

# **OpenDS**

**Directory Server**

## **Installation Guide**

**Version 0.1**  
**July 2006**

# Contents

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<b><u>Contents</u></b> .....	<b>2</b>
<b><u>Overview</u></b> .....	<b>3</b>
<a href="#">Copyright and trademark information</a> .....	3
<a href="#">Feedback</a> .....	3
<a href="#">Acknowledgements</a> .....	3
<a href="#">Modifications and Updates</a> .....	4
<b><u>Obtaining and Unpacking the OpenDS Directory Server</u></b> .....	<b>5</b>
<b><u>Configuring the OpenDS Directory Server</u></b> .....	<b>7</b>
<b><u>Running the OpenDS Directory Server</u></b> .....	<b>9</b>
<a href="#">Stopping the OpenDS Directory Server</a> .....	9
<b><u>Common Development and Distribution License, Version 1.0</u></b> .....	<b>12</b>

# Overview

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The OpenDS Directory Server is a pure Java implementation of a network-accessible database that is able to store information in a hierarchical form. Clients may communicate with it using a standard protocol (e.g., LDAP) to retrieve and update information in a variety of ways. We aim to provide unmatched performance and scalability, robust error handling and debugging capabilities, easy extensibility, and innovative feature sets.

This document provides instruction for installing and configuring the OpenDS Directory Server for evaluation and testing purposes.

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## Feedback

Please direct any comments or suggestions about this document to:  
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## Acknowledgements

The general format of this document was based on the documentation template used by [OpenOffice.org](http://OpenOffice.org).

# Modifications and Updates

<b><i>Date</i></b>	<b><i>Description of Change</i></b>
July 2006	Initial draft

# Obtaining and Unpacking the OpenDS Directory Server

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The OpenDS Directory Server may be obtained in either source or pre-packaged form. In source form, you can compile the code yourself into the packaged form. The process for doing this is described in the OpenDS Source Guide document. Once the server has been built from source, the packaged version will be available as a zip file in the `build/package` directory. Currently, this file will be named `OpenDS-0.1.zip`. For convenience, the contents of this zip file will also be available as a subdirectory of the `build/package` directory (e.g., `build/package/OpenDS-0.1`). This may be used in-place for simple testing purposes without the need to unpack the zip file elsewhere.

The pre-packaged form is available for download from the builds section at <https://OpenDS.dev.java.net/servlets/ProjectDocumentList>. These pre-built packages are simply the result of building from source, and therefore the only differences between them may be that building from source can be based on a more recent version of the code than the latest pre-packaged version. On the other hand, using the pre-built form may be more convenient.

The "installation" process for the OpenDS Directory Server is currently very simple. The packaged version (whether built from source or downloaded in pre-packaged form) will simply be a zip file. Extract the contents of this zip file in the location that you wish to install the server. For example:

```
$ unzip OpenDS-0.1.zip
```

In the event that your system does not come with a utility for extracting zip archives, it is possible to use the `jar` tool provided with the Java environment. For example:

```
$ /usr/java/bin/jar -xvf OpenDS-0.1.zip
```

This will create an `OpenDS-0.1` subdirectory in the current working directory, with the following contents:

- `README` -- This is a simple text file with basic information about the OpenDS Directory Server.
- `bak` -- This is a default directory that may be used for holding backup files.
- `bin` -- This directory contains a number of shell scripts and batch files that may be used to control server operation and perform various administrative tasks.
- `changelogDb` -- This is the default directory that may be used for holding changelog database files.

- `classes` -- This directory may be used to hold class files for any user-defined code that may be accessed by the OpenDS Directory Server (e.g., plugins or other kinds of extensions).
- `config` -- This directory contains the configuration used by the OpenDS Directory Server. The `config.ldif` file contains the main configuration for the server, and the `schema` subdirectory contains the schema element definitions. The `synchronization.ldif` file contains sample entries that may be added to the configuration when setting up synchronization.
- `db` -- This is the default directory that will be used to hold the server database files.
- `ldif` -- This is a default directory that may be used to hold LDIF data files.
- `legal-notice`s -- This directory contains files with license information for the OpenDS Directory Server and any other components that it may contain.
- `lib` -- This directory contains the libraries used by the OpenDS Directory Server. This contains the `OpenDS.jar` file with the core Directory Server code, as well as third-party libraries used by the server (e.g., the Berkeley DB Java Edition).
- `locks` -- This directory is used for maintaining lock files needed to ensure that separate processes running concurrently do not interfere with each other (e.g., to prevent restoring a database from a backup when that database is currently in use by the server).
- `logs` -- This is the default directory that will be used to hold the server log files.
- `war` -- This directory contains the `dsml.war` file, which contains the logic for the DSML to LDAP gateway which runs as a web application.

# Configuring the OpenDS Directory Server

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The default configuration for the OpenDS Directory Server is such that it is possible to run "out of the box" with no additional setup needed. In this case, it will run with the following configuration:

- It will listen for LDAP communication from clients on port 389.
- It will use a suffix of "dc=example,dc=com".
- It will have a root user with a DN of "cn=Directory Manager" and a password of "password".

