SSL. Otherwise, if you want to install Bamboo in an environment that incorporates Apache HTTP Server, keep on reading.

**About using Apache software**

This section has general information pertaining to the use of Apache HTTP Server and Apache Tomcat. It is important that you read this section before proceeding to the steps that follow.

**Configuring Tomcat 7**

Bamboo ships with an instance of Tomcat 7, the configuration of which is determined by the contents of the `server.xml` file, which can be found in the `conf` directory immediately under the Bamboo installation directory. Note that any changes that you make to the `server.xml` file will be effective upon starting or re-starting Bamboo.

You may also find it helpful to refer to the Apache Tomcat 7.0 Proxy Support HowTo page.
Configuring Apache HTTP Server

Since Apache HTTP Server is not an Atlassian product, Atlassian does not guarantee to provide support for its configuration. You should consider the material on this page to be for your information only; use it at your own risk. If you encounter problems with configuring Apache HTTP Server, we recommend that you refer to the Apache HTTP Server Support page.

You may find it helpful to refer to the Apache HTTP Server Documentation, which describes how you can control Apache HTTP Server by changing the contents of the httpd.conf file. The section on Apache Module mod_proxy is particularly relevant. Note that any changes you make to the httpd.conf file will be effective upon starting or re-starting Apache HTTP Server.

This document relates to Apache HTTP Server version 2.4.2; the configuration of other versions may differ.

Step 1: Configure the Tomcat Connector

Find the normal (non-SSL) Connector directive in Tomcat’s server.xml file, and add the scheme, proxyName, and proxyPort attributes as shown below. Instead of mycompany.com, set the proxyName attribute to the domain name that Apache HTTP Server will be configured to serve. This informs Bamboo of the domain name and port of the requests that reach it via Apache HTTP Server, and is important to the correct operation of the Bamboo functions that construct URLs.

```
<Connector port="8085"
    protocol="HTTP/1.1"
    connectionTimeout="20000"
    useBodyEncodingForURI="true"
    redirectPort="8443"
    compression="on"

    compressableMimeType="text/html,text/xml,text/plain,text/css,application/json,application/javascript,application/x-javascript"
    scheme="http"
    proxyName="mycompany.com"
    proxyPort="80" />
```

**Note:** Apache HTTP Server’s ProxyPreserveHost directive is another way to have the hostname of the incoming request recognized by Bamboo instead of the hostname at which Bamboo is actually running. However, the ProxyPreserveHost directive does not cause the scheme to be properly set. Since we have to alter Tomcat’s Connector directive anyway, we recommend that you stick with the above-described approach, and don’t bother to set the ProxyPreserveHost in Apache HTTP Server.

For more information about configuring the Tomcat Connector, refer to the Apache Tomcat 7.0 HTTP Connector Reference.
Step 2: Change Bamboo’s base URL

After re-starting Bamboo, open a browser window and log in using an administrator account. Go to the Bamboo administration area and click **Server settings** (under 'Settings’), and change **Base URL** to match the proxy URL (the URL that Apache HTTP Server will be serving).

Step 3 (optional): Set a context path for Bamboo

By default, Bamboo is configured to run with an empty context path; in other words, from the 'root' of the server's name space. In that default configuration, Bamboo is accessed at:

http://localhost:8085/

It’s perfectly fine to run Bamboo with the empty context path as above. Alternatively, you can set a context path by changing the **Context** directive in Tomcat's **server.xml** file:

```
<Context path="/bamboo" docBase="${catalina.home}/atlassian-bamboo"
reloadable="false" useHttpOnly="true">
  ....
</Context>
```

If you do set a context path, it is important that the same path be used in Step 5, when setting up the **ProxyPass** and **ProxyPassReverse** directives. You should also append the context path to Bamboo’s base URL (see Step 2).

Step 4: Enable **mod_proxy** and **mod_proxy_http** in Apache HTTP Server

In the **mod_proxy** documentation, you will read that **mod_proxy** can be used as a forward proxy, or as a reverse proxy (gateway); you want the latter. Where the **mod_proxy** documentation mentions ‘origin server’, it refers to your Bamboo server. Unless you have a good reason for doing otherwise, load **mod_proxy** and **mod_proxy_http** dynamically, using the **LoadModule** directive; that means un-commenting the following lines in the **httpd.conf** file:

```
LoadModule proxy_module modules/mod_proxy.so
LoadModule proxy_http_module modules/mod_proxy_http.so
```

Experienced administrators may be aware of the Apache Connector module, **mod_jk**. Atlassian does not recommend use of the **mod_jk** module with Bamboo, since it has proven itself to be less reliable than **mod_proxy**.

Step 5: Configure **mod_proxy** to map requests to Bamboo

To configure **mod_proxy** for use with Bamboo, you need to use the **ProxyPass** and **ProxyPassReverse** directives in Apache HTTP Server’s **httpd.conf** file as follows:

```
ProxyPass        / http://localhost:8085/ connectiontimeout=5
timeout=300
ProxyPassReverse / http://localhost:8085/
```

Suppose Apache HTTP Server is configured to serve the **mycompany.com** domain; then the above directives tell Apache HTTP Server to forward web requests of the form http://mycompany.com/* to the Tomcat connector (Bamboo) running on port 8085 on the same machine.
The `connectiontimeout` attribute specifies the number of seconds Apache HTTP Server waits for the creation of a connection to Bamboo.

The `timeout` attribute specifies the number of seconds Apache HTTP Server waits for data to be sent to Bamboo.

If you set up a context path for Bamboo in Step 3, you'll need to use that context path in your `ProxyPass` and `ProxyPassReverse` directives. Suppose your context path is set to "/bamboo", the directives would be as follows:

```plaintext
ProxyPass /bamboo http://localhost:8085/bamboo
connectiontimeout=5 timeout=300
ProxyPassReverse /bamboo http://localhost:8085/bamboo
```

If Bamboo is to run on a different domain and/or different port, you should use that domain and/or port number in the `ProxyPass` and `ProxyPassReverse` directives; for example, suppose that Bamboo will run on port 9900 on `private.mycompany.com` under the context path /bamboo, then you would use the following directives:

```plaintext
ProxyPass /bamboo http://private.mycompany.com:9900/bamboo
connectiontimeout=5 timeout=300
ProxyPassReverse /bamboo http://private.mycompany.com:9900/bamboo
```

Step 6: Configure `mod_proxy` to disable forward proxying

If you are using Apache HTTP Server as a reverse proxy only, and not as a forward proxy server, you should turn forward proxying off by including a `ProxyRequests` directive in the `httpd.conf` file, as follows:

```plaintext
ProxyRequests Off
```

Step 7: Allow proxying to Bamboo from everywhere

Strictly speaking, this step is unnecessary because access to proxied resources is unrestricted by default. Nevertheless, we explicitly allow access to Bamboo from any host so that this policy will be applied regardless of any subsequent changes to access controls at the global level. Use the `Proxy` directive in the `httpd.conf` file as follows:

```plaintext
<Proxy *>
    Order Deny,Allow
    Allow from all
</Proxy>
```

The `Proxy` directive provides a context for the directives that are contained within its delimiting tags. In this case, we specify a wild-card url (the asterisk), which applies the two contained directives to all proxied requests.

The `Order` directive controls the order in which any `Allow` and `Deny` directives are applied. In the above configuration, we specify "Deny,Allow", which tells Apache HTTP Server to apply any `Deny` directives first, and if any match, the request is denied unless it also matches an `Allow` directive. In fact, "Deny,Allow" is the default; we include it merely for the sake of clarity. Note that we specify one `Allow` directive, which is described below, and don't specify any `Deny` directives.

The `Allow` directive, in this context, controls which hosts can access Bamboo via Apache HTTP Server. Here, we specify that all hosts are allowed access to Bamboo.
Step 8 (optional): Configure Apache HTTP Server for SSL

If you want to set up SSL access to Bamboo, take steps 8(a) to 8(d) below. When you are finished, users will be able to make secure connections to Apache HTTP Server; connections between Apache HTTP Server and Bamboo will remain unsecured (not using SSL). If you don’t want to set up SSL access, you can skip this section entirely.

**Note:** It would be possible to set up an SSL connection between Apache HTTP Server and Tomcat (Bamboo), but that configuration is very unusual, and not recommended in most circumstances.

**Step 8(a): Configure the Tomcat Connector for SSL**

Find the normal (non-SSL) Connector directive in Tomcat’s server.xml file, and change the redirectPort, scheme and proxyPort attributes as follows:

```xml
<Connector port="8085"
    protocol="HTTP/1.1"
    connectionTimeout="20000"
    useBodyEncodingForURI="true"
    redirectPort="443"
    compression="on"

    compressableMimeType="text/html,text/xml,text/plain,text/css,application/json,application/javascript,application/x-javascript"
    secure="true"
    scheme="https"
    proxyName="mycompany.com"
    proxyPort="443" />
```

The redirectPort directive causes Tomcat-initiated redirections to secured resources to use the specified port. Right now, the Bamboo configuration of Tomcat does not involve Tomcat-initiated redirections, so the change to redirectPort is redundant. Nevertheless, we suggest that you change it as directed above for the sake of completeness.

**Step 8(b): Set up a virtual host in Apache HTTP Server**

Un-comment the following LoadModule directive in Apache HTTP Server’s httpd.conf file:

```
LoadModule ssl_module modules/mod_ssl.so
```

Add the following directives to the httpd.conf file:

```conf
Listen 443
<VirtualHost *:443>
    SSLEngine On
    SSLCertificateFile    "/usr/local/apache2/conf/server.crt"
    SSLCertificateKeyFile "/usr/local/apache2/conf/server.key"
    ProxyPass        / http://localhost:7990/ connectiontimeout=5
    timeout=300
    ProxyPassReverse / http://localhost:7990/
</VirtualHost>
```

The Listen directive instructs Apache HTTP Server to listen for incoming requests on port 443. Actually, we could omit that directive in this case, since Apache HTTP Server listens for https requests on port 443 by
default. Nevertheless, it's good to make one's intentions explicit.

The **VirtualHost** directive encloses a number of child directives that apply only and always to requests that arrive at port 443. Since our **VirtualHost** block does not include a **ServerName** directive, it inherits the server name from the main server configuration.

The **SSLEngine** directive toggles the use of the SSL/TLS Protocol Engine. In this case, we're using it to turn SSL on for all requests that arrive at port 443.

The **SSLCertificateFile** directive tells Apache HTTP Server where to find the PEM-encoded certificate file for the server.

The **SSLCertificateKeyFile** directive tells Apache HTTP Server where to find the PEM-encoded private key file corresponding to the certificate file identified by the **SSLCertificateFile** directive. Depending on how the certificate file was generated, it may contain a RSA or DSA private key file, making the **SSLCertificateKeyFile** directive redundant; however, Apache strongly discourages that practice. The recommended approach is to separate the certificate and the private key. If the private key is encrypted, Apache HTTP Server will require a pass phrase to be entered when it starts up.

The **ProxyPass** and **ProxyPassReverse** directives should be set up in manner described in **Step 5**.

For more information about the support for SSL in Apache HTTP Server, refer to the Apache SSL/TLS Encryption manual. In addition, you will find lots of relevant information in the `<apache directory>/conf/extra/httpd-ssl.conf` file, which is included in the standard Apache distribution.

### Step 8(c): Create SSL certificate and key files

In **Step 8(b)**, you specified `server.crt` and `server.key` as the certificate file and private key file respectively. Those two files must be created before we can proceed. This step assumes that OpenSSL is installed on your server.

Generate a server key file:

```
oopenssl genrsa -des3 -out server.key 1024
```

You will be asked to provide a password. Make sure that the password is strong because it will form the one real entry point into the SSL encryption set-up. **Make a note of the password because you'll need it when starting Apache HTTP Server later.**

Generate a certificate request file (`server.csr`):

```
oopenssl req -new -key server.key -out server.csr
```

Generate a self-signed certificate (`server.crt`):

```
oopenssl x509 -req -days 365 -in server.csr -signkey server.key -out server.crt
```

The above command generates a self-signed certificate that is valid for one year. You can use the certificate signing request to purchase a certificate from a **certificate authority**. For testing purposes though, the self-signed certificate will suffice. Copy the certificate file and private key file to the locations you specified in **Step 8(b)**.

```
cp server.key /usr/local/apache2/conf/
cp server.crt /usr/local/apache2/conf/
```

### Step 8(d): Update the base URL for 'https'

Created by Atlassian in 2019 Licensed under a Creative Commons Attribution 2.5 Australia License.
Open a browser window and log into Bamboo using an administrator account. Go to the Bamboo administration area and click **Server settings** (under 'Settings'). Change **Base URL** to use 'https'.

**Using a self-signed certificate**

There are two implications of using the self-signed certificate:

- When you access Bamboo in a web browser, you can expect a warning to appear, alerting you that an un-trusted certificate is in use. Before proceeding you will have to indicate to the browser that you trust the certificate.
- When you perform a git clone operation, SSL verification will fail.

The SSL verification error message will look something like this:

```plaintext
error:14090086:SSL routines:SSL3_GET_SERVER_CERTIFICATE:certificate verify failed while accessing https://justme@mycompany/git/TP/test.git
```

It's easy to fix. Turn SSL verification off for individual git operations by setting the `GIT_SSL_NO_VERIFY` environment variable. In Unix, you can set the variable in-line with git commands as follows:

```plaintext
git clone GIT_SSL_NO_VERIFY=true https://justme@mycompany/git/TP/test.git
```

In Windows you have to set the variable in a separate shell statement:

```plaintext
set GIT_SSL_NO_VERIFY=true

```

```plaintext
git clone https://justme@mycompany/git/TP/test.git
```

Once you have purchased and installed a signed certificate from a certificate authority, you will no longer have to include the `GIT_SSL_NO_VERIFY` modifier.

**A note about application links**

When an application link is established between Bamboo and another Atlassian product (e.g. Jira), and Bamboo is operating 'behind' Apache HTTP Server, the link from the other product to Bamboo must be via the proxy URL; that is, the 'reciprocal URL' from, say Jira, to Bamboo must comport with the proxy name and port that you set at **Step 1**.

**Troubleshooting**

- On **Fedora Core 4**, people have reported 'permission denied' errors when trying to get mod_proxy (and mod_jk) working. Disabling SELinux (`/etc/selinux/config`) apparently fixes this.
- Some users have reported problems with user sessions being hijacked when the `mod_cache` module is enabled. If you have such problems, disable the `mod_cache` module. Note that this module is enabled by default in some Apache HTTP Server version 2 distributions.
- In general, if you are having problems:
  1. Ensure that Bamboo works as expected when running directly from Tomcat on `http://localhost:8085/bamboo`
  2. Watch the log files (usually in `/var/log/httpd/` or `/var/log/apache2/`). Check that you have a `LogLevel` directive in your `httpd.conf`, and turn up logging ('`LogLevel debug`') to get more info.

**Securing Bamboo with Apache using SSL**

If you want to set up SSL access to Bamboo, follow steps 1 to 4 below. When you are finished, users will be able to make secure connections to Apache HTTP Server; connections between Apache HTTP Server and Bamboo will remain unsecured (not using SSL).

**Note:**

- The steps on this page would normally be performed after **Integrating Bamboo with Apache HTTP Server**.
- It would be possible to set up an SSL connection between Apache HTTP Server and Tomcat (Bamboo), but that configuration is very unusual, and not recommended in most circumstances.

**Step 1: Configure the Tomcat Connector for SSL**

Find the normal (non-SSL) `Connector` directive in Tomcat's `server.xml` file, and change the `redirectPort`, `scheme` and `proxyPort` attributes as follows:
On this page:
- Step 1: Configure the Tomcat Connector for SSL
- Step 2: Set up a virtual host in Apache HTTP Server
- Step 3: Create SSL certificate and key files
- Step 4: Update the base URL for 'https'
- Using a self-signed certificate

Related pages:
- Integrating Bamboo with Apache HTTP Server
- Securing Bamboo with Tomcat using SSL

```xml
<Connector port="8085"
    protocol="HTTP/1.1"
    connectionTimeout="20000"
    useBodyEncodingForURI="true"
    redirectPort="443"
    compression="on"
    
    compressableMimeTypes="text/html, text/xml, text/plain, text/css, application/json, application/javascript, application/x-javascript"
    secure="true"
    scheme="https"
    proxyName="mycompany.com"
    proxyPort="443" />
```

The redirectPort directive causes Tomcat-initiated redirections to secured resources to use the specified port. Right now, the Bamboo configuration of Tomcat does not involve Tomcat-initiated redirections, so the change to redirectPort is redundant. Nevertheless, we suggest that you change it as directed above for the sake of completeness.

Step 2: Set up a virtual host in Apache HTTP Server

Un-comment the following LoadModule directive in Apache HTTP Server’s httpd.conf file:

```
LoadModule ssl_module modules/mod_ssl.so
```

Add the following directives to the httpd.conf file:

```
Listen 443
<VirtualHost *:443>
    SSLEngine On
    SSLCertificateFile  "usr/local/apache2/conf/server.crt"
    SSLCertificateKeyFile "usr/local/apache2/conf/server.key"
    ProxyPass        / http://localhost:8085/ connectiontimeout=5
    timeout=300
    ProxyPassReverse / http://localhost:8085/
</VirtualHost>
```

The Listen directive instructs Apache HTTP Server to listen for incoming requests on port 443. Actually, we
could omit that directive in this case, since Apache HTTP Server listens for https requests on port 443 by default. Nevertheless, it's good to make one's intentions explicit.

The VirtualHost directive encloses a number of child directives that apply only and always to requests that arrive at port 443. Since our VirtualHost block does not include a ServerName directive, it inherits the server name from the main server configuration.

The SSLEngine directive toggles the use of the SSL/TLS Protocol Engine. In this case, we're using it to turn SSL on for all requests that arrive at port 443.

The SSLCertificateFile directive tells Apache HTTP Server where to find the PEM-encoded certificate file for the server.

The SSLCertificateKeyFile directive tells Apache HTTP Server where to find the PEM-encoded private key file corresponding to the certificate file identified by the SSLCertificateFile directive. Depending on how the certificate file was generated, it may contain a RSA or DSA private key file, making the SSLCertificateKeyFile directive redundant; however, Apache strongly discourages that practice. The recommended approach is to separate the certificate and the private key. If the private key is encrypted, Apache HTTP Server will require a pass phrase to be entered when it starts up.

The ProxyPass and ProxyPassReverse directives should be set up in the manner described in Step 5 of the Integrating Bamboo with Apache HTTP server page.

For more information about the support for SSL in Apache HTTP Server, refer to the Apache SSL/TLS Encryption manual. In addition, you will find lots of relevant information in the <apache directory>/conf/extra/httpd-ssl.conf file, which is included in the standard Apache distribution.

Step 3: Create SSL certificate and key files

In Step 2, you specified server.crt and server.key as the certificate file and private key file respectively. Those two files must be created before we can proceed. This step assumes that OpenSSL is installed on your server.

Generate a server key file:

```
openssl genrsa -des3 -out server.key 2048
```

You will be asked to provide a password. Make sure that the password is strong because it will form the one real entry point into the SSL encryption set-up. Make a note of the password because you'll need it when starting Apache HTTP Server later.

Generate a certificate request file (server.csr):

```
openssl req -new -key server.key -out server.csr
```

Generate a self-signed certificate (server.crt):

```
openssl x509 -req -days 365 -in server.csr -signkey server.key -out server.crt
```

The above command generates a self-signed certificate that is valid for one year. You can use the certificate signing request to purchase a certificate from a certificate authority. For testing purposes though, the self-signed certificate will suffice. Copy the certificate file and private key file to the locations you specified in Step 2.

```
cp server.key /usr/local/apache2/conf/
cp server.crt /usr/local/apache2/conf/
```
Step 4: Update the base URL for ‘https’

Open a browser window and log into Bamboo using an administrator account. Go to the Bamboo administration area and click **Server settings** (under ‘Settings’). Change **Base URL** to use ‘https’.

