Oracle® Fusion Middleware
Installing Oracle Unified Directory

14*c* (14.1.2.1.0)
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ORACLE®

Oracle Fusion Middleware Installing Oracle Unified Directory, 14*c* (14.1.2.1.0)

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Preface

This guide describes how to install and deinstall the Oracle Unified Directory software and how to setup Oracle Unified Directory as a directory server instance, proxy server instance, or replication gateway. This guide also describes the installation requirements and the minimum configuration required to get started using a server.

This Preface includes the following sections:

- Audience
- Documentation Accessibility
- Conventions

Audience

This guide is intended for installers and system administrators and other users who want to install Oracle Unified Directory as a directory server, proxy server, or replication gateway.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at `http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc`.

Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit `http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info` or visit `http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs` if you are hearing impaired.

Conventions

The following text conventions are used in this guide:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

What's New in This Guide?

This preface introduces the new and changed features of Oracle Unified Directory and provides pointers to additional information. The information includes the following section:

- New and Changed Features for Oracle Unified Directory 14c (14.1.2.1.0)

New and Changed Features for Oracle Unified Directory 14c (14.1.2.1.0)

Oracle Unified Directory 14c (14.1.2.1.0) includes the following new and changed features:

- **JDK Upgrade:** Oracle Unified Directory 14c (14.1.2.1.0) is certified for use with JDK 17, which introduces new features, optimizations, and bug fixes enhancing the overall performance and stability.

- **Berkeley Database Java Edition Upgrade:** Oracle Unified Directory uses Berkeley Database Java Edition for storage and retrieval purposes of OUD. The Berkeley Database Java Edition has been upgraded to version 7.5.18 providing improved functionality and better performance.

- **Deprecating TLS 1.1:** Support for TLS 1.1 and earlier versions has been discontinued. Oracle Unified Directory now requires TLS 1.2 or TLS 1.3 for secure communication.

- **Support for PKCS12 as Default Keystore:** Self-signed certificates are now stored in PKCS12 format by default, providing stronger encryption and improved compatibility. Oracle recommends that you switch the KeyStore format of the existing security configuration to PKCS12, which is an industry-standard format.

1
Planning the Oracle Unified Directory Installation

You must check the system requirements, decide which mode of Oracle Unified Directory to set up, set the environment variables, and specify the installation directories before installing Oracle Unified Directory.

Topics:

- Checking the System Requirements for Oracle Unified Directory
- Selecting an Oracle Unified Directory Server Role
- Understanding the Oracle Unified Directory Installation Directories

1.1 Checking the System Requirements for Oracle Unified Directory

Before you install Oracle Unified Directory or any related products, check the certification matrix and system requirements to ensure that your environment meets the minimum requirements for the products you are installing.

The certification matrix contains information about supported installation types, platforms, operating systems, databases, JDKs, and third-party products. This document is available on the Oracle Technology Network (OTN).

This topic includes the following sections:

- Viewing the Oracle Unified Directory Certification Matrix
- Pre-Installation System Notes
- Oracle Identity and Access Management Health Checker

1.1.1 Viewing the Oracle Unified Directory Certification Matrix

Oracle Fusion Middleware provides the system requirements and supported platforms for its components to view the certification matrix.

To view the certification matrix:

1. Access the Oracle Fusion Middleware Supported System Configurations page.
2. Scroll down to System Requirements and Supported Platforms for Oracle Identity and Access Management 14c (14.1.2.1.0).
3. Click the `xls` link to view the certification matrix.

1.1.2 Pre-Installation System Notes

Consider these requirements before installing Oracle Unified Directory.

- On Windows systems you must have administrator privileges to install the Oracle Unified Directory software.

- Before running the installer, set the `DISPLAY` environment variable on your system.

- On UNIX and Linux systems, installation as the root user is not supported.

- The Oracle Unified Directory software treats global, full local, and sparse zones as an independent physical system. Installing Oracle Unified Directory in any type of Solaris zone is therefore like installing on an independent system. Oracle Unified Directory does not share services or file locations with other zones.

1.1.3 Oracle Identity and Access Management Health Checker

The Health Checker is a tool that you can run to test various configurations in an Oracle Identity and Access Management environment. You can run the Health Checker at the post-configuration stage of an Oracle Unified Directory deployment.

The Health Checker retrieves data from your environment and compares this data with the Oracle recommended values for the various configuration settings. The Health Checker then generates a report that provides detailed information about each of the items that it checked.

This guide also provides manual checklists for deploying Oracle identity and Access Management components in production, including a checklist for Oracle Unified Directory.

1.2 Selecting an Oracle Unified Directory Server Role

You can use Oracle Unified Directory in several roles based on your requirements. You can set up Oracle Unified Directory as a directory server, proxy server, or replication gateway.

Oracle Unified Directory can function in the following three modes or roles:

- About Oracle Unified Directory as a Directory Server

- About Oracle Unified Directory as a Proxy Server

- About Oracle Unified Directory as a Replication Gateway

As a general rule, the use of the generic term *server* can apply to the directory server, proxy server, or replication gateway.

1.2.1 About Oracle Unified Directory as a Directory Server

When you set up Oracle Unified Directory as a directory server, the server acts as an LDAP directory server that contains directory data.

See Setting Up Oracle Unified Directory as a Directory Server.

1.2.2 About Oracle Unified Directory as a Proxy Server

When you set up Oracle Unified Directory as an LDAP proxy server, the server acts as an interface between the client and a remote LDAP server containing the data. The proxy server manages the client requests through load balancing, data distribution, or both.

The proxy does not contain any data. The proxy can also manipulate the data sent by the client or received from the remote LDAP servers (for example, DN renaming, RDN changing, transformation, or Enterprise User Security).

When you use the Oracle Unified Directory proxy, your data is stored in one or more remote LDAP servers or data centers, which can be any LDAPv3-compliant directory server such as Oracle Unified Directory directory server or Oracle Directory Server Enterprise Edition.

See Setting Up Oracle Unified Directory as a Proxy Server.

1.2.3 About Oracle Unified Directory as a Replication Gateway

When you set up Oracle Unified Directory as a replication gateway, the server acts as a gateway that enables replication between Oracle Directory Server Enterprise Edition and Oracle Unified Directory.

See Setting Up Oracle Unified Directory as a Replication Gateway.

1.3 Understanding the Oracle Unified Directory Installation Directories

During the software installation, you are asked to specify several installation directories. It is helpful to have an understanding of those directories and what they contain when installation is complete.

These directories are created:

- Oracle Middleware Home Location
- Oracle Home Directory
- Oracle Common Directory
- Oracle WebLogic Domain Directory
- Oracle Unified Directory Installation Directory Structure

1.3.1 Oracle Middleware Home Location

Oracle Middleware home is the directory under which Oracle Unified Directory and Oracle Fusion Middleware Infrastructure are installed. Oracle Fusion Middleware Infrastructure must be installed if you plan to manage Oracle Unified Directory using Oracle Unified Directory Services Manager.

> **Note:**
>
> If you are planning to install Oracle Unified Directory and Fusion Middleware Infrastructure, you must install these two components using the same Middleware home directory.

1.3.2 Oracle Home Directory

An Oracle home contains installed files necessary to host a specific product. The Installer installs the files required to host the component, such as binaries and libraries, in the Oracle home directory.

It contains the Oracle Unified Directory setup files to set up individual instances. Also contains the default schema files for all server instances associated with that `OUD_ORACLE_HOME`.

An Oracle home resides within the directory structure of the Middleware home. Each Oracle home can be associated with multiple Oracle instances or Oracle WebLogic Server domains.

The default `OUD_ORACLE_HOME` directory is `oud`.

1.3.3 Oracle Common Directory

The installer creates this directory under the location you enter in the Oracle Middleware Home Location field. This directory contains the Application Development Framework.

The default directory is `oracle_common`.

1.3.4 Oracle WebLogic Domain Directory

A WebLogic domain includes a special WebLogic Server instance called the Administration Server, which is the central point from which you configure and manage all resources in the domain.

Usually, you configure a domain to include additional WebLogic Server instances called Managed Servers. You deploy Java components, such as Web applications, EJBs, and Web services, and other resources to the Managed Servers and use the Administration Server for configuration and management purposes only.

The directory structure of a domain is separate from the directory structure of the WebLogic Server home. It can reside anywhere; it need not be within the Middleware home directory. A domain is a peer of an Oracle instance.

By default, the Oracle Fusion Middleware Configuration Wizard creates a domain as subdirectory in a directory named `user_projects` under your Middleware Home directory (`MW_HOME`).

1.3.5 Oracle Unified Directory Installation Directory Structure

Review this topic for the directory structure of an Oracle Unified Directory installation on a single host using all of the default values.

In this example, `install-directory` can be any directory on your system. This directory is empty before you install Oracle Unified Directory.

```
install-directory/
            cfgtoollogs
            coherence
            domain-registry.xml
            em
            inventory
            OPatch
            oracle_common
            oraInst.loc
```

```
oud
oui
user_projects
wlserver
```

> **Note:**
>
> If you are planning to manage Oracle Unified Directory with Oracle Unified Directory Services Manager, you must also install Oracle WebLogic Server and Oracle ADF. You must specify the same Middleware home directory to install all three products.

2
Installing the Oracle Unified Directory Software

Oracle Unified Directory primarily supports two domain configurations. You can install Oracle Unified Directory either as a collocated configuration that is managed through a WebLogic server or as a standalone configuration.

Topics:

- Before You Install Oracle Unified Directory
- Installing the Java Development Kit
- Setting the JAVA_HOME Environment Variable
- Setting the PATH Environment Variable
- Obtaining Product Distributions
- Installing and Configuring OUD/OUDSM Domains
- Starting the Administration Server
- Performing an Oracle Unified Directory Silent Installation
- Configuring Oracle Unified Directory with Oracle Directory Integration Platform

2.1 Before You Install Oracle Unified Directory

You can manage Oracle Unified Directory either from the command line or by using the Oracle Unified Directory Services Manager (OUDSM) graphical user interface.

> **Note:**
>
> Apply the one-off ADF patch (search for Bug ID 37376076 at https://support.oracle.com) manually using OPatch to the OUD 14.1.2.1.0 `ORACLE_HOME` after installation and before domain creation. This applies only to collocated OUD installations and does not apply to standalone OUD 14.1.2.1.0 installations.

Oracle Unified Directory Services Manager (OUDSM) requires Oracle WebLogic Server and Oracle ADF, so if you plan to use OUDSM, you must install Oracle Unified Directory in a **Collocated Oracle Unified Directory Server (Managed through WebLogic server)** mode. When you configure Oracle Unified Directory in a WebLogic Server domain, the Oracle Unified Directory instances can be managed like any other elements of the WebLogic Server domain. To configure Oracle Unified Directory in a WebLogic Server domain, you must install the Oracle Unified Directory software in an existing Oracle Fusion Middleware Infrastructure Oracle Home.

You can also install Oracle Unified Directory in a **Standalone Oracle Unified Directory Server (Managed independently of WebLogic server)** mode. A standalone Oracle Unified Directory is not managed by or registered to a WebLogic Server domain. A standalone Oracle Unified Directory 14*c* (14.1.2.1.0) topology is installed and configured without the Oracle Fusion Middleware Infrastructure. You install the Oracle Unified Directory software in its own Oracle home and you configure the Oracle Unified Directory instance in its own standalone

domain. You can use OUDSM installed in a different location or host to manage Oracle Unified Directory that is installed in a standalone mode.

> **Note:**
>
> The product templates for OUD and OUDSM are not interrelated; they are independent of each other. Hence, you can configure OUD and OUDSM independently in separate domains. So, it is possible to have OUD in collocated mode without OUDSM and also you can configure OUDSM alone in a domain without OUD.

You can upgrade Oracle Unified Directory from Oracle Unified Directory Release 12*c* (12.2.1.4.0) to 14*c* (14.1.2.1.0). See Upgrading the Oracle Unified Directory Software.

The installation process requires that you identify certain directories into which the software is installed. For a complete understanding of the installation directory structure, see Understanding the Oracle Unified Directory Installation Directories.

2.2 Installing the Java Development Kit

The installation of Oracle Unified Directory 14*c* (14.1.2.1.0) requires Java Development Kit (JDK) 17.

The archive binary file (`.tar.gz`) can be installed by anyone (not only root users), in any location that you can write to. However, only the root user can install the JDK into the system location.

For the system requirements and instructions to install JDK, see JDK Installation for Linux Platforms and JDK Installation for Microsoft Windows.

2.3 Setting the JAVA_HOME Environment Variable

After installing the Java Development Kit (JDK), you must set the `JAVA_HOME` environment variable to point to the Java installation directory.

The setup scripts will not work if the `JAVA_HOME` environment variable is not set or does not point to a supported Java installation (JDK 17).

For example, on UNIX or Linux systems, run a command similar to the following, depending on your shell:

```
JAVA_HOME=/usr/lang/JAVA/jdk17.0.12
export JAVA_HOME
```

To set the JAVA_HOME environment variable on Windows systems:

1. Go to **Control Panel** > **System and Security** > **System** > **Advanced System Settings**.
2. Click the **Environment Variables** button.
3. In the section **System Variables**, find the `JAVA_HOME` environment variable and select it. Click **Edit**. If the `JAVA_HOME` environment variable does not exist, click **New**.
4. Do one of the following:

- In the Edit System Variable window, enter path to a supported JDK installation as a **Variable value:**.

- In the New System Variable window, enter `JAVA_HOME` as a **Variable name:** and enter the path to a supported JDK installation as a **Variable value:**.

5. Click **OK** to apply the changes.

2.4 Setting the PATH Environment Variable

After installing the Java Development Kit, you must set the `PATH` environment variable to point to the Java installation directory.

For example, on UNIX or Linux systems, run a command similar to the following, depending on your shell:

```
JAVA_HOME=/usr/lang/JAVA/jdk17.0.12
export JAVA_HOME
PATH=$JAVA_HOME/bin:$PATH
export PATH
```

For more information on how to set the PATH environment variable on Windows systems, see How do I set or change the PATH system variable?.

2.5 Obtaining Product Distributions

Oracle provides multiple locations for downloading Oracle Unified Directory and the software it requires.

- Downloading the Oracle Fusion Middleware Infrastructure Distribution
- Downloading the Oracle Unified Directory Distribution from OSDC
- Downloading the Oracle Unified Directory Distribution from OTN

> **Note:**
>
> - If you are planning to manage Oracle Unified Directory using Oracle Unified Directory Services Manager, you must first install the Oracle Fusion Middleware Infrastructure.
>
> - When you install Oracle Unified Directory and Oracle Fusion Middleware Infrastructure, you must specify the same Oracle Home directory. The examples in this chapter use `path-to-oracle-home/ORACLE_HOME` to represent the Oracle Home directory.

2.5.1 Downloading the Oracle Fusion Middleware Infrastructure Distribution

If you are planning to configure and manage Oracle Unified Directory with OUDSM, you must also install Oracle WebLogic Server and Oracle Application Development Framework. The Oracle Fusion Middleware Infrastructure includes several products and feature sets including Oracle WebLogic Server and Oracle ADF.

To download the Oracle Fusion Middleware Infrastructure distribution:

1. Download the Oracle Fusion Middleware Infrastructure distribution from the Oracle ADF download page. In the Oracle ADF Downloads section, select **14.1.2.1.0** from the Application Development Runtime field. Click **Download File**.

2. When your browser asks to download the `.zip` file, save this file onto your system.

3. Extract the `.zip` file contents onto your system. The extracted file `fmw_14.1.2.1.0_infrastructure_generic.jar` runs the product installer and installs the software onto your system.

2.5.2 Downloading the Oracle Unified Directory Distribution from OSDC

Go to the Oracle Software Delivery Cloud (OSDC), to download the Oracle Unified Directory software.

To download Oracle Unified Directory from OSDC:

1. Download the production distribution for Oracle Unified Directory from the Oracle Software Delivery Cloud.

2. If prompted, login with a username and password.

3. Enter `Oracle Unified Directory` in the type-ahead input field and click **Search**.

4. Select **Oracle Unified Directory 14.1.2.1.0** from the list of available platforms.

   After you have made your selection, the software title will immediately be placed into your Selected Software cart where you can assign a platform for each individual Release.

