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### Additional Resources

Visit the Configuration Guide for documentation on configuring databases and application servers. The Confluence User’s Guide has information on how to use Confluence as a collaborative tool. Go to Documentation Home for links to more resources.

### Download

You can download the Confluence Admin Guide in PDF, HTML or XML formats.

### Site Administrator?

The Confluence Administrator’s Guide provides information to site administrators on how to manage their Confluence instances.

If you still have a question that hasn't been answered, write and tell us about it.
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Cache Statistics

Confluence provides statistics about its internal caches that allow you to track the size and hit ratio of each cache and tune it for better performance (if necessary). See Performance Tuning for more information.

Configurable Caches

System administrators can change the sizes of Confluence’s internal caches through the Administration Console and these changes will take effect without the need to first shut down and then restart Confluence. The maximum number of units for any of the defined cache regions can be adjusted individually.

Note that larger cache sizes will require more memory at runtime, so you should review the memory allocation of the Confluence Java process and the physical memory available on your server.

⚠️ The information on this page does not apply to Confluence OnDemand.

Viewing Cache Statistics and Modifying Cache Sizes
To view the cache statistics:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.

2. Click 'Cache Statistics' in the left-hand panel. There you will find a list of all objects cached within Confluence.
3. Click the 'Advanced' tab for more detail. Below is an example for one of the most frequently used caches, the 'Content Object' cache.

<table>
<thead>
<tr>
<th>Name</th>
<th>Percent Used</th>
<th>Effectiveness</th>
<th>Objects / Size</th>
<th>Hit / Miss / Expiry</th>
<th>Adjust Size</th>
<th>Flush</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Object</td>
<td>80%</td>
<td>73%</td>
<td>4023 / 5000</td>
<td>374550 / 140460 / 55044</td>
<td>Adjust Size</td>
<td>Flush</td>
</tr>
</tbody>
</table>

About the generated numbers:

- **Percent Used**: \(\frac{\text{Objects}}{\text{Size}}\)
- **Effectiveness**: \(\frac{\text{Hits}}{\text{Hits} + \text{Misses}}\)
- **Objects / Size**: The number of entries in the cache / the number of total possible entries allowed (configurable).
- **Hit / Miss / Expiry**: The number of reads accessing cache where required content was found / the number of reads accessing cache where required content was not found / the number of objects evicted from the cache.
- **Adjust Size**: Use this option to specify a different maximum cache size. Enter a new cache size and click the 'Adjust Size' button to set it.
- **Flush**: Flushes the cache.

For instance, to calculate Percent Used:

\[
\text{Percent Used} = \frac{\text{Objects}}{\text{Size}} \\
\text{Percent Used} = \frac{4023}{5000} = 80\%
\]

To calculate Effectiveness:

\[
\text{Effectiveness} = \frac{\text{Hits}}{\text{Hits} + \text{Misses}} \\
\text{Effectiveness} = \frac{374550}{374550 + 140460} = 73\%
\]

The clustered versions of Confluence use distributed cache called Tangosol Coherence.

**Watching the Cache Contents**

To see the specific items in the caches, view the cache statistics at `<baseUrl>/admin/cachecontents.jsp`.

**Additional Notes about Configurable Caches**

Changes to cache size configurations persist across Confluence restarts as they are saved in the `<confluence-home>/config/ehcache.xml` file (or `<confluence-home>/config/confluence-coherence-cache-config-clustered.xml` for a clustered instance). In most cases, a Confluence administrator will never need to know about these files. However, if it is necessary to tune cache options other than the maximum cache size, this can be done by manually editing these files. See Cache Performance Tuning for details.
Important note about clustered Confluence installations

The cache configuration file is stored in a home directory of each cluster node. When a Confluence administrator changes a cache size, all running cluster nodes will automatically update their own configuration files in their respective home directories. However, if a cluster node is not running when an administrator adjusts a cache size, the /config/confluence-coherence-cache-config-clustered.xml file in its home directory will not be updated. Since cluster caches are configured by the first node to start, if a node with an outdated cache configuration is the first to start up, the whole cluster would end up using the configuration of that node. However, copying this file from one node to another would resolve this issue.

Performance Tuning

If you need to tune your application when under high usage, you may like to review this document for suggestions.

Related Topics

- Page: Cache Performance Tuning
- Page: Viewing and Editing License Details
- Page: Cache Statistics
- Page: Viewing System Information
- Page: Cache Performance Tuning for Specific Problems
- Page: Confluence Cache Schemes

Confluence Data Directory Configuration

Here is a link listing important Confluence files.

The home directory defines the location of the directory where Confluence will store its data, including attachments, indexes and backups. Administrators can set this location by defining a value for the file <MY-INSTALL>/confluence/WEB-INF/classes/confluence-init.properties. To find what your home directory is currently set to, open this file and check the confluence.home property. It is unset on new installations.

The information on this page does not apply to Confluence OnDemand.

Windows Configuration

On Windows, this path:

C:\confluence\data

will be written like so:

confluence.home=C:/confluence/data

Note that all backslashes (\) are written as forward slashes (/).

Linux/Solaris Configuration

On any Linux-based system, the property is defined using the normal directory syntax:

confluence.home=/var/confluence/
Symbolic links

If your `confluence.home` directory contains a symbolic link, you must define the absolute path.

⚠️ Please note that there can be no symbolic links within the `confluence.home` directory. If disk space is an issue, place the entire `confluence.home` directory on a disk partition where there is enough space.

The absolute path of generated files (such as exports) is compared with the absolute path of the `confluence.home` directory when constructing URLs. When a sub-directory has a different path, the URL will be incorrect, and you may receive "Page not found" errors. These measures are in place to prevent "directory traversal" attacks.

Fixing the Confluence Configuration

The Confluence configuration file: `confluence-cfg.xml` inside the home directory may contain references to the original location of your Confluence home. You will need to edit this file to update these references to also point to the new location. The two properties in this file that need to change are:

- `daily.backup.dir` if you have not configured your backups to be placed elsewhere already
- `hibernate.connection.url` if you are using the embedded HSQL database.

Content Index Administration

The content indexes power Confluence's search functionality. They are also used for a number of related functions such as building email threads in the mail archive, the space activity feature and lists of recently-updated content. The Gliffy plugin also uses them for some of its functionality.

For reasons of efficiency, Confluence does not immediately add content to the index. New and modified Confluence content is first placed in a queue and the queue is processed once every minute (by default).

On this page:

- Viewing the Content Index Summary
- Rebuilding the Content Indexes
- Slow Reindexing
- Viewing the Index Browser
- More Hints and Tips

⚠️ The information on this page does not apply to Confluence OnDemand.

Viewing the Content Index Summary

To see information about your Confluence instance's content indexing,

1. Go to the Confluence ‘Administration Console’:
   - Choose **Browse > Confluence Admin**. The ‘Administrator Access’ login screen will be displayed.
   - Enter your password and click **Confirm**. You will be temporarily logged into a secure session to access the ‘Administration Console’.
2. Click ‘Content Indexing’ under the heading ‘Administration’ in the left-hand panel.

Screenshot: Index summary
Rebuilding the Content Indexes

The content indexes are maintained automatically, but you may need to rebuild one or both of them manually under circumstances such as these:

- Your searching and mail threading are malfunctioning. (Rebuild the Search Index.)
- The Did You Mean feature is malfunctioning. (Rebuild the Did You Mean Index.)
- After an upgrade. If a content re-index is required after an upgrade, it will be noted in an upgrade subsection of the relevant Release Notes.

In new Confluence installations, the ‘Did You Mean’ feature is not initially activated. To activate it, you first need to build its index by clicking its ‘Build’ button on this page.

To rebuild either of the content indexes,

1. Go to the Confluence ‘Administration Console’:
   - Choose Browse > Confluence Admin. The ‘Administrator Access’ login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the ‘Administration Console’.
2. Click ‘Content Indexing’ under the heading ‘Administration’ in the left-hand panel.
3. Click the ‘Rebuild’ button in either the ‘Search Index’ or ‘Did You Mean Index’ sections on this page, depending on the particular index you want to rebuild.

If one of these indexes has not yet been built, its button will indicate ‘Build’ instead of ‘Rebuild’.
As shown in the image below, only one index can be (re)built at a time.
Slow Reindexing

Does the reindexing take a long time to complete? The length of time depends on the following factors:

- Number of pages in your Confluence instance.
- Number, type and size of attachments.
- Amount of memory allocated to Confluence.

It may help to increase the heap memory allocation of Confluence by following the instructions in the JIRA documentation.

If you are running an older version of Confluence and find that the index rebuild is not progressing, you may need to shut down Confluence, and restart it with the following `set`:

```
bucket.indexing.threads.fixed=1
```

This will cause the re-indexing to happen in a single thread and be much more stable (but slower).

Viewing the Index Browser

Confluence uses a search engine called Lucene. If you need to see more details of the indexed pages in your Confluence site, you can download and run Luke. Luke is a development and diagnostic tool that accesses existing Lucene indexes and allows you to display and modify their content in several ways.

Start Luke and use it to open the `index` directory, located in your Confluence Home directory. For example:

```
c:\confluence\data\confluence-home\index
```

More Hints and Tips

- If you are still experiencing problems after performing the above rebuild, the next step might be to remove the index and rebuild it from scratch.

  The space activity feature uses the index to store data. If you remove the index file, the existing activity data will disappear.

- A tip for the development community: If you have the Confluence source, you can look for references to the SmartListManager to find the screens and lists that rely on the content index.

RELATED TOPICS

- Page: Working with Macros
- Page: Creating a Lowercase Page Title Index
- Page: Content Index Administration
- Page: Configuring Indexing Language
- Page: Rebuild the Content Indices from scratch
Finding Unused Spaces

Sometimes, you want to know what is not being used. It’s great to know what’s getting most attention, but what about stagnant pages, or even entire spaces that are no longer active? While viewing space activity can provide hints, it doesn’t always provide enough detail. The simple way is to go directly to the database. We recommend DbVisualizer, and have basic instructions for connecting it to HSQLDB.

The following query identifies the last date on which content was modified in each space within a single Confluence instance:

```sql
SELECT spaces.spacename, MAX(content.lastmoddate)
FROM content, spaces
WHERE content.spaceid = spaces.spaceid
GROUP BY spaces.spacename;
```

It returns a list of spacenames, and the last date and time at which any content was added or changed.

The information on this page does not apply to Confluence OnDemand.

Alternatively, this one simply identifies spaces whose content hasn’t changed since a specified date:

```sql
SELECT spaces.spacename
FROM content, spaces
WHERE content.spaceid = spaces.spaceid
GROUP BY spaces.spacename
HAVING MAX(content.lastmoddate) < '2006-10-10';
```

The result is a simple list of space names.

It’s also possible to present the information in a wiki page, using the SQL plugin, which can be installed using the Plugin Exchange. You’ll also need to define a database resource in `conf/server.xml` and `confluence/WEB-INF/web.xml`, as described here. Having done so, you can use wiki markup code like the following, replacing `confluenceDS` with the name of your own local datasource:

```sql
h3. Space activity
{sql:dataSource=confluenceDS|output=wiki}
SELECT spaces.spacename AS Space, MAX(content.lastmoddate) AS LastModified
FROM content, spaces
WHERE content.spaceid = spaces.spaceid
GROUP BY Space;
{sql}
```

The result will be something like this:

<table>
<thead>
<tr>
<th>Space</th>
<th>LastModified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private Space</td>
<td>2007-10-11 11:34:04.914</td>
</tr>
</tbody>
</table>

You can try the Chart plugin in combination with the SQL plugin to give more visually attractive results.

Important Directories and Files

The Installation Directory
The 'Confluence Installation directory' is the directory into which the Confluence application files and libraries have been unpacked (unzipped) when Confluence was installed. Confluence does not modify or store any data in this directory. This directory is also sometimes called the 'Confluence Install directory'.

**Important Files and Directories**

- `confluence/WEB-INF/classes/confluence-init.properties`: This file tells Confluence where to find the Confluence Home Directory. This file is modified by the administrator when installing Confluence.
- `confluence/WEB-INF/classes/osuser.xml`: This file is modified when connecting Confluence to an external user management system such as an LDAP server or JIRA instance in Confluence 2.0 and earlier. For more information, refer to Understanding User Management in Confluence.
- `confluence/WEB-INF/classes/atlassian-user.xml`: This file is modified when connecting Confluence to an external user management system such as an LDAP server or Crowd. For more information, refer to Understanding User Management in Confluence.
- `confluence/WEB-INF/lib/`: This directory is used when deploying plugins, especially those plugins that cannot automatically be loaded through the Administration Console.
- `confluence/WEB-INF/classes/log4j.properties`: Confluence's logging configuration file. See Working with Confluence Logs.
- `confluence/WEB-INF/classes/ehcache.xml`: This is where you can configure the size of Confluence's internal caches.
- `confluence/WEB-INF/classes/styles/site-css.vm`: Confluence's main stylesheet, modify at your own risk.
- `conf/server.xml`: SSL configuration.

**Memory Settings**

The file used to edit JAVA_OPTS memory settings will depend on the method used to install Confluence, as well as the operating system used for your installation.

- **Windows Users**
  - Confluence: `bin/setenv.bat`
  - Confluence Installer: `wrapperwin32.conf`
- **Mac/Linux Users**
  - Confluence: `bin/setenv.sh`
  - Confluence Installer: `wrapperosx.conf`

⚠️ The information on this page does not apply to Confluence OnDemand.

**The Temp Directory**

The temp directory is configured in the Java runtime and some Confluence components write temporary files or lockfiles into this directory. Typically, this directory is `/tmp` on Linux systems, or `C:\Temp` on Windows.

To change the location of this directory, you should start the Java Virtual Machine in which confluence is running with the argument: `--java.io.tmpdir=/path/to/your/own/temp/directory`.

**The Confluence Home Directory**

The Confluence Home directory is the folder where Confluence stores its configuration information, search indexes and page attachments. If you are using the embedded HSQLDB database supplied for evaluation purposes, the database files are also stored in this directory.

Tip: Another term for 'Home directory' would be 'data directory'.

Administrators can expect the Confluence Home Directory to grow quite large in a busy site.

The location of this directory is configured by the system administrator during installation (see `confluence-init.properties` above).

**Important Files and Directories**

- `confluence.cfg.xml`: Confluence's core configuration file; includes the configuration for connecting to its database.
- `default-formatting.properties`: Some auxiliary configuration data concerning default number and date formats.
- `attachments/`: All file attachments in the Confluence site are stored under this directory. This is the only place Confluence keeps attachment files.
- `backups/`: If Confluence is configured to produce daily backups, these are kept in this directory. Administrators should occasionally delete old or unwanted backups from this directory to prevent it from growing too large.
- `config/`: Miscellaneous global and per-space configuration files are kept in this directory.
- `database/`: If Confluence is being run from the embedded HSQL database, the database files will be kept in this directory.
- `index/`: The full-text search index is kept in this directory. Removing or modifying files in this directory may cause search to no longer function. Rebuilding the search index from Confluence's global administration screen will completely regenerate the contents of this directory.
- `plugins/`: Dynamically uploaded plugins are stored in this directory. Administrators can install new plugins by copying them into this directory and triggering a scan from the plugin management page.
- `temp/`: Confluence stores temporary files in this directory, especially during backups and exports. A daily job within Confluence deletes files that are no longer needed.
- `thumbnails/`: Stores temporary files for image thumbnails. The contents of this directory can be safely deleted, as Confluence will
regenerate thumbnails as required.

- `velocity/`: Storage for customised page layouts, globally and per-space.

## Database

All other data — page contents, links, archived mail and so on — is kept in the database. If you have configured Confluence to use the embedded HSQL database, the database will store its files under `database/` in the Confluence Home Directory. Otherwise, the database management system you are connecting to is responsible for where and how your remaining data is stored.

### Tip

All of Confluence's persistent data is stored either in the Confluence Home Directory, or the database. If you have backup copies of both of these, taken at the same time, you will be able to restore Confluence from them (see [Restoring Data from other Backups](#)).

### RELATED TOPICS

- Confluence Home Directory
- Confluence Installation Directory
- The Embedded HSQLDB Database
- Database Configuration

---

## Confluence Home Directory

Often in the documentation, you'll see a reference to the 'Confluence Home directory'.

### What is the Confluence Home Directory?

The Confluence Home directory is the folder where Confluence stores its configuration information, search indexes and page attachments. If you are using the embedded HSQLDB database supplied for evaluation purposes, the database files are also stored in this directory.

#### Tip: Another term for 'Home directory' would be 'data directory'.

#### The information on this page does not apply to Confluence OnDemand.

### Finding the Confluence Home Directory

The location of the Confluence Home directory is defined when you install Confluence. This location is stored in a configuration file called `confluence-init.properties`, which is located inside the `confluence/WEB-INF/classes` directory in your Confluence Installation directory.

When Confluence first starts up, it reads the `confluence-init.properties` file to determine where to look for the Home directory.

Once Confluence is running you can find the Confluence Home directory via the Administration console, under Administration > System Information > Confluence Information - Confluence Home.

### Content of the Confluence Home Directory

The Confluence home directory contains some of the configuration data used by Confluence. Other data is stored in the database. This section outlines the purpose of the files and directories in the Confluence home directory.

#### `confluence.cfg.xml`

This file contains all of the information necessary for Confluence to start up, such as:

- Product license
- Context path
- Database details, such as location and connection pool settings
- Paths to important directories

#### `attachments`

This directory contains every version of each attachment stored in Confluence. This directory is not used when Confluence is configured to store attachments in the database. Attachments are always stored in the database in clustered instances of Confluence.

Paths within this directory have the following structure:
You can specify an alternative directory for attachment storage by setting the `attachments.dir` property in `confluence.cfg.xml`.

**backups**

Confluence will place its daily backup archives in this directory, as well as any manually generated backups. Backup files in this directory take the following form:

```
daily-backup-YYYY_MM_DD.zip
```

You can specify an alternative directory for backups by setting the `daily.backup.dir` property in `confluence.cfg.xml`.

**bundled-plugins**

Confluence ships with a set of bundled plugins. These are plugins written by the Atlassian and the Confluence community that we think provide useful and broadly applicable functionality in Confluence. The `{bundled-plugins}` directory is where Confluence will unpack its bundled plugins when it starts up. This directory is refreshed on every restart, so removing a plugin from this directory will not uninstall the plugin. It will simply be replaced the next time Confluence starts up.

**database**

This is where Confluence stores its database when configured to run with the HSQL embedded database. In such cases this directory contains all Confluence runtime data. Installations configured to run using an external database such as MySQL will not use this directory.

**index**

This is where Confluence stores its indexes for rapid retrieval of often used data. The Confluence index is used heavily by the application for content searching and recently updated lists and as such is critical for a running Confluence instance. It is important to note however that should the data in this directory be lost or corrupted, it can be restored by running a full reindex from within Confluence. This can take a long time depending on how much data is stored Confluence's database.

An alternative directory may be specified for the index by setting the `lucene.index.dir` property in `confluence.cfg.xml`. As this is the most heavily accessed directory in the Confluence home directory you might want to consider hosting it on the fastest disk available. It would also be useful if the disk holding the Confluence index was not heavily used by any other application to reduce access contention.

**plugin-cache**

All Confluence plugins are stored in the Confluence database. To allow for quicker access to classes contained within the plugin JARs, Confluence will cache these plugins in the `plugin-cache` directory. This directory is updated as plugins are installed and uninstalled from the system and is completely repopulated from the database every time Confluence is restarted. Removing plugins from this directory does not uninstall them.

**resources**

The `resources` directory stores any space logos used in your Confluence instance. For each space with a space logo, there is a directory within `resources` named after the space's key. That directory contains the space's logo.

**temp**

The `temp` directory is used for various runtime functions such as exporting, importing, file upload and indexing. As the name suggests, and file in this directory is of temporary importance and is only used during runtime. This directory can be safely emptied when Confluence is offline.

An alternative directory may be specified for temporary data by setting the `webwork.multipart.saveDir` property in `confluence.cfg.xml`.

**thumbnails**

When Confluence generates a thumbnail of an image (for example when the `gallery` macro is used), the resulting thumbnail is stored in this directory for quicker retrieval on subsequent accesses. This directory is essentially a thumbnail cache, and deleting files from this directory simply means the thumbnail will have to be regenerated on the next access.

**RELATED TOPICS**

Confluence Installation Directory  
Important Directories and Files  
The Embedded HSQLDB Database
Confluence Installation Directory

The 'Confluence Installation directory' is the directory into which the Confluence application files and libraries have been unpacked (unzipped) when Confluence was installed. Confluence does not modify or store any data in this directory. This directory is also sometimes called the 'Confluence Install directory'.

The information on this page does not apply to Confluence OnDemand.

RELATED TOPICS

Confluence Home Directory
Important Directories and Files

Installing a Language Pack

Confluence ships with a number of bundled language packs. These languages appear as options on the 'Language Configuration' screen in the Administration Console when choosing a default language and as 'Language' options for users in their user settings. You can make additional languages available for selection by installing language packs. Please note, you must be a Confluence administrator to install a language pack.

Language packs are plugins. The process of installing a language pack is the same as installing a new plugin.

The information on this page does not apply to Confluence OnDemand.

Installing a Language Pack using the Plugin Manager

To install a language pack using the plugin manager:

1. Click 'Plugins' in the Confluence Administration Console.
2. Click 'Install'.
3. Locate the language pack and install it via the plugin manager interface.

Installing a Language Pack Manually

To install a language pack manually, you will need to upload the language pack plugin as described below. The language pack plugin will be enabled by default once you have installed it.

Plugins are distributed as a jar file. To install a plugin:

1. In the 'Administration' section of Confluence, click Plugins.
2. Use Browse to find the plugin jar you wish to install from your hard drive or network location, and select it.
3. Click Upload.
4. The plugin will be uploaded to Confluence and will be automatically installed.
5. Check the 'Plugin Administration' screen to ensure that the plugin is available.
6. Enable the plugin if necessary. (Some plugins will be enabled by default when they are installed. Others will have to be manually enabled from the 'Plugin Administration' screen.)

Finding more Language Packs

- You can download official language packs from the Atlassian Plugin Exchange. You can also download language packs developed by the Confluence user community from the Language Pack Translations page.

Showing User Interface Key Names for Translation

For those customers working on creating translations of the Confluence user interface, from 4.1 onwards there is a feature that will help. After opening the Confluence dashboard, you can simply add this text to the end of your Confluence URL, like so:

```
http://your-domain.com/display/confluence/translations?uiExport=true
```

Then press Enter.

This will then cause each element of the user interface to display its special key name while Confluence is still in an interactive mode. This makes it easier to find the essential context for each key, which can then be searched on http://translations.atlassian.com where you can enter an appropriate translation for your custom language pack.

The key names are displayed with a "lightning bolt" graphic between elements of the names. For example, the buttons will show up with elements shown like so:
For example, for the Browse button, the associated key system.space.menu can be found on http://translations.atlassian.com, allowing you to write a better translation for the term Browse, being able to see the full context of where the UI element belongs and what it means to the user.

To turn off the translation view, add this code to the end of the Confluence URL:

```

```

RELATED TOPICS

Choosing a Default Language
Configuring Indexing Language
Installing a Plugin

Site Backup and Restore

Atlassian suggests establishing a backup strategy using a native database tool for a production instance of Confluence.

By default, Confluence backs up all data and attachments once a day to a backup file. These files are called XML site backups, and are stored in the backups directory of Confluence home. You can also create XML site backups manually. This mechanism is intended for small to medium-sized deployments of Confluence. It is not intended for use with large deployments with lots of pages and attachments (see below).

- Restore your site from an XML site backup
- Manually create an XML site backup
- Configuring Backups
- User Submitted Backup & Restore Scripts

XML site backups are fine for most small to medium-sized instances of Confluence, containing a few thousand pages and attachments. However, large instances of Confluence may find that backups become slow to create and use large amounts of disk space.

The information on this page does not apply to Confluence OnDemand.

Backups For Large Instances

XML site backups are unsuitable for instances of Confluence that contain thousands of pages, as XML backups take progressively longer to complete as the amount of text increases. Another issue with XML site backups is that Confluence instances with gigabytes of attachments will consume disk space rapidly. This is because each site backup contains all content needed for a site restore. For example, if a 1 GB instance of Confluence is backed up daily, it will create 30 GB of backups per month if left unattended. When administering a large instance, you can reduce disk space by setting XML site backups to exclude attachments, then manually scheduling a backup of your attachments from the Confluence home directory or database. The backup manager can save space by saving changed files instead of all content.

<table>
<thead>
<tr>
<th>Creation Delay</th>
<th>Disk Usage</th>
<th>Recommended Backup Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptable</td>
<td>Acceptable</td>
<td>XML site backup with attachments</td>
</tr>
<tr>
<td>Acceptable</td>
<td>Unacceptable</td>
<td>XML site backup minus attachments, plus manual backup of attachments</td>
</tr>
<tr>
<td>Unacceptable</td>
<td>Unacceptable</td>
<td>Manual backup of database and attachments</td>
</tr>
</tbody>
</table>

**Creation Delay** is the time it takes to create an XML site backup minus attachments. **Disk Usage** can be estimated by multiplying the frequency of your XML site backups by their current size.

Manual Backups

Confluence's Attachment Storage Configuration can be set to store attachments in the Confluence home directory, or in the database.
Database Backup
Use your Database Administration Tool to create a backup of your Confluence database. If your database is storing your attachments, importing this later will restore all content. For instances with big attachments, please note that currently Confluence migrate attachments in a single transaction: CONF-9888.

Attachment Backup
If stored on the filesystem, attachments are placed under the `attachments` directory of your Confluence home directory. Copy this directory to create a backup of all attachments.

To restore from these backups, please refer to Restoring Data from other Backups.

Related Topics

Production Backup Strategy
Backup FAQ

Production Backup Strategy

Confluence's Built-in Backup
Confluence automatic daily XML backup is ideal if you:

- are evaluating Confluence
- do not have database administration familiarity, and your Confluence installation is small

Once your Confluence installation reaches more than a few thousand pages, the XML backup facility can be inefficient compared to your database's own backup tools.

Establishing a Production System Backup Solution

The built-in backup functionality in Confluence requires a lot of memory to run and is less reliable when restoring. Atlassian recommends establishing an alternative database backup strategy:

- Create a backup or dump of your database using tools provided by your database
- Create a file system backup of your Confluence home directory

Once this is in place, disable the daily backups through the scheduled jobs feature via 'Administration Console > Administration > Scheduled Jobs'.

We want to stress that creating these two backups is better than having a Confluence XML backup. It's more robust and far more reliable for large production instances. You will be able to restore your whole site, including all data, attachments and configuration information intact with these two backups. We have written up a document on how to do this here.

Step by step instructions

Take a look at the Migrating Confluence Between Servers document for instructions on restoring a backup using this technique.

Other processes

XML backups are described and used for other processes in Confluence, like upgrading and moving servers. Using the backup strategy described here will work for those processes. Our upgrade guide does not require the use of an xml backup (an old upgrade procedure, and the JIRA upgrade guide use XML backups for upgrading), and our migrate server procedure - used to set up a test server - can leverage an sql dump as well.

The only process that requires the XML backup is the database migration procedure. Large data sets will require third party database migration tools.

RELATED TOPICS

Site Backup and Restore
Backup FAQ

Configuring Backups

Confluence back up your data regularly into a zipped XML file. By default, this backup is performed at 2.00 a.m. each day and the backup files are stored in the backups folder under the Confluence Home directory. The default naming convention for the backup files is `backup-yyyy.MM.dd`. Confluence can write backups to both local and mapped network drives.
From the **Backup Administration** section of Confluence’s administration console, you can:

- Include or exclude attachments in backups.
- Configure a different path to store backup files. (By default, this option is not available. See below for information about enabling the configuration option.)
- Change the naming format used for the files.

- You can also change the schedule of this backup using Confluence’s **scheduled jobs** feature.
- You need to have **System Administrator** permissions in order to configure these options.

### Configuring Confluence Backups

To configure Confluence backups:

1. Go to the Confluence 'Administration Console':
   - Choose **Browse** > **Confluence Admin**. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click **Confirm**. You will be temporarily logged into a **secure session** to access the 'Administration Console'.
2. Click 'Backup Administration' in the 'Configuration' section.
3. Click the 'Edit' button on the 'Backup Administration' screen.
4. Now you can do the following:
   - To specify an alternate path to store backup files — Select 'Custom' and then enter the path. The directory must be on either a local drive or a mounted network drive.
     - **Notes:**
       - By default, this option is not available. See below for information about enabling the configuration option.
       - Please ensure the mapped drive is on a physical server, not a Virtual Machine image.
   - To exclude attachments from backups — Select 'Off' beside 'Backup Attachments'. By default, this feature is 'On'.
   - To use a different naming prefix format — Enter the new format in the 'Backup File Prefix' input field.
   - To use a different date format — Enter the date format in the 'Backup File Date Pattern' input field using the syntax described in this document from Sun.
5. ‘Save’ your changes.

- You can disable Confluence backups through the **scheduled jobs** feature.

### Enabling Backup Path Configuration

By default, it is not possible to specify a backup path via the Confluence Administration Console. This feature is disabled by default for security reasons. Administrators can restore this functionality by updating the relevant configuration property as described below. However, we recommend that you turn the feature **off** in production environments.

To enable the configuration option:

1. Edit the `confluence.cfg.xml` file found in the **Confluence Home Directory**.
2. Set the value of property `admin.ui.allow.daily.backup.custom.location` to 'true' (without the quotation marks).
3. Restart Confluence.
If the value of the above configuration property is 'true', it will be possible to specify a backup path via the Confluence Administration Console. If the value of this property is 'false' or the property is not present in the configuration file, the backup path is not configurable.

Notes

**Time is derived from the Confluence server**

The time zone is taken from the server on which Confluence is running.

To check the time according to the server, do the following:

1. Go to the Confluence 'Administration Console':
   - Choose **Browse > Confluence Admin**. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click **Confirm**. You will be temporarily logged into a **secure session** to access the 'Administration Console'.
2. Click 'System Information' in the left-hand panel and look at the 'System Time'.

**Backup strategy for large Confluence sites**

Consider using the production backup strategy if your Confluence site is large or you are encountering problems with your automated backup.

**RELATED TOPICS**

- Page: Site Backup and Restore
- Page: Manually Backing Up The Site
- Page: Backup FAQ
- Page: Production Backup Strategy
- Page: Configuring Backups
- Page: User Submitted Backup & Restore Scripts

**User Submitted Backup & Restore Scripts**

These scripts are user-submitted and should be used with caution as they are not covered by Atlassian technical support. If you have questions on how to use or modify these scripts, please [post them to Atlassian Answers](https://confluence.atlassian.com/). Feel free to submit new scripts or post updates by logging in and adding them to the page as a comment.

⚠️ The information on this page does not apply to Confluence OnDemand.

*Delete Old Backups - Wscript Script On Windows*

This script examines backup filename and deletes them if necessary, it may need to be edited.
"If you want 3 day old files to be deleted then insert 3 next to Date - "your number here"
"This script will search out and delete files with this string in them ".2005-12-04-" This of
course depends on the number you enter.
'You can always do a wscript.echo strYesterday or strFileName to see what the script thinks you
are searching for.

dtmYesterday = Date - 3
strYear = Year(dtmYesterday)
strMonth = Month(dtmYesterday)
If Len(strMonth) = 1 Then
    strMonth = "0" & strMonth
End If
strDay = Day(dtmYesterday)
If Len(strDay) = 1 Then
    strDay = "0" & strDay
End If
strYesterday = strYear & "-" & strMonth & "-" & strDay
strFileName = "C:\test*." & strYesterday & "-*"
Set objFSO = CreateObject("Scripting.FileSystemObject")
objFSO.DeleteFile(strFileName)

Delete Old Backups - Basic Bash Script For Linux

Old XML backups can be deleted automatically by inserting a nightly or weekly automation script or cron similar to the following:

```bash
ls -t <path to your backup dir>/* | tail -n +6 | xargs -i rm {} 
```

Or, using the older form of the `tail` command if your system does not support the standard form:

```bash
ls -t <path to your backup dir>/* | tail +6 | xargs -i rm {} 
```

Delete Old Backups - Advanced Bash Script For Linux

Old XML backups can be deleted automatically by inserting a nightly or weekly automation script or cron similar to the following. Set the BACKUP_DIR and DAYS_TO_RETAIN variables to appropriate values for your site. Between runs, more files than DAYS_TO_RETAIN builds up.

```
#!/bin/sh
# Script to remove the older Confluence backup files.
# Currently we retain at least the last two weeks worth of backup files in order to restore if needed.
BACKUP_DIR="/data/web/confluence/backups"
DAYS_TO_RETAIN=14
find $BACKUP_DIR -maxdepth 1 -type f -ctime +$DAYS_TO_RETAIN -delete
```

Manual Database & Home Backup - Bash Script For Linux

This backs up a mySQL database and the Confluence home directory.
#!/bin/bash
CNFL=/var/confluence
CNFL_BACKUP=/backup/cnflBackup/`date +%Y%m%d-%H%M%S`
rm -rf $CNFL/temp/*
mkdir $CNFL_BACKUP
mysqldump -uroot -p<password> confluence|gzip > $CNFL_BACKUP/confluence.mysql.data.gz
tar -cjvf $CNFL_BACKUP/data.bzip $CNFL > $CNFL_BACKUP/homedir.status

Backup by Date - Postgres

export d=`date +%u`
mkdir -p /home/backup/postgres/$d
sudo -u postgres pg_dumpall | bzip2 > /home/backup/postgres/$d/sql.bz2

Related Topics

- Site Backup and Restore
- Backup FAQ

Manually Backing Up The Site

Confluence is configured to back up its data. A System Administrator can also manually perform this back up from the Administration Console.

⚠ You need to have System Administrator permissions in order to perform this function.

✔ Consider an Production backup strategy if your Confluence site is large or you are encountering problems with your automated backup.

⚠ The information on this page does not apply to Confluence OnDemand.

Creating the Site Backup

To manually back up your site,

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Click 'Backup & Restore' in the 'Administration' section of the left-hand panel.
3. Select 'Archive to backups folder' to store a copy of the backup in the same folder as Confluence's backups. (If you do not archive the backup it will be made available for you to download, and then deleted from the server after 24 hours)
4. Select 'Backup attachments' to include attachments in your backup.
5. Click 'Backup'.
   ⚠ Please note that this process will take a few minutes.

✔ If you are running Confluence behind Apache and are facing timeout errors, please consider creating the export directly from Tomcat, instead of going through Apache. This will speed up the process and prevent timeouts.

Retrieving the Backup File

Confluence stores the backup as a zipped XML file in the 'backups' directory under the Confluence Home directory on your Confluence server. To find your Confluence Home directory, see the documentation. You will need access to the Confluence server in order to retrieve
Enabling the Download of the Backup File via the Administration Console

By default, it is not possible to retrieve the backup file via the Confluence Administration Console. This feature is disabled for security reasons.

Administrators can enable this functionality by updating the relevant configuration property as described below. When enabled, you will be prompted to download the backup file when the backup process finished. However, we recommend that you turn the feature off in production environments.

To enable download of the backup file from the Administration Console,

1. Edit the `confluence.cfg.xml` file found in the Confluence Home Directory.
2. Set the value of property `admin.ui.allow.manual.backup.download` to 'true' (without the quotation marks).
3. Restart Confluence.

If the value of the above configuration property is 'true', it will be possible to download the backup file after manually backing up the site via the Confluence Administration Console. If the value of this property is 'false' or the property is not present in the configuration file, you will need to retrieve the backup file from the file system on the Confluence server. By default, the value is 'false'.

RELATED TOPICS

Page: Site Backup and Restore
Page: Manually Backing Up The Site
Page: Backup FAQ
Page: Production Backup Strategy
Page: Configuring Backups
Page: User Submitted Backup & Restore Scripts

Migrating Confluence Between Servers

This page describes how to move Confluence between physical servers. It is distinct from other functions. It does not cover database migration, application server migration, or upgrading. Atlassian suggests doing each of these steps separately. See also:

- Upgrading Confluence
- Migrate to Another Database
- Switching to Apache Tomcat

On this page:

- How to Create a Test or Development Instance
- Transferring Confluence To Another Server Using The Same Operating System
- Transferring Confluence To Another Server Using a Different Operating System
- Ensuring no contact with production systems
- Migrating from HTTPS to HTTP

⚠️ The information on this page does not apply to Confluence OnDemand.

How to Create a Test or Development Instance

Administrators may need to move a Confluence instance from one server to another for upgrades or downtime. This page tells you how to copy a Confluence instance from one server to another. For example, you may want to transfer your current production snapshot to a test server as permitted in the licence agreement.

Development licenses are available for any Commercial or Academic license. Create one or contact Atlassian for help.
Avoid upgrades while transferring
If you are planning to switch databases, application servers or Confluence versions, firstly perform the application transfer in isolation, and test that it was successful before making other changes.

Transferring Confluence To Another Server Using The Same Operating System
If the operating systems on both servers are the same, then the home and install folders can be copied straight into an identical external database and user management setup.

1. On the original server, create zips of the Confluence install and home directories. Copy the zips to the new server.
2. On the new server, unzip the install and home directories. Windows users should avoid unzipping with the Windows built-in extractor, instead use Winzip or the free 7Zip.
3. If you are changing the location of the home directory, open the Confluence install/confluence/WEB-INF/classes directory and edit confluence-init.properties by changing the line starting with 'confluence.home='.
4. Modify the location of your war file if need be. If using Tomcat, this is likely in /Conf/Catalina/localhost. You'll want to make sure the docbase attribute is pointing to the right location.
5. This next step is dependent on your database:
   a. Database configuration:
      i. For users of the internal database, the database content is stored inside the home directory. You should switch to an external database after the transfer is successful.
      ii. For external databases stored on another server: change the user account or datasource permissions so that the new server has the same network access permissions as the original. Then confirm from the new server that the hostname can be resolved and is listening for database connections on the expected port.
      iii. For external databases hosted locally (ie. localhost): on the original server, create a manual database backup using a native db dump backup tool. Copy the database backup to the new server.
   b. On the new server, install or upgrade the database version to match the original server.
   c. Import the database backup.
   d. Add a database user account with the same username and password as the original.
   e. Provide the user with the full access to the imported database.
   f. Use a database administration tool to confirm that the user can login from the localhost.
   g. To modify any database connection information, go to the Confluence home directory and edit confluence.cfg.xml. The connection URL is set under hibernate.connection.url. **Ensure it does not point to your production database server.**
   h. If you are using internal user management, skip this step. For users who have JIRA or LDAP integration, provide the new server with network or local access to the same hosts as the original. If this is a true test instance, set up a test of your JIRA instance or LDAP server so as not to disrupt production systems and change the server.xml or atlassian-user.xml files to point to the appropriate test servers. Note that it might be acceptable to use a production connection here, as users won’t be logging on to the test system in high volume.
   i. If appropriate, make sure no emails are sent out from the test system.
   j. Start Confluence.
   k. Go to Administration > License Details and add your development license key. You can generate one at http://my.atlassian.com. There are more details in Getting a License for a Staging Environment.
   l. If you configured Confluence as a Windows service, repeat those instructions.
   m. Add your development license key.
5. Some customers have experienced problems with Confluence’s search functions after performing a migration, or that the content of their \{recently-updated\} macro is not being updated correctly. Errors in the atlassian-confluence.log file corroborate such problems. Hence, to avoid these issues, it is strongly recommended that you perform a rebuild of your content indices after performing a migration.

Transferring Confluence To Another Server Using a Different Operating System

**Migrating from Windows to Linux**
You will need to replace the backslash of the following in confluence.cfg.xml with forward slash:

```
<property name="attachments.dir">${confluenceHome}/attachments</property>
<property name="lucene.index.dir">${confluenceHome}/index</property>
<property name="webwork.multipart.saveDir">${confluenceHome}/temp</property>
```

**Using database tools (preferred option)**
If you are using the Production backup strategy, follow these steps:
1. Download the proper distribution (the same one you have from your original instance) from the Download Archive.
2. Copy your Confluence home (not install) directory from your original server (even if it was a different OS).
3. If you are changing the location of the home directory, open the Confluence install/confluence/WEB-INF/classes directory and edit confluence-init.properties by changing the line starting with 'confluence.home='. 
4. For external databases stored locally, on the original server, create a manual database backup using a native db dump backup tool.
5. Copy the database backup to the new server.
6. On the new server, install or upgrade the database version to match the original server.
7. Import the database backup.
8. Add a database user account with the same username and password as the original.
9. Provide the user with the full access to the imported database.
10. Use a database administration tool to confirm that the user can login from the localhost.
11. To modify any database connection information, go to the Confluence home directory and edit confluence.cfg.xml. The connection URL is set under hibernate.connection.url. Ensure it does not point to your production database server.
12. If you are using internal user management, skip this step. For users who have JIRA or LDAP integration, provide the new server with network or local access to the same hosts as the original.
13. Copy server.xml, atlassian-user.xml, osuser.xml, any patches, and any other customized files velocity or properties files. If you are using internal user management, skip this step. For users who have JIRA or LDAP integration, provide the new server with network or local access to the same hosts as the original. If this is a true test instance, set up a test of your JIRA instance or LDAP server so as not to disrupt production systems and change the server.xml or atlassian-user.xml files to point to the appropriate test servers. Note that it might be acceptable to use a production connection here, as users won't be logging on to the test system in high volume.
14. If appropriate, make sure no emails are sent out from the test system.
15. Start Confluence.
16. Go to Administration > License Details and add your development license key. You can generate one at http://my.atlassian.com. There are more details in Getting a License for a Staging Environment.
17. If you configured Confluence as a Windows service, repeat those instructions.
18. Add your development license key.
19. Some customers have experienced problems with Confluence's search functions after performing a migration, or that the content of their [recently-updated] macro is not being updated correctly. Errors in the atlassian-confluence.log file corroborate such problems. Hence, to avoid these issues, it is strongly recommended that you perform a rebuild of your content indices after performing a migration.

Using XML data backups (only for small to medium sized installations)

If you're not yet using the Production backup strategy, you can migrate Confluence to a different server machine by creating an XML data backup as usual, and then importing that to Confluence on the new server.

1. Create an XML data backup from Confluence as follows:
   a. Go to the Confluence 'Administration Console':
      i. Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
      ii. Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
   b. Select Backup & Restore.
   c. Check the Backup Attachments option and click Backup.
2. Identify the version of Confluence that you are currently using. This is displayed at the bottom of each Confluence page.
3. Download Confluence to the new server. Get the version of Confluence that you identified above, but for the operating system of the new server. You may be using either the latest Confluence version, or an older version.
4. Install Confluence on the new server.
5. Go to Administration > License Details and add your development license key. You can generate a license at http://my.atlassian.com. You can find more details in Getting a License for a Staging Environment.
6. Restore your XML data backup from Administration > Backup and Restore.
7. If appropriate, make sure that no email contact can be made with the test system.

Ensuring no contact with production systems

To ensure no contact with external systems, you will need to disable both inbound and outbound mail services.

1. Disable global outbound mail by running the following database query:

```
SELECT * FROM BANDANA WHERE BANDANAKEY = 'atlassian.confluence.smtp.mail.accounts';
```

2. Disable space-level mail archiving by running the following database query:

```
SELECT * FROM BANDANA WHERE BANDANAKEY = 'atlassian.confluence.space.mailaccounts';
```

Change 'SELECT' to 'DELETE' in the above queries once you are sure you want to remove the specified accounts.

Once this is done, you can start your test instance without any mails being sent or retrieved. Think carefully about other plugins which may access production systems (SQL macro, JIRA macro, etc.). If these write content, or create unwanted load on external systems, they should
be disabled promptly after starting the test instance.

**Blog post on Moving Confluence from Windows to Linux**

Ricky Sheaves (calebscreek) has written an interesting blog post on Moving Confluence from Windows to (Ubuntu) Linux.

**Merging instances**

If you wish to merge two instances, you can consider using the remote import plugin. This plugin is currently unsupported. The supported method would be to export a space and then import each space one by one. The two instances of Confluence must be the same version.

**Migrating from HTTPS to HTTP**

You may want to migrate from a server secured by SSL to one which is not secured by SSL. For example, this may be useful if you are copying a Confluence instance from a production to a test site.

To migrate from HTTPS to HTTP, undo the HTTPS-specific settings that are described on this page: Adding SSL for Secure Logins and Page Security.

**Restoring a Site**

**CAUTION:** Restoring a backup of an entire confluence site (consisting of multiple spaces) will:

- Wipe out all Confluence content in the database. Ensure that your database is backed up.
- Log you out after the restore process. Make sure you know your login details contained in the data being restored.

**The information on this page does not apply to Confluence OnDemand.**

Atlassian suggests establishing the Production Backup Strategy for a production instance of Confluence as confluence xml backups are not recommended for non-evaluation instances.

Confluence supports **backward compatibility** for site backups. (But not for space backups). You can only successfully restore backups of a site from an older version of Confluence to a newer version of Confluence. For example, if you create a site backup in Confluence 2.4.3, it cannot be restored into a Confluence 2.2.2 instance. It can however, be restored into 2.4.5 or 2.5.x, because 2.4.5 and 2.5.x are newer versions of Confluence.

There are two ways to restore a site from a backup file:

1. **Restore a site from the Confluence Setup Wizard:** This restores the data into a new instance of Confluence.
2. **Restore a site from the Administration Console:** This restores data into the current instance of Confluence.

If your daily backup zips cannot be restored for whatever reason, but you have backups of both your database and your Confluence home directory, then it is still possible to restore from these backups.

**Selective space restore not possible**

You cannot select a single space to restore from the entire site backup when the backup contains more than one space.

**RELATED TOPICS**

Page: Restoring Data from the Administration Console

Page: Restoring a Space

Page: Restoring a Site

Page: Manually Backing Up The Site

Page: Restoring from Backup During Setup
Restoring a Space

This page tells you how to import the contents of a Confluence space into another Confluence site, via an XML backup file.

You can export the content of a space, including pages, comments and attachments. The process involves converting the data in the space into XML format. The end product is a zip file that contains XML file(s) and optionally, all the attachments in the space. To transfer this data to another Confluence site, you simply restore this zip file as described below.

Confluence will only allow you to restore a space if there is not already a space by that name on the site. If you already have a space with the identical name, you will need to delete or rename the existing space before restoring the new one.

**Cannot restore to a different major Confluence release**

Confluence only supports forward compatibility and backward compatibility for individual space import and export when executed within the same major version of Confluence instances.

**Restoration Data Must Share the Same Major Version Number**

This means that a space export created in a newer major version of Confluence cannot be imported into an older major version of Confluence. For example, if you create a space export in Confluence 2.4.5, it cannot be imported into a Confluence 2.2.2 instance. It can be however imported into 2.4.6. (because 2.2.2 and 2.4.5 are two different ‘major’ versions). Similarly, a space export created in 2.2.2 can not be imported into 2.4.5. However, it can be restored in 2.2.10 (since 2.2.2 and 2.2.10 belong to the same major version release).

If such an operation is carried out, an error message similar to the one below will be displayed and the import action will be stopped.

**Screenshot: Major Version Clash on Space Restore**

*The following error(s) occurred:*

- Restore denied. You can only restore space backups exported from the same major version (e.g. 2.2.x or 2.3.x).

**Workaround for restoring Spaces between Major Releases**

You’ll need to set up a test server, download and install the same version of Confluence as the version you exported the space from, then import the space into this test server. Next upgrade Confluence on your test installation so it’s the right major version so that you can perform the export and import this space into your production confluence successfully. Otherwise, you can try to Change the version of the space export, but please try this on a test instance as well.

You need to have System Administrator permissions in order to perform this function.

To restore a space,

1. Go to the Confluence ’Administration Console’:
   - Choose Browse > Confluence Admin. The ’Administrator Access’ login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the Administration Console.
2. Select ’Backup and Restore’ in the ’Administration’ section of the left-hand panel.

You can restore data in one of two ways:

1. Upload a zipped backup to Confluence:
   - Browse for the backup file.
   - Uncheck ’Build Index’ if you want to create the index at a later stage.
   - Click ’Upload and Restore’.
2. Restore a backup from the file system:
   - Select the backup file from the form field displayed. If you do not see your backup file, make sure that it has been copied into the /opt/java/src/confluence/deployments/conf.atlassian.com/home/restore directory.
   - Uncheck ’Build Index’ if you want to create the index at a later stage.
   - Click ’Restore’.
Changing the version of a space backup

Confluence prevents the import of space backups which aren't from the same major version. The reason for this is that any schema change between the export and imported version of Confluence will cause the import to fail, leaving you with an incomplete import. Even worse, the failure can be database-dependent, so it may work fine on one particular database but your backup will fail to import later.

Do not import a modified space backup on a production server. Import the modified space backup on a test server, then export from the test server to create a pristine space backup for the new version.

To change the version of a space backup, do the following:

- extract the space backup ZIP file
- edit exportDescriptor.properties in a text editor
- change the buildNumber to the buildNumber of the Confluence version you wish to import into
- zip up the modified contents of the backup into a ZIP file again.

This will allow you to import a backup into a test instance of Confluence. After checking the imported space for errors, export it cleanly from the test server and import the fresh backup into your production server.

If your import fails on the test server due to Hibernate errors, this indicates a schema incompatibility and cannot be worked around. You will need to restore your entire site on an old version of Confluence, and export the space from there. See the last section of Restoring a Space for details.

Restoring a Test Instance from Production

See Migrating Confluence Between Servers for a more comprehensive explanation.

Many Confluence administrators will have a production instance running the "live" version of Confluence, as well as a test instance for testing upgrades and so on. In this situation, it's quite common that the two instances are running different versions of Confluence. This document describes how to copy the data from a production instance to a test instance, where the production version may be different to the test version.

Before proceeding with this guide, ensure you have read and understood the normal procedure for upgrading Confluence.

Upgrading a test Confluence instance with production data

Essentially, we are copying both the production home directory and database to the test instance. We then update the database details on the test instance to point to the test database, leaving all other instance metadata (most importantly the Confluence build number) the same as production.

1. Shut down your test instance.
2. Restore the production database to the test database server.
3. Create a backup of the confluence.cfg.xml file found in the home directory of the test instance.
4. Copy the production confluence-home directory to the test application server.
5. Open the confluence.cfg.xml which has been copied in a text editor. Change the database settings to match the test database
server. Ensure you do not point to your production database. (You can compare with the backup you made in Step 3 if you need to get the database settings. Don’t just copy this file – you need the build number unchanged from production to indicate the database is from an older version of Confluence.)

Before starting your test instance, you need to do the following steps to ensure no contact with production systems.

### Ensuring no contact with production systems

To ensure no contact with external systems, you will need to disable both inbound and outbound mail services.

1. Disable global outbound mail by running the following database query:

   ```sql
   SELECT * FROM BANDANA WHERE BANDANAKEY = 'atlassian.confluence.smtp.mail.accounts';
   ```

2. Disable space-level mail archiving by running the following database query:

   ```sql
   SELECT * FROM BANDANA WHERE BANDANAKEY = 'atlassian.confluence.space.mailaccounts';
   ```

   Change the `SELECT *` to a `DELETE` in the above queries once you are sure you want to remove the specified accounts.

Once this is done, you can start your test instance without any mails being sent or retrieved. Think carefully about other plugins which may access production systems (SQL macro, etc.). These should be disabled promptly after starting the test instance.

You can create a developer license for this server and update the License Details after starting up.

### See also

- Upgrading Confluence
- Migrating Confluence Between Servers
- Restoring to a Test Instance of Confluence from Production

### Restoring Data from other Backups

Typically, Confluence data is restored from the Administration Console or from the Confluence Setup Wizard.

If you are experiencing problems restoring from an zipped XML backup file, it is still possible to restore provided you have:

1. A backup of your home directory.
2. A backup of your database (if you’re using an external database).

Instructions for this method of restoring differ depending on whether you are using the embedded database or an external database (like Oracle, MS SQL Server, MySQL or Postgres).

The information on this page does not apply to Confluence OnDemand.

### Embedded Database

If you are running against the embedded database, the database is located inside the `database` folder of your Confluence Home Directory. Hence, all you need to do is:

1. Retrieve the most recent backup of your home directory.
2. Unpack the Confluence distribution and point the `confluence-init.properties` file to this directory.

### External Database

If you’re using an external database, you need to do the following.

1. Prepare backups of your home directory and database (preferably backups that are dated the same). That is, make sure the home directory is accessible on the filesystem and the database available to be connected to.
2. If this database happens to have a different name, or is on a different server, you need to modify the jdbc url in the `confluence.cfg.xml` file inside the Confluence Home Directory. The value of this property is specified as `hibernate.connection.url`.
3. Unpack the Confluence distribution and point the `confluence-init.properties` file to the home directory.

### RELATED TOPICS
Restoring Data from the Administration Console

Use this option if you want to restore data into your current instance of Confluence. If you want to restore data into a new instance, follow the instructions here.

You need to have System Administrator permissions in order to perform this function.

**CAUTION:** Restoring a backup of an entire Confluence site (consisting of multiple spaces) will do the following:

- Wipe out all Confluence content in the database. Ensure that your database is backed up.
- Log you out after the restore process. Make sure you know your login details contained in the data being restored.

The information on this page does not apply to Confluence OnDemand.

To restore data from backup:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
   - Select 'Backup and Restore' in the 'Administration' section of the left-hand panel.

You can restore data in one of two ways:

1. **Upload a zipped backup to Confluence:**
   - Browse for the backup file.
   - Uncheck 'Build Index' if you want to create the index at a later stage.
   - Click 'Upload and Restore'.

2. **Restore a backup from the file system:**
   - Select the backup file from the form field displayed. If you do not see your backup file, make sure that it has been copied into the /opt/java/src/confluence/deployments/conf.atlassian.com/home/restore directory.
   - Uncheck 'Build Index' if you want to create the index at a later stage.
   - Click 'Restore'.

**RELATED TOPICS**

Page: Restoring Data from the Administration Console

Page: Restoring a Space

Page: Restoring a Site

Page: Manually Backing Up The Site

Page: Restoring from Backup During Setup

Retrieve file attachments from a backup

File attachments on pages can be retrieved from a backup without needing to import the backup into Confluence. This is useful for recovering attachments that have been deleted by users.

Both automated and manual backups allow this, as long as the 'Include attachments' property was set. Users wanting to restore pages, spaces or sites should check out the Confluence Administrator's Guide instead.
Before following the instructions for recovering attachments, please review how backups store file and page information.

⚠️ The information on this page does not apply to Confluence OnDemand.

How Backups Store File and Page Information

The backup zip file contains entities.xml, an XML file containing the Confluence content, and a directory for storing attachments.

Backup Zip File Structure

Page attachments are stored under the attachments directory by page and attachment id. Here is an example listing:

Listing for test-2006033012_00_00.zip
\attachments\98\10001
\attachments\99\10002
\attachments\99\10001
entities.xml

Inside the attachment directory, each numbered directory inside is one page, and the numbered file inside is one attachment. The directory number is the page id, and the file number is the attachment id. For example, the file `\attachments\98\10001` is an attachment with page id 98 and attachment id 10001. You can read entities.xml to link those numbers to the original filename. Entities.xml also links each page id to the page title.

Entities.xml Attachment Object

Inside the entities.xml is an Attachment object written in XML. In this example, the page id is 98, the attachment id is 10001 and the filename is `myimportantfile.doc`. The rest of the XML can be ignored:

```xml
<object class="Attachment" package="com.atlassian.confluence.pages">
  <id name="id">98</id>
  <property name="fileName"><![CDATA[myimportantfile.doc]]></property>
  ...
  <property name="content" class="Page" package="com.atlassian.confluence.pages"><id name="id">10001</id>
  ...
</object>
```

Entities.xml Page Object

This XML describes a page. In this example, the page id is 98 and the title is *Editing Your Files*. The rest of the XML can be ignored:

```xml
<object class="Page" package="com.atlassian.confluence.pages">
  <id name="id">98</id>
  <property name="title"><![CDATA[Editing Your Files]]></property>
  ...
</object>
```

Instructions for Recovering Attachments

Each file must be individually renamed and re-uploaded back into Confluence by following the instructions below. Choose one of the three methods:

**Choice A - Recover Attachments By Filename**

Best if you know each filename you need to restore, especially if you want just a few files:

1. Unzip the backup directory and open entities.xml.
2. Search entities.xml for the filename and find the attachment object with that filename. Locate its page and attachment id.
3. Using the page and attachment id from entities.xml, go to the attachments directory and open that directory with that page id. Locate the file with the attachment id.
4. Rename the file to the original filename and test it.
5. Repeat for each file.
6. To import each file back into Confluence, upload to the original page by attaching the file from within Confluence.

**Choice B - Restore Files By Page**

Best if you only want to restore attachments for certain pages:

1. Unzip the backup directory and open entities.xml.
2. Search entities.xml for the page title and find the page object with that title. Locate its page id.
3. Go to the attachments directory and open that directory with that page id. Each of the files in the directory is an attachment that must be renamed.
4. Search entities.xml for attachment objects with that page id. Every attachment object for the page will have an attachment id and filename.
5. Rename the file with that attachment id to the original filename and test it.
6. Repeat for each page.
7. To import each file back into Confluence, upload to the original page by attaching the file from within Confluence.

**Choice C - Restore All Files**

Best if you have a small backup but want to restore many or all the attachments inside:

Following process is applicable to space export only. Site xml backups do not require page id to be updated manually due to the nature of persistent page_id's.

1. Unzip the backup directory and open entities.xml.
2. Go to the attachments directory and open any directory. The directory name is a page id. Each of the files in the directory is an attachment that must be renamed.
3. Search entities.xml for attachment objects with that page id. When one is found, locate the attachment id and filename.
4. Rename the file with that attachment id to the original filename and test it.
5. Find the next attachment id and rename it. Repeat for each file in the directory.
6. Once all files in the current directory are renamed to their original filenames, search entities.xml for the page id, eg directory name. Find the page object with that page id and locate its page title.
7. Rename the directory to the page title and move on to the next directory. Repeat for each un-renamed directory in the attachments directory.
8. To import each file back into Confluence, upload to the original page by attaching the file from within Confluence.

To obtain detailed information about lost attachments, location, name and type of the attachments, you may use the findattachments script

**Troubleshooting failed XML site backups**

XML site backups are only necessary for migrating to a new database. Setting up a test server or Establishing a reliable backup strategy is better done with an SQL dump.

Seeing an error when creating or importing a backup?

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exception while creating backup</td>
<td>Follow instructions below</td>
</tr>
<tr>
<td>Exception while importing backup</td>
<td>Follow Troubleshooting XML backups that fail on restore instead</td>
</tr>
</tbody>
</table>

⚠️ The information on this page does not apply to Confluence OnDemand.

**Resolve Errors With Creating An XML Backup**

The errors may be caused by a slightly corrupt database. If you're seeing errors such as 'Couldn't backup database data' in your logs, this guide will help you correct the error on your own. We strongly recommend that you backup your database and your Confluence home directory beforehand, so that you can restore your site from those if required. If you are unfamiliar with SQL, we suggest you contact your database administrator for assistance.
Preferable solution

The Production Backup Strategy is a very reliable and more efficient way to do backups. If you are running into problems with XML backups - whether memory related or because of problems like the one described here - use the native backup tool as an alternate solution.

To Identify And Correct The Problem

To work out where the data corruption or problems are, increase the status information reported during backup, then edit the invalid database entry:

1. Stop Confluence.
2. If you have an external database, use a database administration tool to create a manual database backup.
3. Backup your Confluence home directory. You will be able to using this and the database backup.
4. Open the my_confluence_install/confluence/WEB-INF/classes/log4j.properties and add this to the bottom and save:

```
log4j.logger.com.atlassian.confluence.importexport.impl.XMLDatabinder=DEBUG,
confluence
log4j.additivity.com.atlassian.confluence.importexport.impl.XMLDatabinder=false
```
5. Find your atlassian-confluence.log. Move or delete all existing Confluence logs to make it easier to find the relevant logging output.
6. Restart Confluence and login.
7. Begin a backup so that the error reoccurs.
8. You must now check your log files to find out what object could not be converted into XML format. Open
confluence-home/logs/atlassian-confluence.log. Scroll to the bottom of the file.
9. Do a search for 'ObjectNotFoundException'. You should see an error similar to this:

```
01 2005-08-24 00:00:33,743 DEBUG [DOCPRIV2:confluence.importexport.impl.XMLDatabinder] Writing object: com.atlassian.confluence.core.ContentPermission with ID: 5 to XML.
02 2005-08-24 00:00:33,743 DEBUG [DOCPRIV2:confluence.importexport.impl.XMLDatabinder] Writing property: type
03 2005-08-24 00:00:33,743 DEBUG [DOCPRIV2:confluence.importexport.impl.XMLDatabinder] Writing property: group
04 2005-08-24 00:00:33,743 DEBUG [DOCPRIV2:confluence.importexport.impl/XMLDatabinder] Writing property: expiry
05 2005-08-24 00:00:33,743 DEBUG [DOCPRIV2:confluence.importexport.impl/XMLDatabinder] Writing property: content
06 [DOCPRIV2:ERROR] LazyInitializer - Exception initializing proxy <net.sf.hibernate.ObjectNotFoundException: No row with the given identifier exists: 2535, of class: com.atlassian.confluence.core.ContentEntityObject>
```
10. Open a DBA tool such as DbVisualizer and connect to your database instance. Scan the table names in the schema. You will have to modify a row in one of these tables.
11. To work out which table, open catalina.out, check the first line of the exception. This says there was an error writing the ContentPermission object with id 5 into XML. This translates as the row with primary key 5 in the CONTENTLOCK table needs fixing. To work out what table an object maps to in the database, here's a rough guide:
   - Pages, blogposts, comments --> CONTENT table
   - attachments --> ATTACHMENTS table
   - More information can be found in the schema documentation
12. Now you must find the primary key of the incorrect row in this table. In this case, you can check the first line and see that the row has a primary key of 5.
13. Each property is written to a column, so the last property that was being written has the incorrect value. The row being written to when the exception was thrown was CONTENT (line 5) with a value of 2535 (line 6). Now you know the column and value. This value
2535 is the id of an entry that no longer exists.

14. Using a database administrative tool, login ot the Confluence database. Locate the row in the relevant table and correct the entry. Check other rows in the table for the default column value, which may be null, 0 or blank. Overwrite the invalid row value with the default.

15. Restart Confluence.

16. Attempt the backup again. If the backup fails and you are stuck, please lodge a support request with your latest logs.

Troubleshooting "Duplicate Key" related problems

If you are encountering an error message such as:

could not insert:
[bucket.user.propertyset.BucketPropertySetItem#bucket.user.propertyset.BucketPropertySetItem@a70067d3
SQL []; Violation of PRIMARY KEY constraint 'PK_OS_PROPERTYENTRY314D4EA8'. Cannot insert duplicate key in object 'OS_PROPERTYENTRY'.; nested exception is java.sql.SQLException:
Violation of PRIMARY KEY constraint 'PK_OS_PROPERTYENTRY314D4EA8'. Cannot insert duplicate key in object 'OS_PROPERTYENTRY'.

this indicates that the Primary Key constraint 'PK_OS_PROPERTYENTRY_314D4EA8' has duplicate entries in table 'OS_PROPERTYENTRY'.

You can locate the constraint key referring to 'PK_OS_PROPERTYENTRY_314D4EA8' in your table 'OS_PROPERTYENTRY' and locate any duplicate values in it and remove them, to ensure the "PRIMARY KEY" remains unique. An example query to list duplicate entries in the 'OS_PROPERTYENTRY' table is:

```
SELECT ENTITY_NAME,ENTITY_ID,ENTITY_KEY,COUNT(*) FROM OS_PROPERTYENTRY GROUP BY ENTITY_NAME,ENTITY_ID,ENTITY_KEY HAVING COUNT(*)>1
```

To Help Prevent This Issue From Reoccuring

1. If you are using the embedded database, be aware that it is bundled for evaluation purposes and does not offer full transactional integrity in the event of sudden power loss, which is why an external database is recommended for production use. You should migrate to an external database.

2. If you are using an older version of Confluence than the latest, you should consider upgrading at this point.

RELATED TOPICS

Enabling detailed SQL logging

Troubleshooting XML backups that fail on restore

XML site backups are only necessary for migrating to a new database. Upgrading Confluence, Setting up a test server or Production Backup Strategy is better done with an SQL dump.

If migrating from HSQLDB to MySQL, you might have a better experience using the MySQL Migration Toolkit.

Seeing an error when creating or importing a site or space backup?

<table>
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</tr>
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<td>Exception while importing backup</td>
<td>Follow instructions below</td>
</tr>
</tbody>
</table>

⚠️ The information on this page does not apply to Confluence OnDemand.
Resolve Errors When Attempting To Restore An XML Backup

The errors may be caused by a slightly corrupt database. You will need to find the XML backup file entry that is violating the DB rules, modify the entry and recreate the XML backup:

1. On the instance being restored, follow the instructions to disable batched updates (for simpler debugging), log SQL queries and log SQL queries with parameters at Enabling Detailed SQL Logging.
2. Once all three changes have been made, restart Confluence.
3. Attempt another restore.
4. Once the restore fails, check your log files to find out what object could not be converted into XML format. For Confluence distribution users, check your Confluence install directory under the /logs/ and check both atlassian-confluence.log and catalina.out file. The correct file will contain SQL debug output.
5. Scroll to the bottom of the file and identify the last error relating to a violation of the database constraint. For example:

```
net.sf.hibernate.exception.ConstraintViolationException: could not insert: [com.atlassian.confluence.pages.Attachment#38]
net.sf.hibernate.exception.ConstraintViolationException: could not insert: [com.atlassian.confluence.pages.Attachment#38]
... 
Caused by: java.sql.SQLException: ORA-01400: cannot insert NULL into
("CONFUSER"."ATTACHMENTS"."TITLE")
at oracle.jdbc.driver.DatabaseError.throwSqlException(DatabaseError.java:112)
at oracle.jdbc.driver.T4CTTIoer.processError(T4CTTIoer.java:331)
at oracle.jdbc.driver.T4CTTIoer.processError(T4CTTIoer.java:288)
```

This example indicates a row in your attachment table with ID = 38 that has a null title.

6. Go to the server that the backup was created on. You must have a copy of the database from which the backup was created. If you do not have this, use a DBA tool to restore a manual backup of the database.
7. Open a DBA tool and connect to the original database instance and scan the table names in the schema. You will have to modify a row in one of these tables.
8. To work out which table, open catalina.out, check the first line of the exception. To work out what table an object maps to in the database, here's a rough guide:
   - Pages, blogposts, comments --> CONTENT table.
   - attachments --> ATTACHMENTS table.
9. To correct the example error, go to the attachment table and find that attachment object with id 38. This will have a a null title. Give a title using the other attachments titles as a guide. You may have a different error and should modify the database accordingly.
10. Once the entry has been corrected, create the XML backup again.
11. Import the backup into the new version.
12. If the import succeeds, revert the changes made in your SQL logging to re-enable disable batched updates and turn off log SQL queries and log SQL queries with parameters.

Troubleshooting "Duplicate Entry" for key "cp_" or "cps_

If you are encountering an error message such as:

```
com.atlassian.confluence.importexport.ImportExportException: Unable to complete import because
the data does not match the constraints in the Confluence schema. Cause:
MySQLIntegrityConstraintViolationException: Duplicate entry '1475804-Edit' for key
'cps_unique_type'
```

This indicates that the XML export came from a version of Confluence with a corrupt permissions database, caused by some 3rd party plugin. This is an issue that was fixed when CONF-22123 was implemented in Confluence 3.5.2. The simplest workaround is to export the space again after upgrading the instance to 3.5.2 or above. If that is not an option, then either the export will need to be edited manually to remove the duplicate permission entries or the source instance will need to have the offending entries removed. The following SQL queries can be used to look for such entries:
SELECT * FROM CONTENT_PERM WHERE USERNAME IS NULL AND GROUPNAME IS NULL;

SELECT cp.ID, cp.CP_TYPE, cp.USERNAME, cp.GROUPNAME, cp.CPS_ID, cp.CREATOR, cp.CREATIONDATE, cp.LASTMODIFIER, cp.LASTMODDATE
FROM CONTENT_PERM cp
WHERE cp.USERNAME IS NOT NULL AND cp.GROUPNAME IS NOT NULL;

SELECT cps1.ID, cps1.CONTENT_ID, cps1.CONT_PERM_TYPE FROM CONTENT_PERM_SET cps1,
CONTENT_PERM_SET cps2
WHERE cps1.ID <> cps2.ID AND
cps1.CONTENT_ID = cps2.CONTENT_ID AND
cps1.CONT_PERM_TYPE = cps2.CONT_PERM_TYPE
ORDER BY cps1.CONTENT_ID, cps1.CONT_PERM_TYPE, cps1.CREATIONDATE ASC;

SELECT cp.ID, cp.CP_TYPE, cps.CONTENT_ID,
(SELECT scps.ID FROM CONTENT_PERM_SET scps WHERE scps.CONTENT_ID = cps.CONTENT_ID AND
scps.CONT_PERM_TYPE = cp.CP_TYPE) AS suggested_cps_id
FROM CONTENT_PERM cp, CONTENT_PERM_SET cps
WHERE cp.CPS_ID = cps.ID AND
cp.CP_TYPE <> cps.CONT_PERM_TYPE;

SELECT DISTINCT cp1.ID, cp1.CP_TYPE, cp1.USERNAME, cp1.GROUPNAME, cp1.CPS_ID,
cp1.CREATOR, cp1.CREATIONDATE, cp1.LASTMODIFIER, cp1.LASTMODDATE
FROM CONTENT_PERM cp1, CONTENT_PERM_SET cps1, CONTENT_PERM cp2, CONTENT_PERM_SET cps2
WHERE
cp1.CPS_ID = cps1.ID AND
cp2.CPS_ID = cps2.ID AND
cp1.ID <> cp2.ID AND
cps1.CONTENT_ID = cps2.CONTENT_ID AND
cp1.CP_TYPE = cp2.CP_TYPE AND
cp1.USERNAME = cp2.USERNAME
ORDER BY cp1.CPS_ID, cp1.CP_TYPE, cp1.USERNAME, cp1.CREATIONDATE;

SELECT DISTINCT cp1.ID, cp1.CP_TYPE, cp1.USERNAME, cp1.GROUPNAME, cp1.CPS_ID,
cp1.CREATOR, cp1.CREATIONDATE, cp1.LASTMODIFIER, cp1.LASTMODDATE
FROM CONTENT_PERM cp1, CONTENT_PERM_SET cps1, CONTENT_PERM cp2, CONTENT_PERM_SET cps2
WHERE
cp1.CPS_ID = cps1.ID AND
cp2.CPS_ID = cps2.ID AND
cp1.ID <> cp2.ID AND
cps1.CONTENT_ID = cps2.CONTENT_ID AND
cp1.CP_TYPE = cp2.CP_TYPE AND
cp1.GROUPNAME = cp2.GROUPNAME
ORDER BY cp1.CPS_ID, cp1.CP_TYPE, cp1.GROUPNAME, cp1.CREATIONDATE;

SELECT * FROM CONTENT_PERM_SET
WHERE ID NOT IN (SELECT DISTINCT CPS_ID FROM CONTENT_PERM);

Remove all matching entries and perform the export again.

Troubleshooting "Duplicate Key" related problems

If you are encountering an error message such as:

could not insert:
[bucket.user.propertyset.BucketPropertySetItem#bucket.user.propertyset.BucketPropertySetItem@a70067f
SQL []]; Violation of PRIMARY KEY constraint 'PK_OS_PROPERTYENTRY314D4EA8'_. Cannot insert
duplicate key in object 'OS_PROPERTYENTRY'; nested exception is java.sql.SQLException:
Violation of PRIMARY KEY constraint 'PKOS_PROPERTYENTRY_314D4EA8'. Cannot insert duplicate key
in object 'OS_PROPERTYENTRY'.

This indicates that the Primary Key constraint 'PK_OS_PROPERTYENTRY_314D4EA8' has duplicate entries in table
'OS_PROPERTYENTRY'.
You can locate the constraint key referring to 'PK_OS_PROPERTYENTRY_314D4EA8' in your table 'OS_PROPERTYENTRY' and locate
any duplicate values in it and remove them, to ensure the "PRIMARY KEY" remains unique. An example query to list duplicate entries in the
'OS_PROPERTYENTRY' table is:
Troubleshooting "net.sf.hibernate.PropertyValueException: not-null" related problems

If you're receiving a message like:

```xml
ERROR [Importing data task] [confluence.importexport.impl.ReverseDatabinder] endElement
net.sf.hibernate.PropertyValueException: not-null property references a null or transient
value: com.atlassian.user.impl.hibernate.DefaultHibernateUser.name
```

This means there's an unexpected null value in a table. In the above example, the error is in the name column in the USERS table. We've also seen them in the ATTACHMENTS table.

Remove the row with the null value, redo the xml export, and reimport.

To Help Prevent this Issue from Recurring

1. If you are using the embedded database, be aware that it is bundled for evaluation purposes and does not offer full transactional integrity in the event of sudden power loss, which is why an external database is recommended for production use. You should **migrate to an external database**.
2. If you are using an older version of Confluence than the latest, you should consider **upgrading** at this point.

The problem with different settings for case sensitivity varies between databases. The case sensitivity of the database is usually set through the collation that it uses. Please vote on the existing issue.

**RELATED TOPICS**

- Troubleshooting failed XML site backups
- Confluence Administrator's Guide

**Migrating from HSQLDB to MySQL**

If you've gone through Migrate to Another Database and cannot migrate because of a failed xml backup, this page might help.

**Disclaimer**

MySQL Migration Toolkit is released by the makers of MySQL and as such, problems with the software should be directed to them. Atlassian Support does not offer support for the Migration Toolkit, nor do we provide support for this migration path. These instructions are offered for strictly informational purposes, and your mileage may vary.

**Backup Reminder**

Please backup your database and your home folder before attempting this.

**The information on this page does not apply to Confluence OnDemand.**

**Resources needed**

- Empty MySQL DB with appropriate credentials to allow creation, deletion, and insertion of tables and rows.
- A Windows machine that can both communicate to the Confluence server and the destination DB.
- MySQL Migration Toolkit
- HSQL Database Engine

**Preparation for migrating to MySQL from HSQLDB**
1. Shutdown Confluence
2. Make a copy of the confluence home folder for backup purposes
3. Install the Migration Toolkit
4. Unzip the hsqldb package.
5. Copy the hsqldb.jar from hsqldb/lib into C:\Program Files\MySQL\MySQL Tools for 5.0\java\lib
6. Start the MySQL Migration Toolkit

Running the Migration Toolkit

You should be presented with the following screen.

Choose Direct Migration

Source Database
Source Database
Select the source database you want to migrate from.

Destination Database

- Please make sure that the computer that is running MySQL Toolkit is able to access the MySQL server and that the user listed has the ability to create, drop, insert, and update tables.

- If your MySQL user has a $ character in the password (such as 'pa$sword'), please change the password or create a temporary account with full permissions. If you do not, the toolkit will throw an "Illegal group reference" error and you will not be able to proceed with the migration.
**Connecting to Servers**

**Source Schemata Selection**

You should see the toolkit trying to connect. If you have problems, please click on the advanced options and sql will show you debugging information. Click Advanced to see the log. If you see "Java Heap Space: Out of Memory", you can start the MySQL Migration Toolkit with a -Xmx flag to allocate more memory to the JVM.

After this screen you should come to reverse engineering. Click next.
You should see 2 databases, INFORMATION_SCHEMA and PUBLIC. Choose PUBLIC

**Object Type Selection**

**Migration**
In this step the selected object will be migrated.

**Migration of Meta Data**

Tasks to execute
The following tasks will now be executed. Please monitor the execution progress. Press [Advanced >] to see the log:

- [x] Execute Migration Process
- [x] Generate SQL Create Statements

Execution completed successfully.

Click Next.

**Object Type Mapping**
Click **Show Details** on both sections. For **Migration Method for Type Schema**, choose **Multilanguage**. For **Migration Method for Type Table**, choose **Data Consistency/Multilanguage**.

Click **Advanced**. Check **Enabled Detailed Mappings in Next Step**

**Detailed Object Mapping**

Click to rename the destination database to be the one set aside to migrate to. From this point on, you should be able to click next all the way through to finish the migration.

**Rebuilding the Ancestor Table**

In Confluence, the ancestor table defines what pages are ancestors or descendants of other pages (which can be used by search restrictions with the ancestorids restriction). Occasionally, the ancestor table will become out of sync. When this happens, you can rebuild the table to restore everything to normal.

Simply access this URL:

```
http://yoursite/admin/permissions/pagepermsadmin.action
```

⚠️ The information on this page does not apply to Confluence OnDemand.

**Screenshot: Page Level Permissions**

**Dashboard > Administration > Page Level Permissions**

**Configuration**

- General Configuration
- Daily Backup Admin
- Manage Referrers
- Plugins

**Rebuild Ancestor Table**

**RELATED TOPICS**

- Administrators Guide Home  Confluence Documentation Home

**Viewing and Editing License Details**

When you upgrade or renew your Confluence license, you will receive a new license key. You will need to update your Confluence installation with the new license key.
You can access your license key via **http://my.atlassian.com**

**On this page:**
- Updating your License Details
- Viewing your License Details
- Downgrading your Confluence License

⚠️ *The information on this page does not apply to Confluence OnDemand.*

### Updating your License Details

To update your Confluence license,

1. Log into Confluence as a user with Confluence Administrator or System Administrator permissions.
2. Go to the Confluence 'Administration Console':
   - Choose **Browse > Confluence Admin**. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click **Confirm**. You will be temporarily logged into a **secure session** to access the 'Administration Console'.
3. Click 'License Details' under the heading 'Administration' in the left-hand panel.
4. Enter your new license details into the 'License' field and click the 'Save' button.

If you are running a Confluence cluster, you will need to:
- Update each server's Confluence license separately.
- Ensure that the new license has enough nodes to cover all servers that are currently running in your cluster. (To check the number of active servers in your cluster, see the **Cluster Administration page**.)

**Screenshot: License Details**

This page shows your current licensing information.

You can use the form below to update the license Confluence is running with.

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Atlassian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Purchased</td>
<td>Feb 11, 2007</td>
</tr>
<tr>
<td>License Type</td>
<td>Confluence: Commercial Server</td>
</tr>
<tr>
<td>Licensed Users</td>
<td>500 (0 signed up currently)</td>
</tr>
<tr>
<td>Support Period</td>
<td>Your commercial Confluence support and updates are available until <strong>Feb 12, 2008</strong>.</td>
</tr>
<tr>
<td>Server ID</td>
<td>AACK-C015-AACK-C015 (Atlassian sales or support may ask you to provide this ID)</td>
</tr>
<tr>
<td>License</td>
<td></td>
</tr>
</tbody>
</table>
Click the 'Refresh' button to make sure you see the latest count.
- What type of license you have (e.g. Commercial, Academic, Community).
- How much time remains in your one-year support and upgrades period (for full licenses) or 30-day trial (for trial licenses).
- Your server ID, which:
  - is generated when you install Confluence for the first time
  - exists for the life of the Confluence instance
  - survives an upgrade
  - is held in the database
  - is not bound to a specific license
  - is the same for all servers in a cluster.

To view the details of your Confluence license,

1. Log into Confluence as a user with Confluence Administrator or System Administrator permissions.
2. Go to the Confluence ‘Administration Console’:
   - Choose Browse > Confluence Admin. The ‘Administrator Access’ login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the ‘Administration Console’.
3. Click ‘License Details’ under the heading ‘Administration’ in the left-hand panel.

**Downgrading your Confluence License**

If you need to downgrade your Confluence license to one which allows fewer users, please make sure first that your new license covers your current user base.

- View your license details as described above.
- Verify that the number of users ‘signed up currently’ is lower than the number allowed by the new license.
- If you currently have more users signed up than the new license allows, please follow these instructions on removing users from your Confluence site.

**RELATED TOPICS**

- Page: Viewing and Editing License Details
- Page: How Do I Find My License from the File System?
- Page: Getting a License for a Staging Environment
- Page: Cache Performance Tuning
- Page: Cache Statistics
- Page: Viewing System Information
- Page: Cache Performance Tuning for Specific Problems
- Page: Confluence Cache Schemes

**Viewing System Information**

The System Information screen provides information about Confluence's configuration, and the environment in which Confluence has been deployed. Your system configuration information is helpful to us when diagnosing errors you may face using Confluence. If you file a support request or bug report, the more detail you can provide about your installation and environment the faster we will be able to help.

To view your system information,

1. Go to the Confluence ‘Administration Console’:
   - Choose Browse > Confluence Admin. The ‘Administrator Access’ login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the ‘Administration Console’.
2. Click ‘System Configuration’ in the ‘Administration’ section.

✔ The handy Memory Graph helps you keep track of Confluence’s memory usage.

⚠️ The information on this page does not apply to Confluence OnDemand.
Live Monitoring Using the JMX Interface

With the JMX interface (introduced in Confluence 2.8), you can monitor the status of your Confluence instance in real time. This will provide you with useful data such as the resource usage of your instance and its database latency, allowing you to diagnose problems or performance issues. To read the JMX data, you will need to use a JMX client.

**Disable JMX**

If you experience any problems during Confluence startup that are related to JMX, it is possible to disable the JMX registration process. Please place `jmxContext.xml` in your `<confluence-install>/confluence/WEB-INF/classes` folder to do so.

The information on this page does not apply to Confluence OnDemand.

**What is JMX?**

JMX (Java Management eXtensions) is a technology for monitoring and managing Java applications. JMX uses objects called MBeans (Managed Beans) to expose data and resources from your application.

1. **Enabling JMX Remote with Tomcat**

By default, Confluence uses the Apache Tomcat web server. To use JMX, you must enable it on your Tomcat server, by carrying out the steps under the Apache Tomcat documentation, entitled Enabling JMX Remote. With those steps completed, restart your Tomcat server.

For the stand-alone, add the startup parameter `-Dcom.sun.management.jmxremote` to `setenv.sh` or `setenv.bat`. See instructions for the Windows Service - enter it in the same place as PermGen Memory.

2. **Selecting your JMX Client**

You need to use a JMX client in order to view the JMX output from Confluence. JConsole is a readily available JMX client that is included with the supported Java Developer Kit (version 5 onwards). The full name is the 'Java Monitoring and Management Console', but we will refer to it as JConsole for the purposes of this document.

3. **Adding the JMX Client to your Path**

You must add the location of the JConsole binary file to your path environment variable. As JConsole resides in the 'bin' (binaries) folder under your Java directory, the path should resemble something like this:

```
JDK_HOME/bin/
```

In this example, replace ‘JDK_HOME’ with the full system path to your Java directory.

4. **Configuring JConsole**

To configure JConsole:

1. Run the JConsole application.
2. You will be prompted to create a new connection. Choose **remote process** and enter the hostname of your Confluence instance and a port of your choosing.
To connect easily, add the startup parameters to setenv.bat or setenv.sh:
-Dcom.sun.management.jmxremote -Dcom.sun.management.jmxremote.port=8086
-Dcom.sun.management.jmxremote.authenticate=false
Port 8086 is unlikely to be used. Then, connect remotely using port 8086.

JConsole, or any JMX client, will not see applications which are not owned by the same user. For example under Windows, if an application is started as a service, it is the System User which owns the process, and not the Current User.

3. Click Connect.

Note: Other JMX clients besides JConsole can read JMX information from Confluence.

**What can I monitor with JMX?**

The JMX interface allows you to see live internal information from your Confluence instance, via the following MBeans:

**IndexingStatistics**

This MBean shows information related to search indexing.

<table>
<thead>
<tr>
<th>Property name</th>
<th>Function</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flushing</td>
<td>Shows state of cache (i.e. flushing, or not).</td>
<td>True/False</td>
</tr>
<tr>
<td>LastElapsedTimeMillis</td>
<td>Time taken during last indexing.</td>
<td>Milliseconds</td>
</tr>
<tr>
<td>LastElapsedTimeReindexing</td>
<td>Time taken during last re-indexing.</td>
<td>Milliseconds</td>
</tr>
<tr>
<td>TaskQueueLength</td>
<td>Shows number of tasks in the queue.</td>
<td>Integer</td>
</tr>
</tbody>
</table>

**SystemInformation**

This MBean shows information related to database latency. It also contains most of the information presented on the System Information page.

<table>
<thead>
<tr>
<th>Property name</th>
<th>Function</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>DatabaseExampleLatency</td>
<td>Shows the latency of an example query performed against the database.</td>
<td>Milliseconds</td>
</tr>
</tbody>
</table>

**RequestMetrics**

This MBean shows information related to system load and error pages served.

<table>
<thead>
<tr>
<th>Property name</th>
<th>Function</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>AverageExecutionTimeForLastTenRequests</td>
<td>Average execution time for the last ten requests.</td>
<td>Milliseconds</td>
</tr>
<tr>
<td>CurrentNumberOfRequestsBeingServed</td>
<td>Number of requests being served at this instant.</td>
<td>Integer</td>
</tr>
<tr>
<td>ErrorCount</td>
<td>Number of times the Confluence error page was served.</td>
<td>Integer</td>
</tr>
<tr>
<td>NumberOfRequestsInLastTenSeconds</td>
<td>Obviously, the Number Of Requests In the Last Ten Seconds.</td>
<td>Integer</td>
</tr>
</tbody>
</table>

**MailServer-SMTPServer**

This MBean shows information related to email dispatch attempts and failures. There will be an MBean for every SMTP Mailserver that has been configured in the Confluence instance.
### Property name | Function | Values
--- | --- | ---
EmailsAttempted | The number of email messages Confluence has tried to send. | Integer
EmailsSent | The number of email messages sent successfully. | Integer

**MailTaskQueue**

This MBean shows information related to the email workload.

<table>
<thead>
<tr>
<th>Property name</th>
<th>Function</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>ErrorQueueSize</td>
<td>Number of errors in the queue.</td>
<td>Integer</td>
</tr>
<tr>
<td>Flushing</td>
<td>Shows state (i.e. flushing, or not)</td>
<td>True/False</td>
</tr>
<tr>
<td>FlushStarted</td>
<td>Time that operation began.</td>
<td>Time</td>
</tr>
<tr>
<td>RetryCount</td>
<td>The number of retries that were performed.</td>
<td>Integer</td>
</tr>
<tr>
<td>TaskSize</td>
<td>Number of email messages queued for dispatch.</td>
<td>Integer</td>
</tr>
</tbody>
</table>

**SchedulingStatistics**

This MBean shows information related to current jobs, scheduled tasks and the time that they were last run.

**High CPU consuming threads**

For Java 1.6, add the Top Threads Plugin to monitor whether CPU is spiking. Download it to a directory and run JConsole like this:

```
JConsole -pluginpath /pathto/topthreads.jar
```

This works only with JDK 1.6, but that can be on the remote machine if the server is running a lower version.

> Please note, adding live monitoring to a production instance may itself have an impact on performance.

**Related Topics**

- Viewing System Information
- Cache Statistics
- Viewing and Editing License Details
- Viewing and Managing Installed Plugins

**Tracking Customisations Made to your Confluence Installation**

The 'Modification' section of the Confluence 'System Information' screen lists the files that have been changed since your Confluence application was installed. You will find this information particularly useful when upgrading Confluence to a new version, because you will need to re-apply all customisations after the upgrade.