Using a self-signed certificate

There are two implications of using the self-signed certificate:

- When you access Bamboo in a web browser, you can expect a warning to appear, alerting you that an un-trusted certificate is in use. Before proceeding you will have to indicate to the browser that you trust the certificate.

- When you perform a git clone operation, SSL verification will fail.

The SSL verification error message will look something like this:

```
error:14090086:SSL routines:SSL3_GET_SERVER_CERTIFICATE:certificate verify failed while accessing https://justme@mycompany/git/TP/test.git
```

It’s easy to fix. Turn SSL verification off for individual git operations by setting the **GIT_SSL_NO_VERIFY** environment variable. In Unix, you can set the variable in-line with git commands as follows:

```
GIT_SSL_NO_VERIFY=true git clone https://justme@mycompany/git/TP/test.git
```

In Windows you have to set the variable in a separate shell statement:

```
set GIT_SSL_NO_VERIFY=true
git clone https://justme@mycompany/git/TP/test.git
```

Once you have purchased and installed a signed certificate from a certificate authority, you will no longer have to include the **GIT_SSL_NO_VERIFY** modifier.

**Securing Bamboo with Tomcat using SSL**

This page in intended for administrators setting up Bamboo for a small team. It describes how to enable HTTPS (HTTP over SSL) access for Tomcat, the webserver distributed with Bamboo, using a self-signed certificate. You should consider doing this, and making secure access mandatory, if Bamboo will be internet-facing and usernames, passwords and other proprietary data may be at risk.

If you are setting up a production instance you should consider using a CA certificate, briefly described below.

Note that you can set up Bamboo to run behind a web server, such as Apache HTTP Server. To secure Bamboo with HTTPS, when Apache HTTP Server acts as a reverse proxy for Bamboo, see Integrating Bamboo with Apache HTTP Server.

Please note that Atlassian Support will refer SSL-related support to the issuing authority for the certificate. The documentation on this page is for reference only.

### On this page:

1. Generate a self-signed certificate
2. Configure HTTPS in Tomcat
   - Exporting the self-signed certificate
   - Requesting a CA certificate
3. Troubleshooting

### Related pages:

- Integrating Bamboo with Apache HTTP Server

1. Generate a self-signed certificate

Self-signed certificates are useful where you require encryption but do not need to verify the website identity. They are commonly used for testing and on internal corporate networks (intranets).

Users may receive a warning that the site is untrusted and have to "accept" the certificate before they can
access the site. This usually will only occur the first time they access the site.

The following approach to creating a certificate uses Java’s keytool, for Java 1.6. Other tools for generating certificates are available.

**To generate a self-signed certificate:**

- Log in with the user account that Bamboo will run under, and run the following command:
  
  **Windows**
  
  ```
  "%JAVA_HOME%\bin\keytool" -genkey -alias tomcat -keyalg RSA
  ```

  **Linux, MacOS and Unix**
  
  ```
  $JAVA_HOME/bin/keytool -genkey -alias tomcat -keyalg RSA
  ```

  This will create (if it doesn’t already exist) a new .keystore file located in the home directory of the user you used to run the keytool command.

  Note the following:

  - When running the keytool command you will be prompted with: What is your first and last name?
    
    You **must** enter the fully qualified hostname of the server running Bamboo. This is the name you would type in your web browser after “http://” (no port number) to access your Bamboo installation. The qualified host name should match the base URL you have set in Bamboo (without the port number).

  - The keytool utility will also prompt you for two passwords: the keystore password and the key password for Tomcat.

    You **must** use the same value for both passwords, and the value **must** be either:

    - "changeit", which is the default value Tomcat expects, or
    - any other value, but you must also specify it in `conf/server.xml` by adding the following attribute to the `<Connector/>` tag: `keystorePass="<password value>"`

  2. **Configure HTTPS in Tomcat**

  **To configure HTTPS in Tomcat:**

  - Edit `conf/server.xml` and, at the bottom, before the `<Service>` tag, add this section (or uncomment it if it already exists) and add the following attribute to the `<Connector/>` tag: `keystoreFile="<location of keystore file>"`:
<Connector port="8443"
    maxHttpHeaderSize="8192"
    SSLEnabled="true"
    maxThreads="150"
    minSpareThreads="25"
    maxSpareThreads="75"
    enableLookups="false"
    disableUploadTimeout="true"
    useBodyEncodingForURI="true"
    acceptCount="100"
    scheme="https"
    secure="true"
    clientAuth="false"
    sslProtocol="TLS"
    keystoreFile="/path/to/.keystore" />

This enables SSL access on port 8443 (the default for HTTPS is 443, but 8443 is used instead of 443 to avoid conflicts).

Exporting the self-signed certificate

If Bamboo will run as the user who ran the `keytool --genkey` command, you do not need to export the certificate.

You may need to export the self-signed certificate, so that you can import it into a different keystore, if Bamboo will not be run as the user executing `keytool --genkey`. You can do so with the following command:

**Windows**

```
"%JAVA_HOME%\bin\keytool" -export -alias tomcat -file file.cer
```

**Linux, MacOS and Unix**

```
$JAVA_HOME/bin/keytool -export -alias tomcat -file file.cer
```

If you generate the certificate as one user and run Bamboo as another, you'll need to do the certificate export as the generating user and the import as the target user.

Requesting a CA certificate

Digital certificates that are issued by trusted 3rd party CAs (Certification Authorities) provide verification that your website does indeed represent your company.

When running Bamboo in a production environment, you will need a certificate issued by a CA, such as VeriSign, DigiCert or Thawte. The instructions below are adapted from the Tomcat documentation.

First, you will generate a local certificate and create a 'certificate signing request' (CSR) based on that certificate. You then submit the CSR to your chosen certificate authority. The CA will use that CSR to generate a certificate for you.

1. Use Java's `keytool` utility to generate a local certificate, as described in the section above.
2. Use the `keytool` utility to generate a CSR, replacing the text `<MY_KEYSTORE_FILENAME>` with the path to and file name of the .keystore file generated for your local certificate:

   **Windows**
"%JAVA_HOME%\bin\keytool" -certreq -keyalg RSA -alias tomcat -file certreq.csr -keystore <MY_KEYSTORE_FILENAME>

Linux, MacOS and Unix

$JAVA_HOME/bin/keytool -certreq -keyalg RSA -alias tomcat -file certreq.csr -keystore <MY_KEYSTORE_FILENAME>

3. Submit the generated file called certreq.csr to your chosen certificate authority. Refer to the documentation on the CA's website to find out how to do this.
4. The CA will send you a certificate.
5. Import the new certificate into your local keystore. Assuming your certificate is called "file.cer" whether obtained from a CA or self-generated, the following command will add the certificate to the keystore:

Windows

"%JAVA_HOME%\bin\keytool" -import -alias tomcat -file file.cer

Linux, MacOS and Unix

$JAVA_HOME/bin/keytool -import -alias tomcat -file file.cer

Troubleshooting

Here are some troubleshooting tips if you are using a self-signed key created by keytool, or a CA certificate, as described above.

When you enter "https://localhost:8443/" in your browser, if you get a message such as "Cannot establish a connection to the server at localhost:8443", look for error messages in your logs/catalina.out log file. Here are some possible errors with explanations:

SSL + Apache + IE problems

Some people have reported errors when uploading attachments over SSL using IE. This is due to an IE bug, and can be fixed in Apache by setting:

```
BrowserMatch ".MSIE." 
   nokeepalive ssl-unclean-shutdown 
   downgrade-1.0 force-response-1.0
```

Google has plenty more on this.

Can’t find the keystore

java.io.FileNotFoundException: /home/user/.keystore (No such file or directory)

This indicates that Tomcat cannot find the keystore. The keytool utility creates the keystore as a file called .keystore in the current user's home directory. For Unix/Linux the home directory is likely to be /home/<username>. For Windows it is likely to be C:\User\<UserName>.

Make sure you are running Bamboo as the same user who created the keystore. If this is not the case, or if you are running Bamboo on Windows as a service, you will need to specify where the keystore file is in conf/server.xml. Add the following attribute to the connector tag you uncommented:

```
keystoreFile="<location of keystore file>"
```
Incorrect password

java.io.IOException: Keystore was tampered with, or password was incorrect

You used a different password than "changeit". You must either use "changeit" for both the keystore password and for the key password for Tomcat, or if you want to use a different password, you must specify it using the keystorePass attribute of the Connector tag, as described above.

Passwords don’t match

java.io.IOException: Cannot recover key

You specified a different value for the keystore password and the key password for Tomcat. Both passwords must be the same.

Wrong certificate

javax.net.ssl.SSLException: No available certificate corresponds to the SSL cipher suites which are enabled.

If the Keystore has more than one certificate, Tomcat will use the first returned unless otherwise specified in the SSL Connector in conf/server.xml.

Add the keyAlias attribute to the Connector tag you uncommented, with the relevant alias, for example:

```xml
<Connector port="8443"
    maxHttpHeaderSize="8192"
    maxThreads="150"
    minSpareThreads="25"
    maxSpareThreads="75"
    enableLookups="false"
    disableUploadTimeout="true"
    useBodyEncodingForURI="true"
    acceptCount="100"
    scheme="https"
    secure="true"
    clientAuth="false"
    sslProtocol="TLS"
    keystoreFile="/opt/local/.keystore"
    keystorePass="removed"
    keyAlias="tomcat"/>
```

Using Apache Portable Runtime

APR uses a different SSL engine, and you will see an exception like this in your logs

SEVERE: Failed to initialize connector [Connector[HTTP/1.1-8443]]
LifecycleException: Protocol handler initialization failed: java.lang.Exception: No Certificate file specified or invalid file format

The reason for this is that the APR Connector uses OpenSSL and cannot use the keystore in the same way. You can rectify this in one of two ways:

Use the Http11Protocol to handle SSL connections

Edit the server.xml so that the SSL Connector tag you just uncommented specifies the Http11Protocol instead of the APR protocol.
Configure the Connector to use the APR protocol

This is only possible if you have PEM encoded certificates and private keys. If you have used OpenSSL to generate your key, then you will have these PEM encoded files - in all other cases contact your certificate provider for assistance.

<Connector port="8443"
  maxThreads="200"
  scheme="https"
  secure="true"
  SSLEnabled="true"
  SSLCertificateFile="${user.home}/certificate.pem"
  SSLCertificateKeyFile="${user.home}/key.pem"
  clientAuth="optional"
  SSLProtocol="TLSv1" />

Enabling client authentication

To enable client authentication in Tomcat, ensure that the value of the clientAuth attribute in your Connector element of your Tomcat's server.xml file is true.

<Connector ...
  clientAuth="true"
  ... />

For more information about Connector element parameters, please refer to the 'SSL Support' section of the Tomcat 6.0 documentation.

Wrong certificate type

If the certificate from the CA is in PKCS12 format, add the keystoreType attribute to the SSL Connector in conf/server.xml.

keyStoreFile="/opt/local/wildcard_atlassian_com.p12"
keyStorePass="removed"
keyStoreType="PKCS12"/>
Certificate chain is incomplete

If the root certificate and intermediary certificate(s) aren't imported into the keystore before the entity/domain certificate, you will see the following error:

```
[root@dev atlas]# /usr/java/jdk1.7.0_17/bin/keytool -import -alias tomcat -file my_entity_cert.crt
Enter keystore password:
keytool error: java.lang.Exception: Failed to establish chain from reply
```

Most likely, the CA sent a compressed file containing several certificates. The import order matters so you must import the root certificate first, followed by one or many intermediate certificates, followed lastly by the entity/domain certificate. There are many resources online that provide guidance for certificate installation for Tomcat (Java-based) web servers using keytool.

Disabling SSH access to elastic instances

By default, SSH (Secure Shell) access is enabled for elastic instances, the first time that you use Elastic Bamboo. Access rules for the Amazon Elastic Compute Cloud (EC2) are managed by 'security groups' in the Amazon Web Services Console. You can disable SSH access for your elastic instances by changing the EC2 access rules to remove the 'SSH' Connection Method from the 'elasticbamboo' security group.

For instructions on changing the EC2 access rules for Elastic Bamboo, please read the Elastic Bamboo Security document.

Changing Bamboo’s root context path

There are various reasons why you may wish to change Bamboo’s context path. Two of those are:

- You are running Bamboo behind a proxy.
- You have another Atlassian application, or Java web application, available at the same hostname and context path as Bamboo, and are experiencing login problems.

**Related pages:**
- Integrating Bamboo with Apache HTTP Server
- Login and session conflicts with multiple Atlassian applications

**Upgrade Note**
Since the manual steps of this process modify your Bamboo server, you will need to repeat Steps 1-6 each time you upgrade.

Changing the context path for Bamboo:

1. Navigate to the directory where you are running Bamboo from. This is the install directory that you extracted Bamboo to, not Bamboo home.
2. Stop Bamboo. This can be done using `bin/stop-bamboo.bat` on Windows or `bin/stop-bamboo.sh` on OSX or Linux.
3. Edit `conf/server.xml` and find the element below:

```
<Context path="" docBase="${catalina.home}/atlassian-bamboo"
reloadable="false" useHttpOnly="true"/>
```

Update the `path` attribute to reflect the context path that you want Bamboo to be accessible at, e.g. "/bamboo":

```
<Context path="/bamboo" docBase="${catalina.home}/atlassian-bamboo"
reloadable="false" useHttpOnly="true"/>
```
Then save the file.

4. Start Bamboo using /bin/start-bamboo.bat on Windows or /bin/start-bamboo.sh on OSX or Linux.

Bamboo should now be available at the same host as before under the new context path. For example a server that was at http://localhost:8085 will now be reachable at http://localhost:8085/bamboo.

5. Once Bamboo has started, go to the administration area and click General Configuration (under 'System'). Add the new context path to your base URL:

https://my-bamboo-hostname:8085/bamboo

6. Click Save.

**Bamboo + Apache**

Note that if you are running Bamboo behind Apache:

- You will need to make sure that the host or context path that Bamboo is exposed on is not also being used by another web application that is listening on a different port.
- If you have updated the Bamboo context path using the steps outlined above, you will need to update your Apache configuration, as described in Integrating Bamboo with Apache HTTP Server.

**Collecting analytics for Bamboo**

We are continuously working to improve Bamboo. Data about how you use Bamboo helps us do that. We have updated our Privacy Policy so that we may collect usage data automatically unless you disable collection. The data we collect includes information about the systems on which your installation of Bamboo is operating and the features you use in Bamboo.

For more details, see our Privacy Policy, in particular the 'Analytics Information from Downloadable Products' section.

See also our End User Agreement.

**How to change data collection settings?**

You can opt in to, or out of, data collection at any time. A Bamboo admin can change the data collection settings by going to

> Analytics.

**How is data collected?**

We use the Atlassian Analytics plugin to collect event data in Bamboo. Analytics logs are stored locally and then periodically uploaded to a secure location.

**Bamboo Instance Health check**

Bamboo provides a set of tools that you can use to monitor the health of your instance, as well as to identify the root cause when the instance is not performing as expected.

It's recommended that you look at the status of the health check tools after you install Bamboo or when you need to troubleshoot your setup.

To access the health check tools, go to
Health checks visibility is dependent on your instance setup. For example, MySQL health checks are visible only if you’re using a MySQL database.

Instance Health is a functionality provided by a built-in Support Tools Plugin. For more information, see Instance Health.

Bamboo Instance Health check types

**Bamboo Embedded database**
Checks if the instance is connected to an HSQL database.

**Bamboo MySQL Max Allowed Packet**
Checks if the max_allowed_packet variable in your MySQL database is appropriate.

**Bamboo MySQL Character Set**
Checks if the character set used by the tables, columns and database defaults in your MySQL database is correct.

**Bamboo MySQL Collation**
Checks if the collation used by the tables, columns and database defaults in your MySQL database is correct.

**Bamboo MySQL InnoDB Log File Size**
Checks if the innodb_log_file_size variable in your MySQL database is appropriate.

---

**Bamboo Embedded database**

This check verifies if the instance is connected to an H2 database.

The H2 database is provided for evaluating Bamboo and is not supported as a production database. To keep your data safe, migrate to a production database once you finish the evaluation and before moving the instance to production.

For more information about how to move to a supported database, see Moving your Bamboo data to a different database.

**Bamboo MySQL Max Allowed Packet**

This check verifies if the max_allowed_packet variable in your MySQL database is appropriate.

If the packet size limit is too small, it may cause problems with saving build results to the database.

For more information about the packet size limit, see:

- Unable to Save Build Results to the Database due to Error ‘Packet for query is too large’
- MySQL Packet Too Large

**Bamboo MySQL Character Set**

This check verifies the correctness of the character set that is used by tables, columns, and database defaults in your MySQL database.

Character set issues affect not only data storage, but also communication between client programs and the MySQL server.

For more information about character sets, see MySQL Character Set Support.

How to Fix the Collation and Character Set of a MySQL Database
**What is Collation?**

Collation determines how results are sorted and ordered. In newer versions of Atlassian applications, collation changes may become more strict - i.e, an application requires a certain collation. You must ensure your database has the correct collation for the application it will be used with.

Collation in MySQL can be complicated because you can have a separate collation set at:

1. The database level
2. The table level
3. The column level

Additionally, information inside a column may be encoded incorrectly as well - causing the data in that column to be displayed incorrectly.

**Setup Guides for MySQL**

To setup your MySQL database correctly, see the following resources for each product:

- Bamboo
- Confluence
- Crowd
- Fisheye / Crucible
- JIRA
- Bitbucket Server

Always back up your data before performing any modifications to the database. If possible, test any alter, insert, update, or delete SQL commands on a staging server first.

You may wish to add all the ALTER TABLE statements to a single file for easier execution.

**Changing the Database Collation**

Change yourDB to suit your database name:

```
ALTER DATABASE yourDB CHARACTER SET utf8 COLLATE utf8_bin
```

**Changing Table Collation**

The following query will produce a series of ALTER TABLE statements, which you must then run against your database. Change yourDB to suit your database name:

```
SELECT CONCAT('ALTER TABLE ', table_name, ' CHARACTER SET utf8 COLLATE utf8_bin;')
FROM information_schema.TABLES AS T,
information_schema.`COLLATION_CHARACTER_SET_APPLICABILITY` AS C
WHERE C.collation_name = T.table_collation
AND T.table_schema = 'yourDB'
AND
(  
  C.CHARACTER_SET_NAME != 'utf8'
  OR
  C.COLLATION_NAME != 'utf8_bin'
);
```

**Changing Column Collation**
The following queries (one for varchar columns, and one for non-varchar columns) will produce a series of ALTER TABLE statements, which you must then run against your database. Change yourDB to suit your database name:

```sql
SELECT CONCAT('ALTER TABLE `', table_name, '`, MODIFY `', column_name, '`, ', DATA_TYPE, ', CHARACTER_MAXIMUM_LENGTH, ') CHARACTER SET UTF8 COLLATE utf8_bin', (CASE WHEN IS_NULLABLE = 'NO' THEN ' NOT NULL' ELSE '' END), ';
FROM information_schema.COLUMNS
WHERE TABLE_SCHEMA = 'yourDB'
AND DATA_TYPE = 'varchar'
AND
  
  CHARACTER_SET_NAME != 'utf8'
  OR
  COLLATION_NAME != 'utf8_bin'
);
```

```sql
SELECT CONCAT('ALTER TABLE `', table_name, '`, MODIFY `', column_name, '`, ', DATA_TYPE, ' CHARACTER SET UTF8 COLLATE utf8_bin', (CASE WHEN IS_NULLABLE = 'NO' THEN ' NOT NULL' ELSE '' END), ';
FROM information_schema.COLUMNS
WHERE TABLE_SCHEMA = 'yourDB'
AND DATA_TYPE != 'varchar'
AND
  
  CHARACTER_SET_NAME != 'utf8'
  OR
  COLLATION_NAME != 'utf8_bin'
);
```

Dealing with Foreign Key Constraints

It may be necessary to ignore foreign key constraints when making changes to a large number of columns. You can use the SET FOREIGN_KEY_CHECKS command to ignore foreign key constraints while you update the database.

```
SET FOREIGN_KEY_CHECKS=0;
-- Insert your other SQL Queries here...
SET FOREIGN_KEY_CHECKS=1;
```

Bamboo MySQL Collation

The check verifies the correctness of the collation used by tables, columns, and database defaults in your MySQL database.