5. Click your **Selected Software** cart.

6. Select the **Platform** for installing Oracle Unified Directory 14.1.2.1.0 and click **Continue**.

7. Complete the Terms & Restrictions and Export License Agreement as instructed on the site and click **Continue**.

8. Click on the file name to download. Each file has a unique part number.

9. Browse to the directory where you want to save the file. Click **Save** to start the file download. A compressed ZIP file is downloaded.

10. Extract the contents of the ZIP file to a directory of your choice.

2.5.3 Downloading the Oracle Unified Directory Distribution from OTN

Go to the Oracle Technology Network (OTN), to download the Oracle Unified Directory software.

To download Oracle Unified Directory from OTN:

1. Download the production distribution for Oracle Unified Directory from the Oracle Identity Management download page.

2. Click the **download page here** link under the heading **Oracle Identity Management 14c**.

3. Accept the OTN License Agreement.

4. Click the `.zip` file name to download the file individually and save to the directory where you want to save the file.

   Each `.zip` file has a unique part number.

5. Extract the contents of the `.zip` file onto your system.

2.6 Installing and Configuring OUD/OUDSM Domains

You can either install and configure both OUD and OUDSM in a single domain or OUD and OUDSM independently in separate domains.

Topics:

- Installing the OUD/OUDSM Software
- Configuring OUD and OUDSM in Separate Domains
- Configuring OUD and OUDSM in a Single Domain

2.6.1 Installing the OUD/OUDSM Software

You can install OUD and OUDSM independently in separate domains or both in a single domain. This section describes how to install OUD and OUDSM.

- Installing Oracle Fusion Middleware Infrastructure
- Installing Oracle Unified Directory

> **Note:**
>
> If you choose to install Oracle Directory Integration Platform (DIP) 14c with OUD 14c as the Backend Directory Server, you can install and configure OUD (with OUDSM) in the same Oracle Home and the same domain as DIP 14c. In this case, you can skip these steps: Installing Oracle Fusion Middleware Infrastructure and Creating Database Schemas for the Infrastructure Domain Using the Repository Creation Utility.

2.6.1.1 Installing Oracle Fusion Middleware Infrastructure

The installation of Oracle Fusion Middleware Infrastructure is a prerequisite if you are planning to configure and manage Oracle Unified Directory with Oracle Unified Directory Services Manager. Since OUDSM requires Oracle WebLogic Server and Oracle ADF, the installation of Oracle Fusion Middleware Infrastructure takes care of the installation of WebLogic Server, ADF, and other infrastructure components.

If you are planning to configure and manage Oracle Unified Directory with Oracle Unified Directory Services Manager, you must install Oracle Unified Directory in a **Collocated Oracle Unified Directory Server (Managed through WebLogic server)** mode.

To install Oracle Fusion Middleware Infrastructure:

1. Set up the `JAVA_HOME` and `PATH` environment variables pointing to the JDK17 install location.

   See Setting the JAVA_HOME Environment Variable and Setting the PATH Environment Variable.

2. Install Oracle Fusion Middleware Infrastructure.

   See Installing the Infrastructure Software in *Installing and Configuring the Oracle Fusion Middleware Infrastructure*.

2.6.1.2 Installing Oracle Unified Directory

You can install Oracle Unified Directory in two ways depending on how you want to manage it. If you plan to manage OUD through WebLogic server or OUDSM, you must install OUD in collocated mode or a single domain. However, if you plan to manage OUD independently of WebLogic server, you must choose the standalone mode or separate domains.

To install Oracle Unified Directory:

1. Set up the `JAVA_HOME` and `PATH` environment variables pointing to the JDK8 install location.

   See Setting the JAVA_HOME Environment Variable and Setting the PATH Environment Variable.

2. Launch the installation program by invoking the `java` executable from the JDK directory on your system.

   On UNIX operating systems:

   ```
   $ $JAVA_HOME/bin/java -jar fmw_14.1.2.1.0_oud.jar
   ```

   On Windows operating systems:

   ```
   C:\Program Files\Java\jdk17.0.12\bin\java -jar fmw_14.1.2.1.0_oud.jar
   ```

   > **Note:**
   >
   > You must run the command prompt with Windows Administrator privileges. Open the command prompt and specify **Run as administrator**. When you open this window, the title bar reads Administrator: Command Prompt.

   The Installation Inventory Setup screen opens.

3. Use the Installation Inventory Setup screen to specify the location of the Oracle central inventory directory. Click **OK**.

   The Oracle Unified Directory 14c Installer Welcome screen opens.

4. Review the information on the Welcome screen that introduces you to the product installer. Click **Next**.

5. Use the Auto Updates screen to search for the latest software updates, including important security updates, through your My Oracle Support account.

   • Keep the default setting **Skip Auto Updates** if you do not want your system to check for software updates.

   • **Select patches from directory**: Select this option if you already downloaded the latest software updates and you want the installer to search a local directory for updates applicable to the products you are about to install. When you select this option, the installer displays an extra field that you can use to identify the local directory where your updates are located.

   • **Search My Oracle Support for Updates**: If you have a My Oracle Support account, then select this option to have the installer automatically search My Oracle Support for software updates that apply to the software products you are about to install.

   Click **Next**.

6. Use the Installation Location screen to specify your Oracle home directory location and to view the products installed in that directory. Click **Next**.

7. Use the Installation Type screen to determine the type of installation you want to perform and consequently, which products and features are installed.

    • If you plan to manage OUD through Oracle WebLogic Server or OUDSM, select **Collocated Oracle Unified Directory Server (Managed through WebLogic server)**.

    • If you plan to manage OUD independently of Oracle WebLogic Server, select **Standalone Oracle Unified Directory Server (Managed independently of WebLogic server)**.

    Click **Next**.

8. Verify that your system meets minimum requirements on the Prerequisite Checks screen. Click **Next**.

9. The Installation Summary screen contains a list of the feature sets you selected for installation, along with the approximate amount of disk space to be used by the feature sets once installation is complete. Click **Install**.

10. The Installation Progress screen shows the progress of the installation. When the progress bar reaches 100%, the installation is complete. Click **Next**.

11. This screen appears at the conclusion of the installation and provides a summary of the products and features that were installed. Click **Finish** to dismiss the installer.

2.6.2 Configuring OUD and OUDSM in Separate Domains

After the product installation is complete, you can start the process of domain creation. You can configure OUD and OUDSM in separate domains.

> **Note:**
>
> This is the Oracle preferred approach to set up domains for OUD and OUDSM. If you follow this approach, you can create a domain for OUDSM without depending on Oracle database.

• Configuring a Domain for OUD Using the Configuration Wizard
• Creating a Domain for OUDSM Using the WebLogic Scripting Tool

2.6.2.1 Configuring a Domain for OUD Using the Configuration Wizard

You can configure a domain for OUD either by creating a new domain or by extending an existing domain using the Fusion Middleware Configuration Wizard.

To either create a new domain or update an existing domain for OUD:

1. Start the Configuration Wizard from the `ORACLE_HOME/oracle_common/common/bin` directory.

    On UNIX operating systems:

    ```
    ./config.sh
    ```

    On Windows operating systems:

```
config.cmd
```

The Configuration Type screen is displayed.

2. On the Configuration Type screen, perform the following steps:

   a. You can either create a new domain or extend an existing domain.

      • Select **Create a new domain** to create a new domain.

      • Select **Update an existing domain** to extend an existing domain.

   b. Enter the full path for the domain or use the **Browse** button to navigate to the directory in which your domains are located.

   c. Click **Next**.

3. On the Templates screen, make sure **Create Domain Using Product Templates** is selected, and then select the **Oracle Unified Directory - 14.1.2.1.0 [oud]** template. Click **Next**.

   a. Ensure your selection is correct based on the configuration selected in Step 2.

      • If you select **Create a new domain**, ensure **Create Domain Using Product Templates** is selected.

      • If you select **Update an existing domain**, ensure that **Update Domain Using Product Templates** is selected.

   b. Select the **Oracle Unified Directory - 14.1.2.1.0 [oud]** template.

   c. Click **Next**.

   > **Note:**
   >
   > The version of Oracle Unified Directory template is unchanged, hence the template version remains the same as in 12c.

4. On the JDK Selection screen, accept **Oracle Hotspot** as a default selection and click **Next**.

5. On the System Components screen, ignore this screen and click **Next**.

   > **Note:**
   >
   > This screen provides an option to add a component. However, this functionality to add a component or an instance is not available in this release. This option will be supported in future releases.

6. Use the Node Manager screen to enter the node manager username and password.

   Click **Next**.

7. Review each item on the Configuration Summary screen and verify that the information is correct.

   To make any changes, go back to a screen by clicking the Back button or selecting the screen in the navigation pane. Domain creation or domain extension does not start until you click **Create** or **Update**.

8. The Configuration Success screen shows information about the domain you just configured.

   Click **Finish** to dismiss the Configuration Wizard.

2.6.2.2 Creating a Domain for OUDSM Using the WebLogic Scripting Tool

You can create a domain for OUDSM without depending on the Oracle Database or the Repository Creation Utility (RCU) using the WLST command.

> **Note:**
>
> This is the Oracle preferred approach to set up a domain for OUDSM. It is recommended not to extend this domain with any other products or components. In this approach, you do not have to run `config.sh`.

To set up the OUDSM domain using the WLST:

1. Launch the WLST:

   On UNIX and Linux systems:

   ```
   $ ORACLE_HOME/oracle_common/common/bin/wlst.sh
   ```

   On Windows systems:

   ```
   C:\> ORACLE_HOME\oracle_common\common\bin\wlst.cmd
   ```

   `ORACLE_HOME` is the Oracle home directory you specified at installation.

2. Execute the `createOUDSMDomain` command to create a compact domain for Oracle Unified Directory Services Manager.

   The `createOUDSMDomain` command includes the following parameters:

   - `domainLocation` is the absolute location of the domain with domain name.
   - `weblogicPort` is the WebLogic port.
   - `weblogicSSLPort` is the WebLogic SSL port. This parameter is optional and not enabled if not passed.
   - `weblogicUserName` is the WebLogic user name. This parameter is optional and if not passed default value is `weblogic`.
   - `weblogicUserPassword` is the WebLogic admin user password.

   ```
   createOUDSMDomain(domainLocation=<location>,weblogicPort=<value>,
   weblogicSSLPort=<value>,weblogicUserName=<name>,weblogicUserPassword=<password>
   ```

   Example:

   ```
   createOUDSMDomain(domainLocation="/u01/oracle/config/domains/
   oudsm",weblogicPort=7001,weblogicSSLPort=7002,weblogicUserPassword='password')
   ```

2.6.3 Configuring OUD and OUDSM in a Single Domain

You can configure OUD and OUDSM in a single WebLogic domain if you have selected **Collocated Oracle Unified Directory Server (Managed through WebLogic server)** as the installation type.

You can also configure the WebLogic domain for OUDSM using the Fusion Middleware Configuration Wizard. Since the configuration wizard only supports Oracle Platform Security Services (OPSS) DB store, therefore, OUDSM relies on a DB-based OPSS security store for storing the administrator configurations securely.

Before running `config.sh` to set up OUDSM, you must first install and configure a certified database. To use a database repository for the OPSS security store, you must use the Repository Creation Utility (RCU) to create the required schema and to seed some initial data.

- Creating Database Schemas for the Infrastructure Domain Using the Repository Creation Utility
- Configuring OUD/OUDSM Domain Using the Configuration Wizard

2.6.3.1 Creating Database Schemas for the Infrastructure Domain Using the Repository Creation Utility

After Oracle Fusion Middleware Infrastructure is installed, start Repository Creation Utility (RCU) from the `ORACLE_HOME/oracle_common/bin` directory. The Repository Creation Utility enables you to create database schemas that are required for Oracle Fusion Middleware products.

> **Note:**
>
> This database schema creation procedure is required only if you are planning to install the Oracle Unified Directory Services Manager (OUDSM) by selecting the OUDSM template.

To create schemas using the Repository Creation Utility:

1. Before you create the database schemas, you must install and configure a certified database, and verify that the database is up and running.

   See About Database Requirements for an Oracle Fusion Middleware Installation in *Planning an Installation of Oracle Fusion Middleware*.

2. Start the Repository Creation Utility (RCU) from the `ORACLE_HOME/oracle_common/bin` directory.

   On UNIX operating systems:

   ```
   ./rcu
   ```

   On Windows operating systems:

   ```
   rcu.bat
   ```

3. Click **Next** on the Welcome to Repository Creation Utility screen.

4. On the Create Repository screen, select **System Load and Product Load** as the schema creation method and click **Next**.

5. On the Database Connection Details screen, enter database connection details for RCU to connect to your database.

   a. Click **Next** when you are finished entering the connection credentials for your database.

   A dialog box appears indicating the progress of the installer establishing the connection with the specified database.

   b. Click **OK** to dismiss this dialog box.

6. On the Select Components screen, enter a custom prefix you want to use for your schemas, and then select the **Oracle Platform Security Services** schema.

   > **Note:**
   >
   > If you select **Oracle Platform Security Services**, all dependent components will be automatically selected.

   a. Click **Next** when you are finished specifying your prefix and schema names and when you are finished selecting components.

   A dialog box appears, indicating the progress of component prerequisite checking before the schemas are created.

   b. Click **OK** to dismiss this dialog box.

7. On the Schema Passwords screen, specify how you want to set the schema passwords on your database, then enter and confirm your passwords. Click **Next**.

8. Use the Map Tablespaces screen to configure the desired tablespace mapping for the schemas you want to create.

   a. Click **Next** when you are finished with your tablespace information.

   A dialog box appears, asking you to confirm the creation of tablespaces for any new schemas.

   b. Click **OK** to continue. A dialog box appears, indicating the progress of the tablespace creation.

   c. When the tablespaces are created, click **OK** to dismiss this window.

9. On the Summary screen, verify your information, and then click **Create** to begin schema creation.

10. Review the information on the Completion Summary screen, and then click **Close** to dismiss this screen.

    The Completion Summary screen contains information about the log files that were created from this RCU operation. You can click the name of a particular log file to view the contents of that file.

2.6.3.2 Configuring OUD/OUDSM Domain Using the Configuration Wizard

You can configure a domain for OUD/OUDSM either by creating a new domain or by extending an existing domain using the Fusion Middleware Configuration Wizard.

> **Note:**
>
> If you are updating an existing domain to add OUD (for example, adding OUD to a DIP Domain), then the Configuration Wizard screens documented at steps 4 and 5 are not actually displayed and it skips straight to the Database Configuration Type page (step 6).

To create a new domain or extend an existing domain for OUD/OUDSM:

1. Start the Configuration Wizard from the `ORACLE_HOME/oracle_common/common/bin` directory.

   On UNIX operating systems:

   ```
   ./config.sh
   ```

   On Windows operating systems:

   ```
   config.cmd
   ```

   The Configuration Type screen is displayed.

2. On the Configuration Type screen, perform the following steps:

   a. You can either create a new domain or extend an existing domain.

      - Select **Create a new domain** to create a new domain.

      - Select **Update an existing domain** to extend an existing domain.

   b. Enter the full path for the domain or use the **Browse** button to navigate to the directory in which your domains are located.

   c. Click **Next**.

3. On the Templates screen, make sure **Create Domain Using Product Templates** is selected, and then select the following templates:

   a. Ensure your selection is correct based on the configuration selected in Step 2.

      - If you select **Create a new domain**, ensure that **Create Domain Using Product Templates** is selected.

      - If you select **Update an existing domain**, ensure that **Update Domain Using Product Templates** is selected.

   b. Select the following templates:

      - **Oracle Unified Directory - 14.1.2.1.0 [oud]**

      - **Oracle Unified Directory Services Manager - 14.1.2.1.0 [oud]**

        When you select OUDSM, **Oracle JRF - 14.1.2.1.0 [oracle_common]** is automatically selected.

   c. Click **Next**.