> The information on this page does not apply to Confluence OnDemand.

To see the modifications made to files in your Confluence installation,
1. Go to the Confluence 'Administration Console':
   - Choose **Browse > Confluence Admin**. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click **Confirm**. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select 'System Information' in the 'Administration' section of the left-hand panel.
3. Scroll down to the section titled 'Modification'.

**Screenshot: Modifications tracker on the Confluence System Information screen**

<table>
<thead>
<tr>
<th>Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Modified</strong></td>
</tr>
<tr>
<td><strong>Removed</strong></td>
</tr>
</tbody>
</table>

**Notes**

- The modification tracker does not detect changes to class files from the **confluence.jar** or other JAR files. If you modify classes, the Confluence modification detection does not report the modification. See issue CONF-20993.

**RELATED TOPICS**

- **Administrators Guide Home**
- **Confluence Documentation Home**

**Viewing Site Statistics**

Note that the site activity information is **disabled by default**. See notes below.

If enabled, the global activity screen displays statistics on the activity in your Confluence site. These include:

- How many pages and blog posts have been viewed, added or updated over a given period.
- Which spaces are the most popular (most frequently viewed).
- Which spaces are the most active (most frequently edited).
- Which people are the most active contributors/editors of content.

**The information on this page does not apply to Confluence OnDemand.**

**To view the activity on your site,**

1. Go to the Confluence 'Administration Console':
   - Choose **Browse > Confluence Admin**. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click **Confirm**. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Click 'Global Activity' in the 'Administration' section of the left-hand panel.

**Screenshot: Global Activity**
The top ten most popular and most active pages and/or blog posts will be listed, with a link to each.

Notes

- The Confluence Usage Stats plugin, which provides the 'Global Activity' screen, is known to cause performance problems on large installations. This plugin is disabled by default. A status report on the progress of the performance issues with this plugin is available in this issue: USGTRK-15.
- Your Confluence system administrator can enable the plugin, but please be aware of the possible impact upon your site's performance.
- The plugin is sometimes called 'Confluence Usage Tracking'.
- If your Confluence site is clustered, the global activity information will not be available.

RELATED TOPICS

How Do I Get More Statistics From Confluence?
Cache Statistics
Viewing Space Activity
Live Monitoring Using the JMX Interface
Installing and Configuring Plugins

Viewing System Properties

After adding memory, setting a proxy or changing other Java options, it can be difficult to diagnose whether the system has picked them up. This page tells you how to view the system properties that your Confluence site is using.

⚠️ The information on this page does not apply to Confluence OnDemand.

In Confluence 3.0.2 and Later

You can see the expanded system properties on the 'System Information' screen of the Confluence Administration Console.
To see the system properties recognised by your Confluence installation:

1. Go to the Confluence ‘Administration Console’:
   - Choose Browse > Confluence Admin. The ‘Administrator Access’ login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the ‘Administration Console’.
2. Select System Information in the ‘Administration’ section of the left-hand panel.
3. Scroll down to the section titled ‘System Properties’.

**In Confluence Versions Earlier than 3.0.2**

To find out more about what properties are being picked up, download the file systemproperties.jsp (attached to this page). Place it in your <confluence-install>/confluence/admin directory. Access the following URL:

```
http://<yourbaseurl>/admin/systemproperties.jsp
```

No restart of Confluence is required.

**Installing Patched Class Files**

Atlassian support or the Atlassian bug-fixing team may occasionally provide patches for critical issues that have been resolved but have not yet made it into a release. Those patches will be class files which are attached to the relevant issue in our JIRA bug-tracking system.

⚠️ The information on this page does not apply to Confluence OnDemand.

**Installation Instructions for the Confluence Distribution**

Follow these steps to install a patched class file:

1. Shut down your confluence instance.
2. Copy the supplied class files to `<installation-directory>/confluence/WEB-INF/classes/<subdirectories>`, where:
   - `<installation-directory>` must be replaced with your Confluence Installation directory. (If you need more information, read about the Confluence Installation Directory.)
   - `<subdirectories>` must be replaced by the value specified in the relevant JIRA issue. This value will be different for different issues. In some cases, the subdirectories will not exist and you will need to create them before copying the class files. Some issues will contain the patch in the form of a ZIP file which will contain the desired directory structure.
3. Restart your Confluence instance for the changes to become effective.

Class files in the `/WEB-INF/classes` directory of a web application will be loaded before classes located in JAR files in the `/WEB-INF/lib` directory. Therefore, classes in the first directory will effectively replace classes of the same name and package which would otherwise be loaded from the JAR files.

**RELATED TOPICS**

Editing Files within JAR Archives
Where are the files that used to be in my Confluence installation directory?

**Finding Your Confluence Support Entitlement Number (SEN)**

There are three ways to find you Support Entitlement Number (SEN):

- **Method 1:** Check in the Confluence Administration Interface
  Select Administration >> License Details. The SEN is shown:

- **Method 2:** Log into my.atlassian.com as the Account Holder or Technical Contact
Method 3: Atlassian Invoice
Your Support Entitlement Number (SEN) appears on the third page of your Atlassian Invoice.

See Finding Your Support Entitlement Number in the support space for more general information about how Atlassian Support uses this number.

⚠️ The information on this page does not apply to Confluence OnDemand.

Configuring Confluence

The pages listed below contain instructions on configuring Confluence. If you cannot find what you are looking for, try the search box in the left-hand navigation panel.

- Site Configuration
  - Configuring the Site Home Page
  - Configuring the Administrator Contact Page
  - Editing the Site Title
  - Editing the Global Logo
  - Configuring the Server Base URL
  - Customising Default Space Content
  - Configuring the Destination of View Space Links
  - Editing the Site Welcome Message
  - Configuring the What’s New Dialog
- Configuring Encoding
  - Character encodings in Confluence
  - Troubleshooting Character Encodings
    - “€” Euro character not displaying properly
    - MySQL 3.x Character Encoding Problems
- Configuring Mail
  - Configuring a Server for Outgoing Mail
  - The Mail Queue
- Optional Settings
  - Attachment Storage Configuration
Configuring a WebDAV client for Confluence
Configuring Quick Navigation
Enabling OpenSearch
Enabling the Did You Mean Feature
Enabling the Remote API
Enabling Threaded Comments
Enabling Trackback

Other Settings
Configuring Attachment Size
Configuring Character Encoding
Configuring HTTP Timeout Settings
Configuring Indexing Language
Configuring Number Formats
Configuring Shortcut Links
Configuring Time and Date Formats

Configuring System Properties
Recognised System Properties

Configuring a Large Confluence Installation
Configuring Logging
External Gadgets

RELATED TOPICS
Tracking Customisations Made to your Confluence Installation
Confluence Configuration Guide

Site Configuration

- Configuring the Site Home Page
- Configuring the Administrator Contact Page
- Editing the Site Title
- Editing the Global Logo
- Configuring the Server Base URL
- Customising Default Space Content
- Configuring the Destination of View Space Links
- Editing the Site Welcome Message
- Configuring the What's New Dialog

Configuring the Site Home Page

You can configure Confluence to send users to any of the space home pages on the site when they log in, rather than to the dashboard.

To configure the site-wide home page:

1. Go to the 'Administration Console' and click 'General Configuration' in the left-hand panel.
2. Click 'Edit' next to the 'Site Configuration' panel.
3. Select a space from the 'Site Homepage' dropdown menu. When users log in, Confluence will open the home page of the space you choose here.
4. Ensure that the 'View Space Goes to Browse Space' option is set to 'Off' if you want users to be sent to the space home page and not the space summary page.
5. Click the 'Save' button at the bottom of the screen.

The spaces available to be set as your home page will depend on the access permissions of the space and the site.

- The site home page must be accessible to the 'confluence-users' group.
- If your site allows anonymous access, the site home page must also be accessible to anonymous users, that is, people who have not logged in to Confluence.

Notes

- The user's personal settings will override the global setting.

Related Topics
Page: Customising Default Space Content
Page: Editing the Site Welcome Message
Page: Editing the Global Logo
Configuring the Administrator Contact Page

The administrator contact page is a form that allows a user of Confluence to send a message to the administrators of their Confluence site. (In this context, administrators are those users who are members of the 'confluence-administrators' group. See the explanation of site administrators.)

The title of the administrator contact page is 'Contact Site Administrators'. Typically, Confluence users may get to this page by clicking a link on an error screen such as the '500 error' page.

On this page:

- Customising the Administrator Contact Message
  - The Default Administrator Contact Message
  - Customisation Examples
- Disabling the Administrator Contact Form
- Configuring Spam Prevention
- Related Topics

Customising the Administrator Contact Message

You can customise the message that is presented to the user on the 'Contact Site Administrators' page.

To edit the administrator contact message:

1. Go to the 'Administration Console' and click General Configuration in the left-hand panel.
2. Click Edit at the top of the 'Site Configuration' section.
3. Enter your text in the Custom Contact Administrators Message box. You can enter any text or Confluence wiki markup.
4. Click Save.

The Default Administrator Contact Message

By default, the 'contact administrators message' looks much like the highlighted area in the screenshot below, starting with 'Please enter information...'.

Screenshot: The default 'Contact Site Administrators' message

To restore the message to its default simply remove the custom message you entered when following the instructions above, so that the 'Custom Contact Administrators Message' field is empty.

Customisation Examples
When entering the ‘Custom Contact Administrators Message’, you can use text and Confluence wiki markup.

This is similar to entering your own text and markup for the ‘Site Welcome Message’. For examples of the kind of customisations possible, take a look at the guide to editing the site welcome message.

### Disabling the Administrator Contact Form

If you prefer to disable the ability for users to send an email message to the site administrators, you can disable the form portion of this screen. You can only disable the form if you first provide a ‘Custom Contact Administrators Message’ as described above.

**To enable or disable the administrator contact form:**

1. Go to the ‘Administration Console’ and click General Configuration in the left-hand panel.
2. Click Edit at the top of the ‘Site Configuration’ section.
3. Select on or off for the ‘Contact Administrators Form’.
4. Click Save.

### Configuring Spam Prevention

You can configure Confluence to use Captcha to help prevent spam, including the spamming of Confluence administrators. The administrator contact form is covered by the site-wide Captcha settings as documented in Configuring Captcha for Spam Prevention.

### Related Topics

- Contacting Confluence Administrators
- Configuring Captcha for Spam Prevention

### Editing the Site Title

The site title appears in your browser's title bar. By default, it is set to ‘Confluence’.

**To change the title of your Confluence site:**

1. Go to the ‘Administration Console’ and click ‘General Configuration’ in the left-hand panel.
2. Click ‘Edit’ at the top of the ‘Site Configuration’ screen.
3. Enter a new title for your site in the input field next to ‘Site Title’.
4. Click ‘Save’.

### Related Topics

- Customising Default Space Content
- Editing the Site Welcome Message
- Editing the Global Logo
- Editing the Site Title
- Configuring the Destination of View Space Links
- Configuring the Site Home Page
- Configuring the Server Base URL

### Editing the Global Logo

By default, the global logo appears beside the page title on all pages in the site. You can disable the logo or replace it with one of your own.

**To edit the global logo:**

1. Go to ‘Administration Console’ > ‘Global logo’, under ‘Look and Feel’ in the left panel.
2. In the screen displayed, select ‘Off’ to disable logo.
3. To upload a new logo, click ‘Browse’ to select a new image and click ‘Upload Logo’.

### Related Topics

- Customising Default Space Content
- Editing the Site Welcome Message
Configuring the Server Base URL

The **Server Base URL** is the URL via which users access Confluence. The base URL **must** be set to the same URL by which browsers will be viewing your Confluence site.

Confluence will automatically detect the base URL during setup, but you may need to set it manually if your site's URL changes or if you set up Confluence from a different URL to the one that will be used to access it publicly.

⚠️ You need to have **System Administrator** permissions in order to perform this function.

---

**To configure the Server Base URL:**

1. In Confluence, open the 'Browse' menu and select 'Confluence Admin'. The 'Administration Console' will open.
2. Click 'General Configuration' in the left-hand panel.
3. Click the 'Edit' button next to 'Site Configuration'.
4. Enter the new URL in the 'Server Base URL' text box.
5. 'Save' your changes.

**Example**

If Confluence is installed to run in a non-root context path (that is, it has a context path), then the server base URL should include this context path. For example, if Confluence is running at:

```
http://www.foobar.com/confluence
```

then the server base URL should be:

```
http://www.foobar.com/confluence
```

**Notes**

- Using different URLs. If you configure a different base URL or if visitors use some other URL to access Confluence, it is possible that you may encounter errors while viewing some pages.

- Changing the context path. If you change the context path of your base URL, you may also need to edit the web server's `server.xml` to reflect the new path.

**RELATED TOPICS**

- Page: Customising Default Space Content
- Page: Editing the Site Welcome Message
- Page: Editing the Global Logo
- Page: Editing the Site Title
- Page: Configuring the Destination of View Space Links
- Page: Configuring the Site Home Page
- Page: Configuring the Server Base URL
Customising Default Space Content

Confluence Administrators can define default content for a space home page. This content will appear on the home page whenever someone adds a new space. You can define different content for global spaces and for personal spaces.

The default content will appear only for new spaces created after you have defined the content. Content in existing home pages will not be changed.

To define default content for home pages in global spaces:

1. Go to the 'Administration Console' and click 'Default Space Content' under 'Configuration' in the left-hand panel.
2. The 'Space Home Pages' tab will open on the 'Default Space Content' page. Enter the content which you want to appear on the home page for new global spaces. You can use special characters within the content as variables (place holders). Confluence will replace the curly brackets and digits with the corresponding information as shown below:
   - {0} — The space name.
3. Click the 'Save' button.

To define default content for home pages in personal spaces:

1. Go to the 'Administration Console' and click 'Default Space Content' under 'Configuration' in the left panel.
2. The 'Space Home Pages' tab will open on the 'Default Space Content' page. Click the 'Personal Space Home Pages' tab.
3. Enter the content which you want to appear on the home page for new personal spaces. You can use special characters within the content as variables (place holders). Confluence will replace the curly brackets and digits with the corresponding information as shown below:
   - {0} — The space owner's full name.
   - {1} — The space owner's e-mail address.
   - {2} — Any personal information the space owner has entered on their user profile in the 'Information about me' section.
4. Click the 'Save' button.

You can also undo all customisations of the default home page content, and go back to the default content as originally supplied with Confluence.

To restore the original default content:

1. Go to the 'Administration Console' and click 'Default Space Content' under 'Configuration' in the left panel.
2. Select either the 'Space Home Pages' tab or the 'Personal Space Home Pages' tab, as required.
3. Click the 'Revert' button.

Screenshot above: Defining default space content
Configuring the Destination of View Space Links

By default, when you click a space link in order to view the space, you are taken to the space's home page. If you wish, you can configure Confluence to redirect all space links on the site to the 'Browse Space' view of the space instead.

To direct the space link to the 'browse space' view:

1. Go to the 'Administration Console' and click 'General Configuration' in the left-hand panel.
2. Click 'Edit' at the top of the 'Site Configuration' screen.
3. Select 'On' next to 'View Space goes to Browse Space'.
4. Click 'Save'.

Related Topics
Page: Customising Default Space Content
Page: Editing the Site Welcome Message
Page: Editing the Global Logo
Page: Editing the Site Title
Page: Configuring the Destination of View Space Links
Page: Configuring the Site Home Page
Page: Configuring the Server Base URL

Editing the Site Welcome Message

The site welcome message appears at the top left of the Confluence dashboard, between the site logo and the list of spaces. You can use it to display an introduction to the site or a message of the day.

To edit the site welcome message:

1. Go to the Administration Console and click General Configuration in the left-hand panel.
2. Click Edit at the top of the Site Configuration section.
3. Type into the Site Welcome Message box. You can enter text or Confluence wiki markup.
4. Click Save.
By default, the site welcome message looks more or less like the screenshot below, starting with the words Welcome to Confluence and ending above the list of spaces.

To restore the default site welcome message and remove your customised message, just delete the text in the Site Welcome Message text box. Provided that you have not customised Confluence, your Confluence users will see the default message if there is no text in the Site Welcome Message text box in your Administration Console.

Example 1. Adding a Simple Welcome Message

Let's say you want to display a simple message like this at the top of your dashboard:

```
Welcome to the MyCompany Wiki

New to MyCompany? Find out about your induction.
Otherwise, have fun, because you can't always work!
```

To produce the above welcome message, follow the step-by-step instructions above and add the following wiki markup into the Site Welcome Message text box:

```
h2. Welcome to the MyCompany Wiki

New to MyCompany? [Find out about your induction|DS:Company Induction].
Otherwise, [have fun|DS:Have Fun], because you can't always work!
```

In our example, the links point to two pages in the Confluence Demonstration Space, 'DS'. If your Confluence site does not have a 'DS' space, the links will be broken. That's OK, because you will want to replace them with links to your own pages anyway. This is just an example.

Example 2. Formatting your Welcome Message

Now let's say you want to put the words into a panel and add some spacing, so that your dashboard looks like this:
To produce the above welcome message, follow the step-by-step instructions above and add the following wiki markup into the **Site Welcome Message** text box:

```markdown
{panel}

h2. Welcome to the MyCompany Wiki

New to MyCompany? [Find out about your induction](DS:Company Induction).

Otherwise, [have fun](DS:Have Fun), because you can't always work!

{/panel}
```

**Example 3: Including Content from Another Page**

It may be easier to write your welcome message on a normal Confluence page and include the page into the **Site Welcome Message** text box. Using a normal page means that you can:

- Write the message using the editor rather than wiki markup.
- Preview the content of the welcome message before saving it, using the page editor's preview feature.
- Allow other people, who are not Confluence administrators, to edit the welcome message.

To include content from another page:

1. Create a Confluence page as usual and add your welcome message as the page content. Remember to limit the size of the content, because it must fit nicely onto the dashboard. For this example, let's assume you put your page in the 'DS' space and the title of your page is 'Dashboard Welcome Message'.
2. Add page permissions or space permissions to suit your requirements. You may want to restrict the editing of the page to a group of people, or you may want to allow any employee to edit the page. This will determine who can update the welcome message on the dashboard.
3. Follow the step-by-step instructions above and add the following wiki markup into the **Site Welcome Message** text box:

```markdown
{include:DS:Dashboard Welcome Message}
```

In the above example we use the `{include}` macro to display the content from the given page. See the [guide to the include macro](#). In our example, the space key 'DS' and the page name 'Dashboard Welcome Message' are variables. You can use any space and page you like.

4. Save the site welcome message. The dashboard will display the content of the page immediately. Similarly, if you or anyone else edits the page, the welcome message on the dashboard will change as soon as you save the page.

**Example 4. Adding Blog Posts Filtered by Labels to your Welcome Message**

Looking for more advanced ideas?

This video shows you how to display a list of blog posts on your dashboard and how to choose the blog posts by labelling them.

*Video title: ‘Bring "Must Read" Content to the Dashboard’*
Summary of the procedure shown in the video:

1. Create a page containing the \{blog-posts\} macro. Choose to display only the blog posts that are labelled with 'dashboard-blog'. (This is just an example of a label. You can choose any label text you like.) See the guide to the Blog Posts macro.
2. Add the label to a blog post. (In the video, we just add the label to one blog post. You will probably want to add it to a number of posts.)
3. Edit your site welcome message to include the above page, using the \include macro.

How We Use the Site Welcome Message at Atlassian

Atlassian makes great use of the welcome message on our internal Confluence wiki. Here is an example of the dashboard as it appeared on a certain day:

![Dashboard](image)

**Experimental blogroll: All posts labelled "extranet-dashboard"**

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Date Posted</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Open Studio - open source dev powered by JIRA Studio" /></td>
<td>Michael Knighten</td>
<td>Jun 26, 2009</td>
</tr>
<tr>
<td><img src="image" alt="Actioning Your Feedback - June Update" /></td>
<td>Jodette Cleary</td>
<td>Jun 23, 2009</td>
</tr>
<tr>
<td><img src="image" alt="Feedback wanted - Employee Recognition Program" /></td>
<td>Jodette Cleary</td>
<td>Jun 23, 2009</td>
</tr>
<tr>
<td><img src="image" alt="The Big Build System Update" /></td>
<td>James Dumay</td>
<td>Jun 23, 2009</td>
</tr>
<tr>
<td><img src="image" alt="Knowledge Sharing Deputy Position Open" /></td>
<td>Agnes Ip</td>
<td>Jun 19, 2009</td>
</tr>
<tr>
<td><img src="image" alt="Limiting noise on extranet" /></td>
<td>Don Willis</td>
<td>Jun 18, 2009</td>
</tr>
</tbody>
</table>

If you want to promote a good post to stand out from the sea white noise, just add the label **extranet-dashboard**. To avoid inflation please use the label carefully.

The welcome message itself contains just an \{include\} macro:

```
{include:STAFF:Extranet Homepage}
```

The \include macro allows you to include the content an entire page onto another page. This particular page lives in the \STAFF space, where anyone can edit it. It usually shows some amusing picture or company-wide notice. The featured photo generally changes once a week or so – whenever someone feels like changing it. The page itself has over 600 edits by many different people.

The page also includes an edit link, for quick access to change the welcome message. We have the Composition plugin installed which allows you to use the \{float\} macro.
Our wiki markup in the 'Extranet Homepage' page looks something like this:

```
!Clover Dukey.jpg|width=200!

This is the content that goes on the Extranet homepage, above the spaces list.

NOTE: KEEP YOUR PICTURES SMALL (<80KB) -- USE JPG FOR PICTURES, WIDTH 400

h4. Experimental blogroll: All posts labelled "extranet-dashboard"

{blog-posts:content=titles|labels=extranet-dashboard|spaces=@all|max=10} 
If you want to promote a good post to stand out from the eac white noise, just add the label "extranet-dashboard". To avoid inflation please use the label carefully.

{float-right}
{edit me[http://extranet.atlassian.com/pages/editpage.action?pageId=603422736]}
{float-right}
```

**Related Topics**

- Page: Customising Default Space Content
- Page: Editing the Site Welcome Message
- Page: Editing the Global Logo
- Page: Editing the Site Title
- Page: Configuring the Destination of View Space Links
- Page: Configuring the Site Home Page
- Page: Configuring the Server Base URL

**Configuring the What's New Dialog**

The 'What's New' dialog automatically displays when a user first logs in after a major Confluence upgrade (e.g. upgrading to Confluence 4.0). The dialog displays a summary of the new features for the release, sourced from our website (by default).

Confluence administrators can configure the behaviour of the 'What's New' dialog, as follows:

- Change the URL that the 'What's New' dialog retrieves information from.
- Disable the dialog.

**On this page:**

- Changing the 'What's New' Dialog URL
- Disabling the 'What's New' Dialog
- Notes
Changing the 'What's New' Dialog URL

The 'What's New' dialog URL is stored in your Confluence help-paths.properties file. This URL is a concatenation of the help.prefix property with the help.whats.new.iframe.link.

Before you begin:

- The help.prefix property also defines the base URL for Confluence help links, i.e. help links in the Confluence application.

To change the 'What's New' Dialog URL:
Follow the instructions in the 'Changing the Links for Individual Help Pages' section on Local Confluence Documentation. You will need to update the help.prefix and help.whats.new.iframe.link properties, as desired.

For example, you may have installed your Confluence documentation behind a firewall at http://www.example.com/ and created a page http://www.example.com/whatsnew that you use for change management. In this case, you would do the following:

- Set help.prefix to http://www.example.com/
- Set help.whats.new.iframe.link to whatsnew

There is an additional property help.whats.new.full.link. This is only used if the content pointed to by the updated URL isn't loaded in 10 seconds, in which case a 'timeout' screen is displayed with a link to the full 'What's New' content. For locally-hosted pages you can just set this property to the same value as help.whats.new.iframe.link.

Disabling the 'What's New' Dialog

The 'What's New' dialogue is enabled via a plugin. To disable the 'What's New' dialogue, you need to disable the Confluence What's New plugin in Confluence.

To disable the Confluence What's New plugin:
Follow the instructions on Disabling or Enabling a Plugin. Please note, the Confluence What's New plugin is a 'System Plugin'. Click 'Show System Plugins' on the Plugins administration page to display the system plugins.

Notes

Related Topics
Disabling or Enabling a Plugin
Local Confluence Documentation

Configuring Encoding

Confluence allows the configuration of which character encoding is used to deliver pages.
While different character encodings are supported, we strongly recommend that **UTF-8** is used. Confluence is heavily tested on UTF-8, and users are likely to have less problems with this encoding than others.

### Mac Users

Mac Users please note that **MacRoman** encoding is compatible with UTF-8. You do not need to change your encoding settings if you are already using MacRoman.

To avoid problems with character encoding, make sure the encoding used across the different components of your system are the same:

- Configuring Database Character Encoding
- Application Server URL encoding
- Confluence Character Encoding

If you are having problems with the character encoding in Confluence, please see the [Troubleshooting Character Encodings](#) page.

---

**Character encodings in Confluence**

**Character encoding advice**

In general, **always set all character encodings to UTF-8**. That includes database, JDBC drivers, application server, filesystem and Confluence.

In certain isolated cases (e.g. Microsoft Windows), it might not be possible to use a fully Unicode filesystem (that is, a default Windows instal doesn't support Unicode filenames properly). If so, stick with UTF-8 for the other two and be aware that your operating system might have limitations around international attachments (pre-2.2), backup and restore of international data, etc.

The remainder of the document explains the encoding settings that are applicable in Confluence and how they relate to application behaviour.

---

**Where character encoding is used**

There are three places that character encoding matters to Confluence:

1. **Database encoding** - usually the most important; it is where almost all user data is stored.
2. **Filesystem encoding** - important for attachment storage (pre-2.2), reading Velocity templates and writing exported files.
3. **HTTP request and response encoding** - important for form parsing, correct rendering by the browser and browser interpretation of encoded URLs.

Problems generally arise when Confluence thinks one of the above encoding is different to what it actually is. For example, Confluence might believe the database is using ISO-8859-1 encoding, when in fact it is UTF-8 encoded.

**Java character encoding**

Java always uses the multibyte UTF-16 character encoding for all `char` and `String` data. This means that each of the encodings above defines how, at that particular point, characters are converted to and from Java's native UTF-16 format into some other format that the browser, filesystem or database might understand.

So when a request comes in to Confluence, we convert it from the request encoding to UTF-16. Then we store that data into the database, converting from UTF-16 to the database's encoding. Retrieving information from the database and sending it back to the browser is the same process in the opposite direction.

**Problems with character encodings**

If Confluence has the wrong idea about encoding for one of the above, it manifests itself in different ways:

1. Incorrect database encoding - user data is corrupted between saving and restoring from the database. This often happens after a delay, as we cache data as it is written to the database and only later retrieve the corrupted copy from the database.
2. Incorrect/non-Unicode filesystem encoding - international filenames break attachment download/upload/removal (pre-2.2); exports break with international content or attachments.
3. Incorrect HTTP encoding - incorrect encoding selected by browser, resulting in incorrect rendering of characters. Changing browser encoding causes page to render properly. Broken URLs when linking to pages or attachments with non-ASCII characters.

**Configuration of character encodings**

The **Confluence character encoding** is a configuration setting found in Administration > General Configuration, and at runtime available in Settings.defaultEncoding. It is subsequently used in the following parts of the system:

- ConfluenceWebWorkConfiguration sets webwork.i18n.encoding to the this encoding, which WebWork uses in the response Content-Type header.
- AbstractEncodingFilter sets the HTTP request encoding to this encoding. This seems unnecessary, since the Content-Type header from the client should include the encoding used. This affects form submissions and file uploads.
- VelocityUtils reads in Velocity templates using this encoding when reading templates from disk.
- AbstractXmlExporter creates its output using this encoding.
- GeneralUtil uses this encoding when doing URLEncode and URLDecode. Different browsers have different support for character sets in URLs, so it's uncertain how much benefit this provides.

In summary, changing the Confluence character encoding will change your HTTP request and response encoding and your Filesystem encoding as used by exports and velocity templates.

The **database encoding** is the responsibility of your JDBC drivers. The drivers are responsible for reading and writing from the database in its native encoding and translating this data to and from Java Strings (which are UTF-16). For some drivers, such as MySQL, you must set Unicode encoding explicitly in the JDBC URL. For others, the driver is smart enough to determine the database encoding automatically.

Ideally, your database itself should be in a Unicode encoding (and we recommend doing this for the simplest configuration), but that is not necessary as long as:

- the database encoding supports all the characters you want to store in Confluence
- your JDBC drivers can properly convert from the database encoding to UTF-16 and vice-versa.

The **filesystem encoding** is mostly ignored by Confluence, except for the cases where the above configuration setting above plays a part (exports, velocity). When attachments are uploaded, they are written as a stream of bytes directly to the filesystem. It is the same when they are downloaded: the bytes from the file InputStream are written directly to the HTTP response.

In some places in Confluence, we use the default filesystem encoding as determined by the JVM and stored in the file.encoding system property (it can be overridden by setting this property at startup). This encoding is used by the Java InputStreamReader and InputStreamReader classes by default. This encoding should probably never be used; for consistent results across all filesystem access we should be using the encoding set in the General Configuration.

In certain cases we explicitly hard-code the encoding used to read or write data to the filesystem. Two important examples are:

- importing Mbox mailboxes which are known to be ISO-8859-1
- Confluence Bandana config files are always stored as UTF-8.

Some application servers, Tomcat for example, have an encoding setting that modifies Confluence URLs before they reach the application. This can prevent access to international pages and attachments (really anything with international characters in the URL). See configuring your Application Server URL encoding.

**RELATED TOPICS:**

- Configuring Database Character Encoding
- Troubleshooting Database Character Encodings

**Troubleshooting Character Encodings**

Often users may have problems with certain characters in a Confluence instance. Symptoms may include:

- Non-ASCII characters appearing as question marks (?)
- Page links with non-ASCII characters not working
- Single characters being displayed as two characters
- Garbled text appearing

In most cases, it is due to a mis-configuration in one of the components that Confluence uses.

⚠️ The information on this page does not apply to Confluence OnDemand.

Follow these steps to diagnose the problem:

1. **Run the encoding test**

Confluence includes an encoding test that can reveal problems with your configuration.

To perform the test, access the Encoding Test page via the `<confluence base-url>/admin/encodingtest.action` page on your
Confluence instance. You will be required to copy and paste a line of text and submit a form. The test will take the text and pass it through Confluence, the application server and the database, and return the results.

You should also test pasting some sample text (Japanese for example) if you are experiencing problems with a specific language.

Example:

http://confluence.atlassian.com/admin/encodingtest.action

or

http://<host address>:<port>/admin/encodingtest.action

If the text displayed in the encoding test is different to what was entered, then there are problems with your character encoding settings.

A successful test looks like the following:

The encoding test has now been run. Below you can compare the raw text delivered from Confluence round-trip through the database. All the test results should appear identical.

Internationalization

This image is how all the test results below should appear on this page, and all of your System Information.

Test 1: Raw text

This is the test string generated in Confluence

Internationalization

Test 2: Form submission

This is the test string pasted by you into the web form and submitted back to Confluence

Internationalization

Test 3: Database round-trip (select as LOWER)

This is the string from Test 2 after being stored in the database and then retrieved

internationalization

Expected result (converting Java string to lowercase)

internationalization

Test 4: Database round-trip (select as UPPER)

This is the string from Test 2 after being stored in the database and then retrieved

INTERNATIONALIZATION

Expected result (converting Java string to uppercase)

INTERNATIONALIZATION
MySQL 3.x

MySQL 3.x is known to have some problems with the upper- and lower-casing of some characters, and may fail the last two tests. For more information, see MySQL 3.x Character Encoding Problems.

2. Ensure the same encoding is used across all components

As mentioned in the Configuring Encoding document, the same character encoding should be used across the database, application server and web application (Confluence).

- To change the character encoding used in Confluence, see Configuring Character Encoding.
- To change the character encoding used in the application server, please ensure you set the Application Server URL encoding and view your application server’s documentation on any other settings required to enable your encoding.
- To change the character encoding used in the database, see Configuring Database Character Encoding.

3. Requesting support

If there are still problems with character encoding after following the above steps, create a support request, and our support staff will aid in solving your problem.

Entering in the following details will help us to identify your problem:

- Attach screenshots of the problem
- Attach the results of the encoding test (above)
- Select which application server (and version) you are using
- Select which database (and version) you are using
- Copy the contents of the System Information page into the 'Description' field

"€" Euro character not displaying properly

The € (euro) symbol is a three byte character, with byte values in file (UTF-8) of 0xE2, 0x82, 0xAC.

Sometimes, if the character encoding is not set consistently among all participating entities of the system, Confluence, server and the database, one may experience strange behaviour.

... I write a page with a Euro sign in it (€). All is well, the Euro sign shows up in the wiki markup text-box, and the preview, and the display of the saved page.

One day later, the Euro sign has changed into a question mark upside down!

... What is going on? Why does the Euro sign mysteriously change? How do I prevent it?

Interestingly enough the character encoding test passes with no problems, demonstrating that Confluence and the connected Database both recognise the € symbol.

The information on this page does not apply to Confluence OnDemand.

There are two potential reasons for this behaviour:

**Database and Confluence is using utf-8 encoding. The connection is not.**

When data transferred to it via the connection which does not use utf-8 encoding gets encoded incorrectly. Hence, updating the connection encoding may resolve this problem from now on, yet it probably would not affect already existing data.

**Database is not using utf-8. Confluence and your connection are.**

If your Database encoding is not set to UTF-8, yet is using some other encoding such as latin1, it could be one of the potential reasons why you lose the "€" characters at some stage. It could be occurring due to caching. When Confluence saves data to the database, it may also keep a local cached copy. If the database encoding is set incorrectly, the Euro character may not be correctly recorded in the database, but Confluence will continue to use its cached copy of that data (which is encoded correctly). The encoding error will only be noticed when the cache expires, and the incorrectly encoded data is fetched from the database.

For instance the latin1 encoding would store and display all 2-byte UTF8 characters correctly except for the euro character which is replaced by '?' before being stored. As Confluence's encoding was set to UTF-8, the 2-byte UTF-8 characters were stored in latin1 database assuming that they were two latin1 different characters, instead of one utf8 character. Nevertheless, this is not the case for 3-byte utf8 characters, such as the Euro symbol.

Please ensure that you set the character encoding to UTF-8 for all the entities of your system as advised in this guide.
MySQL 3.x Character Encoding Problems

MySQL 3.x is known to have some problems upper- and lower-casing certain (non-ASCII) characters.

Diagnosing the problem

1. Follow the instructions for Troubleshooting Character Encodings.
2. If the upper- and lower-cased strings displayed on the Encoding Test are different, then your database is probably affected.

An example (faulty) output of the Encoding Test is shown below:

---

The information on this page does not apply to Confluence OnDemand.

---

Screenshot: Encoding Test Output

The encoding test has now been run. Below, you can compare the raw text delivered from Confluence through the database. All the test results should appear identical.

<table>
<thead>
<tr>
<th>Test 1: Raw text</th>
<th>This is the test string generated in Confluence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internationažáæíøæ</td>
<td>Internationažáæíøæ</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test 2: Form submission</th>
<th>This is the test string pasted by you into the web form and submitted back to Confluence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internationažáæíøæ</td>
<td>Internationažáæíøæ</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test 3: Database round-trip (select as LOWER)</th>
<th>This is the string from Test 2 after being stored in the database and then retrieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internationažáæíøæ</td>
<td>Internationažáæíøæ</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test 4: Database round-trip (select as UPPER)</th>
<th>This is the string from Test 2 after being stored in the database and then retrieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internationažáæíøæ</td>
<td>Internationažáæíøæ</td>
</tr>
</tbody>
</table>

Solution

Upgrade to a newer version of MySQL. (4.1 is confirmed to work.)

Configuring Mail

- Configuring a Server for Outgoing Mail
- The Mail Queue

Customising the eMail Templates
Configuring a Server for Outgoing Mail

Configuring your Confluence server to send outgoing mail allows your Confluence users to:

- Receive emailed notifications and daily reports of updates.
- Send a page via email.

You can personalise email notifications by configuring the 'From' field to include the name and email address of the Confluence user who made the change.

You need to have System Administrator permissions in order to perform this function.

To configure Confluence to send outgoing mail:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select Mail Servers under Configuration in the left panel. This will list all currently configured SMTP servers.
3. Click Add New SMTP Server (or edit an existing server).
4. Edit the following fields as required:
   - Name: By default, this is simply 'SMTP Server'.
   - From Address: Enter the email address that will be displayed in the 'from' field for email messages originating from this server.
     This field is mandatory. You will not be able to complete the Confluence mail server configuration until this field has been specified.
   - From Name: Enter the name that will be displayed in the 'from' field for email messages originating from this server. This is the text which appears before the user's registered email address (in angled brackets).
     This field accepts the following variables, which reference specific details defined in the relevant Confluence user's profile:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>${fullname}</td>
<td>The user's full name.</td>
</tr>
<tr>
<td>${email}</td>
<td>The user's email address.</td>
</tr>
<tr>
<td>${email.hostname}</td>
<td>The domain/host name component of the user's email address.</td>
</tr>
</tbody>
</table>

The default is '${fullname} (Confluence)'.

Hence, if Joe Bloggs made a change to a page he was watching and the Confluence site’s 'From Address' was set to confluence-administrator@example-company.com, then the ‘From’ field in his email notification would be: Joe Bloggs (Confluence) <confluence-administrator@example-company.com>.

- Subject Prefix: Enter a subject prefix, if required.
5. Configuring the Host Address, User Name and Password:
   - Manually enter your 'Host Address', 'User Name' and 'Password' details in the form fields displayed (recommended).
   OR
   - Specify the 'JNDI location' of a mail session configured in your application server in the form field displayed.

Troubleshooting
If you experience problems with these configurations, please check that your `<Confluence-Install>/confluence/WEB-INF/lib` contains only one copy of the following JAR files:

1. activation-x.x.x.jar
2. mail-x.x.x.jar

Ideally, these should be:

- activation-1.0.2.jar
- mail-1.3.2.jar (or later)

You will then need to move these into the proper directory:

Confluence distribution: Please move (not copy) the two jar files from the `<Confluence-Install>/confluence/WEB-INF/lib` directory to `<confluence-install>/lib` (for Confluence version 2.10 onwards) or `<Confluence-Install>/common/lib` (for earlier product versions) and restart Confluence.

**Related Topics**

Page: The Mail Queue

Page: How do I configure Confluence to use GMail as the mail server

Page: Configuring a Confluence Email Server for Email Notifications

Page: Setting Up a Mail Session for the Confluence Distribution

Page: Configuring a Server for Outgoing Mail

---

### The Mail Queue

Email messages waiting to be sent out are queued in a mail queue and periodically flushed from Confluence once a minute. A Confluence administrator can also manually flush emails from the mail queue.

If there is an error sending messages, the failed emails are sent to an error queue from which you can either try to resend them or delete them.

⚠️ The information on this page does not apply to Confluence OnDemand.

To view the mail queue,

1. Go to the Confluence ‘Administration Console’:
   - Choose **Browse > Confluence Admin**. The ‘Administrator Access’ login screen will be displayed.
   - Enter your password and click **Confirm**. You will be temporarily logged into a secure session to access the ‘Administration Console’.
2. Select ‘**Mail Queue**’ in the left-hand panel. This will display the emails currently in the queue.
3. Click ‘**Flush Mail Queue**’ to send all emails immediately.
4. Click ‘**Error Queue**’ to view failed email messages. You can try to ‘**Resend**’ the messages, which will flush the mails back to the ‘**Mail Queue**’ or ‘**Delete**’ them from here.

**RELATED TOPICS**

Page: The Mail Queue

Page: How do I configure Confluence to use GMail as the mail server

Page: Configuring a Confluence Email Server for Email Notifications

Page: Setting Up a Mail Session for the Confluence Distribution

Page: Configuring a Server for Outgoing Mail

---

### Optional Settings
Attachment Storage Configuration

Confluence allows you to store attachments in one of three places:

- Filesystem - locally in the Confluence home directory
- Database - in Confluence's configured database
- WebDAV - remotely on a WebDAV server

A System Administrator can configure Confluence's attachment storage via the 'Attachment Storage' option on the 'Administration Console'.

⚠ You need to have System Administrator permissions in order to perform this function.

Attachment Storage Options

Local File System

By default, Confluence stores attachments in the attachments directory within the configured Confluence home folder. If you are looking to run Confluence Clustered, attachments must be stored in the database.

Database

Confluence gives administrators the option to store attachments in the database that Confluence is configured to use.

Here are some reasons why, as an administrator, you may want to choose this storage system:

- Ease of backup.
- Avoiding issues with certain characters in attachment file names.

⚠ While storing attachments in the database can offer some advantages, please be aware that the amount of space used by the database will increase because of the greater storage requirements.

WebDAV

Confluence also allows administrators to set an external WebDAV repository as the location for attachment storage.

⚠ WebDAV attachment manager deprecated

The option to store Confluence attachments on a WebDAV server has never worked in a useful fashion, and has not been maintained for many versions.

- The WebDAV attachment manager will be deprecated from Confluence 2.7, and will be removed from a later version of Confluence.
- If you store attachments on external WebDAV servers, we recommend that you migrate to file-system or database-backed attachment storage as soon as possible. Refer to CONF-9313 and CONF-2887.
- This DOES NOT affect the operation of the WebDAV plugin.

Migration between Attachment Storage Systems

You can 'migrate' your attachments from one storage system to another. All existing attachments will be moved over to the new attachment storage system.
When the migration occurs, all other users will be locked out of the Confluence instance. This is to prevent modification of attachments while the migration occurs. Access will be restored as soon as the migration is complete.

When migrating attachments from your database to a filesystem, the attachments are removed from the database after migration. However, when migrating attachments from a filesystem to your database, the attachments remain on the filesystem after migration. If you wish to change this function's behaviour from 'copy' to 'move', please see CONF-14802 and cast your vote.

To perform a migration, follow the steps below:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.

2. Click 'Attachment Storage' in the left-hand panel. The current configuration will be displayed.

   Attachment Storage
   
<table>
<thead>
<tr>
<th>Attachments Storage:</th>
<th>WebDAV:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WebDAV Server URL: <a href="http://localhost:8080/slide/files">http://localhost:8080/slide/files</a></td>
</tr>
<tr>
<td></td>
<td>User Name: confluence</td>
</tr>
</tbody>
</table>

   Attachment storage configuration
   
   3. Click the 'Edit' button to modify the configuration.
   4. Select the storage system you desire.

   Edit attachment storage
   
<table>
<thead>
<tr>
<th>Attachments Storage:</th>
<th>WebDAV Server URL: <a href="http://localhost:8080/slide/files">http://localhost:8080/slide/files</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Locally in Confluence home directory</td>
<td></td>
</tr>
<tr>
<td>In Confluence's configured database</td>
<td></td>
</tr>
<tr>
<td>Remotely on a WebDAV server</td>
<td></td>
</tr>
<tr>
<td>User Name: confluence</td>
<td></td>
</tr>
<tr>
<td>Password:</td>
<td></td>
</tr>
</tbody>
</table>

   Save | Cancel

   5. Click the 'Save' button to save the changes.
   6. A screen will appear, asking you to confirm your changes. Clicking 'Migrate' will take you to a screen that displays the progress of the migration.

   Migration warning

   Changing your attachment storage location from the current setting will result in a migration occurring. This may take time (depending on the amount of attachments).

   During the migration process, users will not be able to access the system.

   Are you sure you want to perform this migration?

   Migrate | Cancel

   Migration warning

   Prior to migration, all records in the Attachment data database table will be removed.

   Are you sure you want to perform this migration?

   Migrate | Cancel

Troubleshooting

To enable debug logging for WebDAV attachment storage, add the following to the bottom of WEB-INF/classes/log4j.properties and restart Confluence:
log4j.logger.com.atlassian.confluence.pages.persistence.dao=DEBUG,confluencelog
log4j.additivity.com.atlassian.confluence.pages.persistence.dao=false
log4j.logger.org.apache.webdav=DEBUG,confluencelog
log4j.additivity.org.apache.webdav=false

RELATED TOPICS

Page: Important Directories and Files

Administrators Guide Home  Confluence Documentation Home

Hierarchical File System Attachment Storage

For Confluence version 3.0, the structure of attachments stored on the filesystem was changed. In versions of Confluence prior to 3.0, attachments were stored in directories corresponding to the id of the content to which they belong. The more content in Confluence with attachments, the more directories you would have immediately beneath your configured attachments directory. This directory structure has been changed in Confluence 3.0 and since the default configuration of Confluence is to store attachments in the filesystem, this change is likely to have relevance to administrators of most existing Confluence installations.

If you are installing Confluence for the first time, there will be no consequences as a result of this change. If you are upgrading from a previous version of Confluence, the migration to this new filesystem structure should happen automatically during the upgrade.

The reason for introducing this change was to address the issue CONF-13004. Certain file systems have a limit on the number of files that can be stored in a directory and large Confluence installations were reaching this limit. In addition, storing too many files at a single directory level can cause performance degradation in some circumstances. This new attachment storage strategy ensures this will no longer be the case.

⚠️ The information on this page does not apply to Confluence OnDemand.

Backup Confluence Home

Before upgrading to Confluence 3.0, as with any upgrade you must ensure you have a backup of your Confluence home directory before you proceed.

The New Directory Layout

The attachment storage layout was chosen to fulfill the following main requirements:

1. Limit the number of entries at any single level in a directory structure.
2. Partition attachments per space making it possible for a system admin to selectively back up attachments from particular spaces (see the JIRA issue for more details).

An attachment in Confluence can be thought of as having a number of identifying attributes: id, space id and content id. That is to say, the attachment logically belongs to a piece of content which logically belongs in a space (not all content belongs to a space). For attachments within a space in Confluence, the directory structure is typically 8 levels, with the name of each directory level based on the following algorithm:

<table>
<thead>
<tr>
<th>level</th>
<th>Derived From</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (top)</td>
<td>Always 'ver003' indicating the Confluence version 3 storage format</td>
</tr>
<tr>
<td>2</td>
<td>The least significant 3 digits of the space id, modulo 250</td>
</tr>
<tr>
<td>3</td>
<td>The next 3 least significant digits of the space id, modulo 250</td>
</tr>
<tr>
<td>4</td>
<td>The full space id</td>
</tr>
</tbody>
</table>
The least significant 3 digits of the content id, modulo 250
The next 3 least significant digits of the content id, modulo 250
The full content id
The full attachment id

Within the 8th level will be a file for each version of that attachment, named to match the version number e.g. 1

An example:

**Attachments:**

- **A**: id: 745644, space id: 800432, content id: 632780
- **B**: id: 782234, space id: 600432, content id: 620002
- **C**: id: 771250, space id: 810032, content id: 603101
- **D**: id: 701002, global logo

**Directory Structure:**

- Top level directory partitioning the new structure
- 3 least significant digits of space id % 250
- Next 3 least significant digits of space id % 250
- Space id
- 3 least significant digits of content id % 250
- Next 3 least significant digits of content id % 250
- Content id
- Attachment id
- Version number of the attachment

(D) (A) (B) (C)
To find the directory where attachments for a particular space are stored, you can use the JSP findspaceattachments.jsp at the location
$confluence$ <confluence url>/admin/findspaceattachments.jsp. This JSP requires a space key and returns the directory on the file system
where attachments for that space are stored.

Attachment D in the above diagram is stored in a slightly different structure. Attachments that are not conceptually within a space replace the
level 2 - 4 directories with a single directory called 'nonspaced'. Examples of such attachments are the global site logo and also attachments
on draft content.

Upgrading to the new attachment storage structure

As mentioned previously, this upgrade is only necessary if you have Confluence configured to store attachments on the file system.

If migration is not necessary due to a different storage configuration (for example, because attachments are stored in the database), then no
migration will occur during upgrade and the Confluence log will simply show the following messages -

```
INFO [main] [AbstractUpgradeManager] upgradeStarted Starting automatic upgrade of Confluence
INFO [main] [UpgradeTask] isUpgradeNeeded The configured attachmentDataDao does not store
attachment data on the file system so the HierarchicalFileSystemAttachmentUpgradeTask is
not necessary.
INFO [main] [AbstractUpgradeManager] upgradeFinished Upgrade completed successfully
```

Should migration be required, it will occur automatically during upgrade and the log will show output similar to this -

```
INFO [main] [UpgradeTask] doUpgrade Beginning HierarchicalFileSystemAttachmentUpgradeTask.
Depending on the size of the
attachment data this may take some time.
INFO [main] [UpgradeTask] run 4023 pages may have attachments to be moved to a new hierarchical
structure.
INFO [main] [UpgradeTask] run 0 of 4023 pages have had their attachments moved to the new
structure
INFO [main] [UpgradeTask] run 500 of 4023 pages have had their attachments moved to the new
structure
INFO [main] [UpgradeTask] run 1000 of 4023 pages have had their attachments moved to the new
structure
INFO [main] [UpgradeTask] run 1500 of 4023 pages have had their attachments moved to the new
structure
INFO [main] [UpgradeTask] run 2000 of 4023 pages have had their attachments moved to the new
structure
INFO [main] [UpgradeTask] run 2500 of 4023 pages have had their attachments moved to the new
structure
INFO [main] [UpgradeTask] run 3000 of 4023 pages have had their attachments moved to the new
structure
INFO [main] [UpgradeTask] run 3500 of 4023 pages have had their attachments moved to the new
structure
INFO [main] [UpgradeTask] run 4000 of 4023 pages have had their attachments moved to the new
structure
INFO [main] [UpgradeTask] run Successfully moved the attachments for all 4023 pages to the new
hierarchical structure.
INFO [main] [UpgradeTask] doUpgrade Completed HierarchicalFileSystemAttachmentUpgradeTask.
INFO [main] [AbstractUpgradeManager] upgradeFinished Upgrade completed successfully
```

It should be noted that for most implementations of Java, the migration to the new data structure involves moving the files
(not copying them). Hence, there should not be a need to have additional disk space available. It also means that the
migration should be relatively fast.

Have you previously applied the CONF-8298 patch?

The patch or workaround on the CONF-8298 issue changed the structure of attachment storage but not to the most efficient possible
structure. So during the Confluence 3.0 upgrade process this intermediate (CONF-8298) structure will be detected and automatically
upgraded.

Troubleshooting the upgrade

It should be noted that in the event of a failure, your attachment directory may be in an inconsistent state and your first step in
troubleshooting should be to restore the backup of your home directory.

There are a number of reasons the migration could fail. This will be shown in the log with a message similar to "Failed to move the
Immediately preceding this message in the log will be entries for each page whose attachments could not be moved. The following table shows examples of these messages and offers some possible explanations.

<table>
<thead>
<tr>
<th>Example Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>The configured attachment directory &lt;directory name&gt; could not be found or was not a directory.</td>
<td>The configured Confluence attachment directory is not accessible. Check confluence home for the attachment directory and ensure the permissions are correct to allow reading and writing for this directory.</td>
</tr>
<tr>
<td>It is not possible to migrate the attachments to the new structure since files already exist which the attachment process may need to create.</td>
<td>Your attachments directory contains files or directories which the upgrade task wants to create. That is, a top level directory called ver003 containing directories or files with names containing up to 3 digits (e.g. 1, 213). This could be due to a previous failed attempt to migrate the attachments. You should restore a previous good copy of your attachments directory and remove any files or directories with this naming pattern before retrying.</td>
</tr>
<tr>
<td>Couldn’t find current Confluence content for the id &lt;content Id&gt;. The attachment is a non-spaced attachment (e.g. global logo, draft attachment, etc) and will be migrated to the nonspaced directory.</td>
<td>This is a normal message indicating that the attachment being migrated does not belong to a space e.g. global logo.</td>
</tr>
<tr>
<td>Problem while accessing the database for content id &lt;content Id&gt; so its attachments will not be migrated.</td>
<td>It was not possible to access the database at this point during the migration. You will need restore your Confluence attachment directory from the backup and attempt the upgrade again, once the database is accessible again.</td>
</tr>
<tr>
<td>Could not create the new attachment directory.</td>
<td>The upgrade task could not create the new directory to contain the attachment being moved. Does the server user have sufficient permission to perform this operation in the indicated directory? Is there sufficient disk space?</td>
</tr>
<tr>
<td>Failed to move the current attachment directory &lt;some path&gt; to the new location of &lt;some other path&gt;.</td>
<td>The upgrade task could not move the directory. Does the server user have sufficient permission to perform this operation in the indicated directory?</td>
</tr>
</tbody>
</table>

### Configuring a WebDAV client for Confluence

WebDAV allows users to access Confluence content via a WebDAV client, such as ‘My Network Places’ in Microsoft Windows. Provided that the user has permission, they will be able to read and write to spaces, pages and attachments in Confluence. Users will be asked to log in and the standard Confluence content access permissions will apply to the equivalent content available through the WebDAV client.

### Introduction to Confluence’s WebDAV Client Integration

By default, all WebDAV clients have permission to write to Confluence. Write permissions include the ability for a WebDAV client to create, edit, move or delete content associated with spaces, pages and attachments in a Confluence installation.

On the ‘WebDav Configuration’ screen in the Confluence Administration Console, you can:

- Deny a WebDAV client write permissions to a Confluence installation using a regular expression (regex).
- Disable or enable strict path checking.
- Enable or disable access to specific virtual files/folders.

**Note:**

- The ‘WebDav Configuration’ page is only be available if the WebDAV plugin has been enabled. Refer to Installing Plugins and Macros for more information on enabling Confluence plugins. Note that this plugin is bundled with Confluence, and can be enabled or disabled by the System Administrator.
- The settings on the ‘WebDav Configuration’ page do not apply to external attachment storage configuration.

---

On this page:

- Introduction to Confluence’s WebDAV Client Integration
- Restricting WebDAV Client Write Access to Confluence
- Disabling Strict Path Checking
- Virtual Files and Folders
- Using a WebDAV Client to Work with Pages
- Known Issues
Restricting WebDAV Client Write Access to Confluence

In earlier versions of the WebDAV plugin, separate options for restricting a WebDAV client's write permissions (that is, create/move, edit and delete actions), were available. However, in the current version of this plugin, they have been simplified and combined into a general write permission restriction that covers all of these actions.

WebDAV clients are now denied write permission to your Confluence installation by setting a regex that matches specific content within the WebDAV client's user agent header. Upon setting a regex, it will be added to a list of restricted WebDAV clients. Any WebDAV clients whose user agent header matches a regex in this list will be denied write permission to your Confluence installation.

Example: A PROPFIND method header generated by a Microsoft Web Folder WebDAV client, showing the user agent header field:

```
PROPFIND /plugins/servlet/confluence/default HTTP/1.1
Content-Language: en-us
Accept-Language: en-us
Content-Type: text/xml
Translate: f
Depth: 1
Content-Length: 489
User-Agent: Microsoft Data Access Internet Publishing Provider DAV
Host: 127.0.0.1:8082
Connection: Keep-Alive
```

Unlike earlier versions of the WebDAV plugin which could only restrict write permissions for WebDAV clients, the current version of this plugin allows you to restrict write permissions to specific WebDAV clients selectively.

To restrict a WebDAV client's write access permissions to your Confluence installation,

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Click 'WebDAV Configuration' under 'Configuration' in the left panel. The 'WebDAV Configuration' page is displayed.
3. Enter a regex that matches a specific component of the user agent header sent by the WebDAV client you want to restrict.
4. Click the 'Add new regex' button. The regex is added to the list of restricted WebDAV clients.
5. Click the 'Save' button to save the configuration changes.

To restore one or more restricted WebDAV client's write access permissions to your Confluence installation,

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Click 'WebDAV Configuration' under 'Configuration' in the left panel. The 'WebDAV Configuration' page is displayed.
3. Select the regex(es) from the list that match(es) the user agent header sent by the restricted WebDAV client(s) you want to restore.
4. Click the 'Remove selected regexes' button. The regexes you had selected are removed from the list of restricted WebDAV clients.
5. Click the 'Save' button to save the configuration changes.
1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Click 'WebDAV Configuration' under 'Configuration' in the left panel. The 'WebDAV Configuration' page is displayed.
3. Clear the 'Enable strict path check' check box.
4. Click the 'Save' button to save this configuration change.

Virtual Files and Folders

In the unlikely event that you observe any problems with the WebDAV client's performance or stability, you can enable access to automatically generated (that is, virtual) files and folders.

By default, these options are hidden on the 'WebDAV Configuration' page. To make them visible, you must append the parameter ?hiddenOptionsEnabled=true to the end of your URL and reload the page. For example:

```
<Confluence base URL>/admin/plugins/webdav/config.action?hiddenOptionsEnabled=true
```
To enable or disable access to virtual files and folders,

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.

2. Click 'WebDAV Configuration' under 'Configuration' in the left panel. The 'WebDAV Configuration' page is displayed.

3. Amend your URL as described in the note above and reload the 'WebDAV Configuration' page.

4. Select or clear the check box options in the 'Virtual Files and Folders' section as required.

5. Click the 'Save' button to save the configuration changes.

Using a WebDAV Client to Work with Pages

The following sections tell you how to set up a WebDAV client natively for a range of different operating systems. WebDAV clients typically appear as drives in your operating system's file browser application, such as Windows Explorer in Microsoft Windows, or Konqueror in Linux.

Setting Up a WebDAV Client in Microsoft Windows

This section covers the two methods for configuring a WebDAV client natively in Microsoft Windows:

- As a network drive
- As a web folder

If possible, use the network drive method as this will enable more comprehensive WebDAV client interaction with Confluence than that provided by a web folder. However, your Confluence instance must meet several environmental constraints if you use this method. If you cannot configure your instance to meet these requirements, then use the web folder method or third-party WebDAV client software.

If you run into any problems with the procedures in this section, please refer to the Troubleshooting WebDAV page.

Windows Network Drive

To map a Confluence WebDAV client network drive, your Confluence instance must be configured so that all of the following criteria is met:

- Uses HTTP (not HTTPS)
- Listens on port 80 (not 8080, which is the default port value used by the popular application server Apache Tomcat that runs many Confluence EAR / WAR installations, or 8090, the default for Confluence distributions)
- Has no context root
- There is an issue (WBDV-208) that can prevent Network Drives from being mapped. Please use the Network Folders steps below as a workaround.

The reason for these restrictions results from limitations in Microsoft's Mini-Redirector component. For more information, please refer to Microsoft's server discovery issue.

To map a Confluence WebDAV client network drive in Microsoft Windows,
1. In Windows XP, go to **My Computer** -> **Tools** menu -> **Map Network Drive**.
   In Windows Vista, go to **Computer** -> **Map Network Drive**.
   The 'Map Network Drive' dialog box opens.
2. Specify the following input to map the WebDAV client as a network drive:
   - Drive: Any drive letter (for example, Z:)
   - Folder: `\<hostname>\webdav` (for example, `\localhost\webdav`)
3. Click 'Finish'.
   - When prompted for login credentials, specify your Confluence username and password.

### Windows Web Folder

#### To map a Confluence WebDAV client web folder in Windows XP,

1. Go to **My Network Places** and choose 'Add a network place'. The 'Add Network Place Wizard' opens.
2. Click 'Next', ensure that 'Choose another network location' is selected and then click 'Next' again.
3. In the 'Internet or network address' field, enter the URL for the Confluence WebDAV location (for example, `http://<confluence server url>/confluence/plugins/servlet/confluence/default` or `http://<confluence server url>/plugins/servlet/confluence/default`) and then click 'Next'.
   - When prompted for login credentials, specify your Confluence username and password.
4. Provide a meaningful name for your web folder and proceed with the remainder of the wizard.
5. Click 'Finish'.

### Screenshot: A Confluence WebDAV Client Web Folder in Windows XP

To map a Confluence WebDAV client web folder in Windows Vista,

- This procedure is very similar to the one for Windows XP. However, the following procedure includes the slight interface differences that are specific to Windows Vista.

1. Open the 'Map Network Drive' dialog box (refer to first step of the procedure above for mapping a network drive) and choose 'Connect to a Web site that you can use to store your documents and pictures'. The 'Add Network Location' wizard opens.
2. Click 'Next', ensure that 'Choose a custom network location' is selected and then click 'Next' again.
3. In the 'Internet or network address' field, enter the URL for the Confluence WebDAV location (for example, `http://<confluence server url>/confluence/plugins/servlet/confluence/default` or `http://<confluence server url>/plugins/servlet/confluence/default`) and then click 'Next'.
   - When prompted for login credentials, specify your Confluence username and password.
4. Provide a meaningful name for your network location/web folder and proceed with the remainder of the wizard.
5. Click 'Finish'.

### Setting up a WebDAV client in Linux or Solaris

There are many tools and mechanisms available for configuring WebDAV clients in these operating systems. Therefore, we have chosen to demonstrate this using the file manager Konqueror, which is part of the Linux K Desktop Environment.
To set up a Confluence WebDAV client in Konqueror,

1. Open Konqueror.
2. In the 'Location' field, enter the URL for the Confluence WebDAV location using the 'protocol' webdavs (for example, webdavs://<confluence server url>/confluence/plugins/servlet/confluence/default or webdavs://<confluence server url>/plugins/servlet/confluence/default) and press Enter.

   If prompted for login credentials, specify your Confluence username and password.

   You should be able to click to load many, but not all files. In practice, you would normally save a modified file locally, then drag it to the Konqueror window to upload it to Confluence.

**Known Issues**

Please refer to the WebDAV plugin documentation for a description of the known issues and suggested workarounds.

**RELATED TOPICS**

Page: Attachment Storage Configuration (Confluence 4.1)
Page: Configuring a WebDAV client for Confluence (Confluence 4.1)
Page: Important Directories and Files (Confluence 4.1)

---

**Configuring Quick Navigation**

When a user is searching Confluence (see Using the Quick Navigation Aid) the quick navigation aid automatically offers a dropdown list of pages and other items, matched by title to the search query. By default, this feature is enabled, with the maximum number of simultaneous quick navigation requests set to 40. However, these options can be modified as described below.

The maximum number of simultaneous quick navigation requests defines the maximum number of individuals who can use this feature simultaneously on the same Confluence server. If your Confluence server serves a large number of individuals who use this feature regularly, some of whom are being denied access to it, you may wish to increase this value.

The information on this page does not apply to Confluence OnDemand.

To modify the quick navigation feature’s options,

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select 'General Configuration' in the left-hand panel.
3. In the 'General Configuration' screen, click 'Edit'.
4. To disable this feature, select 'Off' beside 'Quick Navigation'.
5. To modify the maximum number of simultaneous quick navigation requests, enter the appropriate number in the field beside 'Max Simultaneous Requests'.
6. Click 'Save'.

The following screenshot demonstrates the user interface of the quick navigation aid.

**Screenshot: The quick navigation aid showing titles matching the query 'mark'**
Enabling OpenSearch

With OpenSearch autodiscovery, you can add Confluence search to your Firefox or IE7 search box (see Searching Confluence from your Browser's Search Box). By default, OpenSearch autodiscovery is enabled. This feature can be enabled or disabled as described below.

To enable or disable OpenSearch autodiscovery,

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select 'General Configuration' in the left-hand panel.
3. In the 'General Configuration' screen, click 'Edit'.
4. Select 'On' beside 'Open Search' to enable this feature, or 'Off' to disable it.
5. Click 'Save'.

Enabling the Did You Mean Feature

When you perform a full Confluence search, Confluence may offer you an alternative spelling of your search query. The alternative spelling will appear next to the words 'Did you mean'. By default, this feature is disabled. You can enable it as described below.

To enable the 'Did You Mean' feature,
1. Go to the Confluence ‘Administration Console’:
   - Choose Browse > Confluence Admin. The ‘Administrator Access’ login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the ‘Administration Console’.
2. Select ‘General Configuration’ in the left-hand panel.
3. In the ‘General Configuration’ screen, click ‘Edit’.
4. Select ‘On’ beside ‘Did You Mean’.
   - If you have no ‘Did you mean’ feature index or you have not yet created it, this option will not be available. To create this index, click ‘build the did-you-mean index’ and on the subsequent page, click ‘Build’ in the ‘Did You Mean Index’ section. Then return to the ‘General Configuration’ screen in Edit mode.
5. Click ‘Save’.

Languages and Locales

The ‘Did You Mean’ feature supports only the English language. In addition, the ‘Did You Mean’ index requires the built-in UK-English locale (en_UK). If your Confluence site uses a different language pack, such as English (US), the ‘Did You Mean’ feature will not work. You will see an error message like this:

```
For Did You Mean both the indexing language and the global default language must be set to English.
```

For more information about how the ‘Did You Mean’ feature works, please refer to the user guide.

You can track the request to support other languages by watching issue CONF-14768.

**RELATED TOPICS**

- Searching Confluence
- Enabling the Remote API

**Enabling the Remote API**

Confluence provides XML-RPC and SOAP remote APIs. You need to enable the APIs from the Administration Console before you can access Confluence remotely.

You need to have System Administrator permissions in order to perform this function.

To enable the remote API:

1. Go to the Confluence ‘Administration Console’:
   - Choose Browse > Confluence Admin. The ‘Administrator Access’ login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the ‘Administration Console’.
2. Select ‘General Configuration’ in the left-hand panel.
3. Click ‘Edit’ next to ‘Site Configuration’.
4. Select ‘On’ next to ‘Remote API (XML-RPC & SOAP)’.
5. Click ‘Save’ to retain your changes.

**RELATED TOPICS**

Page: Confluence XML-RPC and SOAP APIs
Page: RPC Module
Confluencer.NET

**Enabling Threaded Comments**

Comments on pages or blog posts are displayed in one of two views:
• **Threaded**: Shows the comments in a hierarchy of responses. Each reply to a comment is indented to indicate the relationships between the comments.

• **Flat**: Displays all the comments in one single list and does not indicate the relationships between comments.

By default, comments are displayed in **threaded** mode. The Confluence administrator can enable or disable the threaded view for the entire Confluence site.

**To enable or disable the threaded view:**

1. Go to the Confluence 'Administration Console':
   - Choose **Browse > Confluence Admin**. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click **Confirm**. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select **General Configuration** in the left-hand panel.
3. In the 'Feature Settings' section, click **Edit**.
4. Check **Threaded Comments** to enable threaded mode. Clear the check box to disable threaded mode and display all comments in flat mode.
5. Click **Save**.

**Related Topics**

**Page:** Working with Comments

---

### Enabling Trackback

When Trackback is enabled, any time you link to an external webpage that supports Trackback Autodiscovery, Confluence will send a trackback ping to that page to inform it that it has been linked to.

Confluence pages also support Trackback Autodiscovery and when Trackback is enabled, can receive trackback pings sent by other sites.

**To enable trackback,**

1. Go to the Confluence 'Administration Console':
   - Choose **Browse > Confluence Admin**. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click **Confirm**. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select 'General Configuration' in the left panel.
3. In the 'Feature Settings' screen, click 'Edit'.
4. Select 'On' beside 'Trackback' and click 'Save'.

**RELATED TOPICS**

**Page:** Configuring Captcha for Failed Logins (Confluence 4.1)

**Page:** Running Confluence Over SSL or HTTPS (Confluence 4.1)

**Page:** Excluding external referrers (Confluence 4.1)

**Page:** Configuring the Administrator Contact Page (Confluence 4.1)

**Page:** Hiding the People Directory (Confluence 4.1)

**Page:** User Email Visibility (Confluence 4.1)

**Page:** Anonymous Access to Remote API (Confluence 4.1)

**Page:** Enabling or Disabling Public Signup (Confluence 4.1)

**Page:** Configuring Captcha for Spam Prevention (Confluence 4.1)

**Page:** Hiding external referrers (Confluence 4.1)

**Page:** Ignoring External Referrers (Confluence 4.1)

**Page:** Managing External Referrers (Confluence 4.1)

**Page:** Hiding External Links From Search Engines (Confluence 4.1)
Other Settings

- Configuring Attachment Size
- Configuring Character Encoding
- Configuring HTTP Timeout Settings
- Configuring Indexing Language
- Configuring Number Formats
- Configuring Shortcut Links
- Configuring Time and Date Formats

Configuring Attachment Size

Confluence gives you the option of limiting the maximum size of a single file attachment. Confluence administrators should keep in mind that the amount of disk space used by Confluence is directly proportional to the number and size of attachments put into the system.

To configure the maximum size allowed for an attachment:

1. Go to the 'Administration Console' and click 'General Configuration' in the left-hand panel.
2. Click 'Edit' on the 'General Configuration' screen.
3. Enter the maximum size next to 'Attachment Maximum Size'. The default is 10 MB.
4. 'Save' your changes.

To configure the maximum 'index-able size of attachments':

By default, large attachment is defined as greater than 1 MB. The threshold for attachments that won't get excerpts can be modified using the system property `atlassian.indexing.contentbody.maxsize`, which takes a size in bytes.

Example

To specify 250 kb you would use the following JVM parameter:

```
-Datlassian.indexing.contentbody.maxsize=256000
```

Outcomes of Limiting Attachment Indexing Size

Limiting the size of attachment indexing has the following effects:

- Decreases the size of the index when large attachments are present.
- Decreases the memory used in indexing large attachments.
- Prevent excerpts of large attachments being displayed in search results.

For more details, please refer to the following JIRA issue.

Related Topics

Page: Recognised System Properties
Page: Configuring HTTP Timeout Settings
Page: Configuring Attachment Size
Page: Configuring Indexing Language
Page: Configuring Character Encoding
Page: Configuring Time and Date Formats
Page: Configuring Number Formats

Configuring Character Encoding

Confluence uses UTF-8 character encoding to deliver its pages.

⚠️ While it is possible to change the character encoding, unless you are certain of what you are doing, we recommend that you leave this as it is.
To change the character encoding:

1. Go to the 'Administration Console' and click on 'General Configuration' in the left panel.
2. Click 'Edit' at the bottom of the 'Formatting and International Settings' screen. For Confluence version earlier than 2.6.2, look for the 'Options and Settings' screen.
3. Beside 'Encoding', enter the new character encoding of your choice.
4. 'Save' your changes.

Related Links

Joel Spolsky: The Absolute Minimum Every Software Developer Absolutely, Positively Must Know About Unicode and Character Sets (No Excuses!)

Related Topics

Page: Recognised System Properties
Page: Configuring HTTP Timeout Settings
Page: Configuring Attachment Size
Page: Configuring Indexing Language
Page: Configuring Time and Date Formats
Page: Configuring Character Encoding
Page: Configuring Number Formats

Configuring HTTP Timeout Settings

When macros such as the RSS Macro make HTTP requests to servers which are down, a long timeout value is used. You can set this timeout value through a system parameter to avoid this.

To configure the HTTP Timeout Settings:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select 'General Configuration' under the 'Configuration' heading in the left-hand panel.
3. Find the 'Connection Timeouts' section in the lower portion of the screen.
4. Click 'Edit' to adjust the settings:
   - Adjust External connections enabled: This setting allows system administrators to disable external connections so macros like the RSS Macro won't be allowed to make connections to an external server. It's protection against external servers providing insecure HTML, timing out or causing performance problems. The default setting is 'true'.
   - Connection Timeout (milliseconds): Sets the maximum time for a connection to be established. A value of zero means the timeout is not used. The default setting is ten seconds (10000).
   - Socket Timeout (milliseconds): Sets the default socket timeout (SO_TIMEOUT) in milliseconds, which is the maximum time Confluence will wait for data. A timeout value of zero is interpreted as an infinite timeout. The default setting is ten seconds (10000).

Configuring Indexing Language

Changing the indexing language defined in Confluence may improve the accuracy of Confluence search results, if the majority of the content of your site is in some language other than English. Confluence supports content indexing in English (default), German, Russian, Chinese, CJK, Custom Japanese, French, Brazilian, Czech and Greek.

To configure a different indexing language:

1. Go to the 'Administration Console' and click 'General Configuration' in the left-hand panel.
2. Click any of the 'Edit' links.
3. Select the 'Indexing Language' from the dropdown list in the 'Formatting and International Settings' section.
4. Click 'Save'.

Related Topics

Choosing a Default Language
Installing a Language Pack
Configuring Number Formats

To change the number formats:

1. Go to the 'Administration Console' and click on 'General Configuration' in the left panel.
2. Click 'Edit' at the bottom of the 'Options and Settings' screen.
   - There are two number format settings:
     - Long Number Format
     - Decimal Number Format
3. Change the formats using the guidelines in this document.
4. 'Save' your changes.

Related Topics

- Page: Recognised System Properties
- Page: Configuring HTTP Timeout Settings
- Page: Configuring Attachment Size
- Page: Configuring Indexing Language
- Page: Configuring Character Encoding
- Page: Configuring Time and Date Formats
- Page: Configuring Number Formats

Configuring Shortcut Links

Shortcut links provide a quick way of linking to resources that are frequently referenced from Confluence. When you create a shortcut link, you assign a key to an URL so that, when editing, a user can type just the key instead of the complete URL.

Here is an example:

Most Google searches look like this: http://www.google.com/search?q=. If you create a shortcut for this search with the key 'google', every time a user needs to use http://www.google.com/search?q=searchterms, they can just type [searchterms@google] instead.

Here is a screenshot showing the shortcuts currently defined on http://confluence.atlassian.com:

<table>
<thead>
<tr>
<th>Key</th>
<th>Expanded Value</th>
<th>Default Alias</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>cache</td>
<td><a href="http://www.google.com/search?q=cache">http://www.google.com/search?q=cache</a>;</td>
<td></td>
<td>Remove</td>
</tr>
<tr>
<td>imdb</td>
<td><a href="http://us.imdb.com/title">http://us.imdb.com/title</a>?</td>
<td></td>
<td>Remove</td>
</tr>
<tr>
<td>jira</td>
<td><a href="http://jira.atlassian.com/secure/QuickSearch.jspa?searchString=">http://jira.atlassian.com/secure/QuickSearch.jspa?searchString=</a></td>
<td>JIRA Issue %s</td>
<td>Remove</td>
</tr>
<tr>
<td>google</td>
<td><a href="http://groups.google.com/groups?q=">http://groups.google.com/groups?q=</a></td>
<td></td>
<td>Remove</td>
</tr>
<tr>
<td>google</td>
<td><a href="http://www.google.com/search?q=">http://www.google.com/search?q=</a></td>
<td></td>
<td>Remove</td>
</tr>
<tr>
<td>dictionary</td>
<td><a href="http://www.dict.org/bin/DictDatabase=0Form=Dict1&amp;Strategy=0&amp;Query=">http://www.dict.org/bin/DictDatabase=0Form=Dict1&amp;Strategy=0&amp;Query=</a></td>
<td></td>
<td>Remove</td>
</tr>
</tbody>
</table>

Shortcut links are added and maintained by Confluence administrators from the Administration Console.

Creating Shortcut Links

To create a shortcut link:

1. Go to the Administration Console and click Shortcut Links in the left panel.
2. Enter a Key for your shortcut. This is the shortcut name a user will use to reference the URL.
3. Enter the Expanded Value. This is the URL for the link. You can use '%s' in the URL to specify where the user's input is inserted. If there is no '%s' in the URL, the user's input will be put at the end.
4. (Optional. Available in Confluence version 2.3 and later.) Enter a Default Alias. This is the text of the link which will be displayed on the page where the shortcut is used, with the user's text being substituted for '%s'.
5. Click Save.
Using Shortcut Links

Enter a shortcut link on the Advanced tab of the Insert Link dialog. See Linking to Pages for details.

Specify in the link what should be appended to the end of the shortcut URL, followed by an at-sign (@) and the key of the shortcut. Shortcut names are case-insensitive. So, for example, using the keys shown in the above screenshot:

<table>
<thead>
<tr>
<th>To link to...</th>
<th>Type this</th>
<th>Resulting URL</th>
<th>Demonstration</th>
</tr>
</thead>
<tbody>
<tr>
<td>a JIRA issue</td>
<td>CONF-1000@JIRA</td>
<td><a href="http://jira.atlassian.com/secure/QuickSearch.jspa?searchString=CONF-1000">http://jira.atlassian.com/secure/QuickSearch.jspa?searchString=CONF-1000</a></td>
<td>CONF-1000</td>
</tr>
<tr>
<td>a Google search</td>
<td>Atlassian Confluence@Google</td>
<td><a href="http://www.google.com/search?q=Atlassian+Confluence">http://www.google.com/search?q=Atlassian+Confluence</a></td>
<td>Atlassian Confluence@Google</td>
</tr>
</tbody>
</table>

Deleting Shortcut Links

Shortcut links are listed on the Shortcut Links tab of the Administration Console. Click Remove to delete the shortcut.

Related Topics

Configuring Time and Date Formats

Confluence allows you to localise the formats used to display dates and times within the web interface. The settings use the syntax of Java’s SimpleDateFormat class (described below).

To change the time and date formats:

1. Go to the Administration Console and click on General Configuration in the left panel.
2. Click Edit at the bottom of the Options and Settings screen.
   - There are three time and date format settings:
     - Time Format: displaying only the time of day (for example, when each news item is posted)
     - Date Time Format: displaying both the date and the time of day (for example, in historical versions of pages)
     - Date Format: displaying only the date (for example, the creation and most recent modification dates of pages)
3. Change the formats using the guidelines in this document.
4. Save your changes.

Related Links

- Java 1.4.2 SimpleDateFormat API

Related Topics

- Page: Recognised System Properties
- Page: Configuring HTTP Timeout Settings
- Page: Configuring Attachment Size
- Page: Configuring Indexing Language
- Page: Configuring Character Encoding
- Page: Configuring Time and Date Formats
- Page: Configuring Number Formats

Configuring System Properties
This page describes how to set Java properties and options on startup for Confluence Stand-alone and EAR/WAR versions.

- See Fix Out of Memory Errors by Increasing Available Memory for specific instructions for OutOfMemory Errors.

On this page:

- The information on this page does not apply to Confluence OnDemand.

Linux

To Configure System Properties in Linux Installations,

1. From <confluence-install>/bin (Stand-alone) or <Tomcat-home>/bin (EAR-WAR installation), open setenv.sh.
2. Find the section JAVA_OPTS=
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 <confluence-install>/bin (Stand-alone) or <Tomcat-home>/bin (EAR-WAR installation), open setenv.bat.
2. Find the section set JAVA_OPTS=%JAVA_OPTS%
3. Refer to the list of parameters below.

Add all parameters in a space-separated list. Make sure to keep the string %JAVA_OPTS% in place.

Windows Service

There are two ways to configure system properties when you Start Confluence Automatically on Windows as a Service, either via command line or in the Windows Registry

Setting Properties for Windows Services via Command Line
Setting Properties for Windows Services via Command Line

1. Identify the name of the service that Confluence is installed as in Windows (Control Panel > Administrative Tools > Services):

   ![Service Manager Screenshot]

   In the above example, the **SERVICENAME** is: JIRA030908110721. Find the Confluence equivalent.

2. Open the command window from Start >> Run >> type in 'cmd' >> Enter

3. cd to the bin directory of your Confluence instance, or the bin directory of your Tomcat installation if you are running Confluence EARWAR.

4. Run:

   ```
   tomcat6w //ES//%SERVICENAME%
   ```

   ![Command Window Screenshot]

   In the above example, it would be `tomcat6w //ES//JIRA030908110721`

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.

---

**Setting Properties for Windows Services via 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 via 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 >> Confluence
   - **64-bit**: HKEY_LOCAL_MACHINE >> SOFTWARE >> Wow6432Node >> Apache Software Foundation >> Procrun 2.0 >> Confluence

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.

**Verifying Your Settings**

To see what Confluence is using, check **Viewing System Properties**.

**Recognised System Properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Since</th>
<th>Default Value</th>
<th>Module...</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>atlassian.forceSchemaUpdate</td>
<td>1.0</td>
<td>false</td>
<td>atlassian-config</td>
<td>By default, Confluence database schema update is checked to ensure Confluence is up-to-date.</td>
</tr>
<tr>
<td>Property</td>
<td>Version</td>
<td>Value</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>------------------------------</td>
<td>---------</td>
<td>---------</td>
<td>-----------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>confluence.home</td>
<td>1.0</td>
<td>Any filesystem path</td>
<td>Confluence and atlassian-config If this system property is set, Confluence will ignore the content of the <code>confluence-init.properties</code> file, and use this property as the setting for the Confluence Home directory.</td>
<td></td>
</tr>
<tr>
<td>confluence.devmode</td>
<td>1.0</td>
<td>false</td>
<td>Confluence Enables additional debugging options that may be of use to Confluence developers (additionally it changes spring bean creation to use lazy initialization by default to decrease startup time). Do not enable this flag on a production system.</td>
<td></td>
</tr>
<tr>
<td>confluence.disable.mailpolling</td>
<td>2.4</td>
<td>false</td>
<td>Confluence If set to &quot;true&quot;, will prevent Confluence from retrieving mail for archiving within spaces. Manually triggering &quot;check for new mail&quot; via the web UI will still work. This property has no effect on outgoing mail.</td>
<td></td>
</tr>
<tr>
<td>confluence.i18n.reloadbundles</td>
<td>1.0</td>
<td>true</td>
<td>Confluence Setting this property will cause Confluence to reload its i18n resource bundles every time an internationalised string is looked up. This can be useful when testing translations, but will make Confluence run insanely slowly.</td>
<td></td>
</tr>
<tr>
<td>confluence.ignore.debug.logging</td>
<td>1.0</td>
<td>true</td>
<td>Confluence Confluence will normally log a severe error message if it detects that DEBUG level logging is enabled (as DEBUG logging generally causes a significant degradation in system performance). Setting this property will suppress the error message.</td>
<td></td>
</tr>
<tr>
<td>confluence.jmx.disabled</td>
<td>3.0</td>
<td>false</td>
<td>Confluence If set to &quot;true&quot;, will disable Confluence's JMX monitoring. This has the same effect as setting the &quot;enabled&quot; property to false in <code>WEB-INF/classes/jmxContext.xml</code>.</td>
<td></td>
</tr>
<tr>
<td>confluence.optimize.index.modulo</td>
<td>2.2</td>
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<td>This property disables the password confirmation functionality that Confluence uses as an additional security measure. With this property set, (password confirm: actions: admin: email address etc) Disabling password confirmation you are using a cl.</td>
<td></td>
</tr>
</tbody>
</table>
| confluence.browser.language.enabled                | 3.5     | true  | Setting this property detection of browser effectively restorin that of earlier rele.
|                                                    |         |       | "true" enables the headers sent by to change the UI lan.
|                                                    |         |       | See doc can choose a lang.                                                 |
| upm.pac.disable                                    |         | false | Universal Plugin Manager (UPM) When this property will not try to acce Exchange. This is servers that do no Internet. See the l. |
| confluence.reindex.documents.to.pop                | 3.5.9   | 20    | Indicates how many indexing thread should pro re-index. Please re-thread not include attachi. |
| confluence.reindex.attachments.to.pop              | 3.5.9   | 10    | Indicates how many indexing thread should pro re-index.                    |
| confluence.upgrade.active.directory                | 3.5.11  | false | Forces Confluence directories it migrs rather than relying sAMAccountName. This is necessary before Confluence attribute other that identify your users error code due to "LDAP error code Exceeded" exceptions in your logs. For more details, see Unable to Log In Due to "LDAP error code Exceeded". |
| com.atlassian.logout.disable.session.invalidation | 4.0     | false | Disables the sesi As of 4.0.0 the defal the JSession assi log out. If this is ses active (but the use valuable when usi systems, but shou. |

### RELATED TOPICS

**Recognised System Properties**

*Fix Out of Memory Errors by Increasing Available Memory*

**Recognised System Properties**

Confluence supports some configuration and debugging settings that can be enabled through Java system properties. System properties are usually set by passing the `-D` flag to the Java virtual machine in which Confluence is running. See the full instructions.

⚠️ The information on this page does not apply to Confluence OnDemand.
<table>
<thead>
<tr>
<th>Property</th>
<th>Since</th>
<th>Default Value</th>
<th>Module...</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>atlassian.forceSchemaUpdate</td>
<td>1.0</td>
<td>false</td>
<td>atlassian-config</td>
<td>By default, Confluence will only run its database schema update when it detects that it has been upgraded. This flag will force Confluence to perform the schema update on system startup.</td>
</tr>
<tr>
<td>confluence.home</td>
<td>1.0</td>
<td>Any filesystem path</td>
<td>Confluence and atlassian-config</td>
<td>If this system property is set, Confluence will ignore the contents of the filesystem path, and use this property as the setting for the Confluence Home directory.</td>
</tr>
<tr>
<td>confluence.devmode</td>
<td>1.0</td>
<td>false</td>
<td>Confluence</td>
<td>Enables additional debugging options that may be of use to Confluence developers (additional it changes spring bean creation to use lazy initialization by default). Do not enable this flag on a production system.</td>
</tr>
<tr>
<td>confluence.disable.mailpolling</td>
<td>2.4</td>
<td>false</td>
<td>Confluence</td>
<td>If set to &quot;true&quot;, will prevent Confluence from retrieving mail for archiving within spaces. Manually triggering &quot;check for new mail&quot; via the web UI will still work. This property has no effect on outgoing mail.</td>
</tr>
<tr>
<td>confluence.i18n.reloadbundles</td>
<td>1.0</td>
<td>true</td>
<td>Confluence</td>
<td>Setting this property will cause Confluence to reload its i18n resource bundles every time an internationalised string is looked up. This can be useful when testing translations, but will make Confluence run insanely slowly.</td>
</tr>
<tr>
<td>confluence.ignore.debug.logging</td>
<td>1.0</td>
<td>true</td>
<td>Confluence</td>
<td>Confluence will normally log a severe error message if it detects that DEBUG level logging is enabled (as DEBUG logging generally causes a significant degradation in system performance). Setting this property will suppress the error message.</td>
</tr>
<tr>
<td>confluence.jmx.disabled</td>
<td>3.0</td>
<td>false</td>
<td>Confluence</td>
<td>If set to &quot;true&quot;, will disable Confluence's JMX monitoring. This has the same effect as setting the &quot;enabled&quot; property to false in WEB-INF/classes/jmxContext.xml.</td>
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<td>true</td>
<td>atlassian-plugins, atlassian-cache-servlet</td>
<td>Setting this property will disable conditional get and expires: headers on some web resources. This will significantly slow down the user experience, but is useful in development if you are frequently changing static resources and don't want to continually flush your browser cache.</td>
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<td></td>
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<td>2.10</td>
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<td>This property disables the password confirmation functionality that Confluence uses as an additional security measure. With this property set, Confluence will require password confirmation for the following actions: administrative actions (change of email address and .Captcha for failed logins. Disabling password confirmations is useful if you are using a custom authenticator.</td>
</tr>
<tr>
<td>confluence.browser.language.enabled</td>
<td>3.5</td>
<td>true</td>
<td>Confluence</td>
<td>Setting this property to &quot;false&quot; disables the detection of browser language headers, effectively restoring Confluence behaviour to that of earlier releases. Setting this property to &quot;true&quot; enables the detection of the language headers sent by the browser. Confluence will change the UI language based on the browser headers. See documentation on how users can choose a language preference.</td>
</tr>
<tr>
<td>upm.pac.disable</td>
<td>1.5</td>
<td>false</td>
<td>Universal Plugin Manager (UPM)</td>
<td>When this property is set to true, then UPM will not try to access the Atlassian Plugin Manager. This is useful for application servers that do not have access to the Internet. See the UPM documentation for more information.</td>
</tr>
<tr>
<td>confluence.reindex.documents.to.pop</td>
<td>3.5.9</td>
<td>20</td>
<td>Confluence</td>
<td>Indicates how many objects each indexing thread should process at a time during a full re-index. Please note that this number does not include attachments.</td>
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### Confluence 4.0 Documentation

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<td>3.5.11</td>
<td>false</td>
</tr>
<tr>
<td>com.atlassian.logout.disable.session.invalidation</td>
<td>4.0</td>
<td>false</td>
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</table>

**RELATED TOPICS**

- Configuring System Properties
- Configuring a Large Confluence Installation

**Configuring a Large Confluence Installation**

Deploying any application to several thousand users requires care and planning, especially if those users are going to be relying on the application to get their work done.