Incorrect collation may result in data loss, incorrect results, unwanted sorting orders, and poor performance.

For more information, see MySQL Collation Implementation Types.

Bamboo MySQL InnoDB Log File Size

This check verifies if the innodb_log_file_size variable in your MySQL database is appropriate.
A fail might be caused either by the maximum allowed packet size of the MySQL server being too small or when the InnoDB log file is too small (sometimes both).

For more information, see:

- MySQLSyntaxErrorException: Row size too large
- MySQL Limits on Table Column Count and Row Size

**Lockout recovery process**

This page describes how to recover administrator access for Bamboo 6.6 and later.

As an administrator, you may find yourself locked out of Bamboo and unable to log in. This can happen for various reasons, including:

- The external user directory server is not accessible (because the network is down, or the directory is down, or the directory has been moved to another IP address).
- The admin password has been forgotten or lost.
- The Bamboo instance is not configured properly and then restarted.

**To regain your access to Bamboo:**

1. **Add the** `-Datlassian.recovery.password=temporarypassword` **Java property.**
   
   a. For operating system and installation specific instructions for configuring a Java property for Bamboo, please see: Configuring your system properties
   
   b. **Linux Example:** Edit the `<Bamboo_installation_directory>/bin/setenv.sh` file and add the `-Datlassian.recovery.password=temporarypassword` value to the `JVM_SUPPORT_RECOMMENDED_ARGS` property.
   
   The property value must not be blank, and should look like this when you've done that:

   ```
   # Occasionally Atlassian Support may recommend that you set some specific JVM arguments.
   # You can use this variable to do that. Simply uncomment the below line and add any required
   # arguments. Note however, if this environment variable has been set in the environment of the
   # user running this script, uncommenting the below will override that.
   #
   # JVM_SUPPORT_RECOMMENDED_ARGS=-Datlassian.recovery.password=temporarypassword
   ```

   Here we are using `temporarypassword` but you should use your own value.

2. **Restart your Bamboo instance.**
3. **Log in to Bamboo using the** `recovery_admin` **username and the temporary password specified in Step 1.**
4. **Repair your Bamboo configuration.**

   In the recovery mode, Bamboo creates an additional account with administrative privileges to allow you to fix your configuration. These privileges are removed when Bamboo restarts without the recovery mode. We strongly recommend that you do not perform any additional actions while Bamboo is in recovery mode.

5. **Confirm your ability to log in with your usual admin profile.**
6. **Shut down Bamboo and remove the** `atlassian.recovery.password` **argument.**
7. **Start Bamboo again.**
Bamboo Specs

Configuration as code is now available in Bamboo! We called this feature Bamboo Specs. Learn more about this feature that lets you store build plans configuration as code.

- Why configuration as code?
- What's in the package?
  - Bamboo goodies
  - High-level language for configuration
  - Configuration in a language of your choice
  - Docs and more docs
- OK, I'm sold. Where do I start?

Why configuration as code?

Consider storing your build plan configuration as code for easier automation, change tracking, validation, and much more. You can read about the details in What is configuration as code?

What's in the package?

✔ Bamboo goodies

  - Bamboo Specs library with an API for writing configuration as code
  - Bamboo Specs Runner Maven plugin for easier plan deployments

✔ High-level language for configuration

YAML can get the job done, but we know that enterprise users need something much more powerful. That's why we decided to use a simple Java-based plan description language:

  - Enjoy highlighting, syntax checks, and code autocompletion.
  - Validate when you compile and run offline tests.
  - Use high-level language features like modularization or libraries.

If you're not familiar with Java, don't worry. Our onboarding process will bootstrap you directly into a working environment and we have made sure that the plan definitions will be familiar to users of other languages such as Python, C++ or C#.

✔ Configuration in a language of your choice

The Bamboo Specs library is written in Java. It means that you can write your code in any high-level JVM language that interoperates with Java, for example Groovy, Scala, or Kotlin.

✔ Docs and more docs

We're still working on our documentation, but progress is more important than perfection, so we're sharing the first versions with you.

Bamboo Specs Reference
Concepts explained with examples. We really like this one, check it out!

Bamboo Specs API reference
Our API. Documented 😊
Best practices
Because we already have some recommendations!

Supported scenarios
Make the best use out of Bamboo Specs and our Support.

OK, I’m sold. Where do I start?
Easy. We’ve prepared some short tutorials for you.

Start with Java | Start with YAML

Quick links
- Tutorial: Create a simple plan with Bamboo Java Specs
- Bamboo Specs reference documentation
- Best practices
- What is configuration as code?

What is configuration as code?

Configuration as code allows the entire configuration of Bamboo plans to be stored as source code. It moves the managing of plans from the Bamboo UI to the developer's integrated development environment (IDE). This approach brings a lot of benefits.

In a world of UI-driven configuration

Prior to Bamboo 6.0, the only way to manage projects and builds plans was via the web UI, and few REST endpoints with limited functionality. It required the user to manually create plans and add stages, jobs, and tasks to them. The user had to define source code repositories, triggers, credentials, artifacts, and much more. Although Bamboo provided shortcuts for some actions, such as cloning an existing job or plan, sharing repositories or plan branches feature, it still required a lot of effort from the Bamboo administrator to manage it.

Advantages of configuration as code

Automation and standardisation
As configuration is written as source code, you can use all best development practices to optimise it, such as: creating reusable definitions of plans, parameterisation, using loops to create lots of different entities like plans, jobs, or repositories.

It is especially crucial for large Bamboo instances with hundreds of plans. Also, in the micro-services world, it's quite common to have similar build plans.

Versioning of changes
You can store configuration code in a version control system, such as Git, to see who changed what and when in your Bamboo environment. You can use tags to mark versions that have been published to Bamboo. You can use branches to isolate changes under construction and to work in parallel streams without affecting your production Bamboo instance.

Traceability of changes
If source code is versioned and properly managed (e.g. tagged), you can track which changes have been
applied to your Bamboo server. Analysing code differences (e.g. via `git diff`) is quite often more convenient and efficient that reading audit logs in Bamboo.

**Smooth promotion of changes from test to production**

In case you use two Bamboo servers - a production and test instance - it's a lot easier to promote changes using configuration as code. In the "UI world", you had to click through many UI pages, test that everything works and next tediously repeat the same steps on the production instance. With configuration as code you can simply deploy plans to a test instance, verify changes and then deploy to the production instance just by changing the target URL.

**Keeping build environment in sync with a product**

It's quite common to keep a build configuration in the same source code repository as the product being built. As your product evolves, so does the environment needed to build it. Thanks to this synchronisation, you can always set up a proper environment, no matter whether you want to build the latest commit from the master branch or a bug fix branch created a few years ago.

**Coding assistance and validation**

Editing build plans in an IDE (such as Eclipse or IntelliJ IDEA) allows you to use IDE features such as: code autocompletion, parameter tool tips, pop-ups with JavaDoc, code refactoring, searching for usages of a given method/object and many more. You can also quickly perform offline validation by compiling and running the code.

---

**Enabling repository-stored Bamboo Specs**

Storing Bamboo Specs in a repository allows you to keep your project configuration together with the code and automatically publish any code changes. It also gives you access to history of plan specification, and makes it easy to revert to a particular moment in time.

**Before you begin**

Make sure you have the following:

- native Git installed
- access to Maven central repository

**To enable Bitbucket Server repository-stored Bamboo Specs:**

1. Go to [Linked repositories](#).
2. Select your repository.
3. In the Bamboo Specs tab, enable Scan for Bamboo Specs.

Bamboo Specs from this repository will be able to modify your plans and deployments in Bamboo. Make sure that write permissions to this repository are properly set in Bitbucket Server as any commit to this repository will refresh Bamboo configuration.
4. In the **Projects** section, select which projects Bamboo Specs can access.

**All projects**

Available only for Bamboo administrators. Use this option if you want to have a repository managing multiple build plans and deployment projects in your Bamboo instance. You can also use this option if you want to be able to create new build projects and deployment projects from Bamboo Specs.

**Build projects**

You must have project administrator or Bamboo administrator permissions to add a build project. You can't add new projects here.

To add a Build project:

i. From the Bamboo header, click **Projects**.
ii. Click your project.
iii. In the top-right corner, click **Project settings**.
iv. In the sidebar, click **Bamboo Specs repositories**.
v. Select your repository and click **Add**.

In case a plan downloads artifacts from another project (the Artifact Downloader task) or triggers builds of plans in another projects (the Dependencies tab on Plan configuration page), you have to grant access to these projects as well.

**Deployment projects**

You must have project administrator or Bamboo administrator permissions to add a deployment project. You can't add new projects here.

To add a Deployment project:

i. From the Bamboo header, click **Deploy > All Deployment Projects**.
ii. Click on your project.
iii. In the top-right corner, click [...] > **Edit project**.
iv. Click **Bamboo Spec repositories**.
v. Select your repository and click **Add**.

Now, Bamboo Specs from this repository will be able to modify this deployment project and environments. Once you have added your repositories, you can see them listed in the Projects section in Linked repositories.

**Additional step for other repositories**
Starting from version 6.5, you will be able to use Bamboo Specs Java and YAML with the following repositories:

- Bitbucket Cloud
- Git
- GitHub
- Subversion

Webhooks allow your repositories other than Bitbucket Server to communicate with Bamboo.

This is an example of webhook request using curl for a Git repository:

```bash
#!/bin/bash
/usr/bin/curl -X POST -H "X-Atlassian-Token: no-check"
http://[BAMBOO_URL]/bamboo/rest/api/latest/repository/scan?repositoryId
\->[REPOSITORY_ID]
```

Once you set up a webhook for a repository, it sends the HTTP request to Bamboo with every new commit. This HTTP request, in turn, triggers Bamboo Specs scan repository to see if there are any changes to Specs. If Bamboo detects any changes in a repository, it automatically updates necessary plans and deployments. Learn more about setting up webhooks.

**Bamboo Java Specs**

We've written down some details about how configuration as a code in Java works in Bamboo.

*Bamboo uses high-level language for configuration*

YAML can get the job done when you want to define your plan quickly but we know that enterprise users sometimes need something much more powerful. That's why we decided to pick Java as the default language for creating Bamboo Specs.

When using Java, you get the following features:

- syntax checking and highlighting while editing
- code autocompletion - IDE "knows" what is available (whereas a YAML file is just text)
- code refactoring
- code analysis - IDE helps you find usages of given method or object
- code validation by the compiler - you can easily spot any spelling mistakes
- offline and online code validation by the Bamboo Specs runner
- API versioning and deprecation (via JavaDoc's '@since' and '@deprecated' tags)
- language features such as loops, modularisation, libraries etc.

*Bamboo allows you to write configuration in language of your choice*

The Bamboo Specs library which provides API to write configuration as code has been written in Java. Thus the most natural is to use Java to write the configuration as well and this is a language which Atlassian will officially support for Bamboo Specs.

However, if you are familiar with other JVM language and have experience how to integrate it with Java classes, you can use any language of your choice. Good examples are: Groovy, Scala or Kotlin (we performed smoke tests with Groovy and Kotlin and it worked fine).

We also provide a Spec Runner Maven plugin, which eases the deployment of plans.

**Create a Bamboo Specs project using Maven Archetype**

You can create Bamboo Specs projects using our Maven Archetype.
Basic usage

You can quickly create a basic Bamboo Specs project using the following command:

```
mvn archetype:generate -DarchetypeGroupId=com.atlassian.bamboo
-DarchetypeArtifactId=bamboo-specs-archetype
-DarchetypeVersion=6.0.0
```

This command runs in the interactive mode. You will be asked to provide the following parameters for the project:

- `groupId`
- `artifactId`
- a version
- a package prefix

The command creates a directory that has the name specified in the `artifactId` parameter.

You can also run the command in the batch mode and provide all necessary parameters:

```
mvn archetype:generate -B \
-DarchetypeGroupId=com.atlassian.bamboo
-DarchetypeArtifactId=bamboo-specs-archetype \
-DarchetypeVersion=6.0.0 \
-DgroupId=com.my.company -DartifactId=my-bamboo-casc
-Dversion=1.0.0 -Dpackage=com.my.company
```

Additional options

- `-Dtemplate=minimal` - creates a minimal template (with no repositories, stages, or artifacts)

Importing created project into IDE

You can easily import the project into IDE, such as Eclipse or IntelliJ IDEA.

**How to import into Eclipse ...**

1. Run Eclipse.
2. From the main menu, select File > Import...
3. In the Import dialog, click Maven > Existing Maven Projects and click Next.
4. Click Browse, select your folder, and click Open.
5. Click Finish.

Eclipse creates a new project and downloads necessary dependencies.
How to import into IntelliJ IDEA ...

1. Run IntelliJ IDEA.
2. From the main menu, click **File > Open** and select the pom.xml file.
3. Click **Open as Project**.

   IntelliJ IDEA creates a new project and downloads necessary dependencies.

Troubleshooting

**Unable to add module**

```
[ERROR] Failed to execute goal
org.apache.maven.plugins:maven-archetype-plugin:3.0.0:generate
  (default-cli) on project p4:
  org.apache.maven.archetype.exception.InvalidPackaging:
  Unable to add module to the current project as it is not of
  packaging type 'pom' -> [Help 1]
```

The archetype found pom.xml file in the current directory and failed to add the module to it.

Run the archetype from a directory which does not contain the pom.xml file.

---

**Creating deployment projects in Bamboo Specs**

Bamboo Specs can be used to create and update deployment projects.

Creating deployment projects in Bamboo Specs is similar to that of updating a plan. The main difference is the class you need to define in your Bamboo Specs code:

```java
private Deployment createDeployment() {
    return new Deployment(new PlanIdentifier("PROJECTKEY", "PLANKEY"),
                           "Deployment project name")
        .releaseNaming(new ReleaseNaming("release-1")
                         .autoIncrement(true))
        .environments(new Environment("Test environment")
                       .tasks(new ScriptTask().inlineBody("echo Hello world!")));
}
```

Once you defined this class, instruct Bamboo Specs to publish your deployment to deployment server, just like you do with plans:

```java
Deployment myDeployment = createDeployment();
bambooServer.publish(myDeployment);
```

**Exporting existing plans to Bamboo Specs**

To ease migration of your Bamboo plans to configuration as code, we have prepared the export feature. In order to export existing plan to Bamboo Specs source code:
1. If you don’t have Bamboo Specs project, create one.
2. Go to your plan and select **Actions > Configure plan**.
3. On the plan configuration page, select **Actions > View plan as Bamboo Specs**.
4. Copy generated Java code to your code editor by putting it in the `PlanSpec#createPlan` method for instance.

The code is ready to run, with few exceptions:

- sensitive data is not exported - you will see `/* PUT YOUR SENSITIVE INFORMATION HERE */` code comment to fill up the data
- manually created branches are not exported - you can add them manually in the UI

We advise you to cross-check the generated code with Bamboo Specs reference manual and to compare original and generated plan.

You will find equivalent classes for the vast majority of Bamboo concepts in the generated code, such as: plans, stages, jobs, tasks of different kinds, permissions, deployments. The export feature also handles tasks not known to Bamboo (e.g. third party plugins or a plugin written by you) via a generic `AnyTask` class.

You may want to refactor the code generated, for instance: split code into smaller methods, extract common parts or merge code from several Bamboo plans into one Bamboo Spec project.

**Tutorial: Create a simple plan with Bamboo Java Specs**

This guide will help you understand how to create plans with Bamboo Java Specs. You’ll create a simple project and execute it to create a plan in Bamboo.

---

**On this page**

- Before you begin
- Step 1: Create a project base with Maven
- Step 2: Import the project into IDE
- Step 3: Define a job with a script task
- Step 4: Validate Bamboo Specs offline
- Step 5: Publish Bamboo Specs to the Bamboo server
- Step 6: Check the results
- Next steps

**Related links**

- Bamboo Specs reference
- Bamboo Specs API reference
- Create a Bamboo Specs project using Maven Archetype

---

**Before you begin**

Make sure you have the following installed:

- **JDK 8 or higher**
- **Maven 3.2 or higher**
- **Eclipse or IntelliJ IDEA IDE**

**Note:** You may use a different IDE, but tutorial provides examples for the two above

- **Bamboo 6.0 or higher**
Step 1: Create a project base with Maven

To create a base of the project, execute the following Maven archetype:

```
mvn archetype:generate -B \
   -DarchetypeGroupId=com.atlassian.bamboo \
   -DarchetypeArtifactId=bamboo-specs-archetype \
   -DarchetypeVersion=6.2.1 \
   -DgroupId=com.atlassian.bamboo -DartifactId=bamboo-specs \
   -Dversion=1.0.0-SNAPSHOT \
   -Dpackage=tutorial -Dtemplate=minimal
```

where:

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>archetypeGroupId</td>
<td>Bamboo archetype identifiers</td>
</tr>
<tr>
<td>archetypeArtifactId</td>
<td></td>
</tr>
<tr>
<td>archetypeVersion</td>
<td></td>
</tr>
<tr>
<td>groupId</td>
<td>Project identifiers</td>
</tr>
<tr>
<td>artifactId</td>
<td></td>
</tr>
<tr>
<td>version</td>
<td></td>
</tr>
<tr>
<td>package</td>
<td>Prefix of the Java package that you want to use</td>
</tr>
<tr>
<td></td>
<td>for the project</td>
</tr>
<tr>
<td>template</td>
<td>Type of code in which the project is generated.</td>
</tr>
<tr>
<td></td>
<td>For the purpose of this tutorial we're using</td>
</tr>
<tr>
<td></td>
<td>minimal.</td>
</tr>
</tbody>
</table>

The project is created in the `bamboo-specs-tutorial` directory:

```
cd bamboo-specs
```

Step 2: Import the project into IDE

You can now import the project into your integrated development environment (IDE).

### How to import into Eclipse

1. Run Eclipse.
2. In the main menu, go to **File > Import**.
3. In the **Import** dialog, select **Maven > Existing Maven Projects**.
4. Click **Next**.
5. Click **Browse**.
6. Select the `bamboo-specs-tutorial` directory and click **Open**.
7. Click **Finish**.

Eclipse will create a new project and download necessary dependencies (it may take a while).

### How to import into IntelliJ IDEA

1. Run IntelliJ IDEA.
2. In the main menu, go to **File > Open**.
3. Select the `pom.xml` file.
4. Click **Open as project**.