> ✎ **Note:**
>
> There is no change in the versions of Oracle Unified Directory, Oracle Unified Directory Services Manager, and Oracle JRF templates, hence the template versions remains the same as in 14c.

4. Use the Administrator Account screen to specify the user name and password for the default WebLogic Administrator account for the domain.

   The password must be at least eight characters and must contain at least one number or special character. Confirm the password and click **Next**.

   Make a note of these details as you will need them to start or restart the WebLogic domain in the following procedure.

5. Use the Domain Mode and JDK screen to specify the domain mode and Java Development Kit (JDK).

   a. Select Production in the Domain Mode field.

   > ✎ **Note:**
   >
   > • If you select **Production** mode as the domain, the node manager has a random username and password assigned to it. Use the WebLogic Server Administration Console to reset the password.
   >
   > • Disable secured mode domain by selecting the **Disable Secure Mode** check-box.

   b. Accept **Oracle Hotspot** as a default JDK location.

   c. Click **Next**.

6. On the Database Configuration type screen, select **RCU Data**. This option instructs the Configuration Wizard to connect to the database's Service Table (STB) schema to automatically retrieve schema information for schemas needed to configure the domain.

   After selecting RCU Data:

   a. Enter the name of the server hosting the database in the Host Name field.

   b. Enter the database DBMS name, or service name if you selected a service type driver in the DBMS/Service field.

   c. Enter the port number on which the database listens.

   d. Enter the username and password for connecting to the database's Service Table schema.

   e. Click **Get RCU Configuration** to retrieve the schema information.

   f. After successfully retrieving the schema information, click **Next** to continue.

7. Verify that the values populated on the JDBC Component Schema screen are correct for all schemas, and click **Next**.

8. Use the JDBC Component Schema Test screen to test data source connections that you just configured.

A green check mark in the Status column indicates a successful test. If you encounter issues, see the error message in the Connection Result Log section of the screen, fix the problem, then test the connection again.

9. Use the Advanced Configuration screen to complete the domain configuration.

To complete domain configuration, select any of these options:

- **Administration Server**: Required to properly configure the Administration Server's listen address.

- **Node Manager**: Required to configure Node Manager.

- **Topology**: Required to configure the Managed Servers and cluster, and for configuring the system and targeting Managed Servers to the system.

- **Domain Frontend Host Capture**: Required to configure Domain Frontend Host.

- **Deployments and Services**: Required to target to servers or clusters.

Click **Next**.

10. Review each item on the Configuration Summary screen and verify that the information is correct.

To make any changes, go back to a screen by clicking the Back button or selecting the screen in the navigation pane. Domain creation or domain extension does not start until you click **Create** or **Update**.

11. The Configuration Success screen shows information about the domain you just configured.

Click **Finish** to dismiss the Configuration Wizard.

2.7 Starting the Administration Server

After the WebLogic domain configuration is complete, you can start the Administration Server to manage the domain. OUDSM also uses this WebLogic Admin Server, so once the Admin Server is up and running, OUDSM is also effectively running as well.

To start the Administration Server:

1. Run the script to start the Administration Server from the following location:

On UNIX operating systems:

```
$ domain-home/bin/startWebLogic.sh
```

On Windows operating systems:

```
domain_home\startWebLogic.cmd
```

> **Note:**
>
> - The *domain-home* for starting the Administration Server depends on how you configure a domain for OUD and OUDSM.
>   - If you configure OUD/OUDSM in separate domains, the *domain-home* is the OUDSM domain that you created in Creating a Domain for OUDSM Using the WebLogic Scripting Tool.
>   - If you configure both OUD and OUDSM in a single domain, the *domain-home* is the domain that you created in Configuring OUD/OUDSM Domain Using the Configuration Wizard. The user name and password that are requested here correspond to those in Step 4 of the previous procedure.
> - If you added OUDSM to the existing DIP Domain by choosing **Update an existing domain** as the Configuration Type, you must restart the existing Admin Server and Managed Server so that the OUDSM application is deployed and accessible.

2. Verify that the Administration Server is up and running by accessing the Oracle Unified Directory Services Manager through a browser. Access OUDSM through a browser, using the following URL:

   ```
   http://hostname:7001/oudsm
   ```

   where *hostname* is the name of the server on which WebLogic Server is installed. `7001` is the default administrative port for the WebLogic Administration Server.

> **Note:**
>
> Ensure that the Administration Server is up and running before you access OUDSM. When the server successfully completes its startup process, it displays the following message:
>
> ```
> <Notice> <WebLogicServer> <BEA-000360> <Server started in RUNNING
> mode>
> ```

2.8 Starting the Node Manager

You can use the command line interface to start the node manager.

1. Navigate to the following directory:

   ```
   $ cd $DOMAIN_HOME/bin
   ```

2. Run the script to start the node manager:

   ```
   ./startNodeManager.sh
   ```

2.9 Performing an Oracle Unified Directory Silent Installation

Silent installation eliminates the need to monitor your product installation because no graphical output is displayed and no input by the user is required.

To perform an Oracle Unified Directory silent installation:

1. Create a response file (`install.rsp`) in the directory of your choice using a text editor such as vi or emacs. Response file provides information specific to the installation of Oracle Unified Directory.

```
[ENGINE]

#DO NOT CHANGE THIS.
Response File Version=1.0.0.0.0

[GENERIC]

#The oracle home location. This can be an existing Oracle Home or a new Oracle Home
ORACLE_HOME=/u01/oracle/products/oud

#Set this variable value to the Installation Type selected. Possible values:
Standalone Oracle Unified Directory Server (Managed independently of WebLogic
server), Collocated Oracle Unified Directory Server (Managed through WebLogic
server).
INSTALL_TYPE=Standalone Oracle Unified Directory Server (Managed independently of
WebLogic server)

#Provide the My Oracle Support Username. If you want to ignore Oracle Configuration
Manager configuration provide empty string for user name.
MYORACLESUPPORT_USERNAME=

#Provide the My Oracle Support Password
MYORACLESUPPORT_PASSWORD=<SECURE VALUE>

#Set this to true if you want to decline the security updates. Setting this to true
and providing empty string for My Oracle Support username will ignore the Oracle
Configuration Manager configuration
DECLINE_SECURITY_UPDATES=true

#Set this to true if My Oracle Support Password is specified
SECURITY_UPDATES_VIA_MYORACLESUPPORT=false

#Provide the Proxy Host
PROXY_HOST=

#Provide the Proxy Port
PROXY_PORT=

#Provide the Proxy Username
PROXY_USER=

#Provide the Proxy Password
PROXY_PWD=<SECURE VALUE>

#Type String (URL format) Indicates the OCM Repeater URL which should be of the
format [scheme[Http/Https]]://[repeater host]:[repeater port]
COLLECTOR_SUPPORTHUB_URL=
```

ORACLE

2. Create the `oraInst.loc` file in the directory of your choice using a text editor such as vi or emacs. The contents of the file consist of the following two lines:

```
inventory_loc=oui_inventory_directory
inst_group=oui_install_group
```

Replace `oui_inventory_directory` with the full path to the directory where you want the installer to create the inventory directory. Then, replace `oui_install_group` with the name of the group whose members have write permissions to this directory.

For example,

```
inventory_loc=/home/exampleuser/oraInst.loc
inst_group=dba
```

The Oracle inventory directory keeps track of all Oracle products installed on the computer. The inventory directory is stored in a file called `oraInst.loc`.

3. Run the following command to perform the silent installation:

```
java -jar distribution_name.jar -silent -responseFile file -invPtrLoc file
```

For example, to install the Oracle Unified Directory, run the following command:

```
/u01/oracle/jdk/jdk17.0.12/bin/java -jar fmw_14.1.2.1.0_oud.jar -silent -
responseFile /u01/oracle/response/install.rsp -invPtrLoc /u01/oracle/oraInst.loc
```

2.10 Configuring Oracle Unified Directory with Oracle Directory Integration Platform

Oracle Directory Integration Platform is a Java EE application that enables you to integrate your applications and directories, including third-party LDAP directories, with Oracle Unified Directory.

Oracle Directory Integration Platform includes services and interfaces that allow you to deploy synchronization solutions with other enterprise repositories. It can also be used to provide Oracle Unified Directory interoperability with third party metadirectory solutions.

For example, in an Oracle Fusion Middleware environment, where access to Oracle components relies on data stored in Oracle Unified Directory, you can still use Microsoft Active Directory as the central enterprise directory. Users of that directory can still access Oracle components because Oracle Directory Integration Platform can synchronize the data in Microsoft Active Directory with that in Oracle Unified Directory.

To configure Oracle Unified Directory, Oracle Unified Directory Services Manager, Oracle Directory Integration Platform, and Fusion Middleware Control in an Oracle WebLogic Server domain, see Configuring Oracle Unified Directory in *Administrator's Guide for Oracle Directory Integration Platform*.

3

Setting Up Oracle Unified Directory as a Directory Server

You can use either the graphical user interface (GUI) or the command-line interface (CLI) to set up an Oracle Unified Directory LDAP directory server instance.

Topics:

- Setting Up the Directory Server Using the Graphical User Interface (GUI)
- Setting Up the Directory Server Using the Command-Line Interface (CLI)
- Setting Up Replication During Installation
- Setting Up the Directory Server Using the WebLogic Scripting Tool

Before you set up an LDAP directory server instance, you must have already installed the software, as described in Installing the Oracle Unified Directory Software.

3.1 Setting Up the Directory Server Using the Graphical User Interface (GUI)

You can use the graphical user interface to set up the directory server. The graphical user interface (GUI) install uses a Java-based graphical installer that enables you to set up the directory server, load it with data, and get it running in very little time.

> **Note:**
>
> The OUD instance creation GUI wizard is deprecated in Oracle Unified Directory 12c (12.2.1.4.0). Oracle recommends that you use the command-line (CLI) to create an instance. See Setting Up the Directory Server Using the Command-Line Interface (CLI).

The installer asks some basic questions about the server configuration and then gives you the choice of leaving your database empty, loading the server with data from your own LDIF or loading the server with automatically generated sample data. The installer also enables you to configure security and replication, and, optionally, to start the server when the configuration is complete.

To setup a directory server instance using the `oud-setup` graphical user interface (GUI):

1. When you have installed the software, change to the `OUD_HOME` subdirectory.

   On UNIX and Linux systems:

   ```
   $ cd OUD-base-location/$OUD_HOME
   ```

   On Windows systems:

   ```
   C:\> cd OUD-base-location/$OUD_HOME
   ```

2. Ensure that your `JAVA_HOME` environment variable is set to a supported JVM installation (JDK 17).

3. Run the `oud-setup` command to configure the directory server installation.

   On UNIX and Linux systems:

   ```
   $ oud-setup
   ```

   On Windows systems:

   ```
   C:\> oud-setup.bat
   ```

   The utility launches the graphical installer and creates the Oracle Unified Directory instance in `OUD-base-location/instance-dir`.

   The default instance directory name is `asinst_1`, with subsequent instances on the same server named `asinst_2`, `asinst_3`, and so on. To specify a different instance name, set the `INSTANCE_NAME` environment variable before you run the setup, for example:

   ```
   $ export INSTANCE_NAME=my-oud-instance
   ```

   > **Note:**
   >
   > The instance is created directly under OUD-base-location by default. However, Oracle strongly recommends that you create your Oracle Unified Directory instance *outside* of the Oracle home directory.

   To change the instance path, include the path relative to OUD-base-location when you set the INSTANCE_NAME variable. For example:

   ```
   $ export INSTANCE_NAME=../../local/my-oud-instance
   ```

4. On the Welcome screen, click **Next**.

   The **Server Administration Settings** screen is displayed.

5. Enter the following information:

   a. **Instance Path**: Enter the path or use the **Browse** button to navigate to the directory where the instance will be created.

   b. **Host Name**: Enter the directory server's host name or IP address.

      The default is the local host name.

   c. Enter the port that will be used for administration traffic based on the protocols you selected.

      Select one of the following protocols:

      • **Enable Administration only with LDAP**: Enter the LDAP port that will be used for administration traffic.

        The default LDAP administration port is `4444`.

      • **Enable Administration with LDAP and HTTP**: Enter the LDAP and HTTP ports that will be used for administration traffic.

        The default administration ports are `4444` for LDAP and `8444` for HTTP.

      • **Enable Administration only with HTTP**: Enter the HTTP port that will be used for administration traffic.

The default HTTP administration port is `8444`.

d. **Root User DN**: Enter the Root User DN, or keep the default, `cn=Directory Manager`.

e. **Password**: Enter the root user bind password.

f. **Password (confirm)**: Retype the root user bind password.

g. Click **Next**.

The **Ports** screen is displayed.

6. Specify the different ports and protocols that clients can use to access the data in the server.

> **Note:**
>
> If you choose to enable a secure protocol, you must provide the certificate that the server will use to encrypt the communication.

- Enable **LDAP** and enter the port number on which the directory server listens for connections. The default secure port is 1389.

- Select **Enable StartTLS for LDAP** to specify that the LDAP connection handler should allow clients to use the StartTLS extended operation to initiate secure communication over an otherwise insecure connection.

- Enable **LDAPS** and enter the port number on which the directory server listens for connections. On UNIX and Linux systems, if you run the installer as a non-root user, the default secure port is `1636`, if available.

- Enable **HTTP** and enter the port number on which the directory server listens for connections. The default secure port is 8080.

- Enable **HTTPS** and enter the port number on which the directory server listens for connections. The default secure port is 10443.

- **Certificate**: Select one of the following radio buttons to obtain the certificate that the server should use for SSL, StartTLS, or both:

  Generate Self-Signed Certificate generates a self-signed certificate that you can use to secure the communication. While this option is convenient for testing purposes, many clients will not trust the certificate by default, and you might need to configure it manually.

  Use an Existing Certificate uses a certificate in an existing JKS keystore, a PKCS #12 file, or a PKCS #11 token. For more information about obtaining and managing certificates, see Configuring Security Between Clients and Servers in *Administering Oracle Unified Directory*.

  For production servers, select **Use an Existing Certificate**, and then select the Keystore Type. Enter the Keystore Path, and Keystore PIN if necessary.

  If more than one certificate is defined in the specified key store, you are asked to select one of the certificates from a drop down menu.

Click **Next**.

The **Topology Options** screen is displayed.

7. Select one of the following:

- **This will be a stand-alone server**.

- **This server will be part of a replication topology**.

  For instructions on setting up a replicated topology, see Setting Up Replication During Installation.

  Click **Next**.

  The **Directory Data** screen is displayed.

8. Specify how to load data into your directory:

   - **Directory Base DN**: Enter the base DN for your directory.

     The default Base DN is `dc=example,dc=com`.

   - **Directory Data**: Select one of the following data options:

     Only Create Base Entry: Creates an entry with the base DN specified previously.

     Leave Database Empty: Sets up a database but does not populate any entries.

     Import Data from LDIF File: Imports LDIF data from the file specified in the Path field.

     Import Automatically-Generated Sample Data: Generates the number of sample entries specified in the Number of User Entries field.

   Click **Next**.

   The **Oracle Components Integration** screen is displayed.

9. Select one of the following options. Some components appear in multiple options, with consecutive options adding additional components to the selection. The options are:

   - **No specific integration**: Select this option if you want a standard installation. This is the default option.

   - **Enable for DIP**: Select this option if you want this server instance to be enabled as a datastore for Oracle Directory Integration Platform (DIP) only.

   - **Enable for EBS (E-Business Suite), Database Net Services and DIP**: Select this option if you want this server instance to be enabled as a datastore for Oracle E-Business Suite (EBS), Oracle Database Net Services, and Oracle Directory Integration Platform (DIP).

   - **Enable for EUS (Enterprise User Security), EBS, Database Net Services and DIP**: Select this option if you want this server instance to be enabled as a datastore for Oracle Enterprise User Security (EUS), Oracle E-Business Suite (EBS), Oracle Database Net Services, and Oracle Directory Integration Platform (DIP).

     To enable a server instance for EUS, you must also have enabled SSL access, as described in the Server Settings screen in Step 5 of this procedure.

     The **Enable for Oracle Database Net Services** option causes this server to store the database connect identifiers.