If any or all of these defaults are unacceptable, then they may be easily changed using the `bin/configure-ds.sh` script on UNIX systems or the `bin\configure-ds.bat` batch file on Windows. This tool accepts the following configuration options:

- "`--ldapPort {ldapPort}`" -- This may be used to set the port number on which the server will listen for connections from LDAP clients. Only a single port number may be provided.
- "`--baseDN {baseDN}`" -- This may be used to specify the base DN (i.e., the suffix) for the server. Multiple base DN's may be given by providing this option multiple times.
- "`--rootDN {rootUserDN}`" -- This specifies the DN that should be used for the initial root user in the Directory Server. Only a single root DN value may be provided.
- "`--rootPassword {rootUserPW}`" -- This specifies the password that should be used for the initial root user in the Directory Server. Only a single password value may be provided. If this option is provided, then the `--rootPasswordFile` option should not be used.
- "`--rootPasswordFile {filename}`" -- This specifies the path to a file containing the password for the initial root user in the Directory Server. Only a single password value may be provided. If this option is provided, then the `--rootPassword` option should not be used.
- "`--help`" -- This will display usage information for the tool, including descriptions of all the above configuration options.

Depending on the Java environment configuration, it may be sufficient to merely run the `configure-ds.sh` or `configure-ds.bat` command with the appropriate arguments and allow it to find the Java environment automatically. If this results in an error because the Java environment

installation could not be located, or if the default Java environment identified is not the one that should be used for running the tool, then it may be explicitly specified by setting the value of the `JAVA_HOME` environment variable to point to the root of the appropriate Java installation. A Java 5 or higher environment will be required to use any part of the OpenDS Directory Server.

If any other configuration properties for the OpenDS Directory Server need to be changed from their default values, then the `config/config.ldif` file may be directly edited with the server offline, or the configuration may be modified using either LDAP or JMX with the server online. Information about accessing the OpenDS configuration may be found in the OpenDS Configuration Guide available online at <https://OpenDS.dev.java.net/>.



# Running the OpenDS Directory Server

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On UNIX systems, to start the OpenDS Directory Server simply run the `bin/start-ds.sh` shell script. It may be executed with no arguments to have the server start in the background, or the string `"-nodetach"` may be given as the first argument to cause the server to start running as a foreground process. On Windows systems, the `bin\start-ds.bat` batch file may be used. It will always cause the server to be started in the foreground.

As with the configuration script, the OpenDS start script will attempt to automatically find the Java environment to use. If this is not successful, or if it does not locate the correct Java installation, then the `JAVA_HOME` environment variable may be used to explicitly specify the path to the Java installation.

It may also be useful to set the `JAVA_ARGS` environment variable when starting the OpenDS Directory Server. This environment variable may be used to provide options directly to the JVM when the server is starting. The particular arguments that will be supported may vary based on the JVM implementation, but some of the most useful options include:

- `-ea` -- This indicates that the JVM should enable the use of assertions. The OpenDS Directory Server uses assertions as a debugging facility, and significantly more debugging information may be obtained while the JVM is running with assertions enabled (although it will significantly degrade performance).
- `-d64` -- This indicates that the 64-bit version of the JVM should be used if possible. This may be used to allow the server to access very large amounts of memory, whereas the amount of memory available to 32-bit JVMs is more limited.
- `-Xms512m` -- This specifies the initial heap size that should be used for the JVM (which impacts the minimum amount of memory that the JVM may consume). The "512m" portion may be changed to use a different initial heap size.
- `-Xmx512m` -- This specifies the maximum heap size that should be used for the JVM (which impacts the maximum amount of memory that the JVM may consume). The "512m" portion may be changed to use a different maximum heap size.

## Stopping the OpenDS Directory Server

If the OpenDS Directory Server is running in the foreground, it may be stopped by using the Ctrl+C key combination on either UNIX or Windows systems. Alternately, on any system (whether the server is running in the foreground or the background), or even from a remote system

it will be possible to use the `bin/stop-ds.sh` script on UNIX systems or `bin\stop-ds.bat` batch file on Windows. This utility communicates with the server over LDAP to invoke the shutdown task. This script may use the same environment variables as the startup script, but it may also take a number of command-line arguments, including:

- `--host {host}` -- This specifies the address of the system on which the Directory Server instance is running. If this is not provided, the loopback address will be used.
- `--port {port}` -- This specifies the port to use to communicate with the Directory Server instance.
- `--useSSL` -- This indicates that the tool should communicate with the server over SSL. See the complete usage generated by the `--help` argument to see the entire set of options that may be specified when using SSL/TLS.
- `--useStartTLS` -- This indicates that the tool should communicate securely with the server through the use of the StartTLS extended operation. See the complete usage generated by the `--help` argument to see the entire set of options that may be specified when using SSL/TLS.
- `--bindDN {bindDN}` -- This specifies the DN that should be used to authenticate to the server using simple authentication. At present, no authentication is required but in the future the access control subsystem will require authentication for this operation.
- `--bindPassword {bindPW}` -- This specifies the password that should be used to authenticate to the server. If this option is given, then the `--bindPasswordFile` option should not be used.
- `--bindPasswordFile {filename}` -- This specifies the path to a file containing the password that should be used to authenticate to the server. If this option is given, then the `--bindPassword` option should not be used.
- `--sasloption {option}` -- This specifies an option that should be used for performing SASL authentication. The individual options that may be used will vary based on the SASL mechanism, but in all cases the "mech" option can specify which SASL mechanism to use (e.g., `--sasloption mech=DIGEST-MD5` will cause the tool to use the DIGEST-MD5 SASL mechanism for authentication).
- `--stopReason {reason}` -- This may be used to provide a human-readable reason for the shutdown. It will appear in the server log and will be included in any alert notifications that are generated.
- `--restart` -- This may be used to cause the server to restart rather than shut down. Note that this will be an "in-core" restart in which the JVM itself stays running but the Directory Server will completely reinitialize itself. Any configuration changes that require a JVM restart will not take effect.

- `--help` -- This may be used to obtain complete usage information for the command, including options not provided in this summary (e.g., for configuring access to SSL key and trust stores, using proxied authorization, or configuring the shutdown to occur at some time in the future rather than immediately).

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