IntelliJ IDEA will create a new project and download necessary dependencies, which might take a while.
If you want to see how PlanSpec.java files is structured, go to src/main/java/tutorial/PlanSpec.java. Your file should have the following structure:

<table>
<thead>
<tr>
<th>PlanSpec</th>
<th>The name of the class. You can use any class name.</th>
</tr>
</thead>
<tbody>
<tr>
<td>BambooSpec</td>
<td>The file is annotated. The annotation is used by the spec-runner Maven plugin to find classes containing Bamboo plans.</td>
</tr>
<tr>
<td>main</td>
<td>With the main method you can run the project as any other Java application.</td>
</tr>
<tr>
<td>BambooServer</td>
<td>The project uses the BambooServer class to publish plans with password authentication. The username and password are read from the .credentials file which is located in the current working directory.</td>
</tr>
</tbody>
</table>

### Step 3: Define a job with a script task

1. In the `createPlan` method put a cursor after the `description` method call:

   ```java
   private Plan createPlan() {
       return new Plan(
           project(),
           "Plan Name", "PLANKEY")
           .description("Plan created from (enter repository url of your plan)");
   }
   ```

2. Type `.` and let your IDE show you available options:

3. Pick the `stages` method and add the new `Stage` ("Stage 1") constructor call inside the method's argument (you need to add the import statement for Stage class).

4. Add a job to the stage using the `jobs` method and new `Job()` constructor (add the import statement too). Name the job `Build & run` and use `RUN` for a key:
private Plan createPlan() {
    return new Plan(
        project(),
        "Plan Name", "PLANKEY")
    .description("Plan created from (enter repository url of your plan")
    .stages(
        new Stage("Stage 1")
        .jobs(new Job("Build & run", "RUN"))
    "RUN"));
}

5. Let's add a task to the job. Type .tasks() and declare a new ScriptTask() inside as shown below (add the import statement too). Call .inlineBody on the ScriptTask().

private Plan createPlan() {
    return new Plan(
        project(),
        "Plan Name", "PLANKEY")
    .description("Plan created from (enter repository url of your plan")
    .stages(
        new Stage("Stage 1")
        .jobs(new Job("Build & run", "RUN")
        .tasks(
            new ScriptTask().inlineBody("echo Hello world!")))
    };
}

You can always open a JavaDoc dialog to learn more about given method or class:

- How to show JavaDoc in Eclipse
  To download JavaDocs, hold the Ctrl/Cmd key, place the mouse cursor over a method or class name, and click open declaration.
  It opens a source editor with a decompiled class file. Eclipse immediately starts downloading sources and JavaDoc JARs in the background and updates editor as soon as it completes.
  To display JavaDocs place the mouse cursor over a class or method name.

- How to show JavaDoc in IntelliJ IDEA
  To download JavaDocs hold the Ctrl/Cmd key and click the method or class name.
  It opens a source editor with the decompiled class file. Click the Download sources link. IDEA will download sources and JavaDoc JARs.
  To display JavaDocs place the cursor over a method or class name and press Ctrl+J to open a quick documentation pop-up.
Step 4: Validate Bamboo Specs offline

You can perform offline validation before deploying a plan to Bamboo. Let's try it out by running a unit test.

**How to run from Maven**

mvn test

**How to run from Eclipse**

1. Right-click `src/test/java/tutorial/PlanSpecTest.java` in the **Package Explorer** view.
2. Select **Run as > JUnit test**.

**How to run from IntelliJ IDEA**

1. Right-click the `src/test/java/tutorial/PlanSpecTest` class in the **Project** view.
2. Click **Run 'PlanSpecTest'**.

Test fails with the following stack trace:

```java
com.atlassian.bamboo.specs.api.exceptions.PropertiesValidationException:
Plan or job / Name: can not contain any of those characters: [", , '", <, >, \] but it is 'Build & run'
at
com.atlassian.bamboo.specs.api.validators.common.ImporterUtils.checkNoErrors(ImporterUtils.java:44)
... at tutorial.PlanSpec.createPlan(PlanSpec.java:42)
at tutorial.PlanSpecTest.checkYourPlanOffline(PlanSpecTest.java:12)
```

where:

<table>
<thead>
<tr>
<th>Plan or job / Name</th>
<th>A path to an invalid element</th>
</tr>
</thead>
<tbody>
<tr>
<td>can not contain ...</td>
<td>Expected and actual value</td>
</tr>
<tr>
<td>but it is ...</td>
<td></td>
</tr>
<tr>
<td>PlanSpec.java:42</td>
<td>The source line containing the error</td>
</tr>
</tbody>
</table>

As you can see, the validation fails because the name of the job contains an invalid & character. Let's remove it. Your code should look like this now:
private Plan createPlan() {
    return new Plan(
        project(),
        "Plan Name", "PLANKEY")
            .description("Plan created from (enter repository url of your plan")
            .stages(
                new Stage("Stage 1")
                    .jobs(new Job("Run", "RUN")
                        .tasks(
                            new ScriptTask().inlineBody("echo Hello world!")))
            );
}

Run the test again to make sure that it passes this time.

Step 5: Publish Bamboo Specs to the Bamboo server

- Make sure that your Bamboo instance is up and running
- If you're not running Bamboo on your local machine (http://localhost:8085), change the bamb ooUrl variable in the main method.
- We're assuming that you have an administrator account with username admin and passwor d admin. If you want to use other credentials, you need to update the .credentials file located in the root directory of the project.

When you're sending a plan, Bamboo validates it.

💡 How to run from Maven

The pom.xml contains the 'publish-specs' profile which executes the spec-runner Maven plugin. So just type:

```
mvn -Ppublish-specs
```

💡 How to run from Eclipse

1. Right-click on the PlanSpec class in the Package Explorer view.
2. Click Run as > Java application.

💡 How to run from IntelliJ IDEA

1. Right-click the PlanSpec class in the Project view.
2. Click Run 'PlanSpec.main()'.

The console output looks like this:

```
Publishing plan PLANKEY
Result OK: http://localhost:8085/browse/PRJ-PLANKEY
```

For more verbose logging, add -Dbamboo.specs.log.level=DEBUG program argument when running
Step 6: Check the results

1. Go to your Bamboo instance.
2. Open the plan that you created.
3. Go to Actions > Configure plan.
4. Check whether the stage contains a job with the Hello world Script Task.
5. Click Run > Run plan to execute the build.
6. Find the "Hello World!" message in the logs.

Having configuration written as code using Bamboo Specs you can very easily manage all your build plans in Bamboo.

This is very convenient method of managing large Bamboo instances with huge number of plans, publishing plans on Bamboo test instances before promoting changes to production, and tracking configuration changes in version control system.

Read What is Configuration as Code? to learn more about the benefits of using Bamboo Specs.

Next steps

Here are some resources that can help you with writing your own Bamboo Specs:

- Create a Bamboo Specs project using Maven Archetype
- Exporting existing plans to Bamboo Specs
- Creating deployment projects in Bamboo Specs
- Bamboo Specs reference
- Bamboo Specs API reference

Tutorial: Bamboo Java Specs stored in Bitbucket Server

This guide will show you how you can store Bamboo Specs in a Git repository on Bitbucket Server. This approach lets you automatically build and execute Bamboo Specs on every push you make to a Git repository.

Before you begin

- Make sure you have the required software installed.
  - See the whole list...
    - Bamboo 6.2 or later
    - Bitbucket Server 4.0 or later
    - JDK 8 or higher
    - Maven 3.2 or higher

- Set up an application link between Bamboo and Bitbucket Server. See Integrating Bamboo with Bitbucket Server.
- If you're not familiar with Bamboo Specs, make sure you read our introductory tutorial: Create a simple plan with Bamboo Java Specs.

Step 1: Create a Git repository in Bitbucket Sever and clone it locally

1. In Bitbucket Server, open the Projects page.
2. Click **Create project**.
3. Enter **Bamboo** for project name and key and click **Create project**.
4. Click **Create repository**.
5. Give your new repository the name **tutorial** and click **Create repository**.

You've just created a new empty repository. Use the `git clone` command to create a clone on your computer. For example:

```
$ git clone http://admin@localhost:7990/scm/bamboo/tutorial.git
```

---

**Step 2: Create a linked repository in Bamboo**

1. Open Bamboo and go to
   
   > Linked repositories.

2. Click **Add repository**.
3. Select a **Bitbucket Server / Stash** repository type.
4. Choose a name for your repository.
5. From the Server drop-down, select your Bitbucket Server.
6. In the **Web repository** section, select the **Bamboo / tutorial** repository from the Web repository drop-down.
7. Click **Save repository**.

Your new repository is created and you can start using it in Bamboo.

---

**Step 3: Enable processing of Bamboo Specs in your repository**

By default Bamboo will not look for Bamboo Specs in the Git repository until you explicitly tell it to do so. Let's do it now:

1. Go to
   
   ![Linked repositories.](link)

2. Select your repository.
3. In the Bamboo Specs tab, enable **Scan for Bamboo Specs**.

In this tutorial we simply grant access to all projects in the Bamboo instance. You can fine-tune project access. See [Enabling repository-stored Bamboo Specs v6.2](link).

Now, Bamboo is ready to execute Bamboo Specs when the relevant code it committed to the repository. Let's create some code.

---

**Step 4: Create Bamboo Specs project using Maven**

1. Go to the empty Git repository you cloned in step 1:

   ```
   cd tutorial
   ```

2. Use the Maven archetype to create a project template. For the purpose of this tutorial, type:
   
   **Note:** You must create Bamboo Specs in the **bamboo-specs** directory, under the repository root.
Your project is created. You can open it in an IDE, such as Eclipse or IDEA, if you want to see how the project is set up. For more information on the code structure, take a look at Tutorial: Create a simple plan with Bamboo Specs.

Step 5: Commit and push code changes to Bitbucket Server

1. Add created `bamboo-specs` directory to VCS and push changes to the server:

   ```
   git add bamboo-specs
   git commit -m "Initial commit of Bamboo Specs"
   git push
   ```

As soon as you push your code changes to Bitbucket Server, Bamboo will get notified about a new commit available.

Bamboo will checkout your project, compile it and execute Bamboo Specs in a sandbox environment. Execution of Bamboo Specs will create or update configuration of plans or deployment projects accordingly.

Step 6: Check to see if the plan was created

1. Open your Bamboo instance.
2. From the header, select Build > All build plans.
3. Open the project and plan you've just created.

   ```
   All configuration options are disabled because entire plan configuration is now managed by Bamboo Specs from your Bitbucket repository.
   ```

4. Click Run plan to execute the build.
5. Find the "Hello World!" message in the logs.

Next steps

Here are some resources that can help you with writing your own Bamboo Specs:

- Create a Bamboo Specs project using Maven Archetype
- Exporting existing plans to Bamboo Specs
- Creating deployment projects in Bamboo Specs
- Bamboo Specs reference

Best practices

There's a couple of things that we find important.
Keep your project in version control system

Keeping your code in VCS, such as Git or Mercurial will give you a lot of benefits, such as:

- traceability - you can track who, when and why changed your build environment
- comparison - you can easily compare two different configurations to analyse what changed, which helps when troubleshooting
- separation of work - you can use branches to prepare new versions of your environment
- remaining in sync with the product.

Keep information from which URL a given plan was created

With hundreds of plans and separate configuration projects it’s very valuable to know which plan is being managed by CASC and which via UI, and which repository manages a given plan in Bamboo.

To stay on top of things, use plan description field for this purpose, e.g.:

“This plan is being managed via configuration-as-code. Modify <vcs url> project to update the plan.”

Keep in mind that your plan configuration is source code as any other

Apply all best development practices when maintaining it. Avoid copy-and-paste, extract common methods or components, use parameterization, modularization.

Go back: Bamboo Specs

Bamboo YAML Specs

As an alternative to using Bamboo Java Specs, Bamboo 6.3+ allows you to create simple plans using Bamboo YAML Specs in no time. Just use one of the templates we provide and you’re ready to start committing your files to a repository.

How it works

Bamboo YAML Specs is another Bamboo Specs format supported by Bamboo next to Bamboo Specs Java. Once you have defined your plan/deployment configuration in YAML, you need to allow your repository to scan for Bamboo Specs.

Bamboo always looks for YAML Specs first. If it doesn't find YAML Specs, Bamboo tries to find and process Java Specs.
In the repository you specified, Bamboo looks for `bamboo-specs/bamboo.yml` or `bamboo-specs/bamboo.yaml` files to fetch your configuration. Linked repository needs to have permissions to create plans within given project in order to process YAML definition and create a plan.

A new plan created using Bamboo YAML Specs does not have any explicit permissions granted - administrators and logged in users will have access to it. You can use YAML Specs to define plan-level permissions. We advise you to use project-level permissions. Contrary to Java Specs, YAML Specs can't create projects.

In Bamboo YAML Specs, artifacts are shared by default. Artifacts are downloaded between stages, e.g user defines Stage 1 with Artifact A, Stage 2 with Artifact B and Stage 3. This means that Stage 2 will download Artifact A from Stage 1 and Stage 3 will download both Artifact A and B from previous stages.

In Bamboo YAML Specs, artifacts are also required by default. This means that a build fails if the artifact can't be published.

**YAML Format**

Bamboo Specs YAML allows for a multiple entities definition in a single YAML file and accepts the following format:

```yaml
---
version: 2
plan:
  project-key: MARS
  key: ROCKET
  name: Build the rockets

# List of plan's stages and jobs
stages:
  - Build the rocket stage:
    - Build

# Job definition
Build:
  tasks:
    - script:
      - mkdir -p falcon/red
      - echo wings > falcon/red/wings
      - sleep 1
      - echo 'Built it'
    - test-parser:
      type: junit
      test-results: '**/junit/*.xml'
# Job's requirements
requirements:
  - isRocketFuel
# Job's artifacts. Artifacts are shared by default.
artifacts:
  - name: Red rocket built
    pattern: falcon/red/wings
```
---
version: 2
deployment:
  name: Deploy Rocket
  source-plan: MARS-ROCKET

release-naming:
  next-version-name: 0.$(bamboo.buildNumber)

environments:
  - QA

QA:
  tasks:
    - clean
    - artifact-download:
        destination: /
    - script:
        - echo 'Hello space'

Default settings

Here's the default settings of plans created using YAML Specs.

These settings cannot be changed:

- Bamboo YAML plan check-out starts with checking out a repository in which it's defined
- notifications are sent to committers and watchers of the plan when plan fails
- plan branches are created automatically with plan brach expiry set for 30 days

These settings can be changed:

- artifacts sharing is turned on
- YAML plans use Bitbucket Server triggers
- only Bamboo administrators can see plan configuration and run builds
- logged in users can view plan builds

Read more

- Bamboo Specs Reference

Bamboo Specs YAML format

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# Job's requirements
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  - isRocketFuel

# Job's artifacts. Artifacts are shared by default.
artifacts:
  - name: Red rocket built
    pattern: falcon/red/wings

---

version: 2
deployment:
  name: Deploy Rocket
  source-plan: MARS-ROCKET

release-naming:
  next-version-name: 0.$(bamboo.buildNumber)

environments:
  - QA

QA:
  tasks:
    - clean
    - artifact-download:
        destination: /
    - script:
        - echo 'Hello space'

Tutorial: Bamboo Specs YAML stored in Bitbucket Server

This guide will show you how you can store Bamboo Specs in a Git repository on Bitbucket Server. This
approach allows to automatically build and execute Bamboo Specs on every push you make to a Git repository.

Before you begin

- Step 1: Create a Git repository in Bitbucket Server and clone it locally
- Step 2: Create Bamboo Specs YAML config
- Step 3: Create a new Project in Bamboo
- Step 4: Enable processing of Bamboo Specs in your repository
- Step 5: Check if plan was created

Next steps

Related links

- Link to Bamboo Specs YAML reference

Before you begin

- Make sure you have the following software installed:
  - Bamboo 6.9 or later
  - Bitbucket Server 5.0 or later
- Set up an application link between Bamboo and Bitbucket Server. See Integrating Bamboo with Bitbucket Server.

Step 1: Create a Git repository in Bitbucket Server and clone it locally

1. In Bitbucket Server, open the Projects page.
2. Click Create project.
3. Select Bamboo for project name and key and click Create project.
   You see that the project has no repositories.
4. Click Create repository.
5. Give your new repository the name tutorial, and click Create repository.

   You've just created a new empty repository. Use the git clone command to create a clone on your computer. For example:

   ```
   git clone http://admin@localhost:7990/scm/bamboo/tutorial.git
   ```

Step 2: Create Bamboo Specs YAML config

1. Go to the empty Git repository you cloned in step 1:

   ```
   cd tutorial
   mkdir bamboo-specs
   cd bamboo-specs
   ```

2. Use any of the templates we've prepared for your in Bamboo YAML Specs Reference or write YAML definition on your own with Bamboo Specs YAML format.

   It's important to save your Bamboo Specs YAML definition in the ${repo-home}/bamboo-specs/bamboo.yml or bamboo.yaml file under the repository root.
---
version: 2
plan:
  project-key: MARS
  key: ROCKET
  name: Build the rocket
stages:
- Build hull:
  - Build

Build:
  tasks:
  - script:
    - echo 'Hello World!'

3. Add created `bamboo-specs` directory to VCS and push changes to the server:

```bash
git add bamboo-specs
git commit -m "Initial commit of Bamboo Specs"
git push
```

Step 3: Create a new Project in Bamboo

1. Open Bamboo and go to Create > Create Project.
2. Fill in Project name, e.g. Mars.
3. If not auto-generated, fill in the Project Key – eg: MARS – this will be referenced in the YAML file.
4. Click Save.

Step 4: Enable processing of Bamboo Specs in your repository

By default Bamboo will not look for Bamboo Specs in the Git repository until your explicitly tell it to do so. Let's do it now:

1. Go to Specs > Set up Specs repository.
2. Select your project Mars.
3. Select Link new repository
4. Select a Bitbucket Server / Stash repository type.
5. Choose a name for your repository.
6. From the Server drop-down, select your Bitbucket Server.
7. Select the Bamboo / tutorial repository from the Repository drop-down.
8. Click Confirm.

Your new repository is created and you can start using it in Bamboo. Bamboo will checkout your repository, process it and create plan.

Execution of Bamboo Specs will create or update configuration of plans accordingly.

In this tutorial we simply grant access to one project in the Bamboo instance. You can fine-tune project access, see Enabling repository-stored Bamboo Specs how to do this.
Step 5: Check if plan was created

1. In Bamboo from the header, select Build > All build plans.
2. Open the project and plan you've just created.

All configuration options are disabled because entire plan configuration is now managed by Bamboo Specs from your Bitbucket repository.

3. Click Run plan to execute the build.
4. Find the "Hello World!" message in the logs.

Next steps

Here are some resources that can help you with writing your own Bamboo YAML Specs:

- Bamboo YAML Specs Reference
- Bamboo Specs troubleshooting

Bamboo Specs troubleshooting

We've gathered answers to most common problems with Bamboo Specs.

✓ I committed Bamboo Specs but nothing happens

Make sure you pushed your code to the Bitbucket Server

It's trivial but it really happens.

Make sure that Bitbucket Server and Bamboo are connected using application link

1. Go to
   > Application links

Make sure that Bamboo Specs processing is enabled in Bamboo

1. Go to
   > Security settings > Repository Stored Specs security settings > Enable Repository Stored Specs

Make sure that Bamboo Specs is enabled for a repository you pushed to

1. Go to
   > Linked repositories > <your repository>
   2. In the Bamboo Specs tab, enable Scan for Bamboo Specs.

Make sure that Bamboo Specs has access to projects or deployment projects you want to modify

1. Go to
   Administration > Linked repositories.
   2. Select your Bitbucket Server repository.
   3. Select Enable all projects access or make sure that your build or deployments projects are listed in that section. See Enabling repository-stored Bamboo Specs.

✓ Bamboo Specs compilation fails

In case compilation fails during the first execution of Bamboo Specs, no plans or deployment projects are created or updated. As a consequence, Bamboo is unable to associate the Bamboo Specs with any plan, so you will not find an error log in any of the existing plans.