     When you enable a server instance for Oracle Enterprise User Security (EUS), Oracle E-Business Suite (EBS), or Oracle Database Net Services, the following naming contexts are created on the instance:

     `cn=oraclecontext`

     `cn=oracleschemaversion`

     `cn=subschemasubentry`

     `cn=oraclecontext,`*baseDN*

These naming contexts are not created if you select DIP.

Click **Next**.

The **Server Tuning** screen is displayed.

10. The **Server Tuning** screen enables you to tune Oracle Unified Directory server by selecting one of these options:

    • Providing the specific memory to be dedicated to the server.

    • Explicitly providing the run-time settings (JVM arguments) to be used by the server and the off-line tools (`import-ldif`, `export-ldif`, `verify-index`, and `rebuild-index`).

    Select one of the following options:

    • **Providing the Memory to be used for OUD**: Move the slider to select the memory you want to use for the server. The off-line tools will use the same heap size as you select for the server using this slider.

      To fully dedicate the system, check **Dedicated Machine for OUD**.

      To reset any changes to the default values, click **Reset to Default**.

      > **✎ Note:**
      >
      > – The **Providing the Memory to be used for OUD** option is available only if you run the `oud-setup` script using a JVM with Java HotSpot (such as Oracle Java SE).
      >
      > – To tune the server using the contents of an LDIF file, use the `dstune` utility after you run the `oud-setup` script. See Using the dstune Utility in *Administering Oracle Unified Directory*.

    • **Providing Runtime Options**: Click **Change** to change any of the displayed values for the **Server Runtime Settings** or the **Offline Tools Runtime Settings**.

      To reset any changes to the default values, click **Reset to Default**.

      See also Configuring the Java Run-Time Settings During the Server Setup.

    Click **Next**.

    The **Review** screen is displayed.

11. Review your configuration.

    Select **Start Server when Configuration has Completed** to start the server after the directory server has been configured. On Windows systems, select **Start Server as a Windows service**, if desired.

    To display the equivalent command-line installation, select **Show Equivalent Command-Line** from the drop down menu at the top of the panel. This option displays the non-interactive commands that are run to set up the server with the specified configuration, and can be useful for scripting purposes.

12. Click **Finish**.

13. Click **Close**.

14. Test whether the directory server has been set up and started successfully by searching an entry in the directory. For example:

    On UNIX and Linux systems:

```
instance-dir/OUD/bin/ldapsearch -h localhost -p 1389 \
  -D "cn=directory manager" -w my-password -b "dc=example,dc=com" \
  "(objectclass=*)"
```

On Windows systems:

```
instance-dir\OUD\bat\ldapsearch.bat -h localhost -p 1389 \
  -D "cn=directory manager" -w my-password -b "dc=example,dc=com" \
  "(objectclass=*)"
```

3.2 Setting Up the Directory Server Using the Command-Line Interface (CLI)

You can use the command-line interface to set up the directory server. You run the `oud-setup` script with the `--cli` option to set up a directory server instance using the command-line interface.

The command-line interface (CLI) install is either interactive or non-interactive. In a non-interactive installation, you can set up the server without user intervention. In interactive mode, you are prompted for the required information before the configuration begins.

To setup a directory server instance using the CLI:

1. When you have installed the software, change to the `OUD_HOME` subdirectory.

   On UNIX and Linux systems:

   ```
   $ cd OUD-base-location/$OUD_HOME
   ```

   On Windows systems:

   ```
   C:\> cd OUD-base-location/$OUD_HOME
   ```

2. Ensure that your `JAVA_HOME` environment variable is set to a supported JVM installation.

3. Enter the `oud-setup` command with the `--cli` option to launch the install in interactive mode.

   ```
   $ ./oud-setup --cli
   ```

   The output should look similar to this:

   ```
   Oracle Unified Directory 14.1.2.1.0
   Please wait while the setup program initializes...

   Instance Path: [OUD-base-location/instance-dir]:
   ```

   The utility launches the command-line installer and creates the Oracle Unified Directory instance in `OUD-base-location/instance-dir`.

   The default instance directory name is `asinst_1`, with subsequent instances on the same server named `asinst_2`, `asinst_3`, and so on. To specify a different instance name, set the `INSTANCE_NAME` environment variable before you run the setup, for example:

   ```
   $ export INSTANCE_NAME=my-oud-instance
   ```

> **✏ Note:**
>
> The instance is created directly under OUD-base-location by default. However, Oracle strongly recommends that you create your Oracle Unified Directory instance *outside* of the Oracle home directory.

To change the instance path, include the path relative to OUD-base-location when you set the INSTANCE_NAME variable. For example:

```
$ export INSTANCE_NAME=../../local/my-oud-instance
```

4. Enable the LDAP administration port, or press Enter or Return to accept the default.

    ```
    Do you want to enable the LDAP administration port?  Note that some of the OUD
    tools require this port to be enabled (yes / no) [yes]:
    ```

5. Enter the port number that will be used for Administration traffic, or press Enter or Return to accept the default.

    ```
    On which port would you like the LDAP Administration Connector to accept
    connections? [4444]:
    ```

    The default administration port is `4444`. See Managing Administration Traffic to the Server in *Administering Oracle Unified Directory*.

6. Enter `yes` to enable the HTTP administrator port, or press Enter or Return to accept the default.

    ```
    Do you want to enable the HTTP administration port? (yes / no) [no]:
    ```

7. Enter the root user DN, or press Enter or Return to accept the default (`cn=Directory Manager`).

    ```
    What would you like to use as the initial root user DN for the Directory
    Server? [cn=Directory Manager]:
    ```

8. Provide a password for the root user and reenter the password to confirm it.

    ```
    Please provide the password to use for the initial root user: **********
    Please re-enter the password for confirmation: **********
    ```

9. Enable LDAP, or press Enter or Return to accept the default.

    ```
    Do you want to enable LDAP? (yes / no) [yes]:
    ```

10. Enter the LDAP port number for your directory server, or press Enter or Return to accept the default.

    ```
    On which port would you like the Directory Server to accept connections from
    LDAP clients? [1389]:
    ```

11. Enter `yes` to enable Start TLS, or press Enter or Return to accept the default.

    ```
    Do you want to enable Start TLS on LDAP Port '1389'? (yes / no) [no]:
    ```

12. Enter `yes` to enable HTTP, or press Enter or Return to accept the default.

    ```
    Do you want to enable HTTP? (yes / no) [no]:
    ```

13. Enter `yes` to enable LDAPS, or press Enter or Return to accept the default.

    ```
    Do you want to enable LDAPS? (yes / no) [no]:
    ```

14. Enter `yes` to enable HTTPS, or press Enter or Return to accept the default

```
Do you want to enable HTTPS? (yes / no) [no]:
```

15. Press Enter or Return to create base DNs in the server, or enter `no` if you do not want to create base DNs.

```
Do you want to create base DNs in the server? (yes / no) [yes]:
```

16. Enter the base DN for the directory data, or press Enter or Return to accept the default.

```
Provide the base DN for the directory data: [dc=example,dc=com]:
```

17. Select an option to populate the database:

    - `Only create the base entry` creates an entry with the base DN specified previously.

    - `Leave the database empty` sets up a database but does not populate any entries.

    - `Import data from an LDIF file` imports LDIF data from a file, specified in the following step.

    - `Load automatically-generated sample data` generates the number of sample entries specified in the following step.

```
Options for populating the database:

1) Only create the base entry
2) Leave the database empty
3) Import data from an LDIF file
4) Load automatically-generated sample data

Enter choice [1]:
```

18. Select one of the following options to integrate Oracle Unified Directory with Oracle components:

    1) No integration

    2) DIP (Directory Integration Platform)

    3) Generic: Database Net Services, EBS and DIP

    4) EUS (Enterprise User Security), Database Net Services, EBS and DIP

    The same components appear in multiple options. These options enable the server instance to be enabled as a datastore for the specified components, as follows.

    - 2) DIP: Oracle Directory Integration Platform (DIP) only.

    - 3) Generic: Database Net Services, EBS and DIP: Oracle E-Business Suite (EBS), Oracle Database Net Services, and Oracle Directory Integration Platform (DIP).

    - 4) EUS (Enterprise User Security), Database Net Services, EBS and DIP: Oracle Enterprise User Security (EUS), Oracle E-Business Suite (EBS), Oracle Database Net Services, and Oracle Directory Integration Platform (DIP).

      To integrate the server with EUS, you must also have enabled SSL access, as described in Step 11.

    When you enable a server instance for Oracle Enterprise User Security (EUS), Oracle E-Business Suite (EBS), or Oracle Database Net Services, the following naming contexts are created on the instance:

    cn=oraclecontext

    cn=oracleschemaversion

    cn=subschemasubentry

    cn=oraclecontext,*baseDN*

These naming contexts are not created for DIP.

```
Specify the Oracle components with which the server integrates.  It is
recommended to choose the option covering only your requirements.

    1)  No Integration
    2)  DIP (Directory Integration Platform)
    3)  Generic: Database Net Services, EBS and DIP
    4)  EUS (Enterprise User Security), Database Net Services, EBS and DIP

    c)  cancel

Enter choice [1]: 3
```

19. Enter an option depending on how you want to tune the Oracle Unified Directory server:

```
How do you want the OUD server to be tuned?

    1)  Use specific Java Virtual Machine arguments
    2)  Use the default Java Virtual Machine settings
    3)  Provide the Java heap size to be used by the server
    4)  Provide the percentage of system memory to be used by the server
    5)  Provide the size of system memory to be used by the server

Enter choice [1]: 2
```

> **Note:**
>
> - Option 2 (default JVM settings) are based on the free memory of the system.
> - Options 3, 4, and 5 are available only if you run the `oud-setup` script using a JVM with Java HotSpot (such as Oracle Java SE).

20. Enter an option depending on how you want to tune the off-line tools:

```
How do you want the off-line tools (import-ldif, export-ldif, verify-index and
rebuild-index) to be tuned?

    1)  Use specific Java Virtual Machine arguments
    2)  Use the default Java Virtual Machine settings
    3)  Automatic Tuning
    4)  Provide the Java heap size to be used by the off-line tools

Enter choice [1]: 2
```

> **Note:**
>
> Select the `Automatic Tuning` option, if you want the off-line tools to be tuned automatically each time they are launched, depending on the system resources.

21. Press Enter or Return to accept the default to start the server after the configuration has completed.

```
Do you want to start the server when the configuration is completed? (yes /
no) [yes]:


Setup Summary
```

```
=============
Instance Path:                    /u01/app/oracle/config/oud_instances/
asinst_1/OUD
LDAP Administration Port:         4444
Root User DN:                     cn=Directory Manager
LDAP Port:                        1389
Directory Data:                   Create New Base DN dc=example,dc=com
                                  Base DN Data: Only Create Base Entry
                                  (dc=example,dc=com)
Integration with Oracle components: Generic: Database Net Services, EBS and DIP
Server Runtime Settings:          Use the default Java Virtual Machine
                                  settings
Off-line Tools Runtime Settings:  Use the default Java Virtual Machine
                                  settings


Start Server when the configuration is completed

Provide the base DN for the directory data: [dc=example,dc=com]:
```

22. Enter 3 to display the equivalent non-interactive commands.

This option displays the commands that are run to set up the server with the specified configuration, and can be useful for scripting purposes.

```
What would you like to do?

    1)  Set up the server with the parameters above
    2)  Provide the setup parameters again
    3)  Print equivalent non-interactive command-line
    4)  Cancel and exit

Enter choice [1]: 3

Equivalent non-interactive command-line to setup server:

oud-setup \
        --cli \
        --instancePath /u01/app/oracle/config/oud_instances/asinst_1/OUD \
        --adminConnectorPort 6444 \
        --httpAdminConnectorPort disabled \
        --rootUserDN cn=Directory\ Manager \
        --rootUserPasswordFile ****** \
        --ldapPort 3389 \
        --baseDN dc=example,dc=com \
        --addBaseEntry \
        --integration generic \
        --serverTuning jvm-default \
        --offlineToolsTuning jvm-default \
        --no-prompt \
        --noPropertiesFile
```

23. Press Enter or Return to accept the default to complete the configuration process.

```
What would you like to do?

    1)  Set up the server with the parameters above
    2)  Provide the setup parameters again
    3)  Print equivalent non-interactive command-line
    4)  Cancel and exit

Enter choice [1]:

Creating instance directory /u01/app/oracle/config/oud_instances/asinst_1/OUD .....
Done.
```

```
See /u01/app/oracle/config/oud_instances/asinst_1/OUD/logs/oud-setup for a detailed
log
of this operation.

Configuring Directory Server ...... Done.
Creating Base Entry dc=example,dc=com ..... Done.
Preparing the server for Oracle integration .......... Done.
Starting Directory Server ........... Done.
Creating Net Services suffixes ..... Done.

To see basic server configuration status and configuration you can launch
/u01/app/oracle/config/oud_instances/asinst_1/OUD/bin/status
```

24. Test whether the directory server has been set up and started successfully by searching an entry in the directory. For example:

```
instance-dir/OUD/bin/ldapsearch -h localhost -p 1389 \
  -D "cn=directory manager" -w my-password -b "dc=example,dc=com" \
  "(objectclass=*)"
```

The output should look similar to this:

```
dn: dc=example,dc=com
dc: example
objectClass: top
objectClass: orclSubscriber
objectClass: domain

dn: cn=OracleContext,dc=example,dc=com
orclVersion: 90600
objectClass: orclContextAux82
objectClass: top
objectClass: orclContext
cn: OracleContext

dn: cn=Products,cn=OracleContext,dc=example,dc=com
objectClass: top
objectClass: orclContainer
cn: Products

dn: cn=OracleDBSecurityAdmins,cn=OracleContext,dc=example,dc=com
uniquemember: cn=Directory Manager
objectClass: groupofUniqueNames
objectClass: orclPrivilegeGroup
objectClass: top
cn: OracleDBSecurityAdmins

dn: cn=OracleDBCreators,cn=OracleContext,dc=example,dc=com
uniquemember: cn=Directory Manager
objectClass: groupofUniqueNames
objectClass: orclPrivilegeGroup
objectClass: top
cn: OracleDBCreators

dn: cn=OracleNetAdmins,cn=OracleContext,dc=example,dc=com
uniquemember: cn=Directory Manager
objectClass: groupofUniqueNames
objectClass: orclPrivilegeGroup
objectClass: top
cn: OracleNetAdmins

dn: cn=OracleDBSecurity,cn=Products,cn=OracleContext,dc=example,dc=com
orclVersion: 102000
```

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```
cn: OracleDBSecurity
orclDBVersionCompatibility: 90000
objectClass: top
objectClass: orclContainer
objectClass: orclDBSecConfig
objectClass: orclDBSecConfig10i
orclDBOIDAuthentication: PASSWORD

dn: cn=OracleDefaultDomain,cn=OracleDBSecurity,cn=Products,cn=OracleContext,dc=e
 xample,dc=com
orcldbauthtypes: ALL
objectClass: groupofuniquenames
objectClass: orclDBEnterpriseDomain_82
objectClass: orclprivilegegroup
objectClass: top
objectClass: orclDBEnterpriseDomain
cn: OracleDefaultDomain

dn: cn=Groups,cn=OracleContext,dc=example,dc=com
objectClass: top
objectClass: orclContainer
cn: Groups

dn: cn=Common,cn=Products,cn=OracleContext,dc=example,dc=com
orclVersion: 90000
orclCommonGroupSearchBase: ou=groups,dc=example,dc=com
orclCommonKrbPrincipalAttribute: krbPrincipalName
orclCommonApplicationGuidAttribute: orclGlobalID
orclCommonNicknameAttribute: uid
orclCommonWindowsPrincipalAttribute: orclSAMAccountName
orclCommonUserCreateBase: ou=people,dc=example,dc=com
orclCommonNamingAttribute: uid
orclUserObjectClasses: top
orclUserObjectClasses: person
orclUserObjectClasses: inetorgperson
orclUserObjectClasses: organizationalperson
orclUserObjectClasses: orcluser
orclUserObjectClasses: orcluserv2
cn: Common
orclSubscriberSearchBase: dc=example,dc=com
orclSubscriberNickNameAttribute:: ZGMg
objectClass: top
objectClass: orclCommonAttributesV2
objectClass: orclCommonAttributes
objectClass: orclContainer
orclCommonDefaultUserCreateBase: ou=people,dc=example,dc=com
orclCommonDefaultGroupCreateBase: ou=groups,dc=example,dc=com
orclCommonGroupCreateBase: ou=groups,dc=example,dc=com
orclCommonUserSearchBase: ou=people,dc=example,dc=com

dn: cn=OracleContextAdmins,cn=Groups,cn=OracleContext,dc=example,dc=com
uniquemember: cn=Directory Manager
cn: OracleContextAdmins
description: Users who can administer all entities in this Oracle Context
objectClass: groupofUniqueNames
objectClass: orclPrivilegeGroup
objectClass: orclGroup
objectClass: top
displayname: Oracle Context Administrators

dn: cn=OracleUserSecurityAdmins,cn=Groups,cn=OracleContext,dc=example,dc=com
uniquemember: cn=Directory Manager
```