> The information on this page does not apply to Confluence OnDemand.

**General Advice**

**Staged Rollout**

Do not try to deploy Confluence immediately to your whole organisation. Instead, roll it out department by department, or project by project.

How Confluence will scale given a particular software and hardware configuration depends very much on how Confluence is likely to be used in your organisation. Launching Confluence to everybody at once may seem like a neat idea, but it also means that any problems you might experience scaling the system up to your entire organisation will hit you all at once, annoy everyone and possibly hurt adoption.

Rolling Confluence out gradually will give you the chance to tune it as you go, resulting in a much more painless experience. There will also be organisational advantages: you can identify those teams or projects who are most likely to be successful 'early adopters', and those teams can experiment with how best a wiki might suit your organisation, and pass on their 'best wiki practices' as usage of Confluence expands.

**Plugin Governance**

Confluence plugins can add tremendous value. Before adding one, visit the plugin's page and explore its issues (available from the issue management link). Try the plugin in a test environment and make sure to note any adverse effects after adding it to a production environment. Test plugins independently when upgrading.

**Backup strategy**

Disable the XML backup and use the Production Backup Strategy.

**New Spaces Governance**

For both performance and good practice, put some modest governance in place around the creation of new spaces, such as a simple request that includes a check for duplicates and some strategy around how to best use a space. Duplicates and unused spaces should be purged by a wiki gardener. Try to keep it to one space per group.

**Choosing User Management and Single Sign-On**

We recommend that you choose and configure your user management solution as soon as possible, rather than adding it to your Confluence installation at a later date.

It is possible to integrate with an LDAP repository, such as Microsoft Active Directory, or add a single sign-on solution later (especially with the addition of Crowd). But if possible it is best to configure your user management system up front. You can configure access for only a
specific group or set of groups, thereby keeping the gradual rollout.

Please refer to our detailed guide to Configuring User Directories and examine the User Management Limitations and Recommendations.

**Configuring your Application Server, Web Server and Database**

Because Confluence can be deployed in so many server combinations, we do not currently have guides on the best tuning parameters for each individual server. We will be happy to provide support, however. If you have any tuning parameters that you find particularly useful for Confluence instances, feel free to share them with other Confluence users in the Confluence Community space.

**Best Practices**

**Troubleshooting possible memory leaks**

The Troubleshooting Confluence Hanging or Crashing guide is a good place to start. Some of the known causes listed there could result in performance issues short of a crash or hang. Many of the issues reported there are exacerbated with a large installation.

**Memory Usage**

The Java virtual machine is configured with a "maximum heap size" that limits the amount of memory it will consume. If Confluence fills up this maximum heap size it will run out of memory, and start behaving unpredictably. You can keep track of Confluence's memory usage from the System Information screen of the administration console:

<table>
<thead>
<tr>
<th>Java VM Memory Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Memory</strong></td>
</tr>
<tr>
<td><strong>Free Memory</strong></td>
</tr>
<tr>
<td><strong>Used Memory</strong></td>
</tr>
<tr>
<td><strong>Memory Graph</strong></td>
</tr>
</tbody>
</table>

This example shows that, at the time of writing, confluence.atlassian.com is using 173MB of an allocated 313MB of heap. (The JVM was configured with a maximum heap size of 450MB, but this information is not available in the graph. The 313MB figure shows that the full 450MB of heap has not yet been needed)

**Database Connection Pool**

Confluence will need a database connection for each simultaneous user connection to the server. It is also a good idea to have 5-10 connections spare for Confluence internal processes such as backups, re-indexing or daily notification jobs.

Running out of pooled connections will cause the server to slow down as more users are waiting for a connection to be freed before starting their own request, and will eventually cause visible system errors as Confluence times out waiting for a database connection.

If you are using Confluence's internal connection pool, you can increase the number of available connections by modifying the hibernate.c3p0.max_size property in {confluence_home}/confluence-cfg.xml, and restarting Confluence. Make sure you have also configured your database to be able to support that many simultaneous connections.

**Cache Sizes**

The Performance Tuning page includes some useful rules of thumb for configuring the sizes of Confluence's internal caches.

**RELATED TOPICS**

- Operating Large or Mission-Critical Confluence Installations
- Performance Tuning
- Confluence Clustering Overview
- Requesting Performance Support
- User Management
- Confluence Administrator's Guide
- Confluence Configuration Guide

**Configuring Logging**

We recommend that you configure Confluence's logging to your own requirements. You can change the log settings in two ways:

- Configure logging in Confluence Administration – Your changes will be in effect only until you next restart Confluence.
- Edit the properties file – Your changes will take effect next time you start Confluence, and for all subsequent sessions.

Both methods are described below. In some rare circumstances you may also need to configure Configuring Logging.

**Terminology:** In log4j, a 'logger' is a named entity. Logger names are case-sensitive and they follow a hierarchical naming standard. For example, the logger named com.foo is a parent of the logger named com.foo.Bar.
Configure logging in Confluence Administration

You can change some of Confluence's logging behaviour via the Administration Console while Confluence is running. Any changes made in this way will apply only to the currently-running Confluence lifetime. The changes are not written to the log4j.properties file and are therefore discarded when you next stop Confluence.

Not all logging behaviour can be changed via the Administration Console. For logging configuration not mentioned below, you will need to stop Confluence and then edit the logging properties file instead.

The 'Logging and Profiling' screen shows a list of all currently defined loggers. On this screen you can:

- Turn page profiling on or off.
- Turn detailed SQL logging on or off.
- Add a new logger for a class/package name.
- Remove a logger for a class/package name.
- Set the logging level (INFO, WARN, FATAL, ERROR or DEBUG) for each class or package name.
- Reset all logging levels to a predefined profile.

Changing the logging configuration

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select 'Logging and Profiling' in the 'Administration' section of the left-hand panel.
   - You need to have System Administrator permissions in order to perform this function.
3. The 'Logging and Profiling' screen appears, as shown below. Use the following guidelines to change the logging behaviour while Confluence is running:
   - 'Performance Profiling' — See Page Request Profiling.
   - 'SQL Logging' — Click the 'Enable SQL Logging' button to log the details of SQL requests made to the database. If you need to enable logging of SQL parameter values, you will need to change the setting in the properties file. This option is not available via the Administration Console.
   - 'Log4j Logging' — Click one of the profile buttons to reset all your loggers to the predefined profiles:
     - The 'Production' profile is a fairly standard profile, recommended for normal production conditions.
     - The 'Diagnostic' profile gives more information, useful for troubleshooting and debugging. It results in slower performance and fills the log files more quickly.
   - 'Add New Entry' — Type a class or package name into the text box and click the 'Add Entry' button. The new logger will appear in the list of 'Existing Levels' in the lower part of the screen.
   - 'Existing Levels' - These are the loggers currently in action for your Confluence instance.
     - You can change the logging level by selecting a value from the 'New Level' dropdown list. Read the Apache documentation for a definition of each level.
     - Click the 'Remove' link to stop logging for the selected class/package name.
4. Click the 'Save' button to save any changes you have made in the 'Existing Levels' section.

Screenshot: Changing Log Levels and Profiling
Performance Profiling
Profiling is currently OFF.

Enable Profiling

SQL Logging

Enable SQL Logging

Log4j Logging

Choose from one of the predefined logging options or configure logging below.

Production  Diagnostic

OR:

Customise specific logging settings

Add New Entry

<table>
<thead>
<tr>
<th>Class/Package Name</th>
<th>New Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO</td>
<td>Add entry</td>
</tr>
</tbody>
</table>

Existing Levels

<table>
<thead>
<tr>
<th>Class/Package Name</th>
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<th>New Level</th>
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<tbody>
<tr>
<td>com.atlassian.confluence.cluster</td>
<td>INFO</td>
<td>INFO</td>
</tr>
<tr>
<td>com.atlassian.confluence.cluster.safety</td>
<td>INFO</td>
<td>INFO</td>
</tr>
<tr>
<td>com.atlassian.confluence.importexport.impl.PdfExporter</td>
<td>ERROR</td>
<td>ERROR</td>
</tr>
<tr>
<td>com.atlassian.confluence.lifecycle</td>
<td>INFO</td>
<td>INFO</td>
</tr>
<tr>
<td>com.atlassian.confluence.upgrade</td>
<td>INFO</td>
<td>INFO</td>
</tr>
<tr>
<td>com.atlassian.core.util.FileUtils</td>
<td>ERROR</td>
<td>ERROR</td>
</tr>
<tr>
<td>com.atlassian.upgrade</td>
<td>INFO</td>
<td>INFO</td>
</tr>
<tr>
<td>net.sf.hibernate.cache.ReadWriteCache</td>
<td>ERROR</td>
<td>ERROR</td>
</tr>
<tr>
<td>net.sf.hibernate.impl.SessionImpl</td>
<td>ERROR</td>
<td>ERROR</td>
</tr>
<tr>
<td>net.sf.hibernate.type.CustomType</td>
<td>ERROR</td>
<td>ERROR</td>
</tr>
<tr>
<td>net.sf.hibernate.util.JDBCExceptionReporter</td>
<td>ERROR</td>
<td>ERROR</td>
</tr>
<tr>
<td>org.apache.fop</td>
<td>ERROR</td>
<td>ERROR</td>
</tr>
<tr>
<td>root</td>
<td>WARN</td>
<td>WARN</td>
</tr>
</tbody>
</table>

Save

Editing the Properties File
To configure the logging levels and other settings on a permanent basis, you need to stop Confluence and then change the settings in the log4j.properties file, described above.

The properties file contains a number of entries for different loggers that can be uncommented if you are interested in logging from particular components. Read more in the Apache log4j documentation.

See Working with Confluence Logs for some guidelines on specific configuration options you may find useful.

**Configuring Levels for java.util.logging in logging.properties**

A few libraries used by Confluence use java.util.logging rather than log4j or slf4j. These libraries include:

- com.sun.jersey
- org.apache.shindig
- net.sf.ehcache

Confluence’s logging.properties file is set to redirect java.util.logging at specific levels to log4j via slf4j.

To increase logging levels for these libraries you must first configure the logging.properties file in the directory:/confluence/WEB-INF/classes/. The logging levels are different from log4j and are listed here. For example, to increase logging for shindig change the following line in the logging.properties file:

```properties
org.apache.shindig.level = INFO
```

to

```properties
org.apache.shindig.level = FINE
```

And then use one of the methods above as well to configure the log4j level.

**External Gadgets**

The External Gadgets section allows you to register gadgets served from external web applications (such as JIRA 4.0+) or websites (such as iGoogle or Gmail) with your Confluence installation, so that they:

- Appear in the macro browser
- Can be added and used in Confluence pages or blog posts via a gadget macro

**Obtaining the External Gadget’s URL**

Before registering an external web application’s gadget with Confluence, you will need to obtain that gadget’s URL and copy it to your computer’s clipboard.

If your web application is another Atlassian application such as Confluence 3.1+ or JIRA 4.0+, please refer to the appropriate documentation to obtain the gadget URL from your other Atlassian application:

- Obtaining a gadget URL from JIRA 4.0+
- Obtaining a gadget URL from another Confluence 3.1+ server

If your external gadget comes from a non-Atlassian web application or web site, please consult the relevant documentation for that application to obtain the gadget’s URL.

---

**Registering an External Gadget for Use in Confluence**

To register an external web application’s gadget for use in Confluence:
1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Click External Gadgets under 'Configuration' in the left panel. The 'External Gadgets' page is displayed.
3. In the 'Add a new Gadget' section, paste your gadget's URL into the Gadget Specification URL field.
4. Click Add. Your gadget will be shown in the list of registered gadgets below and it will also become available in the macro browser.

Do I need to establish an OAuth or Trusted Application relationship too?

In addition to registering an external gadget for use in Confluence, you may also need to establish an OAuth or Trusted Application relationship between the application that serves the gadget (the service provider) and Confluence (the consumer). OAuth and Trusted Application relationships are usually only required for gadgets that access user-restricted data from the external web application. Refer to Configuring OAuth for further information.

If an external web application provides anonymous access to all or some of its data and that is the only data you need to access, then establishing an OAuth or Trusted Applications relationship may be unnecessary.

Removing Access to an External Gadget in Confluence

To remove Confluence’s access to an external web application's gadget:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Click External Gadgets under 'Configuration' in the left panel. The 'External Gadgets' page is displayed.
3. In the 'Added Gadgets' section, click Remove next to the URL of the external gadget whose access in Confluence is to be removed. The gadget will be removed from the 'Added Gadgets' list and will also be removed from the macro browser.

Related Topics

The big list of Atlassian gadgets
Adding JIRA Gadgets to a Confluence Page

Confluence Clustering Overview
Please be aware that Confluence clustered is not available for version 4.0 yet. It will be forthcoming in a minor release of Confluence following the release of version 4.0.

It is possible to run Confluence in a clustered environment instead of on a single server. This means that you can run multiple copies of Confluence in a cluster, so that clients (such as a browser) can connect to any copy and see the same information.

Consider your options carefully before deciding on a clustered installation

While we have tried to make clustering Confluence as easy and administrator-friendly as possible, it is a major architectural change and requires extra planning for deployment and upgrades. Please consider the information on the Cluster Checklist and then consult Atlassian support before making your final decision.

This page gives an overview and links to further pages with information on installing, configuring and administering a Confluence cluster.

The information on this page does not apply to Confluence OnDemand.

Before Deciding to Run a Confluence Cluster

1. Read and consider the details on the Cluster Checklist.
2. Consider the difference between clustering for scalability and clustering for high availability (HA).
3. Contact Atlassian support for further information and advice.

Technical Overview

Confluence on Virtualised Environments

Atlassian officially supports non-clustered installations of Confluence 3.0 and later on VMware. Although possible, we do not recommend (nor support) running versions of Confluence prior to 3.0 on VMware, since Confluence 3.0 resolved many performance issues that were present in earlier versions. Be aware that we also do not support clustered installations of Confluence on VMware. Please comment or vote on the feature request at CONF-19559.

Read a technical overview of clustering in Confluence.

Server and Network Requirements

- Server hardware requirements
- Technical overview of Confluence clustering
- Diagram of recommended network topology

Installation and Upgrading

There are two methods of installing Confluence in a cluster, depending on whether you have existing data:

- Fresh installation
- Existing data

If you are upgrading an existing Confluence cluster to a new version of Confluence, refer to the cluster upgrade guide.

Configuration and Administration

- Cluster Administration page in the Administration Console
- Changing datasources in clusters

Troubleshooting
Confluence cluster topology (simplified)

Cluster troubleshooting

RELATED TOPICS
Operating Large or Mission-Critical Confluence Installations
Performance Tuning
Requesting Performance Support
Confluence Administrator’s Guide
Confluence Configuration Guide

Technical Overview of Clustering in Confluence

Please be aware that Confluence clustered is not available for version 4.0 yet. It will be forthcoming in a minor release of Confluence following the release of version 4.0.

Overview of clustering documentation
Refer to the overview of Confluence clustering in the Administrators’ Guide.

The information on this page does not apply to Confluence OnDemand.

Introduction

From version 2.3, Confluence has had the ability to configure and run multiple copies of itself in a cluster, so that clients can connect to any copy and see the same information. In effect, a Confluence cluster behaves as a single, powerful Confluence installation. While we have tried to make clustering Confluence as easy and administrator-friendly as possible, it is a major architectural change from earlier versions (or non-clustered installations) and consequently, requires extra planning for deployment and upgrades.

This document will give a technical overview of clustering in Confluence, primarily for those users and developers who will be installing and configuring Confluence in a cluster. A separate overview is available for Confluence plugin developers.

Cluster topology

A simple description of the cluster topology for Confluence would be multiple applications, shared data source. A cluster of Confluence consists of:

- multiple homogeneous installations of Confluence (called nodes below)
  - a Confluence home directory for each installation.
- a distributed Oracle Coherence cache (formerly known as Tangosol Coherence), which all nodes use via a multicast group - see networking summary below
- a single database, which all nodes connect to

The user is responsible for configuring an appropriate HTTP load balancer in front of the clustered installations. Typically this means using mod_jk or another application server load-balancing technology. The load balancer must be configured to support session affinity.

Communication between clustered nodes is minimised by using a distributed cache which propagates updates to all other nodes automatically. Where necessary, Coherence provides a locking mechanism for synchronising jobs and a RMI interface for more complex communication.

LAN Clustering Only

Atlassian only supports clustering over a local area network. While it is theoretically possible to configure Confluence to cluster across a WAN, the latency involved is likely to kill performance of the cluster. We can’t stop you trying, of course, but you’re going to have to work out how to configure Coherence yourself, and we’re not going to support the resulting mess.
Homogeneous Confluence installations

All the Confluence installations must be running exactly the same application, down to the lowest level. Items that must be the same include:

- Confluence version
- Application server version
- JDK version
- Libraries and plugins in the Confluence classpath, WEB-INF/lib
- Libraries in the application server classpath

The installation section has more information how to ensure homogeneous node installations.

Creating a Confluence cluster

When installing Confluence in a clustered setup, you will be responsible for configuring your web server and load balancer to distribute traffic between each node. No additional software is required as Coherence is bundled with Confluence.

Here is an overview of the process:

1. Obtain a clustered licence key from Atlassian for each node
2. Upgrade a single node to the clustered licence
3. Start the cluster from that node's administration menu, specifying a name and optionally a preferred network interface
4. Restart the single node and test it
5. Copy the Confluence application and Confluence home directory to the second node
6. Bring up the second node and it will automatically join the cluster.

Copying the Confluence application and home directory helps ensure that the installations are homogeneous.

An alternative to this method is to copy the Confluence web application, but not the Confluence home directory. In this case, the installation wizard will require your cluster name to connect to the other nodes, and it will automatically configure itself. You will need to rebuild the index manually after this installation, however.

There is now full documentation for a Confluence Cluster Installation.

Upgrade process

Another consequence of the homogeneous requirement is that upgrades must be done by following a strict process.

1. All cluster nodes are brought down
2. Upgrade a single node to the latest Confluence version
3. Start the single node so it can upgrade the database
4. Upgrade subsequent nodes and start them one-by-one.

This is the only safe method of upgrading a Confluence cluster.

Single database

The Confluence database in a cluster is shared by all nodes. This means that the database must be able to scale to service all the Confluence nodes, which will probably mean implementing some kind of database cluster and JDBC-level load balancing. We can not offer support with scaling or tuning your database, you will need to talk to your DBA or database vendor.

For obvious reasons, you must have an external database to run Massive - you can not cluster Confluence when using the embedded HSQL database.

The most important requirement for the cluster database is that it have sufficient connections available to support the expected number of application nodes. For example, if each Confluence instance has a connection pool of 20 connections and you expect to run a cluster with four nodes, your database server must allow at least 80 connections to the Confluence database. In practice, you may require more than the minimum for debugging or administrative purposes.

In a cluster, attachments must be stored in the database. Configuring a cluster in an existing installation will automatically migrate your attachments to the database. Non-clustered installations still have the option of using the Confluence home directory for storing attachments.

While attachments are stored in the database, they are temporarily written to the cluster node's local filesystem, designated <confluence-home>/temp folder, when being streamed to users (so Confluence doesn't have to hold open database connections unnecessarily). For this reason, Confluence will still need enough temporary disk space to hold any attachments currently in transit.

Distributed cache

In a normal configuration, Confluence uses many caches to reduce the number of database queries required for common operations. Viewing a page might require dozens of permissions checks, and it would be very slow if Confluence queried the database for this information with every page view. However, caches must be carefully maintained so they are consistent with the application data. If the page permissions change, the old invalid data needs to be removed from the cache so it can be replaced with a fresh correct copy.

To preserve consistent caches across a cluster, Confluence uses a distributed cache called Oracle Coherence, which manages replicating cache updates transparently across all nodes. The network requirements of the distributed cache are quite simple, but must be preserved if the cluster is to work properly.

To discover other nodes in the cluster, Confluence broadcasts a join request on a multicast network address. Confluence must be able to
open a UDP port on this multicast address, or it will not be able to find the other cluster nodes.

Once the nodes are discovered, each responds with a unicast (normal) IP address and port where it can be contacted for cache updates. Confluence must be able to open a UDP port for regular communication with the other nodes.

Because the Coherence network requirements are different to those required by the Confluence database connection, the situation can arise where Confluence can use the database but not talk to the other nodes in the cluster via Coherence. When Confluence detects this, it will shut itself down in a **cluster panic**.

For more details on the network configuration of the distributed cache, see the networking summary.

**Home directory**

Confluence's home directory has a much-reduced role in a cluster. Because the application data must be shared between all nodes for consistency, the only information stored in the Confluence home directory is either node-specific, or needed to start Confluence. This includes information related to:

- database connection
- license
- cluster connection

The only application data stored in the Confluence home directory is the **Lucene search index**. Confluence synchronises this data itself by keeping track of indexing tasks in the database.

This is also why we recommend copying the Confluence home directory from the first node when setting up subsequent nodes. If you did not copy the Confluence home directory, you would need to rebuild the search index from scratch on the subsequent nodes after installation.

**Event handling**

Broadcasting events to all nodes in a cluster is supported in Confluence, but not recommended. The cluster topology uses a shared data store so that application state does not need to be synchronised by events.

The event broadcasting is done only for certain events, like installing a plugin. When a plugin is installed in one node, Confluence puts the plugin data in the database, and notifies the other nodes that they need to load the plugin into memory.

**Indexing**

Confluence maintains a copy of its Lucene search index on each node of the cluster. This index is used for many things beside full-text searches, including RSS feeds and lists of recently updated content. Indexing in a cluster works like this:

1. Node 1 gets a request to save some page update
2. After saving the page in the database, Node 1 adds a "page-updated" index entry to the queue, which is in the database
3. Periodically, each node picks up the "latest entries" from the queue, where what is latest is determined from a timestamp on a file in the Confluence home directory which indicates when the queue was last inspected. This process is called "flushing the index queue".
4. Each node independently updates its local Lucene index. The "page-updated" index entry is internally changed into a delete-document task and an add-document task to apply the changes to Lucene.
5. Each node updates the timestamp on its index-queue-timestamp file to reflect the most recent processing or "flushing" of the index queue.

Because of step #3, if the timing of the nodes is not synchronised or changes sporadically (due to a virtualisation environment, typically), index changes will not be correctly synchronised in the cluster. This is the most common cause of index sync problems in clusters.

If a node is disconnected from the cluster for a short amount of time (less than three hours), it will be able to bring its copy of the index up-to-date when it rejoins the cluster. If a node is down for a long amount of time and its lucene index has become stale as a result, you may want to avoid the expensive operation of rebuilding the index. To do that, you must copy a "live" version of the Lucene index from an active node. Simply replace the contents of the Confluence Home\index directory with those from an active node before bringing the stale node back up.

**Job synchronisation**

For tasks such as sending the daily report emails, it is important that only one node in the cluster does this. Otherwise you would get multiple emails from Confluence every day.

Confluence uses locks in the Coherence distributed cache to ensure only one node can be running certain jobs at a time. This ensures email notifications will only be sent once.

**Activity tracking**

Activity tracking does not work in a cluster, and will be disabled for clustered deployments. We're working on making the activity tracker clusterable in a future release. You can follow this issue. You can try some other options for tracking usage.

**Cluster panic**

In some situations, there can be a network issue or firewall that prevents the distributed cache from communicating but still allows Confluence to update the database. This is a dangerous situation because when the caches on the detached nodes become inconsistent, users on different nodes will see different information and updates can be lost.
Confluence can detect this problem by checking a database value against a cached value, and if they differ, all the clustered nodes will be shut down with a ‘Cluster panic’ message. This is considered a fatal error because the consequences can cause damage to your data. For those administrators that like to live on the edge, there is a system property to prevent cluster panic and allow data corruption. For more information, see Cluster safety mechanism.

If a cluster panic does occur, you need to ensure proper network connectivity between the clustered nodes. Most likely multicast traffic is being blocked or not routed correctly. See the networking summary below.

**Summary of network requirements**

In addition to normal connectivity with its database, all clustered Confluence instances require access to a multicast group and the ability to open a UDP unicast port.

By default, the multicast address is automatically generated from the cluster name you provide when starting the cluster and the multicast port is fixed. During cluster setup, Confluence will prompt for the unicast IP address to use if the server has multiple network interfaces, and by default the unicast port is fixed. The cluster multicast group will be joined on the same network interface as the bound unicast IP address.

For any settings which are not configurable through the Confluence web interface, they can be configured via an XML file in the Confluence home directory for more exotic networking requirements.

**Scaling Confluence On A Single Server**

Since the maximum addressable memory on a 32 bit JVM is 4GB, some large servers may scale Java applications by running JVM instances concurrently. This would be implemented as separate, clustered Confluence nodes running on a single server and communicating internally. Because each JVM replicates the cache entirely, it may be useful to test a single, massive instance running a 64 bit JVM as an alternative. This configuration may result in superior performance than an internal cluster.

**Geographically Distributed Clusters**

Collocating nodes is strongly recommended as high latency will almost certainly degrade performance due to the overhead of cache replication. Cluster nodes will provide the best performance if servers are physically adjacent. However, as long as all nodes share a LAN, users may wish to test alternative configurations to see how performance is affected.

**RELATED TOPICS**

- Server Hardware Requirements Guide
- Overview of Confluence Clusters
- Developers’ Guide to Clustering

**Cluster safety mechanism**

Please be aware that Confluence clustered is not available for version 4.0 yet. It will be forthcoming in a minor release of Confluence following the release of version 4.0.

**Introduction**

A mechanism was added in Confluence 2.3 and above to ensure database consistency when running multiple cluster nodes against the same database. This is called the **cluster safety mechanism**, and is designed to ensure that your wiki cannot become inconsistent because updates by one user are not visible to another. A failure of this mechanism is a fatal error in Confluence and is called **cluster panic**.

Because the cluster safety mechanism helps prevents data inconsistency whenever any two copies of Confluence running against the same database, it is enabled in all instances of Confluence, not just clusters.

The information on this page does not apply to Confluence OnDemand.

**How cluster safety works**

A scheduled task, ClusterSafetyJob, runs every 30 seconds in Confluence. In a cluster, this job is run only on one of the nodes. The scheduled task operates on a **safety number** — a randomly generated number that is stored both in the database and in the distributed cache used across a cluster. It does the following:

1. **Generate** a new random number
2. **Compare the existing safety numbers**, if there is already a safety number in both the database and the cache.
3. **If the numbers differ**, publish a ClusterPanicEvent. Currently in Confluence, this causes the following to happen:
   - disable all access to the application
   - disable all scheduled tasks
3. update the database safety number to a new value, which will cause all nodes accessing the database to fail.
4. If the numbers are the same or aren’t set yet, update the safety numbers:
   - set the safety number in the database to the new random number
   - set the safety number in the cache to the new random number.

How to fix it

See 'Database is being updated by an instance which is not part of the current cluster' Error Message

Technical details

The cluster safety number in the database is stored in the CLUSTERSAFETY table. This table has just one row: the current safety number.

Changing Datasources Manually in a Cluster

Please be aware that Confluence clustered is not available for version 4.0 yet. It will be forthcoming in a minor release of Confluence following the release of version 4.0.

The recommended way of changing database connections is to shut down the whole cluster, install Confluence into new and empty directories and use the Setup Wizard to configure all new database connection settings.

However, if you wish to manually change your settings, you may proceed as described below.

It is strongly recommended that you test all of the following in a staging or test instance of Confluence before performing these steps in your production environment.

The information on this page does not apply to Confluence OnDemand.

Step 1: Prepare

- Locate the confluence-cfg.xml file in the Confluence home directory.
- Make a backup copy of that file.
- Prepare the necessary changes to that file.

Step 2: Shut Down Confluence

You need to shut down all the nodes in the cluster, not just one.

Step 3: Apply your Changes

Apply your configuration changes to the required node.

Step 4: Restart the Changed Node

It is crucial that you bring up the node on which you applied the changes first. Otherwise you will get an error message, and have to shut down all instances again.

Step 5: Restart all Other Nodes

Done.

RELATED PAGES

Overview of Confluence Clusters

Cluster Troubleshooting
Confluence 4.0 Documentation

Please be aware that Confluence clustered is not available for version 4.0 yet. It will be forthcoming in a minor release of Confluence following the release of version 4.0.

Confluence on Virtualised Environments

Atlassian officially supports non-clustered installations of Confluence 3.0 and later on VMware. Although possible, we do not recommend (nor support) running versions of Confluence prior to 3.0 on VMware, since Confluence 3.0 resolved many performance issues that were present in earlier versions. Be aware that we also do not support clustered installations of Confluence on VMware. Please comment or vote on the feature request at CONF-19559.

Overview of clustering documentation

Refer to the overview of Confluence clustering.

This page covers troubleshooting for the Clustered Edition. If you're experiencing Cluster Panic messages in a Standard Edition, visit the Knowledge Base article 'Database is being updated by an instance which is not part of the current cluster' Error Message.

On this page:
- Symptoms
- Confluence cluster debugging tools
- Didn't find a solution?
- Related

The information on this page does not apply to Confluence OnDemand.

Symptoms

Below is a list of potential problems with a Confluence cluster, and their likely solutions. The solutions are listed below.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Likely solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database is being updated by an instance which is not part of the current cluster errors on a stand-alone</td>
<td>'Database is being updated by an instance which is not part of the current cluster' Error Message</td>
</tr>
<tr>
<td>Database is being updated by an instance which is not part of the current cluster errors on a cluster</td>
<td>Add multicast route, Check firewall</td>
</tr>
<tr>
<td>Cannot assign requested address on startup, featuring an IPv6 address</td>
<td>Prefer IPv4</td>
</tr>
<tr>
<td>Error in log: The interface is not suitable for multicast communication</td>
<td>Change multicast interface, Add multicast route</td>
</tr>
<tr>
<td>Multicast being sent, but not received (detectable with Multicast Test)</td>
<td>Check firewall, Check intermediate routers, Increase multicast TTL</td>
</tr>
<tr>
<td>Any issue not covered here</td>
<td>Contact support</td>
</tr>
</tbody>
</table>

Confluence cluster debugging tools
There is an umbrella issue opened for all cluster debugging tools here

It includes the tools listed below.

**Multicast**

- Which multicast address?

The multicast address and port used by Confluence can be found on the [Cluster Administration page](#), or in `confluence.cfg.xml` in the Confluence home directory.

- Multicast address generation.

Confluence uses a hashing algorithm to take the inputted name during setup and it is then turned into a multicast address stored in the config file. Thus, once the initial setup is completed, Confluence will use the address this is the reason why user can change the address if needed, without actually changing the name. Consequently the additional nodes using the same multicast address specified in the config file are able to join the cluster.

Each node has a multicast address configured in the `confluence-cfg.xml` file

```
<property name="confluence.cluster.address">xxx.xx.xxx.xxx</property>
```

A warning message is displayed when an user changes the address from the one that Confluence has generated by the hashing of the name. There is no way of eliminating the message any other way other than by returning the address to the one that matches the cluster name. Purpose of the warning message is to remind the user that the address has been changed - as it is not the hashed version any longer - consequently the node can not join the cluster just by using the name. It is also necessary to provide the correct address as well.

**Mapping interface to IP address.**

To ensure that the interface name is mapped correctly, the following tool can be used. It shows the mapping of the interface name to the IP address.

```bash
C:\>java -jar list-interfaces.jar
interfaces.size() = 4
networkInterface[0] = name:lo (MS TCP Loopback interface) index: 1 addresses: /127.0.0.1;
networkInterface[1] = name:eth0 (VMware Virtual Ethernet Adapter for VMnet8) index: 2 addresses: /192.168.133.1;
networkInterface[2] = name:eth1 (VMware Virtual Ethernet Adapter for VMnet1) index: 3 addresses: /192.168.68.1;
```

**Debugging tools**

Listed below are some debugging tools that help determine what the status of the multicast traffic is:

<table>
<thead>
<tr>
<th>Tool</th>
<th>Information provided</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>netstat -gn</code></td>
<td>Lists multicast groups. Does not work on Mac OS X.</td>
</tr>
<tr>
<td><code>netstat -rn</code></td>
<td>Lists system routing table.</td>
</tr>
<tr>
<td><strong>Multicast Test</strong></td>
<td>Coherence tool for testing multicast traffic from one node to another.</td>
</tr>
<tr>
<td><code>tcpdump -i interface</code></td>
<td>Captures network traffic on the given interface. Most useful on an interface that only receives cluster traffic.</td>
</tr>
</tbody>
</table>

**Add multicast route**
Multicast networking requirements vary across operating systems. Some operating systems require little configuration, while some require the multicast address to be explicitly added to a network interface before Confluence can use it.

If the Multicast Test tool shows that multicast traffic can’t be sent or received correctly, adding a route for multicast traffic on the correct interface will often fix the problem. The example below is for a Ubuntu Linux system:

```
route add -net 224.0.0.0 netmask 240.0.0.0 dev eth0
```

To support multiple applications using multicast on different interfaces, you may need to specify a route specific to the Confluence multicast address.

**Check firewall**

Ensure your firewall allows UDP traffic on the multicast address and port used by Confluence.

**Prefer IPv4**

There’s a known issue with IPv6, especially on Linux.

The fix is to add `-Djava.net.preferIPv4Stack=true` to `JAVA_OPTS`. This tells the JVM to try binding an IPv4 address first, and resort to IPv6 only if that fails.

Note: A more radical approach is to add `NETWORKING_IPV6=no` to `/etc/sysconfig/network`, yet probably should be left for a later consideration on a production machine.

**Change multicast interface**

Confluence might have selected the incorrect interface for multicast traffic, which means it cannot connect to other nodes in the cluster. To override the interface used for multicast traffic after initial setup, edit `confluence.cfg.xml` in the Confluence home directory and add a property (or change the existing one) to select your desired network interface. For example to tell Confluence to use eth1:

```
<property name="confluence.cluster.interface">eth1</property>
```

**Increase multicast TTL**

The multicast time-to-live (TTL) specifies how many hops a multicast packet should be allowed to travel before it is discarded by a router. It should be set to the number of routers in between your clustered nodes: 0 if both are on the same machine, 1 if on two different machines linked by a switch or cable, 2 if on two different machines with one intermediate router, and so on.

Create a file in the Confluence home directory called `tangosol-coherence-override.xml`. Add the following to it, setting the TTL value appropriately (1 is the default):

```
<?xml version='1.0'?>
<coherence>
  <cluster-config>
    <multicast-listener>
      <time-to-live system-property='tangosol.coherence.ttl'>1</time-to-live>
    </multicast-listener>
  </cluster-config>
</coherence>
```

Alternatively, simply start Confluence with the system property: `-Dtangosol.coherence.ttl=1`. Again, 1 is the default value, and you should change it to something appropriate to your network topology.

**Check intermediate routers**

Advanced switches and routers have the ability to understand multicast traffic, and route it appropriately. Unfortunately sometimes this functionality doesn’t work correctly with the multicast management information (IGMP) published by the operating system running Confluence.

If multicast traffic is problematic, try disabling advanced multicast features on switches and routers in between the clustered nodes. These features can prevent multicast traffic being transmitted by certain operating systems.

For best results, use the simplest network topology possible for the cluster traffic between the nodes. For two nodes, that means a single network cable. For larger numbers, try using a single high-quality switch.
Advanced Tangosol configuration

If the solution to your problem involves changes to the Tangosol configuration, these changes should not be made to the Confluence configuration in `confluence/WEB-INF/classes/`. Instead, to ensure your configuration survives upgrades, make your changes via:

- Tangosol system properties
- creating a `tangosol-coherence-override.xml` file in the Confluence home directory.

Examples of making these changes are shown in the increasing the TTL section.

Didn't find a solution?

Check Related Articles from the Confluence Knowledge Base

Page: Cluster safety mechanism
Page: How do I supress cluster warning message in confluence?
Page: Technical Overview of Clustering in Confluence
Page: Confluence Clustering Overview
Page: Changing Datasources Manually in a Cluster
Page: Viewing and Editing License Details
Page: Cluster Troubleshooting
Page: Confluence Cluster Installation
Page: Apache and Tomcat load balancing
Page: Cluster Administration page
Page: Recommended network topology
Page: Upgrading a Confluence Cluster

Open JIRA Features and Bug Reports

<table>
<thead>
<tr>
<th>JIRA Issues (53 issues)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
</tr>
<tr>
<td><strong>CONF-14948</strong></td>
</tr>
<tr>
<td><strong>CONF-10977</strong></td>
</tr>
<tr>
<td><strong>CONF-9712</strong></td>
</tr>
<tr>
<td><strong>CONF-21670</strong></td>
</tr>
<tr>
<td><strong>CONF-20500</strong></td>
</tr>
</tbody>
</table>

Cluster | Ivan Benko | Mar 06, 2008, Mar 06,
<p>| Conf-12689 | Support Confluence cluster upgrades without an outage | Unassigned | Igor Minar | Open | Unresolved | Aug 06, 2008 | May 04, 2010 |
| Conf-23223 | Remove the option to store attachments on filesystem when using a cluster | Unassigned | Carlos Alberto Feijo Schedler [Atlassian] | Open | Unresolved | Sep 14, 2011 | Sep 15, 2011 |
| Conf-9297  | Confluence should be able to automatically recover from cluster panic | Unassigned | Gary Weaver | Open | Unresolved | Aug 27, 2007 | Mar 25, 2009 |
| Conf-19559 | Provide support for Confluence clustered in a virtualized environment... | Unassigned | Tony Atkins [Atlassian] | Open | Unresolved | May 06, 2010 | Apr 08, 2011 |
| Conf-12287 | Coherence cache fails while retrieving profile picture metadata (dashboard or view page shows UnexpectedRollbackException) | Unassigned | Matt Ryall [Atlassian] | Open | Unresolved | Jul 01, 2008 | Apr 05, 2011 |
| Conf-8959  | Attachment migration does not happen when upgrading to a clustered license | Unassigned | Nicholas Ilacqua [Atlassian] | Open | Unresolved | Jul 19, 2007 | Oct 10, 2010 |
| Conf-16419 | Installing a font for PDF export in a cluster will not carry to cluster nodes that are down or unavailable. | Unassigned | Charles Miller [Atlassian] | Open | Unresolved | Jul 20, 2009 | Aug 05, 2009 |
| Conf-17089 | Reindexing in cluster only runs on one node if triggered from web UI | Unassigned | Anatoli Kazatchkov [Atlassian] | Open | Unresolved | Oct 01, 2009 | May 12, 2010 |
| Conf-15523 | Run cluster performance build on two machines | Unassigned | Matt Ryall [Atlassian] | Open | Unresolved | May 05, 2009 | May 12, 2010 |
| Conf-10868 | Node that can not join cluster due to license restriction causes cluster panic | Unassigned | Ivan Benko [Atlassian] | Open | Unresolved | Feb 29, 2008 | Sep 03, 2008 |
| Conf-9040  | Authenticator (subclass of DefaultAuthenticator) can be called twice at almost exactly same time by 2 or more clustered servers | Unassigned | Gary Weaver | Open | Unresolved | Jul 30, 2007 | Nov 04, 2007 |
| Conf-14657 | Retrieving the global settings in a clustered environment causes | Unassigned | Chris Kiehl | Unresolved | Feb 21, 2009 | Nov 08, 2009 |</p>
<table>
<thead>
<tr>
<th>Issue ID</th>
<th>Description</th>
<th>Assignee</th>
<th>Status</th>
<th>Created</th>
<th>Updated</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONF-10325</td>
<td>Viewing the members of a group in a clustered environment works only on one node and not the other.</td>
<td>Partha Kamal [Atlassian]</td>
<td>Open</td>
<td>Dec 27, 2007</td>
<td>Jul 02, 2009</td>
<td>Unresolved</td>
</tr>
<tr>
<td>CONF-9594</td>
<td>ConditionalPropertySet's cannot be cached breaking cluster installations that delegate user management to JIRA</td>
<td>Dave Loeng [Atlassian]</td>
<td>Open</td>
<td>Sep 28, 2007</td>
<td>Jul 02, 2009</td>
<td>Unresolved</td>
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<tr>
<td>CONF-12345</td>
<td>Park issue :)</td>
<td>Dave Loeng [Atlassian]</td>
<td>Open</td>
<td>Jul 07, 2008</td>
<td>Jan 21, 2009</td>
<td>Unresolved</td>
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<tr>
<td>CONF-12486</td>
<td>ClassNotFoundException logged on cluster node startup</td>
<td>Anatoli Kazatchkov [Atlassian]</td>
<td>Open</td>
<td>Jul 17, 2008</td>
<td>Aug 25, 2009</td>
<td>Unresolved</td>
</tr>
<tr>
<td>CONF-23033</td>
<td>Viewfile macro does not work in Confluence Clustered when Office Connector is configured to use Cache in Memory for temporary storage</td>
<td>Roy Hartono [Atlassian]</td>
<td>Open</td>
<td>Aug 09, 2011</td>
<td>Aug 09, 2011</td>
<td>Unresolved</td>
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<tr>
<td>CONF-13421</td>
<td>Layout customisations are not propagated to other cluster nodes</td>
<td>Matt Ryall [Atlassian]</td>
<td>Open</td>
<td>Oct 16, 2008</td>
<td>Dec 09, 2008</td>
<td>Unresolved</td>
</tr>
<tr>
<td>CONF-10323</td>
<td>Coherence Lock being held when it appears no thread should have the lock. Causes ConcurrentModificationException</td>
<td>Paul Curren [Atlassian]</td>
<td>Open</td>
<td>Dec 26, 2007</td>
<td>Oct 25, 2010</td>
<td>Unresolved</td>
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<tr>
<td>CONF-9749</td>
<td>Coherence does not allow the disabling of all JDK shutdown hooks</td>
<td>Christopher Owen [Atlassian]</td>
<td>Open</td>
<td>Oct 17, 2007</td>
<td>Jan 29, 2008</td>
<td>Unresolved</td>
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<tr>
<td>CONF-13870</td>
<td>After a site import into a cluster, admin console displays attachment storage as filesystem</td>
<td>Agnes Ro [Atlassian]</td>
<td>Open</td>
<td>Nov 27, 2008</td>
<td>Sep 04, 2011</td>
<td>Unresolved</td>
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<tr>
<td>CONF-22466</td>
<td>Content Permission changes are propagated between nodes one at a time, should be in bulk</td>
<td>Richard Atkins [Atlassian]</td>
<td>Open</td>
<td>May 09, 2011</td>
<td>May 10, 2011</td>
<td>Unresolved</td>
</tr>
<tr>
<td>CONF-17040</td>
<td>Cannot build milestones outside Atlassian due to coherence</td>
<td>Jonathan Gilbert [Atlassian]</td>
<td>Open</td>
<td>Sep 25, 2009</td>
<td>Dec 08, 2009</td>
<td>Unresolved</td>
</tr>
<tr>
<td>CONF-17577</td>
<td>Cluster build passed but didn't close down Confluence</td>
<td>Brian Nguyen [Atlassian]</td>
<td>Open</td>
<td>Nov 10, 2009</td>
<td>May 12, 2010</td>
<td>Unresolved</td>
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<tr>
<td>CONF-9281</td>
<td>Plugin's i18n properties not loaded in other cluster nodes unless restarted</td>
<td>Roberto Dominguez [Atlassian]</td>
<td>Open</td>
<td>Aug 26, 2007</td>
<td>Apr 16, 2011</td>
<td>Unresolved</td>
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<tr>
<td>CONF-13698</td>
<td>Changing custom html on one node of a cluster is not immedeately reflected on the other node.</td>
<td>Anatoli Kazatchkov [Atlassian]</td>
<td>Open</td>
<td>Nov 12, 2008</td>
<td>Nov 13, 2008</td>
<td>Unresolved</td>
</tr>
<tr>
<td>CONF-7368</td>
<td>Confluence Cluster setup dies horribly when DNS fails</td>
<td>Don Willis [Atlassian]</td>
<td>Open</td>
<td>Nov 23, 2009</td>
<td>Jan 19, 2009</td>
<td>Unresolved</td>
</tr>
<tr>
<td>CONF-22979</td>
<td>Migrating to a cluster with existing data does not add cluster attributes to the confluence.cfg.xml</td>
<td>Adam Laskowski [Atlassian]</td>
<td>Open</td>
<td>Jul 27, 2011</td>
<td>Jul 28, 2011</td>
<td>Unresolved</td>
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<tr>
<td>CONF-14088</td>
<td>Locking on cache keys needs to check if the lock was actually aquired</td>
<td>Chris Kiehl [Atlassian]</td>
<td>Open</td>
<td>Dec 30, 2008</td>
<td>Nov 22, 2009</td>
<td>Unresolved</td>
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<tr>
<td>CONF-9846</td>
<td>Tangosol configuration: the (optional) cluster-name element is in the wrong place</td>
<td>Don Willis [Atlassian]</td>
<td>Open</td>
<td>Oct 30, 2007</td>
<td>Dec 20, 2007</td>
<td>Unresolved</td>
</tr>
<tr>
<td>CONF-8300</td>
<td>Cannot override TTL configuration through tangosol coherence properties</td>
<td>Matthew Jensen [Atlassian]</td>
<td>Needs Verification</td>
<td>Apr 20, 2007</td>
<td>Nov 10, 2009</td>
<td>Unresolved</td>
</tr>
</tbody>
</table>
Contact Atlassian support

We have dedicated staff on hand to support your installation of Confluence. Please follow the instructions for raising a support request and mention that you’re having trouble setting up your Confluence cluster.

Related

Cluster Safety Mechanism

Multicast Test

Please be aware that Confluence clustered is not available for version 4.0 yet. It will be forthcoming in a minor release of Confluence following the release of version 4.0.

This page describes the Multicast Test, a Coherence tool for testing multicast traffic from one node to another. You may find this useful when troubleshooting a clustered installation of Confluence.

In order to run the Multicast test, you need to first download the attached Coherence zip file.

The Multicast Test comes as a script called multicast-test, which you will find located in the bin folder in the above zip file.

Instructions on how to run this script file can be found in the Coherence documentation. You may like to go straight to the subheading called Example in the guide, where there is an example on how to use the multicast-test script.

The information on this page does not apply to Confluence OnDemand.

RELATED TOPICS

Cluster Troubleshooting
Confluence Clustering Overview

Clustering for Scalability vs Clustering for High Availability (HA)

Please be aware that Confluence clustered is not available for version 4.0 yet. It will be forthcoming in a minor release of Confluence following the release of version 4.0.

People occasionally enquire about setting up High-Availability (HA) Confluence clusters. Confluence’s clustering is designed to solve a different problem, that of scaling under high load. This page explains the difference.

On this page:

- What is High Availability (HA)?
- What does Confluence’s clustering do, then?
- So what kind of resilience can I build into a Confluence installation?
- What’s the difference between load balancing and failover?
- What do you mean by ‘session affinity’?

[related topics]

The information on this page does not apply to Confluence OnDemand.

What is High Availability (HA)?

HA means that your application will be available, without interruption. It’s a very difficult thing to achieve, and is typically what people are talking about when they refer to five-nines availability.

In the context of application clustering, it means that any given node (or combination of nodes) can be shut down, blown up, or simply
Confluence 4.0 Documentation

Disconnected from the network unexpectedly, and the rest of the cluster will continue operating cleanly as long as at least one node remains. It requires that nodes can be upgraded individually while the rest of the cluster operates, and that no disruption will result when a node rejoins the cluster. It typically also requires that nodes be installed in geographically separate locations.

What does Confluence’s clustering do, then?

Confluence’s clustering system allows a single installation to serve a much greater number of concurrent requests than a single server. This is what we refer to as ‘scaling under load’.

It does provide a certain amount of resilience, as the death of one node won’t bring the other(s) down. However, it requires very low network latency, which rules out geographic separation of the servers, and upgrading can only be performed while the entire cluster is shut down. This doesn’t mean that Confluence’s clustering is buggy or broken. It simply reflects the difference between the two design aims.

So what kind of resilience can I build into a Confluence installation?

It’s still entirely possible to build a resilient Confluence installation, using a ‘cold-failover’ approach in which two (or more) servers share a database and (normally) a network-mounted file system, where no more than one server is actually running at any given time.

Several different approaches are feasible, but the common elements are:

- a well-configured load balancer (session affinity is irrelevant in this case)
- a reliable monitoring system which can detect and shut down a misbehaving Confluence instance before starting the spare server
- startup scripts with added smarts to check for the presence of another running node before deciding whether to start up a server
- servers with the same view of both the database and the home directory.

It’s vital to ensure that only one server is running at any one time, in this kind of setup. If a server starts while another is already running against the same database, the result will be a cluster panic that shuts down both servers.

A single database becomes the single point of failure in such a system. This can be alleviated by database clustering, or by replication from the ‘active’ database server to the standby server(s) if you wish to separate the failover systems while keeping database latency to a minimum.

In the same vein, the home directory can be hosted on a shared network system — SAN or NAS, preferably with its own replication/rapid recovery system — though there’s a known issue to consider. Alternatively, to avoid the use of networked file systems, a utility such as rsync can be used to periodically bring the spare servers’ home directories up to date, so long as you keep the period sufficiently short — probably between one and five minutes, depending on the rate of activity. This can be avoided altogether by keeping attachments in the database; it increases the demands on the bandwidth between the application and database servers, but guarantees that the system is in a consistent state at switchover. If the data is at all sensitive or confidential, it’s advisable to run rsync over ssh, to minimise the opportunity for the data to be captured on its way across the network.

What’s the difference between load balancing and failover?

Load balancing means that all servers are active, and new requests are distributed among them. Several strategies are available, but the most common are:

- round-robin — the first request goes to the first server, the second request goes to the second server, and so on. When you run out of servers, the next request goes to the first server, and around it goes again.
- percentage-based — if (for example) you have two servers, and one can handle twice the load of the other, you can tell the load balancer to send two requests to the stronger server for every request that goes to the weaker one.
- availability — the load balancer sends a test query to each of the servers every second or so, and directs each new request to the server that’s currently responding the fastest.

Failover means that only one server is active at any given time, and normally involves two servers (any number of servers may be involved, depending on the system). If the active one stops responding, requests are directed to the other server — the system ‘fails over’ to the second one.

‘Cold failover’ means that the second server is only started up after the first one has been shut down. This is the case for non-clustered Confluence.

‘Hot failover’ or ‘hot standby’ means that all servers are running at all times, and that the load is directed entirely toward one server at any one time.

A load balancer can be used in both scenarios, especially if it’s smart enough to keep track of which servers are currently running.

Failover can also be managed via DNS, in a sufficiently well-controlled environment.

What do you mean by ‘session affinity’?

Sessions consist of several transmissions in each direction between the client (browser) and the server. Session affinity means that the load balancer keeps track of which server received the initial transmission from a given browser, and that it will then send any subsequent requests from that browser to the same server.

This is necessary with Confluence clustering, in particular, because sessions are not shared across cluster nodes. If you log into one node and then send a request to another, the other node will send you the login screen because it doesn’t recognise your session cookie.
Please be aware that Confluence clustered is not available for version 4.0 yet. It will be forthcoming in a minor release of Confluence following the release of version 4.0.

Atlassian recommends a network topology similar to the one shown below, to get the best results from a Confluence Clustered deployment.

The number of Confluence nodes in the deployment is adjustable — select the number which suits your own requirements.

The most important aspect is that cluster, database and HTTP (client) traffic are all carried on separate subnets. It is possible, on a sufficiently fast network, to carry cluster and database traffic on the same subnet but we do strongly recommend that HTTP traffic be always confined to a separate subnet on production deployments.

Confluence Clustered does not support clustered communication over WAN, VLAN or VPN. All Confluence Clustered nodes must be on the same local subnet, ideally networked via an ethernet hub or simple switch. The cluster communication network must also support multicast IP networking.

The information on this page does not apply to Confluence OnDemand.

Use this example as a basis for your own network diagram

When you are considering a Confluence Clustered deployment, you should prepare a network diagram like the one on this page. This will facilitate discussion with Atlassian Support and help with your own planning. Please refer to the cluster checklist for more guidance on planning your clustered deployment.
Cluster Administration page

Please be aware that Confluence clustered is not available for version 4.0 yet. It will be forthcoming in a minor release of Confluence following the release of version 4.0.

Overview

Any instance of Confluence which uses a clustered license has a Cluster Configuration page which includes information about the active cluster.

To open the Cluster Administration page,
1. Go to the Confluence ‘Administration Console’:
   - Choose Browse > Confluence Admin. The ‘Administrator Access’ login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the ‘Administration Console’.
2. Click ‘Cluster Configuration’ in the left-hand menu, in the section called ‘Clustering’.

⚠️ The information on this page does not apply to Confluence OnDemand.

### Availability

To access this functionality, you must:

- Be a System Administrator (i.e. have global System Administrator permissions), and
- be using Confluence 2.3 or later, and
- be using a clustered Confluence license.

### Screenshots: Cluster Administration Page

#### Cluster Configuration

<table>
<thead>
<tr>
<th>Cluster Status</th>
<th>RUNNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster Name</td>
<td>extranet</td>
</tr>
<tr>
<td>Multicast Listen Address</td>
<td>235.54.69.161:32357</td>
</tr>
<tr>
<td>Active Nodes</td>
<td>2</td>
</tr>
<tr>
<td>Licensed Nodes</td>
<td>8</td>
</tr>
</tbody>
</table>

#### Active Nodes

<table>
<thead>
<tr>
<th>Node ID</th>
<th>Unicast Listen Address</th>
<th>Uptime</th>
<th>JVM Version</th>
<th>Operating System</th>
<th>Memory Graph</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>172.16.0.11:8088</td>
<td>1 day, 20 hours, 49 minutes, 47 seconds</td>
<td>1.4.2_12</td>
<td>Linux 2.6.9-42.0.3.ELsmp</td>
<td>9 % Free</td>
</tr>
<tr>
<td>3</td>
<td>172.16.0.10:8088</td>
<td>1 day, 20 hours, 27 minutes, 32 seconds</td>
<td>1.4.2_12</td>
<td>Linux 2.6.9-42.0.3.ELsmp</td>
<td>17 % Free</td>
</tr>
</tbody>
</table>

This page shows your cluster configuration, and allows you to start a new Confluence cluster using data from this instance.

- **Cluster Status** indicates whether your cluster is currently running.
- **Licensed nodes** is the maximum number of instances of Confluence your license allows in a cluster.
- **Active nodes** lists the instances of Confluence currently participating in the cluster.
- **Starting a new cluster** will perform the following changes:
  - enable a clustered cache
  - migrate attachments from file system to the database
• publish database connection information so other nodes can join the cluster.

All access to Confluence will be locked while this takes place, and you will be forced to restart Confluence afterwards.

Cluster name is a short name for identifying your cluster. Other Confluence instances can join the cluster using this name.

To join an existing cluster, start a clean copy of Confluence on this node and select 'Join Cluster' during the setup wizard.

Related documents

Overview of Confluence Clusters
Confluence Cluster Installation
Cluster Troubleshooting

Cluster Checklist

Please be aware that Confluence clustered is not available for version 4.0 yet. It will be forthcoming in a minor release of Confluence following the release of version 4.0.

It is possible to run Confluence in a clustered environment instead of on a single server. This means that you can run multiple copies of Confluence in a cluster, so that clients (such as a browser) can connect to any copy and see the same information.

Refer to the clustering overview for more information and a list of related pages about clustering Confluence.

Consider your options carefully before deciding on a clustered installation

While we have tried to make clustering Confluence as easy and administrator-friendly as possible, it is a major architectural change and requires extra planning for deployment and upgrades. Please consider the information below and then consult Atlassian Sales before making your final decision.

On this page:

• Purpose of this Document
• Assumed Knowledge
• General Considerations
• Server Setup
• Database Setup
• Network Setup
• Staging Environment

The information on this page does not apply to Confluence OnDemand.

Purpose of this Document

The purpose of this cluster checklist is to help you:

• Decide whether Confluence Clustered is the right solution for you.
• Create a plan for your clustered deployment.

If you need to raise a support request with Atlassian during or after cluster deployment, we will need to ask you questions about your configuration. It will save crucial time if you can provide us with your deployment plan.

For more information about clustering Confluence, refer to the clustering overview.

Assumed Knowledge

In writing this document, we have assumed that our readers have an in-depth knowledge of the following technical areas:

• Database
• Networking
• Application servers
• Load balancers
Before starting a clustered deployment please read the information on this page carefully, as well as the linked documentation, to assess if you have the assumed knowledge.

**General Considerations**

**What will Confluence Clustered do for you?**

The points in this section of the page will help you evaluate your reasons for considering a clustered deployment, and then decide whether Confluence Clustered is the right solution for your environment.

Confluence Clustered is designed to scale the number of simultaneously connected users at a much better performance than what a single node can achieve.

Confluence Clustered will not improve performance in systems with few users.

Clustering Confluence means that user requests can be served by independent machines. The performance gains are substantial, and have improved a lot further since Confluence 3.0. Clustering is especially great in dealing with spikes to the load, e.g. during certain hours of business. Just note that if rendering a complicated page (e.g. containing many macros or rendering many graphs) takes five seconds on an otherwise idle server, it will not be faster in a clustered environment. Also, the first step when you encounter performance issues is to tune your existing system, make sure you are using the right hardware and have looked at your database.

Confluence Clustered is not a high availability solution.

Confluence Clustered is not designed specifically to provide a high availability solution.

General availability is higher in a Confluence cluster than on a single installation, you can for example take one node down for minor maintenance tasks e.g. when adding a new CPU or adding RAM. But you still have to bring down all nodes at the same time for software upgrades. Also there are certain conditions, like loss of network connectivity between nodes ("split brain"), that will result in the cluster shutting itself down. Confluence Clustered offers higher reliability, but not high availability.

Confluence Clustered is not for disaster recovery nor for transparent failover.

If one node crashes, there is no transparent failover for the connected client. Also, our network requirements (see below) make Confluence unsuitable for deployment to different cities or even to different buildings.

**Server Setup**

The number of supported cluster nodes is limited to four.

⚠️ Not supported. In theory, you can connect more than four nodes — but that is not covered by Atlassian Support.

All cluster nodes must have the same version of OS, application server, etc.

Confluence requires a homogeneous environment. All Confluence cluster nodes must have the same version of the following:

- Operating system
- CPU
- Installed memory
- Java
- Application server

⚠️ Note that 'same version' means 'same to the last digit'. For example, Java v1.4.2_16 is not the same as v1.4.2_15

✅ We strongly recommend user to have the same memory configuration (both the JVM and the physical memory) because a cluster uses a replicated cache. A replicated cache requires the same amount of memory on each node in the operating cluster. The memory allocations must be equal.

Use good and up-to-date hardware.
While the details are up to you, we strongly suggest that your servers have at least 4GB of physical RAM. A high number of concurrent users means that a lot of RAM will be consumed. You usually don’t need to assign more than 4GB per JVM process, and most of the time even just 1GB or 2GB will be fine, you should just be prepared to fine tune the settings.

Confluence Clustered is not supported when run in VMware or other virtualisations.

⚠️ Not supported. We strongly discourage you to deploy a production environment of Confluence to virtual servers, and we will not be able to support you when problems arise.

When running a Confluence cluster your goal is high capacity and performance, so you should not risk lower performance by virtualising it and sharing a computer with other processes.

Many customers who are running Confluence on VMware, or similar virtualisation solutions, experience major performance problems that are extremely hard to pinpoint. Since the problems are not related to Confluence itself, we will not be able to help you.

Confluence should be the only application on the cluster servers.

No additional applications (other than core operating system services) should be running on the same servers as Confluence.

Since your goal should be increased capacity and performance, you should not risk this by running any other process on the machine with a Confluence Clustered node. While it may be fine to run JIRA, Confluence and Bamboo on a dedicated Atlassian software server for small installations, it is strongly discouraged for clustering Confluence.

Do not upgrade and switch to Confluence Clustered at the same time

If you plan to migrate to a clustered solution, make sure you are migrating within the same version of Confluence. If you plan to upgrade to a higher version of Confluence, do this before the migration to the clustered version.

For example, if you are currently running Confluence 2.9.2, and want to roll out the clustered version of Confluence 3.0, you must first upgrade to Confluence 3.0 and check that everything works fine (e.g. by running and monitoring your production system for a week). Then you are in a good position to migrate to the clustered version.

Database Setup

Run the database on its own physical server.

You are optimising for performance, so you don’t want the database to slow down your application servers, or vice versa. In high load scenarios, the database may need to have better hardware than the application servers to be able to handle all requests. You should find out by performing loadtesting.

Attachments must be stored in a database and not the local file system

Storing attachments in the database is the only supported attachment storage configuration for clustering Confluence.

Make sure that you use a supported version of a database server to store Confluence’s data.

Please check that your intended database is officially supported by Atlassian Confluence. The load on an average cluster solution is higher than on a single box installation, and it is therefore even more crucial to use the right database vendor and version.

Your database must be provisioned to store a large volume of binary data.

Note that Confluence clustered stores file attachments in the database, and you need an experienced DBA who can monitor and manage the data growth.

You need an experienced DBA available to troubleshoot database performance issues.

Not having an experienced full-time DBA at hand at short notice when entering the realm of high load is dangerous. While small installations of Confluence basically work ‘out of the box’, anything that involves high load and a lot of database space requires continual monitoring, optimising and fine tuning of the Confluence database. When we ramp up the load on our loadtesting environment, we see that database usage goes up as well. Having powerful hardware in place helps, but if there are queries that become inefficient with you particular load
pattern, you need an expert to tune it. As an example, we have seen PostgresSQL switch its internal caching mechanism when a particular table reached a certain size, which resulted in a drop of performance by about 200ms per request. This happened from one second to the other. Being able to troubleshoot and then fix issues like these is important in any enterprise system, but it is even more in a high load scenario.

**Network Setup**

**We recommend hardware load balancers or putting a software load balancer on its own server.**

If you use a software load balancer (which is fine except for really extreme installations), it must be deployed on a machine of its own. Running a software load balancer on a cluster node is not supported. If a node unexpectedly got overwhelmed by a spike in load, a load balancer on that node would turn unresponsive. As a result, your whole cluster would be inaccessible even though the other nodes would be available. So using a different server is common practice and common sense.

**Use separate network adapters for communication between servers.**

The Confluence cluster nodes should have a separate physical network (i.e. separate NICs) for inter-server communication. This is the best way of getting the cluster to run fast and reliably. Performance problems are likely to occur if you connect cluster nodes via a network that has lots of other data streaming through it.

**The switch connecting the Confluence cluster nodes must not be a ‘smart switch’.**

⚠️ **Not supported.** Smart switches are not covered by Atlassian Support for Confluence Clustered.

Do not use smart switches between cluster nodes. Many problems have been reported and attributed to smart switches. They have a tendency to interrupt broadcast or multicast traffic, thus reliably killing a cluster after a certain amount of time has passed. This makes troubleshooting especially complex and tedious.

**Cisco switches need additional configuration.**

If the switch connecting the Confluence cluster nodes is a Cisco switch then it might need additional configuration to support Confluence clustering.

Please make sure you find out all the details about your switches before you start the deployment.

**It is recommended that the database is on a different physical network from the Confluence server nodes.**

Since you want to increase your capacity and performance for high loads, it is recommended to have your database on a different network. Please refer to the recommended topology diagram for more information.

**Minimize the latency between the Confluence cluster nodes and the database.**

Even though having the nodes and the database on the same physical network usually suffices, you should take the time to explicitly measure network latency, and make sure it is as close to zero as possible.

**Prepare a network diagram.**

To facilitate discussion and to ease planning, you should prepare a network diagram like this example of recommended network topology.

If you request support with Confluence Clustered, we may ask for your network diagram. We recommend that you create one similar to our example before you proceed with the installation.

**You need network support staff available to troubleshoot cluster communication issues.**

Setting up a cluster is not trivial. Even small problems in network design will be expanded in a clustered installation. (This is true of any kind of software.)

It is absolutely vital that you have dedicated network staff available to track down problems when they arise. A cluster will usually be used by
thousands of users, and you don't want to keep them waiting because a network card breaks, or because someone made an undocumented change to the network and you don't have an expert around who can figure it out.

**Staging Environment**

*You need a staging environment that is exactly the same as your production system.*

You must be able to test drive any change to the cluster (installing upgrades, installing plugins) and to perform other tests (checking connectivity, debugging problems) on a staging cluster.

The staging environment must be:

- On the same OS, database, and Java version as your production environment.
- Clustered.

If you require support, we may for example ask you to turn off certain third-party plugins. If you can't do this in your production environment and you don't have a staging environment for troubleshooting, we may not be able to help you.

---

### Getting a license for your staging environment

Only a technical contact for your commercial/academic license is able to create a Developer license.

Atlassian supplies 'developer' licenses which can be used by existing commercial license holders who wish to deploy non-production installations of our software to use in QA/staging environments. Developer licenses are free of charge to commercial license holders and, like our commercial offerings, they include 12 months of updates starting from the date of purchase of the commercial license.

If you hold a commercial license, you can obtain a free developer license by following these steps:

1. Log in to your Atlassian account.
2. Under the "Licenses" heading, all of your licenses will be displayed. Click the plus sign next to a license to view its details.
3. Click the 'View Developer License' link in the bottom right corner of the license detail panel, below your commercial license key.

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**Related Topics**

Page: Cluster safety mechanism

Page: How do I supress cluster warning message in confluence?

Page: Technical Overview of Clustering in Confluence

Page: Confluence Clustering Overview

Page: Changing Datasources Manually in a Cluster

Page: Viewing and Editing License Details

Page: Cluster Troubleshooting

Page: Confluence Cluster Installation

Page: Apache and Tomcat load balancing

Page: Cluster Administration page

Page: Recommended network topology

Page: Upgrading a Confluence Cluster

---

**Configuring Confluence Security**

This section gives guidelines on configuring the security of your Confluence site.

Other topics:

- For information about user management, groups and permissions, please refer to the [internal security overview](#).
- For an overview of Confluence application security, see the page on [Confluence security](#).

---

**Setting up a Secure Confluence Site**
Confluence 4.0 Documentation

- Confluence Cookies
- Configuring Secure Administrator Sessions
- Using Fail2Ban to limit login attempts
- Securing Confluence with Apache
  - Using Apache to limit access to the Confluence administration interface
- Enabling or Disabling Public Signup
- Managing External Referrers
  - Excluding external referrers
  - Hiding external referrers
  - Ignoring External Referrers
- Best Practices for Configuring Confluence Security
- Hiding the People Directory
- Configuring Captcha for Spam Prevention
- Hiding External Links From Search Engines
- Configuring Captcha for Failed Logins
- Configuring XSRF Protection
- User Email Visibility
- Anonymous Access to Remote API
- Running Confluence Over SSL or HTTPS
- Connecting to LDAP or JIRA or Other Services via SSL
- Configuring RSS Feeds

Confluence Cookies

Confluence uses Seraph, an open source framework, for HTTP cookie authentication.

⚠ The information on this page does not apply to Confluence OnDemand.

Cookies

Confluence uses two cookies:

- The JSESSIONID cookie is created by the application server and used for session tracking purposes.
- The 'remember me' cookie, seraph.confluence, is generated by Confluence when the user selects the 'Remember me' checkbox on the login page.

ℹ You can read about cookies on the Wikipedia page.

The 'Remember Me' Cookie

The 'remember me' cookie is a long-lived HTTP cookie. This cookie can be used to authenticate an unauthenticated session. Confluence
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.confluence`. This key is defined in the `CONFLUENCE-INSTALLATION/confluence/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, Confluence will match the 'remember me' cookie (if present) against the token stored for the user in the Confluence 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 `CONFLUENCE-INSTALLATION/confluence/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>
```

**Automatic Cleanup of 'Remember Me' Tokens**

Every cookie issued by Confluence has a corresponding record in the database. A scheduled job runs on 20th of every month to clean up expired tokens. The name of the trigger is `clearExpiredRememberMeTokensTrigger`.

Note: The only purpose of this job is to prevent the database table from growing too big. For authentication purposes, Confluence will ignore expired tokens even if they still exist in the database.

**Is it Possible to Disable the 'Remember Me' Feature?**

Confluence does not offer an option for disabling the 'Remember Me' feature. See the workaround.

**Notes**

- The `autocomplete` that happens when a user logs in is a browser feature, not a Confluence feature. Confluence cannot enable or disable the autocomplete.

**RELATED TOPICS**

- Administrators Guide Home
- Confluence Documentation Home

**Configuring Secure Administrator Sessions**

Confluence protects access to its administrative functions by requiring a secure administration session to use the Confluence administration console or administer a space. When a Confluence administrator (who is logged into Confluence) attempts to access an administration function, they are prompted to log in again. This logs the administrator into a temporary secure session that grants access to the Confluence/space administration console.

The temporary secure session has a rolling timeout (defaulted to 10 minutes). If there is no activity by the administrator in the Confluence/space administration console for a period of time that exceeds the timeout, then the administrator will be logged out of the secure administrator session (note, they will remain logged into Confluence). If the administrator does click an administration function, the timeout will reset.

---

*The information on this page does not apply to Confluence OnDemand.*

**To configure secure administrator sessions:**

1. Go to the Confluence 'Administration Console'.
1. Choose **Browse > Confluence Admin**. The ‘Administrator Access’ login screen will be displayed.
   - Enter your password and click **Confirm**. You will be temporarily logged into a secure session to access the ‘Administration Console’.

2. Click ‘Security Configuration’ in the ‘Security’ section. The ‘Edit Security Configuration’ screen will be displayed.

3. Click the ‘Edit’ link.
   - To disable secure administrator sessions (i.e. administrators will not be required to log into a secure session to access the administration console), uncheck the ‘Enable’ checkbox next to ‘Secure administrator sessions’.
   - To change the timeout for secure administrator sessions, update the value in textbox next to ‘minutes before invalidation’. The default timeout for a secure administration session is 10 minutes.

4. Click the ‘Save’ button.

---

**Notes**

- **Disabling password confirmation.** Confluence installations that use a custom authentication mechanism may run into problems with the Confluence security measure that requires password confirmation. If necessary, you can set the `password.confirmation.disabled` system property to disable the password confirmation functionality. See [Recognised System Properties](#). See issue CONF-20958: “Confluence features that require password confirmation (websudo, captcha) do not work with custom authentication”.

- **WebSudo.** The feature that provides secure administrator sessions is also called ‘WebSudo’.

- **Manually ending a secure session.** An administrator can choose to manually end their secure session by clicking the ‘drop access’ link in the banner displayed at the top of their screen.

- **Note for developers.** Secure administrator sessions can cause exceptions when developing against Confluence or deploying a plugin. Please read this FAQ: How do I develop against Confluence with Secure Administrator Sessions? Note: The Confluence XML-RPC and REST APIs are not affected by secure administration sessions.

---

**Using Fail2Ban to limit login attempts**

**What is Fail2Ban?**

We need a means of defending sites against brute-force login attempts. **Fail2Ban** is a Python application which trails logfiles, looks for regular expressions and works with Shorewall (or directly with iptables) to apply temporary blacklists against addresses that match a pattern too often. This can be used to limit the rate at which a given machine hits login URLs for Confluence.

---

⚠️ The information on this page does not apply to Confluence OnDemand.
Prerequisites

- Requires Python 2.4 or higher to be installed
- Needs a specific file to follow, which means your Apache instance needs to log your Confluence access to a known logfile. You should adjust the configuration below appropriately.

How to set it up

This list is a skeletal version of the instructions

- There's an RPM available for RHEL on the download page, but you can also download the source and set it up manually
- Its configuration files go into /etc/fail2ban
- The generic, default configuration goes into .conf files (fail2ban.conf and jail.conf). Don't change these, as it makes upgrading difficult.
- Overrides to the generic configuration go into .local files corresponding to the .conf files. These only need to contain the specific settings you want overridden, which helps maintainability.
- Filters go into filter.d — this is where you define regexps, each going into its own file
- Actions go into action.d — you probably won't need to add one, but it's handy to know what's available
- "jails" are a configuration unit that specify one regexp to check, and one or more actions to trigger when the threshold is reached, plus the threshold settings (e.g. more than 3 matches in 60 seconds causes that address to be blocked for 600 seconds)
- Jails are defined in jail.conf and jail.local. Don't forget the enabled setting for each one — it can be as bad to have the wrong ones enabled as to have the right ones disabled.

Running Fail2Ban

- Use /etc/init.d/fail2ban {start|stop|status} for the obvious operations
- Use fail2ban-client -d to get it to dump its current configuration to STDOUT. Very useful for troubleshooting.
- Mind the CPU usage; it can soak up resources pretty quickly on a busy site, even with simple regexp
- It can log either to syslog or a file, whichever suits your needs better

Common Configuration

jail.local

```ini
# The DEFAULT allows a global definition of the options. They can be override # in each jail afterwards.

[DEFAULT]

# "ignoreip" can be an IP address, a CIDR mask or a DNS host. Fail2ban will not # ban a host which matches an address in this list. Several addresses can be # defined using space separator.
# ignoreip = <space-separated list of IPs>

# "bantime" is the number of seconds that a host is banned.
bantime  = 600

# A host is banned if it has generated "maxretry" during the last "findtime" # seconds.
findtime  = 60

# "maxretry" is the number of failures before a host get banned.
maxretry = 3

[ssh-iptables]

enabled = false

[apache-shorewall]

enabled = true
filter = cac-login
action = shorewall
logpath = /var/log/httpd/confluence-access.log
bantime = 600
maxretry = 3
findtime = 60
backend = polling
```

Configuring for Confluence

The following is an example only, and you should adjust it for your site.

filter.d/confluence-login.conf

[Definition]
failregex = <HOST>.*GET /login.action
ignoreregex =

Securing Confluence with Apache

The following outlines some basic techniques to secure a Confluence instance using Apache. These instructions are basic to-do lists and should not be considered comprehensive. For more advanced security topics see the "Further Information" section below.

- Using Apache to limit access to the Confluence administration interface
- Using Fail2Ban to limit login attempts

Further Information

Running Confluence behind Apache

The information on this page does not apply to Confluence OnDemand.

Using Apache to limit access to the Confluence administration interface

Limiting administration to specific IP addresses

The Confluence administration interface is a critical part of the application; anyone with access to it can potentially compromise not only the Confluence instance but the entire machine. As well as limiting access to users who really need it, and using strong passwords, you should consider limiting access to it to certain machines on the network or internet. If you are using an Apache web server, this can be done with Apache's Location functionality as follows:

The information on this page does not apply to Confluence OnDemand.

1. Create a file that defines permission settings

This file can be in the Apache configuration directory or in a system-wide directory. For this example we'll call it "sysadmin_ips_only.conf". The file should contain the following:

```
Order Deny,Allow
Deny from All
# Mark the Sysadmin's workstation
Allow from 192.168.12.42
```

2. Add the file to your Virtual Host

In your Apache Virtual Host, add the following lines to restrict the administration actions to the Systems Administrator:

This configuration assumes you've installed Confluence under '/confluence'. If you have installed under '/' or elsewhere, adjust the paths accordingly.
Enabling or Disabling Public Signup

Enabling 'Public Signup' allows users to sign themselves up to the site.

If you want to restrict your site to a particular set of users, you may want to disable 'Public Signup'. In this instance, administrators can add new users from the Administration Console.
To enable or disable public signup:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select 'Security Configuration' in the left-hand panel.
3. This will display the 'Security Configuration' screen. Click 'Edit'.
4. Tick the 'Public Signup' checkbox to enable Public Signup. Untick the checkbox to disable it.
5. Click 'Save'.

Related Topics
Disabling the Built-In User Management
User Management
Configuring Confluence Security

Managing External Referrers

An external referrer is any site that links to your Confluence instance. Each time someone clicks on the external link, your Confluence site can record the click as a referral.

By default, external referrers for a page are listed under 'Hot Referrers' on the 'Info' screen of the page. (See Screenshot 1 below.) Confluence shows a maximum of 10 referrers. If there are more than 10, Confluence shows the 10 with the highest number of hits.

Note that you do not need to enable trackback in order to have external referrers enabled.

To manage your external referrers:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select the 'Manage Referrers' option (See Screenshot 2 below.).

The following actions will be available:

- Record or ignore all external referrers: By default, Confluence records the number of hits made to a page from the link on the external site. If you turn this option off, Confluence will not record the hits.
- Show or hide all external referrers: By default, Confluence lists the external referrers as 'Hot Referrers' on the 'Info' screen of a page, as shown below. If you turn this option off, external referrers will not be listed on the page.
- Specify which external referrers to exclude: You can decide which referrers you want to exclude from being displayed on your site.
Related Topics

Page: Configuring Captcha for Failed Logins (Confluence 4.1)

Page: Running Confluence Over SSL or HTTPS (Confluence 4.1)

Page: Excluding external referrers (Confluence 4.1)

Page: Configuring the Administrator Contact Page (Confluence 4.1)

Page: Hiding the People Directory (Confluence 4.1)

Page: User Email Visibility (Confluence 4.1)

Page: Anonymous Access to Remote API (Confluence 4.1)

Page: Enabling or Disabling Public Signup (Confluence 4.1)

Page: Configuring Captcha for Spam Prevention (Confluence 4.1)

Page: Hiding external referrers (Confluence 4.1)

Page: Ignoring External Referrers (Confluence 4.1)

Page: Managing External Referrers (Confluence 4.1)

Page: Hiding External Links From Search Engines (Confluence 4.1)
Excluding external referrers

An external referrer is any site that links to your Confluence instance. Each time someone clicks on the external link, your Confluence site can record the click as a referral.

You can exclude external referrers to prevent them from being recorded or displayed anywhere on your site. Once you have specified your list of blocked URLs, any incoming links from URLs that match the list will no longer be recorded. Referrer URLs are blocked if they start with any of the URLs in the exclusion list. So http://evilspamsite.blogspot.com will also match http://evilspamsite.blogspot.com/nastypage.html

There are two instances where you may want to do this:

1. If you are running a Confluence installation that is open to public:
   In a site that is open to public, one unfortunate problem is that malicious sites can spam the display of a page's incoming links statistics. This is usually done to get the site's URL to appear in the sidebar. By adding these sites to the 'excluded referrers' list, you can prevent them from being listed on your site.
2. If Confluence is installed on a server with multiple domain names or IP addresses:
   Confluence will consider any URL originating from the domain name where Confluence is installed as an internal link. However, if Confluence is installed on a server with multiple domain names or IP addresses, you will need to add the other domain name prefixes to this list to let Confluence know that any links from these domains should not be considered external links.

You need to be a Confluence administrator and to know the URL of the site to add it to the excluded referrers list.

To add a URL to the excluded referrers list:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select Manage Referrers in the left-hand panel.
3. Add the URL to the 'Excluded External Referrer Prefixes' section.
   - You must include 'http:' at the front of the URL.
   - You can add more than one URL by putting each URL on a new line.

Looking above: Excluding external referrers

Related Topics

Page: Configuring Captcha for Failed Logins
Page: Running Confluence Over SSL or HTTPS
Page: Excluding external referrers
Page: Configuring the Administrator Contact Page
Page: Hiding the People Directory
Page: User Email Visibility
Page: Anonymous Access to Remote API
Hiding external referrers

By default, Confluence lists the external referrers as 'Hot Referrers' on the 'Info' screen of a page. If you turn this option off, external referrers will not be listed on the page.

To hide external referrers:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select Manage Referrers in the left-hand panel.
3. Click 'Off' beside Show Referrers in Page Info.

<table>
<thead>
<tr>
<th>Record External Referrers:</th>
<th>On</th>
<th>Off</th>
</tr>
</thead>
<tbody>
<tr>
<td>Show Referrers in Page Info:</td>
<td>On</td>
<td>Off</td>
</tr>
<tr>
<td>Excluded External Referrer Prefixes:</td>
<td>Add</td>
<td></td>
</tr>
</tbody>
</table>

Screenshot: Managing external referrers

Related Topics

- Page: Configuring Captcha for Failed Logins
- Page: Running Confluence Over SSL or HTTPS
- Page: Excluding external referrers
- Page: Configuring the Administrator Contact Page
- Page: Hiding the People Directory
- Page: User Email Visibility
- Page: Anonymous Access to Remote API
- Page: Enabling or Disabling Public Signup
- Page: Configuring Captcha for Spam Prevention
- Page: Hiding external referrers
- Page: Ignoring External Referrers
- Page: Managing External Referrers
- Page: Hiding External Links From Search Engines
**Ignoring External Referrers**

An external referrer is any site that links to your Confluence instance. Each time someone clicks on the external link, your Confluence site can record the click as a referral. By default, Confluence records the number of hits made to a page from any link on an external site. If you turn this option off, Confluence will not record the hits.

**To ignore external referrers:**

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select 'Manage Referrers' in the left-hand panel.
3. Click 'Off' beside 'Record External Referrers'.

![Screenshot above: Managing external referrers](image)

**Record External Referrers:**

<table>
<thead>
<tr>
<th></th>
<th>On</th>
<th>Off</th>
</tr>
</thead>
</table>

**Show Referrers in Page Info:**

<table>
<thead>
<tr>
<th></th>
<th>On</th>
<th>Off</th>
</tr>
</thead>
</table>

**Excluded External Referrer Prefixes:**

- [Purge All]

**Related Topics**

- Page: Configuring Captcha for Failed Logins
- Page: Running Confluence Over SSL or HTTPS
- Page: Excluding external referrers
- Page: Configuring the Administrator Contact Page
- Page: Hiding the People Directory
- Page: User Email Visibility
- Page: Anonymous Access to Remote API
- Page: Enabling or Disabling Public Signup
- Page: Configuring Captcha for Spam Prevention
- Page: Hiding external referrers
- Page: Ignoring External Referrers
- Page: Managing External Referrers
- Page: Hiding External Links From Search Engines

**Best Practices for Configuring Confluence 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.

⚠️ The information on this page does not apply to Confluence OnDemand.
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: Using Apache to limit access to the Confluence administration interface.
- How to reduce the risk of brute force attacks: Using Fail2Ban to limit login attempts.

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 Confluence roles, permissions and processes makes a big difference in the security of your Confluence site.

Below are some more Confluence-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.

- Keep the number of Confluence administrators extremely low. For example, 3 system administrator accounts should be the maximum.
- Similarly, 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.
- The administrators should have separate Confluence 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 writing pages in the wiki). 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 adresses, for example. See Using Apache to limit access to the Confluence administration interface.
- 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 minimise damage?).
- Make sure the Confluence 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.

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.

Hiding the People Directory

The People Directory provides a list of all users in your Confluence system.

If you need to disable the People Directory set the following system properties on your application server command line:

- To disable the People Directory for anonymous users,

  ```
  -Dconfluence.disable.peopledirectory.anonymous=true
  ```

- To disable the People Directory entirely,

  ```
  -Dconfluence.disable.peopledirectory.all=true
  ```
This workaround will prevent the People directory from appearing on the dashboard, but if you navigate to the profile of a user, and then click on the "People" in the breadcrumb link (Dashboard >> People >> FullName >> Profile) or you go to the URL directly <CONFLUENCE_INSTALL>/browsepeople.action, you will be able to access the people directory.

To workaround this, set up Apache webserver in front of confluence and redirect requests to this URL.

To remove the link on the dashboard:

### Related Topics

- **Page**: Configuring Captcha for Failed Logins
- **Page**: Running Confluence Over SSL or HTTPS
- **Page**: Excluding external referrers
- **Page**: Configuring the Administrator Contact Page
- **Page**: Hiding the People Directory
- **Page**: User Email Visibility
- **Page**: Anonymous Access to Remote API
- **Page**: Enabling or Disabling Public Signup
- **Page**: Configuring Captcha for Spam Prevention
- **Page**: Hiding external referrers
- **Page**: Ignoring External Referrers
- **Page**: Managing External Referrers
- **Page**: Hiding External Links From Search Engines

### Configuring Captcha for Spam Prevention

You need to be a Confluence administrator to configure Captcha for spam prevention in Confluence.

If your Confluence site is open to the public you may find that automated spam is being added, in the form of comments or new pages.
You can configure Confluence to deter automated spam by asking users to prove that they are human before they are allowed to:

- Sign up for an account.
- Add a comment.
- Create a page.
- Edit a page.
- Send a request to the Confluence administrators.

Captcha is the technical term for a test that can distinguish a human being from an automated agent such as a web spider or robot. You can read more about Captcha on Wikipedia.

When Captcha is switched on, users will need to recognise 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.

![Screenshot above: Example of a Captcha test](example_captcha.png)

You can configure Confluence to enforce Captcha for certain types of users. You can exempt logged-in users (they will have completed a Captcha when they signed up) or members of particular groups.

By default, Captcha for spam prevention is disabled. If you enable it, the default is that Captcha for spam prevention will apply to anonymous users only. Only anonymous users will have to perform the Captcha test when creating comments or editing pages. Captcha images will not be shown to logged-in users.

**To enable Captcha for spam prevention in Confluence:**

1. Go to the Confluence 'Administration Console':
   - Choose `Browse > Confluence Admin`. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click `Confirm`. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select 'Spam Prevention' from the 'Configuration' menu on the left.
3. Turn on Captcha by clicking the 'ON' link.
4. If you want to disable Captcha for certain groups:
   - Select 'No one' if you want everyone to see Captchas.
   - Select 'Signed in users' if you want only anonymous users to see Captchas.
   - If you want everyone to see Captchas except members of specific groups, select the 'Members of the following groups' and enter the group names in the text box. You can click the magnifying-glass icon to search for groups. Search for all or part of a group name and click the 'Select Groups' button to add one or more groups to the list.
   - To remove a group from the list, delete the group name.
5. Click the 'Save' button.

**Related Topics**

- Page: Configuring Captcha for Failed Logins
- Page: Running Confluence Over SSL or HTTPS
- Page: Excluding external referrers
- Page: Configuring the Administrator Contact Page
- Page: Hiding the People Directory
- Page: User Email Visibility
- Page: Anonymous Access to Remote API
- Page: Enabling or Disabling Public Signup
- Page: Configuring Captcha for Spam Prevention
- Page: Hiding external referrers
- Page: Ignoring External Referrers
- Page: Managing External Referrers
- Page: Hiding External Links From Search Engines
Hiding External Links From Search Engines

Hiding external links from search engines helps to discourage spammers from posting links on your site. If you turn this option on, any URLs inserted in pages and comments will be given the 'nofollow' attribute, which prevents search engines from following them.

Shortcut links (e.g. CONF-2622@JIRA) and internal links to other pages within Confluence are not tagged.

To hide external links from search engines:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Click 'Security Configuration' in the left panel.
3. This will display the 'Security Configuration' screen. Click 'Edit'.
4. Check the 'Hide External Links From Search Engines' checkbox.
5. Click the 'Save' button.

Background to the nofollow attribute

As part of the effort to combat the spamming of wikis and blogs (Confluence being both), Google came up with some markup which instructs search engines not to follow links. By removing the main benefit of wiki-spamming it's hoped that the practice will stop being cost-effective and eventually die out.

Related Topics

Page: Configuring Captcha for Failed Logins
Page: Running Confluence Over SSL or HTTPS
Page: Excluding external referrers
Page: Configuring the Administrator Contact Page
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Page: Anonymous Access to Remote API
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Page: Ignoring External Referrers
Page: Managing External Referrers
Page: Hiding External Links From Search Engines

Configuring Captcha for Failed Logins

If you have confluence administrator permissions, you can configure Confluence to impose a maximum number of repeated login attempts. After a given number of failed login attempts (the default is three) Confluence will display a Captcha form asking the user to enter a given word when attempting to log in again. This will prevent brute force attacks on the Confluence login screen.

Similarly, after three failed login attempts via the XML-RPC or SOAP API, an error message will be returned instructing the user to log in via the web interface. Captcha will automatically be activated when they attempt this login.
'Captcha' is the technical term for a test that can distinguish a human being from an automated agent such as a web spider or robot. You can read more about Captcha on Wikipedia.

When Captcha is activated, users will need to recognise 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.

Screenshot above: Example of a Captcha test

**Enabling, Disabling and Configuring Captcha for Failed Logins**

By default, Captcha for failed logins is enabled and the number of failed login attempts is set to three.

**To enable, disable and configure Captcha for failed logins:**

1. Go to the Confluence ‘Administration Console’:
   - Choose Browse > Confluence Admin. The ‘Administrator Access’ login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the ‘Administration Console’.
2. Select ‘Security Configuration’ from the ‘Security’ menu on the left.
3. Click the ‘Edit’ button.
4. To enable Captcha:
   - Check the ‘Enable’ checkbox next to ‘CAPTCHA on login’.
   - Set the maximum number of failed logins next to ‘Maximum Authentication Attempts Allowed’. You must enter a number greater than zero.
5. To disable Captcha, remove the check from the ‘Enable’ checkbox.
6. Click the ‘Save’ button.

Screenshot above: Configuring Captcha for failed logins

**Notes**

- Disabling all password confirmation requests, including Captcha on login. Confluence installations that use a custom
authentication mechanism may run into problems with the Confluence security measure that requires password confirmation. If necessary, you can set the `password.confirmation.disabled` system property to disable the password confirmation functionality on administrative actions, change of email address and Captcha for failed logins. See Recognised System Properties.

Related Topics

### Configuring XSRF Protection

Confluence requires an XSRF token to be present on comment creation, to prevent users being tricked into unintentionally submitting malicious data (read more about XSRF (Cross Site Request Forgery)). All of the themes bundled with Confluence have been designed to use this feature. However, if you are using a custom theme that does not support this security feature, you can disable it.

⚠ Please carefully consider the security risks before you disable XSRF protection in your Confluence installation.

⚠ Some functionality described on this page is restricted in Confluence OnDemand.

### To configure XSRF protection:

1. Go to the Confluence 'Administration Console':
   - Choose `Browse > Confluence Admin`. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click `Confirm`. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Click 'Security Configuration' in the 'Security' section. The 'Edit Security Configuration' screen will be displayed.
3. Click the 'Edit' link.
4. To disable XSRF protection, uncheck the 'Add Comments' checkbox in the 'XSRF Protection' section.
5. Click the 'Save' button.

![Screenshot: Configuring XSRF protection]

### User Email Visibility
Confluence provides three options for email address privacy which can be configured by a Confluence administrator from the Administration Console:

- **Public**: email addresses are displayed publicly.
- **Masked**: email addresses are still displayed publicly, but masked in such a way to make it harder for spam-bots to harvest them.
- **Only visible to site administrators**: only Confluence administrators can see the email addresses. Note that, if you select this option, email addresses will not be available in the 'User Search' popup (e.g. when setting Page Restrictions).

The information on this page does not apply to Confluence OnDemand.

To configure user email visibility:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select 'Security Configuration' in the left-hand panel. The 'Security Configuration' screen will be displayed.
3. Click 'Edit'. The fields on the 'Security Configuration' screen will be editable.
4. Select one of the options from the 'User email visibility' dropdown: 'public', 'masked', or 'only visible to site administrators'.
5. Click the 'Save' button.

Screenshot above: Email Visibility

Related Topics

- Page: Configuring Captcha for Failed Logins
- Page: Running Confluence Over SSL or HTTPS
- Page: Excluding external referrers
- Page: Configuring the Administrator Contact Page
- Page: Hiding the People Directory
- Page: User Email Visibility
- Page: Anonymous Access to Remote API
- Page: Enabling or Disabling Public Signup
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Anonymous Access to Remote API

Sites may wish to disable anonymous access to the remote API to make it harder for malicious users to write 'bots' that perform bulk changes to the site. If you wish to enable the Remote APIs but do not want anonymous users to access Confluence remotely, you can disable anonymous access from the Administration Console.

To disable anonymous access to Remote APIs:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Click 'Security Configuration' in the left panel. The 'Security Configuration' screen will be displayed.
3. Click 'Edit'. The fields on the 'Security Configuration' screen will now be editable.
4. Uncheck the 'Anonymous Access to API' checkbox.
5. Click the 'Save' button.

Related Topics
Page: Configuring Captcha for Failed Logins
Page: Running Confluence Over SSL or HTTPS
Page: Excluding external referrers
Page: Configuring the Administrator Contact Page

Page: Hiding the People Directory
Page: User Email Visibility
Page: Anonymous Access to Remote API
Page: Enabling or Disabling Public Signup
Page: Configuring Captcha for Spam Prevention
Page: Hiding external referrers
Page: Ignoring External Referrers
Page: Managing External Referrers
Page: Hiding External Links From Search Engines

Running Confluence Over SSL or HTTPS

This document tells you how to configure Confluence to enable access via HTTPS (HTTP over SSL), so that your Confluence logins and data are encrypted during transport to and from Confluence. SSL encryption is a good way to safeguard your Confluence data and user logins from being intercepted and read by outsiders.

These instructions apply to the following platforms:

- **Confluence or Confluence WAR distribution using Tomcat.** Apache Tomcat is the application server shipped with Confluence, and is the only supported application server. If you are using a different application server or Apache HTTP Server ("httpd"), see the page on [Apache with mod_proxy](http://example.com/) for instructions on how to terminate an SSL connection at the Apache web server.
- **Java 6.** JDK 1.6 is the Java version for Confluence. Note that you need the JDK, since it includes the `keytool` utility used in the instructions below. The JRE is not enough. If you are using JDK 1.5, please refer to the [Java SE documentation](http://example.com/) to see the differences in the `keytool` utility from JDK 1.5 to JDK 1.6.

The default connector port for Confluence is 8090, while a plain Tomcat installation (used for EAR / WAR distribution) will default to 8080.

---

On this page:
- Step 1. Create or Request a New SSL Certificate
- Step 2. Modify the Server Configuration File in your Confluence Installation
- Step 3. Specify the Location of your Certificate
- Step 4. Change your Confluence Base URL to HTTPS
- Step 5. Add a Security Constraint to Cause Redirect of All URLs to HTTPS
- Notes
- Troubleshooting

The information on this page does not apply to Confluence OnDemand.

---

**Step 1. Create or Request a New SSL Certificate**

You will need a valid SSL certificate before you can enable HTTPS. If you already have a certificate prepared, skip to step 2 below.

You can choose to create a self-signed certificate or to use a certificate issued by a certificate authority (CA, sometimes also called a 'certification authority'). We described both options below.
Certificate Option 1 – Create a Self-Signed Certificate

Self-signed certificates are useful if you require encryption but do not need to verify the identity of the requesting website. In general, you might use a self-signed certificate on a test environment and on internal corporate networks (intranets).

Because the certificate is not signed by a certificate authority (CA), users may receive a message that the site is not trusted and may have to perform several steps to accept the certificate before they can access the site. This usually will only occur the first time they access the site.

Follow the steps below to generate a certificate using Java’s keytool utility. This tool is included in the JDK.

1. Use Java’s keytool utility to generate the certificate:
   - On Windows, run the following command at the command prompt:
     ```plaintext
     "%JAVA_HOME%\bin\keytool" -genkeypair -alias tomcat -keyalg RSA
     ```
   - On OS X or UNIX-based systems, run the following command at the command prompt:
     ```plaintext
     $JAVA_HOME/bin/keytool -genkeypair -alias tomcat -keyalg RSA
     ```
   - When asked for a password:
     - Specify the password you want to use for the certificate (private key). Note that the password text will not appear as you type it.
     - Make a note of the password you choose, because you will need it in the next step when editing the configuration file.
     - The default password is 'changeit'.
   - Follow the prompts to specify your name, organisation and location. This information is used to construct the X.500 Distinguished Name (DN) of the entity, such as:
     ```plaintext
     CN=Java Duke, OU=Java Software Division, O=Sun Microsystems Inc, C=US
     ```
     Enter 'y' to confirm the details.
   - When asked for the password for 'tomcat' (the alias you entered in the keytool command above), press the 'Enter' key. This specifies that your keystore entry will have the same password as your private key. You MUST use the same password here as was used for the keystore password itself. This is a restriction of the Tomcat implementation.
   - You certificate is now ready. Go to step 2 below.

Certificate Option 2 – Use a Certificate Issued by a Certificate Authority

When running Confluence in a production environment, you will need a certificate issued by a certificate authority (CA, sometimes also called a ‘certification authority’) such as VeriSign, Thawte or TrustCenter. 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 will 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 previous section.
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:
   ```plaintext
   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:
   ```plaintext
   keytool -importcert -alias tomcat -keystore <MY_KEYSTORE_FILENAME> -file <MY_CERTIFICATE_FILENAME>
   ```

Step 2. Modify the Server Configuration File in your Confluence Installation

1. Edit the server configuration file at this location:
   ```plaintext
   [CONFLUENCE-INSTALLATION]/conf/server.xml.
   ```
2. Uncomment the following lines:
Step 3. Specify the Location of your Certificate

By default, Tomcat expects the keystore file to be named .keystore and to be located in the user home directory under which Tomcat is running (which may or may not be the same as your own home directory). This means that, by default, Tomcat will look for your SSL certificates in the following location:

- On Windows: C:\Documents and Settings\#CURRENT_USER#.keystore
- On OS X and UNIX-based systems: ~/.keystore

You may decide to move the certificate to a custom location. If your certificate is not in the default location, you will need to update your server configuration file as outlined below, so that Tomcat can find the certificate.