In case compilation fails not at first time, you can find "Specs execution error" on the build results page for
the related plans.

Note that in both cases a committer of the change will receive an email with details of the error.

Compilation may fail due to two reasons:

- **errors in the source code**

  Check out the repository on your computer and build it yourself ("mvn compile" or import into IDE) to locate the error. These are usually code typos, wrong project dependencies or an outdated parent pom version.

- **pom.xml has been sanitized by Bamboo**

  By default Bamboo Specs are executed with a default pom.xml file, i.e. it will not use pom.xml from your bamboo-specs project. For that reason, even if your bamboo-specs project compiles and runs correctly on your computer, it may fail in Bamboo. Make sure that:
  
  - it's sufficient to compile your project using maven-resources-plugin and maven-compiler-plugin only instead of using for instance extra plugins for code generation; don't rely on executing tests
  - it's sufficient to compile your project with bamboo-specs and bamboo-specs-api dependencies only - don't add extra dependencies
  - your pom.xml inherits from com.atlassian.bamboo:bamboo-specs-parent

  Bamboo Specs compilation succeeds but log shows that not everything was built

  Repository-stored Bamboo Specs feature requires your project in the/bamboo-specs directory will consist of only one Maven module. We do not support multi-module builds. So in case you put some Bamboo Specs classes in sub-modules of bamboo-specs, they simply won't be built.

  Bamboo Specs fails to import configuration

  Committer of the change will receive an email with details of the error. You can also look up for "Specs execution error" on the build results page of the related plan(s). Most typical reasons are:

  Insufficient permissions

  Make sure that Bamboo Specs has access to projects or deployment projects you want to modify. It applies also to dependent projects, for instance:
  
  - child plans triggered after a build - see plan's dependencies section,
  - artifacts downloaded from a plan from another project.

  Validation errors

  Bamboo validates your plan configuration for correctness. It reports an error if any constraint is violated, such as: invalid project key, reference to non-existing repository or plan etc.

  The repository in which you defined a plan has no permissions to access a project

  1. Go to <Coghweel> Linked repositories.
  2. Select your repository.
  3. Click on the Bamboo Specs tab.
  4. Copy the webhook URL.
  5. In therepository you want to use for storing Bamboo Specs, go to your repository settings.
  6. Find webhook-specific configuration.
  7. Paste in the URL Bamboo provided you with.

  A webhook that allows your repository to communicate with Bamboo is not set up

  1. In the top navigation bar, click Projects.
  2. Select your project.
  3. Click Project settings > Bamboo Specs repositories.
  4. Select your repository and click Add.
  5. Go to settings the repository you want to use for storing Bamboo Specs.
  6. Find webhook-specific configuration.
7. Paste in the URL Bamboo provided you with.

Bamboo Specs reference documentation

We’re still working on our documentation, but progress is more important than perfection, so we’re sharing the first versions with you.

On this page
- Bamboo Specs reference
- Bamboo Specs API reference

Related links
- Tutorial: Create a simple plan with Bamboo Java Specs
- Create a Bamboo Specs project using Maven Archetype
- Best practices

Bamboo Specs reference

This documentation set explains main concepts behind Bamboo Specs. We’ve added a lot of examples for you to use in your configuration files.

Bamboo Specs Reference

Bamboo Specs API reference

Have a look at our Bamboo Specs API docs for the details of packages and classes that you can use.

Bamboo Specs API reference

Bamboo Specs - supported scenarios

Bamboo Specs provides the capability to programatically configure Bamboo using either Java or YAML.

Bamboo Specs typical use case scenarios:
- Migration of existing plans that were created via the Bamboo UI
- New plan configurations created with Bamboo Specs directly and that contain little if any glue code.
- New plan configurations created with Bamboo Specs, or existing plans that are migrated to Specs, which contain a significant amount of glue code which is complex.

What Atlassian support can help you out with:
- Migration of existing plans that were created using the UI to Bamboo Specs with minimal glue code, preferably with minor if any) changes to the code that is provided by the View Plan as Specs feature
- New plan configurations that are created with Bamboo Specs which contain a minimal amount of glue code, similar to what is generated

What is glue code?

By glue code we understand the Java code that is not part of the Bamboo Specs API and which is necessary for the Specs Java code to run as a Java application. The glue code can be minimal or implement extra functionality using heavy code edits.
Bamboo Specs projects that contain a large amount of complex glue code fall outside supported scenarios. For such cases, we recommend starting from simple Bamboo Specs, preferably produced by the View Plan as Specs with a minimal amount of glue code. Then gradually add the complex code and perform as many intermediary tests as possible to be able to detect errors sooner rather than later.

Below is a list of Atlassian validated Bamboo Specs code:

- code generated by View Plan as Bamboo Specs from within the Bamboo UI
- code from the official documented tutorials
- sample code snippets described in the latest Bamboo specs reference documentation, which show the use of the API.

Sensitive data encryption

Bamboo Specs encryption

When working on your repository-stored Bamboo Specs, you might need to use sensitive data like passwords, pass phrases, or other access credentials. To make sure your data remains secure, you can use Bamboo sensitive data encryption before storing the confidential information in your code repository.

To encrypt your data

1. From the top navigation bar, select Specs > Sensitive data encryption.
2. Paste the content you want to encrypt in the text box.
3. Click Encrypt.

Your content is now encrypted. You can copy it and use it in your Bamboo Specs safely.

Where to use the encrypted data

You can use the manually encrypted data in your Bamboo Specs for configuring access to repositories, defining secret plan variables, working with credentials in various tasks, and in a handful of other places. Refer to the documentation or JavaDocs of individual locations to learn whether encrypted content is supported.

Secret variables are determined by their name. To be considered secret and to support encrypted content, a variable name needs to contain one of the following words: “password”, “passphrase”, “secret”, “sshkey”. 

Bamboo requires encryption of sensitive data in your Bamboo Specs. This allows you to store information such as passwords, passphrases and SSH keys, in code repositories. Learn more.

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Troubleshooting

I'm not seeing the Sensitive data encryption option. What should I do?

If you're using Bamboo 6.9 or later, sensitive data encryption is enabled by default. If you can't see it, contact your administrator.

If you're a Bamboo administrator, you can enable/disable and configure the sensitive data encryption feature. Go to

> Security > Security settings and change the **System-wide encryption** option.

Bamboo FAQ

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• Contributing to the Bamboo documentation
• Unpacking large .ZIP archives

Need more help?
Do you have a question, or need help with Bamboo? Please create a support request.
Browse our Bamboo Developer FAQ.
You may also like to check out the forums:
  • Bamboo General Forum
  • Bamboo Developers Forum
Usage FAQ

- Can multiple plans share a common 3rd-party directory
- Changing Bamboo database settings
- Deploying Multiple Atlassian Applications in a Single Tomcat Container
- How Bamboo processes task arguments and passes them to OS shell
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Can multiple plans share a common 3rd-party directory

For example, you might have three repository directories, say, A, B, and C, where A is a common 3rd-party library. A is used across projects.

At this stage, Bamboo doesn't support having multiple checkout directories per build plan. However, you can work around this by setting these three directories up as separate Bamboo build plans - P_A, P_B, and P_C.

To make this work, you will also need to specify as an argument to your build scripts for P_B and P_C the location of A, which will be something like this:

`../Plan_key_for_A/`

Using a set up like this, your library module (A) should only be checked out once across the Bamboo instance.

See also:
- Triggering a build when another build finishes

Changing Bamboo database settings

The Bamboo database configuration is persisted in the `<Bamboo-Home>/bamboo.cfg.xml` file. You can change the database settings by editing this file, as detailed in the instructions below:

**Changing the Bamboo database username and password.**

If you want to change the database username and password, edit the following line,

```
<property name="hibernate.connection.password">YOUR_PASSWORD</property>
<property name="hibernate.connection.username">YOUR_USERNAME</property>
```

**Changing the Bamboo database URL**

If you want to change the database URL, edit the following line,

```
<property name="hibernate.connection.url">DATABASE_URL</property>
```

⚠️ You need to restart the Bamboo application server for the changes to take effect. If you have any elastic
agents running, ensure that they are shut down before you restart the Bamboo server. If you do not shut down your elastic instances before restarting, they will continue to run and become orphaned from your Bamboo server.

Deploying Multiple Atlassian Applications in a Single Tomcat Container
Deploying multiple Atlassian applications in a single Tomcat container is not supported. We do not test this configuration and upgrading any of the applications (even for point releases) is likely to break it. There are also a number of known issues with this configuration:

- You may not be able to start up all of the applications in the container, due to class conflicts (in 3rd party libraries bundled with our application) that result from the Atlassian applications sharing a single JVM in the Tomcat container.
- You will not be able to determine the startup order of the applications. Hence, you may experience problems such as JIRA starting before Crowd, rather than vice versa.
- Memory problems are also common as one application may allocate all of the memory in the Tomcat JVM to itself, starving the other applications.

We also do not support deploying multiple Atlassian applications to a single Tomcat container for a number of practical reasons. Firstly, you must shut down Tomcat to upgrade any application and secondly, if one application crashes, the other applications running in that Tomcat container will be inaccessible.

Finally, we recommend not deploying any other applications to the same Tomcat container that runs the Atlassian application, especially if these other applications have large memory requirements or require additional libraries in Tomcat's lib subdirectory.

How Bamboo processes task arguments and passes them to OS shell
- Parsing arguments
- Passing arguments to shell
- FAQ
  - I want to pass double quotes with my argument to Unix shell.
  - My Maven Task doesn't work when I specify multiple targets in argument field

**Parsing arguments**

When executing different Tasks, Bamboo attempts to tokenize value entered in Arguments field. The general rules are:

- white characters are argument separators,
- single and double quotes are used to preserve white characters in arguments.

This particular string

```
clean install -DpartiallyQuotedArgument1="Partially Quoted Argument"
'Fully Quoted Argument'
```

would be tokenized as

```
clean
install
-DpartiallyQuotedArgument1="Partially Quoted Argument"
'Fully Quoted Argument'
```

Each line here represents a single argument that will be passed to shell.

**Passing arguments to shell**

Bamboo generally doesn't modify tokenized arguments before passing them to shell with one exception:

- on non-Windows OS arguments that are fully enclosed in single or double quotes will be stripped from those quotes.

This particular string
clean install -DpartiallyQuotedArgument1="Partially Quoted Argument"
'Fully Quoted Argument'

would be passed to Windows shell as

clean
install
-DpartiallyQuotedArgument1="Partially Quoted Argument"
'Fully Quoted Argument'

but to Unix shell as

clean
install
-DpartiallyQuotedArgument1="Partially Quoted Argument"
Fully Quoted Argument

FAQ

I want to pass double quotes with my argument to Unix shell.

Try this

"Only external quotes will be stripped and double quotes will be preserved when passing this to Unix shell"

My Maven Task doesn't work when I specify multiple targets in argument field

Make sure you haven't quoted the whole contents of Arguments field:

"clean install"

You should simply delete quotes

clean install

Securing your repository connection

About this page

This page shows how to secure your bamboo server to source repository connection.

Subversion

svn+ssh

In your build plan you must specify the absolute path to the repository when using svn+ssh, for example svn+ssh://<svnhost>/absolute/path/to/repository/root/your/module

Using a key pair
They key pair is shared between your bamboo agent box (the bamboo server box in case of local agents) and the repository server box. Your repository configuration allows you to specify the location of a private key file that must be stored on the agent box.

The key pair has to be in PKCS12/OpenSSH format and the private key must be passphrase protected, otherwise a runtime exception is thrown by JDK security engine while opening the user key.

**Linux and related**

1. On the repository box generate the keypair

   ```
   ssh-keygen -t rsa
   ```

2. add public key to ~/.ssh/authorized_keys

   ```
   cat id_rsa.pub >> ~/.ssh/authorized_keys
   ```

3. copy the private key to all the agent boxes into a directory that is common to all agents (remote and local) e.g. /var/keys/ssh/id_rsa

   **For windows agents**
   Store the private key file in the same location on the drive that the agent is started from. For example you start your agent with

   ```
   d:\bamboo-agent > java -jar atlassian-bamboo-agent-installer-xxx.jar ....
   ```

   Then the key file must be in d:\var\keys\ssh\id_rsa

**Windows**

Private key should always be in OpenSSH format. On windows usually "putty" (plink) program is used that uses keys in its proprietary format (PPK - putty private key), this format is not supported by bamboo. The PuttyGen program may be used on Windows to convert key in PPK format to OpenSSH.

How to add the public key to the windows version of ~/.ssh/authorized_keys

**Troubleshooting**

You can test the svn+ssh connection from the command line. First you need to tell the svn command line client which key file to use:

```
$ export SVN_SSH="ssh -i /absolute/path/to/private/key"
```

Then you can test the connection with

```
$ svn list svn+ssh://<svn-server>/Absolute/Path/To/Repository/[Module]
```

**Changing the remote agent heartbeat interval**

Remote agents periodically send a "heartbeat" signal to the Bamboo server. This is vital for tracking whether your remote agents are online or offline. The remote heartbeat is asynchronous, which means that if a remote
agent goes offline and comes back online again it will reconnect instead of being shut down (as long as the same server is available).

However, you may wish to adjust the time parameters for the remote agent heartbeat, particularly if you have a lot of network activity already.

There are three configurable parameters on the bamboo server for the remote agent heartbeat:

-  **bamboo.agent.heartbeatInterval=60**
  The frequency of the heartbeat signal from remote agents. The value is in seconds.
  The default value is 5 seconds.

-  **bamboo.agent.heartbeatTimeoutSeconds=600**
  How long the Bamboo server will wait before it times out an agent that it hasn’t received a heartbeat signal from. A remote agent that has been timed out will be marked as 'Offline'. Any builds being run by agents which have timed out will be abandoned. The value is in seconds.
  The default value is 600 seconds.

-  **bamboo.agent.heartbeatCheckInterval=30**
  How often Bamboo checks for agents that have exceeded the heartbeat timeout specified in bamboo.agent.heartbeatTimeoutSeconds. The value is in seconds.
  The default value is 30 seconds.

The parameters above are passed as JVM parameters. We recommend to add these options using the variable JVM_SUPPORT_RECOMMENDED_ARGS defined in the file <Bamboo install directory>/bin/setenv.sh.

See Configuring Bamboo on startup for instructions on how to change a Bamboo system property.

Cloning a Bamboo instance

You can clone an existing Bamboo instance by getting a new Bamboo instance in the same version and using the setup of the existing one.

You may want to transfer a snapshot of your current production Bamboo instance to a test server as permitted in the license agreement.

Cloning Bamboo can be a step in preparation for migrating to another database or for upgrading.

-  If you are using Jira or Crowd for user management, the URL of the Bamboo server may change when you clone the Bamboo instance, in which case you will need to edit that setting for the Bamboo application in Jira/CROWD to match the new URL.
-  When cloning your Bamboo instance using the export/import process, you must re-install all of your apps manually.

License

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Cloning a Bamboo instance to a new server

To clone a Bamboo instance to a new server:

1. **Export/Backup your original Bamboo instance.**
2. **Install the same version** of Bamboo on the new server.

If you are cloning a Bamboo instance on the same server, make sure that the original Bamboo instance doesn’t have the same <bamboo-install> installation path as the new Bamboo instance.

The installation path is referred to as <bamboo-install> and points to the...
3. On the new server, in the new `<bamboo-install>` directory, go to `webapp/WEB-INF/classes/` and open the `bamboo-init.properties` file. In the `bamboo-init.properties` file, set the new `<bamboo-home>` path.

   If you are cloning a Bamboo instance on the same server, make sure that the new Bamboo instance doesn’t have the same `<bamboo-home>` path as the original Bamboo instance.

4. Start the new Bamboo instance and import the existing export/backup data prepared in Step 1.

Alternative cloning scenario

If your current instance has grown too large and export/import does not work, you can still clone your instance by using an alternative backup and restore strategy. The approach is to clone the `<bamboo-home>` content and make it available to the new Bamboo instance:

1. Stop the original Bamboo instance.
2. Create a backup:

<table>
<thead>
<tr>
<th>embedded DB</th>
<th>external DB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compress the original <code>&lt;bamboo-home&gt;</code> directory into a .zip file. The embedded database is included in the directory.</td>
<td>• Compress the original <code>&lt;bamboo-home&gt;</code> directory into a .zip file.</td>
</tr>
<tr>
<td></td>
<td>• Create a database backup with the native tools.</td>
</tr>
</tbody>
</table>

   You can reduce the size of a compressed `<bamboo-production-home>` file by deleting the `<xml-data/build-dir>` directory that contains working copies of the checked-out sources.

For more information about migrating databases, see Moving your Bamboo data to a different database.

3. Restart the original Bamboo instance.
4. Install the same version of Bamboo on the new server.

   If you are cloning a Bamboo instance on the same server, make sure that the new Bamboo instance doesn’t have the same `<bamboo-install>` installation path as the original Bamboo instance.

5. Transfer the compressed original `<bamboo-home>` directory to the new server where you installed the new Bamboo instance.
6. Replace the content of the new `<bamboo-home>` directory with the unzipped `<home-directory>` content.
7. On the new server, in the new `<bamboo-install>` directory, go to `webapp/WEB-INF/classes/` and open the `bamboo-init.properties` file. In the `bamboo-init.properties` file, set the new `<bamboo-home>` path.
8. (External DB only) Create a new database for the cloned instance and import the external database backup.

9. In the new `<bamboo-home>` directory, open:
   - `bamboo.cfg.xml`
   - `xml-data/configuration/administration.xml`

   and change the server names/IP addresses according to the new location.

10. (External DB only) Go to the new `<bamboo-home>` directory, open the `bamboo.cfg.xml` file, and enter the new database connection details and credentials.

Before starting Bamboo, depending on your motivation for cloning, you may also want to ensure any customizations that were made in the previous Bamboo instance’s installation directory are also copied to the clone. Examples of customizations include proxy settings, additional JVM arguments and JVM memory allocation tweaks. These customizations most commonly exist in:

- `<bamboo-install>/bin/setenv.sh`
- `<bamboo-install>/conf/server.xml`

11. Start the new Bamboo instance.

Next steps

- (Optional) You can upgrade the new Bamboo instance.
- If the new server has different locations for:
  - JDKs
  - Ant
  - Maven
  - Perforce
  - Msbuild tools
  adjust the settings in the [server capabilities settings](#) to match the locations on the new server.

**How do I connect Bamboo to an unsupported database**

We **strongly recommend** that you use Bamboo with one of the databases that we support (see [Supported platforms](#) for details). However, if you wish to connect Bamboo to an unsupported database, you can do so using the instructions below.

First, choose one of the following methods by which you will connect to your database:

- Connecting using JDBC
- Connecting using a datasource.

Then follow the instructions for that method. Note that using JDBC is generally simpler, and is therefore the recommended method.

---

**On this page:**

- Connecting using JBDC
  - Connecting using a datasource

**Related pages:**

- Connecting Bamboo to an external database
- Moving your Bamboo data to a different database
- Troubleshooting Databases
To connect Bamboo to an unsupported database, using JDBC:

1. Put the appropriate JDBC driver jar file into your application server's classpath by copying the jar file into the `webapp/WEB-INF/lib` directory.
2. Set the following system property before starting your upgraded Bamboo server to enable "Unsupported Database" as a selectable option in the Setup Wizard:
   ```
   -Dbamboo.enable.unsupported.db=true
   ```
3. At Step 2 of the Bamboo Setup Wizard, choose External Database > Unsupported Database.
4. In the 'Select Database Connection' screen, choose Direct JDBC connection.
5. In the 'Setup JDBC Connection' screen, make the following settings:

   **Driver Class Name**
   The classname of your JDBC driver (consult your JDBC driver documentation for details).

   **Database URL**
   The URL where Bamboo will access your database (consult your JDBC driver documentation for details).

   **UserName**
   The username that Bamboo will use to access your database.

   **Password**
   The password (if required) that Bamboo will use to access your database.

   **Hibernate Dialect**
   The Hibernate dialect for your particular database. Using these databases is not recommended as there is no guarantee that they will operate correctly with Bamboo. Please consider using a supported database instead.