```
objectClass: groupofUniqueNames
objectClass: orclPrivilegeGroup
objectClass: top
cn: OracleUserSecurityAdmins

dn: cn=OraclePasswordAccessibleDomains,cn=Groups,cn=OracleContext,dc=example,dc=
 com
uniquemember: cn=OracleDBSecurityAdmins,cn=OracleContext,dc=example,dc=com
objectClass: groupofUniqueNames
objectClass: orclPrivilegeGroup
objectClass: top
cn: OraclePasswordAccessibleDomains

dn: cn=OracleDomainAdmins,cn=OracleDefaultDomain,cn=OracleDBSecurity,cn=Products
 ,cn=OracleContext,dc=example,dc=com
uniquemember: cn=Directory Manager
objectClass: groupofUniqueNames
objectClass: orclPrivilegeGroup
objectClass: top
cn: OracleDomainAdmins

dn: cn=LabelSecurity,cn=Products,cn=OracleContext,dc=example,dc=com
orclVersion: 100000
objectClass: top
objectClass: orclContainer
cn: LabelSecurity

dn: cn=Policies,cn=LabelSecurity,cn=Products,cn=OracleContext,dc=example,dc=com
objectClass: top
objectClass: orclContainer
cn: Policies

dn: cn=PolicyCreators,cn=Policies,cn=LabelSecurity,cn=Products,cn=oraclecontext,
 dc=example,dc=com
owner: cn=OracleContextAdmins,cn=Groups,cn=OracleContext,dc=example,dc=com
objectClass: groupOfUniqueNames
objectClass: orclACPgroup
objectClass: top
cn: PolicyCreators

dn: cn=ProxyPermissions,cn=OracleDefaultDomain,cn=OracleDBSecurity,cn=Products,c
 n=OracleContext,dc=example,dc=com
objectClass: top
objectClass: orclContainer
cn: ProxyPermissions
```

3.2.1 Customizing Self Signed Certificate Generation Options

During OUD setup, you can customize the self-signed certificate by providing the following optional parameters:

1. *--selfSignedCertKeyAlg* – To provide key algorithm of the self-signed certificate.

2. *--selfSignedCertKeySize* – To provide key bit size of the self-signed certificate.

3. *--selfSignedCertSigAlg* – To provide the signature algorithm of the self-signed certificate.

> **Note:**
>
> The values for the above parameters must be as per JDK documentation. For more information, see Java Security Standard Names documentation.

Sample non-interactive command-line to setup server:

```
oud-setup \
--cli \
-v -Z 2386 \
--instancePath /u01/app/oracle/config/oud_instances/asinst_1/OUD \
--adminConnectorPort 4444 \
--generateSelfSignedCertificate \
--selfSignedCertKeyAlg "RSA" \
--selfSignedCertKeySize "3072" \
--selfSignedCertSigAlg "SHA512withRSA" \
--rootUserDN cn=Directory\ Manager \
--rootUserPasswordFile ****** \
--ldapPort 1386 \
--baseDN dc=example,dc=com \
--addBaseEntry \
--integration generic \
--serverTuning jvm-default \
--offlineToolsTuning jvm-default \
--no-prompt \
--noPropertiesFile
```

3.3 Setting Up Replication During Installation

You can set up replication as part of the installation, if you install the directory server using the graphical user interface. However, if you install the server using the command-line interface, you must set up replication using the `dsreplication` command after the server is installed.

See Understanding Data Replication With dsreplication in *Administering Oracle Unified Directory*.

> **Note:**
>
> If you are running Oracle Unified Directory on HP Image Assistant (HPIA) platform, use the command-line interface to set up a replication instance. This will prevent connection issues due to HPIA JDK certificate error. See Setting Up the Directory Server Using the Command-Line Interface (CLI).

1. For the first directory server in your replication topology, follow the instructions in Setting Up the Directory Server Using the Graphical User Interface (GUI).

2. On the Topologies screen, do the following:

   • Select **This server will be part of a replication topology**.

   • Enter the replication port number or accept the default port `8989`.

The replication port must be an available port on the server, and must therefore be different for each directory server in a topology if all of them run on the same host.

- Select **Configure as Secure** to use encrypted communication when connecting to the replication port on the first server.

  Note the host name, and administration port, for this first directory server. You will need this information when you configure the second directory server.

3. Complete the configuration of the first server.

4. For the second directory server in your replication topology, follow the instructions in Setting Up the Directory Server Using the Graphical User Interface (GUI).

5. On the Topologies screen, do the following:

   - Select **This server will be part of a replication topology**.

   - Enter the replication port number for this directory server.

     The replication port must be different from the replication port of the first directory server if both servers run on the same host.

   - Select **There is already a server in the topology** and enter the following:

     a. **Host Name**: Enter the Host Name for the first directory server.

     b. **Port**: Enter the administration port for the first directory server.

     c. **Admin User**: Enter the bind DN for the first directory user, or accept the default.

     d. **Admin Password**: Enter the bind password for the Admin user.

6. On the Global Administrator screen, provide the following information:

   - The UID for the new global administrator.

   - The password for the new global administrator.

   - Confirm the password for the new global administrator.

7. On the Data Replication screen, select one of the following options, and click **Next**.

   a. Create first instance of base DN to be replicated.

   b. Create local instance of existing base DNs and configure replication. Click the base DN for the first directory server.

8. Review the configuration settings for the second server, and click **Finish**.

9. Repeat the above procedures to set up additional servers in the replication topology.

   When you have defined the Global Administrator, the entry with the DN and the password that you provided in step 5c must be defined on all servers in the topology.

3.4 Setting Up the Directory Server Using the WebLogic Scripting Tool

You can use the WebLogic Scripting Tool (WLST) to set up the directory server. Execute the `oud_createInstance` with the `oud-setup` script to set up a directory server instance using the WLST.

To set up a directory instance using the WLST:

1. Set the `PRODUCT_HOME` and `DOMAIN_HOME` environment variables before launching WLST.

```
export PRODUCT_HOME=/scratch/user/middleware/oracle_home
export DOMAIN_HOME=/scratch/user/middleware/oracle_home/user_projects/domains/
base_domain
```

`PRODUCT_HOME` is similar to `ORACLE_HOME`. It points to the directory where a user provides at the time of product installation. However, `DOMAIN_HOME` points to the directory where domains that you configure are created.

2. Launch the WLST:

On UNIX and Linux systems:

```
$ ORACLE_HOME/oracle_common/common/bin/wlst.sh
```

On Windows systems:

```
C:\> ORACLE_HOME\oracle_common\common\bin\wlst.cmd
```

`ORACLE_HOME` is the Oracle home directory you specified at installation.

3. Execute the `oud_createInstance` command with script name `oud-setup` to create the OUD Server instance.

```
oud_createInstance(scriptName='oud-
setup',instanceName='oud1',hostname='localhost',ldapPort=1389,rootUserDN='cn=Director
y\ Manager',
rootUserPasswordFile='/scratch/user/
password.txt',baseDN='dc=example,dc=com',sampleData=5,adminConnectorPort= 1444)
```

`scriptName` indicates the setup script based on the flavor of OUD. The value for this parameter can be any one of [`oud-setup`, `oud-proxy-setup`, `oud-replication-gateway-setup`].

`instanceName` indicates the name of the instance. For example, `oud1`.

> **Note:**
>
> Arguments that cannot have a value like `noPropertiesFile` and so on, can also be used with the custom WLST commands. You must pass an empty value for these arguments. For example, `noPropertiesFile=''`.

See oud-setup in *Administering Oracle Unified Directory* for the rest of the parameters and their descriptions.

Output:

```
Oracle Unified Directory 14.1.2.1.0
Please wait while the setup program initializes…
Creating instance directory
/scratch/user/middleware/oracle_home/user_projects/domains/base_domain/
system_components/OUD/oud1/
.....Done.

See
/scratch/user/middleware/oracle_home/user_projects/domains/base_domain/
system_components/OUD/oud1/logs/oud-setup
for a detailed log of this operation.

Configuring Directory Server ..... Done.
Importing Automatically-Generated Data (5 Entries) ....... Done.
```

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```
To see basic server configuration status and configuration you can launch
/scratch/user/middleware/oracle_home/user_projects/domains/base_domain/
system_components/OUD/oud1/bin/status
Successfully created OUD instance
```

4

Setting Up Oracle Unified Directory as a Proxy Server

You can use the graphical user interface or the command-line utility to set up an Oracle Unified Directory proxy server instance.

Topics:

- Before You Set up the Oracle Unified Directory Proxy
- Setting Up the Proxy Server Using the Graphical User Interface (GUI)
- Set Up the Proxy Using the Command-Line (CLI)
- Duplicating an Oracle Unified Directory Proxy Installation
- Manage Redundancy for Oracle Unified Directory
- Setting Up the Proxy Server Using the WebLogic Scripting Tool

This chapter provides an overview of the supported Oracle Unified Directory proxy deployments. For example deployments using the proxy server, see Understanding Deployments Using the Proxy Server in *Administering Oracle Unified Directory*.

4.1 Before You Set up the Oracle Unified Directory Proxy

To set up the Oracle Unified Directory proxy, you must have one or more remote LDAPv3-compliant directory servers.

Before you start to set up the proxy, determine the type of deployment architecture that you want to implement from the following list:

- Simple load balancing
- Simple distribution
- Distribution with load balancing
- Failover between data centers
- Distribution with failover between data centers

A global index catalog can be incorporated into any scenario that uses distribution. For information about creating a global index catalog, see Configuring Global Indexes Using the Command Line in *Administering Oracle Unified Directory*.

4.2 Setting Up the Proxy Server Using the Graphical User Interface (GUI)

The GUI setup is a Java-based graphical installer that enables you to configure all the elements required for specific Oracle Unified Directory proxy deployments.

> **✏ Note:**
>
> The OUD instance creation GUI wizard is deprecated in Oracle Unified Directory 12c (12.2.1.4.0). Oracle recommends use of the command-line (CLI) to create an instance. See Setting Up the Proxy Using the CLI.

You can use the GUI setup only once per instance. To modify an installation after you have run the GUI setup, use the `dsconfig` command.

The following topics present a step-by-step installation using the `oud-proxy-setup` graphical interface, including configuration examples for simple deployments:

- Presentation of the GUI Setup Wizard
- Configuring Simple Load Balancing
- Configuring Simple Distribution
- Configuring Distribution with Load Balancing
- Enterprise User Security (EUS) Configuration

Before you run the GUI setup, determine the best deployment architecture using the deployment scenarios described in Understanding Deployments Using the Proxy Server in *Administering Oracle Unified Directory*.

4.2.1 Presentation of the GUI Setup Wizard

The setup wizard has all the graphical user interface elements that enables the user to interact with the application while setting up Oracle Unified Directory as a proxy server.

The GUI setup wizard is organized as follows:

- The left hand pane lists the steps of the setup process. The deployment sub-steps change, according to the type of deployment that you select.
- The arrow in the left hand pane indicates the current step.
- The main area on the right is the action pane, where you define your deployment.
- At the bottom of the window you have the option to go back and forth (or quit) to modify and complete your installation.

The remaining tasks in this section walk you through the various types of proxy deployments that can be set up.

4.2.2 Configuring Simple Load Balancing

You can deploy a proxy server in a simple load balancing configuration to optimize performance by distributing incoming requests across multiple resources.

To configure simple load balancing:

1. When you have installed the software, change to the `OUD_HOME` subdirectory.

   On UNIX and Linux systems:

   ```
   $ cd OUD-base-location/$OUD_HOME
   ```

   On Windows systems:

```
C:\> cd OUD-base-location\$OUD_HOME
```

2. Ensure that your `JAVA_HOME` environment variable is set to a supported JVM installation (at least Java 17).

3. Run the `oud-proxy-setup` command to configure the proxy server installation.

   On UNIX and Linux systems:

   ```
   $ oud-proxy-setup
   ```

   On Windows systems:

   ```
   C:\> oud-proxy-setup.bat
   ```

   The utility launches the graphical installer and creates the Oracle Unified Directory proxy instance in *OUD-base-location/instance-dir*.

   The default instance directory name is `asinst_1`, with subsequent instances on the same server named `asinst_2`, `asinst_3`, and so on. To specify a different instance name, set the `INSTANCE_NAME` environment variable before you run the setup, for example:

   ```
   $ export INSTANCE_NAME=my-oud-proxy-instance
   ```

   > **✎ Note:**
   >
   > The instance is created directly under OUD-base-location by default. However, Oracle strongly recommends that you create your Oracle Unified Directory instance *outside* of the Oracle home directory.

   To change the instance path, include the path relative to OUD-base-location when you set the INSTANCE_NAME variable. For example:

   ```
   $ export INSTANCE_NAME=../../local/my-oud-proxy-instance
   ```

4. On the Welcome panel, click **Next**.

5. On the Server Settings panel, enter the following information:

   • **Host Name**: Enter the proxy server's host name or IP address.

     The default is the local host name.

   • **LDAP Listener Port**: Enter the LDAP port for the proxy server.

     The default port that is proposed is the first available port that ends with 389. On UNIX and Linux systems, if you run the installer as a non-root user, the default is 1389, if available.

   • **LDAP Secure Access**: To configure SSL, StartTLS, or both, click Configure.

     Complete the following information:

     a. **SSL Access**: Select Enable SSL and enter a valid port for secure LDAP operations.

        The default secure port that is proposed is the first available port that ends with `636`. On UNIX and Linux systems, if you run the installer as a non-root user, the default is `1636`, if available.

     b. **StartTLS Access**: Select Enable StartTLS for LDAP.

      c. **Certificate**: If you are in a testing environment, select Generate Self-Signed Certificate.

        For production servers, select **Use an Existing Certificate**, and then select the Keystore Type. Enter the Keystore Path, and Keystore PIN if necessary.

      d. Click **OK** to continue.

- **Administration Port**: Enter the port that will be used for administration traffic.

  The default administration port is `4444`. See Managing Administration Traffic to the Server in *Administering Oracle Unified Directory*.

- **Root User DN**: Enter the Root User DN, or keep the default, `cn=Directory Manager`.

- **Password**: Enter the root user bind password.

- **Password (confirm)**: Reenter the root user bind password.

Click **Next**.

The **Deployment Options** screen is displayed.

6. Select **Use load balancing on a replicated data set** from the Configuration Option drop-down menu.

> **Note:**
>
> If you select **Configure later**, only the server settings that you specified in the previous step are configured. You must then use the `dsconfig` command, or the Oracle Unified Directory Services Manager interface, to configure your deployment.

Click **Next**.

The **Back-End Servers** screen is displayed.

7. Select the remote LDAP servers that hold the corresponding replicated data.

    a. If your remote LDAP servers are Oracle Unified Directory servers or Oracle Directory Server Enterprise Edition servers, click Add Oracle Servers.

- For Oracle Unified Directory servers:

  Select **Connect to a replicated Oracle Unified Directory server**.

  Enter the host name, administration port, administration bind DN, and password for the remote Oracle Unified Directory server.

  Click **Connect**.