1. Edit the server configuration file at this location: {CONFLUENCE-INSTALLATION}>/conf/server.xml
2. Add the attribute keystoreFile="<MY_CERTIFICATE_LOCATION>" to the Connector element, so that the element looks like this:

   
   <Connector port="8443" maxHttpHeaderSize="8192"
               maxThreads="150" minSpareThreads="25" maxSpareThreads="75"
               enableLookups="false" disableUploadTimeout="true"
               acceptCount="100" scheme="https" secure="true"
               clientAuth="false" sslProtocol="TLS" SSLEnabled="true"
               URIEncoding="UTF-8" keystorePass="<MY_CERTIFICATE_PASSWORD>"
               keystoreFile="<MY_CERTIFICATE_LOCATION>"/>

3. Replace the text <MY_CERTIFICATE_LOCATION> with the path to your certificate, including the path and the name of the .keystore file.
4. Save the server configuration file.

Step 4. Change your Confluence Base URL to HTTPS

1. In your browser, go to the Confluence Administration Console.
2. Change the Server Base URL to HTTPS. See the documentation on configuring the server base URL.

Step 5. Add a Security Constraint to Cause Redirect of All URLs to HTTPS

Although HTTPS is now activated and available, the old HTTP URLs (http://localhost:8090) are still available. Now you need to redirect the URLs to their HTTPS equivalent. You will do this by adding a security constraint in web.xml. This will cause Tomcat to redirect requests that come in on a non-SSL port.

1. Check whether your Confluence site uses the RSS macro. If your site has the RSS macro enabled, you may need to configure the URL redirection with a firewall rule, rather than by editing the web.xml file. Skip the steps below and follow the steps on the RSS Feed Macro page instead.
2. Otherwise, Edit the file at <CONFLUENCE_INSTALLATION>/confluence/WEB-INF/web.xml.
3. Add the following declaration to the end of the file, before the </web-app>tag:
<security-constraint>
  <web-resource-collection>
    <web-resource-name>Restricted URLs</web-resource-name>
    <url-pattern>/</url-pattern>
  </web-resource-collection>
  <user-data-constraint>
    <transport-guarantee>CONFIDENTIAL</transport-guarantee>
  </user-data-constraint>
</security-constraint>


Confluence has two web.xml files. The other one is at <CONFLUENCE_INSTALLATION>/conf/web.xml. Please only add the security constraints to <CONFLUENCE_INSTALLATION>/confluence/WEB-INF/web.xml, as described above.

Notes

- Background information on generating a certificate: The `keytool -genkeypair` command generates a key pair consisting of a public key and the associated private key, and stores them in a keystore. The command packages the public key into an X.509 v3 self-signed certificate, which is stored as a single-element certificate chain. This certificate chain and the private key are stored in a new keystore entry, identified by the alias that you specify in the command. The Java SE documentation has a good overview of the utility.

- Custom SSL port: If you have changed the port that the SSL connector is running on from the default value of 8443, you must update the redirectPort attribute of the standard HTTP connector to reflect the new SSL port. Tomcat needs this information to know which port to redirect to when an incoming request needs to be secure.

- Protection for logins only or for individual spaces: As of Confluence 3.0, Atlassian does not support HTTPS for logins only or for specific pages. We support only site-wide HTTPS. To see the reasoning behind this decision, please see CONF-18120 and CONF-4116.

Troubleshooting

- Check the Confluence knowledge base articles on troubleshooting SSL.

- If any of your users will access Confluence from Internet Explorer 7 on Vista, please note the following additional points when using Java's keytool utility:
  - Make sure that you specify the `-keyalg RSA` option, as shown in the example of the keytool command above. The default is the SHA1 algorithm, which results in an error 'Internet Explorer cannot display the webpage' on IE7 on Vista.
  - You may also need to specify the `-sigalg MD5withRSA` option. Otherwise, SHA1 will be used even if you specify the `-keyalg RSA` option. See this Atlassian blogpost for more information.

- Problems with Internet Explorer being unable to download attachments: Applying SSL site wide can prevent IE from downloading attachments correctly. To fix this problem, edit <CONFLUENCE_INSTALLATION>/conf/server.xml and add the following line within the `<Context ... />` element:

```
<Va1ue className="org.apache.catalina.authenticator.NonLoginAuthenticator"
  disableProxyCaching="true" securePagesWithPragma="false" />
```

Related Topics

- SSL Configuration HOW-TO in the Apache Tomcat 6.0 documentation
- SSL Configuration HOW-TO in the Apache Tomcat 5.5 documentation
- keytool - Key and Certificate Management Tool in the Java SE documentation
- Connecting to LDAP or JIRA or Other Services via SSL
- Supported Platforms

Connecting to LDAP or JIRA or Other Services via SSL

This page describes how to get Confluence connecting to external servers over SSL, via the various SSL-wrapped protocols.

Here are some examples of when you may need to connect to an external server over SSL/HTTPS:

- You need to connect to an LDAP server, such as Active Directory, if the LDAP server is running over SSL.
- You want to set up JIRA as a trusted application in Confluence, when JIRA is running over SSL.
- You want to refer to an https://... URL in a Confluence macro.

If you want to run Confluence itself over SSL, see Running Confluence Over SSL or HTTPS.
Importing SSL Certificates

The following commands apply to JDK 1.5. For commands/syntax relevant to JDK 1.6, please refer to this document from Oracle.

1. Add the root certificate to your default Java keystore with the following command. This is the certificate that was used to authorise the LDAP server’s certificate. It will be either the one that was used for signing it, or will come from further up in the trust chain, possibly the root certificate. This is often a self-signed certificate, when both ends of the SSL connection are within the same network. Again, the exact alias is not important.

   ```bash
   keytool -import -alias serverCert -file RootCert.crt -keystore %JAVA_HOME%/jre/lib/security/cacerts (Windows)
   keytool -import -alias serverCert -file RootCert.crt -keystore $JAVA_HOME/jre/lib/security/cacerts (Linux/Unix/Mac)
   ```

2. Import your LDAP or JIRA server’s public certificate into the JVM Keystore. This is the certificate that the LDAP server will use to set up the SSL encryption. You can use any alias of your choosing in place of "JIRAorLDAPServer.crt".

   ```bash
   keytool -import -alias ldapCert -file JIRAorLDAPServer.crt -keystore %JAVA_HOME%/jre/lib/security/cacerts (Windows)
   keytool -import -alias ldapCert -file JIRAorLDAPServer.crt -keystore $JAVA_HOME/jre/lib/security/cacerts (Linux/Unix/Mac)
   ```

3. Edit the file in your Confluence installation directory, `.confluence-installation/confluence/WEB-INF/classes/atlassian-user.xml`. Change the value of `securityProtocol` from "plain" to "ssl":

   ```xml
   <securityProtocol>ssl</securityProtocol>
   ```

   Switch the LDAP connection to the SSL port, if it is different from the default LDAP port. If you are using the most common LDAPS port, set:

   ```xml
   <port>636</port>
   ```

   The keytool will ask you for a password. The default password is ‘changeit’ without the quotes.

4. Verify that the certificate has been added successfully by entering the following command:

   ```bash
   keytool -list -keystore %JAVA_HOME%/jre/lib/security/cacerts (Windows)
   keytool -list -keystore $JAVA_HOME/jre/lib/security/cacerts (Unix/Linux)
   keytool -list -keystore /Library/Java/Home/lib/security/cacerts (Mac)
   ```

5. Ensure that you have updated JAVA_OPTS to specify the path to the keystore, as specified in Connecting to SSL services, before restarting Tomcat/Confluence.

   There is no need to specify an alias for Confluence to use. On connecting to the LDAP server, it will search through the keystore to find a certificate to match the key being presented by the server.

Troubleshooting

Check the following knowledge base articles:

- Unable to Connect to SSL Services due to PKIX Path Building Failed
- sun.security.provider.certpath.SunCertPathBuilderException
- SSL troubleshooting articles

Related Topics

- Configuring an SSL Connection to Active Directory
Configuring RSS Feeds

A Confluence System Administrator can configure the following aspects of RSS feeds:

- The maximum number of items that Confluence returns to an RSS feed request.
- The maximum time period that Confluence allows to respond to an RSS feed request.

Both of these are set in the 'Edit Security Configuration' screen.

To configure RSS feeds:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Click Security Configuration in the left panel. The 'Edit Security Configuration' screen will be displayed.
3. Click Edit.
4. Edit the value for Maximum RSS Items. The default value is 200.
5. Edit the value for RSS timeout.
6. Click Save.

Screenshot: Configuring RSS feeds

![Maximum RSS Items Limit the maximum number of items an RSS Feed can request.](image)

Notes

- When using the RSS Feed Builder, a user could potentially enter such a large value for the number of feed items returned that Confluence would eventually run out of memory.
- When using the Feed Builder, if a users a value greater than this setting (or less than 0) they will get a validation error.
- If any pre-existing feeds are set to request more than the configured maximum, they will be supplied with only the configured maximum number of items. This is done silently - there is no logging and no message is returned to the RSS reader.
- If Confluence times out when responding to an RSS feed request, any items already rendered are returned.

Related Topics

Using the RSS Feed Builder

Design and Layout

- Choosing a Default Language
- Custom Decorator Templates
- Customising Look and Feel Overview
  - Customising Colour Schemes
  - Customising Layouts
  - Adding a Navigation Sidebar
  - Adding an All Versions Section to your Navigation Bar
- Upgrading Custom Layouts
  - Global Templates
  - Importing Templates
  - Modify Confluence Interface Text
  - Working With Decorator Macros
  - Customising a Specific Page
  - Customising PDF or HTML Content
  - Customising the Dashboard
Choosing a Default Language

Administrators can define a default language to be applied to all spaces in your Confluence site. Note that individual users can select a language preference for their session.

Setting the Default Language

To change the default language for the Confluence site:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select 'Languages' in the 'Configuration' section of the left-hand panel.
3. The 'Language Configuration' screen will appear. Select the language that you want to use as the default language for your Confluence site.

Other Settings that Affect the Language

Individual users can choose the language that Confluence will use to display screen text and messages. Note that the list of supported languages depends on the language packs installed on your Confluence site.

The language used for your session will depend on the settings below, in the following order of priority from highest to lowest:

- The language preference defined in your user profile. Note that you need to be logged in for this setting to take effect.
- The language that you choose by clicking an option at the bottom of the Confluence login screen. Confluence stores this value in a cookie. When the cookie expires, the setting will expire too.
- The language set in your browser.
  - Note that your Confluence administrator can disable this option by setting a system property.
  - The browser sends a header with a prioritised list of languages. Confluence will use the first supported language in that list.
- The default language for your site, as defined by your Confluence site administrator.

Showing User Interface Key Names for Translation

For those customers working on creating translations of the Confluence user interface, from 4.1 onwards there is a feature that will help. After opening the Confluence dashboard, you can simply add this text to the end of your Confluence URL, like so:

```
http://example.com/confluence?showUserInterfaceKeyNames=true
```

Then press Enter.

This will then cause each element of the user interface to display its special key name while Confluence is still in an interactive mode. This makes it easier to find the essential context for each key, which can then be searched on http://translations.atlassian.com where you can enter an appropriate translation for your custom language pack.

The key names are displayed with a "lightning bolt" graphic between elements of the names. For example, the buttons will show up with elements shown like so:
For example, for the **Browse** button, the associated key `system.space.menu` can be found on [http://translations.atlassian.com](http://translations.atlassian.com), allowing you to write a better translation for the term **Browse**, being able to see the full context of where the UI element belongs and what it means to the user.

To turn off the translation view, add this code to the end of the Confluence URL:

```
?lang=ja
```

**RELATED TOPICS**

Editing User Settings  
Recognised System Properties  
Configuring Indexing Language  
Installing a Language Pack

## Custom Decorator Templates

### About Decorators

Confluence is built on top of the Open Source [SiteMesh](http://www.sitemesh.org) library, a web-page layout system that provides a consistent look and feel across a site. SiteMesh works through "decorators" that define a page's layout and structure, and into which the specific content of the page is placed.

If you are interested, you can read more on the [SiteMesh website](http://www.sitemesh.org).

What this means for Confluence is that you can customise the look and feel of almost all of your Confluence site through editing three decorators:

- The "Main" decorator defines the look and feel of most pages on the site.
- The "Popup" decorator defines the look and feel of the popup windows such as the "Insert Link" and "History" pages.
- The "Printable" decorator defines the look and feel of the printable versions of pages (available through the ![Print](http://confluence.atlassian.com/images/icons/print.png) icon on each page).

You can view and edit these decorators from within Confluence: they are available from the "Layouts" option on the site's Administration menu. Changes to the decorators will affect all spaces hosted on that Confluence installation.

The decorator that is used to draw Confluence’s administrative pages can not be edited from within Confluence. This means that if you make some editing mistake that renders the rest of the site unuseable, the administrative pages should still be available for you to fix the template.

**The information on this page does not apply to Confluence OnDemand.**

### Browsing the Default Decorators

At any time, you can browse the default decorators that come packaged with Confluence by following the "View Default" links on the "Site Layouts" page. The template browser also allows you to view the "#parsed" templates that are included within the template when it is compiled. While you can't edit these included templates, you will probably have to copy some or all of them into your custom template as you do your customisation.

### Editing Custom Decorators: Add a Logo

To edit Confluence decorators, you should have a good knowledge of [HTML](http://www.w3.org/html), and some understanding of the [Velocity templating language](http://velocity.apache.org). The first thing you will see when you choose to create a custom "Main" decorator is... there's not much to edit. By default, most of the content of this decorator is included from other files:
We can add our logo, changing the "logocell" table cell:

```
<td width="60%" rowspan=2 class="logocell">
  <img align="right" src=http://www.atlassian.com/images/atlassian_logo.gif
  width="203" height="60" #pagetitle("spacenametitle")></td>
```

When you insert this into the right section of the template and hit save, visitors to the site will see the logo at the top of each page. Note, the administrative pages will be unaffected: you will have to go to the dashboard or to a space to see the changes you have made.

**Macros**

Some parts of the page are drawn using Velocity macros, including the navigation bar. The macros you should know about when editing decorators are described in *Working With Decorator Macros*. 
If Something Goes Terribly Wrong

From the "Site Layouts" page in Confluence's administrative menu, you can delete your custom templates. When you do this, the default template will be restored, fixing anything that may have been broken.

Alternatively, the custom templates are stored in the DECORATOR table in the database. If you have somehow managed to render Confluence completely unuseable through editing your templates, delete the relevant entries from the DECORATOR table.

For Advanced Users

The velocity directory is at the front of Confluence's velocity template search path. As such, you can override any of Confluence's velocity templates by placing an identically named file in the right place.

While we don't recommend you do this unless you know exactly what you're doing, it does give you complete control over the look of every aspect of Confluence. It also means that you can edit your templates in a text-editor if you wish, rather than through the web interface.

There are, however, two important caveats:

1. Velocity is configured to cache templates in memory. When you edit a page from within Confluence, it knows to reload that page from disk. If you are editing the pages on disk, you will either have to turn off velocity's caching temporarily in WEB-INF/classes/velocity.properties, or restart the server to make your changes visible.
2. Because we only officially support the modification of the three global decorator files, other changes may interact unpredictably with future versions of Confluence. When upgrading, you should always test your custom modifications thoroughly before deploying them on a live site.

Customising Look and Feel Overview

You can customise the 'look and feel' of Confluence at both the global and space levels.

Any changes you make to the look and feel of the site at the global level will be applied as the default look and feel for all the spaces in the site. This means that any customisations will only be reflected in the "Default" theme. No other theme will have an impact from this change.

An individual space can be configured to have its own look and feel through the space administration screens.

Some functionality described on this page is restricted in Confluence OnDemand.

Here's how you can customise the look and feel of your site:

- **Colour Scheme**: Change the colour scheme of the user interface.
- **Layouts**: Edit how the controls are laid out in the site. This does not change the actual page layouts but the way the surrounding controls appear in the page.
- **Themes**: Use themes for advanced layout customisation.

RELATED TOPICS

Page: Customising Colour Schemes
Page: Customising Look and Feel Overview
Page: Global Templates
Page: Upgrading Custom Layouts
Page: Customising a Specific Page
Page: Customising Layouts
Page: Editing the Footer
Page: Working With Decorator Macros
Page: Adding a Site-Wide Banner

Customising Colour Schemes

A Confluence administrator can configure a new colour scheme for the site dynamically from the Administration Console.

The default colour scheme for the site will also become the default for all spaces within it. However, it is possible for space administrators to configure a different colour scheme for spaces from the space administration screens.
To change the site's colour scheme:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select 'Colour Scheme' in the left-hand panel.
   This will bring up a new screen. See screenshot below.
3. Click 'Edit'. Enter standard HTML/CSS2 colour codes, or use the colour-picker to choose a new colour from the palette provided. Any changes you make will immediately be reflected across the Confluence installation.

The colour scheme applies to the following UI elements:

- **Top Bar** - the bar across the top of the page that contains the breadcrumbs
- **Tab Navigation Background** - the background colour of the tab navigation menus
- **Tab Navigation Text** - the text of the tab navigation menus
- **Breadcrumbs Text** - the breadcrumbs text in the top bar of the page
- **Space Name Text** - the text of the current space name located above the page title
- **Heading Text** - all heading tags throughout the space.
- **Links** - all links throughout the space.
- **Borders and Dividers** - table borders and dividing lines.
- **Tab Navigation Background Highlight** - the background colour of the tab navigation menu when highlighted
- **Tab Navigation Text Highlight** - the text of the tab navigation menu when highlighted
- **Top Bar Menu Selected Background** - the background colour of the top bar drop down menu when selected
- **Top Bar Menu Item** - the text colour of the menu items in the top bar drop down menu
- **Page Menu Selected Background** - the background colour of the drop down page menu when selected
- **Page Menu Item Text** - the text of the menu items in the drop down page menu
- **Menu Item Selected Background** - the background colour of the menu item when selected (applies to both the top bar and page drop down menus)
- **Menu Item Selected Text** - the text colour of the menu item when selected (applies to both the top bar and page drop down menus)

Please note that some UI elements are specific to the default theme and may not take effect for other themes.
**Custom Colour Scheme**
A custom colour scheme which can be edited.

The following colours can be customised for this colour scheme.

- **Top Bar**: #003336
- **Tab Navigation Background**: #3e78b5
- **Tab Navigation Text**: #ffffff
- **Breadcrumbs Text**: #ffffff
- **Space Name Text**: #999999
- **Heading Text**: #003366
- **Links**: #003366
- **Borders and Dividers**: #3e78b5
- **Tab Navigation Background Highlight**: #003366
- **Tab Navigation Text Highlight**: #ffffff
- **Top Bar Menu Selected Background**: #336699
- **Top Bar Menu Item Text**: #003366
- **Page Menu Selected Background**: #6699cc
- **Page Menu Item Text**: #555555
- **Menu Item Selected Background**: #6699cc
- **Menu Item Selected Text**: #ffffff

*Screenshot above: Editing a site's colour scheme*

**Note**
If you mess things up, just click the 'Reset' button and then try again.

**Related Topics**
- Page: Customising Colour Schemes
- Page: Customising Look and Feel Overview
- Page: Global Templates
- Page: Upgrading Custom Layouts
- Page: Customising a Specific Page
- Page: Customising Layouts
- Page: Editing the Footer
- Page: Working With Decorator Macros
- Page: Adding a Site-Wide Banner

**Customising Layouts**
Confluence’s look and feel can be modified by editing the ‘decorator’ (layout) files. Modifying these files allows you to change the look and feel of:

- The Confluence site as a whole, which includes all spaces within the Confluence site.
- An individual space within the Confluence site.
This page tells you how to customise the layout files for your Confluence site as a whole. These customisations:

- Modify the default ‘decorator’ files of each space in your site
- Are reflected in every space unless the space’s own equivalent layout files have been customised.

ℹ️ You require System Administrator permissions to perform these customisations.

You can also customise the layout files for a given space only. For more information, refer to Customising Layouts for a Space.

⚠️ Space layout file customisations override the equivalent site layout file customisations.

---

⚠️ The information on this page does not apply to Confluence OnDemand.

If you modify the look and feel of Confluence by following these instructions, you will need to update your customisations when upgrading Confluence. The more dramatic the customisations are, the harder it will be to reapply your changes when upgrading. Please take this into account before proceeding with your customisation. For more information on updating your customisations, please refer to Upgrading Custom Layouts.

Confluence is built on top of the open source SiteMesh library, a web-page layout system. Read more on the SiteMesh website. To edit the layout of Confluence, you will need to modify these decorator files. A decorator file is a .vmd file and is written in a very simple programming language called Velocity. You can learn more from the Velocity User Guide.

Once you are familiar with Velocity, you can edit the decorator files to personalise the appearance of Confluence.

The decorator files are grouped into:

- **Site layouts**: These are used to define the controls that surround each page in the site. For example, the header and the footer.
- **Content layouts**: These control the appearance of content such as pages and blog posts: they don’t change the way the pages themselves are displayed, but allow you to alter the way the surrounding comments or attachments are displayed.
- **Export Layouts**: These control the appearance of spaces and pages when they are exported to HTML. If you are using Confluence to generate a static website, for example, you will need to modify these layouts.

### Editing a site decorator file

1. Go to the Confluence ‘Administration Console’:
   - Choose Browse > Confluence Admin. The ‘Administrator Access’ login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the ‘Administration Console’.
2. Select ‘Layouts’ under ‘Look and Feel’ in the left-hand navigation panel. The decorators are grouped under Site, Content and Export layouts.
   - Click ‘View Default’ to view the vmd file.
   - Click ‘Create Custom’ to edit the default vmd file. This will open up the vmd file in edit mode.
3. Make changes and click ‘Update’.

ℹ️ If something goes wrong : Click ‘Reset Default’ to revert to the original layouts.

### Using Velocity macros

When editing Custom Decorator Templates, there are a number of macros available to define complex or variable parts of the page such as menus and breadcrumbs. You may insert these macros anywhere in your templates. More information on Working With Decorator Macros.

### For advanced users

The velocity directory is at the front of Confluence’s velocity template search path. As such, you can override any of Confluence’s velocity templates by placing an identically named file in the right place. While we don’t recommend you do this unless you know exactly what you’re doing, it does give you complete control over the look of every aspect of Confluence. It also means that you can edit your templates in a text-editor if you wish, rather than through the web interface.

⚠️ Caching

Velocity is configured to cache templates in memory. When you edit a page from within Confluence, it knows to reload that page from disk. If you are editing the pages on disk, you will either have to turn off velocity’s caching temporarily in WEB-INF/classes/velocity.properties, or restart the server to make your changes visible.
In Confluence 2.6 and later, some Velocity files are located inside the Confluence JAR file that can be found at confluence/WEB-INF/lib/confluence-x.x.x.jar. To override files inside this JAR (which you can open with any ZIP tool like WinZip or 7-Zip), put your customised file in the same directory structure under confluence/WEB-INF/classes/.

For example, the file templates/macros/alphaindex.vm inside confluence.jar can be replace by putting your custom file in WEB-INF/classes/templates/macros/alphaindex.vm. You do not need to modify the file inside the JAR.

See also Editing Files within JAR Archives.

**RELATED TOPICS**

Page: Customising Colour Schemes
Page: Customising Look and Feel Overview

Page: Global Templates
Page: Upgrading Custom Layouts
Page: Customising a Specific Page
Page: Customising Layouts
Page: Editing the Footer
Page: Working With Decorator Macros
Page: Adding a Site-Wide Banner

Velocity Template Overview
Basic Introduction to Velocity

Adding a Navigation Sidebar

You can include a left-hand navigation sidebar (table of contents) in your Confluence space. There are two ways to do this:

- **Recommended: Use the Documentation Theme** – The Documentation theme provides the left-hand navigation sidebar that you see in this documentation. Please go to the page that tells you how to configure the Documentation theme.
- **Customise the Page Layouts** — This is an alternative method (documented below) that is more complex to set up than the Documentation theme and requires more maintenance with Confluence major release upgrades.

⚠️ The information on this page does not apply to Confluence OnDemand.

**Notes to Read before you Start**

Please take note of the following points before you use the method documented on this page:

- **Re-apply customisation whenever you upgrade Confluence.** Every time you upgrade Confluence, you must re-apply the layout customisations described on this page. When you upgrade to a new major Confluence version (such as moving from Confluence 2.9.x to Confluence 2.10.x or from Confluence 3.0.x to Confluence 3.1.x) you will need to re-apply the layout customisation. See instructions below.
- **Check your wiki permissions.** To customise a space layout as described below, you must be a space administrator in the given space and you must be a system administrator on the Confluence site. See the overview of permissions and the glossary entries for space administrator and for Confluence administrator and system administrator.

**Customising your Layouts to Add a Navigation Sidebar**

*Screenshot: A left-hand navigation bar resulting from customising the page layouts*
Follow the instructions below to add the navigation sidebar to your Confluence space.

**Step 1. Create the TreeNavigation Page**

First, you will create a Confluence page containing the `pagetree` macro. This is just a normal Confluence page. The only slight oddity is that it should reside at the root of your space, instead of under the space's home page.

Follow these instructions:

1. Go to the 'Space Pages' view for the current space. To do this:
   - Go to a page in the space and choose **Browse > Pages**.
   - You are now at the 'root' level of your space. The 'root' level contains pages that are added above the space's home page, not as children of the home page.
2. At the root level of the space, create a page named 'TreeNavigation'.
3. On the page, insert the following text:

   ```
   {pagetree}
   ```

4. Now decide if you want to add extra functionality to your page tree. By default, using the code above, the page tree will use the home page of the space as its root. You can choose to:
   - Specify a different root for your page tree.
   - Add a search box at the top of the tree.
   - Allow the viewers to expand and collapse the whole tree.
   - Control other aspects of the display.

For more information, read about the **Pagetree macro**.

**Step 2. Change the Page Layout on your Space**

Now you will change the page layout on your space, to include the above page on the left of every web page displayed.

1. Choose **Browse > Space Admin**.
   - **Space Admin** is displayed only if you are a space administrator for that space or you are a Confluence system administrator.
2. Make sure the Confluence Default theme is selected from the 'Themes' menu.
3. Click ‘Layout’ under the ‘Look and Feel’ section.
   - ‘Layout’ is only displayed if you are a system administrator on the Confluence site.
4. Click ‘Create Custom’ under the ‘Page Layout’ section.
5. In the layout, locate the 'VIEW' section, and find this code:
6. Replace the above code block with this code:

```html
# if ($action.isPrintableVersion() == false)
  <style>
    .spacetree * ul{
      padding-left:0px;
      margin-left: 0px;
    }
    .spacetree * li{
      margin-left: 5px;
      padding-left:5px;
    }
  </style>
  <table cellspacing="2" cellpadding="5">
    <tr>
      <td valign="top" align="left" width="22%" bgcolor="#F9F9F9" class="noprint">
        <div class="tabletitle">Table of Contents</div>
        <div class="spacetree">
          #includePage($helper.spaceKey "TreeNavigation")
        </div>
      </td>
      <td valign="top" align="left" width="78%" class="pagecontent">
        $body
      </td>
    </tr>
  </table>
# else
  <div class="wiki-content">
    $body
  </div>
# end
```

7. If you want to, you can change the table title in the above code from 'Table of Contents' to something else. For example, it might say 'Confluence Documentation'.

8. Save the updated layout.

**Re-Applying the Customisation on Upgrade**

When you upgrade to a new major Confluence version (e.g. from Confluence 2.9.x to Confluence 2.10.x or from Confluence 3.0.x to Confluence 3.1.x), you will need to re-apply this customisation.

**Reason:**
The new Confluence version may contain updates to the page layouts. Because you have customised the page layouts, Confluence will not overwrite your customisation. So your space will not get the latest updates until you set the layout to default and then re-apply your changes.

**Here's how to do it:**

1. First make a copy of your customised code, if you have changed it from the code above:
   - Go to 'Space Admin', click 'Layout' and edit the customised page layout (as created above).
   - Copy the section of code that inserts the customised left-hand navigation panel.
   - Close the page layout.
2. Click 'Reset Default' next to 'Page Layout', to set the page layout back to default. This will bring in the new code for the upgraded version of Confluence.
3. Create a custom page layout as described in [step 2 above](##), and reinsert the custom left-hand navigation code.
4. Save the updated layout.
The "All Versions" section in the navigation bar

A number of people have asked how we created the 'All Versions' section at the top of our navigation side bar. Take a look at Adding an All Versions Section to your Navigation Bar.

RELATED TOPICS

Configuring the Documentation Theme
Customising Layouts
Upgrading Custom Layouts
Example Confluence Designs

Adding an All Versions Section to your Navigation Bar

This page gives an example of how you might add an 'All Versions' section to your navigation side bar, as currently used in the Confluence documentation, Crowd documentation and the other Atlassian product documentation spaces.

If you are viewing this page online on the Atlassian documentation wiki, you will be able to see the 'All Versions' section at the top left of the navigation side bar. Below is a screenshot.

A number of people have asked how we do it, so this page gives the answer. For details about creating the navigation side bar itself, please refer to Adding a Navigation Sidebar.

Adding the Version Index to the Navigation Sidebar

This is how we added the 'All Versions' section to the sidebar:

- For each product (Confluence, Crowd, Bamboo, etc) there is a page in the Inclusions Library of the ALLDOC space. The page lists all the versions of that product's documentation, linking to the relevant spaces. For example, here is the page for Confluence and the page for Crowd.

- We put the 'all versions' page in ALLDOC because the page is used in a number of different spaces, via the [include] macro. For example, the 'all versions' page may be included:
  - In every documentation space (each version) for the product concerned, such as DOC, CONF29, CONF28, CROWD, CROWD013, CROWD012, etc.
  - In the Enterprise Hosting doc space.
  - As a panel on the documentation home page, as shown in the 'All Versions' panel of the above screenshot, as well as in the left-hand navigation bar.
  - Any other places where useful.
- In each documentation space, there is a page called 'TreeNavigationVersions' like this one or this one, which copies in the content of the above 'all versions' page.
- For each documentation space, the space's page layout now includes two pages instead of just one:
  - The 'TreeNavigation' page, as already described on the page above.
  - The new 'TreeNavigationVersions' page.

Here's the relevant section of our page layout as it is currently for the Confluence documentation (DOC) space:
Adding the Expand/Collapse Functionality to the Version Index

Another question we are asked is how we group the content of the included page under a collapsible control.

We use the Expand macro. The details are on the [Expand macro's documentation page](#).

### Related Topics

- Adding a Navigation Sidebar
- Upgrading Custom Layouts

#### Upgrading Custom Layouts

As Confluence evolves, so do the default layouts that drive the rendering of every page. As new functionality is added or current functionality is changed, the default layouts are modified to support these changes.

> **Important:** If you are using custom layouts based on defaults from a previous Confluence version, you run the risk of **breaking functionality**, or worse, **missing out on great new features**!

Take care on each new release of Confluence to reapply your changes to the new default templates.

To reapply your custom layouts, you need to:

1. Obtain the source of your custom layouts from your current version of Confluence.
2. Reapply your customisations to the new default layouts.

> **Important:** The information on this page does not apply to **Confluence OnDemand**.
**Step 1. Obtaining your Custom Layouts**

Ideally, you should keep a record of each customisation you have applied to each of your Confluence site or space layouts.

If not, you should be able to find your customisations using the following method. This method extracts all site- and space-level layouts from your Confluence site as a single output. From this output, you should be able to identify your customisations.

This method is handy to use if you have:

- Many spaces with space layout customisations, or
- Do not have an independent record of your site or space layout customisations.

**Before Confluence 2.3**, custom layouts are stored in the *velocity* directory within your Confluence home directory tree. You can open these files in any text editor.

**In Confluence 2.3 and later**, custom layouts are stored in the DECORATOR table within your Confluence database. You can SELECT for the source of the layout using SQL like this:

```
mysql> select SPACEKEY,DECORATORNAME,BODY from DECORATOR;
+----------+---------------------+------+
| SPACEKEY | DECORATORNAME       | BODY |
|----------|---------------------+------+
| NULL     | decorators/main.vmd | ...  |
+----------+---------------------+------+
1 row in set (0.03 sec)
```

This example was tested on MySQL, but should be applicable to all SQL databases.

**Step 2. Reapplying your Customisations**

When you upgrade Confluence to another major release of Confluence, you will need to manually re-apply any customisations you made to any site-wide or space-specific layouts. Unless otherwise stated, you should not need to re-apply customisations after conducting a minor release upgrade of Confluence.

*What are ‘major’ and ‘minor’ release upgrades?*

Major release upgrades are ones where the 1st digit of Confluence's version number or the 1st digit after the 1st decimal place differ after the upgrade, for example, when upgrading from Confluence 3.0 to 3.1, or 2.8 to 3.0. Minor release upgrades are ones where the 1st digit of Confluence’s version number and the 1st digit after the 1st decimal place remain the same after the upgrade, for example, when upgrading Confluence 3.0 to 3.0.1.

If you have made Confluence site-wide layout customisations:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select 'Layouts' under 'Look and Feel' in the left-hand navigation panel. The decorators are grouped under Site, Content and Export layouts.
3. Ensure you have all your customisations available (preferably in a form which can be copied and pasted).
4. Click ‘Reset Default’ next to the layout whose customisations need to be reapplied.
5. Click 'Create Custom' next to the same layout and reapply your customisations (by copying and pasting them) into the appropriate locations within the new default layout.
6. Click the 'Save' button.
7. Repeat this procedure from step 4 for each layout whose customisations need to be reapplied.

If you have made space-specific layout customisations:

1. Visit any page in the relevant space.
2. Choose Browse > Space Admin. **Space Admin** is displayed only if you are a space administrator for that space or you are a Confluence system administrator.
3. Select 'Layout' under 'Look and Feel' in the left-hand navigation panel. The decorators are grouped under Site, Content and Export layouts.
4. Ensure you have all your customisations available (preferably in a form which can be copied and pasted).
5. Click ‘Reset Default’ next to the layout whose customisations need to be reapplied.
6. Click 'Create Custom' next to the same layout and reapply your customisations (by copying and pasting them) into the appropriate
locations within the new default layout.
7. Click the ‘Save’ button.
8. Repeat this procedure from step 5 for each layout whose customisations need to be reapplied.

**Turning off caching**

Velocity is configured to cache templates in memory. When you edit a page from within Confluence, it knows to reload that page from disk. If you are editing the pages on disk, you will either have to turn off velocity’s caching temporarily in WEB-INF/classes/velocity.properties, or restart the server to make your changes visible.

For Confluence 2.6, the velocity.properties file is available in the confluence-2.6.0.jar file. The jar file is located in the WEB-INF/lib directory. If you wish to make modification to the files in the jar, we recommend the following steps:

1. Stop Confluence.
2. Make a backup copy of the jar file.
3. Un-jar the file
4. Locate and edit the appropriate file that you wish to modify.
5. Re-jar the confluence-2.6.0.jar file.
6. Relocate the jar file to the appropriate directory.
7. Restart Confluence.

Test your modifications carefully

Changes may interact unpredictably with future versions of Confluence. When upgrading, you should always test your custom modifications thoroughly before deploying them on a live site. It’s beyond the scope of Atlassian Support to test and deploy these changes.

**Global Templates**

A template is a predefined page that can be used as a prototype when creating new pages. Templates are useful for giving pages a common style or format.

You can use regular Confluence markup to create the content of your template. You can also use special markup to define form fields that the author will fill in when creating the page.

Global templates are defined by Confluence administrators and are available in every space across the Confluence site.

To add a global template:

1. Go to the Global Templates option in the Confluence Administration Console, as follows:
   a. Choose Browse > Confluence Admin.
   b. Enter your password and click Confirm. You will be temporarily logged in to Confluence Admin.
   c. Select Global Templates in the left-hand panel.
   d. Click Add New Global Template.
2. Click Add New Global Template.
3. Enter a name for your template in the Name box and an optional description in the Description box.
4. Using regular wiki markup and form field markup (if you are using forms), enter content in the text-entry box as you would in any other Confluence page.
5. Click Edit next to Labels if you want to use labels to categorise information. Add your labels. These labels will be included in all pages created using this template.
6. Preview and click Save.

**Screenshot:** A template as used to create a page

---

### Step 2: Fill in template variables

Choose values for the variables in this template. These values will be automatically inserted into the template for you in the correct locations.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>(Name)</td>
</tr>
<tr>
<td>Phone Number</td>
<td>(PhoneNumber)</td>
</tr>
<tr>
<td>Date of Birth</td>
<td>(DOB)</td>
</tr>
</tbody>
</table>

**Related Topics**

Working with Templates
Importing Templates

A template is a predefined page that can be used as a prototype when creating new pages. Templates are useful for giving pages a common style or format. You can use regular Confluence markup to create the content of your template. You can also use special markup to define form fields that the author will fill in when creating the page.

Confluence ships with a number of templates, including the 'Charts', 'Document List' and 'Meeting Notes' templates. These templates are not available for use by default. However, if you have the appropriate permissions to access the Administration Console, you can import any of these templates to be used globally or within a specific space.

In addition, you can download additional template bundles from the Atlassian Plugin Exchange and then make them available by importing them.

On this page:
- Step 1. Check the Templates Installed on your Confluence Site
- Step 2. (Optional) Upload Additional Templates from the Atlassian Plugin Exchange
- Step 3. Import a Template to Make it Available to Users
- Notes

Quick guide to importing a template

1. Go to the 'Confluence Administration Console' and click **Import Templates**.
2. Select the templates that you want to import.
3. Choose which space to import the templates to, or whether to import them as global templates.
4. Click **Import**.

Step 1. Check the Templates Installed on your Confluence Site

To see the templates that are currently available for import on your Confluence site:

1. Log in to Confluence as a System Administrator or Confluence Administrator.
2. Go to the Confluence 'Administration Console':
   - Choose **Browse > Confluence Admin**. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click **Confirm**. You will be temporarily logged into a secure session to access the 'Administration Console'.
3. Select **Import Templates** in the left-hand panel. The 'Import Templates' screen will appear, listing the template packages installed on your Confluence instance (for example, 'Default Templates Package') and the templates included in each package.

Step 2. (Optional) Upload Additional Templates from the Atlassian Plugin Exchange

Additional templates are available as plugins, known as template packages. Follow the steps below if you want to add template packages to your site that were not shipped with your Confluence installation.

Before installing a plugin into your Confluence site, please check the plugin's information page to see whether it is supported by Atlassian, by another vendor, or not at all. See our guidelines on plugin support.

To upload more templates:

1. Go to the Atlassian Plugin Exchange and download the template bundle that you need.
2. Log in to Confluence as a System Administrator or Confluence Administrator.
3. Go to the Confluence 'Administration Console':
   - Choose **Browse > Confluence Admin**. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click **Confirm**. You will be temporarily logged into a secure session to access the 'Administration Console'.
4. Select **Plugins** in the left-hand panel.
5. The 'Plugins' screen will appear. Select the 'Install' tab.
6. Click 'Upload Plugin', browse to find the template bundle file that you downloaded and upload it to Confluence.

Step 3. Import a Template to Make it Available to Users

To import a template:

1. Log in to Confluence as a System Administrator or Confluence Administrator.
2. Go to the Confluence 'Administration Console':

- Choose **Browse > Confluence Admin**. The 'Administrator Access' login screen will be displayed.
- Enter your password and click **Confirm**. You will be temporarily logged into a **secure session** to access the 'Administration Console'.

3. Select **Import Templates** in the left-hand panel. The 'Import Templates' screen will appear, listing the template packages installed on your Confluence instance (for example, 'Default Templates Package') and the templates included in each package.

4. Select the templates to be imported by ticking the checkboxes next to the relevant template names.

   - You can view a preview of the template by clicking the template name.

5. Select the import destination for the templates in the 'Import To' dropdown. If you want the templates to be available to only a specific space, select the name of the space, otherwise select **Global Templates** to make the templates available to all spaces.

6. Click the 'Import' button to import the selected templates.

   ![Screenshot above: Importing a template](image)

   ![Screenshot above: Previewing a template](image)

**Notes**

- **Known issue importing templates from multiple template bundles.** There is a known issue preventing templates from being imported when multiple template bundles are available. Please read this [KB article](#) for further information.

- **Building your own custom template bundles.** These are built as plugins and deployed to your Confluence instance. You can then import the templates from your custom template bundle, as described on this page. Read Creating A Template Bundle for instructions. Please note, you will need some programming knowledge to develop a custom template bundle.
• **Duplicate template names.** If a template with the same name already exists on import, a duplicate template of the same name will be created. You will need to check each template and rename manually.

• **Removing the template.** Removing the plugin that contains a template will not remove the template from your Confluence site if you have already imported it. You will need to remove it manually from the administration console or space.

**RELATED TOPICS**

Working with Templates  
Editing a template  
Removing a Template  
Browsing a space  
Working with Pages

**Modify Confluence Interface Text**

All Confluence UI text is contained in a single Java properties file. This file can be modified to change the default text, and also to translate Confluence into other languages than English.

The UI text file is `ConfluenceActionSupport.properties`. From your Confluence install directory:

```
\confluence\WEB-INF\lib\confluence-3.x.jar
```

Within this File, the relevant file to edit is:

```
: \com\atlassian\confluence\core\ConfluenceActionSupport.properties.
```

Refer to [Editing jar files](#) for reference.

⚠️ The information on this page does not apply to Confluence OnDemand.

The file contains parameters with `name=value` pairs, in the format:

```
parameter.name=Parameter value
```

Parameter names are any text before the `=` character and should never be modified. Any text after the `=` character is the parameter value, which can be modified freely and can also contain variables. An example involving variables is:

```
popular.labels=The three most popular labels are {0}, {1} and {2}.
```

For more information on replacing values, check out [Translating ConfluenceActionSupport Content](#). Note that plugins store their text internally, so you must modify plugin text individually.

**Steps For Modification**

1. Stop Confluence
2. Under your install directory, open
```
\confluence\WEB-INF\lib\confluence-3.x.jar\com\atlassian\confluence\core\ConfluenceActionSupport.properties
```
3. Search for the text you wish to modify, replace it and save the file in:
```
<Confluence-Install>\confluence\WEB-INF\classes\com\atlassian\confluence\core
```
   Please create this folder structure, if it does not exist already.

   ![Check mark] If you re-bundle the JAR file, rather than re-deploy the class in the `WEB-INF\classes` directory, make sure to move the backup JAR file out of the `\lib` directory, or the backup may be deployed by mistake.

4. Restart Confluence

**Common Modifications**

• Rename 'Dashboard' by searching for `Dashboard`. To change "Dashboard" to "My Portal", change `dashboard.name=Dashboard` to `dashboard.name=My Portal`
**Common Modifications**

<table>
<thead>
<tr>
<th>Task</th>
<th>Search For</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rename 'Dashboard'</td>
<td>Dashboard</td>
<td>The dashboard.name parameter has the name. To change 'Dashboard' to 'My Portal', change dashboard.name=Dashboard to dashboard.name=My Portal and update any other occurrences of the word 'Dashboard' in the instance.</td>
</tr>
<tr>
<td>Modify login page text</td>
<td>login.</td>
<td>The login.instructions parameter has the &quot;Enter your account details below to login to Confluence&quot; text</td>
</tr>
</tbody>
</table>

**Modify Keyboard Shortcuts**

Confluence provides a set of keyboard shortcuts. You could customise the shortcuts by making modifications inside the ConfluenceActionSupport.properties file.

- To disable a particular shortcut, you can simply just comment out a respective line of code. One may like to disable the shortcut to one of the navigation links: View, Edit, Attachments, Info. For instance, to disable shortcut to Attachments one would comment out the following line:

  ```
  #navlink.attachments.accesskey=a
  ```

- To modify an access key, one could simply just change the letter, bearing in mind the fact that the letter must be unique.

**Working With Decorator Macros**

Decorator Macros are Velocity macros which are used to draw complex or variable parts of the page such as menus and breadcrumbs when editing Custom decorators. Decorator macros can be inserted anywhere in your templates.

The macro is called by inserting a string of the form: #macroName("argument1" "argument2" "argument3"). There are no commas between the arguments. Unless otherwise noted, these macros take no arguments.

**NOTE:** These macros will only work reliably when customising main.vmd. They may not work in other Velocity decorators. Decorator macros will not work inside normal confluence pages.

---

**The information on this page does not apply to Confluence OnDemand.**

<table>
<thead>
<tr>
<th>Macro</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>#breadcrumbs()</td>
<td>Draws the &quot;You are here&quot; breadcrumbs list, like the one found above the page name in the default template.</td>
</tr>
<tr>
<td>#includePage(pageTitle)</td>
<td>Includes a confluence page with the specified title. If you have 2 or more pages with the same title across multiple spaces, this macro will include the page belonging to the space you are currently viewing.</td>
</tr>
<tr>
<td>#searchbox()</td>
<td>Inserts a search box into the page, like the one to the far right of the breadcrumbs in the default template.</td>
</tr>
<tr>
<td>#globalnavbar(type)</td>
<td>Draws the global navigation bar, as found in the top right-hand corner of the default template. The navigation bar can be displayed in two modes:</td>
</tr>
<tr>
<td>#globalnavbar(&quot;table&quot;)</td>
<td>Displays the navigation bar in its default mode: drawn as a table of links with coloured backgrounds and mouse-over effects.</td>
</tr>
</tbody>
</table>
#globalnavbar("text") Displays the navigation bar as series of text links separated by | characters.

#usernavbar() Draws the user-specific navigation-bar. This bar contains the links to the user's profile and history, or to the login and signup pages if the user is not logged in.

#helpicon() Draws the help icon, and link to the Confluence help page.

#printableicon() On pages where a printable version is available, draws the printable page icon, linking to the printable version of the page. Otherwise, draws nothing

#pagetitle(class) When you are viewing a page in a Confluence space, draws the name of the space that page is in. Otherwise, writes the word "CONFLUENCE". The "class" argument is the CSS class that the title should be drawn in. Unless you have customised your Confluence installation's CSS file, you should call this with "spacenametitle" as the class: #pagetitle("spacenametitle")

#poweredby() Writes out the "Powered by Confluence" and Confluence version-number boilerplate found at the bottom of the default template.

#bottomshadow() Draws the fading shadow-effect found at the bottom of the content area in the default template.

#dashboardlink() Inserts a link to the dashboard page.

## RELATED TOPICS

Page: Adding, Editing and Removing User Macros
Page: Writing User Macros
Page: Enabling HTML macros
Page: Include Page Macro
Page: Enabling the html-include Macro

### Customising a Specific Page

If you'd like to change the appearance of a specific page, you can modify the corresponding Velocity template. Here's how to find out which one:

1. Access the page. Note the name of the action. For example, the "Contact Administrators" page is <baseUrl>/administrators.action.
3. Unzip or unjar the file using a standard unzipper or the java jar utility.
4. Open xwork.xml. Search the file for the name of the action corresponding to the page you'd like to modify. You'll see an entry like:

   ```xml
   <action name="administrators"
   class="com.atlassian.confluence.user.actions.AdministratorsAction">
   <interceptor-ref name="defaultStack"/>
   <result name="success" type="velocity">/administrators.vm</result>
   </action>
   ```

   The file to look for is the vm or vmd file. In the above example, it's administrators.vmd. Because there is no context path (just a / before the name of the file), its in the root of the Confluence webapp. For the stand-alone, that's <confluence-install>/confluence folder.
5. Modify the file.

   For details on how to configure the file, check the Velocity Template Overview.
Customising PDF or HTML Content

To customise Confluence's PDF output, you can edit the CSS stylesheets used by the PDF exporter. See Customising Exports to PDF.

To customise the HTML output, you will need to modify the file `confluence-x.y.z-jar/com/atlassian/confluence/pages/Page.htmlexport.vm`. See Editing Files within JAR Archives to learn how to repackage this file.

Customising the Dashboard

If you are a Confluence Administrator, you can customise the global dashboard, affecting the way all users will see the dashboard.

Confluence users can customise their view of the dashboard too. See the user's guide.

Sending Users to a Space Home Page instead of the Dashboard

See Configuring the Site Home Page.

Editing the Top Left-hand Section of the Dashboard

See Editing the Site Welcome Message.

Editing the Bottom Left-hand Section of the Dashboard

This section can be updated using Confluence Web Panels. You can add items to the dashboard by including a web panel with the key `atl.dashboard.left`:

```xml
<web-panel key="{key}" location="atl.dashboard.left">
    <resource name="view" type="velocity" location="{location}"/>
</web-panel>
```

You can remove the existing entities panel by disabling the global-entities-panel plugin from the Dashboard macros plugin.

Editing the Top Right-hand Action Bar

You can add more links to the top right navigation bar by adding web items to `system.dashboard.button`:
Modifying the Global Template or Layout

You can also modify files to add content to the global dashboard.

To make modifications to the dashboard, modify the global template `/confluence/decorators/global.vmd` or the layout at `Administration > Layouts > Global Layout`.

For example, search the Global Layout for these macros:

```confluence
$helper.renderConfluenceMacro("(recently-updated-dashboard:dashboard|showProfilePic=true)"
```

To modify the bundled plugin macros used in the Confluence dashboard:

2. Update the `confluence-dashboard-macros-x.x.jar` file, rezip it and then put it back to `<Confluence install>/confluence/WEB-INF/classes/com/atlassian/confluence/setup`. Refer to `Editing Files within JAR Archives`.
3. Delete the JAR from `<confluence-home>/bundled-plugins`.
4. Restart Confluence.

To customise the space list, you can work with `spacelist.vm`.

Related Topics

- Customising your Personal Dashboard
- Customising Look and Feel Overview

Customising the eMail Templates

Customisations to the Confluence email templates will need to be reapplied when you upgrade Confluence. Consider this before making drastic changes to the layout, and be sure to keep a list of what you have changed for your upgrade process later.

Only administrators with access to the server where Confluence is running can modify the Confluence email templates.

The information on this page does not apply to Confluence OnDemand.

Process to change the email templates

1. Shut down your test instance of Confluence.
2. In the Confluence web application folder, find the file `/confluence/WEB-INF/lib/confluence-2.x.jar`.
3. Make a copy of this file as a backup.
4. Learn how to edit files within JAR archives.
5. Within the jar file, find the `/templates/email` folder. Find the appropriate file(s) within that folder.
6. Edit the file with a text editor to make the required changes. The content is mostly HTML, but has some Velocity template variables in it. See Velocity Template Overview for more information about how these work.
7. Again using the guide on editing files within JAR archives, either rejar the set of folders or drop the new files into the identical folder structure in the `WEB-INF/classes` directory.
8. Start Confluence up again and test your changes.
9. Apply the changes to your production Confluence instance.

The same process can be applied to modify most of the templates in the Confluence web application. For velocity files that are not in a jar file, you need not shut down and restart Confluence. Be careful to test your changes before applying them to a live site. The templates contain code that is vital for Confluence to function, and it is easy to accidentally make a change that prevents use of your site.

RELATED TOPICS
Customising the Login Page

It's fairly straightforward to customise the Confluence login page, to add your own logo or custom text. This will not customise the login process however, just what a user sees when she logs in.

Only administrators with access to the server where Confluence is running can modify the Confluence login page.

Process to change the login page

1. Shut down your test instance of Confluence.
2. In the Confluence web application folder, find the file `confluence/login.vm`.
3. Make a copy of this file as a backup.
4. Edit the file with a text editor to make the required changes. The content is mostly HTML, but has some Velocity template variables in it. See Velocity Template Overview for more information about how these work.
5. Start Confluence up again and test your changes.
6. Apply the changes to your production Confluence instance.

The same process can be applied to modify most of the templates in the Confluence web application. Be careful to test your changes before applying them to a live site. The templates contain code that is vital for Confluence to function, and it is easy to accidentally make a change that prevents use of your site.

Related topics

- Editing the Global Logo
- Velocity Template Overview
- Customising Layouts
- Customising Look and Feel Overview
- Modify Confluence Interface Text

Themes Overview

Themes are pre-defined style sets that can be applied to alter the appearance of your site. Themes allow you to personalise the 'look and feel' of Confluence. You can apply a theme to your entire Confluence site and to individual spaces. Choose a specific theme if you want to add new functionality or significantly alter the appearance of Confluence.

Confluence comes with a selection of themes. In addition, a site administrator can install new themes as plugins via the Confluence Administration Console. Provided that the theme is installed into your Confluence site, any space administrator can apply a theme to a space.

By default when you create a new space, the space will have the Confluence default theme.

To look at the themes installed:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select Themes under 'Look and Feel' in the left-hand panel.
3. You will see a list of all installed themes.

Useful Plugins

Before installing a plugin into your Confluence site, please check the plugin's information page to see whether it is supported by Atlassian, by
Applying a Theme to a Site

Themes allow you to personalise the 'look and feel' of Confluence. You can apply a theme to your entire Confluence site and to individual spaces. Choose a specific theme if you want to add new functionality or significantly alter the appearance of Confluence.

Confluence comes with a selection of themes. In addition, a site administrator can install new themes as plugins via the Confluence Administration Console. Provided that the theme is installed into your Confluence site, any space administrator can apply a theme to a space.

By default when you create a new space, the space will have the Confluence default theme.

To apply a theme across the site,

1. Ensure that the theme you wish to apply has been installed as a plugin.
2. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
3. Select 'Themes' under 'Look and Feel' in the left-hand panel.
4. The screen will display all available themes. Click a radio button to select a theme.
5. Click 'Confirm'.

Related Topics

Page: Applying a Theme to a Space
Page: Configuring the Easy Reader Theme
Page: Including Cascading Stylesheets in Themes
Page: Creating a Theme
Page: Applying a Theme to a Site
Page: Configuring the Documentation Theme

Adaptavist's Theme Builder Plugin for Confluence allows you to customise your Confluence site by adding layouts, logo banners, menu-driven navigation, style sheets, footers and more.
Customising the Left Navigation Theme

The Left Navigation theme is no longer part of Confluence

This theme is no longer part of Confluence and is not supported from Confluence 3.4 onwards. We suggest the Documentation theme, as it provides a customisable left-hand navigation panel and additional configurable features. If you are using an earlier version of Confluence, please refer to the documentation for your version. For example, go to the documentation for Confluence 3.3.

Modifying Look and Feel (for themes)

Here’s how you can define a new look and feel for Confluence in your theme:

1. Layout: Edit Confluence’s layout by modifying the decorator files that are used to define it.
   - Working with Decorators
   - Velocity Template Overview
   - Configuring the atlassian.plugin.xml file to reference the decorators
2. Colour schemes: Configure a new colour scheme for your theme. Optional
   - Configuring a new colour scheme
   - Configuring the atlassian.plugin.xml file to include the new colour scheme
3. Stylesheet: Include a stylesheet to define your theme. Optional

Note that for every component you edit, you will need to configure the atlassian-plugin.xml which is the central configuration file for the plugin to override the default files with the new files you’ve created.
Layout: Working with decorators

What are decorators?
Confluence is built on top of the Open Source SiteMesh library, a web-page layout system. To edit the layout of Confluence, you will need to modify these decorator files. A decorator file is a '.vmd' file and is written in a very simple programming language called Velocity. Learn more about Velocity.

Confluence comes bundled with a set of decorator or VMD files that you can customize. Broadly these are categorised into Site, Content and Export decorators. These are further grouped into categories called contexts and under each context has various modes (ways of viewing the context).

To make editing easier, layout for similar screens (example: view and edit page screens) is configured through the same VMD file. So, if you want to customize how the Confluence View Page Screen or Edit Page Screen looks, you can make both of these changes inside one decorator file: page.vmd.

<table>
<thead>
<tr>
<th>Decorator</th>
<th>Context</th>
<th>Mode</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>page.vmd</td>
<td>page</td>
<td>'view', 'edit', 'edit-preview', 'view-information', and 'view-attachments'</td>
<td></td>
</tr>
<tr>
<td>blogpost.vmd</td>
<td>blogpost (news)</td>
<td>'view', 'edit', 'edit-preview', and 'remove'</td>
<td>We prefer to use ‘news’ as an end-user term; all templates and classes use 'blogpost' to indicate RSS related content</td>
</tr>
<tr>
<td>mail.vmd</td>
<td>mail</td>
<td>'view', 'view-thread' and 'remove'</td>
<td></td>
</tr>
<tr>
<td>space.vmd</td>
<td>space-pages, space-mails, space-blogposts, space-templates, space-operations, space-administration</td>
<td>CONTEXT: &quot;space-pages&quot;, MODES: &quot;list-alphabetically&quot;, &quot;list-recently-updated&quot;, &quot;list-content-tree&quot;, &quot;create-page&quot;. CONTEXT: &quot;space-mail&quot;. MODES: &quot;view-mail-archive&quot;. CONTEXT: &quot;space-blogposts&quot;. MODES: &quot;view-blogposts&quot;, &quot;create-blogpost&quot;. CONTEXT: &quot;space-templates&quot;. MODES: &quot;view-templates&quot;, CONTEXT: &quot;space-operations&quot;. MODES: &quot;view-space-operations&quot;. CONTEXT: &quot;space-administration&quot;. MODES: &quot;view-space-administration&quot;, &quot;list-permission-pages&quot;.</td>
<td>space.vmd handles a wide range of options, this context is accessed by clicking on 'browse space' in the default theme of Confluence (tabbed theme)</td>
</tr>
<tr>
<td>global.vmd</td>
<td>global</td>
<td>'dashboard', 'view-profile', 'edit-profile', 'change-password-profile', 'edit-notifications-profile'</td>
<td></td>
</tr>
<tr>
<td>main.vmd</td>
<td>n/a (header and footer formatting)</td>
<td></td>
<td>main.vmd is used to control the header and footer of each page, not the page specific presentation logic</td>
</tr>
</tbody>
</table>

For example, if you wanted to remove the 'Attachments' tab on the view page screen, you would make this layout change in the page.vmd file - where the 'view' mode is handled (as shown below).
Step One: Copying the decorators

The easiest way to begin configuring a new layout is by copying the default decorator files and editing them to suit your theme.

1. Go to the Confluence ‘Administration Console’:
   - Choose Browse > Confluence Admin. The ‘Administrator Access’ login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the ‘Administration Console’.
   - Select Layouts in the left panel. This will display options to view and edit the default decorators.

2. Copy the files that you intend to modify and place them in a directory structure that makes sense to you. See example below.

   **Step Two: Creating a directory structure for the decorators:**

   You should place your decorators in a directory hierarchy which makes sense to you. We recommend that you place the atlassian-plugin.xml file at the top level of the directory structure, and then place the decorators in directories which make a meaningful division of what they do.

   **Here is an example:**

   ```
   atlassian-plugin.xml
   com/atlassian/confluence/themes/mytheme/
   com/atlassian/confluence/themes/mytheme/global.vmd
   com/atlassian/confluence/themes/mytheme/space.vmd
   com/atlassian/confluence/themes/mytheme/mail.vmd
   com/atlassian/confluence/themes/mytheme/blogpost.vmd
   com/atlassian/confluence/themes/mytheme/main.vmd
   com/atlassian/confluence/themes/mytheme/page.vmd
   ```

   **Step Three: Editing the decorators**

   To edit the decorators, you will require knowledge of a very simple programming language called Velocity. Learn more about Velocity.

   **Decorator Macros**

   When editing the decorators, you will need to use Decorator Macros to draw complex or variable parts of the page such as menus and breadcrumbs. See Working With Decorator Macros

   **Theme Helper Object**

   When editing decorator files you will also come across a variable called $helper - this is the theme helper object.

   The following table summarises what this object can do:

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>$helper.domainName</td>
<td>displays the base URL of your Confluence instance on your page. This is useful for constructing links to your own Confluence pages.</td>
</tr>
<tr>
<td>$helper.spaceKey</td>
<td>returns the current space key or null if in a global context.</td>
</tr>
</tbody>
</table>
$helper.spaceName
returns the name of the current space

$helper.renderConfluenceMacro("{create-space-button}")
renders a call to a Confluence Macro for the velocity context

$helper.getText("key.key1")
looks up a key in a properties file matching
key.key1=A piece of text
and returns the matching value ("A piece of text")

$helper.action
returns the XWork action which processed the request for the current page.

If you are on a page or space screen you also have access to the actual page and space object by using $helper.page and $helper.space respectively.

If you want to deliver more into what other methods are available in this object, please see our API's for ThemeHelper.

**Step Four: Configuring the central configuration file to reference the new decorators**

How to do this is explained in Configuring the Theme Plugin

**Working with colour schemes for themes**

**Configuring the colour scheme**

The easiest way to configure a colour scheme is to do it dynamically from the Administration Console (as you would normally when you want to change the site’s colour scheme online), and then express it as an xml file. This method makes it possible for you to experiment with different colours and test them out before including the colour scheme in your theme.

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select 'Colour scheme' in the left panel.
3. Use the colour picker to define the colours for the following UI elements:
   - **Top Bar** - the bar across the top of the page that contains the breadcrumbs.
   - **Space Name Text** - the text of the current space name located above the page title.
   - **Heading Text** - all heading tags throughout the space.
   - **Links** - all links throughout the space.
   - **Borders and Dividers** - table borders and dividing lines.
   - **Menu Bar Background** - background of top navigational buttons
   - **Menu Bar Text** - text that appears on the menu bar
   - **Menu Bar Background Highlight** - background colour of menu bar when highlighted.
   - **Menu Bar Text Highlight** - menu bar text when highlighted

More information on customising colour schemes

**Expressing the colour scheme as XML**

Once, you have decided on the colours for the different UI elements, you will need to configure the atlassian.plugin.xml to include the new colour scheme. How to do this is explained in detail in Configuring the Theme Plugin.

**RELATED TOPICS**

Page: Applying a Theme to a Space
Page: Configuring the Easy Reader Theme
Page: Including Cascading Stylesheets in Themes
Page: Creating a Theme
Page: Applying a Theme to a Site
Configuring the Theme Plugin

Each plugin is described in its own `atlassian-plugin.xml` file, which specifies attributes of the plugin, including a description of each module it contains. Once you have modified the different components to define a new look and feel for your theme, you will need to configure this file so Confluence knows where to look when overriding the default files.

The easiest way to begin is by copying the `atlassian-plugin.xml` from one of the default themes bundled with Confluence and modifying it for your theme.

The information on this page does not apply to Confluence OnDemand.

The structure of an `atlassian-plugin.xml` file is fairly self-explanatory:

```xml
<atlassian-plugin key="com.atlassian.confluence.themes.tabless" name="Plain Theme">
  <plugin-info>
    <description>This theme demonstrates a plain look and feel for Confluence. It is useful as a building block for your own themes.</description>
    <version>1.0</version>
    <vendor name="Atlassian Software Systems Pty Ltd" url="http://www.atlassian.com/"/>
  </plugin-info>
  <theme key="tabless" name="Tabless Theme" class="com.atlassian.confluence.themes.BasicTheme">
    <description>plain Confluence theme.</description>
    <layout key="com.atlassian.confluence.themes.tabless:main"/>
    <layout key="com.atlassian.confluence.themes.tabless:global"/>
    <layout key="com.atlassian.confluence.themes.tabless:space"/>
    <layout key="com.atlassian.confluence.themes.tabless:page"/>
    <layout key="com.atlassian.confluence.themes.tabless:blogpost"/>
    <layout key="com.atlassian.confluence.themes.tabless:mail"/>
    <colour-scheme key="com.atlassian.confluence.themes.tabless:earth-colours"/>
  </theme>
  <layout key="main" name="Main Decorator" class="com.atlassian.confluence.themes.VelocityDecorator"
    overrides="/decorators/main.vmd">
    <resource type="velocity" name="decorator" location="com/atlassian/confluence/themes/tabless/main.vmd"/>
  </layout>
  <layout key="global" name="Global Decorator" class="com.atlassian.confluence.themes.VelocityDecorator"
    overrides="/decorators/global.vmd">
    <resource type="velocity" name="decorator" location="com/atlassian/confluence/themes/tabless/global.vmd"/>
  </layout>
  <layout key="space" name="Space Decorator" class="com.atlassian.confluence.themes.VelocityDecorator"
    overrides="/decorators/space.vmd">
    <resource type="velocity" name="decorator" location="com/atlassian/confluence/themes/tabless/space.vmd"/>
  </layout>
  <layout key="page" name="Page Decorator" class="com.atlassian.confluence.themes.VelocityDecorator"
    overrides="/decorators/page.vmd">
    <resource type="velocity" name="decorator" location="com/atlassian/confluence/themes/tabless/page.vmd"/>
  </layout>
  <layout key="blogpost" name="Blogpost Decorator" class="com.atlassian.confluence.themes.VelocityDecorator"
    overrides="/decorators/blogpost.vmd">
    <resource type="velocity" name="decorator" location="com/atlassian/confluence/themes/tabless/blogpost.vmd"/>
  </layout>
</atlassian-plugin>
```
<layout key="mail" name="Mail Decorator"
  class="com.atlassian.confluence.themes.VelocityDecorator"
  overrides="/decorators/mail.vmd">
  <resource type="velocity" name="decorator"
    location="/themes/tabless/mail.vmd"/>
</layout>

<colour-scheme key="earth-colours" name="Brown and Red Earth Colours"
  class="com.atlassian.confluence.themes.BaseColourScheme">
  <colour key="topbar" value="#440000"/>
  <colour key="spacename" value="#999999"/>
  <colour key="headingtext" value="#663300"/>
  <colour key="link" value="#663300"/>
  <colour key="border" value="#440000"/>
  <colour key="navbg" value="#663300"/>
  <colour key="navtext" value="#ffffff"/>
  <colour key="navselectedbg" value="#440000"/>
  <colour key="navselectedtext" value="#ffffff"/>
</colour-scheme>
Modifying the `atlassian-plugin.xml` file

We will configure this file section by section.

**Plugin information**

```xml
<atlassian-plugin key="com.atlassian.confluence.themes.tabless" name="Plain Theme">
  <plugin-info>
    <description>This theme demonstrates a plain look and feel for Confluence. It is useful as a building block for your own themes.</description>
    <version>1.0</version>
    <vendor name="Atlassian Software Systems Pty Ltd" url="http://www.atlassian.com/">
  </plugin-info>
</atlassian-plugin>
```

**Plugin key**: Specify a key that uniquely identifies the plugin, e.g., `com.example.themes.dinosaur`

**Name**: Give the plugin a name.

**Description**: Provide a short description of the plugin.

**Vendor**: Replace the text with your information.

**Theme information**

```xml
<theme key="dinosaurs" name="Dinosaur Theme" class="com.atlassian.confluence.themes.BasicTheme">
  <description>A nice theme for the kids</description>
  <colour-scheme key="com.example.themes.dinosaur:earth-colours"/>
  <layout key="com.example.themes.dinosaur:main"/>
  <layout key="com.example.themes.dinosaur:mail-template"/>
</theme>
```

**Theme key**: Specify a key that uniquely identifies the theme.

**Class**: The class of a theme must implement `com.atlassian.confluence.themes.Theme`. The `com.atlassian.confluence.themes.BasicTheme` class provided with Confluence gathers together all the resources listed within the complete module definition into a theme.

**Name**: Give the theme a name. Make sure that you replace all instances of the theme name with this name.

**Description**: Provide a short description of your theme

**Colour-scheme key**: A theme can contain an optional `colour-scheme` element that defines which colour-scheme module this theme will use. If you are using a new colour scheme, enter its key.

**Layout key**: A theme can contain any number of `layout` elements that define which layouts should be applied in this theme. Refer to these modules by their complete module key as shown above.

**Referencing the decorators**

You will need to add a layout entity as shown below for each of the decorators you are using. See working with decorators

```xml
<layout key="page" name="Page Decorator" class="com.atlassian.confluence.themes.VelocityDecorator">
  <resource type="velocity" name="decorator" location="com/atlassian/confluence/themes/tabless/page.vmd"/>
</layout>
```

**Class**: The class which each decorator, or layout, is mapped to must implement `com.atlassian.confluence.themes.VelocityDecorator`. 

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overrides: The layout entry must provide an "overrides" attribute which defines which decorator within Confluence is being overridden by the theme.

Location: Specify the location of the new decorator file, so Confluence knows where to look when overriding the default decorator.

It is possible for a theme to use modules that aren't in the same plugin as the theme. Just keep in mind that your theme will be messed up if the plugin that the theme depends on is removed.

Including the colour scheme

Colour schemes can be pre-configured for your theme dynamically from the Administration Console. See configuring colour schemes

To transport them within a theme however, they need to be expressed in the `atlassian-plugin.xml` file as shown above.

```xml
<colour-scheme key="earth-colours" name="Brown and Red Earth Colours"
    class="com.atlassian.confluence.themes.BaseColourScheme">
    <colour key="topbar" value="#440000"/>
    <colour key="spacename" value="#999999"/>
    <colour key="headingtext" value="#663300"/>
    <colour key="link" value="#663300"/>
    <colour key="border" value="#440000"/>
    <colour key="navbg" value="#663300"/>
    <colour key="navtext" value="#ffffff"/>
    <colour key="navselectedbg" value="#440000"/>
    <colour key="navselectedtext" value="#ffffff"/>
</colour-scheme>
```

colour-scheme key: Specify a key that uniquely identifies the colour scheme.

name: Give a name to the colour scheme.

class: The class of the colour scheme must implement `com.atlassian.confluence.themes.ColourScheme`. The `com.atlassian.confluence.themes.BaseColourScheme` class provided with Confluence sets the colours based on the module's configuration.

colour key: For each UI element, you will need to add its name and value.

See configuring colour scheme

RELATED TOPICS

Page: Applying a Theme to a Space
Page: Configuring the Easy Reader Theme
Page: Including Cascading Stylesheets in Themes
Page: Creating a Theme
Page: Applying a Theme to a Site
Page: Configuring the Documentation Theme

Including Cascading Stylesheets in Themes

Confluence allows you to integrate your own stylesheets within the theme plugin so you can have greater control over the appearance of your site. Confluence's main stylesheet is a useful reference when overriding styles and can be found in the Confluence install directory under `...confluence/styles/site-css.vm`.

⚠️ The information on this page does not apply to Confluence OnDemand.

Step One: Defining the stylesheet in the `atlassian-plugin.xml`

To make a stylesheet available to a decorator, you will need to reference it as a resource from within the central configuration file `- `atlassian-plugin.xml`.

Here is an example where a stylesheet is being used to define the 'leftnavigation' theme:
The resource parameter takes three arguments:

- **Type**: The type of resource—in this instance, ‘stylesheet’.
- **Name**: The name of the stylesheet.
- **Location**: The location of the file represented in the jar archive you will use to bundle your theme.

**Step Two: Using the stylesheet in the decorator**

To reference the stylesheet in the decorator, you will need to use the `#pluginStylesheet` velocity macro.

For example, here’s how you reference the leftnav.css file defined in the layout entry above:

```velocity
#pluginStylesheet("com.atlassian.confluence.themes.leftnavigation:main" "leftnav.css")
```

The macro takes two arguments:

- **completePluginKey**: The complete plugin key which is constructed from the pluginkey and the layout key like this: `{pluginKey}:{layoutKey}`
  
  In the above example, `com.atlassian.confluence.themes.leftnavigation` is the key of the plugin, and `main` is the key of the layout.

- **stylesheetName**: the name of the stylesheet

If you place your stylesheet after the `#standardHeader` macro in the decorator, the contents of your custom stylesheet will override those in Confluence’s default stylesheet.

If your stylesheet needs to reference the color scheme, you need to use the `#pluginSpaceStylesheet` velocity macro instead:

```velocity
#pluginSpaceStylesheet("com.atlassian.confluence.themes.leftnavigation:main" "leftnav.css" $spaceKey)
```

You can then use color scheme references in your stylesheet, similar to Confluence's stylesheets, and they will be replaced with the appropriate global or space-specific color scheme:

```css
.navItemOver {
    color: $action.navSelectedTextColor;
}
```

**RELATED TOPICS**

- Page: [Applying a Theme to a Space](#) (Confluence 4.1)
- Page: [Configuring the Easy Reader Theme](#) (Confluence 4.1)
- Page: [Including Cascading Stylesheets in Themes](#) (Confluence 4.1)
- Page: [Creating a Theme](#) (Confluence 4.1)
- Page: [Applying a Theme to a Site](#) (Confluence 4.1)
- Page: [Configuring the Documentation Theme](#) (Confluence 4.1)
Creating a Theme

Unsure what a theme is? See the overview of themes.

If you want to create your own theme, you will need to write a Confluence plugin. Please refer to the following pages:

- Get started with plugin development.
- Create a theme using the theme plugin module.

The information on this page does not apply to Confluence OnDemand.

RELATED TOPICS

Page: Applying a Theme to a Space
Page: Configuring the Easy Reader Theme
Page: Including Cascading Stylesheets in Themes
Page: Creating a Theme
Page: Applying a Theme to a Site
Page: Configuring the Documentation Theme

Importing Data

- Importing Content from another Wiki
- Universal Wiki Converter
- Importing Content Into Confluence

The information on this page does not apply to Confluence OnDemand.

Importing Content from another Wiki

The Universal Wiki Converter (UWC) allows you to import content from other wikis into Confluence. The Confluence Administration Console offers a link to the Universal Wiki Converter documentation and download sites.

You need to install and run the UWC separately from Confluence.

The UWC is a standalone application that communicates with Confluence remotely. You cannot install the UWC directly into Confluence. Instead, download the UWC separately and run it according to the instructions below.

The UWC supports many wiki dialects. In addition, the UWC is an extensible framework, which means that developers can continue writing new conversion modules for other wikis. To see the latest list of conversions available, please refer to the UWC documentation.

- Download the latest version of the UWC.
- For information on installation and usage, see the UWC Quick Start Guide.
- For information about a specific wiki, including a list of currently supported wikis, see the UWC documentation.
- To ask a question, see the UWC discussions on Atlassian Answers.
Installing Plugins and Macros

A plugin is an add-on to the core Confluence code, which can extend the Confluence functionality. Some plugins are shipped with Confluence, others are available for you to install yourself.

A macro allows a developer to perform programmatic functions within a page, and gives the Confluence user access to more complex content structures. Many macros are made available by plugins.

You need to have System Administrator permissions in order to install and configure plugins. This page introduces two methods of installing plugins:

Read the following topics for information on installing and configuring plugins and macros:

- Importing Content Into Confluence
- Importing Data
- Installing Plugins and Macros
  - Installing and Configuring Plugins using the Universal Plugin Manager
  - Checking Plugin Compatibility for Confluence Upgrades
  - Configuring a Plugin
  - Disabling or Enabling a Plugin
  - Installing a Plugin
  - Uninstalling a Plugin
  - Upgrading your Existing Plugins
  - Viewing the Plugin Audit Log
Installing and Configuring Plugins using the Universal Plugin Manager

This page provides information about the Universal Plugin Manager (UPM) in Confluence and links to topics on how to install and configure plugins using the UPM. For an overview of how plugins work in Confluence, read the Confluence Plugin Guide. Please note, you need to have System Administrator permissions in order to install and configure plugins.

Plugin Safety

Plugins are very powerful: they can change the behaviour of almost any part of the Confluence server. This makes it very important that you trust a plugin before you install it. Always be aware of where (and who) a plugin comes from.

Some functionality described on this page is restricted in Confluence OnDemand.

The Universal Plugin Manager (UPM) provides you with a powerful and user-friendly interface to manage your plugins. The Universal Plugin Manager itself is a plugin, which contains a number of modules that are implementations of the Atlassian REST plugin module type. It allows you to perform common plugin tasks, such as:

- Enabling/disabling plugins and their plugin modules.
- Configuring advanced plugin options.
- Finding out-of-date plugins and updating them.
- Checking the compatibility of your installed plugins against newer versions of the application.

The Universal Plugin Manager also interfaces with the Atlassian Plugin Exchange, so you can browse the wide range of plugins available for your application from within your application. You can install any of these plugins with a single click, or upload your own plugins using the Universal Plugin Manager as well.

Read more about the Universal Plugin Manager in the topics linked below:

- Checking Plugin Compatibility for Confluence Upgrades
- Configuring a Plugin
- Disabling or Enabling a Plugin
- Installing a Plugin
- Uninstalling a Plugin
- Upgrading your Existing Plugins
- Viewing the Plugin Audit Log
- Viewing your Installed Plugins

Having problems with the Universal Plugin Manager? Try the Universal Plugin Manager FAQ (note, this will redirect you to the Universal Plugin Manager documentation. Use the back button on your browser to return the Confluence documentation).

Checking Plugin Compatibility for Confluence Upgrades

The Application Upgrade Check in the Universal Plugin Manager (UPM) helps you to check whether your plugins will still work with Confluence after a Confluence upgrade.

For example, if you were thinking of upgrading from Confluence 3.1 to Confluence 3.2, the Application Upgrade Check can tell you the following:

- Installed plugins that are compatible with Confluence 3.1 and Confluence 3.2.
- Installed plugins that are not compatible with Confluence 3.2, but will be compatible with Confluence 3.2 if you upgrade them.
- Installed plugins that are not compatible with Confluence 3.2, even if you upgrade them to their latest version.
To access the Universal Plugin Manager in Confluence,

1. Click the ‘Browse’ menu link on the top bar and select the ‘Confluence Admin’ option to open the ‘Administration Console’.
2. Click the ‘Plugins’ link under the ‘Administration’ section in the left menu to open the ‘Universal Plugin Manager’. The ‘Universal Plugin Manager’ will be displayed, showing the plugins installed on your Confluence instance.