6. Select **Overwrite existing data** if you wish Bamboo to overwrite any tables that already exist in the database.
7. Go to Step 3 of the Setup Wizard.

Connecting using a datasource

To connect Bamboo to an unsupported database, using a datasource:

1. Configure a datasource in your application server (consult your application server documentation for details). For the syntax of the JDBC URL to use, please see your JDBC driver documentation.
2. Set the following system property before starting your upgraded Bamboo server to enable "Unsupported Database" as a selectable option in the Setup Wizard:
   ```
   -Dbamboo.enable.unsupported.db=true
   ```
3. At Step 2 of the Bamboo Setup Wizard, choose External Database > Unsupported Database from the list.
4. In the 'Select Database Connection' screen, select Connect via a datasource (configured in the application server).
5. The 'Setup Datasource Connection' screen is displayed. In the JNDI name field, type the JNDI name of your datasource, as configured in your application server. 
   - If `java:comp/env/jdbc/DataSourceName` doesn't work, try `jdbc/DataSourceName` (and vice versa).
6. Select **Overwrite existing data** if you wish Bamboo to overwrite any tables that already exist in the database.
7. Go to Step 3 of the Setup Wizard.

How do I shut down my elastic instances if I have restarted my Bamboo server

If you restart your Bamboo server without shutting down your elastic instances first, your elastic instances will continue to run. Your elastic instances will also be orphaned from your Bamboo server, and you will not be able to shut them down via Bamboo after your Bamboo server has restarted. You will need to terminate them via the Amazon Web Services (AWS) Console.

To shut down an elastic instance via the AWS Console:

1. Log in to the AWS Console. The 'Amazon EC2' tab of the console should display.
2. Click the **Instances** link under the 'Images & Instances' section of the left navigation column. Your EC2 instances should be displayed.
3. Check the checkbox next to the instances that need to be terminated in the 'My Instances' panel. In most cases, it should be all instances unless you are running Elastic Bamboo on multiple Bamboo servers.
4. The buttons at the top of the 'My Instances' panel should become enabled. Click **Terminate** to terminate your instances.

**Screenshot: Shutting down an elastic instance via the AWS Console**

---

**How do I stop the Bamboo server from automatically configuring my remote agent's capabilities**

The Bamboo server automatically detects and populates the capabilities that a remote agent should be configured with upon agent start up. If you have modified the agent capabilities, they will be reset by the server's automatic capability detection when the agent is next restarted.

You can override this by adding the following flag, "-DDISABLE_AGENT_AUTO_CAPACITY_DETECTION=true", to the Bamboo server. Read [Starting Bamboo](https://confluence.atlassian.com/display/BAMOON/Starting+Bamboo) for information on how to do this.

**JUnit parsing in Bamboo**

Bamboo can parse any test output that conforms to standard JUnit XML format. The implementation of this is pretty simple — Bamboo looks for specific tags in the JUnit XML output.

A failed JUnit XML report, that is successfully parsed by Bamboo:

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<testsuite errors="0" tests="3" time="0.391" failures="1" name="com.atlassian.bamboo.repository.perforce.PerforceSyncCommandTest">  
  <properties>
    <property value="Java(TM) 2 Runtime Environment, Standard Edition" name="java.runtime.name"/>
    <property value="UnicodeBig" name="sun.io.unicode.encoding"/>
  </properties>
  <testcase time="0.001" name="testGeneratesCorrectP4CommandLine"/>
  <testcase time="0.164" name="testUsingPerforceWhenNoFilesHaveChanged">
    <failure type="junit.framework.AssertionFailedError" message="Should not have any errors. [Perforce client error:, Connect to server failed; Check $P4PORT., TCP connect to keg failed., keg: host unknown.] expected:&lt;0&gt; but was:&lt;4&gt; 
    at junit.framework.Assert.fail(Assert.java:47)"
```

---

*Created by Atlassian in 2019 Licensed under a [Creative Commons Attribution 2.5 Australia License](https://creativecommons.org/licenses/by/2.5/au/).*
at junit.framework.Assert.failNotEquals(Assert.java:282)
at junit.framework.Assert.assertEquals(Assert.java:64)
at junit.framework.Assert.assertEquals(Assert.java:201)
at com.atlassian.bamboo.repository.perforce.PerforceSyncCommandTest.testUsingPerforceWhenNoFilesHaveChanged(PerforceSyncCommandTest.java:60)
at sun.reflect.NativeMethodAccessorImpl.invoke0(Native
Method)
at sun.reflect.NativeMethodAccessorImpl.invoke(NativeMethodAccessorImpl.jav
a:39)
at sun.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorIm
pl.java:25)
at java.lang.reflect.Method.invoke(Method.java:585)
at junit.framework.TestCase.runTest(TestCase.java:154)
at junit.framework.TestCase.runBare(TestCase.java:127)
at junit.framework.TestResult$1.protect(TestResult.java:106)
at junit.framework.TestResult.runProtected(TestResult.java:124)
at junit.framework.TestResult.run(TestResult.java:109)
at junit.framework.TestCase.run(TestCase.java:118)
at junit.framework.TestSuite.runTest(TestSuite.java:208)
at junit.framework.TestSuite.run(TestSuite.java:203)
at sun.reflect.GeneratedMethodAccessor17.invoke(Unknown
Source)
at sun.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorIm
pl.java:25)
at java.lang.reflect.Method.invoke(Method.java:585)
at org.apache.maven.surefire.battery.JUnitBattery.executeJUnit(JUnitBattery.java:242)
at org.apache.maven.surefire.battery.JUnitBattery.executeJUnit(JUnitBattery.java:216)
at org.apache.maven.surefire.Surefire.executeBattery(Surefire.java:215)
at org.apache.maven.surefire.Surefire.run(Surefire.java:163)
at org.apache.maven.surefire.Surefire.run(Surefire.java:87)
at sun.reflect.NativeMethodAccessorImpl.invoke0(Native
Method)
at sun.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorIm
pl.java:25)
at java.lang.reflect.Method.invoke(Method.java:585)
at org.apache.maven.surefire.SurefireBoote
r.java:313)
at org.apache.maven.surefire.SurefireBoote
r.java:221)
at org.apache.maven.test.SurefirePlugin.execute(SurefirePlugin.java:371)
org.apache.maven.plugin.DefaultPluginManager.executeMojo(DefaultPluginManager.java:412)
at org.apache.maven.lifecycle.DefaultLifecycleExecutor.executeGoals(DefaultLifecycleExecutor.java:534)
at org.apache.maven.lifecycle.DefaultLifecycleExecutor.executeGoalWithLifecycle(DefaultLifecycleExecutor.java:475)
at org.apache.maven.lifecycle.DefaultLifecycleExecutor.executeGoal(DefaultLifecycleExecutor.java:454)
at org.apache.maven.lifecycle.DefaultLifecycleExecutor.executeGoalAndHandleFailures(DefaultLifecycleExecutor.java:306)
at org.apache.maven.lifecycle.DefaultLifecycleExecutor.executeTaskSegments(DefaultLifecycleExecutor.java:273)
at org.apache.maven.lifecycle.DefaultLifecycleExecutor.execute(DefaultLifecycleExecutor.java:140)
at org.apache.maven.DefaultMaven.doExecute(DefaultMaven.java:322)
at org.apache.maven.DefaultMaven.execute(DefaultMaven.java:115)
at org.apache.maven.cli.MavenCli.main(MavenCli.java:256)
at sun.reflect.NativeMethodAccessorImpl.invoke0(NativeMethodAccessorImpl.java:39)
at sun.reflect.NativeMethodAccessorImpl.invoke(NativeMethodAccessorImpl.java:39)
at sun.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl.java:25)
at java.lang.reflect.Method.invoke(Method.java:585)
at org.codehaus.classworlds.Launcher.launchEnhanced(Launcher.java:315)
at org.codehaus.classworlds.Launcher.launch(Launcher.java:255)
at org.codehaus.classworlds.Launcher.mainWithExitCode(Launcher.java:430)
at org.codehaus.classworlds.Launcher.main(Launcher.java:375)
</failure>
<system-out>
  PerforceSyncCommand.command: /usr/local/bin/p4
</system-out>
Click here to download the XML report.
A passed JUnit XML report, that is successfully parsed by Bamboo.

```xml
<testsuite errors="0" skipped="0" tests="1" time="0.045" failures="0" name="com.atlassian.bamboo.labels.LabelManagerImplTest">
  <properties>
    <property value="Java(TM) 2 Runtime Environment, Standard Edition" name="java.runtime.name"/>
    <property value="/usr/java/jdk1.5.0_07/jre/lib/i386" name="sun.boot.library.path"/>
    <property value="1.5.0_07-b03" name="java.vm.version"/>
    <property value="Sun Microsystems Inc." name="java.vm.vendor"/>
    <property value="http://java.sun.com/" name="java.vendor.url"/>
    <property value=":" name="path.separator"/>
    <property value="Java HotSpot(TM) Client VM" name="java.vm.name"/>
    <property value="sun.io" name="file.encoding.pkg"/>
    <property value="US" name="user.country"/>
    <property value="unknown" name="sun.os.patch.level"/>
    <property value="Java Virtual Machine Specification" name="java.vm.specification.name"/>
    <property value="/opt/bamboo-data/bamboohome/xml-data/build-dir/BAM-MAIN" name="user.dir"/>
    <property value="/opt/bamboo-data/bamboohome/xml-data/build-dir/BAM-MAIN/bamboo-core" name="basedir"/>
  </properties>
</testsuite>
```
<property value="ISO-8859-1" name="file.encoding"/>
<property value="1.5" name="java.specification.version"/>
<property value="bamboo" name="user.name"/>
<property value="/opt/java/tools/maven2/boot/classworlds-1.1.jar" name="java.class.path"/>
<property value="1.0" name="java.vm.specification.version"/>
<property value="32" name="sun.arch.data.model"/>
<property value="/usr/java/jdk1.5.0_07/jre" name="java.home"/>
<property value="Sun Microsystems Inc." name="java.specification.vendor"/>
<property value="en" name="user.language"/>
<property value="mixed mode, sharing" name="java.vm.info"/>
<property value="1.5.0_07" name="java.version"/>
<property value="/usr/java/jdk1.5.0_07/jre/lib/ext" name="java.ext.dirs"/>
<property value="Sun Microsystems Inc." name="java.vendor"/>
<property value="/opt/java/tools/maven2" name="maven.home"/>
<property value="/home/bamboo/.m2/repository" name="localRepository"/>
<property value="/" name="file.separator"/>
<property value="http://java.sun.com/cgi-bin/bugreport.cgi" name="java.vendor.url.bug"/>
<property value="little" name="sun.cpu.endian"/>
<property value="UnicodeLittle" name="sun.io.unicode.encoding"/>
<property value="" name="sun.cpu.isalist"/>
</properties>
Click here to download the XML report.

Click here for the AntXmlResultParser.java file which contains the Bamboo code for parsing JUnit XML output.

For those interested in the XUint XML Schema, please see this document.

**Known issues with CVS in Bamboo**

Bamboo uses CVS `rlog` command - this lets you perform a CVS update on your local working directory without checking out your project.

**CVS Error logging in Bamboo**

Currently, if the server throws an error during a CVS build in Bamboo versions 2.0.x, the application will hang with no indication of any checkout/update problems. There is an [open Jira issue](https://jira.atlassian.com/browse/) tracking this problem.

In order to further debug any CVS issues, you will need to turn up the CVS logging by passing in the `-D cvsClientLog=system` system argument to Bamboo.

1) **Incompatibility with CVS servers 1.11.1 and below**

Support for the `rlog` command 1.11.1p and performing a CVS `rlog` command returns the following error:

```
-cvs [rlog aborted]: server does not support rlog
```

2) **Incompatibility with CVS server version 1.11.x when using "." to denote the root module to be checked out.**

The CVS `rlog` command fails if you are using CVS version 1.11.x, with the following error.

```
INFO   | jvm 1    | 2008/05/15 14:19:10 | E cvs: recurse.c:642: do_recursion: Assertion `strstr (repository, "/./") == ((void *)0)' failed.
INFO   | jvm 1    | 2008/05/15 14:19:10 | error
```

Please upgrade your CVS version to 1.12.x to get around this issue.

3) **CVS Checkout format**

Due to prior issues, Bamboo will checkout all files (including text files) from the CVS server as binary, however post Bamoo 2.1.2 this behavior can be changed via a system parameter. To do this restart Bamboo with the following parameter (if you have any [elastic agents](https://www.atlassian.com/software/elastic) running, ensure that they are shut down before you restart the Bamboo server. If you do not shut down your elastic instances before restarting, they will continue to run and become orphaned from your Bamboo server).

```
-DCVS_CHECKOUT_BINARY_FORMAT=false
```

Post 2.1.5 this has been replaced with a more flexible option

```
-DCVS_CHECKOUT_FORMAT=BINARY
```

<table>
<thead>
<tr>
<th>Option</th>
<th>Command Options</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>-DCVS_CHECKOUT_BINARY_FORMAT=false</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-DCVS_CHECKOUT_FORMAT=BINARY</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Option*  |  *Command Options* |  *Behavior* |
---|---|---|
-DCVS_CHECKOUT_BINARY_FORMAT=false | | |
-DCVS_CHECKOUT_FORMAT=BINARY | | |
### Parameters

Please add the following parameters to Bamboo:

```
-XX:+PrintGCDetails -XX:+PrintGCTimeStamps -verbose:gc
-Xloggc:/path/to/gc.log
```

**Note:** Remember to substitute `/path/to/gc.log` with a meaningful file path on your server.

#### GC log file location

The garbage collection traces and the heap dumps are in `<bamboo-install>/gc.log`.

**Additional Note**

The `-XX:+PrintGCTimeStamps` flag prints when GCs happen relative to the start of the application.

**Some helpful links:**

- [http://www.oracle.com/technetwork/articles/javase/gcportal-136937.html](http://www.oracle.com/technetwork/articles/javase/gcportal-136937.html)

### Moving Bamboo-Home of an agent

To move an agent's Bamboo-Home:

1. Move the Bamboo-Home of the agent to the intended location.
2. Edit the `<Bamboo-Agent-Home>/bamboo-agent.cfg.xml` file, find the following line:
   ```
   ```
3. Point the working directory to the new Bamboo-Home.
4. Start your Agent with `-Dbamboo.home=your_new_agent_home` and point to your new Bamboo-Agent-Home.

### Performing a thread dump

If Bamboo stops responding or is performing poorly, you should create a thread dump to help Atlassian determine the cause of the problem.
This will show the state of each thread in the JVM, including a stack trace and information about what locks that thread is holding and waiting for.

**Linux (and Solaris and other Unixes) Users**

Find the process id of the JVM and issue the command:

Use the `ps` command to get list of all processes.

```
kill -3 <pid>
```

Note: This will not kill your server (so long as you included the "-3" option, no space in between). The thread dump will be printed to Bamboo's standard output.

Please note that some application servers (like tomcat) redirect stdout (to catalina.out for instance).

**Jstack (any Platform with an JAVA JDK)**

Sun JDK 1.5 and above ship with native tool called `jstack` to perform thread dump. To use the tool find the Process ID and execute the command:

```
jstack <ProcessID>
```

When running jstack, please be sure to run it as the same user that runs the process you're targeting for thread dumps.

If you run your Atlassian product via wrapper (as a service) on Windows, you may encounter this error, 'Not enough storage is available to process this command'. See the suggestions in this KB article for workarounds.

**Java VisualVM (any Platform with an JAVA JDK)**

Oracle JDK has a native tool `jvisualvm` to perform thread dumps (and much more). To use the tool execute the command:

```
jvisualvm
```

Find Bamboo process `{{com.atlassian.bamboo.server.Server}}` and execute "Thread Dump" option available from a context menu.

**Thread Dump Tools**

- **Samurai**
- **Thread Dump Analyzer TDA**

**Send Errors to stderr - Script Builder in Visual Studio WinXP to build Solutions Files**

To display an Error Summary for erroneous builds in bamboo build summary is not available for the Script Builder - going through the build logs seems tedious.

There is a section named "Error summary" which collects all errors during the build process that are printed to `stderr`. For example a build script
would print this message into the build summary section. It is up to you to insert the appropriate messages into your build script.

**Problem**

The actual problem is devenv.com/msbuild not being very helpful: both build tools only append to **stdout** stream, even in the case of warnings/errors during the build.

**Solution**

I solved the issue by writing a simple Ruby script that invokes the build tool and filters the stdout stream for any warnings and errors via regexp; the matching warning/error lines are then echoed to **stderr** and Bamboo picks them up nicely.