  Accept the certificate.

  Check the servers that should be part of the load balanced topology.

  When you have entered the details of one directory server in a replicated topology, the setup wizard displays all other replicated servers in that topology.

  Click **OK**.

- For Oracle Directory Server Enterprise Edition servers:

  Select **Connect to a DSCC registry**.

Enter the DSCC host name, DSCC port, protocol, and the Directory Service Manager credentials for the DSCC registry.

Check the servers that should be part of the load balanced topology.

The setup wizard displays all the Oracle Directory Server Enterprise Edition server instances that are registered in the DSCC registry.

Click **OK**.

b. If your remote LDAP servers are not Oracle Unified Directory servers or Oracle Directory Server Enterprise Edition servers, click Add Server.

- Enter the server name, port and security settings.

  The security settings you set here will determine the security between the Oracle Unified Directory proxy and remote LDAP servers. See Configuring Security Between Clients and Servers in *Administering Oracle Unified Directory*.

- Click **Add**.

- Click **Close** when you have added all the remote LDAP servers for the load balanced topology.

Click **Next**.

The **Load Balancing Options** screen is displayed.

8. Choose a load balancing algorithm.

For information about the various load balancing algorithms, see Configuring Load Balancing Using the Proxy in *Administering Oracle Unified Directory*.

9. Set the load balancing algorithm properties or select Default Values.

When you have completed the installation, the properties can be modified. For more information about modifying load balancing properties, see Configuring Load Balancing Using the Proxy in *Administering Oracle Unified Directory*.

a. For proportional, set the weight. Requests are distributed between the remote LDAP servers based on the weight indicated.

For example, if you leave the default value of 1, then all servers will receive the same number of requests.

b. For failover, indicate the order in which the servers are used.

The server with a value of 0 is the highest priority server. The other servers are used only if there is a failure on the main server.

c. For saturation, set the order in which the servers are used and the saturation threshold of each server.

Requests are sent to the server with the highest priority (1) until it reaches the threshold indicated. The saturation threshold is the rate at which the server is considered saturated, or full. Typically this limit should be set lower than 100%.

d. For optimal, no additional configuration is required.

The active server is selected based on the saturation index, which is calculated automatically.

10. Enter the naming context, or suffix.

If the remote LDAP servers are online, the setup connects to them and displays the naming contexts that are available on the servers.

If no naming contexts are proposed, enter the DN of the naming context that you want to use, for example, `dc=example,dc=com`.

Click **Next**.

The **Runtime options** screen is displayed.

11. Click **Change** to configure any specific JVM settings, or click **Next** to run the server with the default JVM settings.

    The **Review** screen is displayed.

12. Review the installation configuration.

    If you need to make any modifications, use the **Previous** button.

13. To display the commands that will be launched for this installation, select Show Command from the drop down menu.

    These commands are saved in a log file, in the logs folder. You can use these commands to run additional installations with similar deployment options later.

14. Click **Finish** to complete the installation.

    When the installation is complete, you can use the `dsconfig` command to modify the installation. See Managing the Server Configuration Using dsconfig in *Administering Oracle Unified Directory*.

4.2.3 Configuring Simple Distribution

You can deploy a proxy server in a simple distribution topology to scale your directory by splitting your data across multiple servers.

To configure simple distribution:

1. When you have installed the software, change to the `OUD_HOME` subdirectory.

   On UNIX and Linux systems:

   ```
   $ cd OUD-base-location/$OUD_HOME
   ```

   On Windows systems:

   ```
   C:\> cd OUD-base-location\$OUD_HOME
   ```

2. Ensure that your `JAVA_HOME` environment variable is set to a supported JVM installation (at least Java 1.6).

3. Run the `oud-proxy-setup` command to configure the proxy server installation.

   On UNIX and Linux systems:

   ```
   $ oud-proxy-setup
   ```

   On Windows systems:

   ```
   C:\> oud-proxy-setup.bat
   ```

   The utility launches the graphical installer and creates the Oracle Unified Directory proxy instance in `OUD-base-location/instance-dir`.

   The default instance directory name is `asinst_1`, with subsequent instances on the same server named `asinst_2`, `asinst_3`, and so on. To specify a different instance name, set the `INSTANCE_NAME` environment variable before you run the setup, for example:

   ```
   $ export INSTANCE_NAME=my-oud-proxy-instance
   ```

> **Note:**
>
> The instance is created directly under OUD-base-location by default. However, Oracle strongly recommends that you create your Oracle Unified Directory instance *outside* of the Oracle home directory.

To change the instance path, include the path relative to OUD-base-location when you set the INSTANCE_NAME variable. For example:

```
$ export INSTANCE_NAME=../../local/my-oud-proxy-instance
```

4. On the Welcome panel, click **Next**.

5. On the Server Settings screen, enter the following information:

   • **Host Name**: Enter the proxy server's host name or IP address.

   The default is the local host name.

   • **LDAP Listener Port**: Enter the LDAP port for the proxy server.

   The default port that is proposed is the first available port that ends with **389**. On UNIX and Linux systems, if you run the installer as a non-root user, the default is 1389, if available.

   • **LDAP Secure Access**: To configure SSL, StartTLS, or both, click **Configure**.

   Complete the following information:

   a. **SSL Access**: Select Enable SSL and enter a valid port for secure LDAP operations.

   The default secure port that is proposed is the first available port that ends with `636`. On UNIX and Linux systems, if you run the installer as a non-root user, the default is `1636`, if available.

   b. **StartTLS Access**: Click **Enable StartTLS** for **LDAP**.

   c. **Certificate**: If you are in a testing environment, select **Generate Self-Signed Certificate**.

   For production servers, click **Use an Existing Certificate**, and then click the **Keystore Type**. Enter the Keystore Path, and Keystore PIN if necessary.

   d. Click **OK**.

   • **Administration Port**: Enter the port that will be used for administration traffic.

   The default administration port is `4444`. See Managing Administration Traffic to the Server in *Administering Oracle Unified Directory*.

   • **Root User DN**: Enter the Root User DN, or keep the default, `cn=Directory Manager`.

   • **Password**: Enter the root user bind password.

   • **Password (confirm)**: Retype the root user bind password.

   • Click **Next**.

6. In the Deployment Options panel, select Use distribution on a partitioned data set from the Configuration Option drop-down menu.

   If you select **Configure later**, only the server settings that you specified in the previous step are configured. You must then use the `dsconfig` command or the Oracle Unified Directory Services Manager interface to configure your deployment.

7. Drag the sliding arrow to specify the number of partitions on which the data is separated.

   For the example distribution scenario, select two partitions.

   Click **Next**.

8. Define how the data will be partitioned across the LDAP servers.

   a. Select the Partitioning Algorithm from the drop-down list.

      For information about the various partitioning algorithms and distribution using the proxy, see Overview of Load Balancing Using the Proxy in *Administering Oracle Unified Directory*.

   b. Enter the naming context.

      For example, `dc=example,dc=com`.

   c. Enter the distribution base DN.

      For example, `ou=people`. The distribution base DN is the level after which the distribution requests apply.

   d. If you have selected a Lexico or Numeric algorithm, enter the distribution attribute.

      For example,`uid`.

9. Depending on the distribution algorithm, define the partition capacities, DN patterns, or boundaries for each partition.

   If you use the Set Default button, the installation wizard sets defaults that might not correspond to your deployment. This feature can, however, be useful for testing purposes.

   a. For capacity, set the maximum number of entries for each partition.

      For example, if you set maximum entries to `1000`, only `1000` Add requests will be sent to the LDAP server associated with that partition. If you set maximum entries to `1000` for partition `1` and `2000` for partition `2`, the proxy will send twice the number of requests to partition `2`.

      > **✎ Note:**
      >
      > If you select the capacity algorithm, you **must** create a global index, as described in the next step.

   b. For DN pattern, set the DN pattern string for each partition.

      For example, `cn=[a].*` means that requests with a `uid` that starts with `a` will be sent to partition 1. See About DN Pattern String Syntax in *Administering Oracle Unified Directory*.

   c. For lexico, set the alphabetic boundaries for each partition.

      For example, for partition 1, `From=A, To=K`. Then, `uids` with values between A and K will be sent to partition 1.

   d. For numeric, set numeric boundaries for each partition.

      For example, for partition 1, `From=0, To=1000`. Then, `uids` between 0 and 1000 will be sent to partition 1.

> **Note:**
>
> The upper boundary is exclusive. That is, if you set the upper boundary to 1000, only entries up to 999 will be distributed to that partition.
>
> If you leave one of the boundaries blank, this will be considered as `unlimited`. In other words, if you set the lower boundary to 1000 and the upper boundary to blank, the partition will include everything after 1000.

Click **Next**.

10. Configure the global index.

    a. Select **Enable Global Indexes**.

    If you have selected a capacity algorithm, this option will already be selected because Global indexes are **mandatory** for the capacity algorithm.

    b. Add attributes to be indexed:

    - Select Index the DNs if you want the DNs included in the global index.

    - Select Index other attributes if you want attributes other than the DNs included.

    - Select attributes from the Available Attributes list and click Add to include those attributes in the global index.

      All available attributes are listed. Choose only those attributes that contain unique values.

      If necessary, use the `split-ldif` command to divide LDIF files into files containing the expected data for global indexes. See Configuring Global Indexes Using the Command Line in *Administering Oracle Unified Directory*.

    The installation wizard creates a global index catalog, named `gi-catalog` by default, and populates the global index catalog with global indexes of the selected attributes. All global indexes are associated with the same global index catalog (`gi-catalog`). The installation wizard also creates a global index replication administrator with the same password as the directory manager.

    See Configuring Global Indexes Using the Command Line in *Administering Oracle Unified Directory*.

11. For each partition, select the remote LDAP server that holds the corresponding partitioned data.

> **Note:**
>
> If you add two servers for one partition, you must configure load balancing between these servers. This use case is explained in the example Configuring Distribution with Load Balancing.

    a. If your remote LDAP servers are Oracle Unified Directory servers or Oracle Directory Server Enterprise Edition servers, click Add Oracle Servers.

    For Oracle Unified Directory servers:

    i. Select **Connect to a replicated Oracle Unified Directory server**.

    ii. Enter the host name, administration port, administration bind DN, and password for the remote Oracle Unified Directory server.

    iii. Click **Connect**.

    iv. Accept the certificate.

    Check the servers that should be part of the load balanced topology.

    When you have entered the details of one directory server in a replicated topology, the setup wizard displays all other replicated servers in that topology.

    v. Click **OK**.

For Oracle Directory Server Enterprise Edition servers:

    i. Select **Connect to a DSCC registry**.

    ii. Enter the DSCC host name, DSCC port, protocol, and the Directory Service Manager credentials for the DSCC registry.

    iii. Check the servers that should be part of the load balanced topology.

    The setup wizard displays all the Oracle Directory Server Enterprise Edition server instances that are registered in the DSCC registry.

    iv. Click **OK**.

b. If your remote LDAP servers are not Oracle Unified Directory servers or Oracle Directory Server Enterprise Edition servers, click Add Server.

    i. Enter the server name, port and security settings.

    The security settings that you set here determine the security between the Oracle Unified Directory proxy and remote LDAP servers. See Configuring Security Between the Proxy and the Data Source in *Administering Oracle Unified Directory*.

    ii. Click **Add**.

    iii. Click **Close** when you have added all the remote LDAP servers for the distributed topology.

12. On the Runtime options panel, click Change to configure any specific JVM setting, or click Next to run the server with the default JVM settings.

13. Review the installation configuration.

If you need to make any modifications, use the Previous button.

14. To display the commands that will be launched for this installation, select Show Command from the drop down menu.

These commands are saved in a log file, in the logs folder. You can use these commands to run additional installations with similar deployment options later.

15. Click **Finish** to complete the installation.

When the installation is complete, you can use the `dsconfig` command to modify the installation. See Managing the Server Configuration Using dsconfig in *Administering Oracle Unified Directory*.

4.2.4 Configuring Distribution with Load Balancing

You can deploy a proxy server in a distribution with load balancing configuration to split the data into partitions. You can also replicate the data on the remote LDAP servers.

To configure distribution with load balancing:

1. When you have installed the software, change to the `OUD_HOME` subdirectory.

   On UNIX and Linux systems:

   ```
   $ cd OUD-base-location/$OUD_HOME
   ```

   On Windows systems:

   ```
   C:\> cd OUD-base-location\$OUD_HOME
   ```

2. Ensure that your `JAVA_HOME` environment variable is set to a supported JVM installation (at least Java 1.6).

3. Run the `oud-proxy-setup` command to configure the proxy server installation.

   On UNIX and Linux systems:

   ```
   $ oud-proxy-setup
   ```

   On Windows systems:

   ```
   C:\> oud-proxy-setup.bat
   ```

   The utility launches the graphical installer and creates the Oracle Unified Directory proxy instance in `OUD-base-location/instance-dir`.

   The default instance directory name is `asinst_1`, with subsequent instances on the same server named `asinst_2`, `asinst_3`, and so on. To specify a different instance name, set the `INSTANCE_NAME` environment variable before you run the setup, for example:

   ```
   $ export INSTANCE_NAME=my-oud-proxy-instance
   ```

   > **Note:**
   >
   > The instance is created directly under OUD-base-location by default. However, Oracle strongly recommends that you create your Oracle Unified Directory instance *outside* of the Oracle home directory.

   To change the instance path, include the path relative to OUD-base-location when you set the INSTANCE_NAME variable. For example:

   ```
   $ export INSTANCE_NAME=../../local/my-oud-proxy-instance
   ```

4. On the Welcome panel, click **Next**.

5. On the Server Settings panel, enter the following information:

   • **Host Name**: Enter the proxy server's host name or IP address.

   The default is the local host name.

   • **LDAP Listener Port**: Enter the LDAP port for the proxy server.

   The default port that is proposed is the first available port that ends with `389`. On UNIX and Linux systems, if you run the installer as a non-root user, the default is `1389`, if available.

   • **LDAP Secure Access**: To configure SSL, StartTLS, or both, click **Configure**.

   Complete the following information:

   a. **SSL Access**: Select Enable SSL and enter a valid port for secure LDAP operations.

The default secure port that is proposed is the first available port that ends with `636`. On UNIX and Linux systems, if you run the installer as a non-root user, the default is `1636`, if available.

    b. **StartTLS Access**: Click **Enable StartTLS for LDAP**.

    c. **Certificate**: If you are in a testing environment, select Generate Self-Signed Certificate.

       For production servers, click **Use an Existing Certificate**, and then select the Keystore Type. Enter the Keystore Path, and Keystore PIN if necessary.

    d. Click **OK**.

- **Administration Port**: Enter the port that will be used for administration traffic.

  The default administration port is `4444`. See Managing Administration Traffic to the Server in *Administering Oracle Unified Directory*.

- **Root User DN**: Enter the Root User DN, or keep the default, `cn=Directory Manager`.

- **Password**: Enter the root user bind password.

- **Password (confirm)**: Retype the root user bind password.

Click **Next** to continue.

The **Deployment Options** screen is displayed.

6. Select **Use distribution on a partitioned data set** from the Configuration Option drop-down menu.

   If you select **Configure later**, only the server settings that you specified in the previous step are configured. You must then use the `dsconfig` command or the Oracle Unified Directory Services Manager interface to configure your deployment.

7. Drag the sliding arrow to specify the number of partitions on which the data is separated.

   For the example distribution scenario, select two partitions.

   Click **Next**.

8. Define how the data will be partitioned across the LDAP servers.

   a. Select the Partitioning Algorithm from the drop-down list.

      For information about the various partitioning algorithms for the proxy, see Overview of Data Distribution Using the Proxy in *Administering Oracle Unified Directory*.

   b. Enter the naming context.

      For example, `dc=example,dc=com`.

   c. Enter the distribution base DN.

      For example, `ou=people`. The distribution base DN is the level after which the distribution requests apply.

   d. If you have selected a Lexico or Numeric algorithm, enter the distribution attribute.

      For example,`uid`.

9. Depending on the distribution algorithm, define the partition capacities, DN patterns, or boundaries for each partition.