To check compatibility of your plugins against different Confluence versions,

1. Click the ‘<application name> Upgrade Check’ tab, (e.g. ‘Confluence Upgrade Check’). The ‘<application name> Upgrade Check’ page will display (see screenshot below).
2. Select the version of your application that you wish to check the compatibility of your installed plugins against in the ‘Check compatibility for’ dropdown and click the ‘Check’ button.
3. The page will refresh displaying any of your installed plugins that are not compatible with the selected application version (see screenshot below). The compatibility checker will also check the compatibility of the latest available version of each plugin (if not already upgraded) with the selected application version. You can click on the name of any of the plugins to view more information about the plugin.

The plugins will be grouped into sections under the following headings:

- **Incompatible** — The installed versions of plugins in this section are currently not compatible with the selected application version. There are currently no plugin upgrades available that are compatible with the selected application version.
- **Compatible, if upgraded** — The installed versions of plugins in this section are currently not compatible with the selected application version. However, the plugins will be compatible with the selected application version if they are upgraded. There are buttons to allow you to upgrade these plugins.
- **Compatible if both Confluence and the plugin are upgraded** — The installed versions of plugins in this section are currently not compatible with the selected application version. There is a plugin compatible with the newer application version, but it is not compatible with the application version you are currently running. You must upgrade the application and then proceed with the plugin upgrade. There are buttons to allow you to disable these plugins before proceeding with the upgrade.
- **Compatible** — The currently installed versions of plugins in this section are compatible with the selected application version.
- **Unknown** — Plugins listed under this section may or may not be compatible with the selected application version. If a plugin is not registered with the Atlassian Plugin Exchange, the Universal Plugin Manager cannot check its compatibility with different application versions.

*Screenshot: Checking plugin compatibility against different Confluence versions*
Configuring a Plugin

A number of Confluence plugins have advanced configuration options. If you have one of these plugins installed on your application instance, you can view and update these configuration options via the Universal Plugin Manager (UPM).
Disabling or Enabling a Plugin

If you would like to disable or enable a plugin, please refer to Disabling or Enabling a Plugin.

To access the Universal Plugin Manager in Confluence,

1. Click the 'Browse' menu link on the top bar and select the 'Confluence Admin' option to open the 'Administration Console'.
2. Click the 'Plugins' link under the 'Administration' section in the left menu to open the 'Universal Plugin Manager'. The 'Universal Plugin Manager' will be displayed, showing the plugins installed on your Confluence instance.

To configure a plugin in Confluence via the UPM,

1. Click the 'Manage Existing' tab.
2. Locate the plugin that you want to configure in the list of installed plugins and click its title. The plugin details section will expand (see first screenshot below).
3. Click the 'Configure' link for that plugin. The link will be disabled if the plugin is disabled. If there is no 'Configure' link, then there are no advanced configuration options available for that plugin.
4. The advanced configuration options for the plugin will display (see second screenshot below). Update the configuration settings as desired and save your changes.

Note: The advanced configuration screens are provided by each plugin. If you encounter any problems after you click the 'Configure' link, the plugin is responsible for the issue, not the Universal Plugin Manager.

Screenshot: Configuring a plugin example — WebDAV configuration

Denying Modifications From WebDAV Clients

You can deny certain WebDAV clients from writing to Confluence. To do that, please add a regular expression matching the clients user agent headers. For instance, "Microsoft.*" will deny write operations by Microsoft WebDAV clients.

Disabling or Enabling a Plugin

The Universal Plugin Manager (UPM) allows you to disable a plugin in your Confluence instance without permanently removing it. You can also enable any plugins that have been previously disabled. If you want to add or remove a plugin from your Confluence site, please refer to Installing a Plugin or Uninstalling a Plugin respectively.

You can also disable all user installed plugins in your application, by enabling safe mode. This may help you to diagnose a plugin-related problem more easily.

On this page:

- Disabling a Plugin
- Enabling a Plugin
- Disabling/Enabling all User Installed Plugins (Safe Mode)
Disabling a Plugin

To access the Universal Plugin Manager in Confluence,

1. Click the 'Browse' menu link on the top bar and select the 'Confluence Admin' option to open the 'Administration Console'.
2. Click the 'Plugins' link under the 'Administration' section in the left menu to open the 'Universal Plugin Manager'. The 'Universal Plugin Manager' will be displayed, showing the plugins installed on your Confluence instance.

To disable a plugin in Confluence,

1. Click the 'Manage Existing' tab. The plugins installed on your application will be displayed. Enabled plugins will be listed with an icon.
2. Locate the plugin that you want to disable and click the title to expand its plugin details section.
3. Click the 'Disable' button.
4. Once a plugin has been disabled, you may need to restart your application for your change to take effect. If so, the plugin will display with 'Disabled, requires restart'. This will depend on the plugin and the application. The plugin will display with an 'Enable' link once your change is applied (i.e. immediately or after an application restart).

Screenshot: Disabling a Plugin

Enabling a Plugin

To access the Universal Plugin Manager in Confluence,

1. Click the 'Browse' menu link on the top bar and select the 'Confluence Admin' option to open the 'Administration Console'.
2. Click the 'Plugins' link under the 'Administration' section in the left menu to open the 'Universal Plugin Manager'. The 'Universal Plugin Manager' will be displayed, showing the plugins installed on your Confluence instance.

To enable a plugin in Confluence,

1. Click the 'Manage Existing' tab. The plugins installed on your application will be displayed. Disabled plugins will be listed with an icon.
2. Locate the plugin that you want to enable and click the title to expand its plugin details section.
3. Click the 'Enable' button.
4. Once a plugin has been enabled, you may need to restart your application for your change to take effect. If so, the plugin will display with 'Enable, requires restart'. This will depend on the plugin and the application. The plugin will display with an 'Disable' link once your change is applied (i.e. immediately or after an application restart).

Screenshot: Enabling a Plugin
Disabling/Enabling all User Installed Plugins (Safe Mode)

Running your application in safe mode disables all user installed plugins at once. All plugins that were disabled when you entered safe mode will be re-enabled when you exit safe mode.

To access the Universal Plugin Manager in Confluence,

1. Click the ‘Browse’ menu link on the top bar and select the ‘Confluence Admin’ option to open the ‘Administration Console’.
2. Click the ‘Plugins’ link under the ‘Administration’ section in the left menu to open the ‘Universal Plugin Manager’. The ‘Universal Plugin Manager’ will be displayed, showing the plugins installed on your Confluence instance.

To enable safe mode in Confluence,

1. Click the ‘Manage Existing’ tab. The plugins installed on your application will be displayed.
2. Click the ‘Enable Safe Mode’ button.
3. Click the ‘Continue’ button in the confirmation window that displays. All user installed plugins will be disabled and your application will now be running in ‘Safe Mode’ (see screenshot below).
4. You can now make changes to your installed plugins, as desired (e.g. enable/disable specific plugins or plugin modules).
5. Exit safe mode by clicking one of the links in the Safe Mode banner:
   - Click ‘Exit Safe Mode and restore the previous configuration’ to exit support mode and restore your plugin configuration prior to entering Safe Mode.
   - Click ‘Exit Safe Mode and keep the current configuration’ to exit support mode and keep any changes made to your plugin configuration during Safe Mode.

Installing a Plugin
This page describes how to install a plugin into Confluence using the Universal Plugin Manager. Plugins can be used to customise and extend the functionality of your application.

You can search for plugins in the Universal Plugin Manager that are sourced from the Atlassian Plugin Exchange or upload your own.

### On this page:
- Adding a plugin from the Atlassian Plugin Exchange
- Uploading your own plugin
- Notes

⚠️ The information on this page does not apply to Confluence OnDemand.

### Adding a plugin from the Atlassian Plugin Exchange

To access the Universal Plugin Manager in Confluence,

1. Click the 'Browse' menu link on the top bar and select the 'Confluence Admin' option to open the 'Administration Console'.
2. Click the 'Plugins' link under the 'Administration' section in the left menu to open the 'Universal Plugin Manager'. The 'Universal Plugin Manager' will be displayed, showing the plugins installed on your Confluence instance.

To find and add a plugin to Confluence from the Atlassian Plugin Exchange,

1. Click the 'Install' tab in the UPM. The Install Plugins page will display showing the featured plugins for your application (see screenshot below).
2. Search for your plugin as follows:
   - Enter some keywords that describe your desired plugin, e.g. 'Charting', in the 'Search the Plugin Exchange' search box and press 'Enter' on your keyboard.
   - Alternatively, just browse to the desired plugin in the list, choose 'Featured', 'Popular', 'Supported' (by Atlassian) or 'All available' from the 'Plugins to show' dropdown to show a different list of plugins.
3. When you have located the desired plugin, click the 'Install' button for the plugin to add it to your application. A confirmation message and the plugin details (see 'Viewing Plugin Details' in the Related Topics below) for the plugin will display, if it is installed successfully.

**Note:** You may need to restart your application for your change to take effect. The Universal Plugin Manager will inform you if this is the case.

**Note:** Not all plugins can be automatically installed. Some required manual installation. These plugins will have a 'Download' button instead of an install button. In these cases, you should read and follow that plugin's installation instructions.

Screenshot: Finding a new plugin from the Atlassian Plugin Exchange
Uploading your own plugin

To access the Universal Plugin Manager in Confluence,

1. Click the ‘Browse’ menu link on the top bar and select the ‘Confluence Admin’ option to open the ‘Administration Console’.
2. Click the ‘Plugins’ link under the ‘Administration’ section in the left menu to open the ‘Universal Plugin Manager’. The ‘Universal Plugin Manager’ will be displayed, showing the plugins installed on your Confluence instance.

To upload your own plugin to Confluence,

1. Click the ‘Install’ tab in the UPM. The find new plugin page will display showing the featured plugins for your application.
2. Click the ‘Upload Plugin’ link. The ‘Upload Plugin’ window will display.
3. Enter the location of your plugin in either the ‘From my computer’ or ‘From this location’ textbox.
   - If the plugin you want to install is on your computer, use the ‘Browse’ dialogue to choose the plugin file.
   - If you want to install a plugin from a remote location, enter the URL of the plugin jar file in to the ‘From this location’ field.
4. Click the ‘Upload’ button to upload and enable your plugin. A confirmation message for the plugin will display if it is installed successfully.
   
   **Note:** You may need to restart your application for your change to take effect. The Universal Plugin Manager will inform you if this is the case.

Screenshot: Uploading a new plugin
In Confluence, you can install and uninstall both version 1 and version 2 plugins using the Universal Plugin Manager. You will see an 'Install' or an 'Uninstall' button.

Some entries that you find listed in the Universal Plugin Manager are not actually plugins. These entries will show a 'Download' button which allows you to download the application to your desktop and run it following its specific instructions.

**Related Topics**

**Uninstalling a Plugin**

If you wish to remove a plugin from Confluence altogether, you can uninstall it via the Universal Plugin Manager (UPM). If you only want to temporarily remove it, you may wish to disable your plugin instead.

To access the Universal Plugin Manager in Confluence,

1. Click the 'Browse' menu link on the top bar and select the 'Confluence Admin' option to open the 'Administration Console'.
2. Click the 'Plugins' link under the 'Administration' section in the left menu to open the 'Universal Plugin Manager'. The 'Universal Plugin Manager' will be displayed, showing the plugins installed on your Confluence instance.

To uninstall a plugin from Confluence,

1. Click the 'Manage Existing' tab. The plugins installed on your application will be displayed.
2. Click the name of the plugin that you wish to uninstall. The plugin details for the plugin will display.
3. Click the 'Uninstall' button. The information summary will display an 'Uninstalling' message and the plugin will be uninstalled from your application.

⚠️ The information on this page does not apply to Confluence OnDemand.
Upgrading your Existing Plugins

Plugins are often developed separately from Confluence. You may wish to upgrade your plugins to more recent versions to allow them to work with your Confluence version or simply to take advantage of new features in a plugin version. The Universal Plugin Manager (UPM) provides you with a list of plugins that have available upgrades and allows you to upgrade each plugin individually or in bulk.

If you are considering upgrading Confluence, you can use the Universal Plugin Manager to check the compatibility of your plugins with your desired Confluence version. Read Checking Plugin Compatibility for Confluence Upgrades for further details.

On this page:
- Upgrading a Plugin
- Upgrading all Plugins

The information on this page does not apply to Confluence OnDemand.

Upgrading a Plugin

To access the Universal Plugin Manager in Confluence,

1. Click the 'Browse' menu link on the top bar and select the 'Confluence Admin' option to open the 'Administration Console'.
2. Click the 'Plugins' link under the 'Administration' section in the left menu to open the 'Universal Plugin Manager'. The 'Universal Plugin Manager' will be displayed, showing the plugins installed on your Confluence instance.

To upgrade a plugin in Confluence,

1. Click the 'Upgrade' tab. The plugin upgrades page will display.
   - If you have a version of a plugin installed that is not the latest version available, the latest compatible version of the plugin will be listed on this page.
   - You can click the plugin name to expand the row and view more information about the plugin.
   - You can filter your list by entering keywords in the 'Filter plugins' text box.
2. Click the 'Upgrade Now' button next to the relevant plugin to update it to the plugin version displayed.

Upgrading all Plugins

To access the Universal Plugin Manager in Confluence,

1. Click the 'Browse' menu link on the top bar and select the 'Confluence Admin' option to open the 'Administration Console'.
2. Click the 'Plugins' link under the 'Administration' section in the left menu to open the 'Universal Plugin Manager'. The 'Universal Plugin Manager' will be displayed, showing the plugins installed on your Confluence instance.

To upgrade all available plugins in Confluence,
1. Click the 'Upgrade' tab. The plugin upgrades page will display.
   - If you have a version of a plugin installed that is not the latest version available, the latest **compatible** version of the plugin will be listed on this page.
   - You can click the plugin name to expand the row and view more information about the plugin.
   - You can filter your list by entering keywords in the 'Filter plugins' text box.
2. Click the 'Upgrade all' button next to the relevant plugin, to update each to the plugin version displayed for each plugin.

**Note:** Some plugins cannot be installed via the Universal Plugin Manager – these plugins must be installed manually. These plugins will not be upgraded automatically.

---

**Viewing the Plugin Audit Log**

The Universal Plugin Manager (UPM) keeps a log of all plugin activity in the UPM for your Confluence instance, e.g. adding plugins, enabling plugins, etc. You can configure the audit log, to adjust the period of time for which log entries should be kept.

**On this page:**
- Viewing the Plugin Audit Log
- Configuring the Plugin Audit Log

**Viewing the Plugin Audit Log**

To access the Universal Plugin Manager in Confluence,

1. Click the 'Browse' menu link on the top bar and select the 'Confluence Admin' option to open the 'Administration Console'.
2. Click the 'Plugins' link under the 'Administration' section in the left menu to open the 'Universal Plugin Manager'. The 'Universal Plugin Manager' will be displayed, showing the plugins installed on your Confluence instance.

To view the plugin audit log,

1. Click the 'Audit Log' tab. The plugin audit log will be displayed.
2. The log will display the 25 most recent entries. You can use the arrows to view older entries.
3. Click the orange RSS icon, if you want to receive the audit log activity in an RSS feed.
1. Click the ‘Browse’ menu link on the top bar and select the ‘Confluence Admin’ option to open the ‘Administration Console’.
2. Click the ‘Plugins’ link under the ‘Administration’ section in the left menu to open the ‘Universal Plugin Manager’. The ‘Universal Plugin Manager’ will be displayed, showing the plugins installed on your Confluence instance.

To configure the amount of time log entries are kept,

1. Click the ‘Audit Log’ tab. The plugin audit log will be displayed.
2. Click the link ‘Configure purge policy’.
3. Specify the number of days you wish to keep logs in the ‘Purge audit log after’ field.
4. Click the ‘Confirm’ button.

Viewing your Installed Plugins

The Universal Plugin Manager (UPM) allows you to easily view the plugins installed on your Confluence instance. This includes plugins that are bundled with Confluence as well as any third party plugins that you have installed. Both enabled and disabled plugins are displayed.

On this page:

- Viewing your Installed Plugins
- Viewing a Plugin’s Details

Viewing your Installed Plugins

To view your installed plugins,
1. Click the 'Manage Existing' tab. The plugins installed on your application will be displayed.
   - You can filter your list by entering keywords in the 'Filter visible plugins' text box.
   - The list of 'System Plugins' will be hidden by default. Click the 'Show System Plugins' link, if you want to view them.
   - Enabled plugins will be listed with an icon. Disabled plugins will be listed with an icon.
   - Click the name of a plugin to view the plugin's details.
   - Click 'Enable Safe Mode' to run your application in safe mode. Read 'Disabling or Enabling a Plugin' (see Related Topics below) for more information on Safe Mode.

What is the difference between a 'System Plugin' and a 'User Installed Plugin'?

- **System plugins** are those that shipped with the product when you downloaded it from Atlassian. These plugins are integral to the functioning of the system, and although you can disable some of them, you should not do so unless instructed by an Atlassian Support engineer. Note, not every system plugin can be disabled and you will not be able to uninstall any system plugins at all.

- **User-installed plugins** are those which have been installed in the product after it was set up: either by uploading a plugin jar file, or by placing it in the applications plugin directories. These plugins can be uninstalled.

Viewing a Plugin's Details

You can view the details for a plugin when you click the name of a plugin in the installed plugins list (as described above). The summary contains a short description of the plugin as well as buttons/links for plugin operations and related information.
**Related Topics**

Configuring a Plugin  
Disabling or Enabling a Plugin  
Uninstalling a Plugin

## Plugin loading strategies in Confluence

### The categories

Confluence plugins have different behaviour based on how they are loaded by Confluence. The plugins themselves are the same, but based on how they are loaded, they may or may not be upgraded, or may not be disabled, or may not be uninstalled. This chart should explain how plugins can be loaded by Confluence, and the ramifications for each choice.

The category any particular plugin is in can vary with Confluence version or circumstance. The examples mentioned here describe the way particular plugins are loaded by default in Confluence 2.8.

⚠️ The information on this page does not apply to Confluence OnDemand.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Static</strong></td>
<td>cannot be installed or upgraded without a Confluence restart</td>
<td></td>
</tr>
<tr>
<td><strong>Core</strong></td>
<td>Included with Confluence and cannot be uninstalled. The classes and plugin.xml are not bundled into plugin jars, but mixed in with Confluence source on the main classpath. Additionally, the plugin.xml definitions are not called &quot;atlassian-plugin.xml&quot; as they are everywhere else, but are named for the plugin e.g., &quot;basic-macros.xml&quot;. We would like to separate some of them out and turn them into Bundled plugins.</td>
<td>Admin Sections</td>
</tr>
</tbody>
</table>

**WEB-INF/lib**  
Confluence also places some plugin jars inside WEB-INF/lib. They are inserted during the build process by Maven. These plugins, likewise, cannot be uninstalled. In ancient times, this was the only way to install plugins, so users are also free to install plugins here. We try to discourage them from doing so, however. As of version 3.0, most of the JAR files in this directory are library dependencies, not plugins.

| **Dynamic**  | the opposite of static, these can be installed/upgraded while Confluence is running | |
Bundled plugins can be administered from the Plugins console from Administration >> Plugins. You can upload or disable them there. 

Bundled plugins are included in a zip of jars called `atlassian-bundled-plugins.zip` which is on the main Confluence classpath, in a resources directory - `<confluence-install>/confluence/WEB-INF/classes/com/atlassian/confluence/setup`.

At Confluence startup, they are extracted and copied into the `$CONFLUENCE_HOME/bundled-plugins` directory, from whence they are loaded. To remove a bundled plugin (you shouldn't normally have to do this), remove the plugin from the `atlassian-bundled-plugins.zip` file and the bundled-plugins directory, otherwise Confluence will just put it back in place on the next startup. In versions later than 2.6, you’ll have to recreate the `.jar` file (if the jar file is from the `lib` folder) or recreate the zip folder (if its in the classes folder). Bundled plugins can be upgraded or disabled.

**Uploaded**

Installed by the user via the plugin repository or the Plugin Manager page. These plugins are stored in the database and then copied to the `$CONFLUENCE_HOME/plugins-cache` folder on each Confluence node.

To summarise the relationships of categories in the table, all plugins are either Static or Dynamic. Static plugins can be further categorised into Core or WEB-INF/lib. Dynamic plugins are divided into Bundled and Uploaded.

### Use of the categories in Confluence

Within Confluence, the Core and WEB-INF/lib categories are not actually named as such, and they don’t map neatly to other names (though they do map, as will be explained). They are used here because of the logical distinction they provide.

In Confluence, some of the Core plugins are called “System”. Plugins can be designated as “System” by adding a flag to the plugin manifest file. To do this, `system=true` should be added to the top-level `atlassian-plugin` element of the manifest file. The manifest file is generally called `atlassian-plugin.xml`, but it could have another name; the Core plugins’ files do.

All of the Core plugins once were labeled as “System”, but it seems the practice has faded over time. If a plugin is designated as “System”, then it will not show up in the Plugin Manager page in Confluence and thus cannot be enabled/disabled. However, it will show up in the Plugin Repository Client, where it can be disabled; allowing disabling there is probably incorrect behavior.

Static plugins that are not marked as “System” (any remaining Core and WEB-INF/lib plugins), are simply called Static in Confluence. There is no way to tell the WEB-INF/lib and Core plugins apart from within Confluence. You just have to figure out where the classes are.

Members of the other specific categories - Bundled and Uploaded - can be determined. We can tell which plugins are Bundled and which plugins are Uploaded, so we know which plugins are Uploaded though this specific term is never used in the Confluence UI. Instead, they are called Dynamic.

### Upgrading plugins

- Core plugins cannot be upgraded.
- WEB-INF/lib plugins can be upgraded by replacing the JAR in WEB-INF/lib and restarting Confluence.
- Bundled plugins can be upgraded using the Plugin Manager or the Plugin Repository Client. A new plugin jar is uploaded and stored as an Uploaded plugin. Confluence compares the version number with the Bundled plugin and uses the newer.
- Uploaded plugins are upgradable using the Plugin Manager or the Plugin Repository Client. When a new plugin jar is uploaded, the previous version is discarded from the database and the `$CONFLUENCE_HOME/plugin-cache` folder.

### RELATED TOPICS

Removing Malfunctioning Plugins

### Removing Malfunctioning Plugins

Confluence goes to some lengths to prevent itself being unusable due to a problematic plugin. However, sometimes a plugin will manage to do this anyway. This page describes what to do if a plugin cannot be disabled or deleted from the Administration console (from Administration >> Plugins).

⚠️ The information on this page does not apply to Confluence OnDemand.

### Plugin Loading Strategies

1. Read through Plugin loading strategies in Confluence.
2. Determine where your plugin is loaded. The usual options are:
   a. The `PLUGINDATA` table on the database
   b. The `<confluence-home>/bundled-plugins` folder
   c. The `<confluence-home>/plugin-cache` folder
   d. The `<confluence-home>/plugins-osgi-cache` folder
   e. The `<confluence-home>/plugins-temp` folder
   f. The `<confluence-install>/confluence/WEB-INF/lib` folder (deprecated approach)
Check these locations when troubleshooting plugin loading issues.

- Check the How to display classpath utility for tips on what's loading, and the Knowledge Base Article on plugin malfunctioning.

Deleting a plugin from the Database

To remove a plugin from Confluence when Confluence is not running,

1. Connect to the Confluence database.
2. Run the following SQL statement in your database:

   ```sql
   select plugindataid, pluginkey, filename, lastmoddate from plugindata;
   ```

3. After you have found the plugindataid for the offending plugin, please run the following:

   ```sql
   delete from plugindata where plugindataid='XXXXXX';
   ```

   where XXXXXX is the plugindataid value.

4. Restart Confluence.

Disabling a plugin from the database

To disable in the database,

Run the following query on your Confluence database:

```sql
select BANDANAVALUE from BANDANA where BANDANAKEY = 'plugin.manager.state.Map'
```

This will return a value like:

```xml
<map>
  <entry>
    <string>com.atlassian.confluence.ext.usage</string>
    <boolean>true</boolean>
  </entry>
</map>
```

Edit the value boolean to have false:

```xml
<map>
  <entry>
    <string>com.atlassian.confluence.ext.usage</string>
    <boolean>false</boolean>
  </entry>
</map>
```

Deleting a Bundled Plugin

Bundled plugins can be administered from the Plugins console from Administration >> Plugins. You can upload or disable them there.

Bundled plugins are included in a zip of jars called atlassian-bundled-plugins.zip which is on the main Confluence classpath, in a resources directory -<confluence-install>/confluence/WEB-INF/classes/com/atlassian/confluence/setup. At Confluence startup, they are extracted and copied into the $CONFLUENCE_HOME/bundled-plugins directory, from whence they are loaded. To remove a bundled plugin (you shouldn't normally have to do this), remove the plugin from the atlassian-bundled-plugins.zip file and the bundled-plugins directory, otherwise Confluence will just put it back in place on the next startup. In versions later than 2.6, you'll have
to recreate the .jar file (if the jar file is from the lib folder) or recreate the zip folder (if its in the classes folder). Bundled plugins can be upgraded or disabled.

If you need to remove a bundled plugin, check to see if you have duplicates in the <confluence-home>/bundled-plugins or <confluence-home>/plugin-cache directory.

Usually, the problem is that an old plugin is getting loaded along with the properly bundled one, but if you need to remove a bundled plugin, check Plugin loading strategies in Confluence.

**Enabling and Configuring Macros**

Macros allow you to perform programmatic functions within a page, and can be used for generating more complex content structures.

Generally speaking, a macro is simply a command wrapped inside curly braces {...}. To learn how to write your own macro, or use macros written by other people, read the Confluence Plugin Guide.

---

**Configuring a URL Whitelist**

This page contains instructions for how to use the URL whitelist features for Confluence gadgets.

---

**Using the Whitelist for External Gadgets**

By default, Confluence will block Gadget’s access to third-party data sources. When you are using gadget that draws content from a third-party data source, you will need to add the URL of that data source to the general gadgets whitelist.

To do this, click Confluence Admin > Configuration > External Gadgets.

The ‘External Gadgets’ configuration screen appears. Under ‘Gadget whitelist’, you can click Add URL to add a third party data source to the Confluence whitelist. Having done this, your gadget will be able to access the data source.

---

**Using the Whitelist for the RSS and HTML-include macros**

The RSS and HTML-include macros are used to include content dynamically from other websites onto a Confluence page. The included
content may possibly be malicious or harmful to your Confluence instance. Confluence administrators can set up a list of trusted URLs, thus limiting the locations from which the RSS macro and the HTML-include macro can draw their content. The form below allows you to define specific URLs and/or URL patterns which are trusted, or to allow inclusion from all URLs without restriction.

**To configure the URL whitelist:**

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select Configure Whitelist in the left-hand panel. The 'Configure Whitelist' screen will appear, as shown in the screenshot below.
3. Select one of the options as follows:
   - **Allow all domains** — There will be no restrictions to the content which can be included onto your Confluence pages.
   - **Restrict to listed domains** — Confluence will allow content from trusted URLs only. When you select this option, a textbox will open allowing you to enter specific URLs and/or URL patterns. Enter one or more URLs, each on its own line. You can enter the full URL, or use the pattern matching rules described below.
4. Click Save.

**Screenshot: Configuring a URL whitelist for RSS or HTML-Include macros**

### URL Pattern-Matching Rules

Enter one URL or URL pattern per line. You can enter a full URL or use pattern-matching as described below:

- If the rule starts with an equals sign (=), only the exact URL following the '=' will be allowed.
- If the rule starts with a slash (/) then the whole rule will be treated as a regular expression.
- Otherwise, any asterisk (*) will be treated as a wildcard to match one or more characters.

**Notes**

Some things to be aware of:

- By default, the RSS and HTML-include macros are disabled in Confluence. A System Administrator can enable them on the 'Plugins' screen of the Confluence Administration Console.
- A user who has the 'Confluence Administrator' permission, but not necessarily the 'System Administrator' permission, can configure the URL whitelist (for the HTML-include and RSS macros).

**What Happens to a Page Containing a Disallowed URL?**

A user can add the RSS Feed macro or the HTML-include macro to a Confluence page. The macro code includes a URL from which the content is drawn. When the page is displayed, Confluence will check the URL against the whitelist. If the URL is not allowed, Confluence will display an error message on the page.
The error message says that Confluence "could not access the content at the URL because it is not from an allowed source" and displays the offending URL. If the person viewing the page is a Confluence Administrator, they will also see a link to the Administration page where they can configure the URL whitelist.

Here is an example of the error message, including the link shown only to Confluence Administrators:

```
Could not access the content at the URL because it is not from an allowed source.
http://feathers.wordpress.com
Configure whitelist >>
```

Here is an example of the error message, but without the link.

```
Could not access the content at the URL because it is not from an allowed source.
http://feathers.wordpress.com
You may contact your site administrator and request that this URL be added to the list of allowed sources.
```

Related Topics

- Enabling HTML macros
- RSS Feed Macro
- HTML Include Macro

### Configuring the User List Macro

The User List macro has an optional Display Online parameter. If the User Listener plugin is configured to allow this feature, then the page author can select Display Online to show a list of all online users.

⚠️ You need to have System Administrator permissions in order to perform this function.

To enable the Display Online filter in the User List macro:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select Plugins in the left-hand panel. This will list the currently installed plugins.
3. Scroll down and click User Listener. The User Listener plugin panel will appear at the top of the screen.
4. Enable the User Log In Listener module by clicking Enable on its right.
5. Restart Confluence.

⚠️ The information on this page does not apply to Confluence OnDemand.

**List of online users can be misleading**

When the Display Online parameter is used, Confluence uses a context listener to generate the list of online users. A context listener is a J2EE term for something that listens for events in the application server. We listen for session open and close events, so a user is ‘online’ if they have a session on the application server. Some application servers don’t correctly despatch close events for sessions – in these cases, the list of online users may be misleading.

Screenshot: Enabling the User Log In Listener
Enabling HTML macros

The \{html\} macro allows you to use HTML code within a Confluence page.

The \{html-include\} macro allows you to include the contents of an HTML file in a Confluence page.

**CAUTION:** Including unknown HTML inside a webpage is dangerous. Because HTML can contain active scripting components, it would be possible for a malicious attacker to present a user of your site with script that their web browser would believe came from you. Such code could be used, for example, to steal a user's authentication cookie and give the attacker their Confluence login password.

By default, the HTML macros are disabled. You should only turn on these macros if you trust all your users not to attempt to exploit them.

You need to have System Administrator permissions in order to perform this function.

---

To enable the HTML macros,

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select 'Plugins' in the left-hand panel. This will display the installed plugins active for this Confluence installation. Click on 'Show System Plugins' to display bundled plugins.
3. Click 'HTML macros', then click 'Enable Plugin'.
4. Ensure that 'html (html)' module is enabled

---

**RELATED TOPICS**

- Page: Adding, Editing and Removing User Macros
- Page: Writing User Macros
- Page: Enabling HTML macros
- Page: Include Page Macro
- Page: Enabling the html-include Macro
Enabling the html-include Macro

The `{html-include}` macro allows you to include the content of an HTML file in a Confluence page. This page tells you how to enable the macro, so that it is available on your Confluence site. For help on using the macro, see HTML Include Macro.

⚠️ CAUTION: Including unknown HTML inside a web page is dangerous.

Because HTML can contain active scripting components, it would be possible for a malicious attacker to present a user of your site with script that their web browser would believe came from you. Such code could be used, for example, to steal a user's authentication cookie and give the attacker their Confluence login password.

⚠️ The information on this page does not apply to Confluence OnDemand.

Enabling the HTML Macros

By default, the HTML macros are disabled. You should only turn on these macros if you trust all your users not to attempt to exploit them.

ℹ️ You need to have System Administrator permissions in order to perform this function.

To enable the HTML macros,

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select 'Plugins' in the left-hand panel. This will display the installed plugins active for this Confluence installation.
3. Click 'HTML macros', then click 'Enable Plugin'.

To embed an external page,

Use the following syntax:

```
{html-include:url=http://www.example.com}
```

To include HTML inline,

Use the following syntax:

```
<html>
<b>I like cheese</b>
<html>
```

RELATED TOPICS

HTML Include Macro

Page: Adding, Editing and Removing User Macros

Page: Writing User Macros

Page: Enabling HTML macros

Page: Include Page Macro

Page: Enabling the html-include Macro
# Troubleshooting the Gallery Macro

**Gallery Macro**

The full list of parameters is shown in the following table.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gallery Title</td>
<td>Nothing</td>
<td>Specify a title for your gallery.</td>
</tr>
<tr>
<td>Number of Columns</td>
<td>4</td>
<td>Specify the number of columns for your table.</td>
</tr>
<tr>
<td>Images to Exclude</td>
<td>No exclusions i.e. include all the pictures on the page.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>The gallery will ignore any pictures specified. You can specify more</td>
</tr>
<tr>
<td></td>
<td></td>
<td>than one picture, separated by commas. Please note, the filename and filetype</td>
</tr>
<tr>
<td></td>
<td></td>
<td>for this parameter are case-sensitive, i.e. 'my picture.PNG' will not be</td>
</tr>
<tr>
<td></td>
<td></td>
<td>recognised as 'my picture.png'.</td>
</tr>
<tr>
<td>Include these Images Only</td>
<td></td>
<td>If you specifically include one or more pictures, the gallery will show</td>
</tr>
<tr>
<td></td>
<td></td>
<td>only those pictures. You can specify more than one picture, separated by</td>
</tr>
<tr>
<td></td>
<td></td>
<td>commas. Please note, the filename and filetype for this parameter are</td>
</tr>
<tr>
<td></td>
<td></td>
<td>case-sensitive, i.e. 'my picture.PNG' will not be recognised as 'my</td>
</tr>
<tr>
<td></td>
<td></td>
<td>picture.png'.</td>
</tr>
<tr>
<td>Use Images in these Pages</td>
<td></td>
<td>Specify the title of the page which contains the images you want displayed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To specify a page in a different space, use the SPACEKEY:Page Title syntax.</td>
</tr>
<tr>
<td>Sort Images By</td>
<td>None, i.e. the sort order is unspecified and therefore unpredictable.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Specify an attribute to sort the images by. Sort order is ascending,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>unless you select the Reverse Sort parameter (see below). Options are:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- name – file name.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- comment – comment linked to the attached file.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- date – date/time last modified.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- size – size of the attached file.</td>
</tr>
<tr>
<td>Reverse Sort</td>
<td>Off, i.e. sort order is ascending</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Used in conjunction with the Sort Images By parameter above. Use Reverse</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sort to reverse the sort order, from ascending to descending.</td>
</tr>
</tbody>
</table>

If the name of an attached file or page contains a comma, you can refer to it in the relevant parameters above by enclosing it in single or double quotes, for example "this,that.jpg", theother.png.

For more information, refer to [Gallery Macro](#).

⚠️ The information on this page does not apply to Confluence OnDemand.

## Troubleshooting

If you encounter the following error message: System does not support thumbnails: no JDK image support then ensure that you have following system property available for your JVM:

```java
JAVA_OPTS=-Djava.awt.headless=true
```
Adding, Editing and Removing User Macros

User macros are short pieces of code that perform an often-used function or add some custom formatting to a page. People can call the macro into action by adding the macro keyword to their Confluence pages. You can write a 'user macro' by adding code on a screen in the Confluence Administration Console.

Notes:

- You need System Administrator permissions in order to perform this function.
- See Shared User Macros for a list of community-donated macros.
- Be careful when installing user macros from unknown authors.
- If you remove a user macro that is in use on Confluence pages, you will need to remove the macro from the pages manually. When you remove the user macro, the usage of the macro on the page will become invalid. Hint: Use the Confluence search to find all occurrences of the macro on pages and blog posts.

The information on this page does not apply to Confluence OnDemand.

To add a user macro:

1. Go to the Confluence 'Administration Console':
   
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Click User Macros in the left-hand panel.
3. Click Create a User Macro at the top of the list of macros.
4. Enter the macro details as explained in the guide to writing user macros.
5. Click Add.

To edit a user macro:

1. Go to the Confluence 'Administration Console':

   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select User Macros in the left-hand panel. This will list the currently configured user macros.
3. Click Edit next to the relevant macro.
4. Update the macro details as explained in the guide to writing user macros.
5. Click Save.

To remove a user macro:

1. Go to the Confluence 'Administration Console':

   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select User Macros in the left-hand panel. This will list the currently configured user macros.
3. Click Remove next to the relevant macro.

Related Topics:

Page: Writing Macros
Page: Shared User Macros
Page: Adding, Editing and Removing User Macros

Page: Writing User Macros
Page: Enabling HTML macros
Page: Include Page Macro
Page: Enabling the html-include Macro
Writing User Macros

User macros are short pieces of code that perform an often-used function or add some custom formatting to a page. People can add the macro to a page by choosing it from the Macro Browser when editing a Confluence page. The macro is run when the page is loaded by the browser. You can write a user macro by adding code on a screen in the Confluence Administration Console.

You need to have System Administrator permissions in order to create user macros.

Do you need a plugin instead?

If you want to distribute your user macro as a plugin, please refer to the developer's guide to the User Macro plugin module. If you want to create more complex, programmatic macros in Confluence, you may need to write a Macro plugin.

Creating a User Macro

To create a user macro:

1. Go to the Confluence Administration Console and click User Macros in the left-hand panel.
2. Click Create a User Macro.
3. Supply the information in the input fields as explained below, then click Add.

The sections below tell you about each of the input fields.

**Macro Name**

Enter the text that people will see when looking for the macro in the Macro Browser.

**Visibility**

Set the visibility options to specify who can see this macro when they are searching using the Macro Browser or Autocomplete.

User macros must have parameters defined in order to appear in the Confluence 4.0 Macro Browser.

<table>
<thead>
<tr>
<th>Visibility Option</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visible to all users</td>
<td>All users will see this macro when searching for a macro using the Macro Browser or Autocomplete.</td>
</tr>
</tbody>
</table>
Visible only to system administrators

Choose this option if you want the macro to be ‘hidden’ from most users when the users are looking for a macro to add to a page. Note that this does not completely hide the macro. Instead, it is useful if you want to avoid cluttering the Macro Browser and Autocomplete with unnecessary macros. Specifically, if you are:

- **Editing a page and inserting a macro using the Macro Browser**: Only system administrators will see this macro in the Macro Browser. For other users, the macro will not show up in the Macro Browser when the user searches for a macro to add to a page.
- **Editing a page and inserting a macro using Autocomplete**: Only system administrators will see this macro in Autocomplete. For other users, the macro will not show up in the Autocomplete list when the user searches for a macro to add to a page.
- **Viewing the page**: The macro output will be visible to all users who have permission to see the page.
- **Editing a page that already contains the macro**: Provided a user has permission to edit the page, the macro will be visible to all users when editing the page, and all users who have permission to edit the page will also be able to edit or remove the macro.

Please note that all the macro information will also be discoverable, including the macro title, description, parameter names and other metadata. Do not include confidential data anywhere in the definition of a user macro, even if it is marked as visible only to system administrators.

---

### Macro Title

Enter the text that should appear in the Macro Browser and in Autocomplete, to identify this macro when people are looking for it to insert onto a page.

### Description

Enter the text that should appear in the Macro Browser describing this macro. Note that the Macro Browser's search will pick up matches in the description as well as in the title.

### Categories

Select one or more categories for your macro. To select more than one category, hold down the 'Ctrl' key while selecting. These are the categories that appear in the Macro Browser, helping users to choose a macro from a logical set.

### Icon URL

If you would like the Macro Browser to display an icon for your macro, enter the URL here. You can enter an absolute URL or a path relative to the Confluence base URL. For example:

- **Absolute URL**:
  ```
  http://mysite.com/mypath/status.png
  ```

- **Relative URL**:
  ```
  /images/icons/macrobrowser/status.png
  ```

### Documentation URL

Enter the URL pointing to the online help or other documentation for your macro.

### Macro Body Processing

Specify how you want Confluence to process the body of your macro before passing it to your macro. Below is an explanation of the macro body and the options available.

#### What is the macro body?

The macro body is the content that is displayed on the wiki page. If the macro allows a body, users will be able to enter body content when configuring the macro in the Macro Browser.

#### How can I use the macro body?

If you specify that your macro has a body, you will be able to pass text to the macro when you invoke it from within a page.

If your macro has a body, any body content that the user enters will be available to the macro in the $body variable. See the section about the template below. In addition, the options below allow you to tell Confluence to pre-process the body before it is placed in the macro output.
## What are the options for macro body?

<table>
<thead>
<tr>
<th>Body Processing Option</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>No macro body</td>
<td>Select this option if your macro does not need a body.</td>
</tr>
<tr>
<td>Escaped</td>
<td>If your macro has a body, and you make use of the body as $body in your template, Confluence will add escape characters to the HTML markup in the macro body. You could use this if you want to show the HTML markup in the rendered page. For example, if the body is:</td>
</tr>
<tr>
<td></td>
<td><code>&lt;b&gt;Hello World&lt;/b&gt;</code></td>
</tr>
<tr>
<td></td>
<td>Then value of $body will be:</td>
</tr>
<tr>
<td></td>
<td><code>&amp;lt;b&amp;gt;Hello World&amp;lt;/b&amp;gt;</code></td>
</tr>
<tr>
<td></td>
<td>This will render as:</td>
</tr>
<tr>
<td></td>
<td><code>&lt;b&gt;Hello World&lt;/b&gt;</code></td>
</tr>
<tr>
<td>Unrendered</td>
<td>If your macro has a body, and you make use of the body as $body in your template, HTML in the body will be processed within the template before being output. Ensure that HTML is ultimately output by the template.</td>
</tr>
<tr>
<td>Rendered</td>
<td>If your macro has a body, and you make use of the body as $body in your template, Confluence will recognise HTML in the macro body. For example, if the body is:</td>
</tr>
<tr>
<td></td>
<td><code>&lt;b&gt;Hello World&lt;/b&gt;</code></td>
</tr>
<tr>
<td></td>
<td>Then value of $body will be:</td>
</tr>
<tr>
<td></td>
<td><code>&lt;b&gt;Hello World&lt;/b&gt;</code></td>
</tr>
<tr>
<td></td>
<td>This will render as:</td>
</tr>
<tr>
<td></td>
<td>Hello World</td>
</tr>
</tbody>
</table>

### Template

Enter XHTML code to specify what the macro will do.

For example, to add a macro inside the macro you are writing, you would write:

```
<ac:macro ac:name="someOtherMacro" />
```

### Quick guide

- Use XHTML in the macro template.
- You can use the Velocity templating language. Here is more information on the [Velocity project](#).
- If your macro has a body, your template can refer to the macro body text by specifying `$body`.
- Each parameter variable you use must have a matching metadata definition. Use `@param` to define metadata for your macro.
parameters.
  • When using the information passed using parameters, refer to your parameters as $paramXXX where 'XXX' is the parameter name that you specified in the @param metadata definition.
  • Use @noparams if your macro does not accept parameters. Note that this will prevent your macro appearing in the macro browser.

See our detailed guide to writing a user macro template.

Examples and Best Practices

See:
  • Examples of User Macros
  • Best Practices for Writing User Macros

Related Topics

Developer documentation:
  • User Macro Module
  • Macro Module
  • Confluence Plugin Guide

Library of user-contributed user macros
  • Shared User Macros

⚠️ Be careful when installing user macros. Ideally use only macros from authors and sources that are well known to you.

Best Practices for Writing User Macros

This section contains tips and suggestions for best practice in macro coding. To see how to write a user macro and add it to your Confluence site, take a look at our guide to writing user macros.

⚠️ The information on this page does not apply to Confluence OnDemand.

Add a Descriptive Header to your Macro Template

We recommend that you include a short description of your macro via comments at the top of the Template field as shown below. You can see an excellent example in the 'Image rollover' user macro.

```markdown
## Macro title: My macro name
## Macro has a body: Y or N
## Body processing: Selected body processing option
## Output: Selected output option
##
## Developed by: My Name
## Date created: dd/mm/yyyy
## Installed by: My Name
##
## Short description of what the macro does
```

Expose your Parameters in the Macro Browser

Confluence offers great options for making your macro look good in the macro browser. You can specify the macro category, link to an icon, define the parameters that the macro browser will use to prompt the user for information, and more.

In particular, read the documentation on defining the macro parameters to be displayed in the macro browser.

Supply Default Values for Macro Parameters

You cannot guarantee that a user will supply parameters, so one of the first things to do in the macro is check that you have received some value if you expect to rely on it later on in the macro code.

In the example below, the macro expects three parameters. It substitutes sensible defaults if they are not supplied:
Related Topics

Writing User Macros

Examples of User Macros

Below are some sample user macros. To see how to write a user macro and add it to your Confluence site, take a look at our guide to writing user macros.

On this page:
- Simple Examples of User Macros
- User-Contributed User Macros

⚠️ The information on this page does not apply to Confluence OnDemand.

Simple Examples of User Macros

We provide these user macros as simple examples just to get you started. You would not want to install these user macros onto your Confluence site.

Example 1: User Macro to Display 'Hello World'

Take a look at an example of a 'Hello World' macro.

Example 2: The 'Error' User Macro to Create a Red Box

Let's write a simple macro that creates a red box (using an existing Confluence style) around some text. This may be useful for writing about error conditions, for example. That is why we give this macro the name 'error'.

To create the 'Error' user macro:

1. Go to the 'Confluence Administration Console' and click User Macros in the left-hand panel.
2. Click Create a User Macro at the top of the list of macros.
3. Enter the macro attributes as follows:
   - Macro Name: error
   - Visibility: Visible to all users in the Macro Browser
   - Macro Title: Error
   - Description: Displays a red box around some text
   - Categories: Confluence Content
   - Icon URL: You can leave this field empty.
   - Documentation URL: You can leave this field empty.
   - Macro Body Processing: Rendered
   - Template:

   ```html
   <div class="error">$body</div>
   ```
4. Click Add.

To use the macro within a page, use the Macro Browser. Your page will display an error box, like this:

![This is bad]

**Example 3: User Macro to Demonstrate the Use of Parameters**

This example demonstrates how you can pass parameters into your macro. Let's say you want to write your own font colour macro:

```html
<span style="color: $param0">$body</span>
```

The usage of this macro will be:

```
[colour:green]Some example text(colour)
```

The output will be:

**Some example text**

If your macro requires more than one parameter, you can use variables $param0 to $param9 to represent them. To specify multiple parameters, use:

```
[colour:red|blue|green]
```

Where red, blue and green are the 1st, 2nd and 3rd parameters respectively.

Alternatively, you can also use explicitly named parameters in your macro. These macro parameters will appear as variables with the name $param<x> where <x> is the name of your parameter. To specify named parameters, use:

```
{style:colour=red}
```

In your user macro you can then use $paramcolour which will have the value red in this case.

**User-Contributed User Macros**

You may want to take a look at the library of user-contributed user macros.

Be careful when installing user macros from unknown authors.

**Hello World Example of User Macro**

This page tells you how to create a user macro that displays the text 'Hello World!' and any variable text you place between the macro tags.

(For full details about creating a user macro, see the guide to **writing user macros**.)

⚠️ The information on this page does not apply to Confluence OnDemand.

**Defining the 'Hello World' User Macro**

To create the 'Hello World' user macro:

1. Go to the 'Confluence Administration Console' and click User Macros in the left-hand panel.
2. Click Create a User Macro at the top of the list of macros.
3. Enter the macro attributes as follows:
   - **Macro Name**: helloworld
   - **Visibility**: Visible to all users in the Macro Browser
   - **Macro Title**: Hello World
   - **Description**: Displays "Hello World" and the macro body.
   - **Categories**: Confluence Content
   - **Icon URL**: You can leave this field empty.
   - **Documentation URL**: You can leave this field empty.
   - **Macro Body Processing**: Rendered
   - **Template**: 

---

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Using the 'Hello World' Macro on a Page

Now you can add the macro to your Confluence page using the Macro Browser:
The result is:

![Testing the Hello World macro](image)

Added by Administrator, last edited by Administrator on Sep 28, 2010

Hello World! What a beautiful day.

Add Labels

Add Comment

Related Topics

Writing User Macros

NoPrint Example of a User Macro

This page gives an example of a user macro, the 'NoPrint' macro, that you can use to prevent text from being printed. (For full details about creating a user macro, see the guide to writing user macros.)

⚠️ The information on this page does not apply to Confluence OnDemand.

Defining the 'NoPrint' User Macro

To create the 'NoPrint' user macro:

1. Go to the 'Confluence Administration Console' and click User Macros in the left-hand panel.
2. Click Create a User Macro at the top of the list of macros.
3. Enter the macro attributes as follows:
   - Macro Name: noprint
   - Visibility: Visible to all users in the Macro Browser
   - Macro Title: NoPrint
   - Description: Hides text from printed output.
   - Categories: Confluence Content
   - Icon URL: You can leave this field empty.
   - Documentation URL: You can leave this field empty.
   - Macro Body Processing: Rendered
   - Template:
Using the 'NoPrint' Macro on a Page

Now you can add the macro to your Confluence page using the Macro Browser. Text entered into the body of the macro placeholder will not be printed.

Making PDF Export Recognise the NoPrint Macro

See Advanced PDF Export Customisations#noprint.

Related Topics

Writing User Macros

Guide to User Macro Templates

You write a user macro in a screen in the Confluence Administration Console. The 'template' is one of the fields that you define when writing a user macro. (See the rest of the guide to writing user macros.) This page gives you guidelines about the code you can enter in a user macro template.

Quick guide to user macro templates

- Use XHTML in the macro template.
- You can use the Velocity templating language. Here is more information on the Velocity project.
- If your macro has a body, your template can refer to the macro body text by specifying `$body`.
- Each parameter variable you use must have a matching metadata definition. Use @param to define metadata for your macro parameters.
- When using the information passed using parameters, refer to your parameters as $paramXXX where 'XXX' is the parameter name that you specified in the @param metadata definition.
- Use @noparams if your macro does not accept parameters. Note that this will prevent your macro appearing in the macro browser.

On this page:

- Accessing your Macro’s Body
- Using Parameters in your User Macro
- Objects Available to your Macro
- Controlling Parameter Appearance in the Editor Placeholder
- Related Topics

The information on this page does not apply to Confluence OnDemand.

Accessing your Macro’s Body

Use the $body object within your user macro template to access the content passed to your macro in the macro body.

The $body object is available if you have specified that your macro has a body (in other words, if you have not selected No macro body).

Example: Let’s assume your macro is called helloworld. Enter the following code in your template:
Hello World: $body

A user, when editing a Confluence page, chooses your macro in the Macro Browser and then enters the following in the macro placeholder that is displayed in the edit view:

From Matthew

The wiki page will display the following:

| Hello World: From Matthew |

**Using Parameters in your User Macro**

You can specify parameters for your macro, so that users can pass it information to determine its behaviour on a Confluence page.

**How your Macro's Parameters are Used on a Confluence Page**

When adding a macro to a Confluence page, the Macro Browser will display an input field for each of your macro's parameters. The field type is determined by the parameter type you specify for each parameter.

**Defining the Parameters**

Briefly, a parameter definition in the template contains:

- `@param`
- The parameter name
- A number of attributes (optional)

**Format:**

```plaintext
## @param MYNAME:title=MY TITLE|type=MY TYPE|desc=MY DESCRIPTION|required=true|multiple=true|default=MY DEFAULT VALUE
```

**Additional notes:**

- The order of the parameters in the template determines the order in which the Macro Browser displays the parameters.
- We recommend that you define the parameters at the top of the template.
- There may be additional attributes, depending on the parameter type you specify.

The sections below describe each of the attributes in detail.

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Description</th>
<th>Required / Recommended / Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>(an unnamed, first attribute)</td>
<td>A unique name for the parameter. The parameter name is the first attribute in the list. The name attribute itself does not have a name. See the section on name below.</td>
<td>Required</td>
</tr>
<tr>
<td>title</td>
<td>The parameter title will appear in the Macro Browser. If you do not specify a title, Confluence will use the parameter name.</td>
<td>Recommended</td>
</tr>
<tr>
<td>type</td>
<td>The field type for the parameter. See the section on type below.</td>
<td>Recommended</td>
</tr>
<tr>
<td>desc</td>
<td>The parameter description will appear in the Macro Browser.</td>
<td>Optional</td>
</tr>
<tr>
<td>required</td>
<td>Specifies whether the user must enter information for this parameter. Defaults to 'false'.</td>
<td>Optional</td>
</tr>
<tr>
<td>multiple</td>
<td>Specifies whether the parameter accepts multiple values. Defaults to 'false'.</td>
<td>Optional</td>
</tr>
<tr>
<td>default</td>
<td>The default value for the parameter.</td>
<td>Optional</td>
</tr>
</tbody>
</table>
**Parameter Name**

The parameter name is the first attribute in the list. The name attribute itself does not have a name.

**Example:** The following code defines 2 parameters, named 'foo' and 'bar':

```yaml
## @param foo
## @param bar
```

**Parameter Type**

The field type for the parameter. If you do not specify a type, the default is `string`.

<table>
<thead>
<tr>
<th>Parameter Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>boolean</td>
<td>Displays a checkbox to the user and passes the value 'true' or 'false' to the macro as a string.</td>
</tr>
<tr>
<td>enum</td>
<td>Offers a list of values for selection. You can specify the values to appear in a dropdown in the Macro Browser. Example of specifying the enum values:</td>
</tr>
</tbody>
</table>
|                  | ```yaml
## @param colour:title=Colour|type=enum|enumValues=Grey,Red,Yellow,Green
```                                                                                                                                 |

*Note about i18n: Confluence does not support internationalisation of the enum values. The value the user sees is the one passed to the macro as the parameter value, with the capitalisation given. In this case ‘Grey’, ‘Red’, etc.*

| string           | A text field. This is the default type. Example with a required field:                                                                         |
|                  | ```yaml
## @param status:title=Status|type=string|required=true|desc=Status to display
```                                                                                                                                 |

| confluence-content | Offers a control allowing the user to search for a page or blog post. Example:                                                                      |
|                   | ```yaml
## @param page:title=Page|type=confluence-content|required=true|desc=Select a page do use
```                                                                                                                                            |

| username          | Search for user.                                                                                                                            |
|                  | ```yaml
## @param user:title=Username|type=username|desc=Select username to display
```                                                                                                                                 |

| spacekey          | Offers a list of spaces for selection. Passes the space key to the macro. Example:                                                            |
|                  | ```yaml
## @param space:title=Space|type=spacekey
```                                                                                                                                 |

| date              | Confluence accepts this type, but currently treats it in the same way as 'string'. Example:                                                      |
|                  | ```yaml
## @param fromDate:title=From Date|type=date|desc=Date to start from. Format: dd/mm/YYYY
```                                                                                                                                           |

*Note about dates:* A user can enter a date in any format, you should validate the date format in your user macro.
Using the Parameters in your Macro Code

The parameters are available in your template as $paramfoo, $parambar for parameters named "foo" and "bar".

Normally, a parameter like $paramfoo that is missing will appear as '$paramfoo' in the output. To display nothing when a parameter is not set, use an exclamation mark after the dollar sign like this: $!paramfoo

Using No Parameters

If your macro does not accept parameters, you should use @noparams in your template. That will let Confluence know that it need not display a parameter input field in the Macro Browser.

If the user macro contains no parameters and does not specify @noparams, then the Macro Browser will display a free-format text box allowing users to enter undefined parameters. This can be confusing, especially if the macro does not accept parameters.

Example: Add the following line at the top of your template:

```
## @noparams
```

Objects Available to your Macro

Including the macro body and parameters, the following Confluence objects are available to the macro:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Class Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>$body</td>
<td>The body of the macro (if the macro has a body)</td>
<td>String</td>
</tr>
<tr>
<td>$paramfoo, $parambar, ... $param&lt;name&gt;</td>
<td>Named parameters (&quot;foo&quot;, &quot;bar&quot;) passed to your macro.</td>
<td>String</td>
</tr>
<tr>
<td>$config</td>
<td>The BootstrapManager object, useful for retrieving Confluence properties.</td>
<td>BootstrapManager</td>
</tr>
<tr>
<td>$renderContext</td>
<td>The PageContext object, useful for (among other things) checking $renderContext.outputType</td>
<td>PageContext</td>
</tr>
<tr>
<td>$space</td>
<td>The Space object that this content object (page, blog post, etc) is located in (if relevant).</td>
<td>Space</td>
</tr>
<tr>
<td>$content</td>
<td>The current ContentEntity object that this macro is a included in (if available).</td>
<td>ContentEntityObject</td>
</tr>
</tbody>
</table>

Macros can also access objects available in the default Velocity context, as described in the developer documentation.

Controlling Parameter Appearance in the Editor Placeholder

A macro developer (or author of a user macro) can control which fields of the macro should appear in the placeholder in the Confluence Editor.

Plugin Macro Metadata
The macro metadata for a plugin macro now has parameter options as shown in the following example:

```
<macro name="panel" documentation-url="help.panel.macro">
  <category name="formatting"/>
  <parameters>
    <parameter name="title" type="string">
      <option key="showNameInPlaceholder" value="false"/>
      <option key="showValueInPlaceholder" value="true"/>
    </parameter>
    <parameter name="borderStyle" type="string"/>
    <parameter name="borderColor" type="color"/>
  </parameters>
</macro>
```

The option `showNameInPlaceholder` specifies that in the above example the 'title' parameters name should not be shown.

The option `showValueInPlaceholder` specifies that the user entered value for this parameter should be shown.

So, for the above example, the macro placeholder could show something like 'panel | my panel title'.
If `showNameInPlaceholder` was true instead of false it would show something like 'panel | title = my panel title'.

If a macro has neither option on any of it's parameters then the default behaviour is to show all parameters: full title and value. If one or more parameters has either option set then all parameters without the options set will default to false (i.e. will not be shown).

User Macro Metadata

The behaviour for a user macro is as described above, however the method of configuration is within the `@param` entry in the template. So, the example from above would look something like:

```
## @param title|type=string|option-showNameInPlaceholder=false|option-showValueInPlaceholder=true
```

**Related Topics**

- Writing User Macros
- Examples of User Macros

**Configuring the Office Connector**

The Office Connector is a Confluence plugin that allows Confluence users to interact with Microsoft Office and Open Office in various ways. You can display content from Office documents on a wiki page and import content from an Office document into Confluence. Please refer to the User Guide for details of these interactions.

A System Administrator can enable or disable parts of the Office Connector and can configure options as described below.

**On this page:**
- Enabling and Disabling the Office Connector and its Modules
- Configuring the Office Connector Options
- Related Topics

⚠️ *The information on this page does not apply to Confluence OnDemand.*

**Enabling and Disabling the Office Connector and its Modules**

The Office Connector is bundled with Confluence 2.10 and later, so you should not need to install it. But you may wish to enable or disable some of its modules.

A System Administrator can install, enable or disable plugins and plugin modules. You can read a general overview in Installing Plugins and Macros.

To enable or disable the Office Connector and its modules:

1. Select **Plugins**, under 'Configuration' in the left-hand panel of the Confluence Administration Console.
2. Click **Show system plugins** under 'System Plugins'.
3. Search the page for **Office Connector plugin** and select the link.
4. The 'Office Connector plugin' panel will appear near the top centre of the page, as shown in the screenshot below.
5. Now you can do one of the following:
   - **Configure plugin** – This will take you to the separate plugin configuration screen described below.
   - **Disable plugin** – Click this link if you want to disable all modules of the plugin, but leave the plugin installed on your Confluence site.
   - **Uninstall plugin** – Click this link if you want to remove the Office Connector permanently from your Confluence site. To restore it at a later date, you will need to re-install it from the Confluence Plugin Repository.
- Manage plugin modules – You can also enable or disable one or more of the Office Connector modules, as described in the table below.

Screenshot: Enabling the Office Connector plugin and its modules

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OC Settings Manager</td>
<td>Component to read and write persistent settings for the Office Connector.</td>
</tr>
<tr>
<td>Slide Cache Manager</td>
<td>Component to cache slide-based conversions when displaying PowerPoint and PDF documents.</td>
</tr>
<tr>
<td>Html Cache Manager</td>
<td>Component to cache HTML-based conversions when displaying Word and Excel documents.</td>
</tr>
<tr>
<td>File Cache Cleanup Job</td>
<td>This module is a recurring task that cleans up the Office Connector file cache.</td>
</tr>
<tr>
<td>File Cache Cleanup Job</td>
<td>This module is the trigger for the File Cache Cleanup Job.</td>
</tr>
<tr>
<td>Office Connector administration link</td>
<td>This module supplies the 'Office Connector Configuration' link in the left-hand panel of the Confluence Administration Console. The link gives access to the plugin configuration screen described below.</td>
</tr>
<tr>
<td>Link for previewing a search result</td>
<td>This module supplies the 'View' link which appears next to attachments displayed in search results, where the attachment is an Office document.</td>
</tr>
</tbody>
</table>
### Link for previewing an attachment

This module supplies the 'View' link which appears next to attachments displayed on the 'Attachments' view of a page, where the attachment is an Office document.

### viewfile

This module supplies the {viewfile} macro. See [View File Macro](#).

### viewdoc

This module supplies the Word document component of the {viewfile} macro.

### viewxls

This module supplies the Excel document component of the {viewfile} macro.

### viewppt

This module supplies the PowerPoint document component of the {viewfile} macro.

### viewpdf

This module supplies the PDF document component of the {viewfile} macro.

### editgrid

This module is used to migrate editgrid users to the Office Connector.

### Import Word UI on page tabs

This module supplies a ‘Doc Import’ tab which appears in older versions of Confluence, next to the 'View', 'Edit', 'Attachments' and 'Info' tabs. Not relevant to Confluence 2.10 or later, except for custom themes.

### Import Word UI on drop down menu

This module supplies the 'Doc Import' link which appears in the Confluence 'Tools' dropdown menu.

### Edit in Office javascript resource

This module contains the javascript resources for launching the desktop applications for editing Office documents.

### Office Connector Servlet

This module allows Confluence users to edit their Confluence pages in Microsoft Word. It performs the conversion to and from Word.

### Office Authenticator Filter

This module authenticates HTTP requests from Office applications.

### PPT slide web service

This module allows Confluence users to view a PowerPoint presentation on a wiki page. It provides the slide images to the Flash control which displays the slides on the wiki page.

### DOC and XLS image cache web service

This module is required if Confluence users want to view a Word document or an Excel spreadsheet on a wiki page. It allows images to be stored in a cache on the server, so that they can be retrieved when the browser renders the HTML page.

### Office Connector Actions

This module must be enabled if the Office Connector is used.

---

### Configuring the Office Connector Options

A Confluence administrator can set the options described below, to determine the behaviour of the Office Connector on your Confluence site.

#### To set the configuration options for the Office Connector:

1. Select **Office Connector** under "Configuration" in the left-hand panel of the 'Confluence Administration Console'. The 'Configure Office Connector plugin' screen will appear.
2. Set the configuration options as described in the table below.

![Screenshot: Configuring the Office Connector options](#)
The configuration options are described in the table below:

<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warnings: Show a warning before allowing a</td>
<td>Disabled</td>
<td>If this option is enabled, the user will receive a warning when importing a Word document. The warning will they are about to overwrite existing content.</td>
</tr>
<tr>
<td>user to perform an import</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced Formatting Options: Use the footnote</td>
<td>Disabled</td>
<td>If this option is enabled, a Confluence page created from an imported Word document will use the [footnote Adaptavist to render any footnotes contained in the document. Note that you will need to install the Footnotes plugin for more information about this plugin and macro, please refer to the Footnotes plugin.</td>
</tr>
<tr>
<td>macro for Word footnotes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Authentication: Allow authentication tokens</td>
<td>Disabled</td>
<td>If this option is enabled, the Office Connector will use authentication tokens in the URL.</td>
</tr>
</tbody>
</table>
### Temporary storage for viewfile macro

The (viewfile) macro will cache data temporarily. This option allows you to set the location of the cache. Available settings are:

- **Confluence home directory** – The temporary file will be stored in your Confluence Home directory.
- **A directory specified in the directories.properties file** – You can specify a location by editing the Office Connector's directories.properties file:
  1. Go to the bundled-plugins directory in your Confluence Home directory.
  2. Copy the Office Connector JAR file to a temporary location: `OfficeConnector-x.xx.jar` version number.
  3. Unzip the JAR file and find the directories.properties file in the `resources` directory. The content of the `directories.properties` file looks like this:

   ```
   #Complete the following line to set a custom cache directory.
   #If resetting to blank, don't delete anything before or including the '='
   com.benryan.confluence.word.edit.cacheDir=
   
   # On Windows:
   com.benryan.confluence.word.edit.cacheDir=c:\my\path\
   
   # On Linux:
   com.benryan.confluence.word.edit.cacheDir=/home/myusername/
   
   5. Save the file, recreate the JAR and put it in the bundled-plugins directory in your Confluence Home directory, overwriting the original JAR.

- **Cache in-memory** – The temporary file will be held in memory. We recommend this option if you are running in a clustered environment.

### Maximum file space for cache (MB)

500

This is the maximum size of the cache used by the (viewfile) macro. (See above.)

### Number of Conversion Queues

6

This is the maximum number of threads used to convert PowerPoint or PDF slide shows. You can use this to Confluence performance, by limiting the number of threads so that the Office Connector does not consume too many resources.

**Click Manage Queues to view attachments that are still pending conversion.**

### Related Topics

- Office Connector Prerequisites
- Office Connector Limitations and Known Issues
- Working with the Office Connector
- Installing Plugins and Macros

### Operating Large or Mission-Critical Confluence Installations

This page gives guidelines for operational management teams who are responsible for a large Confluence installation, or for a Confluence installation which is crucial to the business of their organisation.

### Introduction to this Page

#### Motivation for Presenting these Guidelines

Most Confluence installations start off small. Ten people in an early-adoption department use it for a couple of weeks. Everything works well and the good news starts spreading. Adoption increases throughout the organisation. More and more people use the wiki, and more and more rely on Confluence being up and running. After a while even the CEO starts blogging. And then a system outage occurs.

Now what?

Wikis like Confluence often grow into mission-critical applications within just a few months. Often adoption is so fast that IT departments haven’t had the time to scale up their support.
We have assembled some requirements to help you make sure that your installation of Confluence can be mission critical. There are no surprises to be found here — all of the requirements would apply to any other piece of software that is mission critical within your organisation.

Who should Read these Guidelines?

The guidelines do not apply to you if you are using Confluence with just a few dozen users, and no one really minds if Confluence is down for a couple of hours because your database has crashed.

But if any one of the following applies to you, then these guidelines are a must read for you!

- The wiki has become your organisation's documentation base.
- Your users can't work properly when Confluence is down.
- Your boss or customer threatens to terminate your contract if you don't meet a strict service level agreement (SLA), such as 99.9% availability.

On this page:

- Motivation for Presenting these Guidelines
- Who should Read these Guidelines?
- Dedicated Hardware for Confluence
- Dedicated Qualified Staff
- Constant Monitoring of Production Systems
- Adherence to Strict Upgrade Procedures
- Testing of Upgrades before Production Implementation
- Enforcing Security Guidelines
- Load-Testing Environments
- Tuning
- Related Topics

The information on this page does not apply to Confluence OnDemand.

Requirements of Large or Mission-Critical Confluence Installations

Dedicated Hardware for Confluence

In a small work group with a few dozen or even hundreds of users, your Confluence installation can happily share the CPUs, memory and disks with other low-profile applications and a database.

But with thousands or even tens of thousands of users, you need dedicated hardware that runs Confluence and nothing else, and it needs to be fast hardware with plenty of RAM. While you can run Confluence in a virtualised environment such as VMware, we suggest you don't do it for mission-critical or high-load installations unless you are a real expert in virtualisation. Otherwise your other VMs might have performance problems which propagate to Confluence.

If you experience database-related problems, you should consider moving the Confluence database to a dedicated machine. Confluence itself can run queries that impact the performance of other applications, and other application problems or scheduled tasks can have an adverse affect on the usability of Confluence.

Dedicated Qualified Staff

If your Confluence installation is mission critical and your service level agreements require 24/7 up time, you need to be able to pinpoint problems quickly. You need qualified staff, dedicated to looking after Confluence, who are available during business hours and possibly beyond.

If you require assistance from the Atlassian Support team, you may need to answer some pretty technical questions to help us diagnose what is going on in your systems. Also keep in mind that Atlassian support assists you in finding problems in Confluence, but we can't help you administer your systems.

In particular, we recommend that you have dedicated staff in the roles listed below.

Operations Team with General Administrators

If your organisation relies on Confluence being up and running around the clock with very little downtime, you need people who can set up, maintain, tune and improve your Confluence installation. This requires at least one person, but ideally you will have a team of operational engineers.

If your wiki is mission critical, chances are that other IT systems within your organisation have already made it necessary to have such an operations team. So you will probably not need to hire someone specifically to administrate Confluence. But it is vital that supporting and maintaining Confluence is added to the list of responsibilities of that operations teams, and that you can get them to troubleshoot and analyse...
Confluence at short notice.

If problems arise and you need to contact Atlassian Support, these engineers will be our first point of contact. We may ask them to provide details of log files, application-server settings, monitoring systems, and so on.

**Network Staff**

If Confluence is mission critical for large numbers of users, it is vital that you have dedicated network staff available to track down problems when they arise.

A mission-critical installation will usually be used by hundreds or even thousands of users, and you don’t want to keep them waiting because a network card breaks, or because someone has made an undocumented change to the network and you don’t have an expert around who can figure it out.

Again, this only applies to mission-critical systems. If you use Confluence for less critical collaboration and knowledge sharing, and a broken network cable causing a day’s downtime is no major catastrophe, then you will not need dedicated networking staff.

**Database Staff**

If Confluence is mission critical for a large number of users, you need an experienced database administrator (DBA) available to troubleshoot database performance issues and other potential problems. It is dangerous not to have an experienced full-time DBA at hand at short notice when running a mission critical application. While small installations of Confluence basically work 'out of the box', any system that involves high load or high-availability requirements needs continual monitoring, optimising and fine tuning of the Confluence database. Database monitoring is no trivial task — it's not something that anyone can learn quickly.

**Developers**

You may have decided to customise Confluence by changing its source-code, or by writing your own plugins. If your server is mission-critical, you must nominate staff who will be responsible for that code, and they must be up for the task. Otherwise you might end up in a situation in which your server experiences downtimes because of custom code is broken, or does not work with a newer version of Confluence anymore, but you can’t fix the problem because no one knows how the customized code works, and you can’t uninstall it either because it has become critical for your Confluence usage pattern. Keep good track of changes, and have someone available to jump into action if there is a problem. Don't let the summer intern write mission-critical plugins, unless you have more senior staff to maintain that code as long as it is in use.

**Constant Monitoring of Production Systems**

You will need to monitor your production systems constantly.

When the wiki is the lifeblood of your organisation, you need know exactly what is going on inside, so that you can plan for future needs and analyse potential bottlenecks.

Monitoring involves a number of essential tasks, including those listed below:

- Monitoring log files.
- Checking for HTTP-availability and performance (e.g. by getting the same page every five minutes and displaying the time on a graph).
- Looking at many different parameters such as load, connections, IO, database-trends, and so on.
- Charting long-term trends.
- Keeping an access log of requests to the web server. This is vital, especially when requesting performance-related support from Atlassian.

Monitoring a web application like Confluence implies also monitoring the subsystems it uses. Many outages and downtimes are caused by broken mail servers, databases running out of space, file systems filling up and so on. It is often possible to detect these trends way before the actual web application breaks down. Keep an eye on the file system, and if you see it is getting closer to 90% utilisation, you can mend the situation without Confluence breaking down. Or even if the worst case happens (e.g. the database breaks down and Confluence is affected straight away) then having the proper monitoring for the database server makes troubleshooting a lot easier.

**Tools for Monitoring Confluence**

At Atlassian we use Hyperic. But the list of monitoring systems is long and we can’t recommend a specific product over the other. If your organisation has a monitoring system already, make sure you hook up Confluence to it. If you don’t have a monitoring system yet, you need to install one as soon as you feel Confluence is mission critical.

As an example of what our monitoring UI looks like, have a look at this screenshot:
The following screenshot shows one of our sensors looking at the HTTP response times of our documentation wiki over the last 8 days. You can clearly see an incident four days ago. Having the graph (and regularly looking at it) allowed us to pinpoint the problem. We analysed the access logs and found that webpage-profiling had been enabled but not disabled again, which caused performance problems.
This page would get too long if we described all our monitoring sensors - but just to give you an impression, this is what we monitor on the JVM level alone.

**JVM basics**

- Current Loaded Classes
- Daemon Thread Count
- Heap Memory Committed
- Heap Memory Max
- Heap Memory Used
- Loaded Classes
- Loaded Classes per Minute
- Object Pending Finalization Count
- Peak Thread Count
- Thread Count
- Unloaded Classes
- Unloaded Classes per Minute

**JVM garbage collection**

- Collection Count
- Collection Count per Minute
- Collection Time
- Collection Time per Minute

**JVM memory: (Metrics for Eden space, Old Gen, Survivor space, Perm Gen)**

- Commited Memory
- Used Memory

We get the same level of detail for our database, for the file system, for the CPU, for the network, and so on. Not all of this is needed all the time. But if your company depends on an application, then the more information you have at your fingertips the better. Fortunately these metrics can be extracted quite easily once you have a monitoring system in place.

**Adherence to Strict Upgrade Procedures**

Your organisation will have its own upgrading procedure. Here are a few recommendations that you should add to your list:

- **Our main recommendation:** Never change more than one component at a time. Sometimes it may be tempting to upgrade the server hardware when you upgrade Confluence, but we recommend you don't do that. It makes pinpointing errors much more difficult. So, for example, don't upgrade hard disks in conjunction with a Confluence version upgrade, don't change the Confluence configuration at the same time as you upgrade your Apache software, and don't upgrade a major third-party plugin the day you move your database system to a new machine. The list is endless, these were just a few examples to get you thinking.
- **After each upgrade step, run Confluence for a couple of days to check that everything is still fine.**
- **Keep track diligently of what you change, and when.** It will be nearly impossible for us to help you if you can't tell us what exactly you changed at what time.
- **Keep a copy of all log files produced during the upgrade, together with notes about what changed between successive restarts.**

Always take careful note of the upgrade notes published with the [Release Notes](http://confluence.atlassian.com) of each Confluence version, as well as the [Confluence Upgrade Guide](http://confluence.atlassian.com).

**Example**

Here you can see an extract of our change log for [http://confluence.atlassian.com](http://confluence.atlassian.com) — the server that hosts this very page.

<table>
<thead>
<tr>
<th>Sydney time</th>
<th>Server time</th>
<th>Event</th>
<th>Reason/Purpose (including JIRA issues)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008-03-25 22:18</td>
<td>Started upgrade to 2.8-m9-r3 (build #1314)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008-03-25 22:25</td>
<td>App server brought down due to failed database upgrade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008-03-26 00:51</td>
<td>Server brought back up after database restored from backup. Running 2.8-m9-r3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008-03-28 04:18</td>
<td>GC algorithm changed from concurrent to parallel collector. Max heap increased from 1.4 GB to 2.0 GB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008-04-24</td>
<td>Hyperic agent started with connection to Resin.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Testing of Upgrades before Production Implementation

You should test upgrades in a staging environment.

Before rolling out a new version of Confluence (or of the software or hardware that it uses, e.g. database systems, application servers, data storage), make sure that you test the upgrade with real data (e.g. a database dump) on a completely independent machine.

Here’s an example of what such a test would pick up: The new release of Confluence may not be compatible with a custom third party plugin you have previously installed, thus breaking the plugin’s functionality. You may not even know that anyone installed that plugin — but maybe many people are already using it. You’ll want to find out about this before you actually roll out the new version of Confluence.

Here is an outline for a simple upgrade test:

1. Create a clone of your production environment, using a database dump to obtain a copy of the Confluence data. We’ll call this your ‘staging environment’.
2. Upgrade the staging environment to the new version of Confluence.
3. Ask a few selected users from different departments to check the pages they commonly access, but have them do it in the staging environment.

**Hint:** In addition to finding weirdnesses with plugins, this may also show whether training for new functionality is needed in some of the departments. The IT department staff may be able to handle the upgrade to a new version of Confluence without training, but perhaps the sales representatives who use the wiki less often will need some training.

#### Getting a license for your staging environment

Only a technical contact for your commercial/academic license is able to create a Developer license.

Atlassian supplies 'developer' licenses which can be used by existing commercial license holders who wish to deploy non-production installations of our software to use in QA/staging environments. Developer licenses are free of charge to commercial license holders and, like our commercial offerings, they include 12 months of updates starting from the date of purchase of the commercial license.

If you hold a commercial license, you can obtain a free developer license by following these steps:

1. Log in to your Atlassian account.
2. Under the “Licenses” heading, all of your licenses will be displayed. Click the plus sign next to a license to view its details.
3. Click the ‘View Developer License’ link in the bottom right corner of the license detail panel, below your commercial license key.

### Enforcing Security Guidelines

Security is one of the most important issues for Confluence. We are constantly spending large amounts of effort to keep up with security threats and to Confluence’s security model. We treat security breaches with utmost priority, and the recent releases have been improved to fend off advanced attack vectors like cross-site scripting (XSS), cross-site request forgery (XSRF) and header injection flaws. Altogether we believe that Confluence is a very secure product. But of course as with any software there are occasional bugs, and we are fixing security issues whenever they come up. We regularly release minor software releases that contain security fixes. This means you should upgrade your system frequently. Obviously this can affect your system’s uptime. You should also make sure your whole infrastructure around Confluence is made robust as well (consider operating systems, websevers, application servers, networks, social engineering aspects, etc).

As with any other distributed system, you need to decide on a case by case basis if classified documents can be stored in it. It is common practice to store the most secure documents on computers that are not even connected to the physical intranet. Please contact your company’s security officer to learn more about your enterprise’s security procedures.
Make sure to have qualified staff around, so you can deal with security issues quickly. Once a security patch becomes available or a security incident happens, speed is essential.

Please refer to our dedicated Configuring Confluence Security page for more technical details.

Load-Testing Environments

Many customers ask us,

> So, how many users and spaces can I put into Confluence, and what is the best hardware do to so?

The answer is, 'It depends'.

It depends a lot on your use case. Confluence is so successful because it can cover a huge range of use cases. If most of your users only access Confluence infrequently, it is no problem to have 70 000 to 100 000 users. But if each user is a power-user who uses the system the whole day, there's a substantial decrease in number Confluence can take without tuning. If your pages are short, simple, and don't contain a lot of macros, then the situation will be vastly different from a system that relies heavily on macros, background-tasks, or other features.

If your system is large (for example serving more than 10 000 users or storing more than 1000 spaces) or mission-critical (which it could be with as few as 1000 users who use it all the time) you need one or more more load-testing environments.

Even if your system is working nicely for 20 000 users right now, it might take just another 2000 users to push it over the edge.

We recommend the following basic procedure:

- Set up an environment that closely resembles your production environment.
- Gather statistics from your production system.
- Regularly apply a similar kind of load (and slightly higher) to the load-testing environment.
- Analyse how well Confluence scales for your usage patterns.

The Confluence development team has load-testing scripts available which you can use to simulate load. You can also contact Atlassian Support for more details.

Tuning

You may need to be able to tune your installation in the ways mentioned below.

Optimising your System

If you have large numbers of users, then downloading all the static content (CSS, default images, JavaScript-files) may result in a high additional load on the application server that can be offloaded to a caching web server.

Please refer to the following additional information:

- Our general Performance Tuning page.
- Information on configuring a large Confluence installation.

Limiting Third-Party Plugins

You may have to restrict the number of third-party plugins installed on your Confluence instance.

Most third-party plugins are not specifically written for high-load environments. What works fine in low-load environments could have unexpected and adverse effects when thousands of users are competing for your application server's CPU time or for database IO.

A common source of problems is access to database connections. If you have fewer users than database connections, it does not matter if an operation holds on to a database connection for two seconds while it downloads some data from the internet. With hundreds of concurrent users, this could quickly become a bottleneck.

Confluence itself is tested and optimised to handle high loads and avoids these kinds of problems. But if you install a number of plugins that have not been tested against high load, your system may become unstable.

We recommend that you load test the common use cases of each unofficial third-party plugin if your Confluence installation is mission critical. Only activate plugins that are vital to your business, and never allow experimental plugins onto your production system until they have been tested in a staging environment.

Selecting and Tuning your JVM

You should select your JVM carefully and you may need to be able to tune it.

The selection of the JVM for your large Confluence instance can have a huge impact on the performance perceived by the users. Between versions 1.4 and 6 of the Sun Java JVM there have been some impressive improvements in performance, especially under high concurrent load.

Here are some essential guidelines:

- Always run the most recent point release of your selected JVM.
Where ever possible run the most recent major release from your selected JVM manufacturer. The Sun JVM version 6 is much faster than 1.4, especially under high loads.

Tune your garbage collection algorithms. Experiment with different algorithms and settings to get the response times you desire in your environment. Here are some specific guidelines for Sun JVM in the Sun documentation:

- Java 6
- Java 5
- Java 1.4

Customising Confluence to Optimise Performance

You may need to customise Confluence for performance reasons. Depending on your usage scenario, there may be ways to enhance Confluence performance that become necessary when you reach a certain level of usage.

Here are some things you might decide to do:

- Remove the display of the space list on the Dashboard. See Customising the Dashboard.
- Configure any search appliances or other crawlers which are configured to index the Confluence site:
  - These should be suitably rate limited.
  - Configure them to crawl only pages in the /display/ URL path, and only current versions of pages.

Please refer to our general Performance Tuning page for more details.

Related Topics

Performance Tuning
Configuring a Large Confluence Installation
Confluence Clustering Overview
Requesting Performance Support
Confluence Administrator's Guide
Confluence Configuration Guide
Server Hardware Requirements Guide
Fix Out of Memory Errors by Increasing Available Memory

Performance Tuning

This document describes tuning your application for improved performance. It is not a guide for troubleshooting Confluence outages. Check Troubleshooting Confluence Hanging or Crashing for help if Confluence is crashing. NEW: Garbage Collector Performance Issues

Description

Like any server application, Confluence may require some tuning as it is put under heavier use. We do our best to make sure Confluence performs well under a wide variety of circumstances, but there's no single configuration that is best for everyone's environment and usage patterns.

If you are having problems with the performance of Confluence and need our help resolving them, you should read Requesting Performance Support.

Use the latest version of your tools

Use the latest versions of your application servers and Java runtime environments. Newer versions are usually better optimized for performance. As an example, our internal performance tests show a 20% speed-up (when viewing pages under load) between Tomcat 6 on Java 6 vs Tomcat 5.5 on Java 5 out of the box.

Avoid swapping due to not enough RAM

Always watch the swapping activity of your server. If there is not enough RAM available, your server may start swapping out some of Confluence's heap data to your hard disk. This will slow down the JVM's garbage collection considerably and affect Confluence's performance. In clustered installations, swapping can lead to a Cluster Panic due to Performance Problems. This is because swapping causes the JVM to pause during Garbage Collection, which in turn can break the inter-node communication required to keep the clustered nodes in sync.
Careful about those other systems using the same infrastructure

It may sound tempting: Just have one powerful server hosting your database and/or application server, and run all your crucial programs on that server. If the system is set up perfectly, then you might be fine. Chances are however that you are missing something, and then one application's bug might start affecting other applications. So if Confluence is slow every day around noon, then maybe this is because another application is using the shared database to generate complicated reports at that time? Either make sure applications can't harm each other despite sharing the same infrastructure, or get these systems untangled, for example by moving them to separate instances that can be controlled better.

Choice of Database

The embedded database that is provided with Confluence is meant only to be used for evaluation, not for production Confluence sites. After the evaluation finishes, you will certainly need to switch to an external relational database management system. Beyond this, we do not recommend any particular RDBMS over another. We recommend using what you are familiar with, because your ability to maintain the database will probably make far more difference to what you get out of it than the choice of database itself.

Database Connection Pool

If load on Confluence is high, you may need more simultaneous connections to the database.

- If you are using JNDI data-sources, you will do this in your application server's configuration files.
- If you have configured Confluence to access the database directly, you will need to manually edit the hibernate.c3p0.max_size property in the confluence.cfg.xml file in your confluence.home directory. After you have changed the URL in this file, restart Confluence.

To assess whether you need to tune your database connection pool, take thread dumps during different times (including peak usage). Inspect how many threads have concurrent database connections.

Database in general

If Confluence is running slowly, one of the most likely cause is that there is some kind of bottleneck in (or around) the database.

The first item you should check is the "Database Latency" field in the System Information tab in the admin console.

<table>
<thead>
<tr>
<th>Database Connection Transaction Isolation</th>
<th>Head committed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database Latency</td>
<td>0</td>
</tr>
</tbody>
</table>

The latency is calculated by sending a trivial request to the database, querying a table which is known to have only one column and one row. ("select * from CLUSTERSAFETY"). Obviously this query should be blazing fast, and return within 1 or 2 milliseconds. If the value displayed is between 3 and 5 milliseconds, you might already have an issue. If the value is above 10ms, then you definitely need to investigate and improve something! A few milliseconds may not sound so bad, but consider that Confluence sends quite a few database queries per page.
request, and those queries are a lot more complex too! High latency might stem from all sorts of problems (slow network, slow database, connection-pool contention, etc), so it’s up to you to investigate. Don’t stop improving until latency is below 2ms on average.

Obviously, latency is just the very first thing to look at. You may get zero latency and still have massive database problems, e.g. if your tables are poorly indexed. So don’t let a low latency fool you either.

Database indexes

Especially if you have more than a few thousand active users, and all most obvious measures have been tried out but the database still seems to be under high load, you should consider engaging a database administrator (DBA) to tune the database specifically to the demands that your particular Confluence installation is placing on it. If you do not have a full-time DBA and can’t even get one for temporary consulting, you may want to consult the database indexing advice that we have been gathering from customer reports and our own experience running and developing Confluence. The instructions on that page are for Oracle, but most of the indexes can be applied to (and will help with) any database.

(These database indexes are now created automatically when Confluence is installed, but existing installations upgrading to a more recent version may still need to add them manually)

Database Statistics and Query Analysers

Modern databases have query optimisers based on collecting statistics on the current data. Using the SQL EXPLAIN statement will provide you information on how well the query optimiser is performing. If the cost estimate is wildly inaccurate then you will need to run statistics collection on the database. The exact command will depend on your database and version. In most cases you can run statistics collection while Confluence is running, but due to the increased load on the database it’s best to do this after normal hours or on a week-end.

Cache Tuning

To reduce the load on the database, and speed up many operations, Confluence keeps its own cache of data. Tuning the size of this cache may speed up Confluence (if the caches are too small), or reduce memory (if the caches are too big).

Please have a look at our documentation on Cache Performance Tuning for information on how to tune Confluence caches.

Antivirus Software

Antivirus software greatly decreases the performance of Confluence. Antivirus software that intercepts access to the hard disk is particularly detrimental, and may even cause errors with Confluence. You should configure your antivirus software to ignore the Confluence home directory, its index directory and any database-related directories.

Enabling HTTP Compression

If bandwidth is responsible for bottlenecking in your Confluence installation, you should consider enabling HTTP compression. This may also be useful when running an external facing instance to reduce your bandwidth costs.

⚠️ Take note of the known issues with HTTP compression in versions of Confluence prior to 2.8, which may result in high memory consumption.

Virtual Operating Systems

Virtual Environments such as VMWare can cause Confluence CPU to spike. Run Confluence on a native OS. Refer to the list of supported operating systems for Confluence in the Supported Platforms topic.

⚠️ In some situation the VMTools can crash, cause a excessive context switches and interrupts causing the JVM to run slowly and Confluence to start up very slowly.

Performance Testing

You should try out all configuration changes on a demo system. Ideally, you should run and customize loadtests that simulate user behaviour. Learn about how to test performance issues using the Performance Testing Scripts.

Access logs

You can find out which pages are slow and which users are accessing them by enabling Confluence's built-in access logging.

Built-in Profiler

You can identify the cause of page delays using Confluence's built-in profiler according to Troubleshooting Slow Performance Using Page Request Profiling.
Adjust Application Server Memory Settings

See Fix Out of Memory Errors by Increasing Available Memory.

Use A Web Server

For high-load environments, performance can be improved by using a web server such as Apache in front of the application server. There is a configuration guide to Running Confluence behind Apache.

When configuring your new web server, make sure you configure sufficient threads/processes to handle the load. This applies to both the web server and the application server connector, which are typically configured separately. If possible, you should enable connection pooling in your web server connections to the application server.

Parallel GC

If you have multiple CPUs on your server, you can add -XX:+UseParallelOldGC to your JAVA_OPTS options. This will allow garbage collection of the Tenured Space to happen in parallel with the application and can boost performance and can reduce slow performance spikes. For more information, please refer to our detailed page on Garbage Collector Performance Issues, and Sun's summary of collectors.

Troubleshoot possible memory leaks

Some external plugins, usually ones that have been written a long time ago and that are not actively maintained anymore, have been reported to consume memory and never return it. Ultimately this can lead to a crash, but first this manifests as reduced performance. The Troubleshooting Confluence Hanging or Crashing guide is a good place to start. Some of the known causes listed there could result in performance issues short of a crash or hang.

Some 3rd-party plugins were not written to scale to large enterprises' needs

Confluence has been optimized to work under high load and with many pages. Some 3rd party plugins however have been written with small size companies in mind, and can't cope with large numbers of concurrent users, or large numbers of pages and permissions, or large numbers of spaces. It is impossible to tell which ones will fail under which conditions, but it will always help to turn off 3rd-party plugins that are not strictly mission-critical while investigating performance issues.

RELATED TOPICS

Garbage Collector Performance Issues
Cache Performance Tuning
Cache Performance Tuning for Specific Problems
Performance Testing Scripts
Working with Confluence Logs
Operating Large or Mission-Critical Confluence Installations
Confluence Clustering Overview
Requesting Performance Support
Confluence Administrator's Guide
Confluence Configuration Guide

Cache Performance Tuning

Confluence performance can be significantly affected by the performance of its caches. It is essential for the administrator of a large production installation of Confluence to tune the caches to suit its environment. There are several configurable parameters for each of the cache regions, most notably cache size, cache expiry delay and eviction policy. In the majority of the cases, cache size is the parameter you would want to change. Fortunately, from Confluence 3.0, it is very easy to adjust cache sizes through the Administration Console. However, if you need to modify parameters other than a cache size, you would need to modify the relevant configuration files manually.

If you only need to modify Confluence's maximum cache sizes, you can do this through the Cache Statistics feature of the Administration Console.

The cache performance information for your Confluence installation is available under Administration > Cache Statistics. More information about the numbers displayed here is available on Cache Statistics.
Cache tuning example

As an example of how to tune Confluence's caches, let's have a look at the following table:

<table>
<thead>
<tr>
<th>Caches</th>
<th>% Used</th>
<th>% Effectiveness</th>
<th>Objects/Size</th>
<th>Hit/Miss/Expiry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attachments</td>
<td>87%</td>
<td>29%</td>
<td>874/1000</td>
<td>78226/189715/187530</td>
</tr>
<tr>
<td>Content Attachments</td>
<td>29%</td>
<td>9%</td>
<td>292/1000</td>
<td>4289/41012/20569</td>
</tr>
<tr>
<td>Content Bodies</td>
<td>98%</td>
<td>81%</td>
<td>987/1000</td>
<td>28717/6671/5522</td>
</tr>
<tr>
<td>Content Label Mappings</td>
<td>29%</td>
<td>20%</td>
<td>294/1000</td>
<td>4693/18185/9150</td>
</tr>
<tr>
<td>Database Queries</td>
<td>96%</td>
<td>54%</td>
<td>968/1000</td>
<td>105949/86889/83334</td>
</tr>
<tr>
<td>Object Properties</td>
<td>27%</td>
<td>18%</td>
<td>279/1000</td>
<td>5746/25386/8102</td>
</tr>
<tr>
<td>Page Comments</td>
<td>26%</td>
<td>11%</td>
<td>261/1000</td>
<td>2304/17178/8606</td>
</tr>
<tr>
<td>Users</td>
<td>98%</td>
<td>5%</td>
<td>982/1000</td>
<td>6561/115330/114279</td>
</tr>
</tbody>
</table>

The caches above are of size 1000 (meaning that it can contain up to 1000 objects), which is the default size for caches in the default cache scheme. Refer to Confluence Cache Schemes for more explanation.

You can tell when a cache size needs to be increased because the cache has both:

- a high usage percentage (above 75%)
- a low effectiveness percentage.

Check the 'effectiveness' versus the 'percent used'. A cache with a low percent used need not have its size lowered; it does not use more memory until the cache is filled.

Based on this, the sizes of the "Attachments", "Database Queries", and "Users" caches should be increased to improve their effectiveness.

As the stored information gets older or unused it will expire and be eliminated from the cache. Cache expiry may be based on time or on frequency of use.

There is not much that you can do with a cache that has both a low percentage of usage and effectiveness. Over time, as the cache is populated with more objects and repeat requests for them are made, the cache's effectiveness will increase.

Finding the configuration file

The caches are configured in ehcache.xml (for standard editions) or confluence-coherence-cache-config-clustered.xml (for clustered editions) which is stored in `<confluence-home>/config/`. 

⚠️ The information on this page does not apply to Confluence OnDemand.
Oracle Coherence Licensing Change:

- Due to a license agreement change, Confluence is now available in two editions:
  - **Standard Edition** — Confluence with Ehcache's caching technology (available to customers with non-clustered Confluence licenses).
  - **Clustered Edition** — Confluence with Oracle's Coherence clustering and distributed caching technology (available to customers with Confluence clustered licenses only).

⚠️ If you are currently running a clustered installation of Confluence, please do not upgrade it with a standard edition of Confluence.

For more information about these changes, please refer to the Coherence License Changes document.

If you have a Confluence clustered license, are running a clustered installation of Confluence and wish to upgrade to Confluence version 2.6 or later, please ensure that you download only a clustered edition of Confluence and please refer to the Confluence 3.0.1 Upgrade Notes for additional upgrade information.

Cache Key Mappings

The cache configuration file configures caches by their keys. When you move your mouse over the the cache names displayed on the cache statistics page, a tooltip will indicate the actual cache key for that cache name.

Using our example from the table above, if we were to modify parameters for the Users cache we would need to change the cache with the key `com.atlassian.user.impl.hibernate.DefaultHibernateUser`. Do not get confused with Users (External Mappings) and Users (External Groups) which are in themselves, two separate caches. “Users” is the friendly name for `com.atlassian.user.impl.hibernate.DefaultHibernateUser`.

Standard Editions of Confluence

In standard editions of Confluence, the caching layer is Ehcache.

Understanding the Ehcache Configuration File

For more information about the Ehcache configuration file and a full reference on Ehcache configuration, please refer to the Ehcache configuration documentation.

Converting your Coherence configuration to Ehcache

This section only applies to customers who:

- Have an installation of Confluence that was downloaded before the 4th of September 2009.
- Intend to (or have already) upgraded to Confluence 3.0.1 or later (or to Confluence versions 2.6.3, 2.7.4, 2.8.3, 2.9.3 and 2.10.4).
- Will use a non-clustered Confluence license for the Confluence upgrade.
- Have implemented customisations to their Confluence installation’s cache configuration file (`confluence-coherence-cache-config.xml`).

To maintain your existing cache configuration file settings, you will need to transfer any cache customisations you have implemented in the Coherence cache configuration file (`confluence-coherence-cache-config.xml`) to the relevant entries in the Ehcache cache configuration file (`ehcache.xml`).

Each cache has a `cache-mapping` element in the Coherence file (of which there is an equivalent `cache` element in the `ehcache.xml` file). Unfortunately, copying across your customisations is not quite a straightforward process because the Coherence file defines several ‘caching schemes’ to store the actual cache values, which in turn are referenced by the `cache-mapping` elements. In contrast, the `ehcache.xml` file does not support caching schemes and a cache’s values are expressed explicitly in separate parameters of a `cache` element.

To convert your Coherence cache configuration file customisations across to the equivalent Ehcache file:

1. Open both the `confluence-coherence-cache-config.xml` and `ehcache.xml` files in a text editor. These files are located in the `<confluence-home>/config` directory.
   - If you implemented your customisations in a version of Confluence prior to 3.0, you will most likely find the `confluence-coherence-cache-config.xml` file in the `<confluence-install>/confluence/WEB-INF/classes directory.

2. In the customised `confluence-coherence-cache-config.xml` file:
   a. Identify the caching schemes that were customised in this file and make a note of the values of all its child elements.
Typically, each caching scheme is located inside a local-scheme element and all of these are enclosed within the cache-schemes element, which appears towards the end of this file.

b. Note each customised caching scheme by the content of its scheme-name element.

c. For each cache-mapping element (which typically appears towards the top of this file), identify if it has a scheme-name element whose content matches one noted in the previous step and if so, make a note of its associated cache-name element.

3. In the ehcache.xml file:

   a. Identify each cache element whose ‘name’ parameter matches the cache-name elements noted in step ‘2c’.
   b. Using the mappings table below, apply the values noted in step ‘2a’ to the appropriate parameters of the cache elements identified in the previous step (‘3a’).

Mappings table showing how elements of the Coherence cache configuration file map to parameters of the equivalent Ehcache file.

<table>
<thead>
<tr>
<th>Coherence Element</th>
<th>Ehcache Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>high-units</td>
<td>maxElementsInMemory</td>
</tr>
<tr>
<td>expiry-delay &gt; 0s</td>
<td>timeToIdleSeconds - Use this attribute for expiry delays greater than 0s along with the eternal attribute set to 'false'</td>
</tr>
<tr>
<td>expiry-delay = 0s</td>
<td>eternal - For expiry delays of 0s, set this attribute to 'true'.</td>
</tr>
</tbody>
</table>

Clustered Editions of Confluence

Understanding the Coherence configuration file

The Coherence configuration file is a mapping of cache keys to cache schemes. Each cache scheme controls the expiry, eviction policy and size of the caches linked to it. A cache scheme can extend another scheme.

For a full reference, see the Oracle's Coherence cache configuration documentation.

Defining Caching Scheme Mappings in Coherence Cache config file

If a cache key does not have an explicit definition in the caching scheme mappings (defined in confluence-coherence-cache-config.xml) then it will use the “default” cache-mapping.

In our example, com.atlassian.user.impl.hibernate.DefaultHibernateUser is not explicitly defined in the caching scheme mappings. Hence to increase the expiry-delay to 2 hours, we will need to define the mapping ourselves and add the following within the tags:

```xml
<cache-mapping>
  <cache-name>com.atlassian.user.impl.hibernate.DefaultHibernateUser</cache-name>
  <scheme-name>cache:com.atlassian.user.impl.hibernate.DefaultHibernateUser</scheme-name>
</cache-mapping>
```

Then we will need to define a cache schema with name cache:com.atlassian.user.impl.hibernate.DefaultHibernateUser within tags:

```xml
<local-scheme>
  <scheme-name>cache:com.atlassian.user.impl.hibernate.DefaultHibernateUser</scheme-name>
  <scheme-ref>default</scheme-ref>
  <high-units>10000</high-units>
  <expiry-delay>7200</expiry-delay>
</local-scheme>
```

It's possible to define a local-scheme mapping for a cache key without defining certain parameters (e.g. <high-units>). In such a cases, their parameters will be inherited from scheme-ref scheme, which is the default scheme in our case.

Important Caches
The following suggestions are general guidelines. In cases of large databases, 20-30% of the size of the table may be unnecessarily large. Check the effectiveness and Percent Used categories in the cache for more specific assessments.

- `com.atlassian.confluence.core.ContentEntityObject` (known as Content Objects cache) should be set to at least 20-30% of the number of content entity objects (pages, comments, emails, news items) in your system. To find the number of content entity objects, use the query `select count(*) from CONTENT where prevver is null`.
- `com.atlassian.confluence.core.ContentEntityObject.bodyContents` (known as Content Body Mappings cache) should be set to at least 20% of the number of content entity objects (pages, comments, emails, news items) in your system. To find the number of content entity objects, use the query `select count(*) from CONTENT where prevver is null`.
- `com.atlassian.confluence.security.PermissionCheckDispatcher.isPermitted()` (known as User Authorized URLs cache) should be set to at least the number of concurrent users you expect to access Confluence at the same time.
- `com.atlassian.user.impl.hibernate.DefaultHibernateUser` (known as Users cache) should be set to the number of users you have. Note that by default, this will also control the LDAP user's cache, including expiration.
- `com.atlassian.confluence.security.SpacePermission` (known as Permissions cache) should be set to the number of space permissions in your deployment (a good rule of thumb is 20 times the number of spaces). You can find the number of space permissions using the query `select count(*) from SPACEPERMISSIONS`.

Cache Tuning Follow-Up

After you have made changes to your cache config, doing a follow up on the changes in the next week or after the expected performance spike would be important.

Make sure that you take a screenshot of the cache statistics before and after the change. Then compare them with the cache statistics in the later period where performance improvement is expected.

You can monitor what's in the cache by using a JSP included in the Confluence distribution. Browse to `<base-URL>/admin/cachecontents.jsp` to monitor the cache contents.

RELATED TOPICS

- Cache Performance Tuning for Specific Problems
- Confluence Cache Schemes
- Performance Testing Scripts
- Working with Confluence Logs
- Operating Large or Mission-Critical Confluence Installations
- Confluence Clustering Overview
- Requesting Performance Support
- Confluence Administrator's Guide
- Confluence Configuration Guide

Cache Performance Tuning for Specific Problems

The following are more specific performance problems that can be resolved from tuning the cache.

LDAP cache sizes and expiry does not appear to be picked up.

This is a known problem, please refer to CONF-11858 for the solution.

The information on this page does not apply to Confluence OnDemand.

"Edit Page" screen takes a long time to load

If your installation of Confluence is suffering from this problem, it may be due to a insufficient SpacePermissions cache size. To address this problem, first determine the number of space permission objects in your Confluence instance. You can do this by running this query against your database:

```
> select count(*) from SPACEPERMISSIONS
```

Now locate the cache entry for SpacePermissions in your `confluence-coherence-cache-config.xml`:
Adjust the `maxElementsInMemory` or `high-units` property to the number of space permissions you have (in the example above, I've used 10000). Also, just as important, you need to adjust the `timeToLiveSeconds` or `expiry-delay` property to 0.

**Note:** 10K of space permissions consumes approximately 8MB of memory. Please ensure there is enough memory allocated to your instance to cater for this.

### How to set specific cache settings

1. Find the cache name from the cache name mappings:
   - For **Confluence 2.5.x and earlier**, the cache name mappings are in file `confluence/WEB-INF/classes/com/atlassian/confluence/admin/actions/cache-name-mappings.properties`.
   - For **Confluence 2.6.0 and later**, you will find the cache name mappings in the file `com/atlassian/confluence/core/ConfluenceActionSupport.properties` which is packed into the `confluence-2.x.*.jar` file.
2. Find the appropriate `<cache-mapping>` tag in `confluence-coherence-cache-config.xml` or `confluence-coherence-cache-config-clustered.xml`. If the tag doesn't exist, you can create it within the `<caching-scheme-mapping>` tag.

   Attached to this page are corrected copies of `confluence-coherence-cache-config.xml` and `confluence-coherence-cache-config-clustered.xml`. These are updated from a bug CONF-11857.

3. The `<scheme-name>` will correspond to a `<local-scheme>` tag below. It refers to a scheme reference. Either change the high-units tag in the scheme reference, or add a high-units tag to override the scheme reference. For example, the following tag would change the Content Bodies cache from the default 1000 units to 2000 units:

   ```
   <local-scheme>
   <scheme-name>cache:com.atlassian.confluence.core.ContentEntityObject.bodyContents</scheme-name>
   <high-units>2000</high-units>
   <scheme-ref>default</scheme-ref>
   <expiry-delay>0s</expiry-delay>
   </local-scheme>
   ```

   Another popular cache to change is the LDAP related User cache:

   ```
   <local-scheme>
   <scheme-name>user</scheme-name>
   <scheme-ref>default</scheme-ref>
   <high-units>5000</high-units>
   <expiry-delay>300s</expiry-delay>
   </local-scheme>
   ```

4. After updating the appropriate file, you do not need to repack it into the jar to use it. You can simply place the file in your `confluence/WEB-INF/classes/` directory. The file in this directory will override the settings in your jar file. If you want to back out the changes, you only need to remove the file from your `confluence/WEB-INF/classes/` directory — then the default values in the `confluence-coherence-cache-config.xml` located in your jar file will apply.

You can find more information about configuring the Coherence cache in the Coherence cache documentation.

### RELATED TOPICS

- Cache Performance Tuning
- Performance Testing Scripts
- Confluence Cache Schemes
- Working with Confluence Logs
- Operating Large or Mission-Critical Confluence Installations
- Confluence Clustering Overview
- Requesting Performance Support
- Confluence Administrator’s Guide
- Confluence Configuration Guide
Confluence Cache Schemes

Default Scheme

If a cache has not been defined, then it will use the default cache size and expiry. As the start of your confluence/WEB-INF/classes/confluence-coherence-cache-config.xml file you will notice the following:

```
<cache-mapping>
  <cache-name>*</cache-name>
  <scheme-name>default</scheme-name>
</cache-mapping>
```

So basically all caches will default to using the default scheme, which is defined as below:

```
<!-- Default scheme -->
<local-scheme>
  <scheme-name>default</scheme-name>
  <class-name>com.atlassian.confluence.cache.tangosol.ExpiryCountingLocalCache</class-name>
  <high-units>1000</high-units>
  <expiry-delay>3600</expiry-delay>
</local-scheme>
```

I.e. with a size of 1000 Objects and an expiry of 3600 seconds. Other schemes use the above as their default and either override the size of the cache, or the length of the expiry.

⚠️ The information on this page does not apply to Confluence OnDemand.

Common Schemes

In addition to the default scheme, there are also common schemes used in Confluence caches:

```
<!-- Common schemes -->
<local-scheme>
  <scheme-name>large</scheme-name>
  <scheme-ref>default</scheme-ref>
  <high-units>10000</high-units>
</local-scheme>
<local-scheme>
  <scheme-name>medium</scheme-name>
  <scheme-ref>default</scheme-ref>
  <high-units>5000</high-units>
</local-scheme>
<local-scheme>
  <scheme-name>small</scheme-name>
  <scheme-ref>default</scheme-ref>
  <high-units>100</high-units>
</local-scheme>
<local-scheme>
  <scheme-name>large-transient</scheme-name>
  <scheme-ref>default</scheme-ref>
  <high-units>10000</high-units>
  <expiry-delay>300s</expiry-delay>
</local-scheme>
<local-scheme>
  <scheme-name>user</scheme-name>
  <scheme-ref>default</scheme-ref>
  <high-units>5000</high-units>
  <expiry-delay>300s</expiry-delay>
</local-scheme>
```

RELATED TOPICS
Memory usage and requirements

Managing Confluence's performance and memory usage really depends on what resources are available - Confluence will run faster if you give it lots of memory for its caches, but it should still be able to run quite well in low-memory environments, with the right tuning. Below are some tips on getting the most out of your Confluence site.

Increasing the amount of memory available to Confluence

See Increasing JIRA Memory for details on how to increase the memory available to web application servers typically used to run Confluence.

Embedded Database

The embedded HSQL database that comes with Confluence essentially holds all your data in memory while the Confluence server is running. If you are running out of memory, you should consider migrating Confluence to some external RDBMS.

Caching

By default, Confluence keeps large in-memory caches of data to improve its responsiveness and the user experience. The trade off is an increase in memory requirements to support the cache. Administrators of larger Confluence sites may need to configure the size of their caches to improve performance.

To customise Confluence's cache to meet your needs, see cache tuning.

To increase the amount of memory available to confluence, see Fix Out of Memory Errors by Increasing Available Memory.

Mail error queue

Confluence keeps a copy of all emails that it failed to send within an internal error queue. In the event of intermittent failures such as network connectivity issues, the emails in this queue can be manually resent when the problem is fixed. Under certain circumstances, the mail queue can fill up with large objects. The queue is regularly flushed, but if you get a lot of mail errors, you might get a spike in memory usage.

Attachments

The indexing of large attachments requires that the attachment be loaded into memory. In the case of large attachments, this can cause a temporary strain on the systems resources, and may result in indexing failing because the attachment could not be fully loaded into memory.

System backup / restore

The Confluence backup and restore process scales linearly with the size of data. This can have a significant impact on large Confluence instances where the amount of data exceeds the amount of available memory. If you are experiencing an OutOfMemoryError during either a backup or restore processes, then we strongly recommend that you choose and Production Backup Strategy.

If you encounter an OutOfMemoryError while restoring a backup and wish to overcome this issue by increasing memory, how much more will you need to make this process work? A good rule of thumb is to have a look at the size of the entities.xml file in your backup. This file contains all of the data Confluence will be loading, so at least that much is required. Add another 64-128Mb to ensure that Confluence has enough memory to load and function and that should be enough. To increase the amount of memory available to Confluence, see Fix Out of Memory Errors by Increasing Available Memory.

Known issues that we do not have control over.

There are also some memory issues we don't have any control over. For example,

- There's a memory leak in the Oracle 10g JDBC drivers. Not much we can do about that.
- one customer found a rather nasty memory leak that appeared to originate inside Tomcat 5, but only using the IBM JDK on PowerPC.

If you are having problems that appear to result from a memory leak, file an issue on http://support.atlassian.com. Our memory profiler of choice is YourKit. It would be helpful to us if you can provide us with a memory dump from that tool showing the leak.
Confluence 4.0 Documentation

Confluence is taking long periods of time to respond to some actions

A common cause of random pauses in Confluence is the JVM running garbage collection. To determine if this is what is happening, enable verbose garbage collection and look at how long Java is taking to free up memory. If the random pauses match when Java is running its garbage collection, garbage collection is the cause of the pause.

Verbose garbage collection will generate log statements that indicate when Java is collecting garbage, how long it takes, and how much memory has been freed.


For example, with a Windows service, run:

```
tomcat5 //US//Confluence ++JvmOptions="--Xloggc:c:\confluence\logs\gc.log --XX:+PrintGCDetails --XX:+PrintGCTimeStamps --verbose:gc"
```

or in `bin/setenv.sh`, set:

```
export CATALINA_OPTS="$CATALINA_OPTS --Xloggc:${CATALINA_BASE}/logs/gc.log --XX:+PrintGCDetails --XX:+PrintGCTimeStamps --verbose:gc"
```

If you modify `bin/setenv.sh`, you will need to restart Confluence for the changes to take effect.

What can you do to minimise the time taken to handle the garbage collection? See [http://java.sun.com/docs/hotspot/gc1.4.2/](http://java.sun.com/docs/hotspot/gc1.4.2/) for details on tuning the JVM to minimise the impact that garbage collection has on the running application.

Requesting Performance Support

Basic Performance Troubleshooting Steps

Begin with the following procedures:

1. Go through the Troubleshooting Confluence Hanging or Crashing page to identify the major known performance problems
2. Proceed with the Performance Tuning tips to help optimize performance

⚠️ The information on this page does not apply to Confluence OnDemand.

Requesting Basic Performance Support

If those tips don’t help or you’re not sure where to start, open a support ticket starting with at least the basic information:

1. The `atlassian-confluence.log`
2. The `catalina.out` log (or your application server log), with a series of three thread dumps separated by 10 seconds
3. A description with as much detail as possible regarding:
   a. What changes have been made to the system?
   b. When did performance problems begin?
   c. When in the day do performance issues occur?
   d. What pages or operations experience performance issues?
   e. Is there a pattern?

Continue with as much of the Advanced Performance Troubleshooting information as you can.

Advanced Performance Troubleshooting

Please gather all of the information listed below and include it in your support request, even if you think you have a good idea what's causing the problem. That way we don't have to ask for it later.

System Information

Confluence Server

• Take a screenshot of Confluence's Administration System Information (or save the page as HTML)
• Take a screenshot of Confluence's Administration Cache Statistics (or save the page as HTML)
• Find out the exact hardware Confluence is running on
  • How many CPUs? What make and model? What MHz?
  • How much memory is installed on the machine?
  • How much memory is assigned to Confluence’s JVM? (i.e. what are the -Xmx and -Xms settings for the JVM?)
  • What other applications are being hosted on the same box?

Confluence Content

• How many users are registered in Confluence?
• On average, to how many groups does each user belong?
• How many spaces (global and personal) are there in your Confluence server?
• How many of those spaces would be viewable by the average user?
  • Approximately how many pages? (Connect to your database and perform `select count(*) from content where prevver is null and contenttype = 'PAGE'`)
  • How much data is being stored in Bandana (where plugins usually store data)? (Connect to your database and perform `select count(*), sum(length(bandanavalue)) from bandana`)

The Database

• What is the exact version number of Confluence’s database server?
• What is the exact version number of the JDBC drivers being used to access it? (For some databases, the full filename of the driver JAR file will suffice)
• Is the database being hosted on the same server as Confluence?
• If it is on a different server, what is the network latency between Confluence and the database?
• What are the database connection details? How big is the connection pool? If you are using the standard configuration this information will be in your confluence_cfg.xml file. Collect this file. If you are using a Data source this information will be stored in your application server’s configuration file, collect this data.

User Management

• Are you using external user management or authentication? (i.e. JIRA or LDAP user delegation, or single sign-on)
• If you are using external JIRA user management, what is the latency between Confluence and JIRA’s database server?
• If you are using LDAP user management:
  • What version of which LDAP server are you using?
  • What is the latency between Confluence and the LDAP server?

Diagnostics

Observed Problems

• Which pages are slow to load?
  • If it is a specific wiki page, attach the wiki source-code for that page
• Are they always slow to load, or is the slowness intermittent?

Monitoring data

Before drilling down into individual problems, helps a lot to understand the nature of the performance problem. Do we deal with sudden spikes of load, or is it a slowly growing load, or maybe a load that follows a certain pattern (daily, weekly, maybe even monthly) that only on certain occasions exceeds critical thresholds? It helps a lot to have access to continuous monitoring data available to get a rough overview.

Here are sample graphs from the confluence.atlassian.com system, showing

Load
This graph shows the load for two consecutive days. The obvious pattern is that the machine is under decent load, which corresponds to the user activity, and there is no major problem.

Resin Threads and Database Connections
These two charts show the active threads in the application server (first chart) and the size database connection pool (second chart). As you can see, there was a sudden spike of server threads and a corresponding spike of db-connections.

The database connection pool size peaked over 112, which happened to be more than the maximum number of connections the database was configured for (100). So it was no surprise that some requests to Confluence failed and many users thought it had crashed, since many requests could not obtain the crucial database connections.

We were able to identify this configuration problem quite easily just by looking at those charts. The next spikes were uncritical because more database connections were enabled.

The bottom line being: it helps a lot to monitor your Confluence systems continuously (we use Hyperic, for example), and it helps even more if you are able to send us graphs when you encounter problems.

**Access logs**

- How to audit Confluence - enabling user access logging, including redirecting the logs to a separate file
  - You can run this file through a log file analyser such as AWStats, or manually look through for pages which are slow to load.

**Profiling and Logs**

- Enable Confluence's built-in profiling for long enough to demonstrate the performance problem using Troubleshooting Slow Performance Using Page Request Profiling.
  - If a single page is reliably slow, you should make several requests to that page
  - If the performance problem is intermittent, or is just a general slowness, leave profiling enabled for thirty minutes to an hour to get a good sample of profiling times
- Find Confluence’s standard output logs (which will include the profiling data above). Take a zip of the entire logs directory.
- Take a thread dump during times of poor performance
**CPU Load**

- If you are experiencing high CPU load, please [install the YourKit profile](#) and attach two profiler dumps taken during a CPU spike. If the CPU spikes are long enough, please take the profiles 30-60 seconds apart. The most common cause for CPU spikes is a virtual machine operating system.
- If the CPU is spiking to 100%, try [Live Monitoring Using the JMX Interface](#), in particular with the Top threads plugin.

**Instance Metrics and Scripts**

- It is essential to understand the user access and usage of your instance. Please use the access log scripts and sql scripts to generate Usage statistics for your instance.

**Next Step**

Open a ticket on [https://support.atlassian.com](https://support.atlassian.com) and attach all the data you have collected. This should give us the information we need to track down the source of your performance problems and suggest a solution. Please follow the progress of your enquiry on the support ticket you have created.

If your site is non-responsive, please use our Live Support during business hours once you have created the ticket to escalate your problem.

**Access Log Scripts**

The access log scripts are attached to this page. To use the scripts:

1. Unzip the 7z file.
2. Copy all the daily access logs to a folder called logs.
3. Run Atlassian-processDailyLog.rb. This will generate a csv file called summary.csv and several directories which contain the access logs of each defined user action.
4. Run the appropriate script Atlassian-processDailyLog-hourly.rb <admin/comment/create/edit/search/rss>. Each script will generate a different csv file. For example, Atlassian-processDailyLog-hourly.rb admin will process the admin logs extracted in step 3.
5. Import the csv files to www-log-Analysis.xls (summary.csv to 'raw stats - daily' sheet and admin.csv to 'admin -hours' sheet, etc) to generate the load profiles and graphs. You may need to modify the number of rows in each sheet depending on the number of logs.

---

**Troubleshooting Slow Performance Using Page Request Profiling**

This page tells you how to enable page-request profiling. With profiling turned on, you will see a record of the time it takes (in milliseconds) to complete each action made on any Confluence page. If Confluence is responding slowly, an internal timing trace of the slow page request can help to identify the cause of the delay.

You will need access to the Confluence server to view a profile.

**On this page:**

- Enabling Page-Request Profiling
- Profiling an Activity
- Example of a Profile
- Start Confluence with Profiling Enabled

---

The information on this page does not apply to Confluence OnDemand.
To see just the slow performing macros, see Identifying Slow Performing Macros.

From Confluence 2.7, you can use the 'Logging and Profiling' option to enable or disable profiling.

You need to have System Administrator permissions in order to perform this function.

To enable page profiling,

1. Go to the 'Administration Console' and click 'Logging and Profiling' in the 'Administration' section of the left-hand panel.
2. The 'Logging and Profiling' screen appears. Click the 'Enable Profiling' button.
   - If profiling is already enabled, the button will be labelled 'Disable Profiling' instead.

To disable page profiling,

1. Go to the 'Administration Console' and click 'Logging and Profiling' in the 'Administration' section of the left-hand panel.
2. The 'Logging and Profiling' screen appears. Click the 'Disable Profiling' button.
   - If profiling is already disabled, the button will be labelled 'Enable Profiling' instead.

Screenshot: Changing Log Levels and Profiling
Performance Profiling
Profiling is currently OFF.

Enable Profiling

SQL Logging

Enable SQL Logging

Log4j Logging
Choose from one of the predefined logging options or configure logging below.

Production Diagnostic

OR:

Customise specific logging settings

Add New Entry

Class/Package Name New Level

Add entry

Existing Levels

<table>
<thead>
<tr>
<th>Class/Package Name</th>
<th>Current Level</th>
<th>New Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>com.atlassian.confucne.cluster</td>
<td>INFO</td>
<td>INFO</td>
</tr>
<tr>
<td>com.atlassian.confucne.cluster.safety</td>
<td>INFO</td>
<td>INFO</td>
</tr>
<tr>
<td>com.atlassian.confucne.importexport.impl.PdfExporter</td>
<td>ERROR</td>
<td>ERROR</td>
</tr>
<tr>
<td>com.atlassian.confucne.lifecycle</td>
<td>INFO</td>
<td>INFO</td>
</tr>
<tr>
<td>com.atlassian.confucne.upgrade</td>
<td>INFO</td>
<td>INFO</td>
</tr>
<tr>
<td>com.atlassian.core.util.FileUtils</td>
<td>ERROR</td>
<td>ERROR</td>
</tr>
<tr>
<td>com.atlassian.upgrade</td>
<td>INFO</td>
<td>INFO</td>
</tr>
<tr>
<td>net.sf.hibernate.cache.ReadWriteCache</td>
<td>ERROR</td>
<td>ERROR</td>
</tr>
<tr>
<td>net.sf.hibernate.impl.SessionImpl</td>
<td>ERROR</td>
<td>ERROR</td>
</tr>
<tr>
<td>net.sf.hibernate.type.CustomType</td>
<td>ERROR</td>
<td>ERROR</td>
</tr>
<tr>
<td>net.sf.hibernate.util.JDBCExceptionReporter</td>
<td>ERROR</td>
<td>ERROR</td>
</tr>
<tr>
<td>org.apache.fop</td>
<td>ERROR</td>
<td>ERROR</td>
</tr>
<tr>
<td>root</td>
<td>WARN</td>
<td>WARN</td>
</tr>
</tbody>
</table>

Save

Profiling an Activity
Enable profiling, using either of the methods described above.
Profiles for every page hit, for all users, will now be logged to your application server's default logs until Confluence is restarted. Note that each time a user visits a link, a single profile is printed.

2. Confirm that profiles are being written to the Confluence log file — see Working with Confluence Logs for location of the log files and other details.

3. Perform the activity that is resulting in unusually slow response time.

4. Copy the profile for that action. When deciding which profiles to copy, look for the links that took a long time to respond. If a single page is slow, only that profile is necessary. If Confluence is generally or intermittently slow, copy all profiles logged during the slowdown until a reasonable sample has been collected.

5. If you were instructed to profile your instance by Atlassian technical support, attach all relevant profiles to your support ticket.

6. Turn profiling off again, using either of the methods described above.

7. Confirm that profiles are no longer being printed to the Confluence log file.

**Example of a Profile**

Below are the first few lines of a normal profile for accessing a page called Confluence Overview.

```
[344ms] - /display/ds/Confluence+Overview
[313ms] - XW Interceptor: Before defaultStack: /pages/viewpage.action (ViewPageAction.execute())
  [0ms] - SpaceAwareInterceptor.intercept()
  [16ms] - PageAwareInterceptor.intercept()
  [0ms] - AOP: PageManager.getPage()
  [16ms] - AOP: PermissionManager.hasPermission()
  [0ms] - AOP: SpacePermissionManager.hasPermission()
  [16ms] - AOP: SpacePermissionManager.hasPermission()
  [0ms] - AOP: SpacePermissionManager.hasPermission()
  [0ms] - AOP: SpacePermissionManager.hasPermission()
  [281ms] - XW Interceptor: After defaultStack: /pages/viewpage.action (ViewPageAction.execute())
  [281ms] - XW Interceptor: After validatingStack: /pages/viewpage.action (ViewPageAction.execute())
...```

**Start Confluence with Profiling Enabled**

There may be some situations where you may wish to have Confluence profiling enabled during startup. This may be useful if you restart often and may forget to enable profiling for Support/Trouble-shooting purposes.

Edit the file `WEB-INF/web.xml`. You should see a stanza similar to the one below. Set the parameter value for `autostart` to `true`:

```
<filter>
  <filter-name>profiling</filter-name>
  <filter-class>com.atlassian.core.filters.ProfilingAndErrorFilter</filter-class>
  <init-param>
    <!-- specify the which HTTP parameter to use to turn the filter on or off -->
    <!-- if not specified - defaults to "profile.filter" -->
    <param-name>activate.param</param-name>
    <param-value>profile</param-value>
  </init-param>
  <init-param>
    <!-- specify whether to start the filter automatically -->
    <!-- if not specified - defaults to "true" -->
    <param-name>autostart</param-name>
    <param-value>true</param-value>
  </init-param>
</filter>
```

Remember to turn it back to `false` or your logs will grow very large.

**RELATED TOPICS**

- Requesting Performance Support
- Working with Confluence Logs

**Compressing an HTTP Response within Confluence**

Confluence supports HTTP GZip transfer encoding. This means that if a user's web browser supports it, Confluence will compress the data it
sends to the user. This will speed up Confluence over slow or congested Internet links, and reduce the amount of bandwidth consumed by a Confluence server.

Gzipping the HTTP Response is available in Confluence 1.4 and later.

You should turn on Confluence's GZip encoding if:

- Users are accessing Confluence over the Internet, or a WAN connection with limited bandwidth.
- You wish to reduce the amount of data transfer between the Confluence server and client.

If you are accessing Confluence over a Local Area Network or over a particularly fast WAN, you may wish to leave GZip encoding disabled. If the network is fast enough that transferring data from Confluence to the user isn't a limiting factor, the additional CPU load caused by having to compress each HTTP response may in fact slow Confluence down.

---

The information on this page does not apply to Confluence OnDemand.

## Known issues in Confluence 2.7 and earlier

There are known issues with the GZip filter and memory consumption evident in versions 2.7 of Confluence and earlier (CONF-9930). If you are running a large instance of Confluence 2.7 or earlier and frequently experiencing 'out of memory' errors, we recommend that you do not enable HTTP compression. These issues have been resolved in Confluence 2.8.

---

### Enabling HTTP Compression

1. Go to the Confluence 'Administration Console':
   - Choose `Browse > Confluence Admin`. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click `Confirm`. You will be temporarily logged into a secure session to access the 'Administration Console'.

2. Select `General Configuration` in the left-hand panel.

3. Enable 'Compress HTTP Responses'.

In Confluence 2.8 and later, you can configure which types of content are compressed within Confluence. By default, the following mime types will be compressed:

- text/html
- text/javascript
- text/css
- text/plain
- application/x-javascript
- application/javascript

If you wish to change the types of content to be compressed, add a replacement `urlrewrite-gzip-default.xml` file within the `WEB-INF/classes/com/atlassian/gzipfilter/` directory in your Confluence Installation Directory. A sample file is provided as an attachment. Generally speaking, it is unlikely that you will need to alter this file.

---

### RELATED TOPICS

- Performance Tuning
- Confluence Administrator's Guide

### Performance Testing Scripts

#### Load Testing Confluence

This page contains scripts and hints on load-testing your Confluence installations.

#### Introduction

Before making a new Confluence instance available to your users it is useful to get a feel for how it will perform under your anticipated load and where you may need to consider improving your configuration to remove bottlenecks. Likewise, before making changes to your Confluence instance it would again be useful to assess the impact of these changes before making them live in a production context.

This kind of testing is not an exact science but the tools and process described here are intended to be a straightforward, configurable and extensible way of allowing you to begin this kind of load testing.

It will rarely be the case that these scripts will perform representative testing for you 'out of the box'. But either through configuration or by extending the scripts it should be possible to build an appropriate load test.
Load testing scripts are not designed for a production environment

The load testing scripts will update the data within the targeted Confluence instance and are not designed to be run against a production server. If you want to load test your production environment you will need to perform these tests on a backup of your data and restore your real data after the tests.

On this page:

- Load Testing Confluence
- Introduction
- Setup
- Quick, Just Tell Me How To Run It.
- Creating the Test Data
- Running the Test

The information on this page does not apply to Confluence OnDemand.

Setup

You will need the following -

- A Confluence server, set up and running with an admin user. The scripts assume a default username and password for this user: 'admin'/'admin'.
- Ensure the Confluence Remote API is enabled in the administration options. See Enabling the Remote API for details on how to configure this.
- Apache JMeter
- The load testing scripts and resources which are available in our public Maven repository — Please choose the version that most closely matches your Confluence version and download the ZIP or Gzip file in that directory. If in doubt, download the ZIP file archive.

Users have reported problems when using the Windows built-in unzip utility. Please use a third party file archiving and extraction program (for example, 7-Zip) to extract these performance tests.

The test scripts have been updated to work with Confluence 3.4 in version 3.4. Using an older version of the tests will result in errors when running the test.

Quick, Just Tell Me How To Run It.

If you don't want to read the rest of this document, here are the main points:

1. Download and Unzip the performance tests
2. Open a command prompt and change directory to the performanceTest directory that has just been unzipped.
3. Create the test data:

   `<jmeter location>/bin/jmeter -n -t jmeter-test-setup.jmx -Jspace.zip=<path to a demo space ZIP file> -Jadmin.user=<username> -Jadmin.pass=<password>`

4. Run the test:

   `<jmeter location>/bin/jmeter -n -t jmeter-test-fixedload.jmx`

The remainder of this document is just an elaboration of those two steps.

For information on how to use JMeter please refer to the manual
Creating the Test Data

A known data set is required to run the testing against. By default this is the Confluence demo space (space key = DS) although this can be changed (more on this later). If you decide to use the Confluence demo space, ensure that the group "confluence-users" is able to update content in this space.

The script `jmeter-test-setup.jmx` is used to:

- create a set of users to be used in the test
- import the Confluence demo space for running tests against.

You should first ensure that you don't already have the demo space (key = DS) on your test instance. Delete it if you do.

Run the script from the `performanceTest` directory as follows:

```
<jmeter location>/bin/jmeter -n -t jmeter-test-setup.jmx -Jspace.zip=<path to a space export.zip>-Jadmin.user=<username> -Jadmin.pass=<password>
```

Where:

- `<path to a space export.zip>` is the absolute path to the space export zip you want to be used in your testing. For example, the path to `as` found in your Confluence distribution or source: `<confluence install>/confluence/WEB-INF/classes/com/atlassian/confluence/setup/demo-site.zip`

- `<username>` and `<password>` are the username and password for an admin user that is able to create Confluence users and to import spaces.

By default the setup process will create 250 users — 50 each of the following formats: tstreader<n>, tstcommentor<n>, tsteditor<n>, tstcreator<n> and tstsearcher<n>. The password for each matches the username.

A typical run of the setup script will only take a few seconds.

Removing the Test Data

You can reverse the effects of the setup script by setting the `remove.data` parameter to `true`, e.g.

```
<jmeter location>/bin/jmeter -n -t jmeter-test-setup.jmx -Jremove.data=true -Jadmin.user=<username> -Jadmin.pass=<password>
```

Setup Script Parameters

You can modify the behaviour of the setup script via JMeter parameters. These are supplied on the command line in the form `-J<parameter name>=<parameter value>`.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>script.base</td>
<td>.</td>
<td>The absolute path to the script. Defaults to the current working directory.</td>
</tr>
<tr>
<td>space.zip</td>
<td>N/A</td>
<td>The absolute path to space export zip file to be imported as test data.</td>
</tr>
<tr>
<td>remove.data</td>
<td>false</td>
<td>Run the script in reverse — remove all test data.</td>
</tr>
<tr>
<td>admin.user</td>
<td>admin</td>
<td>The admin user name used to import data and create users.</td>
</tr>
<tr>
<td>admin.pass</td>
<td>admin</td>
<td>The password for the admin user.</td>
</tr>
<tr>
<td>confluence.context</td>
<td>confluence</td>
<td>The confluence webapp context.</td>
</tr>
<tr>
<td>confluence.host</td>
<td>localhost</td>
<td>The address or host name of the test instance.</td>
</tr>
<tr>
<td>confluence.port</td>
<td>8080</td>
<td>The port of the test instance.</td>
</tr>
<tr>
<td>space.key</td>
<td>ds</td>
<td>The space key for the space import that will be tested against.</td>
</tr>
</tbody>
</table>
space.setup | true | Control whether the test space will be created (or removed).
commentor.max | 250 | The number of users to be created for making comments.
creator.max | 250 | The number of users to be created for adding pages.
editor.max | 250 | The number of users to be created for editing existing pages.
reader.max | 250 | The number of users to be created for viewing existing pages.
searcher.max | 250 | The number of users to be created for performing searches.
resource.max | 250 | The number of users to be created for downloading site resources.
attributes.max | 250 | The number of users to be created for downloading attachments.

Setup Script Output

On the console you will see no obvious indication of success or otherwise. JMeter will output something similar to this:

```
Created the tree successfully
Starting the test @ Mon Apr 14 17:35:08 EST 2008 (1208158508222)
Tidying up ... @ Mon Apr 14 17:35:08 EST 2008 (1208158508928)
... end of run
```

The `scripts location/results` directory will contain the file `jmeter-result-setuptest.jtl`. There were failures or errors if there are any assertions in this file that have the value `true` for the failure or error element, e.g.

```
<assertionResult>
<name>Manage Users</name>
<failure>true</failure>
<error>false</error>
<failureMessage>Test failed: URL expected to contain /browseusers.action/</failureMessage>
</assertionResult>
```

Running the Test

The test script itself will put Confluence under a fixed load. Each thread group will attempt to do a certain amount of work for a prescribed period of time (30 minutes by default). This is by design so that load during test runs can accurately be compared against each other.

Execute the test as follows:

```
<jmeter location>/bin/jmeter -n -t jmeter-test-fixedload.jmx
```

Where:

- `<scripts location>` is the absolute path to where you extracted the scripts e.g. `/Users/YourName/Download/performanceTest`. This is needed for the script to find its external resources.

Test Behaviour

The test has a number of parameters to tweak its behaviour but generally speaking it has the rough format of:

- 5 groups of users - readers, commentors, searchers, editors and creators.
  - readers simply view a set of individual pages or browse space functionality.
  - commentors add comments to a set of pages.
  - searchers perform searches on a fixed set of keywords.
  - editors make small additions to the end of a set of pages.
  - creators add new pages to a particular space.
- Each individual user in each group will repeat for a fixed amount of time with a small pause between each request.

Note that there is no execution of JavaScript by the client. Keep this in mind if you use this test to gauge Confluence performance in a
production environment.

There is also very little use of permissions in these tests. All data involved is accessible to all of the test users.

**Test Script Parameters**

You can modify the behaviour of the test script via JMeter parameters. These are supplied on the command line in the form `-J<parameter name>=<parameter value>`.

<table>
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<tr>
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</thead>
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<tr>
<td>script.base</td>
<td>.</td>
<td>The absolute path to the script. Defaults to the current working directory.</td>
</tr>
<tr>
<td>confluence.context</td>
<td>confluence</td>
<td>The confluence webapp context.</td>
</tr>
<tr>
<td>confluence.host</td>
<td>localhost</td>
<td>The address or host name of the test instance.</td>
</tr>
<tr>
<td>confluence.port</td>
<td>8080</td>
<td>The port of the test instance.</td>
</tr>
<tr>
<td>create.page.prefix</td>
<td>Nihilist</td>
<td>The title prefix for any created page e.g. Nihilist00001.</td>
</tr>
<tr>
<td>script.runtime</td>
<td>1800</td>
<td>The amount of time the script will run for in seconds.</td>
</tr>
</tbody>
</table>

**Test Thread Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>threads.reader</td>
<td>15</td>
<td>Number of readers.</td>
</tr>
<tr>
<td>pause.reader</td>
<td>2000</td>
<td>The approximate (within 500ms) millisecond pause between reader repeats.</td>
</tr>
<tr>
<td>threads.searcher</td>
<td>8</td>
<td>Number of searchers.</td>
</tr>
<tr>
<td>pause.searcher</td>
<td>2000</td>
<td>The approximate (within 500ms) millisecond pause between searcher repeats.</td>
</tr>
<tr>
<td>threads.creator</td>
<td>3</td>
<td>Number of page creators.</td>
</tr>
<tr>
<td>pause.creator</td>
<td>2000</td>
<td>The approximate (within 500ms) millisecond pause between creator repeats.</td>
</tr>
<tr>
<td>threads.editor</td>
<td>3</td>
<td>Number of page editors.</td>
</tr>
<tr>
<td>pause.editor</td>
<td>2000</td>
<td>The approximate (within 500ms) millisecond pause between editor repeats.</td>
</tr>
<tr>
<td>threads.commentor</td>
<td>4</td>
<td>Number of page commentors.</td>
</tr>
<tr>
<td>pause.commentor</td>
<td>2000</td>
<td>The approximate (within 500ms) millisecond pause between commentor repeats.</td>
</tr>
</tbody>
</table>

In version 3.0 of the tests, it's now possible to control the percentage executions of certain actions. These percentages are defined in the "Thread Details" configuration screen.

So with the default parameters, you are emulating a load on Confluence of 33 concurrent users who will each be hitting the server approximately every 2 seconds (16 users per second).

23 of these users are read only (searchers or readers) and 10 of them are read/write — 11 read only users per second and 5 read/write users per second.

**Test Script Output**

During the run of the test script JMeter will output progress to the console of the form:
Garbage Collector Performance Issues

This document relates broadly to memory management with Oracle's Hotspot JVM. These are recommendations based on Support's successful experiences with customers and their large Confluence instances.

Please do not use the Concurrent Mark Sweep (CMS) Collector with Confluence, unless otherwise advised by Atlassian Support. It requires extensive manual tuning and testing, and is likely to result in degraded performance.

The information on this page does not apply to Confluence OnDemand.

Summary

1. Set the Young space up to 30-40% of the overall heap: 
   -XX:NewSize=<between 30% and 40% of your Xmx value, eg, 384m>
2. Use a parallel collector: 
   -XX:+UseParallelOldGC (make sure this is Old GC)
3. limit the Tomcat connector's spare thread counts to minimize impact
4. effectively disable explicit garbage collection triggered from distributed remote clients
   -Dsun.rmi.dgc.client.gcInterval=900000 -Dsun.rmi.dgc.server.gcInterval=900000
5. Disable remote clients from triggering a full GC event 
   -XX:+DisableExplicitGC
6. set the minimum and maximum Xmx and Xms values as the same (eg. 
   -Xms1024m -Xmx1024m) to discourage address map swapping
7. Turn on GC logging (add the flags 
   -verbose:gc -Xloggc:<full-path-to-log> -XX:+PrintGCTimeStamps
   -XX:+PrintGCDetails) and submit the logs in a support ticket
8. Use Java 1.6
9. Read below if heap > 2G

See Configuring System Properties for how to add these properties to your environment.

Background

Performance problems in Confluence, and in rarer circumstances for JIRA, generally manifest themselves in either:

- frequent or infrequent periods of viciously sluggish responsiveness, which requires a manual restart, or, the application eventually and almost inexplicably recovers
- some event or action triggering a non-recoverable memory debt, which in turn envelopes into an application-fatal death spiral (Eg. overhead GC collection limit reached, or Out-Of-Memory)
- generally consistent poor overall performance across all Confluence actions
There are a wealth of simple tips and tricks that can be applied to Confluence, that can have a significantly tangible benefit to the long-term stability, performance and responsiveness of the application.

On this page:

- Summary
- Background
- Why Bad Things Happen
- Appreciate how Confluence and the JAVA JVM use memory
- Memory is contiguous
- Figure out which (default) collector implementation your vendor is using
- Use the Parallel Garbage Collector
- Restrict ability of Tomcat to 'cache' incoming requests
- Disable remote (distributed) garbage collection by Java clients
- Virtual Machines are Evil
- Use Java 1.6
- Use -server flag
- If using 64bit JRE for larger heaps, use CompressedOops
- Use NUMA if on SPARC, Opteron or recent Intel (Nehalem or Tukwila onwards)
- Use 32bit JRE if Heap < 2GB
- JVM core dumps be instigated by memory pressures
- Artificial Windows memory limit
- Instigate useful monitoring techniques
- Tuning the frequency of full collections
- Performance tuning works

Why Bad Things Happen

Confluence can be thought of like a gel or a glue, a tool for bringing things together. Multiple applications, data-types, social networks and business requirements can be efficiently amalgamated, leading to more effective collaboration. The real beauty of Confluence, however, is its agility to mould itself into your organizations' DNA - your existing business and cultural processes, rather than the other way around - your organization having to adapt to how the software product works.

The flip side of this flexibility is having many competing demands placed on Confluence by its users. Historically, this is an extraordinarily broad and deep set of functions, that really, practically can't be predicted for individual use cases.

The best mechanism to protect the installation is to place Confluence on a foundation where it is fundamentally more resilient and able to react and cope with competing user requirements.

Appreciate how Confluence and the JAVA JVM use memory

The Java memory model is naive. Compared to a unix process, which has four intensive decades of development built into time-slicing, inter-process communication and intelligent deadlock avoidance, the Java thread model really only has 10 years at best under its belt. As it is also an interpreted language, particular idiosyncrasies of the chosen platform Confluence is running can also influence how the JRE reacts.

As a result it is sometimes necessary to tune the jvm parameters to give it a "hint" about how it should behave.

There are circumstances whereby the Java JVM will take a mediocre option in respect to resource contentation and allocation and struggle along with oftentimes highly impractical goals. For example, The JRE will be quite happy to perform at 5 or 10% of optimum capacity if it means overall application stability and integrity can be ensured. This often translates into periods of extreme sluggishness, which effectively means that the application isn't stable, and isn't integral (as it cannot be accessed).

This is mainly because Java shouldn't make assumptions on what kind of runtime behavior an application needs, but it's plain to see that the charter is to assume 'business-as-usual' for a wide range of scenarios and really only react in the case of dire circumstances.

Memory is contiguous

The Java memory model requires that memory be allocated in a contiguous block. This is because the heap has a number of side data structures which are indexed by a scaled offset (e n*512 bytes) from the start of the heap. For example, updates to references on objects within the heap are tracked in these "side" data structures.

Consider the differences between:

1. Xms (the allocated portion of memory)
2. Xmx (the reserved portion of memory)

Allocated memory is fully backed, memory mapped physical allocation to the application. That application now owns that segment of memory.

Reserved memory (the difference between Xms and Xmx) is memory which is reserved for use, but not physically mapped (or backed) by memory. This means that, for example, in the 4G address space of a 32bit system, the reserved memory segment can be used by other applications, but, because Java requires contiguous memory, if the reserved memory requested is occupied the OS must swap that memory out of the reserved space either to another non-used segment, or, more painfully, it must swap to disk.

Permanent Generation memory is also contiguous. The net effect is even if the system has vast quantities of cumulative free memory, Confluence demands contiguous blocks, and consequently undesirable swapping may occur if segments of requested size do not exist. See Causes of OutOfMemoryErrors for more details.

Please be sure to position Confluence within a server environment that can successfully complete competing requirements (operating
system, contiguous memory, other applications, swap, and Confluence itself).

**Figure out which (default) collector implementation your vendor is using**

Default JVM Vendor implementations are subtly different, but in production can differ enormously.

The Oracle JVM *by default* splits the heap into three spaces

1. Young (New, divided into Eden and Survivor)
2. Tenured (Old)
3. Permanent Generation (classes & library dependencies)

Objects are central to the operation of Confluence. When a request is received, the Java runtime will create new objects to fulfill the request in the Eden Space. If, after some time, those objects are still required, they may be moved to the Tenured (Old) space. But, typically, the overwhelming majority of objects created die young, within the Eden space. These are objects like method local references within a while or for loop, or Iterators for scanning through Collections or Sets.

But in IBM J9 the default policy is for a single, contiguous space - one large heap. The net effect is that for large Websphere environments, garbage collection can be terribly inefficient - and capable of suffering outages during peak periods.

For *larger instances with performance issues*, it is recommended to tune Confluence such that there is a large Young space, at up to 50% the overall size of the heap.

-XX:NewSize=XXXm where XXX is the size in megabytes, is the command line parameter. -XmnXXXm can also be used interchangeably. Ie. 
  -XX:NewSize=700m, -Xmn700m

By setting a larger *NewSize*, the net effect is that the JRE will spend less time garbage collecting, clearing dead memory references, compacting and copying memory between spaces, and more time *doing actual work*.

**Use the Parallel Garbage Collector**

Confluence out of the box, and Oracle Java as default, uses the *serial* garbage collector on the Full Tenured heap. The Young space is collected in parallel, but the Tenured is not. This means that at a time of load if a full collection event occurs, since the event is a 'stop-the-world' serial event then *all application threads* other than the garbage collector thread are taken off the CPU. This can have severe consequences if requests continue to accrue during these 'outage' periods. As a rough guide, for every gigabyte of memory allocated allow a full second (exclusive) to collect.

If we parallelize the collector on a multi-core/multi-cpu architecture instance, we not only *reduce* the total time of collection (down from whole seconds to fractions of a second) but we also improve the resiliency of the JRE in being able to recover from high-demand occasions.

Additionally, Oracle provide a CMS, *Concurrent Mark-Sweep Collector* (-XX:+UseConcMarkSweepGC), which is optimized for higher-throughput, server-grade instances. As a general rule, the Parallel Collector (-XX:+UseParallelOldGC) is the right choice for JIRA or Confluence installations, unless otherwise advised by support.

**Restrict ability of Tomcat to 'cache' incoming requests**

Quite often the fatal blow is swung by the 'backlog' of accumulated web requests whilst some critical resource (say the index) is held hostage by a temporary, expensive job. Even if the instance is busy garbage collecting due to load, Tomcat will still trigger new http requests and cache internally, as well as the operating system beneath which is also buffering incoming requests in the socket for Tomcat to pick up the next time it gets the CPU.

```xml
<Connector port="8090" protocol="HTTP/1.1" maxHttpHeaderSize="8192" maxThreads="150" minSpareThreads="25" maxSpareThreads="75" useBodyEncodingForURI="true" enableLookups="false" redirectPort="8443" acceptCount="100" connectionTimeout="20000" disableUploadTimeout="true"/>
```

Here the Tomcat *Connector* is configured for 150 "maxThreads" with an "acceptCount" of 100. This means up to 150 threads will awaken to accept (but importantly not to *complete*) web requests during performance outages, and 100 will be cached in a queue for further processing when threads are available. That's 250 threads, many of which can be quite expensive in and of themselves. Java will attempt to juggle all these threads concurrently and become extremely inefficient at doing so, exasperating the garbage collection performance issue.

Resolution: reduce the number of maxThreads and acceptCount to something slightly higher than normal 'busy-hour' demands.

**Disable remote (distributed) garbage collection by Java clients**

Many clients integrate third-party or their own custom applications to interrogate, or add content to Confluence via its RPC interface. The Distributed Remote Garbage Collector in the client uses RMI to trigger a remote GC event in the Confluence server. Unfortunately, as of this writing, a System.gc() call via this mechanism triggers a full, serial collection of the entire Confluence heap (as it needs to remove references to remote client objects in its own deterministic object graph). This is a deficiency in the configuration and/or implementation of the JVM. It has the potential to cause severe impact if the remote client is poorly written, or operating within a constricted JVM.
This can be disabled by using the flag `-XX:+DisableExplicitGC` at startup.

**Virtual Machines are Evil**

Vmware Virtual Machines, whilst being extremely convenient and fantastic, also cause particular problems for Java applications because it's very easy for host operating system constraints such as temporarily insolvent memory availability, or I/O swapping, to cascade into the Java VM and manifest as extremely unusual, frustrating and seemingly illogical problems. We already document some disk I/O metrics with VMware images. Although we now officially support the use of virtual instances we absolutely do not recommend them unless maintained correctly.

This is not to say that vmware instances cannot be used, but, they must be used with due care, proper maintenance and configuration. Besides, if you are reading this document because of poor performance, the first action should be to remove any virtualization. Emulation will never beat the real thing and always introduces more black box variability into the system.

**Use Java 1.6**

Java 1.6 is generally regarded via public discussion to have an approximate 20% performance improvement over 1.5. Our own internal testing revealed this statistic to be credible. 1.6 is compatible for all supported versions of Confluence, and we strongly recommend that installations not using 1.6 should migrate.

**Use -server flag**

The hotspot server JVM has specific code-path optimizations which yield an approximate 10% gain over the client version. Most installations should already have this selected by default, but it is still wise to force it with -server, especially on some Windows machines.

**If using 64bit JRE for larger heaps, use `CompressedOops`**

For every JDK release, Oracle also build a "Performance" branch in which specifically optimized performance features can be enabled; it is available on the Java SE page after a brief survey. These builds are certified production grade.

Some blogs have suggested a 25% performance gain and a reduction in heap size when using this parameter. The use and function of the `-XX:+UseCompressedOops` parameter is more deeply discussed on Oracle's Official Wiki (which itself uses Confluence!)

**Use NUMA if on SPARC, Opteron or recent Intel (Nehalem or Tukwila onwards)**

`-XX:+UseNUMA` flag enables the Java heap to take advantage of Non-Uniform-Memory-Architectures. JAVA will place data structures relevant to the thread which it owns / operates on, in memory locations closest to that particular processor. Depending on the environment, gains can be substantial. Intel market NUMA as Quick Path Interconnect™.

**Use 32bit JRE if Heap < 2GB**

Using a 64bit JRE when the heap is under 2GB will cause substantial degradation in heap size and performance. This is because nearly every object, reference, primitive, class and variable will use twice as much memory to be addressed.

A 64bit JRE/JDK is only recommended if heaps greater than 2GB are required. If so, use `CompressedOops`.

**JVM core dumps can be instigated by memory pressures**

If your instance of Confluence is throwing Java core dumps, it's known that memory pressure and space/generation sizings can influence the frequency and occurrence of this phenomena.

If your Tomcat process completely disappears and the logs record similar to:
# An unexpected error has been detected by HotSpot Virtual Machine:
# SIGSEGV (0xb) at pc=0xfe9bb960, pid=20929, tid=17
# Java VM: Java HotSpot(TM) Server VM (1.5.0_01-b08 mixed mode)
# Problematic frame:
# V [libjvm.so+0x1bb960]
#
# ------------- T H R E A D ------------
Current thread (0x01a770e0):  JavaThread "JiraQuartzScheduler_Worker-1" [__thread_in_vm, id=17]

siginfo:si_signo=11, si_errno=0, si_code=1, si_addr=0x00000000

Registers:
O0=0xf5999882 O1=0xf5999882 O2=0x00000000 O3=0x00000000
O4=0x00000000 O5=0x0000000001 O6=0xc24ff0b0 O7=0x00000000
G1=0xfe9bb80c G2=0xf5999a48 G3=0x0a67677d G4=0xf5999882
G5=0xc24ff380 G6=0x00000000 G7=0xfdbc3800 Y=0x00000000
PC=0xfe9bb960 nPC=0xfe9bb964

then you should upgrade the JVM. See SIGSEGV Segmentation Fault JVM Crash.

### Artificial Windows memory limit

On Windows, the maximum heap allocatable to the Tomcat 32bit wrapper process is around 1400MB. If the instance is allocated too close to this limit, **chronic garbage collection is likely to result**, often producing JAVA core dumps similar to:

```
# A fatal error has been detected by the Java Runtime Environment:
# java.lang.OutOfMemoryError: requested 8388608 bytes for GrET in
C:\BUILD_AREA\jdk6_18\hotspot\src\share\vm\utilities\growableArray.cpp. Out of swap space?
# Internal Error {allocation.inline.hpp:39}, pid=11572, tid=12284
# Error: GrET in C:\BUILD_AREA\jdk6_18\hotspot\src\share\vm\utilities\growableArray.cpp
# JRE version: 6.0_18-b07
# Java VM: Java HotSpot(TM) Server VM (16.0-b13 mixed mode windows-x86 )
# If you would like to submit a bug report, please visit:
# http://bugreport.sun.com/bugreport/crash.jsp
#
# ------------- T H R E A D -------------
Current thread (0x0d2af800):  GCTaskThread [stack: 0x00000000,0x00000000] [id=12284]
```
or,
# A fatal error has been detected by the Java Runtime Environment:
# java.lang.OutOfMemoryError: requested 123384 bytes for Chunk::new. Out of swap space?
# Internal Error (allocation.cpp:215), pid=10076, tid=4584
# Error: Chunk::new
# JRE version: 6.0_18-b07
# Java VM: Java HotSpot(TM) Server VM (16.0-b13 mixed mode windows-x86 )
# If you would like to submit a bug report, please visit:
# http://bugreport.sun.com/bugreport/crash.jsp
#
# ------------------------ T H R E A D ------------------------
Current thread (0x6ca4d000):  JavaThread "CompilerThread1" daemon [__thread_in_native, id=4584, stack(0x6cd10000,0x6cd60000)]

Workarounds include:
- changing the server OS to something other than Windows. For example, Linux
- switching to the 64 bit Tomcat wrapper (this is not supported)
- reducing memory allocation to the Tomcat process. Try backing off 100MB at a time and observe the results.

Instigate useful monitoring techniques

At all times the best performance tuning recommendations are based on current, detailed metrics. This data is easily available and configurable and helps us tremendously at Atlassian when diagnosing reported performance regressions.

1. enable JMX monitoring
2. enable Confluence Access logging
3. enable Garbage Collection Logging
4. Take Thread dumps at the time of regression. If you can't get into Confluence, you can take one externally.
5. jmap can take a memory dump in real time without impacting the application. Syntax: jmap -heap:format=b <process_id>

Great tools available include:
- The excellent VisualVM, documentation.
- Thread Dump Analyzer - a great all-round thread debugging tool, particularly for identifying deadlocks.
- Samurai, an excellent alternative thread analysis tool, good for iterative dumps over a period of time.
- GC Viewer - getting a bit long in the tooth, but is a good mainstay for GC analysis.
- GChisto - A GC analysis tool written by members of the Sun Garbage Collection team.

Documentation:
- Sun's state-of-the-art JavaOne 2009 session on garbage collection (registration required).
- IBM stack: Java 5 GC basics for WebSphere Application Server.
- An Excellent IBM document covering native memory, thread stacks, and how these influence memory constricted systems. Highly recommended for additional reading.
- The complete list of JRE 6 options
- I strongly recommend viewing George Barnett's Summit 2010 performance presentation, Pulling a Rabbit from a Hat.

Atlassian recommends at the very least to get VisualVM up and running (you willneed JMX), and to add Access and Garbage Collection logging.

Tuning the frequency of full collections

The JVM will generally only collect on the full heap when it has no other alternative, because of the relative size of the Tenured space (it is typically larger than the Young space), and the natural probability of objects within tenured not being eligible for collection, i.e. they are still alive.

Some installations can trundle along, only ever collecting in Young space. As time goes on, some object will survive the initial Young object collection and be promoted to Tenured. At some point, it will be dereferenced and no longer reachable by the deterministic, directed object graph. However, the occupied memory will still be held in limbo as "dead" memory until a collection occurs in the Tenured space to clear and compact the space.

It is not uncommon for moderately sized Confluence installations to reclaim as much as 50% of the current heap size on a full collection; This is because full collections occur so infrequently. By reducing the occupancy fraction heap trigger, this means that more memory will be available at any time, meaning that fewer swapping/object collections will occur during the busy hour.
Atlassian would classify frequency tuning on collections as an advanced topic for further experimentation, and is provided for informational purposes only. Unfortunately, it's impractical for Atlassian to support these kinds of changes in general.

**Performance tuning works**

Atlassian has a number of high profile and some extremely high demanding, mission-critical clients who have successfully, usually through trial and error, applied these recommendations to production instances and have significantly improved their instances. For more information, please file a support case at support.atlassian.com.

**Scheduled Jobs**

The administration console allows you to schedule various administrative jobs in Confluence, so that they are executed at regular time intervals. The types of jobs which can be scheduled cover:

- Confluence site backups
- Storage optimisation jobs to clear Confluence's temporary files and caches
- Index optimisation jobs to ensure Confluence's search indexes are up to date
- Mail queue optimisation jobs to ensure Confluence's mail queue is maintained and notifications have been sent.

You need to have System Administrator permissions in order to configure and execute jobs.

**On this page:**

- Accessing Confluence's Scheduled Jobs Configuration
- Executing a Job Manually
- Configuring a Job's Schedule
- Disabling/Re-enabling a Job
- Viewing a Job's Execution History
- Types of Jobs
- Cron Expressions

**Accessing Confluence's Scheduled Jobs Configuration**

To access Confluence's Scheduled Jobs configuration page:

1. Go to the Confluence 'Administration Console':

   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click **Confirm**. You will be temporarily logged into a secure session to access the 'Administration Console'.

2. Click 'Scheduled Jobs' under 'Administration' in the left panel to open the 'Scheduled Jobs' page. For each job listed down this page, the following information is shown:

   - **Job** — the name of a job.
   - **Status** — the job's status, which is either 'Scheduled' (it it is currently enabled) or 'Disabled'. See below for details on disabling or re-enabling a job.
   - **Last Execution** — the date and time when the job was last executed. This field will be empty of the job was never executed.
   - **Next Execution** — the date and time when the job is next scheduled to be executed. This field will contain dash symbol ('-') if the job is disabled.
   - **Avg. Duration** — the length of time (in milliseconds) that it took to complete the job's last execution.
   - **Actions** — allows you to configure the job, execute it manually, view a history of previous executions or disable the job.
Executing a Job Manually

1. Access the 'Scheduled Jobs' configuration page (above).
2. Locate the job you wish to execute manually and click its 'Run' link in the 'Actions' column. The job will be run immediately.
   - Refer to 'Types of Jobs' (below) for detailed descriptions about each job.
   - Not all jobs can be run manually.

Configuring a Job's Schedule

1. Access the 'Scheduled Jobs' configuration page (above).
2. Locate the job whose schedule you wish to configure and click its 'Edit' link in the 'Actions' column. The job's 'Edit Schedule for job' dialog box opens.
   - Refer to 'Types of Jobs' (below) for detailed descriptions about each job.
3. Enter an appropriate cron expression to define the frequency with which the job is executed.
   - Refer to 'Cron Expressions' (below) for more details about their syntax. To revert the job's schedule back to its default settings, click the 'Default' button.
4. Click 'Save' to record your job's new schedule.
   - Not all jobs’ schedules are configurable.
Disabling/Re-enabling a Job

By default, all jobs in Confluence are enabled.

1. Access the 'Scheduled Jobs' configuration page (above).
2. Locate the job you wish to disable/re-enable.
   - Refer to 'Types of Jobs' (below) for detailed descriptions about each job.
     - If a job is enabled, click its 'Disable' link in the 'Actions' column to disable the job.
     - If a job is disabled, click its 'Enable' link in the 'Actions' column to enable the job.

Not all jobs in Confluence can be disabled.

Viewing a Job's Execution History

1. Access the 'Scheduled Jobs' configuration page (above).
2. Locate the job whose execution history you wish to view and click the 'History' link.
   - If a job has not completed at least one execution, its 'History' link will not be available.
   - Refer to 'Types of Jobs' (below) for detailed descriptions about each job.

   The 'History for job' dialog box opens, showing a list of previous executions of the job in reverse chronological order, including the:
     - Start date and time
     - End date and time
     - The length of time (in milliseconds) that it took to complete the job
### Types of Jobs

<table>
<thead>
<tr>
<th>Job Name</th>
<th>Description</th>
<th>Execution Behaviour</th>
<th>Default Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back Up Confluence</td>
<td>Performs a <a href="#">backup</a> of your entire Confluence site.</td>
<td>Per cluster</td>
<td>At 2am every day</td>
</tr>
<tr>
<td>Check Cluster Safety</td>
<td>For clustered Confluence installations, this job ensures that only one Confluence instance in the cluster writes to the database at a time. For standard (non-clustered) editions of Confluence, this job is useful for alerting customers who have accidentally connected a second Confluence instance to a Confluence database which is already in use.</td>
<td>Per cluster</td>
<td>Every 30 seconds</td>
</tr>
<tr>
<td>Clean Index Queue</td>
<td>Triggers a periodical clean of the <a href="#">index queue</a> to ensure that its size does NOT grow indefinitely.</td>
<td>Per cluster</td>
<td>At 2am every day</td>
</tr>
<tr>
<td>Clean Temporary Directory</td>
<td>Cleans up temporary files generated in the 'temp' subdirectory of the Confluence home directory. This temp directory may be created by exports etc.</td>
<td>Per node</td>
<td>At 4am every day</td>
</tr>
<tr>
<td>Clear Expired Mail Errors</td>
<td>Clears notification errors in the <a href="#">mail error queue</a>. A notification error is sent to the mail error queue whenever the notification fails to be sent due to an error.</td>
<td>Per cluster</td>
<td>At 3am every day</td>
</tr>
<tr>
<td>Clear Expired Remember Me Tokens</td>
<td>Clears all expired 'Remember Me' tokens from the Confluence site. Remember Me tokens expire after two weeks.</td>
<td>Per cluster</td>
<td>On the 20th of each month</td>
</tr>
</tbody>
</table>
### Cron Expressions

A cron expression is a string of 6-7 'time interval' fields that defines the frequency with which a job is executed. Each of these fields can be expressed as either a numerical value or a special character and each field is separated by at least one space or tab character.

The table below is shows the order of time interval fields in a cron expression and each field's permitted numerical values.

You can specify a special character instead of a numerical value for any field in the cron expression to provide flexibility in defining a job's frequency. Common special characters include:

- `*` — a 'wild card' that indicates 'all permitted values'.
- `?` — indicates 'ignore this time interval' in the cron expression. That is, the cron expression will not be bound by the time interval (such as 'Month', 'Day of week' or 'Year') to which this character is specified.

For more information about cron expressions, please refer to the Cron Trigger tutorial on the Quartz website.

<table>
<thead>
<tr>
<th>Order in cron expression</th>
<th>Time interval field</th>
<th>Permitted values*</th>
<th>Required?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Seconds</td>
<td>0-59</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>Minutes</td>
<td>0-59</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Hours</td>
<td>0-23</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>Day of month</td>
<td>1-31</td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td>Month</td>
<td>1-12 or JAN-DEC</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>Day of week</td>
<td>1-7 or SUN-SAT</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Confluence cannot easily index external sites due to technical reasons, but there are two alternatives:

1. Embed External Pages Into Confluence
2. Replace Confluence Search

**Technical Reasons**

Confluence indexes pages using a customised Lucene search engine that returns matching pages, mail and blog posts for which the searcher has view permission. It would require significant source code modifications to enable Confluence to process search results from external pages, as the indexing process has been customised to utilise internal Confluence metadata. Note that users can still index content from new attachment filetypes.

**Embed External Pages Into Confluence**

If you only have a small number of external sites to index, you may prefer to enable the HTML-include Macro and use it embed the external content inside normal Confluence pages.

**Replace Confluence Search**

Use your own programmer resources to replace Confluence's internal search with a crawler that indexes both Confluence and external sites. This advanced option is easier than modifying the internal search engine. It requires removing Confluence internal search from all pages and replacing the internal results page with your own crawler front-end.

1. Setup a replacement federated search engine to index the Confluence site, as well as your other sites, and provide the results that way. You would need to host a web crawler, such as these open-source crawlers. Note that you can perform a search in Confluence via the remote API
2. Replace references to the internal search by modifying the site layout so that it links to your search front-end
3. Host another site containing the search front-end. You may wish to insert it into a suitable context path in your application server so that it appears to be from a path under Confluence. Tomcat sets Confluence's paths from the Confluence install/confluence/WEBINF/web.xml file.

**Setup External Search Tool To Index Confluence**

Any web crawler can be configured to index Confluence content, for example the Google Search Appliance or similar. If a login is required to
view content that will be indexed, you should create a Confluence user specifically for the search crawler to use. Grant this user view rights to all content you wish to index, but deny that user all delete and administration rights. This ensures that an aggressive crawler will not be able to perform actions that could modify the site. There is also a forum thread on Google Mini integration.

External applications can also use the search function in the Confluence Remote API.

⚠️ The information on this page does not apply to Confluence OnDemand.

Related Information

Page: Setup Confluence To Index External Sites
Page: Setup External Search Tool To Index Confluence
Page: Setup Confluence To Index External Sites
Page: Setup External Search Tool To Index Confluence
Page: Setup Confluence To Index External Sites
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Page: Setup External Search Tool To Index Confluence

Working with Confluence Logs
Confluence uses Apache's log4j logging service. This allows a developer or administrator to control the logging behavior and the log output file by editing a configuration file, without touching the application binary. There are six known log4j logging levels.

If you request help from Atlassian Support, we will almost always ask for the atlassian-confluence.log file from the confluence-home/logs directory. You can access the logs from the Confluence Administration Console, via the support tool. If you cannot access the Confluence Administration Console, check the properties file at <confluence-installation>/confluence/WEB-INF/classes/confluence-init.properties, look for the confluence.home setting in that file, then find the logs in the Confluence home directory.

On this page:
- Finding the Confluence Log Files
- Finding the Log Configuration File
- Changing the Destination of the Log Files
- Changing the Logging Levels
- Using Some Specific Confluence Logging Options
- Scanning Log Files for Known Problems
- Notes

The information on this page does not apply to Confluence OnDemand.

Finding the Confluence Log Files

This section describes Confluence's default logging behaviour, assuming that you have not changed the destination of the logs. In order to unify logging across different application servers, Confluence uses the atlassian-confluence.log as its primary log, not the application server log.

Both the Confluence and Confluence EAR/WAR distributions follow the same default behaviour:

- When you start Confluence, log entries will be sent to the application server logs until Confluence has completed its initial bootstrap. Any log entries written to the console will be repeated into the log in the Confluence home directory as described below.
- Once the initial startup sequence is complete, all logging will be to <confluence-home>/logs/atlassian-confluence.log.

For example: c:/confluence/data/logs/atlassian-confluence.log

Note that the default location is the Confluence home directory, not the application server's log file. The home directory is specified in <confluence-installation>/confluence/WEB-INF/classes/confluence-init.properties.

Finding the Log Configuration File

Confluence's logging behaviour is defined in the following properties file:

<CONFLUENCE-INSTALL>/confluence/WEB-INF/classes/log4j.properties

This file is a standard log4j configuration file, as described in the Apache log4j documentation.

Changing the Destination of the Log Files

Terminology: In log4j, an output destination is called an 'appender'.

To change the destination of the log files, you need to stop Confluence and then change the settings in the 'Logging Location and Appender' section of the log4j.properties file. The location of this file is described above.

In the standard properties file, you will find entries for two appenders:

- com.atlassian.confluence.logging.ConfluenceHomeLogAppender – This is a custom appender which controls the default logging destination described above. This appender allows the following settings:
  - MaxFileSize
  - MaxBackupIndex
- org.apache.log4j.RollingFileAppender – If you want to log to a different location, uncomment the RollingFileAppender line and change the destination file in the line below it. Comment out the previous lines referring to the ConfluenceHomeLogAppender.

Confluence ships with the full suite of appenders offered by log4j. Read more about appenders in the log4j documentation.

Changing the Logging Levels
See Configuring Logging for instructions on how to change the logging configuration of Confluence.

Using Some Specific Confluence Logging Options

This section contains some pointers to specific log configurations you may need.

Log the Details of SQL Requests made to the Database

You may want to increase Confluence's logging so that it records individual SQL requests sent to the database. This is useful for troubleshooting specific problems.

You can enable detailed SQL logging in two ways:

- At runtime – see instructions above.
- Via the logging properties file – see the detailed instructions.

Log the Details of Users Viewing/Accessing each Confluence Page

You can configure the log to show which users are accessing which pages in Confluence. This can only be done via the logging properties file – see the detailed instructions.

Scanning Log Files for Known Problems

Confluence provides an inbuilt log scanner that will check your Confluence logs for errors and attempt to match them against known issues in our knowledge base and bug tracker. See Troubleshooting Problems and Requesting Technical Support.

Notes

- Finding the thread dumps. Thread dumps are logged to the application server log file.

RELATED TOPICS

Important Directories and Files
Enabling Detailed SQL Logging
Enabling user access logging
Generating a Thread Dump
Enabling Page Request Profiling
Troubleshooting Problems and Requesting Technical Support

log4j Logging Levels

Logging Levels

- DEBUG - designates fine-grained informational events that are most useful to debug an application (what is going on)
- INFO - announcements about the normal operation of the system - scheduled jobs running, services starting and stopping, user-triggered processes and actions
- WARN - any condition that, while not an error in itself, may indicate that the system is running sub-optimally
- ERROR - a condition that indicates something has gone wrong with the system
- FATAL - a condition that indicates something has gone wrong so badly that the system can not recover
- TRACE - n/a within confluence

There are two ways to modify the logging levels, as described in Working with Confluence Logs.

1. Modifying the runtime log levels via the Administration Console.
2. Manually modifying the <Confluence-Install>\confluence\WEB-INF\classes\log4j.properties file.

⚠️ The information on this page does not apply to Confluence OnDemand.
Default Log Level

The standard Confluence log level **WARN** is a way for Confluence to communicate with the server administrator. Logging at WARN level and higher should be reserved for situations that require some kind of attention from the server administrator, and for which corrective action is possible.

Reference: log4j manual

User Management

- Understanding User Management in Confluence
- Configuring User Directories
  - Configuring the Internal Directory
  - Connecting to an LDAP Directory
    - Configuring the LDAP Connection Pool
    - Configuring an SSL Connection to Active Directory
  - Connecting to an Internal Directory with LDAP Authentication
  - Connecting to Crowd or JIRA for User Management
    - Reverting from Crowd or JIRA to Internal User Management
  - Connecting to JIRA 4.2 or Earlier for User Management
  - Managing Multiple Directories
  - Managing Nested Groups
  - Synchronising Data from External Directories
  - Diagrams of Possible Configurations for User Management
  - User Management Limitations and Recommendations
  - Requesting Support for External User Management
- Confluence User Management
  - Searching For and Managing Users
  - Adding a New User
  - Adding a Group
  - Adding or Removing Users in Groups
  - Changing Usernames
  - Editing User Details
  - Global Groups Overview
  - Global Permissions Overview
  - Removing a Group
  - Removing or Deactivating a User
  - Setting up Anonymous Access
  - Viewing members of a group
  - Restoring Passwords To Recover Admin User Rights
  - Resetting the Login Count for a User
- Disabling the Built-In User Management

⚠️ The information on this page does not apply to Confluence OnDemand.

Understanding User Management in Confluence

This page introduces the concepts and components of user management in Confluence.

The components of user management are:

- **Authentication**: Determining what user identity is making a request to Confluence.
- **User management**: Storing and retrieving core information about users.
- **Group membership**: Storing and retrieving groups, and group membership.
- **Profile information**: Providing metadata associated with users.

It is important to understand that these are separate components of the user management system. When referring to 'LDAP integration', remember that you could use an LDAP directory for any or all of the above tasks.
Authentication

Seraph

Almost all authentication in Confluence (and JIRA) is performed through Seraph, Atlassian's open source web authentication framework. The goal of Seraph is to provide a simple, extensible authentication system that we can use on any application server.

Seraph is implemented as a servlet filter. Its sole job is, given a web request, to associate that request with a particular user (or no user if the request is anonymous). It supports several methods of authentication, including HTTP Basic Authentication, form-based authentication, and looking up credentials already stored in the user's session.

Seraph itself performs no user management functions. It merely checks the credentials of the incoming request and delegates any user management functions (looking up a user, checking a user's password is correct) to Confluence's user management system.

If you were looking to integrate Confluence with your own single sign-on (SSO) infrastructure, you would do so by installing Atlassian Crowd or by writing a custom Seraph authenticator.

XML-RPC and SOAP Authentication

Normally, requests for Confluence's remote API will include an authentication token as the first argument. With this method of authentication, XML-RPC and SOAP authentication requests are checked directly against the user management framework, and tokens are assigned directly by the remote API subsystem. These requests do not pass through Seraph authenticators.

However, if the token argument is blank, Seraph will be used as a fallback authentication method for remote API requests. So, to use a custom Seraph authenticator with XML-RPC or SOAP requests, ensure that you pass an empty string as the authentication token to remote API methods.

Password Authentication and User Management

By default, password authentication is delegated from Seraph to the user management system. This is not necessary, however. Single sign-on systems may have no password authentication at all, and get all the necessary credentials from the SSO provider.

Confluence User Management Framework

User Management via the Confluence Administration Console

Configuring User Directories

A user directory is a place where you store information about users and groups. User information includes the person's full name, username, password, email address and other personal information. Group information includes the name of the group, the users that belong to the group, and possibly groups that belong to other groups.

The internal directory stores user and group information in the Confluence database. You can also connect to external user directories, and to Atlassian Crowd and JIRA as directory managers. You can configure multiple directories. For example Confluence can draw user information from both the database and an LDAP server.

See Configuring User Directories.

Managing Users and Groups

You can add users and groups, add members to groups, and add profile information to each user. See Confluence User Management.

If you have connected Confluence to more than one user directory, you need to define the directory order. Here is a summary of how the directory order affects the processing:

- 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.
Information about Earlier User Management Frameworks

Atlassian-User – Now Behind the Scenes

Atlassian-User is a user and group management framework developed by Atlassian. It provides user, group and profile management services to Confluence. In earlier versions of Confluence, you needed to configure your user directories by editing the atlassian-user.xml file directly. In Confluence 3.5 and later this is no longer necessary, nor is it possible. Please refer to the documentation for Confluence 3.4 or earlier, if you need details of this framework.

Refer to the Confluence 3.5 Upgrade Notes for details of the automatic migration that will occur during the upgrade process.

OSUser – Obsolete

OpenSymphony User was Confluence's core user management framework before Atlassian-User. Please refer to the documentation for Confluence 3.4 or earlier, if you need details of this framework.

RELATED TOPICS

HTTP authentication with Seraph
User Management

- Understanding User Management in Confluence
- Configuring User Directories
- Confluence User Management
- Disabling the Built-In User Management

Configuring User Directories

A user directory is a place where you store information about users and groups. User information includes the person’s full name, username, password, email address and other personal information. Group information includes the name of the group, the users that belong to the group, and possibly groups that belong to other groups.

The internal directory stores user and group information in the Confluence database. You can also connect to external user directories, and to Atlassian Crowd and JIRA as directory managers.

On this page:

- Configuring User Directories in Confluence
- Connecting to a Directory
- Updating Directories

⚠️ The information on this page does not apply to Confluence OnDemand.

Configuring User Directories in Confluence

To configure your Confluence user directories:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Click ‘User Directories’ in the left-hand panel.

Connecting to a Directory

You can add the following types of directory servers and directory managers:

- Confluence's internal directory. See Configuring the Internal Directory.
- Various other LDAP directory servers. See Connecting to an LDAP Directory.
- An LDAP directory for delegated authentication. See Connecting to an Internal Directory with LDAP Authentication.
- Atlassian Crowd. See Connecting to Crowd or JIRA for User Management.
- Atlassian JIRA 4.3 or later. See Connecting Confluence to JIRA for User Management.
Atlassian JIRA 4.2 or earlier, using the legacy database connection. See Connecting to JIRA 4.2 or Earlier for User Management.

You can add as many external user directories as you need. Note that you can define the order of the directories. This determines which directory Confluence will search first, when looking for user and group information. See Managing Multiple Directories.

**Updating Directories**

**Limitations when Editing Directories**

You cannot edit, disable or remove the directory your user belongs to. This precaution is designed to prevent administrators from locking themselves out of the application by changing the directory configuration in a way that prevents them logging in or removes their administration permissions.

This limitation applies to all directory types. For example:

- You cannot disable the internal directory if your user is an internal user.
- You cannot disable or remove an LDAP or a Crowd directory if your user comes from that directory.

In some situations, reordering the directories will change the directory that the current user comes from, if a user with the same username happens to exist in both. This behaviour can be used in some cases to create a copy of the existing configuration, move it to the top, then remove the old one. Note, however, that duplicate usernames are not a supported configuration.

You cannot remove the internal directory. This precaution aligns with the recommendation below that you always keep an administrator account active in the internal directory.