```bash
#!/bin/bash
echo "ERROR build xyz failed" >&2
```

```
pipe = IO.popen("devenv.com #{$*[0]} /Rebuild ")
errors = 0
warnings = 0
while line = pipe.gets
  if line =~ /^.* : .* error .*$/
    $stderr.puts line
    errors += 1
  elsif line =~ /^.* : warning .*$/
    $stderr.puts line
    warnings += 1
  else
    $stdout.puts line
  end
end
exit errors > 0 ? 1 : 0
```

**Related Pages**

- Knowledge Base - (BSP-1381) Script Builder Display build errors in Error Summary
- Using Bamboo with Clover
  
  Clover is now available as an open source project. Learn more

**Getting Started**

- **One-click Clover Integration**
  
  Clover reports can be activated in the Builder configuration screen. Please see Automatic Clover integration or further details.
To configure Clover activity refer to Clover Reference Guides for your builder:

- Clover for Ant
- Clover for Maven 2

**Classic Clover Integration**

To use Clover with Bamboo, you need to:

1. Integrate Clover with your build and ensure that HTML and XML reports are generated:
   - Clover-for-Ant Installation Guide
   - Clover-for-Maven 2 and 3 Installation Guide
2. Ensure that there are tests present in your build plan that generate test results in JUnit test report format.
3. Configure where Bamboo can find Clover reports:
   - see Enabling the Clover add-on # Manual Clover integration

For further details, please see Configuring tasks.

**Common Problems**

**Q:** I have managed to get Clover statistics displayed in numerical form for each build, but the graphs do not show a history of these statistics?

**A:** The history of Clover is displayed over time periods (e.g. a day, a week, a month), and the minimum data point is per day. The Clover coverage will not display data that is less than a day old.

**Q:** Will the Bamboo/Clover integration run on failed builds?

**A:** Before Bamboo version 1.2.1, Bamboo would only report Clover coverage for successful builds. As of Bamboo 1.2.1, Bamboo will report Clover coverage regardless of the build outcome.

### Getting gcov results in Clover coverage summary

Clover is now available as an open source project. [Learn more](#)

This feature is not officially supported by Atlassian. It is being maintained by open source community, feel free to contribute.

**Description**

Clover does not support code coverage for C/C++. However, it is possible to display C/C++ coverage statistics on "Clover" tab on "Job Summary" and "Plan Summary" pages. In order to get this working:

- create a task in which gcov is used and produces coverage file
- create a task in which python script (see references below) converts gcov data to clover.xml file
- enable Clover on Miscellaneous tab on Job Configuration page
• enable "Use Clover to collect code coverage for this build"
• select option "Clover is already integrated into this build and a clover.xml will be produced."
• enter path to clover.xml file

References
Source code for Python script performing conversion is kept in Mercurial bamboo-gcov-plugin repository on bitbucket.org:

hg clone ssh://hg@bitbucket.org/atlassian/bamboo-gcov-plugin

Discussion about Clover schema on Atlassian Answers:
• https://answers.atlassian.com/questions/68875/clover-xml-schema

Working with Java libraries
Due to licensing restrictions, we are not allowed to re-distribute native Java libraries through our maven2 public repositories.

If you are developing plugins for Bamboo or building Bamboo from source, you might need javax.mail and javax.transaction:jta:jar for Bamboo to build successfully. The relevant POMs for this look something like this:

```
.......  
<dependency>
  <groupId>javax.mail</groupId>
  <artifactId>mail</artifactId>
  <version>1.3.2</version>
  <scope>compile</scope>
</dependency>

<dependency>
  <groupId>jta</groupId>
  <artifactId>jta</artifactId>
  <version>1.0.1</version>
  <scope>compile</scope>
</dependency>
.......  
```

Before building, please install the Oracle JAR's into your local Maven2 repositories by following the instructions below.

To install the javax.mail jar into your local Maven2 repository:

1. Download the javax.mail jar from the Oracle website.
2. Install it on your local machine by entering the following command in a terminal:

   mvn install:install-file -DgroupId=javax.mail -DartifactId=mail
   -Dversion=1.3.3 -Dpackaging=jar -Dfile=YOUR/PATH/TO/FILE

To install javax.transaction:jta:jar into your local Maven2 repository:

1. Download the javax.transaction:jta:jar from the Oracle website.
2. Install it on your local machine by entering the following command in a terminal:
mvn install:install-file -DgroupId=javax.transaction  
-DartifactId=jta -Dversion=1.0.1B -Dpackaging=jar  
-Dfile=/path/to/file

**Bamboo indicates that my Ant or Maven builds failed, even though they were successful**

Please note this Bamboo functionality relates only to the Maven Task and Ant Task outputs.

If your plan's build logs indicate that your Maven or Ant builds are passing but Bamboo is reporting them as failed (or vice-versa), it could be that:

- Bamboo is not finding 'BUILD SUCCESS' in your build logs
- Bamboo is finding 'BUILD FAILED' in your build logs when it should not be doing so. (This marker is not used in Maven.)
- Your builds are returning a non-zero return code. (For example, the build log will indicate `Build process for 'ABC Application - XYZ Build' returned with return code = 1`.)

If your builds produce atypical or non-standard output, you can make Bamboo check for text other than 'BUILD SUCCESS' or 'BUILD FAILED' in your build logs. An additional system property is available to specify how far back in the logs Bamboo checks for these text markers.

<table>
<thead>
<tr>
<th>System Property</th>
<th>Description</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>atlassian.bamboo.builder.</td>
<td>Specifies the text (or string) that Bamboo looks for in the build log to</td>
<td>BUILD SUCCESS</td>
</tr>
<tr>
<td>successMarker</td>
<td>determine if the build was successful</td>
<td></td>
</tr>
<tr>
<td>atlassian.bamboo.builder.</td>
<td>Specifies the text (or string) that Bamboo looks for in the build log to</td>
<td>BUILD FAILED</td>
</tr>
<tr>
<td>failedMarker</td>
<td>determine if the build failed</td>
<td></td>
</tr>
<tr>
<td>SUCCESS_MESSAGE_LINES</td>
<td>Specifies the number of lines from the end of the builder log in which to</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td>check for the values of atlassian.bamboo.builder.successMarker or atlassian.bamboo.builder.failedMarker</td>
<td></td>
</tr>
</tbody>
</table>

For instructions on how to configure a system property, please refer to the *Starting Bamboo* page.

**Raising a request with Atlassian Support**

If you encounter any problems when setting up or using Bamboo, please let us know — we’re here to help!

You may want to search the following first:

- the [Atlassian Answers site](https://answers.atlassian.com) (the Bamboo forum), where Atlassian staff and Bamboo users can answer your questions.

If you've found a bug in Bamboo, or want to request a feature or improvement, raise a ticket in the Bamboo project of our public issue tracker. Try searching for similar issues - voting for an existing issue is quicker, and avoids duplicates.

If you still need assistance, please raise a support request, either from within Bamboo or on the Atlassian Support site, as described in the following sections.

*Providing as much information as possible about your Bamboo installation with your initial request will help our Support Engineers to give you a faster and more complete response.*
On this page:
- Raising a Support Request from within Bamboo
- Raising a Support request yourself at Atlassian Support
- Information you should provide

Raising a Support Request from within Bamboo

This method depends on having a mail server configured for Bamboo that supports large zip file attachments.

1. Log in to Bamboo (as a System Administrator) and go to the admin area.
2. Click Atlassian Support Tools (under ‘System’) then Support Request.
3. Provide as much information as possible in the Description, including steps to replicate the problem, and any error messages that are appearing on the console or in the logs. For performance issues, please include profiling logs. See the section below about information you should provide.
4. Click Send.

This will produce a zip file containing the information categories selected from the list and will email this to Atlassian Support. You will receive an email advising you of details of the Support Request that was automatically created, and you will receive emailed updates about progress on your issue. You can also see the status of your request directly by visiting the Atlassian Support System.

Raising a Support request yourself at Atlassian Support

1. Log in to Bamboo (as a System Administrator) and go to the admin area.
2. Click Atlassian Support Tools (under ‘System’) then Support Zip.
3. Select information categories to include in the zip file.
4. Click Create.

The zip file is created in the home directory of the Bamboo server, for example <Bamboo_HOME>\export\Bamboo_support_2013-11-17-20-49-18.zip.

When you now go to Atlassian Support and create a Support Request, you can attach the Support Zip file to the request.

Please provide as much information as possible in the request, including steps to replicate the problem, and any error messages that are appearing on the console or in the logs. For performance issues, please include profiling logs. See the section below about information you should provide.

Information you should provide

In addition to the logs and configuration information that you can include in the Support Request zip file, the following information can help to give you a faster response:

Environment details
- Bamboo version
- Java version (for example OpenJDK 1.7.0 JDK)
- Operating system (for example, Windows 7, Mac OS X 10.6.8)
- Database type (for example, MySQL) and version
- Browsers and versions
- Network topology - is Bamboo running behind a reverse proxy? Is that secured using HTTPS (SSL)?

Configuration
- Java settings, including JVM_MINIMUM_MEMORY, JVM_MAXIMUM_MEMORY

Logs
You may need to adjust the logging level, or enable profiling in Bamboo, in order to get more detailed logs. See Bamboo debug logging.
• Debug logs – Bamboo debug logs can be found in `<Bamboo_HOME>/log`.
• Profiling logs – Bamboo profiling logs can help with analyzing performance issues and can be found in `<Bamboo_HOME>/log`.

**Performance factors**

- Number of users
- CPU spec, number of cores, whether hyperthreading is enabled
- RAM and cache sizes

**Integrations**

- Other Atlassian applications (and their versions)
- Which build servers are integrated with Bamboo, if any?
- Are Application Links configured?

**Support Policies**

Welcome to the support policies index page. Here, you'll find information about how Atlassian Support can help you and how to get in touch with our helpful support engineers. Please choose the relevant page below to find out more.

- [Bamboo Support Policy](#)
- [New Features Policy](#)
- [Finding Your Bamboo Support Entitlement Number (SEN)](#)

To request support from Atlassian, please raise a support issue in our online support system. To do this, visit [support.atlassian.com](http://support.atlassian.com), log in (creating an account if need be) and create an issue under Bamboo. Our friendly support engineers will get right back to you with an answer.

**Bamboo Support Policy**

This page contains details about the scope of Bamboo Support.

**On this page:**

- [Build Failures](#)
- [Distributed Builds](#)
- [EC2](#)
- [Plugins](#)

**Build Failures**

Atlassian will provide [Troubleshooting Guide(s)](#) and documentation to help customers resolve Bamboo-related issues.

Ultimately, users are responsible for the administration and maintenance of their build systems and infrastructure.

However, if the root cause of the problem is partially or wholly related to Bamboo, we will create a Bug Report or Feature request to address the issue.

Any bug or feature request reported during the course of investigation is subject to Atlassian's [Bug Fixing](#) and [New Features](#) Policies, as outlined in the [Atlassian Support Offerings](#) document.

**Distributed Builds**

The pre-requisites outlined in the Technical Overview section of [Troubleshooting Guide](#) must be met for server/agent communication to work.

If Atlassian determines that a customer's agent connectivity or communication problem results from a network or environmental factor, it is the customer's responsibility to address this problem and keep their network maintained.

**EC2**
Atlassian does not support custom elastic images (custom AMIs) and recommends using an EBS volume to customize your image if desired. While we are happy to assist with issues related to the elastic agent, we cannot help troubleshoot modifications to the Stock images which are not directly related to Bamboo functionality.

Plugins

Atlassian offers support for certain third party plugins as listed in our supported plugins list. For unsupported plugins, issues should be raised with the provider of the plugin.

The following can be classified as being third-party plugins:

- Integration with repositories other than Subversion, CVS and Perforce.
- Third party builders, test and code coverage tools other than what is shipped with Bamboo.

Each plugin’s supported status is listed on its page in the Plugin Exchange.

New Features Policy

Summary

- We don’t publish roadmaps with specific release dates.
- Suggested features and improvements are tracked in our public issue tracking system https://jira.atlassian.com/. We encourage and display comments from customers.
- Our product managers review the most popular issues on a regular basis.
- New features are selected and scheduled based on a number of factors, not just popularity.
- We provide consistent updates on the top 20 issues.

This policy does not apply to bugs. See our Server Bug Fix Policy to learn about our approach to bug fixing.

How to track when features are implemented

Cloud products

We’re continuously improving and updating our Cloud products. To see the latest changes, take a look at the Atlassian Cloud release notes blog.

Server and Data Center products

When a new feature or improvement is scheduled, we’ll update the fix version on the relevant Jira issue to indicate the earliest product version that will include the change. This update often happens close to the product release date. While we have roadmaps for future releases, we don’t make these public.

For a summary of changes, see the release notes for your product:

- Jira Software | Jira Service Desk | Jira platform | Portfolio for Jira
- Confluence | Questions for Confluence | Team Calendars for Confluence
- Bitbucket | Bamboo | Fisheye | Crucible

How we choose what to implement

When we plan a release, we use many factors to help decide which suggestions to implement, including:

- **Customer feedback** - there are many ways we listen for your feedback:
  - formal customer interviews and other research activities
  - events like Atlassian Summit, developer conferences, and road shows
  - in-product feedback from evaluation and EAP (early access program) releases
  - comments and votes on issues in https://jira.atlassian.com/, our public issue tracker
  - questions and posts on Atlassian Community.

- **Support team insights** - our support team know which issues are the most challenging, and most common for customers.

- **Solution partner insights** - our solution partners help us better understand real-world customer deployments, especially for customers at scale.

- **Product analytics** - some customers opt-in to send us analytics, which helps us understand how existing
features are being used.

- **Product strategy** - our long-term strategic vision for the product.

**Our features workflow**

We use the *Suggestion* issue type for improvements and feature requests.

We have standardized our workflow statuses across Server and Data Center products to make it easy for you to see where an issue is at. Here's the current workflow, and a description of each status:

<table>
<thead>
<tr>
<th>Workflow status</th>
<th>Definition</th>
<th>Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gathering interest</td>
<td>This issue is waiting to gather more customer interest, before being reviewed by a member of the Atlassian product team.</td>
<td>Prioritization</td>
</tr>
<tr>
<td>Reviewing</td>
<td>This issue is being investigated in-depth by a member of the Atlassian product team.</td>
<td></td>
</tr>
<tr>
<td>Under consideration</td>
<td>This issue is a strong candidate for our roadmap. We'll follow up on it in a few months time.</td>
<td></td>
</tr>
<tr>
<td>Future consideration</td>
<td>This issue is a potential candidate for our long term roadmap. We won't work on it in the short term, but will review it again within a year.</td>
<td></td>
</tr>
<tr>
<td>Not Being Considered</td>
<td>We appreciate the merit of this issue, but don't intend to work it in the foreseeable future. We'll review it again within a year to see if our decision has changed.</td>
<td></td>
</tr>
<tr>
<td>In progress</td>
<td>The development team is currently working on this issue.</td>
<td>Implementation</td>
</tr>
<tr>
<td>Waiting for release</td>
<td>The change has been implemented and is waiting to be shipped in a release. The Fix Version field will indicate the product version that will contain the change.</td>
<td>Closure</td>
</tr>
</tbody>
</table>
Resolved | Work on this issue is complete. If the change has been implemented, the resolution will be 'Fixed' and the Fix Version field will indicate the product version that contains the change. If we don't intend to implement this change, the resolution will be 'Won't fix', 'Duplicate', 'Timed out', or similar.

For a product manager's perspective on this workflow, see An updated workflow for Server feature suggestions on Atlassian Community.

How to get new features and improvements

To get access to new features and improvements, you will need to upgrade to a release that contains the change.

Release terminology

To make understanding our bug fix policy easier, here's some definitions.

- **Platform release** (4.0) contains significant or breaking changes. For example changes or removal of existing APIs, significant changes to the user experience, or removal or a major feature.
- **Feature release** (4.6) can contain new features, changes to existing features, changes to supported platforms (such as databases, operating systems, Git versions), or removal of features. These were previously referred to as 'major' releases by most products.
- **Bug fix release** (4.6.2) can contain bug fixes, stability and performance improvements. Depending on the nature of the bug fixes they may introduce minor changes to existing features, but do not include new features or high risk changes, so can be adopted quickly. We recommend regularly upgrading to the latest bug fix release for your current version. These were previously referred to as 'maintenance' releases by most products.

In addition to the three main release types, a feature release can also be designated an **Enterprise release**, which means it will receive bug fixes for a longer period of time than a standard feature release.

Enterprise releases

Enterprise releases are for Server and Data Center customers who prefer to allow more time to prepare for upgrades to new feature versions, but still need to receive critical bug fixes. If you only upgrade to a new feature version about once a year, an Enterprise release may be a good fit for your organisation. For Jira Software and Confluence we will:

- Designate a feature release as an Enterprise release, at least every 12 months.
- Backport critical security fixes, as outlined in our current security bug fix policy, and fixes relating to stability, data integrity or critical performance issues.
- Make bug fix releases available for the designated version until it reaches end of life.
- Provide a change log of all changes between one Enterprise release and the next to make upgrading easier.

Not all bug fixes will be backported. We'll target the bugs and regressions that we deem most critical, focusing on stability, data integrity, or performance issues. There may also be some fixes that we choose not to backport due to risk, complexity or because the fix requires changes to an API, code used by third party apps (also known as add-ons), or infrastructure that we would usually reserve for a platform release.

For Jira Software Data Center customers, we'll endeavour to allow zero downtime upgrades between one Enterprise release and the next Enterprise release, but can't guarantee that down time will not be required, depending on the nature of the changes. The change log will indicate if zero downtime upgrade will be available.

In the example below, version 4.2 has been designated an Enterprise release. The number of bug fix releases and timing illustrated below is just an example, your product's release cadence may differ.
Further reading

See Atlassian Support Offerings for more support-related information.

Finding Your Bamboo Support Entitlement Number (SEN)

Your Support Entitlement Number (SEN) is required when raising a support request in our Support system: https://support.atlassian.com.

See How to find your Support Entitlement Number (SEN) in the Support space for more general information about how Atlassian Support uses this number.

The three ways of finding your SEN are described below.

**On this page:**
- Method 1 — Check the Bamboo Administration Interface
- Method 2 — Check my.atlassian.com
- Method 3 — Check your Atlassian Invoice

Method 1 — Check the Bamboo Administration Interface

**To find your SEN in the Bamboo administration interface:**

1. Click the icon in the Bamboo header and choose **Overview**.
2. Click **License Details** in the left navigation panel (under ‘System’). The SEN is shown, as in the screenshot below:
Method 2 — Check my.atlassian.com

To find your SEN via my.atlassian.com:

1. Log into my.atlassian.com as the Account Holder or Technical Contact for your Bamboo product.
2. The SEN will be shown, as per the screenshot below:
Method 3 — Check your Atlassian Invoice

Your Support Entitlement Number (SEN) appears on the third page of your Atlassian Invoice.

**Bamboo resources**

*Resources for Evaluators*
- Free Trial
- Feature Tour

*Resources for Administrators*
- Bamboo forum at Atlassian Answers
- Bamboo Knowledge Base
- Bamboo FAQ
- Guide to Installing an Atlassian Integrated Suite
- The big list of Atlassian gadgets

*Resources for Developers*
- Bamboo Developer Documentation
- API documentation
- Developer topics on Atlassian Answers

*Downloadable Documentation*
- Bamboo documentation in PDF, HTML or XML formats

*Plugins*
- Atlassian Marketplace

*IDE Connectors*
- Use the Atlassian Connector for Eclipse or the Atlassian Connector for IntelliJ IDEA to work with your Bamboo builds right there in your development environment. Do you use Jira, Crucible or Fisheye too? With the connector you can manage your issues and code reviews within your IDE, or move quickly between the IDE and a Fisheye view of your source repository. **Hint:** The Atlassian IDE Connectors are free.

*Support*
- Atlassian Support
- Support Policies

*Training*
- Atlassian Training

*Forums*
- Bamboo forum at Atlassian Answers
- Bamboo developers forum

*Mailing Lists*
- Visit [http://my.atlassian.com](http://my.atlassian.com) to sign up for mailing lists relating to Atlassian products, such as technical alerts, product announcements and developer updates.

*Feature Requests*
- Issue Tracker and Feature Requests for Bamboo

*Glossary*
activity log
Every plan has an activity log. An activity log is a temporary display of the latest output from the plan's most recent build log.

agent
A Bamboo agent is a service that can run job builds. There are the following types of Bamboo agents:

- **local agents** run as part of the Bamboo server.
- **remote agents** run on computers, other than the Bamboo server, that run the remote agent tool.
- **elastic agents** run in the Amazon Elastic Compute Cloud (EC2).

Local agents run in the Bamboo server's process, i.e. in the same JVM as the server. Each remote agent runs in its own process, i.e. has its own JVM.

Each agent has a defined set of capabilities and can only run builds for jobs whose requirements match the agent's capabilities.

agent-specific capability
An agent-specific capability is a capability that applies to one agent only. Note that the value of an agent-specific capability will override the value of a shared capability of the same name (if one exists).

See
Agents and capabilities and
Configuring capabilities for more information.

artifact
Artifacts are files created by a job build (e.g. JAR files). Artifact definitions are used to specify which artifacts to keep from a build and are configured for individual jobs.

See Sharing artifacts.

authors in Bamboo
An author is any person who checks in code to a repository that is associated with a Bamboo plan. An author need not be a Bamboo user.

See Generating reports on selected authors.

build
A build is the execution of either a plan or a job. The execution of a plan is referred to as a 'plan build' and that of a job is a 'job build'.

build activity
**Build activity** is the number of builds that occur in a given period of time.

**build duration**
Build duration is the total time taken to execute a plan - from the time the plan is dispatched till the plan is finished and the build results are processed.

Variations in a plan's build duration can be over time.

**build log**
Every build has a build log. A build log is a permanent record of all the output generated by compiling the job's source-code and executing the tests.

**build queue**
The Bamboo build queue controls the sequence of builds. When a plan submits a build to the build queue, the build will wait in the build queue until a suitable agent is available to run the build.

The build queue is displayed on the Build Activity tab of the Dashboard.

**build result**
Every completed build has a build result:

- 'Successful' — the code compiled, with or without errors, and all tests completed successfully.
- 'Failed' — either the code did not compile, or at least one test failed.
- 'Incomplete' — the build was not completed, e.g. it may have been stopped manually.

Additionally,

- if the build result is 'Failed', and the previous build result was 'Successful', the build is said to be 'Broken'.
- if the build result is 'Successful', and the previous build result was 'Failed', the build is said to be 'Fixed'.

**build telemetry**
Build telemetry is the insight provided by Bamboo's dynamic reports, charts and collation of build metrics. Build telemetry helps identify trends across build plans and across authors — not just focusing on the results of a single build.

**capability**
A capability is a feature of an agent. A capability can be defined on an agent for:

- an executable (e.g. Maven)
- a JDK
- a Version Control System client application (e.g. Git)
- a custom capability. This is a key-value property which defines a particular characteristic of an agent (e.g. 'operating.system=WindowsXP' or 'fast.builds=true').

Capabilities typically define the path to an executable that has already been installed, and must be defined in Bamboo before Bamboo or its agents can make use of those.

Capabilities can be defined specifically for an agent, or they can be shared between either all local agents or all remote agents. Note that the value of an agent-specific capability overrides the value of a shared capability of the same name (if one exists).

See Configuring capabilities for more information.

**child**
A child is a plan which gets triggered when another plan completes a build. See Setting up plan build dependencies.

**committer**
A committer is the Bamboo user(s) who committed code to a particular build (i.e. someone who committed code after the previous build was checked out by Bamboo).
Administrators can configure a plan’s notifications to be sent to the build’s committer(s).

**custom capability**

Custom capabilities can be used to control which jobs will be built by a particular agent, since agent capabilities are required to match job requirements. For example, if the builds for a particular job should only run in a Windows environment, you could create a custom capability `operating.system=WindowsXP` for the appropriate agent(s), and specify it as a requirement for this job.

- To create a new custom capability in your Bamboo system, see Defining a new custom capability.
- To specify a job’s requirement for a custom capability, see Configuring a job’s requirements.

**default repository**

The first repository in the list of plan repositories is the Plan’s Default Repository. The default repository will be automatically checked out by any new job created.

Repository specific Plan Variables, such as `repository.revision.number`, will point to the default repository of a Plan. To address a specific repository, you must add the name of the repository to the end of the variable as follows: `repository.revision.number.product_core`.

---

**elastic agent**

An elastic agent is an agent that runs in the Amazon Elastic Compute Cloud (EC2). An elastic agent process runs in an elastic instance of an elastic image. An elastic agent inherits its capabilities from the elastic image that it was created from.

**elastic Bamboo**

Elastic Bamboo allows you to use computing resources from the Amazon Elastic Compute Cloud (EC2) to run builds. Elastic Bamboo uses a remote agent AMI (Amazon Machine Image) to create instances of remote agents in the Amazon EC2.

**elastic block store**

The Amazon Elastic Block Store (EBS) provides ‘EBS volumes’ which can attach to EC2 instances. EBS volumes (and the ‘EBS snapshots’ created from these volumes) provide persistent storage for your elastic instances.

If you have relatively static resources required for building your Bamboo jobs (such as, source code checkouts and Maven repository artifacts), you can add these to an EBS volume. From this volume, you can create an EBS snapshot, which effectively records the ‘state’ of an EBS volume at a given point in time.

**elastic image**

An elastic image is an Amazon Machine Image (AMI) that is stored in one of Amazon data centers for use with the Elastic Bamboo feature. An elastic image is used to create elastic instances, which in turn create elastic agents. Conceptually, an elastic image is equivalent to an operating system running on a computer’s boot hard drive and elastic instances would be the software that runs on this operation system.

Each elastic image registered with the Amazon Web Services (AWS) has its own unique identifier, known as an AMI ID.

You can associate multiple elastic images with a Bamboo server. One default shared image is maintained by Atlassian in AWS, and is available to all Elastic Bamboo users.
You can also create your own custom elastic images.

**elastic instance**

An *elastic instance* is a running instance of an *elastic image*. One elastic instance is created whenever an elastic image is started. Hence, starting one elastic image multiple times, results in the creation of multiple elastic instances. Each time an elastic instance is created, one *elastic agent* is created on that instance.

Conceptually, an elastic instance can be thought of as a computer. The elastic agent's processes are run on this computer and the elastic image is the boot hard drive. Unlike computers, however, elastic instances are temporary and stateless. When an elastic instance is shut down:

- Any changes that an elastic instance makes to the boot hard drive (e.g. agent log file) will not persist.
- Any customizations to the instance itself will also be lost.

The Amazon Elastic Block Store can provide persistent storage for your elastic instances.

**executable**

An *executable* is an external program that Bamboo uses during the build process. Generally, executables compile source code to generate compiled executable files (referred to as *artifacts* in Bamboo). Ant, Maven, MS Build or PHPUnit are just some examples of executables that can be used as part of your build process.

New executables can be defined as *capabilities* in Bamboo. Once an executable has been defined in Bamboo, it can be configured as part of a *task*.

See Defining a new executable capability.

**favorites**

Each Bamboo user can nominate their *favorite* plans — that is, the plans they work with the most.

Each user's favorites are displayed on the 'My' page of the Dashboard. Bamboo administrators can also configure each plan to send *build result notifications* to users who have nominated the plan as one of their favorites (these users are known as the plan's 'watchers').

**global permission**

A *global permission* is the ability to perform a particular operation in relation to Bamboo as a whole. See Granting global permissions to users or groups.

See also plan permission.

**job**

A Bamboo *job* is a single build unit within a *plan*. One or more jobs can be organized into one or more *stages*. The jobs in a stage can all be run at the same time, if enough Bamboo agents are available. A job is made up of one or more *tasks*.

A job:

- Processes a series of one or more *tasks* that are run *sequentially* on the same agent.
- Controls the order in which tasks are performed.
- Collects the requirements of individual tasks in the job, so that these requirements can be matched with agent capabilities.
- Defines the *artifacts* that the build will produce.
- Can only use artifacts produced in a previous stage.
- Specifies any *labels* with which the build result or build artifacts will be tagged.

Each new plan created in Bamboo contains at least one job known as the 'Default Job'.

Projects and plans can only be configured by Bamboo administrators (see Creating a plan).

**label**

A *label* is a convenient way to tag and group *build results* that are logically related to each other. Labels can also be used to define RSS feeds.

Labels can be applied to build results automatically, by specifying the label(s) in a plan (note that only Bamboo administrators can do this). Labels can also be applied to build results manually by Bamboo users.

**local agent**

See agent.
parent

A **parent** is a **plan** which triggers another plan to build whenever it completes a build. See Setting up plan build dependencies.

permission

See **plan permission** and **global permission**.

plan

A **plan** defines everything about your continuous integration build process in Bamboo.

A plan:

- Has a single **stage**, by default, but can be used to group **jobs** into multiple stages.
- Processes a series of one or more stages that are run **sequentially** using the **same** repository.
- Specifies the default repository.
- Specifies how the build is **triggered**, and the triggering dependencies between the plan and other plans in the project.
- Specifies **notifications** of **build results**.
- Specifies who has **permission** to view and configure the plan and its jobs.
- Provides for the definition of **plan variables**.

Every plan belongs to a **project**.

Projects and plans can only be configured by Bamboo administrators (see Creating a plan).

plan permission

A **plan permission** is the ability to perform a particular operation on a **plan** and its **jobs**. For each plan, different permissions can be granted to particular groups and/or users.

See Configuring a plan's permissions and Granting plan permissions in bulk.

See also **global permission**.

projects in Bamboo

A **project** is a collection of **plans**. Projects enable you to easily group and identify plans which are logically related to each other. They are especially useful when generating **reports** across multiple plans. For example, you can control access to your projects easily by using project-level permissions.

A project:

- Has none, one, or more, **plans**.
- Provides **reporting** (using the wallboard, for example) across all plans in the project.
- Provides links to other applications.
- Allows setting up permissions for all the plans it contains

Projects are created from the create plan screen. Select New Project from the project dropdown when creating a new plan.

If you're using repository-stored specs in Bamboo, you can define which repositories may have access to your projects.

queue

See **build queue**.

reason

A build's **reason** is the way in which the build was triggered.

Triggering in Bamboo allows plan builds to be started automatically. Bamboo has the following trigger methods:

- **Polling the repository for changes** — Bamboo polls the source repository for changes, either periodically or according to a schedule. This ensures that a plan build only runs when code has changed in the plan's source repository.
- **Repository triggers the build when changes are committed** — Requires that your source repository is
configured to fire an event to Bamboo. This has the advantage of placing minimal load on your Bamboo server.

- **Cron-based scheduling** — Builds are run according to a schedule, regardless of whether any code changes have occurred. This can allow a team to structure the day according to a predictable schedule.

- **Single daily build** — The build is run at a specified time every day.

For more information, see Triggering builds.

remote agent

See agent.

See also the Bamboo remote agent installation guide.

remote agent supervisor

A remote agent supervisor is an application that is installed alongside a Bamboo remote agent, by default. The remote agent supervisor is an implementation of the Java Service Wrapper.

The remote agent supervisor monitors remote agents on the machine that it is installed on. If any remote agent crashes, the remote agent supervisor will automatically attempt to restart it. If communications are lost with the Bamboo server, the remote agent will shut itself down and wait for the remote agent supervisor to restart it.

The remote agent supervisor will run on the following operating systems:

- **Linux:**
  - x86
  - x86_64
  - IA64
  - PPC 64 bit (but not 32 bit)

- **Mac OSX:**
  - all architectures

- **Solaris:**
  - x86
  - x86_64 (running in 32 bit mode)
  - IA64 (running in 32 bit mode)
  - SPARC (both 32 bit and 64 bit)

- **Windows:**
  - 32 bit
  - 64 bit

requirement

A requirement is specified in a job or a task. A requirement specifies a capability that an agent must have for it to build that job or task. A job inherits all of the requirements specified in its tasks.

Together, capabilities and requirements control which agents can execute builds for particular jobs. Each job can only be built by agents whose capabilities match the job's requirements. See Configuring a job's requirements for more information.

shared capability

Shared capabilities are inherited by all applicable agents, that is, (shared) local server capabilities are inherited by all local agents, and shared remote capabilities are inherited by all remote agents. Note, however, that the value of a shared capability will be overridden by the value of an agent-specific capability of the same name (if one exists).

See:

Agents and capabilities and
Configuring capabilities.

Stage

Stages group (or 'map') jobs to individual steps within a plan’s build process. For example, you may have an overall build process plan that comprises a compilation step, followed by several test steps, followed by a deployment step. You can create separate Bamboo stages to represent each of these steps.

A stage:

- By default has a single job but can be used to group multiple jobs.
- Processes its jobs in parallel, on multiple agents (where available).
- Must successfully complete all its jobs before the next stage in the plan can be processed.
- May produce artifacts that can be made available for use by a subsequent stage.

Each new plan created in Bamboo contains at least one stage (for the default job) and is known as the 'Default Stage'. Stages can only be configured by Bamboo administrators.

Stock images

This page describes the latest available stock elastic images. The previously released elastic images are still available.

For more information about how to get a list of stock images available for your Bamboo version, see View the list of Bamboo stock images.

Atlassian maintains public ‘default’ elastic images, which are currently available as follows:

<table>
<thead>
<tr>
<th>Operating system</th>
<th>AWS availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ubuntu</td>
<td>All regions</td>
</tr>
<tr>
<td>Windows 2012</td>
<td>All regions</td>
</tr>
<tr>
<td>Amazon Linux</td>
<td>US East region</td>
</tr>
</tbody>
</table>

All stock images in Bamboo use Java 8 for the system Java.

Bamboo’s Elastic Bamboo feature uses these images by default. In your list of elastic image configurations, an image will have '(stock image)' appended to its name.

On this page:

- Amazon Linux/Ubuntu stock image
- Windows stock image
- Notes

Amazon Linux/Ubuntu stock image

The stock images available for Bamboo contain one of the following operating systems:

- Amazon Linux
- Ubuntu

as well as the Bamboo elastic agent.

The images have the following default packages and capabilities:

<table>
<thead>
<tr>
<th>Default packages/capabilities</th>
<th>Path/value</th>
</tr>
</thead>
</table>

Created by Atlassian in 2019 Licensed under a Creative Commons Attribution 2.5 Australia License.
<table>
<thead>
<tr>
<th>Builders</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ant 1.9</td>
<td>/opt/ant-1.9</td>
</tr>
<tr>
<td>Ant 1.10</td>
<td>/opt/ant-1.10</td>
</tr>
<tr>
<td>Grails 2.4</td>
<td>/opt/grails-2.4</td>
</tr>
<tr>
<td>Grails 3.2</td>
<td>/opt/grails-3.2</td>
</tr>
<tr>
<td>Grails 3.3</td>
<td>/opt/grails-3.3</td>
</tr>
<tr>
<td>Maven 2.0</td>
<td>/opt/maven-2.0</td>
</tr>
<tr>
<td>Maven 2.1</td>
<td>/opt/maven-2.1</td>
</tr>
<tr>
<td>Maven 2.2</td>
<td>/opt/maven-2.2</td>
</tr>
<tr>
<td>Maven 3.2</td>
<td>/opt/maven-3.2</td>
</tr>
<tr>
<td>Maven 3.3</td>
<td>/opt/maven-3.3</td>
</tr>
<tr>
<td>Maven 3.5</td>
<td>/opt/maven-3.5</td>
</tr>
<tr>
<td>Maven 3.6</td>
<td>/opt/maven-3.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JDKs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>JDK 5</td>
<td>/opt/jdk-5</td>
</tr>
<tr>
<td>JDK 6</td>
<td>/opt/jdk-6</td>
</tr>
<tr>
<td>JDK 7</td>
<td>/opt/jdk-7</td>
</tr>
<tr>
<td>JDK 8</td>
<td>/opt/jdk-8</td>
</tr>
<tr>
<td>JDK 9</td>
<td>/opt/jdk-9</td>
</tr>
<tr>
<td>JDK 10</td>
<td>/opt/jdk-10</td>
</tr>
<tr>
<td>JDK 11</td>
<td>/opt/jdk-11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AWS CLI</td>
<td></td>
</tr>
<tr>
<td>Bash (Command)</td>
<td>/bin/bash</td>
</tr>
<tr>
<td>Docker</td>
<td>/usr/bin/docker</td>
</tr>
</tbody>
</table>

The latest version supplied with your Linux distribution, might be different for Amazon, Linux, and Ubuntu.
### Windows stock image

The Windows stock image is built from:

- the Windows Server 2012 R2 Standard 64-bit operating system, with all updates applied.
- the Bamboo elastic agent.

Note that:

- the elastic agents now run on Java JDK 8.
- the image now uses Git for Windows and its SSH.
- support for MSBuild 2.0 and 3.5 has been removed.

The Windows stock image has the following default packages and capabilities:

<table>
<thead>
<tr>
<th>Default packages/capabilities</th>
<th>Path/value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Builders</strong></td>
<td></td>
</tr>
<tr>
<td>Ant 1.9</td>
<td>C:\opt\ant-1.9</td>
</tr>
<tr>
<td>Ant 1.10</td>
<td>C:\opt\ant-1.10</td>
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<td>C:\opt\grails-2.4</td>
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<tr>
<td>Grails 3.3</td>
<td>C:\opt\grails-3.3</td>
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<td>Maven 2.0</td>
<td>C:\opt\maven-2.0</td>
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<tr>
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<td>C:\opt\maven-3.3</td>
</tr>
<tr>
<td>Maven 3.5</td>
<td>C:\opt\maven-3.5</td>
</tr>
<tr>
<td>Maven 3.6</td>
<td>C:\opt\maven-3.6</td>
</tr>
<tr>
<td>MSBuild 4.0 (32bit)</td>
<td>C:\Windows\Microsoft.NET\Framework\v4.0.30319\MSBuild.exe</td>
</tr>
<tr>
<td>MSBuild 4.0 (64bit)</td>
<td>C:\Windows\Microsoft.NET\Framework64\v4.0.30319\MSBuild.exe</td>
</tr>
</tbody>
</table>
Notes

Be aware that the default packages and capabilities listed above may change with each major release of Bamboo. There is a new default image (with its own AMI ID) for each new version of Bamboo. However, older default images will still be available for use.

A task:

- Is a small discrete unit of work, such as source code checkout, executing a Maven goal, running a script, or parsing test results.
- Is run sequentially within a job on a Bamboo working directory.

Tasks may make use of an executable if required. Tasks are configured within the scope of a job. A job can be configured to execute a number of tasks, on the same working directory. For example, before executing a Maven goal, the user could substitute specific files within the working directory, substitute version numbers, check out source repositories, or execute a script.

Final tasks for a job are always executed, even if previous tasks in the job failed.
Triggering in Bamboo allows plan builds to be started automatically. Bamboo has the following trigger methods:

- **Polling the repository for changes** — Bamboo polls the source repository for changes, either periodically or according to a schedule. This ensures that a plan build only runs when code has changed in the plan's source repository.
- **Repository triggers the build when changes are committed** — Requires that your source repository is configured to fire an event to Bamboo. This has the advantage of placing minimal load on your Bamboo server.
- **Cron-based scheduling** — Builds are run according to a schedule, regardless of whether any code changes have occurred. This can allow a team to structure the day according to a predictable schedule.
- **Single daily build** — The build is run at a specified time every day.

For more information, see [Triggering builds](#).

**watcher**

A plan's [*watchers*](#) are the Bamboo users who have marked this plan as one of their [*favorites*](#). Administrators can configure a plan's [*notifications*](#) to be sent to the plan's watchers.

**Contributing to the Bamboo documentation**

Would you like to share your Bamboo hints, tips and techniques with us and with other Bamboo users? We welcome your contributions.

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### On this page:

- Blogging your technical tips and guides
- Contributing documentation in other languages
- Updating the documentation Itself
  - Getting permission to update the documentation
  - Our style guide
  - How we manage community updates

### Related pages:

- Author Guidelines
- Atlassian Contributor License Agreement

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**Unpacking large .ZIP archives**

We noticed that the TrueZIP archiver used by Bamboo might be incompatible with some binaries for archives exceeding 4 GB. In order to extract files from a large archive, use the following script:
# TrueZIP extractor