   If you use the Set Default button, the installation wizard sets defaults, that might not correspond to your deployment. This feature can, however, be useful for testing purposes.

   a. For capacity, set the maximum number of entries for each partition.

For example, if you set maximum entries to `1000`, only `1000` Add requests will be sent to the LDAP server associated with that partition. If you set maximum entries to `1000` for partition `1` and `2000` for partition `2`, the proxy will send twice the number of requests to partition `2`.

If you select the capacity algorithm, you must create a global index, as described in the next step.

b. For DN pattern, set the DN pattern string for each partition.

For example, `cn=[a].*` means that requests with a `uid` that starts with `a` will be sent to partition 1. See About DN Pattern String Syntax in *Administering Oracle Unified Directory*.

c. For lexico, set the alphabetic boundaries for each partition.

For example, for partition 1, `From=A, To=K`. Then, `uids` with values between A and K will be sent to partition 1.

d. For numeric, set numeric boundaries for each partition.

For example, for partition 1, `From=0, To=1000`. Then, `uids` between 0 and 1000 will be sent to partition 1.

The upper boundary is exclusive. That is, if you set the upper boundary to 1000, only entries up to 999 will be distributed to that partition.

If you leave one of the boundaries blank, this will be considered as `unlimited`. In other words, if you set the lower boundary to 1000 and the upper boundary to blank, the partition will include everything after 1000.

Click **Next**.

10. Configure the global index.

a. Select **Enable Global Indexes**.

If you have selected a capacity algorithm, this option will already be selected because Global indexes are **mandatory** for the capacity algorithm.

b. Add attributes to be indexed:

i. Select Index the DNs if you want the DNs included in the global index.

ii. Select Index other attributes if you want attributes other than the DNs included.

iii. Select attributes from the Available Attributes list and click Add to include those attributes in the global index.

All available attributes are listed. Choose only those attributes that contain unique values.

If necessary, use the `split-ldif` command to divide LDIF files into files containing the expected data for global indexes. See Creating a Global Index Catalog Containing Global Indexes in *Administering Oracle Unified Directory*.

The installation wizard creates a global index catalog, named `gi-catalog` by default, and populates the global index catalog with global indexes of the selected attributes. All global indexes are associated with the same global index catalog (`gi-catalog`). The installation wizard also creates a global index replication administrator with the same password as the directory manager.

See Configuring Global Indexes Using the Command Line in *Administering Oracle Unified Directory*.

11. For each partition, select the remote LDAP server that holds the corresponding partitioned data.

You must select at least two remote LDAP servers per partition to deploy distribution with load balancing.

a. If your remote LDAP servers are Oracle Unified Directory servers or Oracle Directory Server Enterprise Edition servers, click Add Oracle Servers.

For Oracle Unified Directory servers:

i. Select **Connect to a replicated Oracle Unified Directory server**.

ii. Enter the host name, administration port, administration bind DN, and password for the remote Oracle Unified Directory server.

iii. Click **Connect**.

iv. Accept the certificate.

v. Check the servers that should be part of the load balanced topology.

When you have entered the details of one directory server in a replicated topology, the setup wizard displays all other replicated servers in that topology.

vi. Click **OK**.

For Oracle Directory Server Enterprise Edition servers:

i. Select **Connect to a DSCC registry**.

ii. Enter the DSCC host name, DSCC port, protocol, and the Directory Service Manager credentials for the DSCC registry.

iii. Check the servers that should be part of the load balanced topology.

The setup wizard displays all the Oracle Directory Server Enterprise Edition server instances that are registered in the DSCC registry.

iv. Click **OK**.

b. If your remote LDAP servers are not Oracle Unified Directory servers or Oracle Directory Server Enterprise Edition servers, click Add Server.

i. Enter the server name, port and security settings.

The security settings you set here will determine the security between the Oracle Unified Directory proxy and remote LDAP servers. See Configuring Security Between the Proxy and the Data Source in *Administering Oracle Unified Directory*.

ii. Click **Add**.

iii. Click **Close** when you have added all the remote LDAP servers for the distributed topology.

12. For each partition, set load balancing.

a. Choose the load balancing algorithm.

For example, select **Proportional with default values**.

b. Set the load balancing algorithm properties or select Default Values.

When you have completed the installation, the properties can be modified. See Modifying Load Balancing Properties in *Administering Oracle Unified Directory*.

• For proportional load balancing, set the weight. Requests are distributed between the remote LDAP servers based on the weight indicated.

For example, if you leave the default value of `1`, all servers will receive the same number of requests.

- For failover, indicate the order in which the servers are used.

  The server with a value of `1` will be the main server. The other servers will only be used if there is a failure on the server with a priority of `1`.

- For saturation, set the order in which the servers are used and the saturation threshold of each server.

  Requests are sent to the server with the highest priority (1) until it reaches the threshold indicated. The saturation threshold is the rate at which the server is considered saturated, or full. Typically this limit should be set lower than 100%.

- For optimal, no additional configuration is required.

  The active server is selected based on the saturation index, which is calculated automatically.

13. On the Runtime options panel, click **Change** to configure any specific JVM setting, or click **Next** to run the server with the default JVM settings.

    See Configuring the Java Run-Time Settings During the Server Setup.

    The **Review** screen is displayed.

14. Review the installation configuration.

    If you need to make any modifications, use the **Previous** button.

15. To display the commands that will be launched for this installation, select **Show Command** from the drop down menu.

    These commands are saved in a log file, in the logs folder. You can use these commands to run additional installations with similar deployment options later.

16. Click **Finish** to complete the installation.

When the installation is complete, you can use the `dsconfig` command to modify the installation. See Managing the Server Configuration Using dsconfig in *Administering Oracle Unified Directory*.

4.2.5 Enterprise User Security (EUS) Configuration

You can deploy a proxy server in an Enterprise User Security configuration to store the configuration details locally in the Oracle Unified Directory directory server and the enterprise users or group details in the remote external LDAP directory.

After you have installed the Oracle Unified Directory software, as described in Installing the Oracle Unified Directory Software, you can configure the proxy instance to use Enterprise User Security (EUS).

For the configuration procedure, see Configuring Oracle Unified Proxy to Work with an External LDAP Directory and Enterprise User Security in *Administering Oracle Unified Directory*.

4.3 Set Up the Proxy Using the Command-Line (CLI)

The interactive command-line setup prompts you for the first steps of an Oracle Unified Directory proxy installation. For example, running the `oud-proxy-setup` or `oud-proxy-setup.bat` script in command-line mode defines the proxy host name, proxy port, and security configuration.

To complete the deployment and to configure the proxy instance using `dsconfig` or Oracle Unified Directory Services Manager, see Configuring Proxy, Distribution, and Virtualization Functionality in *Administering Oracle Unified Directory*.

You can also use a common properties file to provide default values for options. For more information about using a properties file with server commands, see Using a Properties File With Server Commands in *Administering Oracle Unified Directory*.

4.3.1 Setting Up the Proxy Using the CLI

If you have previously used the graphical wizard to set up the proxy, you can copy the commands that are launched by the wizard before completing the installation. The commands displayed by the install wizard are a good starting point for scripting an installation.

See Duplicating an Oracle Unified Directory Proxy Installation.

To set up a proxy using the CLI:

1. After you have installed the Oracle Unified Directory software, change to the `OUD_HOME` subdirectory.

   On UNIX and Linux systems:

   ```
   $ cd OUD-base-location/$OUD_HOME
   ```

   On Widows systems:

   ```
   C:\> cd OUD-base-location\$OUD_HOME
   ```

2. Ensure that your `JAVA_HOME` environment variable is set to a supported JVM installation (JDK 17).

3. Enter the `oud-proxy-setup` command with the `--cli` option, specifying the server details as follows:

   On UNIX and Linux systems:

   ```
   $ oud-proxy-setup --cli -p 1389 --adminConnectorPort 4444 -D
   "cn=Directory Manager" -j pwd-file
   ```

   On Windows systems:

   ```
   C:\> oud-proxy-setup.bat -cli -p 1389  --adminConnectorPort 4444 -D
   "cn=Directory Manager" -j pwd-file
   ```

   In these examples, `-p` specifies the proxy LDAP port used to send data between the client and the proxy, `--adminConnectorPort` specifies the proxy administration port, `-D` specifies the bind DN, and `-j` specifies the file containing the proxy LDAP bind password.

   The `oud-proxy-setup` command launches the setup script and creates the Oracle Unified Directory proxy instance in `OUD-base-location/instance-dir`.

   The default instance directory is `asinst_1`, with subsequent instances on the same server named `asinst_2`, `asinst_3`, and so on. To specify a different instance name, set the `INSTANCE_NAME` environment variable before you run the script. For example:

   ```
   $ export INSTANCE_NAME=my-oud-proxy-instance
   ```

ORACLE

> **Note:**
>
> The instance is created directly under OUD-base-location by default. However, Oracle strongly recommends that you create your Oracle Unified Directory instance *outside* of the Oracle home directory.

To change the instance path, include the path relative to `OUD-base-location` when you set the INSTANCE_NAME variable. For example:

```
$ export INSTANCE_NAME=../../local/my-oud-proxy-instance
```

> **Note:**
>
> To configure Enterprise User Security (EUS) in CLI mode, specify the following option when you run the setup script:
>
> ```
> oud-proxy-setup --eusContext namingContext
> ```
>
> For example:
>
> ```
> $ oud-proxy-setup --eusContext dc=example,dc=com
> ```

4. To complete the proxy deployment, you must configure workflow elements, workflows, network group, and other required components.

   These components depend on your deployment architecture. For examples based on supported use cases, see Configuring Proxy, Distribution, and Virtualization Deployments in *Administering Oracle Unified Directory*.

4.4 Duplicating an Oracle Unified Directory Proxy Installation

You must duplicate your Oracle Unified Directory proxy installation to set up a replicated Oracle Unified Directory proxy. You can either use the graphical user interface or the installation log file to duplicate a proxy installation.

- Duplicating a Proxy Installation Using the GUI
- Duplicating a Proxy Installation Using the Installation Log File

4.4.1 Duplicating a Proxy Installation Using the GUI

If you are using the graphical install wizard to set up Oracle Unified Directory proxy, you can copy the commands that are launched by the wizard before completing the installation. The commands displayed by the install wizard are a good starting point for scripting an installation.

To duplicate a proxy installation:

1. Using the graphical install wizard, define the proxy installation but do not click Finish.

2. On the Review page, select the Show Commands button from the top right.

3. Copy the commands that are displayed.

4. Paste them into a text file.

   You can now complete your first installation by clicking Finish.

5. Edit the commands to modify the port, the host name, and the password.

   Replace the generic *asinst* variable with the appropriate instance name, either by anticipating the instance name, or by setting the `INSTANCE_NAME` variable. You might also need to quote certain arguments, depending on your shell scripting language.

6. Save the updated file as a script.

7. On the system where you want to host the next Oracle Unified Directory proxy instance, install the Oracle Unified Directory software, as described in Installing the Oracle Unified Directory Software.

8. Change to the `OUD_HOME` subdirectory.

   On UNIX and Linux systems:

   ```
   $ cd OUD-base-location/$OUD_HOME
   ```

   On Windows systems:

   ```
   C:\> cd OUD-base-location\$OUD_HOME
   ```

9. Run the script that you saved in Step 5.

4.4.2 Duplicating a Proxy Installation Using the Installation Log File

When you have completed a proxy installation, a log file named `oud-setup` saves the commands of the installation. You can use this file to duplicate an Oracle Unified Directory proxy instance.

To duplicate a proxy installation:

1. Change to the logs directory.

   ```
   $ cd OUD-base-location/instance-name/OUD/logs
   ```

2. Open the file `oud-setup`.

3. Edit the commands to modify the port, the host name, and the password file of the new proxy instance.

   Replace the generic *asinst* variable with the appropriate instance name, either by anticipating the instance name, or by setting the `INSTANCE_NAME` variable. You might also need to quote certain arguments, depending on your shell scripting language.

4. Save the updated file as a script.

5. On the system where you want to host the next Oracle Unified Directory proxy instance, install the Oracle Unified Directory software, as described in Installing the Oracle Unified Directory Software.

6. Change to the `OUD_HOME` subdirectory.

   On UNIX and Linux systems:

   ```
   $ cd OUD-base-location/$OUD_HOME
   ```

   On Windows systems:

   ```
   C:\> cd OUD-base-location\$OUD_HOME
   ```

7. Run the script that you saved in Step 4.

4.5 Manage Redundancy for Oracle Unified Directory

You can make the proxy server redundant to avoid a single point of failure in your deployment. Use multiple replicated proxy server instances to ensure redundancy.

See Multiple Replicated Proxies in *Administering Oracle Unified Directory*.

4.6 Setting Up the Proxy Server Using the WebLogic Scripting Tool

You can use the WebLogic Scripting Tool (WLST) to set up the proxy server. Execute the `oud_createInstance` with the `oud-proxy-setup` script to set up a proxy instance using the WLST.

To set up a proxy instance using the WLST:

1. Set the `PRODUCT_HOME` and `DOMAIN_HOME` environment variables before launching WLST.

   ```
   export PRODUCT_HOME=/scratch/user/middleware/oracle_home
   export DOMAIN_HOME=/scratch/user/middleware/oracle_home/user_projects/domains/
   base_domain
   ```

   `PRODUCT_HOME` is similar to `ORACLE_HOME`. It points to the directory where a user provides at the time of product installation. However, `DOMAIN_HOME` points to the directory where domains that you configure are created.

2. Launch the WLST:

   On UNIX and Linux systems:

   ```
   $ ORACLE_HOME/oracle_common/common/bin/wlst.sh
   ```

   On Windows systems:

   ```
   C:\> ORACLE_HOME\oracle_common\common\bin\wlst.cmd
   ```

   `ORACLE_HOME` is the Oracle home directory you specified at installation.

3. Execute the `oud_createInstance` command with script name `oud-proxy-setup` to create the OUD Server instance.

   ```
   oud_createInstance(scriptName='oud-proxy-
   setup',instanceName='oud_proxy',hostname='localhost',ldapPort=1393,
   rootUserDN='cn=Directory\ Manager',rootUserPasswordFile='/scratch/user/work/
   password.txt',adminConnectorPort=2444)
   ```

   `scriptName` indicates the setup script based on the flavor of OUD. The value for this parameter can be any one from [`oud-setup`, `oud-proxy-setup`, `oud-replication-gateway-setup`].

   `instanceName` indicates the name of the instance. For example, `oud_proxy`.

> **✎ Note:**
>
> Arguments that cannot have a value like `noPropertiesFile` and so on, can also be used with the custom WLST commands. You must pass an empty value for these arguments. For example, `noPropertiesFile=''`.

See oud-proxy-setup in *Administering Oracle Unified Directory* for the rest of the parameters and their descriptions.

Output:

```
Successfully wrote the updated Directory Server configuration
The server is now installed but not started. You can start the server using the
"start-ds" command
Successfully created OUD instance
```

5

Setting Up Oracle Unified Directory as a Replication Gateway

The replication gateway enables replication between Oracle Directory Server Enterprise Edition and Oracle Unified Directory. Its main purpose is to facilitate migration from an Oracle Directory Server Enterprise Edition deployment. You can use either the graphical user interface or the command-line utility to set up an Oracle Unified Directory replication gateway.

Topics:

5.1 Before You Set Up the Replication Gateway

Review these conditions before you set up a replication gateway instance.

Note the following:

- The Oracle Unified Directory servers in the topology must be configured so that inconsistencies between the Oracle Directory Server Enterprise Edition configuration and the Oracle Unified Directory configuration are taken into account.

  Run the `ds2oud` command to configure the Oracle Unified Directory directory servers to coexist with Oracle Directory Server Enterprise Edition servers in a replicated topology. See Replicating Between Oracle Directory Server Enterprise Edition and Oracle Unified Directory in *Administering Oracle Unified Directory*.

- The Oracle Directory Server Enterprise Edition servers that will be connected to the replication gateway must be configured for replication and must be master replicas.

  Replication *must* be enabled in Oracle Directory Server Enterprise Edition on the suffix that will be replicated. This is the case even if there is only one Oracle Directory Server Enterprise Edition server in the topology.