**Recommendations**

The recommended way to edit directory configurations is to log in as an internal user when making changes to external directory configuration. We recommend that you keep an administrator user active in your internal directory for troubleshooting problems with your user directories.

**Enabling, Disabling and Removing Directories**

You can enable or disable a directory at any time. If you disable a directory, your configuration details will remain but the application will not recognise the users and groups in that directory.

You have to disable a directory before you can remove it. Removing a directory will remove the details from the database.

![Screenshot above: Configuring user directories](image)

**RELATED TOPICS**

- Configuring the Internal Directory
- Connecting to an LDAP Directory
- Connecting to an Internal Directory with LDAP Authentication
- Connecting to Crowd or JIRA for User Management
- Connecting to JIRA 4.2 or Earlier for User Management
- Managing Multiple Directories
- Managing Nested Groups
- Synchronising Data from External Directories
- Diagrams of Possible Configurations for User Management
- User Management Limitations and Recommendations
- Requesting Support for External User Management
- Adding a New User
- Adding a Group
Configuring the Internal Directory

The internal directory stores user and group information in the Confluence database.

Overview

The internal directory is enabled by default at installation. When you create the first administrator during the setup procedure, that administrator's username and other details are stored in the internal directory.

If needed, you can configure one or more additional user directories. This is useful if you want to grant access to users and groups that are stored in a corporate directory or other directory server.

On this page:
- Overview
- Diagram of Possible Configuration

⚠️ The information on this page does not apply to Confluence OnDemand.

Diagram of Possible Configuration

Diagram above: Confluence using its internal directory for user management.

RELATED TOPICS

- Configuring User Directories
- Configuring the Internal Directory
- Connecting to an LDAP Directory
- Connecting to an Internal Directory with LDAP Authentication
- Connecting to Crowd or JIRA for User Management
- Connecting to JIRA 4.2 or Earlier for User Management
- Managing Multiple Directories
- Managing Nested Groups
- Synchronising Data from External Directories
- Diagrams of Possible Configurations for User Management
- User Management Limitations and Recommendations
- Requesting Support for External User Management

How to Reenable the Internal Directory (Knowledge base article)
Connecting to an LDAP Directory

You can connect your Confluence application to an LDAP directory for authentication, user and group management.

Overview
An LDAP directory is a collection of data about users and groups. LDAP (Lightweight Directory Access Protocol) is an Internet protocol that web applications can use to look up information about those users and groups from the LDAP server.

We provide built-in connectors for the most popular LDAP directory servers:

- Microsoft Active Directory
- Apache Directory Server (ApacheDS)
- Apple Open Directory
- Fedora Directory Server
- Novell eDirectory
- OpenDS
- OpenLDAP
- OpenLDAP Using Posix Schema
- Posix Schema for LDAP
- Sun Directory Server Enterprise Edition (DSEE)
- A generic LDAP directory server

When to use this option: Connecting to an LDAP directory server is useful if your users and groups are stored in a corporate directory. When configuring the directory, you can choose to make it read only, read only with local groups, or read/write. If you choose read/write, any changes made to user and group information in the application will also update the LDAP directory.

On this page:
- Overview
- Connecting to an LDAP Directory in Confluence
- Server Settings
- Schema Settings
- Permission Settings
- Adding Users to Groups Automatically
- Advanced Settings
- User Schema Settings
- Group Schema Settings
- Membership Schema Settings
- Diagrams of Some Possible Configurations

The information on this page does not apply to Confluence OnDemand.

Connecting to an LDAP Directory in Confluence

To connect Confluence to an LDAP directory:

1. Go to the Confluence 'Administration Console':
   - Choose Browse -> Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Click 'User Directories' in the left-hand panel.
3. Add a directory and select one of these types:
   - 'Microsoft Active Directory' – This option provides a quick way to select AD, because it is the most popular LDAP directory type.
   - 'LDAP' – You will be able to choose a specific LDAP directory type on the next screen.
4. Enter the values for the settings, as described below.
5. Save the directory settings.
6. Define the directory order by clicking the blue up- and down-arrows next to each directory on the 'User Directories' screen. Here is a summary of how the directory order affects the processing:
   - 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. For details see Managing Multiple Directories.

Server Settings

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<th>Setting</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Setting</td>
<td>Description</td>
</tr>
<tr>
<td>------------------</td>
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</tr>
</tbody>
</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  
  - opends.example.com |
| **Port**         | The port on which your directory server is listening. Examples:  
  - 389  
  - 10389  
  - 636 (for example, for SSL) |
| **Use SSL**      | Tick this check box 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 |
| **Password**     | The password of the user specified above. |

**Schema Settings**

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<thead>
<tr>
<th>Setting</th>
<th>Description</th>
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</table>
| **Base DN**      | The root distinguished name (DN) to use when running queries against the directory server. Examples:  
  - o=example, c=com  
  - cn=users, dc=ad, dc=example, dc=com  
  - For Microsoft Active Directory, specify the base DN in the following format: dc=domain1, dc=local. You will need to replace the domain1 and local for your specific configuration. Microsoft Server provides a tool called ldp.exe which is useful for finding out and configuring the the LDAP structure of your server. |
| **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 |

**Permission Settings**

<table>
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<th>Setting</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td><strong>Read Only</strong></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>
</tbody>
</table>
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.

LDAP users, groups and memberships are retrieved from your directory server. When you modify a user, group or membership via the application administration screens, the changes will be applied directly to your LDAP directory server. Please ensure that the LDAP user specified for the application has modification permissions on your LDAP directory server.

### Adding Users to Groups Automatically

<table>
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<th>Setting</th>
<th>Description</th>
</tr>
</thead>
</table>
| Default Group Memberships | Option available in Confluence 3.5 and later, and JIRA 4.3.3 and later. This field appears if you select the 'Read Only, with Local Groups' permission. If you would like users to be automatically added to a group or groups, enter the group name(s) here. To specify more than one group, separate the group names with commas. 

*In Confluence 3.5 to Confluence 3.5.1:* Each time a user logs in, their group memberships will be checked. If the user does not belong to the specified group(s), their username will be added to the group(s). If a group does not yet exist, it will be added locally.

*In Confluence 3.5.2 and later, and JIRA 4.3.3 and later:* The first time a user logs in, their group memberships will be checked. If the user does not belong to the specified group(s), their username will be added to the group(s). If a group does not yet exist, it will be added locally. On subsequent logins, the username will not be added automatically to any groups. This change in behaviour allows users to be removed from automatically-added groups. In Confluence 3.5 and 3.5.1, they would be re-added upon next login. |

Please note that there is no validation of the group names. If you mis-type the group name, authorisation failures will result – users will not be able to access the applications or functionality based on the intended group name.

Examples:

- `confluence-users`
- `confluence-users,jira-users,jira-developers`

### 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'. 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>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.referal</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>
</tbody>
</table>
| Naive DN Matching | 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. 

- If this check box is ticked, 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. 
- If this check box is not ticked, the application will parse the DN and then check the parsed version. |
Enable Incremental Synchronisation

Enable incremental synchronisation if you only want changes since the last synchronisation to be queried when synchronising a directory.

⚠️ Please be aware that when using this option, the user account configured for synchronisation must have read access to:

- The `uSNChanged` attribute of all users and groups in the directory that need to be synchronised.
- The objects and attributes in the Active Directory deleted objects container (see Microsoft's Knowledge Base Article No. 892806 for details).

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 JIRA.

**Synchronisation Interval (minutes)**

Synchronisation 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>
<tbody>
<tr>
<td>User Object Class</td>
<td>This is the name of the class used for the LDAP user object. Example: <code>user</code></td>
</tr>
<tr>
<td>User Object Filter</td>
<td>The filter to use when searching user objects. Example: <code>{objectCategory=Person} {sAMAccountName=*}</code></td>
</tr>
<tr>
<td>User Name Attribute</td>
<td>The attribute field to use when loading the username. Examples: <code>cn</code>, <code>sAMAccountName</code></td>
</tr>
<tr>
<td>User Name RDN Attribute</td>
<td>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: <code>cn</code></td>
</tr>
<tr>
<td>User First Name Attribute</td>
<td>The attribute field to use when loading the user’s first name. Example: <code>givenName</code></td>
</tr>
<tr>
<td>User Last Name Attribute</td>
<td>The attribute field to use when loading the user’s last name. Example: <code>sn</code></td>
</tr>
<tr>
<td>User Display Name Attribute</td>
<td>The attribute field to use when loading the user’s full name. Example: <code>displayName</code></td>
</tr>
</tbody>
</table>
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

Group Schema Settings

<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>
<tr>
<td>Group Object Filter</td>
<td>The filter to use when searching group objects. Example:</td>
</tr>
<tr>
<td></td>
<td>(objectCategory=Group)</td>
</tr>
<tr>
<td>Group Name Attribute</td>
<td>The attribute field to use when loading the group's name. Example:</td>
</tr>
<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>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>Put a tick in the checkbox 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 ticked, your application will use the group membership attribute on the user when retrieving the members of a given group. This will result in a more efficient retrieval.</td>
</tr>
<tr>
<td></td>
<td>If this checkbox is not ticked, your application will use the members attribute on the group (‘member’ by default) for the search.</td>
</tr>
<tr>
<td></td>
<td>If the ‘Enable Nested Groups’ checkbox is ticked, your application will ignore the ‘Use memberOf Attribute on the User’ option and will use the members attribute on the group for the search.</td>
</tr>
</tbody>
</table>

Use the User Membership Attribute, when finding the members of a group

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Put a tick in the checkbox 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 ticked, your application will use the group membership attribute on the user when retrieving the list of groups to which a given user belongs. This will result in a more efficient search.</td>
</tr>
<tr>
<td></td>
<td>If this checkbox is not ticked, your application will use the members attribute on the group (‘member’ by default) for the search.</td>
</tr>
</tbody>
</table>

Diagrams of Some Possible Configurations
Diagram above: Confluence connecting to an LDAP directory.

Diagram above: Confluence connecting to an LDAP directory with permissions set to read only and local groups.

RELATED TOPICS
Configuring User Directories
Configuring the LDAP Connection Pool

When connection pooling is enabled, the LDAP directory server maintains a pool of connections and assigns them as needed. When a connection is closed, the directory server returns the connection to the pool for future use. This can improve performance significantly.

To configure your LDAP connection pool:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Click 'User Directories' in the left-hand panel.
3. Click 'LDAP Connection Pool Configuration' in the 'Additional Configuration' section.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Pool Size</td>
<td>The number of LDAP connections created when initially connecting to the pool.</td>
<td>1</td>
</tr>
<tr>
<td>Preferred Pool Size</td>
<td>The optimal pool size. LDAP will remove idle connections when the number of connections grows larger than this value. A value of 0 (zero) means that there is no preferred size, so the number of idle connections is unlimited.</td>
<td>10</td>
</tr>
<tr>
<td>Maximum Pool Size</td>
<td>The maximum number of connections. When the number of connections reaches this value, LDAP will refuse further connections. As a result, requests made by an application to the LDAP directory server will be blocked. A value of 0 (zero) means that the number of connections is unlimited.</td>
<td>0</td>
</tr>
<tr>
<td>Pool Timeout (seconds)</td>
<td>The length of time, in seconds, that a connection may remain idle before being removed from the pool. When the application is finished with a pooled connection, the connection is marked as idle, waiting to be reused. A value of 0 (zero) means that the idle time is unlimited, so connections will never be timed out.</td>
<td>30</td>
</tr>
<tr>
<td>Pool Protocol</td>
<td>Only these protocol types will be allowed to connect to the LDAP directory server. If you want to allow multiple protocols, enter the values separated by a space. Valid values are: plain ssl (Both plain and ssl)</td>
<td>plain ssl</td>
</tr>
<tr>
<td>Pool Authentication</td>
<td>Only these authentication types will be allowed to connect to the LDAP directory server. If you want to allow multiple authentication types, enter the values separated by a space. See RFC 2829 for details of LDAP authentication methods. Valid values are: none simple DIGEST-MD5</td>
<td>simple</td>
</tr>
</tbody>
</table>
1. The connection pool settings are system wide and will be used to create a new connection pool for every configured LDAP directory server.
2. You must restart your application server for these settings to take effect.

**RELATED TOPICS**

Connecting to an LDAP Directory
Configuring User Directories

**Administrators Guide Home  Confluence Documentation Home**

**Configuring an SSL Connection to Active Directory**

If you want to configure a read/write connection with Microsoft Active Directory, you will need to install an SSL certificate, generated by your Active Directory server, onto your Confluence server and then install the certificate into your JVM keystore.

The information on this page does not apply to Confluence OnDemand.

**Prerequisites**

To generate a certificate, you need the following components installed on the Windows Domain Controller to which you're connecting.

<table>
<thead>
<tr>
<th>Required Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet Information Services (IIS)</td>
<td>This is required before you can install Windows Certificate Services.</td>
</tr>
<tr>
<td>Windows Certificate Services</td>
<td>This installs a certification authority (CA) which is used to issue certificates. Step 1, below, explains this process.</td>
</tr>
<tr>
<td>Windows 2000 Service Pack 2</td>
<td>Required if you are using Windows 2000</td>
</tr>
</tbody>
</table>

**Step 1. Install the Active Directory Certificate Services**

If Certificate Services are already installed, skip to step 2, below. The screenshots below are from Server 2008, but the process is similar for Server 2000 and 2003.

1. Log in to your Active Directory server as an administrator.
2. Click Start, point to Administrative Tools, and then click Server Manager.
3. In the Roles Summary section, click Add Roles.
4. On the **Select Server Roles** page, select the **Active Directory Certificate Services** check box. Click **Next** twice.

5. On the **Select Role Services** page, select the **Certification Authority** check box, and then click **Next**.
6. On the **Specify Setup Type** page, click **Enterprise**, and then click **Next**.

7. On the **Specify CA Type** page, click **Root CA**, and then click **Next**.
8. On the Set Up Private Key and Configure Cryptography for CA pages, you can configure optional configuration settings, including cryptographic service providers. However, the default values should be fine. Click Next twice.

9. In the Common name for this CA box, type the common name of the CA, and then click Next.
10. On the **Set Validity Period** page, accept the default values or specify other storage locations for the certificate database and the certificate database log, and then click **Next**.
11. After verifying the information on the Confirm Installation Selections page, click Install.
12. Review the information on the results screen to verify that the installation was successful.

Step 2. Obtain the Server Certificate

The steps above describe how to install the certification authority (CA) on your Microsoft Active Directory server. Next, you will need to add the Microsoft Active Directory server’s SSL certificate to the list of accepted certificates used by the JDK that runs your application server.
The Active Directory certificate is automatically generated and placed in root of the C:\ drive, matching a file format similar to the tree structure of your Active Directory server. For example: c:\ad2008.ad01.atlassian.com_ad01.crt.

You can also export the certificate by executing this command on the Active Directory server:

```
keytool
```

### Step 3. Import the Server Certificate

For an application server to trust your directory’s certificate, the certificate must be imported into your Java runtime environment. The JDK stores trusted certificates in a file called a keystore. The default keystore file is called cacerts and it lives in the jre\lib\security sub-directory of your Java installation.

In the following examples, we use server-certificate.crt to represent the certificate file exported by your directory server. You will need to alter the instructions below to match the name actually generated.

#### Windows

1. Navigate to the directory in which Java is installed. It's probably called something like C:\Program Files\Java\jdk1.5.0_12.
2. Run the command below, where server-certificate.crt is the name of the file from your directory server:

```
keytool -import -trustcacerts -keystore cacerts -keypasswd changeit -alias server-name -file server-certificate.crt
```

3. Keytool will prompt you for a password. The default keystore password is changeit.
4. When prompted Trust this certificate? [no]: enter yes to confirm the key import:

```
Enter keystore password:  changeit
Owner: CN=ad01, C=US
Issuer: CN=ad01, C=US
Serial number: 15563d6677a4e9e4582d8a84be683f9
Certificate fingerprints:
Trust this certificate? [no]:  yes
Certificate was added to keystore
```

You may now use the 'Secure SSL' option when connecting your application to your directory server.

#### UNIX

1. Navigate to the directory in which Java is installed. cd $JAVA_HOME will usually get you there.
2. Run the command below, where server-certificate.crt is the name of the file from your directory server:

```
keytool -import -trustcacerts -keystore cacerts -keypasswd changeit -alias server-name -file server-certificate.crt
```

3. Keytool will prompt you for a password. The default keystore password is changeit.
4. When prompted Trust this certificate? [no]: enter yes to confirm the key import:

```
Password:
Enter keystore password:  changeit
Owner: CN=ad01, C=US
Issuer: CN=ad01, C=US
Serial number: 15563d6677a4e9e4582d8a84be683f9
Certificate fingerprints:
Trust this certificate? [no]:  yes
Certificate was added to keystore
```

You may now use the 'Secure SSL' option when connecting your application to your directory server.

#### Mac OS X

1. Navigate to the directory in which Java is installed. This is usually /Library/Java/Home.
2. Run the command below, where server-certificate.crt is the name of the file from your directory server:

```
keytool -import -trustcacerts -keystore cacerts -keypasswd changeit -alias server-name -file server-certificate.crt
```

3. Keytool will prompt you for a password. The default keystore password is changeit.
4. When prompted Trust this certificate? [no]: enter yes to confirm the key import:

```
Password:
Enter keystore password:  changeit
Owner: CN=ad01, C=US
Issuer: CN=ad01, C=US
Serial number: 15563d6677a4e9e4582d8a84be683f9
Certificate fingerprints:
Trust this certificate? [no]:  yes
Certificate was added to keystore
```

You may now use the 'Secure SSL' option when connecting your application to your directory server.
keytool will prompt you for a password. The default keystore password is changeit.

When prompted enter to confirm the key import:

```
Password:
Enter keystore password: changeit
Owner: CN=ad01, C=US
Issuer: CN=ad01, C=US
Serial number: 15563d6677a4e9e4582d8a84be683f9
Certificate fingerprints:
Trust this certificate? [no]: yes
Certificate was added to keystore
```

You may now use the 'Secure SSL' option when connecting your application to your directory server.

RELATED TOPICS

Connecting to an LDAP Directory
Configuring User Directories

Connecting to an Internal Directory with LDAP Authentication

You can connect your Confluence application to an LDAP directory for delegated authentication. This means that Confluence will have an internal directory that uses LDAP for authentication only. There is an option to create users in the internal directory automatically when they attempt to log in, as described in the settings section.

Overview

An internal directory with LDAP authentication offers the features of an internal directory while allowing you to store and check users’ passwords in LDAP only. Note that the 'internal directory with LDAP authentication' is separate from the default 'internal directory'. On LDAP, all that the application does is to check the password. The LDAP connection is read only. Every user in the internal directory with LDAP authentication must map to a user on LDAP, otherwise they cannot log in.

When to use this option: Choose this option if you want to set up a user and group configuration within your application that suits your needs, while checking your users’ passwords against the corporate LDAP directory. This option also helps to avoid the performance issues that may result from downloading large numbers of groups from LDAP.

On this page:

- Overview
- Connecting Confluence to an Internal Directory with LDAP Authentication
- Server Settings
  - Copying Users on Login
- Schema Settings
- Advanced Settings
- User Schema Settings
- Group Schema Settings
- Membership Schema Settings
- Diagrams of Possible Configurations

The information on this page does not apply to Confluence OnDemand.

Connecting Confluence to an Internal Directory with LDAP Authentication

To connect to an internal directory but check logins via LDAP:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Click 'User Directories' in the left-hand panel.
3. Add a directory and select type 'Internal with LDAP Authentication'.
4. Enter the values for the settings, as described below.
5. Save the directory settings.
6. If you want LDAP users to be used in place of existing internal users, move the 'Internal with LDAP Authentication' directory to the top of the list. You can define the directory order by clicking the blue up- and down-arrows next to each directory on the User Directories' screen. Here is a summary of how the directory order affects the processing:
   - 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.
   For details see Managing Multiple Directories.
7. Add your users and groups in Confluence. See Adding a New User and Adding a Group.

Server Settings

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>A descriptive name that will help you to identify the directory. Examples:</td>
</tr>
<tr>
<td></td>
<td>Internal directory with LDAP Authentication</td>
</tr>
<tr>
<td></td>
<td>Corporate LDAP for Authentication Only</td>
</tr>
<tr>
<td>Directory Type</td>
<td>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 some of the options on the rest of the screen. Examples:</td>
</tr>
<tr>
<td></td>
<td>Microsoft Active Directory</td>
</tr>
<tr>
<td></td>
<td>OpenDS</td>
</tr>
<tr>
<td></td>
<td>And more.</td>
</tr>
<tr>
<td>Hostname</td>
<td>The host name of your directory server. Examples:</td>
</tr>
<tr>
<td></td>
<td>ad.example.com</td>
</tr>
<tr>
<td></td>
<td>ldap.example.com</td>
</tr>
<tr>
<td></td>
<td>opends.example.com</td>
</tr>
<tr>
<td>Port</td>
<td>The port on which your directory server is listening. Examples:</td>
</tr>
<tr>
<td></td>
<td>389</td>
</tr>
<tr>
<td></td>
<td>10389</td>
</tr>
<tr>
<td></td>
<td>636 (for example, for SSL)</td>
</tr>
<tr>
<td>Use SSL</td>
<td>Select this check box 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.</td>
</tr>
<tr>
<td>Username</td>
<td>The distinguished name of the user that the application will use when connecting to the directory server. Examples:</td>
</tr>
<tr>
<td></td>
<td>cn=administrator, cn=users, dc=ad, dc=example, dc=com</td>
</tr>
<tr>
<td></td>
<td>cn=user, dc=domain, dc=com</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:user@domain.name">user@domain.name</a></td>
</tr>
<tr>
<td>Password</td>
<td>The password of the user specified above.</td>
</tr>
</tbody>
</table>

Copying Users on Login

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copy User on Login</td>
<td>This option affects what will happen when a user attempts to log in. If this check box is selected, the user will be created automatically in the internal directory when the user first logs in and their details will be synchronised on each subsequent log in. If this check box is not selected, the user's login will fail.</td>
</tr>
<tr>
<td></td>
<td>If you select this check box the following additional fields will appear on the screen, which are described in more detail below:</td>
</tr>
<tr>
<td></td>
<td>Default Group Memberships</td>
</tr>
<tr>
<td></td>
<td>Synchronise Group Memberships</td>
</tr>
<tr>
<td></td>
<td>User Schema Settings (described in a separate section below)</td>
</tr>
<tr>
<td>Setting</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Base DN</td>
<td>The root distinguished name (DN) to use when running queries against the directory server. Examples:</td>
</tr>
<tr>
<td></td>
<td>o=example,c=com</td>
</tr>
<tr>
<td></td>
<td>cn=users,dc=ad,dc=example,dc=com</td>
</tr>
<tr>
<td></td>
<td>For Microsoft Active Directory, specify the base DN in the following format: dc=domain1,dc=local. You will need to replace the domain1 and local for your specific configuration. Microsoft Server provides a tool called ldp.exe which is useful for finding out and configuring the LDAP structure of your server.</td>
</tr>
<tr>
<td>User Name Attribute</td>
<td>The attribute field to use when loading the username. Examples:</td>
</tr>
<tr>
<td></td>
<td>cn</td>
</tr>
<tr>
<td></td>
<td>sAMAccountName</td>
</tr>
</tbody>
</table>

### Advanced Settings

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<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 java.naming.refferal) configuration setting. It is generally needed for Active Directory servers configured without proper DNS, to prevent a 'javax.naming.PartialResultException: Unprocessed Continuation Reference(s)’ error.</td>
</tr>
</tbody>
</table>

### User Schema Settings

Note: this section is only visible when **Copy User on Login** is enabled.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional User DN</td>
<td>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:</td>
</tr>
<tr>
<td></td>
<td>ou=Users</td>
</tr>
<tr>
<td>User Object Class</td>
<td>This is the name of the class used for the LDAP user object. Example:</td>
</tr>
<tr>
<td></td>
<td>user</td>
</tr>
</tbody>
</table>
### User Object Filter

The filter to use when searching user objects. Example:

- `{(&(objectCategory=Person)(sAMAccountName=*))}`

### 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`

### Group Schema Settings

Note: this section is only visible when both **Copy User on Login** and **Synchronise Group Memberships** are enabled.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional Group DN</td>
<td>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:</td>
</tr>
<tr>
<td></td>
<td><code>ou=Groups</code></td>
</tr>
<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><code>groupOfUniqueNames</code></td>
</tr>
<tr>
<td></td>
<td><code>group</code></td>
</tr>
<tr>
<td>Group Object Filter</td>
<td>The filter to use when searching group objects. Example:</td>
</tr>
<tr>
<td></td>
<td><code>{objectCategory=Group}</code></td>
</tr>
<tr>
<td>Group Name Attribute</td>
<td>The attribute field to use when loading the group’s name. Example:</td>
</tr>
<tr>
<td></td>
<td><code>cn</code></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><code>description</code></td>
</tr>
</tbody>
</table>

### Membership Schema Settings

Note: this section is only visible when both **Copy User on Login** and **Synchronise Group Memberships** are enabled.

<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><code>member</code></td>
</tr>
</tbody>
</table>
User Membership Attribute

The attribute field to use when loading the user's groups. Example:

- `memberOf`

Use the User Membership Attribute, when finding the user's group membership

Select the check box if your directory server supports the group membership attribute on the user. (By default, this is the `memberOf` attribute.)

- If this check box is selected, your application will use the group membership attribute on the user when finding the members of a given group. This will result in a more efficient retrieval.
- If this check box is not selected, your application will use the members attribute on the group ("member" by default) for the search.

Diagrams of Possible Configurations

Confluence

Authentication

Updates and queries

Authentication, updates and queries

LDAP

Confluence database (internal directory with LDAP auth)

Confluence database (internal directory)

Diagram above: Confluence connecting to an LDAP directory for authentication only.
Diagram above: Confluence connecting to an LDAP directory for authentication only, with each user synchronised with the internal directory when they log in to Confluence.

**RELATED TOPICS**

- Configuring User Directories
- Configuring the Internal Directory
- Connecting to an LDAP Directory
- Connecting to an Internal Directory with LDAP Authentication
- Connecting to Crowd or JIRA for User Management
- Connecting to JIRA 4.2 or Earlier for User Management
- Managing Multiple Directories
- Managing Nested Groups
- Synchronising Data from External Directories
- Diagrams of Possible Configurations for User Management
- User Management Limitations and Recommendations
- Requesting Support for External User Management

**Connecting to Crowd or JIRA for User Management**

You can connect your Confluence application to Atlassian Crowd or to JIRA (version 4.3 or later) for management of users and groups, and for authentication (verification of a user’s login).

**On this page:**

- Connecting Confluence to Crowd for User Management
- Connecting Confluence to JIRA for User Management
- Diagrams of Some Possible Configurations

⚠️ The information on this page does not apply to Confluence OnDemand.

**Connecting Confluence to Crowd for User Management**

Atlassian Crowd is an application security framework that handles authentication and authorisation for your web-based applications. With Crowd you can integrate multiple web applications and user directories, with support for single sign-on (SSO) and centralised identity...
management. The Crowd Administration Console provides a web interface for managing directories, users and their permissions. See the Crowd Administration Guide.

**When to use this option:** Connect to Crowd if you want to use the full Crowd functionality to manage your directories, users and groups. You can connect your Crowd server to a number of directories of all types that Crowd supports, including custom directory connectors.

**To connect Confluence to Crowd:**

1. Go to your Crowd Administration Console and define the Confluence application to Crowd. See the Crowd documentation: Adding an Application.
2. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
3. Click 'User Directories' in the left-hand panel.
4. Add a directory and select type 'Atlassian Crowd'. Enter the settings as described below.
5. Save the directory settings.
6. Define the directory order by clicking the blue up- and down-arrows next to each directory on the 'User Directories' screen. Here is a summary of how the directory order affects the processing:
   - 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.
   - For details see Managing Multiple Directories.
7. If required, configure Confluence to use Crowd for single sign-on (SSO) too. See the Crowd documentation: Integrating Crowd with Atlassian Confluence.

**Crowd Settings in Confluence**

<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 recognised 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**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read Only</td>
<td>The users, groups and memberships in this directory are retrieved from Crowd and can only be modified via Crowd. You cannot modify Crowd users, groups or memberships via the application administration screens.</td>
</tr>
<tr>
<td>Read/Write</td>
<td>The users, groups and memberships in this directory are retrieved from Crowd. When you modify a user, group or membership via the application administration screens, the changes will be applied directly to Crowd. Please ensure that the application has modification permissions for the relevant directories in Crowd. See the Crowd documentation: Specifying an Application's Directory Permissions.</td>
</tr>
</tbody>
</table>

**Advanced Crowd 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>
</tbody>
</table>
Synchronisation Interval (minutes)

Synchronisation 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.

Connecting Confluence to JIRA for User Management

Subject to certain limitations, you can connect a number of Atlassian web applications to a single JIRA server for centralised user management.

When to use this option: You can only connect to a server running JIRA 4.3 or later. Choose this option as an alternative to Atlassian Crowd, for simple configurations with a limited number of users.

If you are running JIRA 4.2 or earlier, please see Connecting to JIRA 4.2 or Earlier for User Management.

To connect Confluence to JIRA 4.3 or later:

1. Go to your JIRA administration screen and define the Confluence application to JIRA:
   - For JIRA 4.3.x, select ‘Other Applications’ from the ‘Users, Groups & Roles’ section of the ‘Administration’ menu.
   - For JIRA 4.4 or later, select ‘Users’ > ‘JIRA User Server’ in Administration mode.
   - Click ‘Add Application’.
   - Enter the application name and password that Confluence will use when accessing JIRA.
   - Enter the IP address or addresses of your Confluence server. 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 and RFC 4632.
   - Save the new application.

2. Set up the JIRA user directory in Confluence:
   - Go to the Confluence ‘Administration Console’:
     - Choose ‘Browse’ > ‘Confluence Admin’. The ‘Administrator Access’ login screen will be displayed.
     - Enter your password and click ‘Confirm’. You will be temporarily logged into a secure session to access the ‘Administration Console’.
     - Click ‘User Directories’ in the left-hand panel.
     - Add a directory and select type ‘Atlassian JIRA’.
     - Enter the settings as described below. When asked for the application name and password, enter the values that you defined for your Confluence application in the settings on JIRA.
     - Save the directory settings.
     - Define the directory order by clicking the blue up- and down-arrows next to each directory on the ‘User Directories’ screen. Here is a summary of how the directory order affects the processing:
       - 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.
     - For details see Managing Multiple Directories.

3. In order to use Confluence, users must be a member of the confluence-users group or have Confluence ‘can use’ permission. Follow these steps to configure your Confluence groups in JIRA:
   a. Add the confluence-users and confluence-administrators groups in JIRA.
   b. Add your own username as a member of both of the above groups.
   c. Choose one of the following methods to give your existing JIRA users access to Confluence:
      - Option 1: In JIRA, find the groups that the relevant users belong to. Add the groups as members of one or both of the above Confluence groups.
      - Option 2: Log in to Confluence using your JIRA account and go to the Confluence Administration Console. Click ‘Global Permissions’ and assign the ‘can use’ permission to the relevant JIRA groups.

JIRA Settings in Confluence

<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 amongst your list of directory servers. Examples:</td>
</tr>
<tr>
<td></td>
<td>- JIRA 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>
<tr>
<td>Application Name</td>
<td>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 &amp; Roles’ section of the ‘Administration’ menu.</td>
</tr>
</tbody>
</table>
Application Password

The password used by your application when accessing the JIRA server that acts as user manager.

**JIRA Permissions**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read Only</td>
<td>The users, groups and memberships in this directory are retrieved from the JIRA server that is acting as user manager. They can only be modified via that JIRA server.</td>
</tr>
<tr>
<td>Read/Write</td>
<td>The users, groups and memberships in this directory are retrieved from the JIRA server that is acting as user manager. When you modify a user, group or membership, the changes will be applied directly to your application and to the JIRA server that is acting as user manager.</td>
</tr>
</tbody>
</table>

**Advanced JIRA 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>Synchronisation Interval (minutes)</td>
<td>Synchronisation 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>

**Diagrams of Some Possible Configurations**
Diagram above: Confluence, JIRA and other applications connecting to Crowd for user management.
Diagram above: Confluence connecting to JIRA for user management.
Diagram above: Confluence connecting to JIRA for user management, with JIRA in turn connecting to LDAP.

**RELATED TOPICS**

**Configuring User Directories**

- Configuring the Internal Directory
- Connecting to an LDAP Directory
- Connecting to an Internal Directory with LDAP Authentication
- Connecting to Crowd or JIRA for User Management
Reverting from Crowd or JIRA to Internal User Management

If your Confluence site currently uses JIRA or Crowd for user management, you can revert to internal user management as described below. If your Confluence instance has only a few users, it is easier to recreate the users and groups in Confluence manually. If you have a large number of users and groups, it is more efficient to migrate the relevant users and groups into the Confluence Internal directory.

Both options provided below will reset the affected users' passwords. When done, be sure to notify them to use the 'Reset My Password' link on the Confluence log in page before they attempt to log in.

Reverting from Crowd or JIRA to Internal User Management

Option 1 – Manually Recreate Users and Groups in Confluence

Use this option if you have only a few users and groups.

1. Log in to Confluence as a Confluence system administrator.
2. Go to the user directories administration screen and move the internal directory to the top of the list of directories, by clicking the arrows in the 'Order' column.
3. Make sure that you have at least one user from the internal directory in each of the confluence-users and confluence-administrators groups.
4. Make sure that you have a username in the internal directory with Confluence system administrator permissions.
   * If you do not have such a user, add a new one now, and log out of Confluence.
   * Log back in as the user you just added, and go back to the user directories administration screen.
5. Disable the Atlassian Crowd directory.
6. Manually add the required users and groups in Confluence. They will be added to the internal directory, because you have moved it to the top of the list of directories.
   * If you have assigned Confluence permissions to a group which exists in JIRA, you must create a group in Confluence with the same name.
   * If a user who exists in JIRA has created content or has had permissions assigned to them in Confluence, you must also create that user in Confluence.
7. Add the users to the required groups.

Option 2 – Transfer Crowd/JIRA Users and Groups to the Confluence Database

Use this option to migrate External Application (Crowd or JIRA) users into the Confluence database. You need a knowledge of SQL to perform this task.

The SQL commands given below are tailored for MySQL. If you are using a database other than MySQL, you will need to modify the SQL to work in your database.

Step 1. Create Backups

Creating backups is the only way to restore your data if something goes wrong.

1. From Confluence, create a full XML site backup including attachments.
2. Stop Confluence.
3. Make a backup copy of the Confluence home and installation directories.
4. Repeat the above steps for your External Application.
5. From your MySQL administration tool, create a database backup for the Crowd/JIRA and Confluence databases.

Step 2. Replace Confluence User Management

Use the SQL below to move groups and users from your External Application to Confluence by transferring table content. The SQL provided is specific to MySQL and must be modified for other databases.
Find the IDs for your Directories

1. Run the following command and take note of the resulting number. It will be referenced throughout the following instructions as <Confluence Internal ID>.

   ```sql
   select id from cwd_directory where directory_name='Confluence Internal Directory';
   ```

2. From the User Directories administration page, find the name of the directory who's users/groups you want to move. Run the following command and take note of the resulting number. It will be referenced throughout the following instructions as <External Application ID>.

   ```sql
   select id from cwd_directory where directory_name='External Directory Name';
   ```

Move Groups to Confluence

1. It is possible that you have several groups in your Internal Directory that have the same name as groups in your External Application. To find these, run:

   ```sql
   select distinct a.id, a.directory_id, a.group_name, d.directory_name from cwd_group a
   join cwd_group b on a.group_name=b.group_name join cwd_directory d on d.id=a.directory_id
   where a.directory_id != b.directory_id;
   ```

   a. If you have results from the previous query, for each of the group names that have duplicates, find the id for the group in the Confluence Internal Directory (<internal group id>) and the External Application (<external group id>). Run the following:

   ```sql
   update cwd_group_attribute set group_id=<internal group id>, directory_id=<Confluence Internal Id> where group_id=<external group id>;
   update cwd_membership set child_group_id=<internal group id> where child_group_id=<external group id>;
   update cwd_membership set parent_id=<internal group id> where parent_id=<external group id>;
   delete from cwd_group where id=<external group id>;
   ```

2. Move all the groups in the External Application to the Confluence Internal Directory.

   ```sql
   update cwd_group set directory_id=<Confluence Internal ID> where directory_id=<External Application ID>;
   ```

Move Users to Confluence

1. It is possible that you have several users in your Internal Directory that have the same name as users in your External Application. To find these, run:

   ```sql
   select distinct a.id, a.directory_id, a.user_name, d.directory_name from cwd_user a join cwd_user b on a.user_name=b.user_name join cwd_directory d on d.id=a.directory_id
   where a.directory_id != b.directory_id;
   ```

   a. If you have results from the previous query, for each of the user names that have duplicates, find the id for the user in the Confluence Internal Directory (<internal user id>) and the External Application (<external user id>). Run the following:

   ```sql
   update cwd_user_attribute set user_id=<internal user id>, directory_id=<Confluence Internal Id> where user_id=<external user id>;
   update cwd_membership set child_group_id=<internal group id> where child_group_id=<external group id>;
   update cwd_membership set parent_id=<internal group id> where parent_id=<external group id>;
   delete from cwd_user where id=<external group id>;
   ```

update cwd_user set directory_id=<Confluence Internal ID> where directory_id=<External Application ID>;

Delete the External Application directory

1. You need to change the order of your directories so that the Internal directory is at the top, and active.
   a. If you have only two directories - the Internal and the External Application directory you are deleting, then do the following:

update cwd_app_dir_mapping set list_index = 0 where directory_id = <Confluence Internal ID>;

b. If you have more than two directories, you need to rearrange them so the Internal Directory is at the top (list_index 0) and the External Application directory you are deleting is at the bottom.
   • List the directories and their order using

   ```sql
   select d.id, d.directory_name, m.list_index from cwd_directory d join cwd_app_dir_mapping m on d.id=m.directory_id order by m.list_index;
   ```

   • Change the list indexes so that they are in the order you want. Directory order can be rearranged using

   ```sql
   update cwd_app_dir_mapping set list_index = <position> where directory_id = <directory id>;
   ```

c. Check that the internal directory is enabled.
   • List the internal directory. An enabled directory will have its 'active' column set to 'T'

   ```sql
   select id, directory_name, active from cwd_directory where id = <Internal Directory id>;
   ```

   • If the internal directory is not active, activate it by

   ```sql
   update cwd_directory set active = 'T' where id = <Internal Directory id>;
   ```

2. When the directories are ordered correctly, delete the External Application directory from the directory order:

   ```sql
   delete from cwd_app_dir_operation where app_dir_mapping_id = (select id from cwd_app_dir_mapping where directory_id = <External Application ID>);
   delete from cwd_app_dir_mapping where directory_id = <External Application ID>;
   ```

3. The External Application directory is referenced in several other tables in the database. You need to remove the remaining references to it:
3. Delete from cwd_directory_attribute where directory_id=<External Application ID>;
   delete from cwd_directory_operation where directory_id=<External Application ID>;

4. All references to the External Directory should now have been removed. Delete the directory using:
   delete from cwd_directory where id = <External Application ID>;

Reset passwords

1. All users who were in the External Directory you deleted, including admins, will be unable to log in. Their passwords need to be reset by choosing the 'Forgot your password?' link on the login page. Alternatively, use the instructions at Restoring Passwords To Recover Admin User Rights to reset the administrator password, then set the users' passwords for them via the Manage Users page in the administration screen.

RELATED TOPICS
Configuring User Directories

Connecting to JIRA 4.2 or Earlier for User Management

Atlassian JIRA is an issue and project tracking tool. Like Confluence, JIRA offers the ability to store its users and groups in its database. You can configure Confluence to look for its users and groups in the JIRA database. This page describes the legacy JIRA database connector, which provides a direct connection to the JIRA database.

When to use this option: Choose the legacy JIRA database connector if your JIRA server is JIRA 4.2 or earlier, for backwards compatibility with the already-existing option for Confluence to use JIRA for user management.

If you are using JIRA 4.3 or later, you cannot use the legacy JIRA database connector. Instead, choose the 'Atlassian JIRA' directory type.

On this page:
- Connecting Confluence to JIRA
- JIRA Settings in Confluence

⚠️ The information on this page does not apply to Confluence OnDemand.

Connecting Confluence to JIRA

To connect Confluence to JIRA 4.2 or earlier:

1. Edit the Confluence server.xml file, to construct the datasource location, as described below.
2. Restart Confluence.
3. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
4. Click User Directories in the left-hand panel.
5. Add a directory and select type Legacy Atlassian JIRA (4.2 and earlier). Enter the settings as described below.
6. Save the directory settings.
7. Define the directory order by clicking the blue up- and down-arrows next to each directory on the 'User Directories' screen. Here is a summary of how the directory order affects the processing:
   - 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.
   For details see Managing Multiple Directories.
8. In order to use Confluence, users must be a member of the confluence-users group or have Confluence 'can use' permission. Follow these steps to configure your Confluence groups in JIRA:
   a. Add the confluence-users and confluence-administrators groups in JIRA.
   b. Add your own username as a member of both of the above groups.
   c. Choose one of the following methods to give your existing JIRA users access to Confluence:
      - Option 1: In JIRA, find the groups that the relevant users belong to. Add the groups as members of one or both of the above Confluence groups.
      - Option 2: Log in to Confluence using your JIRA account and go to the Confluence Administration Console. Click 'Global Permissions' and assign the 'can use' permission to the relevant JIRA groups.

JIRA Settings in Confluence
### Setting | Description
---|---
Name | A meaningful name that will help you to identify this JIRA server amongst your list of directory servers. Examples:
- JIRA
- Example Company JIRA

Datasource Location | The JNDI name of the JIRA datasource configured in your application server. Example:
java:comp/env/jdbc/YourJiraDatasource

In JIRA standalone distributions (using the default application server, Tomcat 6) you can construct the datasource location as follows:

1. Open your `<jira_install>/conf/server.xml` file in a text editor.
2. Look for the database setup section in that file. It looks something like this:

   ```
   <Resource name="JiraDS" type="javax.sql.DataSource">
   <JndiUrl>java:comp/env/jdbc/YourJiraDatasource</JndiUrl>
   </Resource>
   ```

3. Copy the above lines (the 'Resource' section) and paste it to your Confluence's server.xml file (located at `<confluence_install>/conf/server.xml`), under the Context path. This will then expose the value of the name attribute as the JNDI resource locator.

4. Copy the JNDI name from the name parameter. In this example, the datasource location is: java:comp/env/jdbc/JiraDS

### RELATED TOPICS
- Configuring User Directories
- Configuring Multiple Directories
- Managing Multiple Directories
- Managing Nested Groups
- Synchronising Data from External Directories
- Diagrams of Possible Configurations for User Management
- User Management Limitations and Recommendations
- Requesting Support for External User Management

---

## Managing Multiple Directories

This page describes what happens when you have defined more than one user directory in Confluence. For example, you may have an internal directory and you may also connect to an LDAP directory server and/or other types of user directories. When you connect to a new directory server, you also need to define the directory order.

**Duplicate usernames across directories are not supported.** If you are connecting to more than one user directory, please ensure that the usernames are unique to one directory. For example, if you have a user `j smith` in both 'Directory1' and 'Directory2', that is an unsupported configuration.

### Overview

Here is a summary of how the directory order affects the processing:

- 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.

---

⚠️ The information on this page does not apply to Confluence OnDemand.
Configuring the Directory Order

You can change the order of your directories as defined to Confluence. Select 'User Directories' from the Confluence Administration Console and click the blue up- and down-arrows next to each directory.

<table>
<thead>
<tr>
<th>Directory Name</th>
<th>Type</th>
<th>Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confluence Internal Directory</td>
<td>Internal</td>
<td></td>
</tr>
<tr>
<td>OpenLDAP</td>
<td>OpenLDAP (Read-Write)</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
- Please read the rest of this page to understand what effect the directory order will have on authentication (login) and permissions in Confluence, and what happens when you update users and groups in Confluence.

Effect of Directory Order

This section summarises the effect the order of the directories will have on login and permissions, and on the updating of users and groups.

Login

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.

Permissions

The directory order is significant when granting the user permissions based on group membership. If the same username exists in more than one directory, the application will look for group membership only in the first directory where the username appears, based on the directory order.

Example:
- You have connected two directories: The Customers directory and the Partners directory.
- The Customers directory is first in the directory order.
- A username `jsmith` exists in both the Customers directory and the Partners directory.
- The user `jsmith` is a member of group `G1` in the Customers directory and group `G2` in the Partners directory.
- The user `jsmith` will have permissions based on membership of `G1` only, not `G2`.

Updating Users and groups

If you update a user or group via the application's administration screens, the update will be made in the first directory where the application has write permissions.

Example 1:
- You have connected two directories: The Customers directory and the Partners directory.
- The application has permission to update both directories.
- The Customers directory is first in the directory order.
- A username `jsmith` exists in both the Customers directory and the Partners directory.
- You update the email address of user `jsmith` via the application's administration screens.
- The email address will be updated in the Customers directory only, not the Partners directory.

Example 2:
- You have connected two directories: A read/write LDAP directory and the internal directory.
- The LDAP directory is first in the directory order.
- All new users will be added to the LDAP directory. It is not possible to add a new user to the internal directory.

RELATED TOPICS

- Configuring User Directories
- Configuring the Internal Directory
- Connecting to an LDAP Directory
- Connecting to an Internal Directory with LDAP Authentication
- Connecting to Crowd or JIRA for User Management
- Connecting to JIRA 4.2 or Earlier for User Management
- Managing Multiple Directories
- Managing Nested Groups
- Synchronising Data from External Directories
- Diagnostics of Possible Configurations for User Management
- User Management Limitations and Recommendations
- Requesting Support for External User Management
Managing 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’. 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.

This page describes how Confluence handles nested groups that exist in one or more of your directory servers.

Enabling Nested Groups

You can enable or disable support for nested groups on each directory individually. Go to the ‘User Directories’ section of the Confluence Administration Console, edit the directory and select ‘Enable Nested Groups’. See Configuring User Directories.

Notes:

• Before enabling nested groups for a specific directory type in Confluence, please make sure that your directory server supports nested groups.
• Please read the rest of this page to understand what effect nested groups will have on authentication (login) and permissions in Confluence, and what happens when you update users and groups in Confluence.

On this page:

• Enabling Nested Groups
• Effect of Nested Groups
  • Login
  • Permissions
  • Viewing Lists of Group Members
  • Adding and Updating Group Memberships
• Examples
  • Example 1: User is Member of Sub-Group
  • Example 2: Sub-Groups as Members of the ‘jira-developers’ group
  • Example 3: Sub-Groups as Members of the ‘confluence-users’ group
• Notes

Effect of Nested Groups

This section summarises the effect nested groups will have on login and permissions, and on the viewing and updating of users and groups.

Login

When a user logs in, they will be allowed access to the application if they belong to an authorised group or any of its sub-groups.

Permissions

The user will be allowed access to a function if they belong to a group that has the necessary permissions, or if they belong to any of its sub-groups.

Viewing Lists of Group Members

If you ask to view the members of a group, you will see all users who are members of the group and all users belonging its sub-groups, consolidated into one list. We call this a ‘flattened’ list.

You cannot view or edit the nested groups themselves. You will not be able to see that one group is a member of another group.

Adding and Updating Group Memberships

If you add a user to a group, the user is added to the named group and not to any other groups.

If you try to remove a user from a flattened list, the following will happen:

• If the user is a member of the top group in the hierarchy (tree) of groups contained in the flattened list, the user will be removed from the group.
• Otherwise, you will see an error message stating that the user is not a direct member of the group.

Examples
Example 1: User is Member of Sub-Group

Let’s assume that the following two groups exist in your directory server:

- staff
- marketing

Memberships:

- The marketing group is a member of the staff group.
- User jsmith is a member of marketing.

You will see that jsmith is a member of both marketing and staff. You will not see that the two groups are nested. If you assign permissions to the staff group, then jsmith will get those permissions.

Example 2: Sub-Groups as Members of the 'jira-developers' group

In an LDAP directory server, we have groups 'engineering-group' and 'techwriters-group'. We want to grant both groups developer-level access to our JIRA site.

- Add a group called 'jira-developers'.
- Add the 'engineering-group' as a sub-group of 'jira-developers'.
- Add the 'techwriters-group' as a sub-group of 'jira-developers'.

Group memberships are now:

- jira-developers — sub-groups: engineering-group, techwriters-group
- engineering-group — sub-groups: dev-a, dev-b; users: pblack
- dev-a — users: jsmith, sbrown
- dev-b — users: jsmith,dblue
- techwriters-group — users: rgreen

When JIRA requests a list of users in the 'jira-developers' group, it will receive the following list:

- pblack
- jsmith
- sbrown
- dblue
- rgreen

Diagram: Sub-groups as members of the 'jira-developers' group
Example 3: Sub-Groups as Members of the 'confluence-users' group

In an LDAP directory server, we have groups 'engineering-group' and 'payroll-group'. We want to grant both groups access to our Confluence site.

- Add a group called 'confluence-users'.
- Add the 'engineering-group' as a sub-group of 'confluence-users'.
- Add the 'payroll-group' as a sub-group of 'confluence-users'.

Group memberships are now:

- confluence-users — sub-groups: engineering-group, payroll-group
- engineering-group — sub-groups: dev-a, dev-b; users: pblack
- dev-a — users: jsmith, sbrown
- dev-b — users: jsmith, dbblue
- payroll-group — users: rgreen

When Confluence requests a list of users in the 'confluence-users' group, it will receive the following list:

- pblack
- jsmith
- sbrown
- dbblue
- rgreen

Diagram: Sub-groups as members of the 'confluence-users' group
Notes

- **Possible impact on performance.** Enabling nested groups may result in slower user searches.

- **Definition of nested groups in LDAP.** In an LDAP directory, a nested group is defined as a child group entry whose DN (Distinguished Name) is referenced by an attribute contained within a parent group entry. For example, a parent group 'Group One' might have an `objectClass=group` attribute and one or more `member=DN` attributes, where the DN can be that of a user or that of a group elsewhere in the LDAP tree.

### RELATED TOPICS

**Configuring User Directories**
- Configuring the Internal Directory
- Connecting to an LDAP Directory
- Connecting to an Internal Directory with LDAP Authentication
- Connecting to Crowd or JIRA for User Management
- Connecting to JIRA 4.2 or Earlier for User Management
- Managing Multiple Directories
- Managing Nested Groups
- Synchronising Data from External Directories
- Diagrams of Possible Configurations for User Management
- User Management Limitations and Recommendations
- Requesting Support for External User Management

## Synchronising Data from External Directories

For certain directory types, Confluence stores a cache of directory information (users and groups) in the application database, to ensure fast recurrent access to user and group data. A synchronisation task runs periodically to update the internal cache with changes from the external directory.
Confluence 4.0 Documentation

On this page:
- Affected Directory Types
- How it Works
- Finding the Time Taken to Synchronise
- Manually Synchronising the Cache
- Configuring the Synchronisation Interval

⚠️ The information on this page does not apply to Confluence OnDemand.

Affected Directory Types

Data caching and synchronisation apply to the following user directory types:

- **LDAP** (Microsoft Active Directory and all supported LDAP directories) where permissions are set to **read only**.
- **LDAP** (Microsoft Active Directory and all supported LDAP directories) where permissions are set to **read only, with local groups**.
- **LDAP** (Microsoft Active Directory and all supported LDAP directories) where permissions are set to **read/write**.
- **Atlassian Crowd**.
- **Atlassian JIRA**.

Data caching and synchronisation do not occur for the following user directory types:

- **LDAP** (Microsoft Active Directory and all supported LDAP directories) where permissions are set to **authentication only, with local groups**.
- **Internal Directory with LDAP Authentication**.
- **Internal Directory**.

How it Works

Here is a summary of the caching functionality:

- The caches are held in the application database.
- When you connect a new external user directory to the application, a synchronisation task will start running in the background to copy all the required users, groups and membership information from the external directory to the application database. This task may take a while to complete, depending on the size and complexity of your user base.
- Note that a user will not be able to log in until the synchronisation task has copied that user’s details into the cache.
- A periodic synchronisation task will run to update the database with any changes made to the external directory. The default synchronisation interval, or polling interval, is one hour (60 minutes). You can change the synchronisation interval on the directory configuration screen.
- You can manually synchronise the cache if necessary.
- If the external directory permissions are set to read/write: Whenever an update is made to the users, groups or membership information via the application, the update will also be applied to the cache and the external directory immediately.
- All authentication happens via calls to the external directory. When caching information from an external directory, the application database does not store user passwords.
- All other queries run against the internal cache.

Finding the Time Taken to Synchronise

The ‘User Directories’ screen shows information about the last synchronisation operation, including the length of time it took.

Manually Synchronising the Cache

You can manually synchronise the cache by clicking ‘Synchronise’ on the ‘User Directories’ screen. If a synchronisation operation is already in progress, you cannot start another until the first has finished.

Screen snippet: User directories, showing information about synchronisation

<table>
<thead>
<tr>
<th>Directory Type</th>
<th>Description</th>
<th>Synchronisation Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>OpenLDAP</td>
<td>OpenLDAP (Read-Write)</td>
<td>Disable Edit Synchronise</td>
</tr>
<tr>
<td>Crowd</td>
<td>Atlassian Crowd</td>
<td>Disable Edit Synchronise</td>
</tr>
</tbody>
</table>

Configuring the Synchronisation Interval

Note: The option to configure the synchronisation interval for Crowd and JIRA directories is available in Confluence 3.5.3 and later. Earlier versions of Confluence allow you to configure the interval for LDAP directories only.

You can set the ‘Synchronisation Interval’ on the directory configuration screen. The synchronisation interval is the period of time to wait between requests for updates from the directory server.

The length you choose for your synchronisation interval depends on:
• The length of time you can tolerate stale data.
• The amount of load you want to put on the application and the directory server.
• The size of your user base.

If you synchronise more frequently, then your data will be more up to date. The downside of synchronising more frequently is that you may overload your server with requests.

If you are not sure what to do, we recommend that you start with an interval of 60 minutes (this is the default setting) and reduce the value incrementally. You will need to experiment with your setup.

**RELATED TOPICS**

Configuring User Directories

- Configuring the Internal Directory
- Connecting to an LDAP Directory
- Connecting to an Internal Directory with LDAP Authentication
- Connecting to Crowd or JIRA for User Management
- Managing Multiple Directories
- Managing Nested Groups
- Synchronising Data from External Directories
- Diagrams of Possible Configurations for User Management
- User Management Limitations and Recommendations
- Requesting Support for External User Management

**Diagrams of Possible Configurations for User Management**

The aim of these diagrams is to help people understand each directory type at a glance. We have kept the diagrams simple and conceptual, with just enough information to be correct.

Some things that we do **not** attempt to show:

- In most cases, we do not attempt to show that you can have multiple directory types mapped to Confluence at the same time. We illustrate that fact in just the first two LDAP diagrams.
- We have not included a diagram for Confluence's legacy connection to JIRA database.
- We do not attempt to show all of the possible configurations and layered connections that are available now that you can use JIRA as a directory manager.

**On this page:**

- Confluence Internal Directory
- Confluence with Read/Write Connection to LDAP
- Confluence with Read-Only Connection to LDAP, with Local Groups
- Confluence Internal Directory with LDAP Authentication
- Confluence with LDAP Authentication, Copy Users on First Login
- Confluence Connecting to JIRA
- Confluence Connecting to JIRA and JIRA Connecting to LDAP
- Confluence and JIRA Connecting to Crowd

⚠️ The information on this page does not apply to Confluence OnDemand.

Confluence Internal Directory
Diagram above: Confluence using its internal directory for user management.

Confluence with Read/Write Connection to LDAP

Diagram above: Confluence connecting to an LDAP directory.

Confluence with Read-Only Connection to LDAP, with Local Groups
Diagram above: Confluence connecting to an LDAP directory with permissions set to read only and local groups.

Confluence Internal Directory with LDAP Authentication

Diagram above: Confluence connecting to an LDAP directory for authentication only.

Confluence with LDAP Authentication, Copy Users on First Login
Diagram above: Confluence connecting to an LDAP directory for authentication only, with each user synchronised with the internal directory when they log in to Confluence.

Confluence Connecting to JIRA
Diagram above: Confluence connecting to JIRA for user management.

Confluence Connecting to JIRA and JIRA Connecting to LDAP
Diagram above: Confluence connecting to JIRA for user management, with JIRA in turn connecting to LDAP.

Confluence and JIRA Connecting to Crowd
Diagram above: Confluence, JIRA and other applications connecting to Crowd for user management.

**RELATED TOPICS**

- Configuring User Directories
  - Configuring the Internal Directory
  - Connecting to an LDAP Directory
  - Connecting to an Internal Directory with LDAP Authentication
  - Connecting to Crowd or JIRA for User Management
  - Connecting to JIRA 4.2 or Earlier for User Management
  - Managing Multiple Directories
  - Managing Nested Groups
  - Synchronising Data from External Directories
  - Diagrams of Possible Configurations for User Management
  - User Management Limitations and Recommendations
  - Requesting Support for External User Management

**User Management Limitations and Recommendations**

This page describes the optimal configurations and limitations that apply to user management in Confluence.
General Recommendations

- **Duplicate usernames across directories are not supported.** If you are connecting to more than one user directory, please ensure that the usernames are unique to one directory. For example, if you have a user jsmith in both 'Directory1' and 'Directory2', that is an unsupported configuration.

- **Be careful when deleting users in remote directories.** If you are connecting to an LDAP directory, a Crowd directory or a JIRA directory, please take care when deleting users from the remote directory. If you delete a user that is associated with data in Confluence, this will cause problems in Confluence.

Recommendations for Connecting to LDAP

Please consider the following limitations and recommendations when connecting to an LDAP user directory.

**Optimal Number of Users and Groups in your LDAP Directory**

The connection to your LDAP directory provides powerful and flexible support for connecting to, configuring and managing LDAP directory servers. To achieve optimal performance, a background synchronisation task loads the required users and groups from the LDAP server into the application’s database, and periodically fetches updates from the LDAP server to keep the data in step. The amount of time needed to copy the users and groups rises with the number of users, groups, and group memberships. For that reason, we recommended a maximum number of users and groups as described below.

This recommendation affects connections to LDAP directories:

- Microsoft Active Directory
- All other LDAP directory servers

The following LDAP configurations are not affected:

- Internal directories with LDAP authentication
- LDAP directories configured for 'Authentication Only, Copy User On First Login'

Please choose one of the following solutions, depending on the number of users, groups and memberships in your LDAP directory.

<table>
<thead>
<tr>
<th>Your environment</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 10 000 (ten thousand) users, 1000 (one thousand) groups, and 20 (twenty) groups per user</td>
<td>Choose the 'LDAP' or 'Microsoft Active Directory' directory type. You can make use of the full synchronisation option. Your application's database will contain all the users and groups that are in your LDAP server.</td>
</tr>
<tr>
<td>More than the above</td>
<td>Use LDAP filters to reduce the number of users and groups visible to the synchronisation task.</td>
</tr>
</tbody>
</table>

**Our Test Results**

We performed internal testing of synchronisation with an AD server on our local network consisting of 10 000 users, 1000 groups and 200 000 memberships.

We found that the initial synchronisation took about 5 minutes. Subsequent synchronisations with 100 modifications on the AD server took a couple of seconds to complete.

Please keep in mind that a number of factors come into play when trying to tune the performance of the synchronisation process, including:

- **Size of userbase.** Use LDAP filters to keep this to the minimum that suits your requirements.
- **Type of LDAP server.** We currently support change detection in AD, so subsequent synchronisations are much faster for AD than for other LDAP servers.
- **Network topology.** The further away your LDAP server is from your application server, the more latent LDAP queries will be.
- **Database performance.** As the synchronisation process caches data in the database, the performance of your database will affect the performance of the synchronisation.
- **JVM heap size.** If your heap size is too small for your userbase, you may experience heavy garbage collection during the synchronisation process which could in turn slow down the synchronisation.

**Redundant LDAP is Not Supported**

The LDAP connections do not support the configuration of two or more LDAP servers for redundancy (automated failover if one of the servers goes down).

**Specific Notes for Connecting to Active Directory**

When the application synchronises with Active Directory (AD), the synchronisation task requests only the changes from the LDAP server rather than the entire user base. This optimises the synchronisation process and gives much faster performance on the second and subsequent requests.

On the other hand, this synchronisation method results in a few limitations:

1. **Externally moving objects out of scope or renaming objects causes problems in AD.** If you move objects out of scope in AD, this will result in an inconsistent cache. We recommend that you do not use the external LDAP directory interface to move objects out of the scope of the sub-tree, as defined on the application's directory configuration screen. If you do need to make structural changes to your LDAP directory, manually synchronise the directory cache after you have made the changes to ensure cache consistency.
2. **Synchronising between AD servers is not supported.** Microsoft Active Directory does not replicate the uSNChanged attribute across instances. For that reason, we do not support connecting to different AD servers for synchronisation. (You can of course define multiple different directories, each pointing to its own respective AD server.)
3. **Synchronising with AD servers behind a load balancer is not supported.** As with synchronising between two different AD servers, Microsoft Active Directory does not replicate the uSNChanged attribute across instances. For that reason, we do not support connecting to different AD servers even when they are load balanced. You will need to select one server (preferably one that is local) to synchronise with instead of using the load balancer.
4. **You must restart the application after restoring AD from backup.** On restoring from backup of an AD server, the uSNChanged timestamps are reverted to the backup time. To avoid the resulting confusion, you will need to flush the directory cache after a Active Directory restore operation.
5. **Obtaining AD object deletions requires administrator access.** Active Directory stores deleted objects in a special container called cn=Deleted Objects. By default, to access this container you need to connect as an administrator and so, for the synchronisation task to be aware of deletions, you must use administrator credentials. Alternatively, it is possible to change the permissions on the cn=Deleted Objects container. If you wish to do so, please see this [Microsoft KB Article](#).
6. **The User DN used to connect to AD must be able to see the uSNChanged attribute.** The synchronisation task relies on the uSNChanged attribute to detect changes, and so must be in the appropriate AD security groups to see this attribute for all LDAP objects in the subtree.

**Recommendations for Connecting to JIRA for User Management**

Please consider the following limitations and recommendations when connecting to a JIRA server for user management.

**Single Sign-On Across Multiple Applications is Not Supported**

When you connect to JIRA for user management, you will not have single sign-on across the applications connected in this way. JIRA, when acting as a directory manager, does not support SSO.

**Custom Application Connectors are Not Supported**

JIRA, Confluence, FishEye and Crucible can connect to a JIRA server for user management. We intend to add support for Bamboo at some time in the future. Custom application connectors will need to use the new REST API.

**Custom Directories are Not Supported**

Earlier versions of JIRA supported OSUser Providers. It was therefore possible write a special provider to obtain user information from any external user directory. This is no longer the case.

**Optimal Number of Users and Applications**

Please consider the following limitations when connecting to a JIRA server for user management:

- Maximum 500 users.
- Maximum 5 connected applications.

**Recommendations**

<table>
<thead>
<tr>
<th>Your environment</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
If all the following are true:

<table>
<thead>
<tr>
<th>Your environment meets the optimal requirements for using JIRA for user management.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• You have fewer than 500 users.</td>
</tr>
<tr>
<td>• You want to share user and group management across just a few applications, such as one JIRA server and one Confluence server, or two JIRA servers.</td>
</tr>
<tr>
<td>• You do not need single sign-on (SSO) between JIRA and Confluence, or between two JIRA servers.</td>
</tr>
<tr>
<td>• You do not have custom application connectors. Or, if you do have them, you are happy to convert them to use the new REST API.</td>
</tr>
<tr>
<td>• You are happy to shut down all your servers when you need to upgrade JIRA.</td>
</tr>
<tr>
<td>• You do not have Bamboo. Or, if you do have Bamboo, you are happy not to integrate its user management with JIRA at the moment. You are happy to wait until at least July 2011, perhaps longer.</td>
</tr>
</tbody>
</table>

If one or more of the following are true:

<table>
<thead>
<tr>
<th>We recommend that you install Atlassian Crowd for user management and SSO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• You have more than 500 users.</td>
</tr>
<tr>
<td>• You want to share user and group management across more than 5 applications.</td>
</tr>
<tr>
<td>• You need single sign-on (SSO) across multiple applications.</td>
</tr>
<tr>
<td>• You have custom applications integrated via the Crowd SOAP API, and you cannot convert them to use the new REST API.</td>
</tr>
<tr>
<td>• You are not happy to shut down all your servers when you need to upgrade JIRA.</td>
</tr>
<tr>
<td>• You have Bamboo and you want to integrate its user management with JIRA immediately.</td>
</tr>
</tbody>
</table>

If you are considering creating a custom directory connector to define your own storage for users and groups

Please see if one of the following solutions will work for you:

- If you have written a custom provider to support a specific LDAP schema, please check the supported LDAP schemas to see if you can use one of them instead.
- If you have written a custom provider to support nested groups, please consider enabling nested groups in the supported directory connectors instead.
- If you have written a custom provider to connect to your own database, please consider loading the data into the application's database instead.
- If you need to keep the custom directory connection, please consider whether Atlassian Crowd meets your requirements. See the documentation on developing a custom directory connector for Crowd.

**RELATED TOPICS**

- Connecting to an LDAP Directory
- Connecting to Crowd or JIRA for User Management
- Configuring User Directories

**Requesting Support for External User Management**

This page gives guidelines on how to request help from the Atlassian support team if you are having problems with external user management. External user management includes connections to Active Directory, other LDAP servers, Atlassian Crowd or Atlassian JIRA for user management. The information on this page is provided in addition to the more general page on Troubleshooting Problems and Requesting Technical Support.

The cause of such problems may be:

- The LDAP server is not responding.
- The application password is incorrectly configured, causing the LDAP server or other directory to return an authentication error.
- Other LDAP settings are incorrectly configured.

**On this page:**

- Troubleshooting the Connection to your External User Directory
- Problems During Initial Setup
- Complex Authentication or Performance Problems
Troubleshooting the Connection to your External User Directory

The configuration screen for external directories in Confluence has a 'Test Settings' button. This will help you to diagnose problems with user management in Active Directory and other LDAP servers.

To test your directory connection:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Click 'User Directories' in the left-hand panel.
3. Edit the relevant directory.
4. Click 'Test Settings'.
5. The results of the test will appear at the top of the screen.

Please refer to our Knowedge base articles for troubleshooting user management and login issues.

If the above resources do not help, continue below.

Problems During Initial Setup

Raise a support request and include the following information.

- Download an LDAP browser to make sure you have the right settings in your LDAP directory. Atlassian recommends LDAP Studio. Include screenshots of your user and group DNs.
- If you can start up Confluence and access the Administration Console, review your directory settings. See Connecting to an LDAP Directory. Attach screenshots of all your settings.

Complex Authentication or Performance Problems

Raise a support request and include the following information.

Confluence Server

Log in to Confluence and access the Administration Console.

- Take a screenshot of the 'System Information' screen, or save the page as HTML.
- Take a screenshot of the 'Global Permissions' screen, if people are having problems with logging in.
- Go to 'Space Admin' for the relevant space and take a screenshot of the 'Permissions' page, if you are having problems with space or page permissions.

Confluence Configuration Files

- If you have implemented a custom authenticator or in any way modified seraph-config.xml or seraph-paths.xml, please provide the modified file.

User Management System

- Include the name and version of your LDAP server.
- Does your LDAP server use dynamic or static groups?
- Review your directory settings. See Connecting to an LDAP Directory. Attach screenshots of all your settings.

Diagnostics

- Enable profiling. See Performance Tuning.
- Enable detailed user management logging, by editing confluence/WEB-INF/classes/log4j.properties. Change this section:

```plaintext
###
# Atlassian User
###
#log4j.logger.com.atlassian.user=DEBUG
#log4j.logger.com.atlassian.confluence.user=DEBUG
#log4j.logger.bucket.user=DEBUG
#log4j.logger.com.atlassian.seraph=DEBUG
#log4j.logger.com.opensymphony.user=DEBUG
```
Remove the '#' signs at the beginning of the lines, so that it looks like this:

```
###
# Atlassian User
###
log4j.logger.com.atlassian.user=DEBUG
log4j.logger.com.atlassian.confluence.user=DEBUG
log4j.logger.bucket.user=DEBUG
log4j.logger.com.atlassian.seraph=DEBUG
log4j.logger.com.opensymphony.user=DEBUG
```

- After enabling both the above, please attempt a Confluence LDAP account login and attach a copy of the log files that are produced when the problem occurs. To do this, locate your install directory or exploded WAR directory, then zip the full `/logs` subdirectory into a single file for us to examine. The logs subdirectory is located in your Confluence Home directory.

### RELATED TOPICS

Troubleshooting Problems and Requesting Technical Support

Configuring User Directories

- Configuring the Internal Directory
- Connecting to an LDAP Directory
- Connecting to an Internal Directory with LDAP Authentication
- Connecting to Crowd or JIRA for User Management
- Connecting to JIRA 4.2 or Earlier for User Management
- Managing Multiple Directories
- Managing Nested Groups
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- User Management Limitations and Recommendations
- Requesting Support for External User Management

## Confluence User Management

This section describes how to manage users and groups in Confluence. To learn how to configure external user management in Confluence, see Configuring User Directories.

⚠️ The information on this page does not apply to Confluence OnDemand.

- Searching For and Managing Users
- Adding a New User
- Adding a Group
- Adding or Removing Users in Groups
- Changing Usernames
- Editing User Details
- Global Groups Overview
- Global Permissions Overview
- Removing a Group
- Removing or Deactivating a User
- Setting up Anonymous Access
- Viewing members of a group
- Restoring Passwords To Recover Admin User Rights
- Resetting the Login Count for a User

### Searching For and Managing Users

If you are a Confluence Administrator, you can add users, assign them to groups and edit their user details.
Accessing the User Management Screen

To search for and manage users:

1. Go to the user management screen for the user concerned. There are two ways to do this:
   - Either, Go to the user's Profile and click the 'Administer User' link on the user's profile screen. (This link is available in Confluence 2.8.2 and later.)
   - Or, Go to the Confluence 'Administration Console':
     - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
     - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
     - Select 'Manage Users' in the left-hand panel.
     - The 'Manage Users' screen appears, as shown below. You can now choose to list all users or you can search for a specific user.

![Screenshot above: Managing users](image)

Listing All Users

To list all users:

1. Open the 'Manage Users' screen as described above.
2. Click the 'Show all users' link. All members of the confluence-users group are listed in alphabetical order, by username. If there are more users than can fit on one page, the results will be divided into multiple pages.
3. To move to another page of results, click the numbered links, 'Next' or 'Previous' near the top or bottom of the page.
4. To specify how many results should be shown per page, click a number '10', '20', '50' or '100' near the top of the page.
Using the Simple User Search

To search for a specific user via the simple user search:

1. Open the 'Manage Users' screen as described above.
2. If the 'Simple' link is showing, click it. (If you see the 'Advanced' link and no 'Simple' link, then you're fine. The simple search is already active.)
3. The simple user search screen will appear, as shown below.
4. Type some information about the user into the 'Search' textbox. You can type all or part of their username, full name or email address.
5. Click the 'Search' button.
6. Confluence will display a list of matching users. Click the link on a username to see and edit the details for that user.

Using the Advanced User Search

The advanced user search allows you to specify the field in which your search term appears, i.e. username, full name or email address. You may find this useful if you need to limit the number of users appearing in the search results.
To search via the advanced user search:

1. Open the ‘Manage Users’ screen as described above.
2. If the ‘Advanced’ link is showing, click it. (If you see the ‘Simple’ link and no ‘Advanced’ link, then you're fine. The advanced search is already active.)
3. The advanced user search screen will appear, as shown below.
4. Complete one or more of the following fields:
   - **User Name** — Enter all or part of the person's username i.e. their login id, e.g. 'joe', or 'bloggs'.
   - **Full Name** — Enter all or part of the person's name, e.g. 'joe bloggs', or 'bloggs', or 'joe'.
   - **E-Mail** — Enter all or part of the person's email address, e.g. ‘acme’
5. Click the ‘Search’ button.
6. Confluence will display a list of matching users. Click the link on a username to see and edit the details for that user.

![Advanced user search](image.png)

**Screenshot above: Advanced user search**

**Notes**

- **Multiple user directories**: You may define multiple user directories in Confluence, so that Confluence looks in more than one place for its users and groups. For example, you may use the default Confluence **internal directory** and also connect to an **LDAP** directory server. In such cases, you can define the **directory order** to determine where Confluence looks first when processing users and groups. Here is a summary of how the directory order affects the processing:
  - 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.

  See **Managing Multiple Directories**.

- **Crowd and the user search**: If you are using Atlassian’s Crowd for user management, you will need Crowd 1.5.1 or later to use the 'Simple' option in the user search. If your version of Crowd does not support the simple user search, you will see only the ‘Advanced’ search form.

**RELATED TOPICS**

- Page: Removing a Group
- Page: Adding a New User
- Page: Editing User Details
- Page: Adding or Removing Users in Groups
- Page: Global Permissions Overview
- Page: Viewing members of a group
- Page: Removing or Deactivating a User
- Page: Adding a Group
- Page: Permissions Overview
- Page: Changing Usernames
- Page: Enabling or Disabling Public Signup
- Page: Global Groups Overview
Adding a New User

There are a number of ways new users can be added to Confluence:

- **By public signup**: If public signup is enabled on your Confluence site, people can add themselves as users of the site.
- **By Confluence administrators**: Administrators with Confluence Administrator or System Administrator permissions can add new users from the Administration Console.
- **Via an external user directory**: See Configuring User Directories.

To add a new user to Confluence from the Administration Console:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select 'Manage Users' in the left-hand panel.
3. Click the link 'Add User' at the top of the page.
4. Enter the user's details: username, password, name and email address.
5. Click 'Create'.

**Notes**

- **Multiple user directories**: You may define multiple user directories in Confluence, so that Confluence looks in more than one place for its users and groups. For example, you may use the default Confluence internal directory and also connect to an LDAP directory server. In such cases, you can define the directory order to determine where Confluence looks first when processing users and groups. Here is a summary of how the directory order affects the processing:
  - 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.

See Managing Multiple Directories.

**RELATED TOPICS**

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- Page: Enabling or Disabling Public Signup
- Page: Global Groups Overview
- Page: Disabling the Built-In User Management
- Page: Setting up Anonymous Access
- Page: Searching For and Managing Users
Adding a Group

A group is a collection of users. Administrators create groups so that the administrator can assign permissions to a number of people at once. For example, it is quicker to give group 'X' access to Confluence, rather than giving every team member access individually.

The information on this page does not apply to Confluence OnDemand.

To add a new group:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Click Manage Groups in the left-hand panel.
3. Click Add Group.
4. Enter a name for your group and click Save.

You are now ready to start adding users to the group.

Notes

- **Multiple user directories**: You may define multiple user directories in Confluence, so that Confluence looks in more than one place for its users and groups. For example, you may use the default Confluence internal directory and also connect to an LDAP directory server. In such cases, you can define the directory order to determine where Confluence looks first when processing users and groups. Here is a summary of how the directory order affects the processing:
  - 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.

See Managing Multiple Directories.

Related Topics

- Page: Removing a Group
- Page: Adding or Removing Users in Groups
- Page: Viewing members of a group
- Page: Global Groups Overview
- Page: Searching For and Managing Users

Adding or Removing Users in Groups

If you are a Confluence Administrator, you can add users and groups, and assign users to groups in order to determine their permissions.

This page tells you how to add a user to a group or remove a user from a group. For an overview of users and groups, please refer to Users and Groups and Confluence User Management.

You can edit group membership in two places:

- From the group management screen.
- From the user management screen for a particular user.

Both methods are described below.

The information on this page does not apply to Confluence OnDemand.
This is the recommended method, available in Confluence 2.10 and later. It allows you to manage the group membership for a number of users at the same time.

**To add members to a group:**

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.

2. Select 'Manage Groups' in the left-hand panel.
3. The 'Manage Groups' screen appears, showing a list of groups. Select the group to which you want to add users.
4. The 'Group Members' screen appears, showing the users who belong to the selected group. (See screenshot below.) Click the 'Add Members' link.
5. The 'Add Members' screen appears, as shown below. Type in the usernames of the people you want to add to the group. You can also search for and select users by clicking the icon, as described in Searching for Users.
6. When you have added the required username(s), click the 'Add' button to add the member(s) to the group.

**To remove members from a group:**

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.

2. Select 'Manage Groups' in the left-hand panel.
3. The 'Manage Groups' screen appears, showing a list of groups. Select the group from which you want to remove the user.
4. The 'Group Members' screen appears, showing the users who belong to the selected group. (See screenshot below.) Click the 'Remove user from group' icon next to the user whose group membership you want to remove.

![Group Members: developers](image1)

Screenshot above: Group members

![Group Members: developers](image2)

Screenshot above: Adding members

**Editing Group Membership from the User Management Screen**

You can update a user’s group membership from the user management screen. This functionality allows you to update one user at a time.

**To add a user to a group or remove a user from a group:**

1. Go to the user management screen for the user concerned. There are two ways to do this:
   - Either,
     - Go to the user's Profile and click the 'Administer User' link on the user's profile screen. (This link is available in Confluence 2.8.2 and later.)
   - Or,
     - Go to the Confluence 'Administration Console':
1. Choose **Browse > Confluence Admin**. The 'Administrator Access' login screen will be displayed.
2. Enter your password and click **Confirm**. You will be temporarily logged into a secure session to access the 'Administration Console'.
3. Select 'Manage Users' in the left-hand panel.
   - The 'Manage Users' screen appears, as shown below. You can now choose to 'Show all users' or you can search for a specific user by entering all or part of the person's username, full name or email address. (For more details about the user search, see **Searching For and Managing Users**.)
   - Click the link on the username you want to edit.
4. Now you should be able to see the user's current details, with links allowing you to edit the user's details and groups. See the screenshot showing a user's details below.
5. Click 'Edit Groups'. This will display two lists of groups, as shown in the screenshot below. Update the user's group membership as follows:
   - **Not a member of groups** — This box shows all groups to which the user does not belong. To add the user to a group, select a group and click 'Join'. Hold the Ctrl key down and click to select more than one group.
   - **Member of groups** — This box shows all groups to which the user belongs. Select a group and click 'Leave' to remove the user from the group.

### Manage Users

**Configuration**
- Add User

**Find User**

- Search
- Show all users

---

**View User: jenny**

**Configuration**
- Back to Manage Users

**User**: jenny

**Full Name**: Jenny James

**Email**: jenny@example.com

**Groups**: confluence-users

---

**Edit User Groups : jenny**

**Configuration**
- Return to view user jenny

**Not a member of groups**
- confluence-administrators
- developers
- developers-mates

**Member of groups**
- confluence-users

---

**Notes**

- **Multiple user directories**: You may define multiple user directories in Confluence, so that Confluence looks in more than one place for its users and groups. For example, you may use the default Confluence internal directory and also connect to an LDAP.
directory server. In such cases, you can define the directory order to determine where Confluence looks first when processing users and groups. Here is a summary of how the directory order affects the processing:

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See Managing Multiple Directories.

**RELATED TOPICS**

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**Changing Usernames**

A **username** is the name used to log into Confluence, eg. jsmith.

Currently, there is no straightforward method for changing a username and its associated content, to that of another user. The only practicable method currently available is to execute direct SQL queries on your database. There is a feature request to facilitate this process via a web interface and you can vote for it to improve its chances of being implemented. Be aware, however, that no matter what method you use to change usernames in Confluence, there is **no support** provided for this process. The instructions below provide suggested guidelines on how to change a username via SQL queries, although this may vary depending on your database.

**The information on this page does not apply to Confluence OnDemand.**

**Instructions For Changing Usernames**

This document is for use with 3.5. If using an earlier version, please see the 3.4 version of the page.

The following SQL commands are only tested for MySQL and PostgreSQL Databases. If you have any other database please contact your DBA to determine the equivalent queries.

Usernames can only be changed through direct update to the Confluence database.

1. If you have a database administrator, request that they approve the database-related steps described below
2. If you are using JIRA user management, Revert from JIRA To Internal User Management
3. Backup Confluence
4. If you are using MySQL, make sure you are not running in safe updates mode:
5. Create a `usermigration` table:

```
create table usermigration
(
oldusername varchar(255),
newusername varchar(255)
);
```

6. Usernames that will be changed must be placed in the `usermigration` table with their current and planned usernames:

```
insert into usermigration (oldusername, newusername)
values ('oldusername', 'newusername');
```

7. Run the following SQL commands:
   a. If you have command line access to your database, download the scripts for PostgreSQL or MySQL then run them against your database:

   **PostgreSQL**
   ```
   $ psql -f PostgreSQLChangeUsernames.sql your_database_name
   ```

   **MySQL**
   ```
   $ mysql your_database_name < MySQLChangeUsernames.sql
   ```

   b. Otherwise, run the following:
      i. If your DB administration tool does not support multiple SQL queries, these must be entered individually:

      **PostgreSQL**
      ```
      update attachments
      set creator = newusername from usermigration u
      where creator = u.oldusername;

      update attachments
      set lastmodifier = newusername from usermigration u
      where lastmodifier = u.oldusername;

      update content
      set creator = newusername from usermigration u
      where creator = u.oldusername;

      update content
      set lastmodifier = newusername from usermigration u
      where lastmodifier = u.oldusername;

      update content
      set username = newusername from usermigration u
      where username = u.oldusername;

      update content_label
      set owner = newusername from usermigration u
      where owner = u.oldusername;

      update content_perm
      set creator = newusername from usermigration u
      where creator = u.oldusername;
      ```
update content_perm
set lastmodifier = newusername from usermigration u
where lastmodifier = u.oldusername;

update content_perm
set username = newusername from usermigration u
where username = u.oldusername;

update contentlock
set creator = newusername from usermigration u
where creator = u.oldusername;

update contentlock
set lastmodifier = newusername from usermigration u
where lastmodifier = u.oldusername;

update cwd_user
set lower_user_name = lower(newusername) from usermigration u
where lower_user_name = lower(u.oldusername);

update cwd_user
set user_name = newusername from usermigration u
where user_name = u.oldusername;

update extrnlks
set creator = newusername from usermigration u
where creator = u.oldusername;

update extrnlks
set lastmodifier = newusername from usermigration u
where lastmodifier = u.oldusername;

update follow_connections
set followee = newusername from usermigration u
where followee = u.oldusername;

update follow_connections
set follower = newusername from usermigration u
where follower = u.oldusername;

update label
set owner = newusername from usermigration u
where owner = u.oldusername;

update links
set creator = newusername from usermigration u
where creator = u.oldusername;

update links
set lastmodifier = newusername from usermigration u
where lastmodifier = u.oldusername;

update notifications
set creator = newusername from usermigration u
where creator = u.oldusername;

update notifications
set lastmodifier = newusername from usermigration u
where lastmodifier = u.oldusername;

update notifications
set username = newusername from usermigration u
where username = u.oldusername;

update pagetemplates
set creator = newusername from usermigration u
where creator = u.oldusername;

update pagetemplates
set lastmodifier = newusername from usermigration u
where lastmodifier = u.oldusername;

update remembermetoken
set username = newusername from usermigration u
where username = u.oldusername;

update spacegroups
set creator = newusername from usermigration u
where creator = u.oldusername;

update spacegroups
set lastmodifier = newusername from usermigration u
where lastmodifier = u.oldusername;

update spacepermissions
set creator = newusername from usermigration u
where creator = u.oldusername;

update spacepermissions
set lastmodifier = newusername from usermigration u
where lastmodifier = u.oldusername;

update spacepermissions
set permusername = newusername from usermigration u
where permusername = u.oldusername;

update spaces
set creator = newusername from usermigration u
where creator = u.oldusername;

update spaces
set lastmodifier = newusername from usermigration u
where lastmodifier = u.oldusername;

update trackbacklinks
set creator = newusername from usermigration u
where creator = u.oldusername;
update trackbacklinks
set lastmodifier = newusername from usermigration u
where lastmodifier = u.oldusername;

MySQL

update ATTACHMENTS a, usermigration u
set a.creator = u.newusername
where a.creator = u.oldusername;

update ATTACHMENTS a, usermigration u
set a.lastmodifier = u.newusername
where a.lastmodifier = u.oldusername;

update CONTENT a, usermigration u
set a.creator = u.newusername
where a.creator = u.oldusername;

update CONTENT a, usermigration u
set a.lastmodifier = u.newusername
where a.lastmodifier = u.oldusername;

update ATTACHMENTS a, usermigration u
set a.creator = u.newusername
where a.creator = u.oldusername;

update ATTACHMENTS a, usermigration u
set a.lastmodifier = u.newusername
where a.lastmodifier = u.oldusername;

update CONTENT a, usermigration u
set a.username = u.newusername
where a.username = u.oldusername;

update CONTENTLOCK a, usermigration u
set a.creator = u.newusername
where a.creator = u.oldusername;

update CONTENTLOCK a, usermigration u
set a.lastmodifier = u.newusername
where a.lastmodifier = u.oldusername;

update CONTENTLABEL a, usermigration u
set a.owner = u.newusername
where a.owner = u.oldusername;

update CONTENTPERM a, usermigration u
set a.creator = u.newusername
where a.creator = u.oldusername;

update CONTENTPERM a, usermigration u
set a.lastmodifier = u.newusername
where a.lastmodifier = u.oldusername;

update CONTENTPERM a, usermigration u
set a.username = u.newusername
where a.username = u.oldusername;

update CWD_USER a, usermigration u
set a.lower_username = LOWER(u.newusername)
where a.lower_username = LOWER(u.oldusername);

update CWD_USER a, usermigration u
set a.user_name = u.newusername
where a.user_name = u.oldusername;

update EXTRNLNKS a, usermigration u
set a.creator = u.newusername
where a.creator = u.oldusername;

update EXTRNLNKS a, usermigration u
set a.lastmodifier = u.newusername
where a.lastmodifier = u.oldusername;

update FOLLOW_CONNECTIONS a, usermigration u
set a.followee = u.newusername
where a.followee = u.oldusername;
update FOLLOW_CONNECTIONS a, usermigration u
set a.follower = u.newusername
where a.follower = u.oldusername;

update LABEL a, usermigration u
set a.owner = u.newusername
where a.owner = u.oldusername;

update LINKS a, usermigration u
set a.creator = u.newusername
where a.creator = u.oldusername;

update LINKS a, usermigration u
set a.lastmodifier = u.newusername
where a.lastmodifier = u.oldusername;

update NOTIFICATIONS a, usermigration u
set a.creator = u.newusername
where a.creator = u.oldusername;

update NOTIFICATIONS a, usermigration u
set a.lastmodifier = u.newusername
where a.lastmodifier = u.oldusername;

update NOTIFICATIONS a, usermigration u
set a.username = u.newusername
where a.username = u.oldusername;

update PAGETEMPLATES a, usermigration u
set a.creator = u.newusername
where a.creator = u.oldusername;

update PAGETEMPLATES a, usermigration u
set a.lastmodifier = u.newusername
where a.lastmodifier = u.oldusername;

update REMEMBERMETOKEN a, usermigration u
set a.username = u.newusername
where a.username = u.oldusername;

update SPACEGROUPS a, usermigration u
set a.creator = u.newusername
where a.creator = u.oldusername;

update SPACEGROUPS a, usermigration u
set a.lastmodifier = u.newusername
where a.lastmodifier = u.oldusername;

update SPACEPERMISSIONS a, usermigration u
set a.creator = u.newusername
where a.creator = u.oldusername;

update SPACEPERMISSIONS a, usermigration u
set a.lastmodifier = u.newusername
where a.lastmodifier = u.oldusername;

update SPACEPERMISSIONS a, usermigration u
set a.permusername = u.newusername
where a.permusername = u.oldusername;

update SPACES a, usermigration u
set a.creator = u.newusername
where a.creator = u.oldusername;

update SPACES a, usermigration u
set a.lastmodifier = u.newusername
where a.lastmodifier = u.oldusername;

update TRACKBACKLINKS a, usermigration u
set a.creator = u.newusername
where a.creator = u.oldusername;
ii. Reassign user preferences in the OS_PROPERTYENTRY table. Usernames in the OS_PROPERTYENTRY table need to be prefixed with 'CWD_'.