```bash
#!/bin/sh

TRUEZIP_JAR=truezip-samples-7.7.9-jar-with-dependencies.jar

if [ ! $# -eq 1 ]; then
  echo "Usage:"
  echo "  $0 [bambooCloudExportFile]"
  exit 1
fi

BAMBOO_EXPORT_FILE=$1

if [ ! -f $BAMBOO_EXPORT_FILE ]; then
  echo Can not access $BAMBOO_EXPORT_FILE
  exit 1
fi

if [ ! -f $TRUEZIP_JAR ]; then
  echo Downloading TrueZip JAR ...
  curl -s https://repo1.maven.org/maven2/de/schlichtherle/truezip/truezip-samples/7.7.9/$TRUEZIP_JAR -o $TRUEZIP_JAR
fi

if [ -d bamboo-home ]; then
  echo Directory bamboo-home exists, please remove it before proceeding
  exit 1
fi

if [ -d database ]; then
  echo Directory database exists, please remove it before proceeding
  exit 1
fi

echo Unzipping Bamboo HOME directory ...
java -jar $TRUEZIP_JAR cp $BAMBOO_EXPORT_FILE/bamboo-home bamboo-home

echo Unzipping Bamboo database ...
java -jar $TRUEZIP_JAR cp $BAMBOO_EXPORT_FILE/database database
```

Exporting existing project to Bamboo Specs

Error rendering macro 'viewport-redirect': null

Bamboo Filesystem Encoding

File name encoding
Checks if file system encoding can handle extended character sets for file names.
Unable to determine the encoding used to encode file names.
Encoding used to encode file names is not capable of handling extended character sets.