**PostgreSQL**

```sql
update os_propertyentry
set entity_name = 'CWD_' || newusername from usermigration u
where entity_name = 'CWD_' || u.oldusername;
```

**MySQL**

```sql
update OS_PROPERTYENTRY a, usermigration u
set a.entity_name = concat('CWD_', u.newusername)
where a.entity_name = concat('CWD_', u.oldusername);
```

iii. Reassign personal spaces and settings associated with the old username to the new username. The tilda (~) is required as it is prepended to the space key of all personal spaces:

**PostgreSQL**

```sql
update spaces
set spacekey = '~' || newusername from usermigration u
where spacekey = '~' || u.oldusername;

update bandana
set bandanacontext = '~' || newusername from usermigration u
where bandanacontext = '~' || u.oldusername;
```

**MySQL**

```sql
update SPACES a, usermigration u
set a.spacekey = concat('~', u.newusername)
where a.spacekey = concat('~', u.oldusername);

update BANDANA a, usermigration u
set a.bandanacontext = concat('~', u.newusername)
where a.bandanacontext = concat('~', u.oldusername);
```

8. Each username is associated with a full name. For example, username 'jsmith' may have a full name of 'John M Smith'. If this fullname needs to be changed, modify the first_name, lower_first_name, last_name and lower_last_name in the cwd_user table. Ensure the lower_columns are merely copies of their normal counterparts but with all letters in lower case. Then modify the display_name and lower_display_name columns so that they are the first_name and last_name columns or the lower_first_name and lower_last_name columns put together but separated by a space.

**Rebuild the Indexes**

After all the updates, it's necessary to **Rebuild the Indexes from Scratch**

All old usernames in Confluence should now be replaced with the new usernames from the usermigration table.

**RELATED TOPICS**

Page: Removing a Group
Page: Adding a New User
Editing User Details

To update a user’s details:

1. First, go to the user management screen for the user concerned. There are two ways to do this:
   - Either,
     - Go to the user’s Profile and click the ‘Administer User’ link on the user’s profile screen.
   - Or,
     - Go to the Confluence ‘Administration Console’:
       - Choose Browse > Confluence Admin. The ‘Administrator Access’ login screen will be displayed.
       - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the
         ‘Administration Console’.
       - Select the link ‘Manage Users’ in the left-hand panel.
       - Locate the user by doing a search on the username or the groups to which they belong.
       - Click the user link.

2. Now you should be able to see the user’s current details and links allowing you to edit them.
   - View Profile — View the user’s profile.
   - Edit Details — Change details such as the user’s name, email address, contact details and team or department information.
     Changing a user’s username is not supported. See Changing Usernames for information.
   - Set Password — Edit the user’s password details.
   - Remove — You can remove a user permanently if the user has not added or edited any content on the site.
   - Disable — You can disable (i.e. deactivate) access for a user who has already added or edited any content on the site.
Multiple user directories: You may define multiple user directories in Confluence, so that Confluence looks in more than one place for its users and groups. For example, you may use the default Confluence internal directory and also connect to an LDAP directory server. In such cases, you can define the directory order to determine where Confluence looks first when processing users and groups. Here is a summary of how the directory order affects the processing:

- 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.

See Managing Multiple Directories.
2. confluence-users: This is the default group for all new users. Permissions you assign to this group will be assigned to all newly signed-up users of Confluence.

⚠️ Confluence Administrator permission and confluence-administrators group are not related

Going by the names, you would think the 'confluence-administrators' group and the 'Confluence Administrator' permission are related – but they are not. To resolve confusion, we want to make explicit that granting a user or group 'Confluence Administrator' permission is not the same as granting them membership to the 'confluence-administrators' group. Granting the 'Confluence Administrator' permission enables access to only a subset of the administrative functions. Granting membership to the 'confluence-administrators' group, on the other hand, gives complete access.

⚠️ The information on this page does not apply to Confluence OnDemand.

⚠️ Confluence Administrator permission and confluence-administrators group are not related

Going by the names, you would think the 'confluence-administrators' group and the 'Confluence Administrator' permission are related – but they are not. To resolve confusion, we want to make explicit that granting a user or group 'Confluence Administrator' permission is the same as granting them membership to the 'confluence-administrators' group. Granting not the 'Confluence Administrator' permission enables access to only a subset of the administrative functions. Granting membership to the 'confluence-administrators' group, on the other hand, gives complete access.

Other user groups: A Confluence administrator can also group users together into user groups for more convenient administration. Once created, groups become available at the space and page levels to allow for flexible access control. A user in one of these groups will automatically be granted all permissions granted to the group.

Anonymous users: Confluence treats all users who do not log in when they access Confluence as being 'anonymous'. You can grant anonymous 'Use Confluence' permission via the Global Permissions screen. This will allow non-registered users to access pages and spaces in Confluence. A space administrator can then further control anonymous access per space via the space permissions.

Related Topics:

- Page: Removing a Group
- Page: Adding a New User
- Page: Editing User Details
- Page: Adding or Removing Users in Groups
- Page: Global Permissions Overview
- Page: Viewing members of a group
- Page: Removing or Deactivating a User
- Page: Adding a Group
- Page: Permissions Overview
- Page: Changing Usernames

Showing first 10 of 15 results

Global Permissions Overview

Permissions determine the actions which a user is allowed to perform within Confluence. Global permissions are one of the levels of permission provided by Confluence.

In order to assign these permissions, you must already have the global 'Confluence Administrator' or 'System Administrator' permission (described below). You can then assign global permissions to groups, individual users and anonymous users. Further permissions are granted from the space administration screens.
Overview of the Global Permissions

Global permissions control access across the whole Confluence site. Here is a list:

<table>
<thead>
<tr>
<th>Global Permission</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can Use</td>
<td>This is the most basic permission that allows users to access the site. Users with this permission count towards the number of users allowed by your license. See the information on removing/deactivating users.</td>
</tr>
<tr>
<td>Attach Files to User Profile</td>
<td>This allows the user to upload files to be stored in their user profile. This feature was made obsolete by the introduction of personal spaces in Confluence 2.2. Hence, this permission is no longer relevant. Attachments can be accessed from a user profile view (for example, an image within the 'About Me' field of a profile view) by attaching these files to a page within that user's personal space and referencing them using appropriate wiki markup code.</td>
</tr>
<tr>
<td>Update User Status</td>
<td>This allows the user to update their user status message, which can be seen on the user's profile, pages in their personal space and on various activity streams accessible to other Confluence users.</td>
</tr>
<tr>
<td>Personal Space</td>
<td>This permission allows the user to create a personal space.</td>
</tr>
<tr>
<td>Create Space(s)</td>
<td>This permission allows users to create new spaces within your Confluence site. When a space is created, the creator automatically has the 'Admin' permission for that space and can perform space-wide administrative functions.</td>
</tr>
<tr>
<td>Confluence Administrator</td>
<td>This permission allows users to access the 'Administration Console' that controls site-wide administrative functions. Users with this permission can perform most, but not all, of the Confluence administrative functions. See the comparison of 'System Administrator' and 'Confluence Administrator' below.</td>
</tr>
<tr>
<td>System Administrator</td>
<td>This permission allows users to access the 'Administration Console' that controls site-wide administrative functions. Users with this permission can perform all the Confluence administrative functions, including the ones which the 'Confluence Administrator' permission does not allow. See the comparison of 'System Administrator' and 'Confluence Administrator' below. Refer also to the note about the 'confluence-administrators' group below.</td>
</tr>
</tbody>
</table>

⚠️ The first system administrator is defined during installation

During the initial configuration of Confluence, the Setup Wizard asks for the username of the System Administrator. This user will have the ‘System Administrator’ permission and will be a member of the ‘confluence-administrators’ group.

Comparing the System Administrator with the Confluence Administrator Permission

New with Confluence 2.7 and later comes the ability to have two levels of administrator in Confluence:

- **System Administrator** – Users with this permission can perform all the Confluence administrative functions, including the ones which the ‘Confluence Administrator’ permission does not allow.
- **Confluence Administrator** – Users with this permission can perform most, but not all, of the Confluence administrative functions.

Tip: The two-tier administration is useful when you want to delegate some administrator privileges to project managers or team leaders. You can give ‘Confluence Administrator’ permission to users who should be able to perform most administrative functions, but should not be able to perform functions that can compromise the security of the Confluence system.
The following functions are excluded from the 'Confluence Administrator' permission:

<table>
<thead>
<tr>
<th>Administration Screen</th>
<th>Excluded Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Configuration</td>
<td>The following functionality is disallowed:</td>
</tr>
<tr>
<td></td>
<td>- Server Base URL</td>
</tr>
<tr>
<td></td>
<td>- Remote API plugin</td>
</tr>
<tr>
<td></td>
<td>- Public Signup</td>
</tr>
<tr>
<td></td>
<td>- Connection Timeouts</td>
</tr>
<tr>
<td>Security Configuration</td>
<td>The following functionality is disallowed:</td>
</tr>
<tr>
<td></td>
<td>- External user management</td>
</tr>
<tr>
<td></td>
<td>- Append wildcards to user and group searches</td>
</tr>
<tr>
<td></td>
<td>- Public Signup</td>
</tr>
<tr>
<td></td>
<td>- Anti XSS Mode</td>
</tr>
<tr>
<td></td>
<td>- Enable Custom Stylesheets for Spaces</td>
</tr>
<tr>
<td></td>
<td>- Show system information on the 500 page</td>
</tr>
<tr>
<td></td>
<td>- Maximum RSS Items</td>
</tr>
<tr>
<td></td>
<td>- XSRF Protection</td>
</tr>
<tr>
<td>Plugins</td>
<td>The following functionality is disallowed:</td>
</tr>
<tr>
<td></td>
<td>- Upgrade</td>
</tr>
<tr>
<td></td>
<td>- Install</td>
</tr>
<tr>
<td></td>
<td>- Confluence Upgrade Check</td>
</tr>
<tr>
<td>Daily Backup Admin</td>
<td>This function is disallowed entirely.</td>
</tr>
<tr>
<td>Mail Servers</td>
<td>This function is disallowed entirely.</td>
</tr>
<tr>
<td>User Macros</td>
<td>This function is disallowed entirely.</td>
</tr>
<tr>
<td>Attachment Storage</td>
<td>This function is disallowed entirely.</td>
</tr>
<tr>
<td>Layouts</td>
<td>This function is disallowed entirely.</td>
</tr>
<tr>
<td>Custom HTML</td>
<td>This function is disallowed entirely.</td>
</tr>
<tr>
<td>Backup &amp; Restore</td>
<td>This function is disallowed entirely.</td>
</tr>
<tr>
<td>Logging and Profiling</td>
<td>This function is disallowed entirely.</td>
</tr>
<tr>
<td>Cluster Configuration</td>
<td>This function is disallowed entirely.</td>
</tr>
<tr>
<td>Scheduled Jobs</td>
<td>This function is disallowed entirely.</td>
</tr>
<tr>
<td>Application Links</td>
<td>This function is disallowed entirely.</td>
</tr>
</tbody>
</table>

Comparing the Administrator Permissions with the confluence-administrators Group

The 'confluence-administrators' group defines a set of 'super-users' who can access the Administration Console and perform site-wide administration. Members of this group can also see the content of all pages and spaces in the Confluence instance, regardless of space permissions. They cannot immediately see the pages for which they are excluded by page restrictions without knowing the direct URL to the page (restrictions can be removed by members of the confluence-administrators group in the Space Admin screen if need be). For example, they will not see restricted pages displayed by the children macro. But they are able to access restricted pages directly using the page URL. The settings on the 'Global Permissions' screen do not affect the powers allowed to members of this group.

Granting the 'System Administrator' or 'Confluence Administrator' permission to a user will not automatically grant the user access to all spaces in the site. These permissions will only give access to the Administration Console.

Be aware, however, that users with 'System Administrator' can add themselves to the 'confluence-administrators' group and become a super-user.
Confluence Administrator permission and confluence-administrators group are not related

Going by the names, you would think the 'confluence-administrators' group and the 'Confluence Administrator' permission are related – but they are not. To resolve confusion, we want to make explicit that granting a user or group 'Confluence Administrator' permission is not the same as granting them membership to the 'confluence-administrators' group. Granting the 'Confluence Administrator' permission enables access to only a subset of the administrative functions. Granting membership to the 'confluence-administrators' group, on the other hand, gives complete access.

Read more about global groups.

Updating Global Permissions

To view the global permissions for a group or user:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.

2. Select Global Permissions in the Security section of the left-hand panel. The View Global Permissions screen appears.

Add or edit group and user permissions as follows:

To add permissions for a group:

1. First add the group to Confluence, if you have not already done so.
2. Click Edit Permissions. The 'Edit Global Permissions' screen appears, as shown below.
3. Enter the group name in the Grant browse permission to box in the 'Groups' section. You can search for the group name.
4. Click Add.
5. The group will appear in the list and you can now edit its permissions.

To add permissions for a specific user:

(Consider adding the user to a group and then assigning the permissions to the group, as described above, instead of assigning permissions to the specific user.)

1. First add the user to Confluence, if you have not already done so.
2. Click Edit Permissions. The 'Edit Global Permissions' screen appears, as shown below.
3. Enter the username in the Grant browse permission to box in the 'Individual Users' section. You can search for the username.
4. Click Add.
5. The username will appear in the list and you can now edit its permissions.

To add or edit the permissions for a user or group:

1. Select, or clear, the check box under the relevant permission in the row for the relevant user/group. A selected check box indicates that the permission is granted.
2. To allow anonymous access to your Confluence site, select the 'Use Confluence' and 'View User Profile' options in the 'Anonymous Access' section.
   - For more information about these permissions, refer to Setting up Anonymous Access.
3. Click Save All to save your changes.

Screenshot: Editing global permissions
About some error messages you may see

In Confluence 2.7.2 and later, Confluence will let you know if there is a problem with some permissions. In rare situations, you may see the following error messages below a permission:

- "User/Group not found" — This message may appear if your LDAP repository is unavailable, or if the user/group has been deleted after the permission was created.
- "Case incorrect. Correct case is: xxxxxx" — This message may appear if the upper/lower case in the permission does not match the case of the username or group name. If you see a number of occurrences of this message, you should consider running the routine supplied to fix the problem.

## Related Topics

- Page: Removing a Group
- Page: Adding a New User
- Page: Editing User Details
- Page: Adding or Removing Users in Groups
- Page: Global Permissions Overview
- Page: Viewing members of a group
- Page: Removing or Deactivating a User
- Page: Adding a Group
- Page: Permissions Overview
- Page: Changing Usernames
- Page: Enabling or Disabling Public Signup
- Page: Global Groups Overview
- Page: Disabling the Built-In User Management
Removing a Group

To remove a group:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select 'Manage Groups' in the left panel. A list of all existing groups is displayed along with links to remove them.
3. Click 'Remove' beside the group you want to remove. You will need to confirm your action before the group is deleted.

The information on this page does not apply to Confluence OnDemand.

Notes

- **Multiple user directories:** You may define multiple user directories in Confluence, so that Confluence looks in more than one place for its users and groups. For example, you may use the default Confluence internal directory and also connect to an LDAP directory server. In such cases, you can define the directory order to determine where Confluence looks first when processing users and groups. Here is a summary of how the directory order affects the processing:
  - 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.

See Managing Multiple Directories.

**RELATED TOPICS**

Page: Recognised System Properties
Page: Configuring HTTP Timeout Settings
Page: Configuring Attachment Size
Page: Configuring Indexing Language
Page: Configuring Character Encoding
Page: Configuring Time and Date Formats
Page: Configuring Number Formats

Removing or Deactivating a User

If you are a Confluence Administrator, you can remove and deactivate users.

You can remove a user from Confluence if they have not yet added or edited any content on the site. Such content includes pages and blog posts, and edits and comments on existing pages.

You can deactivate, or disable, a user, including one who has contributed content.

- Deactivated users can no longer log in to Confluence.
- Deactivating a user will not remove the content created by them from the site.
- Deactivated users do not count towards your license count. (See the notes below.)

The information on this page does not apply to Confluence OnDemand.

To remove a user:
1. Go to the user’s Profile and click the ‘Administer User’ link.
2. Click ‘Remove’.

To deactivate a user:
1. Go to the user’s Profile and click the ‘Administer User’ link.
2. Click ‘Disable’.

### User: alui

| Full Name: Andrew Lui [Atlassian Technical Writer] |
| Email: alui@atlassian.com |
| Directory: Confluence Internal Directory |
| Created: Feb 24, 2011 18:47 |
| Last Updated: Feb 24, 2011 18:47 |
| Login: Last Login: Mar 13, 2011 22:34 |
| Last Failed Login: Jan 26, 2011 19:25 |
| Total Failed Login Count: 3 |
| Current Failed Login Count: 0 |
| Groups: atlassian-developers, atlassian-staff, confluence-administrators, confluence-managers, confluence-users, documentation, licensed-contributors |

View Profile | Edit Groups | Edit Details | Set Password | Remove | Disable

Screenshot above: Viewing user details

**Notes**

- The ‘Administer User’ link is only visible if you are logged in as an administrator.
- You can also remove or disable users using the Administration Console.
- You can edit the groups that a user belongs to if you don't wish to prevent their access to Confluence completely.
- **Multiple user directories:** You may define multiple user directories in Confluence, so that Confluence looks in more than one place for its users and groups. For example, you may use the default Confluence internal directory and also connect to an LDAP directory server. In such cases, you can define the directory order to determine where Confluence looks first when processing users and groups. Here is a summary of how the directory order affects the processing:
  - 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.

  See Managing Multiple Directories.

- **Number of users and your license.** The Confluence ‘License Details’ screen tells you how many users your Confluence instance is licensed to support, and how many are currently registered. See Viewing and Editing License Details. The number of registered users includes only users who have the 'Can Use' global permission. Deactivated users, as described above, are not included.

**Related Topics**

Page: Removing a Group
Page: Adding a New User
Page: Editing User Details
Page: Adding or Removing Users in Groups
Page: Global Permissions Overview
Page: Viewing members of a group
Page: Removing or Deactivating a User
Page: Adding a Group
Page: Permissions Overview
Page: Changing Usernames
You can enable anonymous access (also known as public access) to your site by granting the 'Use Confluence' permission to 'Anonymous' users.

This user category has been created for convenient administration of users who have not logged into the site. Permissions assigned to this group apply to all anonymous users of the site.

---

**Enabling Anonymous Access**

To enable anonymous access to your site,

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Click 'Global Permissions' in the left-hand panel.
3. Click 'Edit Permissions'.
4. In the 'Anonymous Access' section, select the 'can use' check box to enable anonymous access to the content on your site.
5. If you selected the 'can use' check box in the previous step and want to allow anonymous access to user profile views, select the check box in the 'View User Profiles' section.
   - Note: You cannot grant the 'View User Profiles' permission independently of the 'Use Confluence' permission.
6. Click 'Save All'.
7. You can now grant further permissions from the space administration screens to control the viewing and editing privileges of anonymous users. See Space Permissions Overview

---

**Disabling Anonymous Access**

To disable anonymous access to your site, clear the 'can use' check box and the 'View User Profiles' check box, then click 'Save All'.

---

**RELATED TOPICS**

Page: Adding a New User
Page: Editing User Details
Page: Adding or Removing Users in Groups
Page: Global Permissions Overview
Page: Removing or Deactivating a User
Page: Configuring Captcha for Spam Prevention
Page: Setting up Anonymous Access
Page: Searching For and Managing Users

---

**Viewing members of a group**
To view the members of a group:

1. Go to the Confluence 'Administration Console':
   - Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Click Manage Groups in the left-hand panel. This will list all the existing groups on the site.
3. Click a group name to display all the users in the group.

⚠️ The information on this page does not apply to Confluence OnDemand.

Notes

- **Multiple user directories:** You may define multiple user directories in Confluence, so that Confluence looks in more than one place for its users and groups. For example, you may use the default Confluence internal directory and also connect to an LDAP directory server. In such cases, you can define the directory order to determine where Confluence looks first when processing users and groups. Here is a summary of how the directory order affects the processing:
  - 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.

See Managing Multiple Directories.

Related Topics

- Page: Removing a Group
- Page: Adding or Removing Users in Groups
- Page: Viewing members of a group
- Page: Global Groups Overview
- Page: Searching For and Managing Users

Restoring Passwords To Recover Admin User Rights

Use this document if you are unable to log in to Confluence as administrator. The most common reason for using these instructions is if you have lost the administration password for your Confluence site.

Before you Start

Please note the following before you start:

- The following instructions include example SQL that should work on MySQL and PostgreSQL. You may need to customise the queries for other databases or for your installation.
- We strongly recommend testing the queries on a test database before modifying your production database.

**New user management in Confluence 3.5 and later**

- Confluence now uses the CWD_USER table in the database to store and refer to its users.
- When you imported your backup on upgrade from Confluence 3.4.9 or earlier, the upgrade process copied the users from the OS_USER table (for upgrades from versions older than 2.7) or the USERS table (for versions 2.7 to 3.4) into the CWD_USER table.
- The new user management framework also introduced user directories. Making modifications to users in the database will only fully work for users in Confluence's Internal Directory. The instructions below include extra steps for instances in which the user management has been delegated to external sources (via LDAP, Crowd or JIRA).

Please refer to the older documentation if you are still using OSUser or AtlassianUser.
Step 0. Get access to the database

If you are using the embedded HSQL database, you can find the files containing your database in `<confluence-home-directory>/database`. When you shut down Confluence, the SQL will be written to a `.script` or `.log` file in that directory to which you can append the SQL described below.

If you are using a proper production database, connect to the database with your normal tools. You will need to have permission to run queries and update data in the database.

Step 1. Identify Administrator

To find out which usernames have admin privileges, connect to your database using a database admin tool such as DBVisualiser. Please download a database admin tool now if you do not have one installed already. Then connect to your database and retrieve the list of administrator usernames and IDs with:

```sql
select u.id, u.user_name from cwd_user u
join cwd_membership m on u.id=m.child_user_id join cwd_group g on m.parent_id=g.id join cwd_directory d on d.id=g.directory_id
where g.group_name = 'confluence-administrators' and d.directory_name='Confluence Internal Directory';
```

If there are multiple results, choose one ID/username combination to use for the following steps. If there are no results, skip down to 'If No Local Users Exist' in Step 2.

Step 2. Replace Administrator Password

Confluence does not store passwords in plain text in the database, but uses hashes computed from the original password. You will need to insert a hash, rather than the plain password, over the existing password in the database. Below is the hash for the password `admin`:

For an External Database

To change the password to `admin` for a given username:

1. Shut down Confluence.
2. Connect to your database.
3. Run the following SQL:

   ```sql
   update cwd_user set credential = 'x61Ey612Kl2gpFL56FT9weDnpSo4AV8j8+qx2AuTHdRyY036xzxZTTrw10Wq3+4qQyB+XURPwXONxp3Y3pB37A=='
   where id=<id from Stage 1>;
   ```

For the Evaluation Embedded HSQL Database

To change the password to `admin` for a given username:

1. Shut down Confluence.
2. Open `<confluence-home>/database/confluencedb.script` or `confluencedb.log` if the `.script` file looks empty.
3. Search for:
4. Keep searching until you find the appropriate user, then replace their password with the hash value above.
5. Save the file.

If No Local Users Exist

There may be no administrators in your Internal Directory. If this is the case, you need to add one:

1. Add a new admin user by running:

```sql
INSERT INTO CWD_USER VALUES(1212121, 'admin', 'admin', 'T', '2009-11-26 17:42:08', '2009-11-26 17:42:08', 'A. D.', 'a. d.', 'Ministrator', 'ministrator', 'A. D. Ministrator', 'a. d. ministrator', 'admin@example.com', 'admin@example.com', (select id from cwd_directory where directory_name='Confluence Internal Directory'), 'x61Ey612Kl2gpFL56FT9weDnp5o4AV8j8+qx2AuThdRyY036xxzTTrw10Wq3+4qQyB+XURPWx1ONxp3Y3pB37A==');
```

```sql
ADD new groups by running:

```
insert into cwd_group(id, group_name, lower_group_name, active, local, created_date, updated_date, description, group_type, directory_id) values ('888888','confluence-administrators','confluence-administrators','T','F','2011-03-21 12:20:29','2011-03-21 12:20:29',NULL,'GROUP', (select id from cwd_directory where directory_name='Confluence Internal Directory'));
insert into cwd_group(id, group_name, lower_group_name, active, local, created_date, updated_date, description, group_type, directory_id) values ('999999','confluence-users','confluence-users','T','F','2011-03-21 12:20:29','2011-03-21 12:20:29',NULL,'GROUP', (select id from cwd_directory where directory_name='Confluence Internal Directory'));
```

2. Add group memberships into cwd_membership:

```sql
insert into cwd_membership (id, parent_id, child_user_id) values (888888, (select id from cwd_group where group_name='confluence-users' and directory_id=(select id from cwd_directory where directory_name='Confluence Internal Directory')), 1212121);
insert into cwd_membership (id, parent_id, child_user_id) values (999999, (select id from cwd_group where group_name='confluence-administrators' and directory_id=(select id from cwd_directory where directory_name='Confluence Internal Directory')), 1212121);
```

With Oracle, use `sysdate` instead of a string to the `created` column.

**Step 3. Put the Internal Directory in First Position**

Start Confluence, and try logging in with the username of the user you updated/created and the password 'admin'. If this works, skip to Step 4. Otherwise, your Internal Directory does not have high enough priority.

**To put your Internal Directory in first position:**

1. Find the directory names and their order:

```sql
select d.id, d.directory_name, m.list_index from cwd_directory d join cwd_app_dir_mapping m on d.id=m.directory_id;
```

2. Take note of the ID with list_index 0, and the list_index and ID of the Confluence Internal Directory.
3. Switch the order of the directories:
4. Check to see if the directory is active (the 'active' column should be set to 'T'):

```sql
select id, directory_name, active from cwd_directory where id = <Internal Directory id>;
```

5. If necessary, activate the directory:

```sql
update cwd_directory set active = 'T' where id = <Internal Directory id>;
```

### Step 4. Clean Up

**To tidy up:**

1. Start Confluence.
2. Log in with your modified/created username and use password `admin`.
3. Change your password. **Do not leave your password as admin, or your instance will not be secure.**
4. If you created a new user in Stage 2, create a new admin via the UI and delete the admin you created in Stage 2.
5. If you followed Stage Three, go to Confluence Administration > User Directories and rearrange your directories so they are correctly configured again.

### Notes

- Learn more about the password hash algorithm Confluence is using.

### Resetting the Login Count for a User

Confluence records the number of failed login attempts made against each user account. When the login attempts exceed a preset number (see Configuring Captcha for Failed Logins), the user will be prompted to authenticate using CAPTCHA until they successfully log in.

If you are a Confluence Administrator, you can manually reset the failed login count for a user.

⚠️ **The information on this page does not apply to Confluence OnDemand.**

**To reset the failed login count for a user,**

1. Go to the Confluence 'Administration Console':
   - Choose `Browse > Confluence Admin`. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click `Confirm`. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select 'Manage Users' in the left-hand panel. The 'Manage Users' screen appears, as shown below.
3. Search for the desired user and click the user in the search results. The 'View User' screen will be displayed.
4. Click the 'Reset Failed Login Count' for the user. The 'Current Failed Login Count' will be reset to 0.

**Screenshot: Resetting failed login count for a user**

![Login Information](image)

- **CAPTCHA required at next login**
- **Last Login:** May 27, 2010 16:47
- **Last Failed Login:** May 27, 2010 17:21
- **Total Failed Login Count:** 6
- **Current Failed Login Count:** 6

*View Profile | Edit Groups | Edit Details | Set Password | Remove*
Disabling the Built-In User Management

By selecting the 'External user management' option in Confluence, you can disable the group and user management screens in Confluence. You need system administrator permissions to set this option.

⚠️ Setting this option currently has no effect. Please see the notes below.

You will find it useful to select external user management under the following circumstances:

• When Crowd's directory permissions are configured so that Confluence cannot update the Crowd directories, then Confluence's external user management setting must be turned on. Otherwise, a 'System Error' will occur when Confluence attempts to write data into Crowd. For more information about integrating Crowd with Confluence, see Connecting to Crowd or JIRA for User Management
• If you are using JIRA for user management, we recommend that you turn on Confluence's external user management setting. This centralises user management in JIRA. See Connecting to Crowd or JIRA for User Management and Connecting to JIRA 4.2 or Earlier for User Management.

The information on this page does not apply to Confluence OnDemand.

To disable management of users and groups within Confluence:

1. Go to the Confluence 'Administration Console':
   • Choose Browse > Confluence Admin. The 'Administrator Access' login screen will be displayed.
   • Enter your password and click Confirm. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Click 'Security Configuration' in the left-hand panel.
3. The 'Edit Security Configuration' screen will appear. Click 'Edit'.
4. Tick the 'External user management' check box.
5. Click 'Save'.

Notes

• Please refer to the following bugs and improvement requests:
  • CONF-16709 – When the External User Management check box is ticked, the group and user management screens are still functional.
  • CONF-21158 – Enabling both public signup and external user management renders a blank screen during signup.
  • CONF-9830 – This is a request to rename this feature to better reflect its functionality.

RELATED TOPICS

Page: Disabling the Built-In User Management

Integrating Confluence with Other Applications

You can integrate Confluence with other applications using Application Links. The Application Links feature allows you to link Confluence to applications like Atlassian's JIRA. Linking two applications allows you to share information and access one application's functions from within the other. For example, if you linked your Confluence server with a JIRA server, you could view JIRA issues in a Confluence page via the JIRA Issues Macro.

The information on this page does not apply to Confluence OnDemand.

Getting Started

The Application Links quick start guide provides instructions on how to set up the most common application link configuration.

Administrator's Guide

The administrator's guide is for administrators who want to configure application links for their applications. The guide contains information on adding a new application link, configuring the authentication for an application link, setting up project links and more.
Developer Resources

These resources are for developers who want to develop with the Application Links plugin. Take a look at the Development Hub.

Related Topics

- Configuring Application Links
- Configuring OAuth
- Confluence and JIRA

Configuring Application Links

An application link is a trust relationship between two applications. Linking two applications allows you to share information and to access one application’s functions from within the other.

The information on this page does not apply to Confluence OnDemand.

Notes

- In the above screenshot, the column titled ‘Incoming Authentication’ is visible in Confluence 3.5.1 and later. The column does not appear in Confluence 3.5.

Related Topics

- Adding an Application Link
- Configuring Authentication for an Application Link
- Editing an Application Link
- Making an Application Link the Primary Link
- Relocating an Application Link
- Upgrading an Application Link
- Deleting an Application Link
- Configuring Project Links across Applications

Adding an Application Link

This page describes how to add a new application link in Confluence. The process for adding an application link is different depending on whether the application that you are linking Confluence to, supports Application Links (i.e. has Application Links installed) or not.

If you are linking Confluence to an application that does not have Application Links, you will need to do additional configuration in that application. This is because Application Links in Confluence will not be able to automatically configure authentication in your remote application.

Please read the appropriate set of instructions below:

- Linking to an application that supports Application Links.
- Linking to an application that does not support Application Links.

On this page:

- Adding an Application Link to an Application That Supports Application Links
- Adding an Application Link to an Application That Does Not Support Application Links
- Notes

The information on this page does not apply to Confluence OnDemand.
Adding an Application Link to an Application That Supports Application Links

Before you begin:

- Make sure that the base URL is set correctly in Confluence. See Configuring the Server Base URL for instructions.
- Make sure that the base URL is set correctly in the application which you intend to link to. See the appropriate instructions: JIRA instructions | FishEye/Crucible instructions | Bamboo instructions. This is required for synchronisation to work correctly.

To link to an application that supports Application Links:

1. Log in as a system administrator and go to the administration page. Click 'Application Links' in the administration menu. The 'Configure Application Links' page will appear, showing the application links that have been set up.
2. Click 'Add Application Link'. Step 1 of the link wizard will appear.
3. Enter the server URL of the application that you want to link to (the 'remote application').
4. Click the 'Next' button. Step 2 of the link wizard will appear.
5. Enter the following information:
   - 'Create a link back to this server' – Tick this check box if you want to create a two-way link between the remote application and your application. If you want to do this, you will need to enter the username and password of an administrator for the remote application.
   - 'Reciprocal Link URL' – The URL you give here will override the base URL specified in your remote application's administration console, for the purposes of the application links connection. Application Links will use this URL to access the remote application.
6. Click the 'Next' button. Step 3 of the link wizard will appear.
7. Enter the information required to configure authentication for your application link:
   - 'The servers have the same set of users' or 'The servers have different sets of users' – Select one of these options depending on how you manage users between the two applications.
   - 'These servers fully trust each other' – Tick this check box if you know that the code in both applications will behave itself at all times and are sure each application will maintain the security of its private key.

Adding an Application Link to an Application That Does Not Support Application Links

Before you begin:

- Make sure that the base URL is set correctly in Confluence. See Configuring the Server Base URL for instructions.
- Make sure that the base URL is set correctly in the application which you intend to link to. See the appropriate instructions: JIRA instructions | FishEye/Crucible instructions | Bamboo instructions. This is required for synchronisation to work correctly.

To link to an application that does not support Application Links:

1. Log in as a system administrator and go to the administration page. Click 'Application Links' in the administration menu. The 'Configure Application Links' page will appear, showing the application links that have been set up.
2. Click 'Add Application Link'. Step 1 of the 'Link to another server' dialogue will be displayed.
3. Enter the server URL of the application that you want to link to, in the 'Server URL' field. Click the 'Next' button. Step 2 of the 'Link to another server' dialogue will be displayed.
4. Fill out the fields, as follows:
   - 'Application Name' — Enter the name by which this remote application will be referred to, in your application.
   - 'Application Type' — Select the type of application that you are linking to: Bamboo, FishEye/Crucible, JIRA, Confluence, Subversion.
   - 'Application URL' — This will be set to the server URL you entered in the previous step and will not be editable.
5. Click the 'Create' button to create the application link. The 'Configure Application Links' page will be displayed, listing all of the application links that have currently been set up for your application including the one you just added.
6. Configure the desired authentication type (Trusted Applications, OAuth, basic HTTP, none) for your new application link. See Configuring Authentication for an Application Link.
7. In your application that does not support Application Links, configure the same type of authentication that you configured for your application link’s outgoing authentication (in the previous step). For example, if you configured outgoing Trusted Applications authentication in your Application-Links-enabled application, you also need to log into your non-Application-Links application and manually configure Trusted Applications (see the relevant administrator's documentation for the application).

Related Topics
- Making an Application Link the Primary Link
- Configuring Authentication for an Application Link
- Configuring Project Links across Applications

Choosing Authentication for an Application Link

The level of authentication that you should configure for your application link depends on a number of factors.

- Do the two applications you are linking trust each other? i.e. are you sure that the code in the application will behave itself at all times and that the application will maintain the security of its private key?
- Do the two applications you are linking share the same user base or not?
- Do you have administrative access to the application you are linking to?

Common scenarios include:

- If the two applications you are linking **trust each other** and **share the same user base**, configure **two-way authentication using Trusted Applications** for both incoming and outgoing authentication. For example, you may link your internal Confluence server to an internal JIRA server.
- If the two applications you are linking **trust each other** but **do not share the same user base**, configure **two-way authentication using OAuth** for both incoming and outgoing authentication. For example, you may link your internal Confluence server to an external (customer-facing) JIRA server.
- If you **do not have administrative rights** to the application that you are linking to (e.g. linking to a public FishEye server), configure a **one-way outgoing link** authenticated using **basic HTTP authentication** or do not configure any authentication for the link. For example, you may link your external Confluence server to a partner organisation’s Confluence server. An unauthenticated link will still allow the local application to render hyperlinks to the remote application or query anonymously-accessible APIs.

The flowchart below provides a guide to what authentication you should configure for your application link.

Read the following topics for information on how to configure authentication for an application link:

- Configuring Basic HTTP Authentication for an Application Link
- Configuring OAuth Authentication for an Application Link
- Configuring Trusted Applications Authentication for an Application Link
- Incoming and Outgoing Authentication

**Flowchart above: Determining what authentication to configure for an Application Link**

**Security Implications for each Authentication Type**

If you configure **Trusted Applications authentication** for your application (i.e. your servers have the same set of users and they fully trust each other), please be aware of the following security implications:

- **Trusted applications are a potential security risk.** When you configure Trusted Applications authentication, you are allowing one application to access another as any user. This allows all of the built-in security measures to be bypassed. Do not configure a trusted application unless you know that all code in the application you are trusting will behave itself at all times, and you are sure that the application will maintain the security of its private key.

If you configure **OAuth authentication** for your application (i.e. your servers have different sets of users and they fully trust each other), please be aware of the following security implications:

- Adding an OAuth consumer requires the transmission of sensitive data. To prevent ‘man-in-the-middle’ attacks, it is recommended...
that you **use SSL** for your applications while configuring OAuth authentication.

- Do not link to an application using OAuth authentication, unless you **trust all code in the application** to behave itself at all times. OAuth consumers are a potential security risk to the applications that they are linked to.

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**About Primary Authentication Types**

You can configure multiple authentication types for each application link. When a feature makes a request using an Application Link, it will use one of the configured authentication types. If more than one authentication type is configured, it will by default use the authentication type that is marked as the primary authentication type. The default authentication type is indicated by the green tick ✓ next to the authentication type on the list application link screen.

You **cannot** configure which authentication type is the primary authentication type. The primary authentication type is determined automatically by Application Links and depends on a weight defined by each authentication type method. However, every feature that uses Application Links can also choose to use a specific authentication type and might not use the default primary authentication type.

**About Impersonating and Non-Impersonating Authentication Types**

Applications Links allows you to configure ‘impersonating’ and ‘non-impersonating’ authentication types:

- **Impersonating authentication types** make requests on behalf of the user who is currently logged in. People will see only the information that they have permission to see. This includes OAuth and Trusted Applications authentication.
- **Non-impersonating authentication types** always use a pre-configured user when making a request. Everyone logged into the system will see the same information. This includes basic HTTP authentication.

**Configuring Basic HTTP Authentication for an Application Link**

The instructions on this page describe how to configure **Basic HTTP authentication** for outgoing authentication and/or incoming
authentication for an application link.

Basic HTTP authentication allows Confluence to provide user credentials to a remote application and vice versa. Once authenticated, one application can access specified functions on the other application on behalf of that user. For example, if you supply the credentials of a Confluence administrator on your Confluence server to a remote application, the remote application will be able to access all functions on your Confluence server that the Confluence administrator can access.

This method of authentication relies on the connection between Confluence and the remote application being secure. We recommend that you use Trusted Applications authentication or OAuth authentication for your application link instead, if possible.

On this page:
- Before You Begin
- Configuring Basic HTTP Authentication for Outgoing Authentication
- Configuring Basic HTTP Authentication for Incoming Authentication
- Notes

⚠️ The information on this page does not apply to Confluence OnDemand.

Before You Begin

- The instructions assume that both of the applications that you are linking have the Application Links plugin installed. If the remote application that you are linking to supports Basic HTTP authentication, but does not have the Application Links plugin installed, you will need to configure Basic HTTP authentication from within the remote application (see the relevant administrator’s documentation for the application). This is in addition to configuring the outgoing/incoming authentication for the application link (as described below).
- You must be a Confluence administrator to configure Basic HTTP authentication for an application link.

Configuring Basic HTTP Authentication for Outgoing Authentication

Configuring outgoing basic http authentication will allow Confluence to trust a remote application (i.e. allow the remote application to access specified functions in Confluence).

To configure basic http authentication for an outgoing application link:

1. Log in as a system administrator and go to the administration page. Click 'Application Links' in the administration menu. The 'Configure Application Links' page will appear, showing the application links that have been set up.
2. Click the 'Configure' link next to the application link that you want to configure authentication for.
3. Click the 'Outgoing Authentication' tab. The outgoing authentication page will be displayed.
4. Click the 'Basic Access' tab.
5. Click the 'Configure' button and enter the credentials (username and password) that the remote application will use to log into your application.
6. Click the 'Apply' button to save your changes.

Configuring Basic HTTP Authentication for Incoming Authentication

Configuring incoming basic http authentication will allow the remote application that you are linking to, to trust Confluence (i.e. allow Confluence to access specified functions on the remote application it is linked to).

To configure basic http authentication for an incoming application link:

1. Log in as a system administrator and go to the administration page. Click 'Application Links' in the administration menu. The 'Configure Application Links' page will appear, showing the application links that have been set up.
2. Click the 'Configure' link next to the application link that you want to configure authentication for.
3. Click the 'Incoming Authentication' tab. The incoming authentication page will be displayed.
4. Click the 'Basic Access' tab.
5. Click the 'Configure' button and enter the credentials (username and password) that the your application will use to log in to the remote application.
6. Click the 'Apply' button to save your changes.

Notes

Related Topics

Configuring OAuth Authentication for an Application Link
Configuring Trusted Applications Authentication for an Application Link

Configuring OAuth Authentication for an Application Link
The instructions on this page describe how to configure **OAuth** for outgoing authentication and/or incoming authentication for an application link.

**OAuth** is a protocol that allows a web application to share data/resources with any other OAuth-compliant external application. These external applications could be another web application (such as a JIRA installation or an iGoogle home page), a desktop application or a mobile device application, provided that they are accessible from within your network or available on the Internet.

For example, you could set up an application link between Confluence and an iGoogle page using OAuth authentication. This would allow you to view data from your Confluence server in a Confluence gadget on the iGoogle page (see Configuring Confluence Gadgets for Use in Other Applications).

A typical scenario is setting up an application link between two applications which trust each other, do not share the same set of users but both applications have the Application Links plugin installed. In this case, you would configure OAuth for both outgoing authentication and incoming authentication. See Configuring Authentication for an Application Link for other configurations.

### Key OAuth Terminology

- **Service provider** — An application that shares ('provides') its resources.
- **Consumer** — An application that accesses ('consumes') a service provider's resources.
- **User** — An individual who has an account with the Service Provider.

For more information about OAuth, see Configuring OAuth as well as the OAuth specification.

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**Before You Begin**

- Adding an OAuth consumer requires the transmission of sensitive data. To prevent 'man-in-the-middle' attacks, it is recommended that you use SSL for your applications while configuring OAuth authentication.
- Do not link to an application using OAuth authentication, unless you **trust all code in the application** to behave itself at all times. OAuth consumers are a potential security risk to the applications that they are linked to.
- The instructions assume that **both of the applications that you are linking have the Application Links plugin installed**. If the remote application that you are linking to supports OAuth, but does not have the Application Links plugin installed, you will need to configure OAuth from within the remote application (see the relevant administrator's documentation for the application) in addition to configuring the outgoing/incoming authentication for the application link (as described below).
- You must be a Confluence administrator to configure OAuth authentication for an application link.

### Configuring OAuth for Outgoing Authentication

Configuring outgoing OAuth authentication will allow Confluence to access data in a remote application on behalf of a user (i.e. allow Confluence to access specified functions in the remote application).

**To configure OAuth authentication for an outgoing application link:**

1. Log in as a system administrator and go to the administration page. Click 'Application Links' in the administration menu. The 'Configure Application Links' page will appear, showing the application links that have been set up.
2. Click the 'Configure' link next to the application link that you want to configure OAuth for.
3. Click the 'Outgoing Authentication' tab. The outgoing authentication page will be displayed.
4. Click the 'OAuth' tab.
5. If you are not currently logged in to the remote application (or you logged in to the remote application under a variant of the application's hostname, such as the IP address), a login dialogue will display.
   - Enter the 'Username' and 'Password' for the remote server, not your local server, and click the 'Login' button. The remote server needs to learn the identity of your local server for the OAuth protocol to work and your admin credentials are used to store your local server's public key on the remote server. If you are already logged into your remote server, then the appropriate changes can be made without having to log in again.
6. Click the 'Enable' button to enable OAuth authentication for the outgoing link. Your application will be automatically set up to be the 'consumer' and the remote application as a 'service provider'.

### Configuring OAuth for Incoming Authentication
Configuring incoming OAuth authentication will allow the remote application that you are linking to, to access data in Confluence.

To configure OAuth authentication for an incoming application link:

1. Log in as a system administrator and go to the administration page. Click 'Application Links' in the administration menu. The 'Configure Application Links' page will appear, showing the application links that have been set up.
2. Click the 'Configure' link next to the application link that you want to configure OAuth for.
3. Click the 'Incoming Authentication' tab. The incoming authentication page will be displayed.
4. Click the 'OAuth' tab.
5. Click the 'Enable' button to enable OAuth authentication for the incoming link. The remote application will be automatically set up to be the 'consumer' and your local application as a 'service provider'.

Related Topics
- Configuring Basic HTTP Authentication for an Application Link
- Configuring Trusted Applications Authentication for an Application Link
- Configuring Confluence Gadgets for Use in Other Applications

Configuring Trusted Applications Authentication for an Application Link

The instructions on this page describe how to configure Trusted Applications for outgoing authentication and/or incoming authentication for an application link.

Trusted Applications authentication allows one application to allow access to specified functions on another application on behalf of any user without the user having to log into the second application. For example, if you configure a JIRA server to trust a Confluence server, every Confluence user will see exactly the same list of issues when they view the Confluence 'JIRA Issues' macro as they see when they use the JIRA Issue Navigator as a logged-in JIRA user.

A typical scenario is setting up an application link between two applications which trust each other, have the same set of users and both have the application links plugin installed. In this case, you would configure Trusted Applications for both outgoing authentication and incoming authentication. See Configuring Authentication for an Application Link for other configurations.

On this page:
- Before You Begin
- Configuring Trusted Applications for Outgoing Authentication
- Configuring Trusted Applications for Incoming Authentication
- Notes

⚠️ The information on this page does not apply to Confluence OnDemand.

Before You Begin

- Trusted applications are a potential security risk. When you configure Trusted Applications authentication, you are allowing one application to access another as any user. This allows all of the built-in security measures to be bypassed. Do not configure a trusted application unless you know that all code in the application you are trusting will behave itself at all times, and you are sure that the application will maintain the security of its private key.

- The instructions below assume that both of the applications that you are linking have the Application Links plugin installed. If the remote application that you are linking to supports Trusted Applications, but does not have the Application Links plugin installed, you will need to configure Trusted Applications from within the remote application (see the relevant administrator's documentation for the application) in addition to configuring the outgoing/incoming authentication for the application link (as described below).

- You must be a Confluence administrator to configure Trusted Applications authentication for an application link.

Configuring Trusted Applications for Outgoing Authentication

Configuring outgoing Trusted Applications authentication will allow the remote application to trust Confluence (i.e. allow Confluence to access specified functions and data on the remote application).

To configure Trusted Applications authentication for an outgoing application link:

1. Log in as a system administrator and go to the administration page. Click 'Application Links' in the administration menu. The 'Configure Application Links' page will appear, showing the application links that have been set up.
2. Click the 'Configure' link next to the application link that you want to configure Trusted Applications authentication for.
3. Click the 'Outgoing Authentication' tab. The outgoing authentication page will show, with the 'Trusted Applications' tab displayed.
4. If you are not currently logged into the remote application (or you logged into the remote application under a variant of the application's hostname, e.g. the IP address), a login dialogue will display.

   - Enter the 'Username' and 'Password' for the remote server, (not your local server), and click the 'Login' button. You need to enter the credentials for the remote server, as the remote server needs to be instructed to trust your local server for the Trusted Applications protocol to work. If you are already logged into your remote server, then the appropriate changes can be made without having to log in again.
5. Configure the settings for the Trusted Applications authentication:

- **IP Patterns** — Enter the IP addresses (IPv4 only) from which the remote application will accept requests (this effectively is the IP address your local server). You can specify wildcard matches by using an asterisk (*), e.g. '192.111.111.*'. Note, you cannot use netmasks to specify network ranges. If you are entering multiple IP addresses, separate them with commas or spaces.

  **Please note,** if you are setting up Trusted Applications between two applications that both have the Application Links plugin installed, you can leave this field blank (or explicitly use ".*.*.*.". However, if your remote application does not have the Application Links plugin installed and you are configuring the IP Patterns in the remote application (not the Application Links plugin), you must not leave this field blank nor use ".*.*.*.". Failure to configure IP address restrictions in this scenario is a security vulnerability, allowing an unknown site to log into your site under a user’s login ID. Consider the following scenarios, if you want to limit access by using this field:

  - If your local application is using a proxy server, you need to add the proxy server’s IP address to this field.
  - If your application is a clustered instance of Confluence, you need to configure the remote server to accept requests from each cluster node. If you do not set up each node appropriately, your Confluence users may not be able to view any information from the remote server. You can set this up by either specifying each individual IP address for each node of the cluster (e.g. 172.16.0.10, 172.16.0.11, 172.16.0.12), or specifying the IP address for the clustered Confluence instance using wildcards (e.g. 172.16.*.*).

- **URL Patterns** — Enter the URLs in the remote application that your local application will be allowed to access. Each URL corresponds to a particular application function. Enter one URL per line, as follows:

  - If your remote application is JIRA, enter the following URL Patterns: /plugins/servlet/streams, /sr/jira.issueviews:searchrequest, /secure/RunPortlet, /rest, /rpc/soap
  - If your remote application is Confluence, enter the following URL Patterns: /plugins/servlet/streams, /plugins/servlet/applinks/whoami

- **Certificate Timeout (ms)** — Enter the certificate timeout. The default is 10 seconds. The certificate timeout is used to prevent replay attacks. For example, if a Trusted Applications request is intercepted and (maliciously) re-sent, the application will be able to check when the request was first sent. If the second request is sent more than 10 seconds (or whatever the certificate timeout is set to) after the initial request, it will be rejected. Please note, you should not have to change the default value of this field for most application links. Note that the certificate timeout relies on the clocks on both servers being synchronised.

6. Click the ‘Apply’ button to save your changes.

### Configuring Trusted Applications for Incoming Authentication

Configuring incoming Trusted Applications authentication will allow Confluence to trust the remote application that you are linking to (i.e. allow your ‘trusted’ remote application to access specified functions and data on Confluence).

To configure Trusted Applications authentication for an incoming application link:

1. Log in as a system administrator and go to the administration page. Click ‘Application Links’ in the administration menu. The ’Configure Application Links’ page will appear, showing the application links that have been set up.
2. Click the ‘Configure’ link next to the application link that you want to configure Trusted Applications authentication for.
3. Click the ‘Incoming Authentication’ tab. The incoming authentication page will show, with the ‘Trusted Applications’ tab displayed.
4. The tab will show whether Trusted Applications is currently enabled or not. Use the ‘Modify’ or ‘Configure’ button to configure Trusted Applications. The Trusted Applications configuration settings will be displayed:

   - **IP Patterns** — Enter the IP addresses (IPv4 only) from which our application will accept requests. You can specify wildcard matches by using an asterisk (*), e.g. '192.111.111.*'. Note, you cannot use netmasks to specify network ranges. If you are entering multiple IP addresses, separate them with commas or spaces.

   **Please note,** if you are setting up Trusted Applications between two applications that both have the Application Links plugin installed, you can leave this field blank (or explicitly use ".*.*,*."). However, if your remote application does not have the Application Links plugin installed and you are configuring the IP Patterns in the remote application (not the Application Links plugin), you must not leave this field blank nor use ".*.*,*.". Failure to configure IP address restrictions in this scenario is a security vulnerability, allowing an unknown site to log into your site under a user’s login ID. Consider the following scenarios, if you want to limit access by using this field:

     - If the remote application is using a proxy server, you need to add the proxy server’s IP address to this field.
     - If your application is a clustered instance of Confluence, you need to accept requests from each cluster node. If you do not specify each node’s address, Confluence users may not be able to view any data from your application. You can set this up by either specifying each individual IP address for each node of the cluster (e.g. 172.16.0.10, 172.16.0.11, 172.16.0.12), or specifying the IP address for your clustered Confluence instance using wildcards (e.g. 172.16.*.*).

   - **URL Patterns** — Enter the local URLs that the remote application will be allowed to access. Each URL corresponds to a particular application function. Enter one URL per line, as follows:

     - If your local application is JIRA, enter the following URL Patterns: /plugins/servlet/streams, /sr/jira.issueviews:searchrequest, /secure/RunPortlet, /rest, /rpc/soap
     - If your local application is Confluence, enter the following URL Patterns: /plugins/servlet/streams, /plugins/servlet/applinks/whoami

   - **Certificate Timeout (ms)** — Enter the certificate timeout. The default is 10 seconds. The certificate timeout is used to prevent replay attacks. For example, if a Trusted Applications request is intercepted and (maliciously) re-sent, the application will be able to check when the request was first sent. If the second request is sent more than 10 seconds (or whatever the certificate timeout is set to) after the initial request, it will be rejected. Please note, you should not have to change the default value of this field for most application links. Note that the certificate timeout relies on the clocks on both servers being synchronised.

5. Click the ‘Apply’ button to save your changes.

### Notes

Related Topics
Incoming and Outgoing Authentication

When you configure authentication for an application link, you are defining the level of trust between the two linked servers. When configuring a link from one application to another, you can set up:

- **Incoming authentication** (authentication of requests coming from a linked application into this application).
- **Outgoing authentication** (authentication of requests sent from this application to a linked application).

See Configuring Authentication for an Application Link.

The information on this page does not apply to Confluence OnDemand.

Editing an Application Link

You can change the details, such as the application name and display URL, for an existing application link.

To edit an application link:

1. Log in as a system administrator and go to the administration page. Click 'Application Links' in the administration menu. The 'Configure Application Links' page will appear, showing the application links that have been set up.
2. Click the 'Configure' link next to the application link that you want to edit the details for. The application details for the application link will be displayed.
3. Update the application details as desired. Please note, you cannot update the Application Type nor the Application URL.
   - **Application Name** — Update this field to change the display name for the application that you are linking to.
   - **Display URL** — This URL is used when displaying links to the application in the browser. When creating the application link, you may have used a URL that is not accessible to other users, such as an internal IP address. If so, you can change the display URL to an address in a domain that is accessible to other users.
4. Click the 'Update' button to save your changes.
Making an Application Link the Primary Link

If you have set up application links to more than one of the same application type, e.g. you have linked your application to two JIRA servers, then one of the servers will be marked as the ‘Primary’ link. This means that any outgoing requests will be directed to the primary link’s application.

For example, if you have set up a Confluence server that is linked to two JIRA servers with two-way authentication for both links, you can nominate an application link to one of the JIRA servers as the primary link. Every time Confluence requests JIRA information (e.g. for a JIRA issues macro), it will request it from the primary link’s JIRA server. Note, both JIRA servers can still make requests of the Confluence server (e.g. a Confluence page gadget on the dashboards of each JIRA instance).

To make an application link the primary link:

1. Log in as a system administrator and go to the administration page. Click ‘Application Links’ in the administration menu. The ‘Configure Application Links’ page will appear, showing the application links that have been set up.
2. Click the ‘Make Primary’ link next to the application link that you want to make the primary link. A ✔ symbol will display in the

On this page:
- Making an Application Link the Primary Link
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The information on this page does not apply to Confluence OnDemand.
'Primary' column next to the application link.

- **Notes**

Please read Making a Project Link the Primary Link for information on how primary project links also influence the information shared between servers.

**Related Topics**

Making a Project Link the Primary Link

**Relocating an Application Link**

This page describes how to change the location of an application link. You will need to relocate an application link if the target application has been moved to a new address.

![Image](https://example.com/image.png)

**To relocate an application link:**

1. Log in as a system administrator and go to the administration page. Click 'Application Links' in the administration menu. The 'Configure Application Links' page will appear, showing the application links that have been set up.
2. If the remote application for an application link cannot be reached by your application, the 'List Application Links' page will display a warning message (see 'Relocate Link - Warning Message' screenshot below).
3. If your remote application has been moved to a different address (rather than just being offline temporarily), click the 'Relocate' link in the warning message (see 'Relocate Link - Updating URL' screenshot below).
4. Enter the new URL for the remote application of your application link and click 'Relocate'.
5. You will need to confirm the relocation, if the new URL cannot be contacted. Otherwise, the application link will be updated.

![Image](https://example.com/image.png)

**Related Topics**

Making an Application Link the Primary Link

**Upgrading an Application Link**

The instructions on this page describe how to upgrade an existing application link. You may want to upgrade an application link in either of the two situations below:
Your Confluence instance has been upgraded from a version that does not include Application Links to a version that does. For example, you may have configured Trusted Applications or OAuth in a Confluence 3.4 instance (does not include Application Links) and then upgraded to Confluence 3.5 (includes Application Links).

Your remote application has been upgraded to a version that includes Application Links. For example, you had set up an application link in a Confluence 3.5 instance (includes Application Links) to JIRA 4.2 instance (does not include Application Links), and then upgrade to JIRA 4.3 (includes Application Links).

On this page:

- Upgrading an Application Link (Local App Upgraded to Include Application Links)
- Upgrading an Application Link (Remote App Upgraded to Include Application Links)
- Notes

⚠️ The information on this page does not apply to Confluence OnDemand.

Upgrading an Application Link (Local App Upgraded to Include Application Links)

When you upgrade from a Confluence version that does not include Application Links to version that does, you will have the option of converting any Trusted Applications or OAuth links to Application Links. The advantage of converting your links to Application Links is that link configuration will be simplified in future.

To upgrade an application link when your local application has been upgraded to include Application Links:

1. After your application upgrade, navigate to the administration console.
2. Click 'Application Links'. The Configure Application Links screen will be displayed with the following message: "There are existing Trusted Applications or OAuth relationships that should be upgraded to Application Links. Click here to upgrade."
3. Click the 'Click here to upgrade' link. The Existing Trust Relationships screen will be displayed showing all Trusted Applications and OAuth relationships that can be upgraded to Application Links.
4. Click the 'Upgrade to Application Link' link next to the desired trust relationship. The Upgrade to Application Link wizard will be displayed.
5. Complete the wizard. The process will be similar to adding a new link (described on Adding an Application Link), except that most fields should be pre-filled.

Screenshots above: Upgrading an application link for local application

Upgrading an Application Link (Remote App Upgraded to Include Application Links)

When an application link is created between a version of Confluence that supports Application Links, and a remote legacy application (either a non-Atlassian product, or an older version of an Atlassian product that did not ship with Application Links), this link is configured to run in "legacy mode". While there is no distinguishable difference to a user, connection and configuration without Application Links is a little different. For example:

- Setting up OAuth requires manual configuration by the administrator. In OAuth authentication for between applications that support Application Links, exchange of the consumer keys and public keys is done automatically.
- The Trusted Applications protocol (Atlassian-specific) will not be available for authentication.
If you upgrade your remote application to a version that does include Application Links, the application link will continue to work. However, upgrading your link may simplify link configuration and make additional authentication protocols available (as mentioned above).

**To upgrade an application link when your remote application has been upgraded to include Application Links:**

1. After you have upgraded your remote application to a version that includes Application Links, go to the administration console of your local application. A warning will be displayed, requesting that you upgrade the link to full Application Links mode.
2. Click 'Upgrade' in the warning message to start the upgrade wizard. Note the following:
   - You will be prompted to make your application link a reciprocal link. You will need to provide administrator credentials for your remote application, if you choose to do so.
   - If you make your application link a reciprocal link, you will also be able to make reciprocal links for your project links. For example, you may be able to link your JIRA project to a FishEye repository and also make a link from your FishEye repository back to the JIRA project.

![Screenshot above: Upgrading an application link for remote application](image)
Deleting an Application Link

Deleting an application link stops the two applications from sharing information. You will no longer be able to make requests from one application to the other. This means that certain features may not work, e.g. JIRA issues macro in Confluence, Confluence Page Gadget in JIRA, etc.

If you have set up application links to multiple servers of the same application type, e.g. you have linked your application to multiple JIRA servers, deleting the primary link will mean that another of the links will be made the primary link.

Deleting an application link will also delete all project links set up for that application link.
To delete an application link:

1. Log in as a system administrator and go to the administration page. Click ‘Application Links’ in the administration menu. The 'Configure Application Links' page will appear, showing the application links that have been set up.
2. Click the ‘Delete’ link next to the application link that you want to delete. A confirmation screen will be displayed.
3. Click the ‘Confirm’ button to delete the application link.

RELATED TOPICS

Editing an Application Link
Relocating an Application Link

Configuring Project Links across Applications

Let's assume that you are managing a project or team. You would like to connect your project's Confluence space with your JIRA project, and link up your team's source repository too. When you have connected your applications via Application Links, you can also connect the areas of those applications that contain information relating to your project or team. Using project links (also called entity links) you can associate one or more projects, spaces and repositories across the linked applications.

To connect all the information relating to the project or team that you are managing, you can link one or more of the following:

- JIRA projects.
- Confluence spaces.
- FishEye repositories.
- FishEye projects. A FishEye 'project' is the Crucible project if you have installed FishEye and Crucible, otherwise it is the paths associated via the 'FishEye Project Content' function in FishEye.
- Crucible projects.
- Bamboo projects.

On this page:

- Uses for Project Links
- Managing Project Links

Uses for Project Links

The following integration features use project links:

- Activity streams. For example, the project links determine the activity retrieved from JIRA to display in the activity stream of a FishEye repository or a Crucible project.
- The JIRA FishEye plugin. For example:
  - The link between a JIRA project and a FishEye repository determines the repository searched for a particular issue key when displaying the FishEye source tab in JIRA.
  - The link between a JIRA project and a Crucible project determines the Crucible project scanned for review activity when displaying the Crucible reviews tab in JIRA.
  - When you create a defect in Crucible, Crucible will know which JIRA project to put it in.
- Third-party plugins may make use of project links to enrich their functionality too.

Managing Project Links

- Adding Project Links between Applications
- Making a Project Link the Primary Link
- Deleting a Project Link

RELATED TOPICS

Adding an Application Link

Adding Project Links between Applications

Let's assume that you are managing a project or team. You would like to connect your project's Confluence space with your JIRA project, and link up your team's source repository too. When you have connected your applications via Application Links, you can also connect the areas of those applications that contain
information relating to your project or team. Using project links (also called entity links) you can associate one or more projects, spaces and repositories across the linked applications.

To connect all the information relating to the project or team that you are managing, you can link one or more of the following:

- JIRA projects.
- Confluence spaces.
- FishEye repositories.
- FishEye projects. A FishEye 'project' is the Crucible project if you have installed FishEye and Crucible, otherwise it is the paths associated via the 'FishEye Project Content' function in FishEye.
- Crucible projects.
- Bamboo projects.

⚠️ The information on this page does not apply to Confluence OnDemand.

To link a Confluence space to a project in another application:

1. Choose Browse > Space Admin.
   - Space Admin is displayed only if you are a space administrator for that space or you are a Confluence system administrator.
2. Click 'Application Links' in the left-hand panel.
3. Choose the Confluence space that you want to link from.
4. The instructions for adding a project link will vary depending on whether the target application has the Application Links functionality installed:
   - If the target application has Application Links:
     a. Click 'Add Link'. A dropdown menu will appear listing the applications you have already linked to.
     b. In the dropdown menu, click the application that contains the project you want to link to. For example, if you want to link to a specific JIRA project, click the JIRA site that contains that project. If you want to link to a Confluence space, click the Confluence site that contains that space.
     c. Click one of the options on the 'Authorization required' screen:
        - 'Authorize' — Click this option if you want to grant your project authorised access to the target project. The target application will open in a new window, so that you can log in and authorise access.
        - 'Skip – your access is anonymous' — Click this option if you only want to allow anonymous access to the target project.
     d. In the 'Name or Key' field, enter the name/key of the project in the remote application that you want to link to. For example, if you want to link to a JIRA project, enter the project key. If you want to link to a Confluence space, enter the space key.
     e. Click the 'Create' button to create the project link.
   - If the target application does not have Application Links:
     a. Click 'Add Link'. A dropdown menu will display listing the applications you have already linked to.
     b. In the dropdown menu, click the application that contains the project you want to link to. For example, if you want to link to a specific JIRA project, click the JIRA site that contains that project. If you want to link to a Confluence space, click the Confluence site that contains that space.
     c. In the 'Key' field, enter the name/key of the project in the remote application that you want to link to. For example, if you want to link to a JIRA project, enter the project key. If you want to link to a Confluence space, enter the space key.
     d. (optional) Enter the alias for the project in the 'Alias' field. This is the display name for the project in your administration console.
     e. Click the 'Create' button to create the project link.
CONFLUENCE 4.0 DOCUMENTATION

1. Screenshots above: Linking to a JIRA project (where the target JIRA server supports Application Links)

RELATED TOPICS

Making a Project Link the Primary Link
Deleting a Project Link

Making a Project Link the Primary Link

If you have set up project links to more than one project in the same application, for example you have linked your Confluence space to two JIRA projects, then one of the project links will be marked as the primary link. All outgoing requests will be directed to the primary link.

For example, if you have a Confluence space that is linked to two JIRA projects, you can nominate the link to one of the JIRA projects as the primary link. Every time Confluence requests JIRA information (for example, in a JIRA issues macro) it will request it from the primary link’s JIRA project. Note, both JIRA projects can still request information from the Confluence space (for example, a Confluence page gadget on the dashboards of each JIRA instance).

The information on this page does not apply to Confluence OnDemand.

To make a project link the primary link:

1. Choose Browse > Space Admin.
   - Space Admin is displayed only if you are a space administrator for that space or you are a Confluence system administrator.
2. Click ‘Application Links’ in the left-hand panel.
3. Click the ‘Action’ link in the ‘Action’ column for the project link that you want to make the primary link. A symbol will display in the ‘Primary’ column next to the link.
   - Note: The ‘Primary’ column and ‘Make Primary’ link will appear only if you have set up multiple project links to the same application, for example you have linked a Confluence space to a number of JIRA projects.

   Screenshot above: Viewing the project links for a Confluence space

RELATED TOPICS

Adding Project Links between Applications
Deleting a Project Link

Deleting a Project Link

Deleting a project link stops the two projects from sharing information.

If you have set up multiple project links to the same application, for example you have linked a Confluence space to multiple JIRA projects, deleting the primary link will mean that another of the links will be made the primary link.

The information on this page does not apply to Confluence OnDemand.

To delete a project link:

1. Choose Browse > Space Admin.
   - Space Admin is displayed only if you are a space administrator for that space or you are a Confluence system administrator.
2. Click ‘Application Links’ in the left-hand panel.
3. Click the ‘Delete’ link next to the link that you want to delete.
4. A confirmation screen will appear. Click the ‘Confirm’ button to delete the link.
OAuth is a protocol that allows one application to share a defined set of its private resources and data (through gadgets, for example) with another application. These applications could be a Confluence or JIRA site, or a website such as iGoogle. All applications involved must be OAuth-compliant. In Confluence, use Application Links to set up an OAuth relationship with another application.

Configuring OAuth Authentication

Application links are used to enable trust relationships between two applications. Linking two applications allows you to share information and access one application's functions from within the other. You can configure an application link to use OAuth as the authentication mechanism. For instructions, see Configuring OAuth Authentication for an Application Link.

About OAuth

Using OAuth, you can access data within a Confluence installation externally via a Confluence gadget published on a JIRA site's dashboard, another Confluence site's page, or a website like iGoogle. While some data in Confluence may be accessible anonymously on the external application, other data may be restricted to a specific user account within the Confluence installation. OAuth provides the facility to access this restricted data.

The key security advantage of OAuth is that Confluence's user-restricted resources can be shared without Confluence having to hand out user authentication details. Instead, access to these private resources is handled via an access token. Access tokens define what Confluence resources can be accessed by another application and the duration of this access. Access tokens are dissociated from a user's authentication details, since authentication to gain access to these resources is handled separately.

In OAuth terminology, an application that shares its resources is known as a service provider and an application that accesses a service provider's resources is known as a consumer.

Notes
OAuth relationships provide the ability to access restricted data on the service provider when an individual’s usernames on the service provider and consumer applications are different. This is different to Trusted Application relationships, also provided via [Application Links][Administering Application Links], where the usernames must be the same in both applications.

Not all external gadgets used in Confluence require the establishment of an OAuth relationship. If the gadget does not need to access restricted resources on the service provider, then there should be no need to establish an OAuth relationship.

For more information about OAuth, please refer to the OAuth protocol workflow section of our Gadgets and Dashboards documentation.

Related Topics
Configuring Application Links
Configuring OAuth Authentication for an Application Link

Confluence and JIRA

- Installing Confluence and JIRA Together
- Integrating JIRA and Confluence
- Setting Up Trusted Communication between JIRA and Confluence

Related Topics
Connecting to Crowd or JIRA for User Management
JIRA Issues Macro
JIRA Portlet Macro

The information on this page does not apply to Confluence OnDemand.

Installing Confluence and JIRA Together

This page describes Atlassian’s recommendation for installing JIRA and Confluence on the same server. Refer to Here Be Dragons for instructions on integrating all Atlassian applications.

Do not deploy 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 (see this FAQ for more information).

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 Confluence, especially if these other applications have large memory requirements or require additional libraries in Tomcat’s lib subdirectory.

The information on this page does not apply to Confluence OnDemand.

Recommended Setup - Separate Stand-Alone Installations

Atlassian recommends running JIRA and Confluence in separate stand-alone instances running behind an Apache Web Server. See the guides for:

- Installing Confluence
- Running Confluence behind Apache
- Installing JIRA
- Integrating JIRA with Apache

Advantages

- Each application can be restarted without affecting the other.
- If one webapp hangs for any reason (eg. running out of memory), it doesn't affect the other.
- Any problems can be debugged more easily. Logs are separate and product-specific, rather than everything going to catalina.out. Thread and heap dumps are smaller and more relevant.
- It reduces the likelihood of jar conflicts (eg. jars that must be installed in common/lib or lib for Confluence running off Apache Tomcat version 6 or above), particularly if you later want to install a third webapp not from Atlassian.
- Apache HTTP Web Server is well suited for running publicly available sites, with extensive modules for security and efficiency. It also allows for flexibility with URLs (ie http://confluence.atlassian.com, http://confluence, and so on).
Integrating JIRA and Confluence

Please refer to the guide to Installing Confluence and JIRA Together.

JIRA and Confluence are designed to complement each other. Collect your team's thoughts, plans and knowledge in Confluence, track your issues in JIRA, and let the two applications work together to help you get your job done.

Below are some ways you can get JIRA and Confluence working together.

- Setting Up Trusted Communication between JIRA and Confluence
- Inserting JIRA issues
- Combining Confluence Shortcuts and JIRA Quick Search
- Viewing Confluence Content in JIRA or JIRA Content in Confluence
- Integrating JIRA and Confluence User Management
- Useful Plugins

The information on this page does not apply to Confluence OnDemand.

Setting Up Trusted Communication between JIRA and Confluence

An administrator can configure JIRA (3.12.0 or later) and Confluence to communicate in a trusted way, so that Confluence can request information from JIRA on behalf of the currently logged-in user. JIRA will not ask the user to log in again or to supply a password.

Trusted communication is used when embedding information from one application (for example, a list of JIRA issues) into another application (for example, a Confluence page).

Read more about trusted communication.

Inserting JIRA issues

You can insert issues from a JIRA site onto your Confluence page using the 'Insert JIRA Issue' dialogue box. You can also use this dialogue box to create a new issue on the JIRA site. See Inserting JIRA Issues.

Combining Confluence Shortcuts and JIRA Quick Search

In our Confluence site's global configuration (Administration > Shortcut Links) we have the following shortcut defined:
Use the above option to create links using Confluence's shortcut notation.

- Link directly to JIRA issues like this: CONF-1000
- Use JIRA's quick-search functionality to create links to particular groups of issues. The following link will display a list of all open issues in the Confluence project of type ‘Improvement’: CONF open improvements

Viewing Confluence Content in JIRA or JIRA Content in Confluence

Using Gadgets

You can embed a Confluence activity stream or a Confluence page in JIRA's dashboard. Likewise, JIRA gadgets can be rendered on a Confluence page. See Adding a Confluence Gadget to a JIRA Dashboard and Gadget Macro for information on how to set up gadgets.

Using the JIRA Issues macro

For versions earlier than Confluence 3.1 and JIRA 4.0, use the {jiraissues} and {jiraportlet} macros to embed JIRA reports and portlets into your Confluence site.

Any JIRA search result can be embedded in a Confluence page using the JIRA Issues macro with your choice of included fields and field ordering, and any JIRA dashboard portlet can be embedded in a Confluence page using the JIRA Portlet macro.

Integrating JIRA and Confluence User Management

To save you having to enter users into both JIRA and Confluence, you may benefit from using Atlassian Crowd as the user repository for both applications. Alternatively you can configure Confluence to use JIRA’s user database. See Connecting to Crowd or JIRA for User Management.

Useful Plugins

Before installing a plugin into your Confluence site, please check the plugin's information page to see whether it is supported by Atlassian, by another vendor, or not at all. See our guidelines on plugin support.

- The JIRA Linker plugin provides a custom field that helps you find an URL, particularly a Confluence page, so you can add a page link into a JIRA issue.

Setting Up Trusted Communication between JIRA and Confluence

An administrator can configure JIRA and Confluence to communicate in a trusted way, so that Confluence can request information from JIRA on behalf of the currently logged-in user. JIRA will not ask the user to log in again or to supply a password.

When JIRA is configured to trust Confluence in this way, we call Confluence the 'trusted application' and JIRA the 'trusting application'.

Trusted communication is used when embedding information from one application (e.g. a list of JIRA issues) into another application (e.g. a Confluence page). Currently only JIRA can be configured to trust Confluence, and only the following two macros have been enhanced to use trusted communication:

- JIRA Issues macro
- JIRA Portlet macro

Further implementations will follow, especially as we roll out the tight integration required between Atlassian products for JIRA Studio.
Prerequisites

- JIRA 3.12.0 or later.
- Confluence 2.7.0 or later.
- In order to authenticate successfully against JIRA, the Confluence user must also be registered as a JIRA user with the same username.

Common user base recommended

It is highly recommended that your JIRA and Confluence instances share a common user base, rather than two separate user bases with duplicated usernames. You will receive an error if Confluence passes JIRA a username which JIRA cannot recognise. Also, with separate user bases you run the risk that the same username may be used by two different people. The trusted application does not supply the user's password, so the trusting application will assume the username belongs to the user registered in the trusting application's own user base.

Tip: Try Atlassian Crowd for a tidy user management solution.

Why do we need Trusted Communication?

The JIRA Issues and the JIRA Portlet macros allow you to embed a list of JIRA issues into a Confluence page. Prior to Confluence 2.7, if you wanted to display JIRA issues that had restricted viewing, then you needed to store the JIRA user's credentials (username and password) in the macro code directly on the Confluence page. This was not very secure.

The reasons we require the user credentials are:

- Your JIRA instance might not be public, and you might not want to allow anonymous access to your issues.
- You might have security restrictions on some of your issues. So you don't want to allow someone to leak data from your JIRA project by using the JIRA Issues Macro on a Confluence page.

Overview

Here is a summary of the integration points in a trusted communications relationship. Each of the following points is described in more detail in the sections below.

- A JIRA System Administrator configures JIRA to trust Confluence.
- A Confluence System Administrator configures the macro plugin to use (or not use) trusted communication.
- A Confluence user adds one of the macros to a Confluence page.
- A Confluence user or anonymous user views the Confluence page.

Configuring JIRA to Trust Confluence Using Trusted Applications
Trust only has to be established once between the two applications. Once trust has been established, it is entirely transparent to the Confluence users.

Application links are used to enable trust relationships between two applications. Linking two applications allows you to share information and access one application's functions from within the other.

You can configure an application link to use Trusted Applications as the authentication mechanism. For instructions, see Configuring Trusted Applications Authentication for an Application Link.

**Configuring the Macro Plugin in Confluence**

By default, Confluence ships with trusted communication enabled for the following macros:

- JIRA Issues macro
- JIRA Portlet macro

A Confluence System Administrator can decide on the level of trusted communication used by the macros. The different levels are:

- Ignore trusted communications altogether. Trusted communication is turned off at the global level.
- Perform trusted communications whenever the macro is used on a Confluence page, but do not show certain warning messages.
- Perform trusted communications whenever the macro is used on a Confluence page, and show all warning messages. This is the default configuration.

To change the default trusted communication level for the JIRA Macros plugin,

1. Go to the Confluence 'Administration Console':
   - Choose **Browse > Confluence Admin**. The 'Administrator Access' login screen will be displayed.
   - Enter your password and click **Confirm**. You will be temporarily logged into a secure session to access the 'Administration Console'.
2. Select **Plugins** in the left-hand panel.
3. The **Plugin Manager** screen appears, showing a list of installed plugins. Scroll down and click the **JIRA Macros** link.
4. The **JIRA Macros** panel appears in the top middle of the screen, as shown below. Click **Enable** or **Disable** next to the following options:
   - **JIRA application trust support** – With this option enabled, Confluence will attempt trusted communication with JIRA whenever a user views a page containing the JIRA Issues or Portlet macro, provided criteria are met as described below. With this option disabled, Confluence will never attempt trusted communication with JIRA for these macros.
   - **JIRA application trust warnings** – With this option enabled, Confluence will display all error and warning messages that may arise from a problem during trusted communication (assuming that trusted communication is enabled). With this option disabled, Confluence will suppress certain warnings. See troubleshooting below.  

**Screenshot: JIRA Macros panel in Plugin Manager**
Adding the Macro to a Confluence Page

The Confluence user can add and edit the macros as described on the following pages:

- Using the JIRA Issues macro
- Using the JIRA Portlet macro

**Remove the username and password from your macro markup code**

Prior to Confluence 2.7, you needed to include a username and password in the macro markup code if you wanted to display JIRA issues which had restricted viewing. Once your administrator has set up trusted communication between Confluence and JIRA, you no longer need to include a username and password in the markup code for your JIRA macros.

The following options are available for determining the issues which will be retrieved from JIRA and displayed on the Confluence page:

<table>
<thead>
<tr>
<th>What you want to do</th>
<th>Macro parameter</th>
<th>URL parameter</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disable plugin</td>
<td>jiraportlet</td>
<td></td>
<td>Disable</td>
</tr>
<tr>
<td></td>
<td>jiraissues</td>
<td></td>
<td>Disable</td>
</tr>
<tr>
<td></td>
<td>JIRA application trust support</td>
<td></td>
<td>Disable</td>
</tr>
<tr>
<td></td>
<td>JIRA application trust warnings</td>
<td></td>
<td>Enable</td>
</tr>
</tbody>
</table>

Vendor: [Atlassian Software Systems](https://www.atlassian.com/software)

Plugin Version: 2.4
<table>
<thead>
<tr>
<th>Display the JIRA issues which the logged-in user is authorised to see. And if the user is not logged in, display only issues which allow unrestricted viewing.</th>
<th>Do not specify any authentication parameters. In this case, the behaviour depends on the way your administrator has set up trusted communication between JIRA and Confluence. Here is a summary of the behaviour. If trusted communication is <strong>enabled</strong>, the authorisation will work seamlessly. When a logged-in user views your page, they will see only the JIRA issues they are allowed to see. And if they are not logged in, they will see only the issues which allow unrestricted viewing. If trusted communication is <strong>disabled</strong>, the Confluence page will show only the JIRA issues which allow unrestricted viewing.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ensure that Confluence will display only the JIRA issues which allow unrestricted viewing.</strong></td>
<td><strong>anonymous</strong> Regardless of who the user is (logged in or not), the Confluence page will show only anonymously-visible issues. Confluence will not attempt to set up a trusted communication link with JIRA in this case.</td>
</tr>
<tr>
<td>Use a pre-determined username and password to access the JIRA issues.</td>
<td><strong>&amp;os_username=MYNAME&amp;os_password=MYPASSWORD</strong> <strong>Not recommended.</strong> Prior to Confluence 2.7, this was the only way of displaying issues with restricted viewing. For Confluence 2.7 and later, this method will still work. Confluence will not attempt to set up a trusted communication link with JIRA in this case.</td>
</tr>
</tbody>
</table>

Refer to the [section below](#) for details of what happens when a user views a Confluence page containing a JIRA macro.

**Viewing the Confluence Page**

When a user views a Confluence page which contains a JIRA Issues or JIRA Portlet macro, this is what happens:

- If the macro markup contains an explicit username and password in the URL parameter, Confluence will not request trusted communication with JIRA. Confluence will retrieve the JIRA issues which the specified username is authorised to see. This behaviour is the same as Confluence versions prior to 2.7.
- If the macro markup contains the **anonymous** parameter, Confluence will retrieve only the JIRA issues which allow unrestricted viewing. Confluence will not attempt to set up a trusted communication link with JIRA in this case.
- If the user is anonymous (not logged in), Confluence will retrieve only the JIRA issues which allow unrestricted viewing. Confluence will not attempt to set up a trusted communication link with JIRA in this case.
- If trusted communication is **disabled** via the Plugin Manager in Confluence, then Confluence will not request trusted communication with JIRA. So if there is no explicit username and password in the markup code, Confluence will retrieve only the JIRA issues which allow unrestricted viewing. This behaviour is the same as Confluence versions prior to 2.7.
- If trusted communication is **enabled** via the Plugin Manager in Confluence:
  - If the user is logged in, then Confluence attempts trusted communication with JIRA. Confluence sends the username to JIRA. JIRA returns a set of issues which that username is authorised to access, based on the JIRA user base and the JIRA groups and permissions. Confluence displays those issues on the page.
  - If JIRA or Confluence encounters a problem during the trusted communication process, an error message may appear on the Confluence page above the macro output – see troubleshooting below.

**Security Risks**

Please take the following considerations into account when setting up trusted communication:
• When you configure JIRA to trust an application, you are allowing the application to access JIRA in the name of a particular user. The trusted application passes JIRA the user's login name, but no other authentication information. JIRA does not request the user's password. By doing this, you are bypassing JIRA's authentication mechanism.
• Do not configure a trusted application unless you trust all code in that application to behave itself at all times.
• Trusted communication uses public/private key cryptography to establish the identity of the trusted server. The trusted application needs to maintain the security of its private key. Confluence stores its private key in the database. So you must be sure that the Confluence database is secure, and also any full backups of the database.
• Ensure that you specify an IP address for your Confluence site when configuring trusted applications in JIRA. Do not use the wild card ‘.*.*.*’ as the IP address. Failure to configure IP address restrictions is a security vulnerability, allowing an unknown site to log into your JIRA site under a user's login ID.
• Be aware of the risks associated with using separate user bases, as explained above. We strongly recommend a common user base between the trusted and trusting applications.
• When configuring an application to trust another application, you should use a trusted network or SSL to protect the sensitive information passed between the applications during the configuration procedure. This will help to prevent man-in-the-middle attacks.

Troubleshooting

Below are the warning messages which may appear on your Confluence page, above the output of the JIRA Issues or JIRA Portlet macro.

<table>
<thead>
<tr>
<th>Warning Message</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>javax.net.ssl.SSLHandshakeException:</td>
<td>JIRA is running over SSL</td>
<td>Add JIRA’s SSL Certificate to the Java Keystore</td>
</tr>
<tr>
<td>sun.security.validator.ValidatorException: PKIX path building failed:</td>
<td>The logged-in Confluence user is not registered in the JIRA user base.</td>
<td>Add the username to your JIRA user base. It is highly recommended that your JIRA and Confluence instances share a common user base.</td>
</tr>
<tr>
<td>sun.security.provider.certpath.SunCertPathBuilderException:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>unable to find valid certification path to requested target</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The JIRA server does not recognise your user name. Issues have been retrieved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>anonymously.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The JIRA server does not trust this Confluence instance for user authentication.</td>
<td>Your JIRA instance has not been configured to trust your Confluence instance.</td>
<td>One of the following solutions:</td>
</tr>
<tr>
<td>Issues have been retrieved anonymously.</td>
<td></td>
<td>• Configure JIRA to trust Confluence.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disable trusted communications for the JIRA macros in Confluence.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Use the anonymous parameter in all your JIRA Issues and JIRA Portlet macros.</td>
</tr>
</tbody>
</table>
The JIRA server does not support trust requests. Issues have been retrieved anonymously. You can set the macro to always use an anonymous request by setting the 'anonymous' parameter to 'true'. Your JIRA instance is not able to handle trusted communications (i.e. the JIRA version is earlier than 3.12.0).

One of the following solutions:

- Download the latest version of JIRA and then configure JIRA to trust Confluence.
- Disable trusted communications for the JIRA macros in Confluence.
- Use the anonymous parameter in all your JIRA Issues and JIRA Portlet macros.


There is a date/time difference between the JIRA server and Confluence server.

- Certificate Too Old KnowledgeBase Entry

Consult Troubleshooting the JIRA Issues Macro and Trusted Applications for further troubleshooting.

Technical Overview of the Trusted Applications Authentication (TAA) Protocol

Read this section if you want a bit more information on the technical side of things.

Atlassian has developed its own protocol to set up trust between JIRA and Confluence. Below is a technical overview of the process.

Configuring JIRA to trust Confluence:

1. When the JIRA System Administrator provides the base URL of the Confluence instance, JIRA requests a trusted application authentication certificate from Confluence. The certificate contains Confluence's trusted application ID and public key (generated specifically for use with the TAA protocol).
2. JIRA validates the certificate and asks the System Administrator for a few extra details about the trust relationship, such as a name for the Confluence instance, timeout, allowed IP addresses and allowed request URLs.
3. JIRA stores all this information in the database.

Making a trusted request from Confluence to JIRA:

1. Confluence sends a web request to JIRA, appending additional headers to the request, including:
   - Timestamp (nonce) of the request + user name of the currently logged-in Confluence user, encrypted with a symmetric key (generated on the fly).
   - The symmetric key, encrypted with Confluence’s private key.
   - Confluence’s application ID (as displayed when trusted communication was established).
2. JIRA attempts to decode the encrypted headers, using the stored information about the relationship. It conducts the following checks to validate the request:
   - The trusted application ID refers to a valid trusted application.
   - The given username exists in the JIRA user base.
   - The agreed timeout has not expired.
   - The request originated from a trusted IP address.
   - The resource being requested matches those specified in the URL match list.
3. If any of these checks fails, a response is sent to Confluence indicating the reason for failure. Otherwise, JIRA will authenticate the specified user for the duration of the single request, and respond with the resources (i.e. the JIRA issues).

RELATED TOPICS

- JIRA Issues Macro
- JIRA Portlet Macro
- Connecting to LDAP or JIRA or Other Services via SSL
- Single Sign-on Integration with JIRA and Confluence
- Troubleshooting the JIRA Issues Macro and Trusted Applications