- The replication gateway setup attempts to contact the Oracle Unified Directory server and the Oracle Directory Server Enterprise Edition server. These servers must therefore be up and running.

5.2 Setting Up the Replication Gateway Using the Graphical User Interface (GUI)

The GUI setup uses a Java-based graphical installer that enables you to set up and configure the replication gateway.

> **Note:**
>
> The OUD instance creation GUI wizard is deprecated in Oracle Unified Directory 12c (12.2.1.4.0). Oracle recommends use of the command-line (CLI) to create an instance. See Setting Up the Replication Gateway Using the Command-Line Interface (CLI).

To set up a replication gateway server instance using the graphical user interface:

1. When you have installed the software, change to the `OUD_HOME` subdirectory.

   On UNIX and Linux systems:

   ```
   $ cd OUD-base-location/$OUD_HOME
   ```

   On Windows systems:

   ```
   C:\> cd OUD-base-location/$OUD_HOME
   ```

2. Ensure that your `JAVA_HOME` environment variable is set to a supported JVM installation (at least Java 1.8).

3. Run the `oud-replication-gateway-setup` command to configure the replication gateway installation.

   On UNIX and Linux systems:

   ```
   $ oud-replication-gateway-setup
   ```

   On Windows systems:

   ```
   C:\> oud-replication-gateway-setup.bat
   ```

   The utility launches the graphical installer and creates the replication gateway instance in `OUD-base-location/instance-dir`.

   The default instance directory name is `asinst_1`, with subsequent instances on the same server named `asinst_2`, `asinst_3`, and so on. To specify a different instance name, set the `INSTANCE_NAME` environment variable before you run the setup, for example:

   ```
   $ export INSTANCE_NAME=my-oud-instance
   ```

   > **Note:**
   >
   > The instance is created directly under OUD-base-location by default. However, Oracle strongly recommends that you create your Oracle Unified Directory instance *outside* of the Oracle home directory.

4. On the Welcome screen, click **Next**.

A confirmation message is displayed, requesting you to confirm that you have configured the Oracle Unified Directory directory servers to coexist with Oracle Directory Server Enterprise Edition servers in a replicated topology. If you have done this configuration, click **Yes**. If you have not, click **No**, exit the installer, and run the `ds2oud` command to perform the required configuration before you install the replication gateway.

See Replicating Between Oracle Directory Server Enterprise Edition and Oracle Unified Directory in *Administering Oracle Unified Directory*.

The **Replication Gateway Administration** screen is displayed.

5. Enter the following information:

   • **Host Name**: Enter the host name or IP address for this replication gateway instance.

      The default is the local host name.

   • **Administration Connector Port**: Enter the port that will be used for administration traffic.

      The default administration port is `4444`. See Managing Administration Traffic to the Server in *Administering Oracle Unified Directory*.

   • **Root User DN**: Enter the Root User DN, or keep the default, `cn=Directory Manager`.

   • **Password**: Enter the root user bind password.

   • **Password (confirm)**: Retype the root user bind password.

   Click **Next**.

   The **ODSEE Server Settings** screen is displayed.

6. Enter the following information:

   • **Host Name**: Enter the ODSEE directory server's host name or IP address.

      The default is the local host name.

   • **Port**: Enter the LDAP port for the ODSEE directory server.

   • **Bind DN**: Enter the Bind DN that will be used to access the Oracle Directory Server Enterprise Edition server, or keep the default, `cn=Directory Manager`.

   • **Password**: Enter the bind password.

   • If the Oracle Unified Directory servers are read-only servers, uncheck the first check box. Otherwise, leave it checked.

   • To secure the traffic between the gateway and the Oracle Directory Server Enterprise Edition server:

      a. Check the **Use SSL** between ODSEE and Replication Gateway check box.

      b. Ensure that the port you specified above is the secure port of the Oracle Directory Server Enterprise Edition server.

      c. Check the **Use Client Authentication** check box and click **Change** to configure the certificate.

         If you have selected this check box, then it indicates that you want to use secured communication between Oracle Unified Directory and ODSEE (vice versa). For secure communication, the certificate based authentication mechanism used during replication from ODSEE to Oracle Unified Directory further depends on the SASL and certificate mapper configuration.

> ✎ **Note:**
>
> Observe the following points from ODSEE configuration point of view. Make sure that the configuration has been done before proceeding with the replication gateway setup.
>
> – Ensure that the certificate is exchanged properly if there are more than one ODSEE instances.
>
> – Ensure replication agreements are enabled with the help of SSL port.
>
> – Modify `certmap.conf` present in the <ODSEE INST>/alise with correct details according to your certificate.
>
>   This file indicates how certificate is mapped to the LDAP entry. Also modify "`cn=replication manager, cn=replication, cn=config`" and add binary format of the certificate.
>
> Observe the following points from Oracle Unified Directory configuration point of view. Make sure that the following configuration is performed after the replication gateway setup is done.
>
> – Setup the Replication gateway.
>
>   After gateway installation is done, follow the displayed post commands. Some of them are explained below.
>
> – Export the replication gateway certificate and add it to the respective ODSEE instance which must be replicated.
>
> – Modify DN "`cn=replication manager, cn=replication, cn=config`" with `usercertifcate` attribute which contains the ODSEE instance certificate in binary form.

   If you do not want certificate based authentication process, leave the check box unchecked and proceed with the gateway replication.

- To set up replication monitoring with registration into the ODSEE Directory Service Control Center Registry, provide the following information:

  a. Check the **Enable DSCC monitoring between ODSEE and Replication Gateway** box.

  b. **DSCC Directory Service Manager:** Enter the Directory Service Manager username.

  c. **DSCC Directory Service Manager Password:** Enter the password for the Directory Service Manager.

  d. **DSCC Registry Host Name:** Enter the host name or IP address for the DSCC Registry host.

  e. **DSCC Registry Port:** Enter the port number for the DSCC Registry host.

- Click **Next.**

The **Review Replication Setting** screen is displayed.

7. Review the ODSEE replication setup and click **Next**.

The **Port for ODSEE Replication** screen is displayed.

8. Enter the port on the replication gateway instance that will be used for Oracle Directory Server Enterprise Edition replication updates.

9. Click **Next**.

   The **Oracle Unified Directory Server Settings** screen is displayed.

10. Enter the following information:

    • **Host Name**: Enter the directory server's host name or IP address.

      The default is the local host name.

    • **Administration Connector Port**: Enter the port that is used for administration traffic.

      The default administration port is `4444`. See Managing Administration Traffic to the Server in *Administering Oracle Unified Directory*.

    • **Global Administrator User ID**: Enter the name of the global administrator that has been defined to manage replication on the Oracle Unified Directory instance.

      If no global administrator has been defined, enter the root user bind DN.

    • Enter the password of the Global Administrator.

    Click **Next**.

11. Accept the certificates.

12. If the Oracle Unified Directory server was not previously configured for replication, perform the following steps:

    • Enter the replication port number for this directory server.

    • Provide a UID and password for the new global administrator.

13. Review the replication settings and click **Next**.

    The **Replicated Base DNs** screen is displayed.

14. Select the suffixes that will be replicated between the Oracle Directory Server Enterprise Edition servers and the Oracle Unified Directory servers.

15. On the Review screen, verify the final topology and click **Finish** to complete the installation.

    The Show Summary menu item in the drop down list displays a textual summary of the resulting topology.

    The Show Topology menu item displays a graphical summary of the topology, and can be useful for obtaining a physical idea of the resulting topology.

    The Show Equivalent Command Line menu item displays all of the commands that are executed in configuring the replication gateway. This item also provides information about the next steps that are required to start replication between the two servers. See Replicating Between Oracle Directory Server Enterprise Edition and Oracle Unified Directory in *Administering Oracle Unified Directory*.

16. Click **Finish** to complete the setup.

17. Execute the following command in ODSEE server host for the replication to be successful.

```
dsadm export \
        -f opends-export \
        <DSEE Instance1> \
        <Base DN> \
        {exportedLDIFPath}
```

Where {exportedLDIFPath} is the path of the resulting LDIF file containing the replicated data.

18. Execute the following commands in Oracle Unified Directory server for the replication to be successful.

  • Execute `dsreplication pre-external-initialization` command.

```
asinst/OUD/bin/dsreplication pre-external-initialization \
          --hostname <OUD hostname> \
          --port <OUD Admin port> \
          --adminUID <Provide Admin UID> \
          --adminPasswordFile <Password file> \
          --baseDN <Base DN> \
          --trustAll \
          --no-prompt \
          --noPropertiesFile
```

  • Execute `import-ldif` command. Copy the LDIF file generated in the first step in a directory accessible by the Oracle Unified Directory servers and run the following command for every Oracle Unified Directory server that contains data to be replicated:

```
asinst/OUD/bin/import-ldif \
          --hostname <OUD Hostname> \
          --port <OUD Admin port> \
          --bindDN <Bind DN> \
          --bindPasswordFile <Password file> \
          --includeBranch <Base DN> \
          --ldifFile {exportedLDIFPath} \
          --clearBackend \
          --trustAll \
          --noPropertiesFile
```

  • Execute `dsreplication post-external-initialization` command.

```
asinst/OUD/bin/dsreplication post-external-initialization \
          --hostname <OUD Hostname> \
          --port <OUD Admin Port> \
          --adminUID <Provide Admin UID> \
          --adminPasswordFile <Password file> \
          --baseDN <Base DN> \
          --trustAll \
          --no-prompt \
          --noPropertiesFile
```

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5.3 Setting Up the Replication Gateway Using the Command-Line Interface (CLI)

The command-line setup is either interactive or non-interactive. The non-interactive setup enables you to configure the server without user intervention. The interactive setup prompts you for any required information before the configuration begins.

> **Note:**
>
> The command-line setup is complex and is recommended for scripting purposes only. Oracle recommends that you use the GUI to set up the replication gateway.

To set up the replication gateway using the command line:

```
$ oud-replication-gateway-setup --cli
```

> **Note:**
>
> The instance is created directly under OUD-base-location by default. However, Oracle strongly recommends that you create your Oracle Unified Directory instance *outside* of the Oracle home directory.

In interactive command-line mode, you are prompted to provide the required configuration details, for example:

```
$ oud-replication-gateway-setup --cli
OUD Instance location successfully created - /local/OUD_BASE/Oracle_OUD1/../asinst_4
The migration utility ds2oud must be run to configure the OUD servers before
setting up the replication gateway.
If you have executed ds2oud type 'yes' to continue, type 'no' otherwise. (yes
/ no) [yes]: yes

Oracle Unified Directory 11.1.2.1.0
Please wait while the replication gateway setup program initializes ..... Done.

======================================================================
Replication gateway administration settings
======================================================================

You must provide the fully-qualified name of the host where the replication
gateway will be installed.  The ODSEE server and Oracle Unified Directory
servers in the replication topology must be able to access this host name
[server1]:

What would you like to use as the initial root user DN for the replication
gateway? [cn=Directory Manager]:
```

To facilitate scripting, you can also set up the replication gateway in non-interactive mode, by using the `--no-prompt` option. The following example shows a typical replication gateway setup in non-interactive mode:

```
$ oud-replication-gateway-setup --cli --hostname localhost \
  --adminConnectorPort 4444 --replicationPortForLegacy 2389 \
  --rootUserDN "cn=Directory Manager" --rootUserPasswordFile pwd-file \
  --baseDN dc=example,dc=com --hostNameLegacy ODSEE-host \
  --portLegacy 1389 --doNotUpdateTrustStoreWithLegacyCertsArg \
  --bindDNLegacy "cn=Directory Manager" --bindPasswordFileLegacy pwd-file \
  --hostNameNg OUD-host --portNg 4444 --adminUID admin \
  --adminPasswordFile pwd-file --trustAll --no-prompt \
  --noPropertiesFile --doNotMonitorUsingDsccLegacy
```

The following example shows a typical replication gateway setup in non-interactive mode with registration into the ODSEE Directory Service Control Center Registry. This configuration is useful when you want to monitor replicated changes using the ODSEE monitoring interface.

```
$ oud-replication-gateway-setup --cli --hostname localhost \
  --adminConnectorPort 4444 --replicationPortForLegacy 2389 \
  --rootUserDN "cn=Directory Manager" --rootUserPasswordFile pwd-file \
  --baseDN dc=example,dc=com --hostNameLegacy ODSEE-host \
  --portLegacy 1389 --doNotUpdateTrustStoreWithLegacyCertsArg \
  --bindDNLegacy "cn=Directory Manager" --bindPasswordFileLegacy pwd-file \
  --hostNameNg OUD-host --portNg 4444 --adminUID admin \
  --adminPasswordFile pwd-file --trustAll --no-prompt --noPropertiesFile \
  --dsccHostLegacy  gnb10492 --dsccPortLegacy 3998 --dsccAdminUidLegacy admin \
  --dsccPasswordFileLegacy pwd-file
```

See oud-replication-gateway-setup in *Administering Oracle Unified Directory*.

5.4 Verifying the Replication Gateway Setup

To verify that the replication gateway has been set up and is working correctly, add an entry on the Oracle Unified Directory server. Verify that the newly added entry has been successfully replicated to the Oracle Directory Server Enterprise Edition server.

The following example adds a user entry on the Oracle Unified Directory server:

```
$ ldapmodify -a -h oud-host -p 1389 -D "cn=directory manager" -j pwd-file
dn: uid=bjensen,ou=People,dc=example,dc=com
objectclass: top
objectclass: person
objectclass: organizationalPerson
objectclass: inetorgPerson
uid: bjensen
givenName: Barbara
sn: Jensen
cn: Babs Jensen
telephoneNumber: (408) 555-3922
facsimileTelephoneNumber: (408) 555-4000
mail: bjensen@example.com
userPassword: secret

Processing ADD request for uid=bjensen,ou=People,dc=example,dc=com
ADD operation successful for DN uid=bjensen,ou=People,dc=example,dc=com
```

The following example searches for that user entry on the Oracle Directory Server Enterprise Edition server:

```
$ ldapsearch -h odsee-host -p 1389 -D "cn=directory manager" -j pwd-file -b
"ou=people,dc=example,dc=com" ("uid=bjensen")

version: 1
```

```
dn: uid=bjensen, ou=People, dc=example,dc=com
cn: Barbara Jensen
cn: Babs Jensen
sn: Jensen
givenName: Barbara
objectClass: top
objectClass: person
objectClass: organizationalPerson
objectClass: inetOrgPerson
ou: Product Development
ou: People
l: Cupertino
uid: bjensen
mail: bjensen@example.com
telephoneNumber: +1 408 555 1862
facsimileTelephoneNumber: +1 408 555 1992
roomNumber: 0209
userPassword: {SSHA}rDLnCHlFRhyAcBM7GZpby0MrwfxzTlIEdG7WYA==
```

5.5 Setting Up the Replication Gateway Using the WebLogic Scripting Tool

You can use the WebLogic Scripting Tool (WLST) to set up the replication gateway server. Execute the `oud_createInstance` with the `oud-replication-gateway-setup` script to set up a replication gateway server instance using the WLST.

Before you set up a replication gateway instance, the following must be in place:

- The Oracle Unified Directory servers in the topology must be configured so that inconsistencies between the Oracle Directory Server Enterprise Edition configuration and the Oracle Unified Directory configuration are taken into account. See Replicating Between Oracle Directory Server Enterprise Edition and Oracle Unified Directory in *Administering Oracle Unified Directory*.

  Run the `ds2oud` command to configure the Oracle Unified Directory directory servers to coexist with Oracle Directory Server Enterprise Edition servers in a replicated topology. See ds2oud in *Administering Oracle Unified Directory*.

- The Oracle Directory Server Enterprise Edition servers that will be connected to the replication gateway must be configured for replication and must be master replicas.

  Replication must be enabled in Oracle Directory Server Enterprise Edition on the suffix that will be replicated. This is the case even if there is only one Oracle Directory Server Enterprise Edition server in the topology.

- The replication gateway setup attempts to contact the Oracle Unified Directory server and the Oracle Directory Server Enterprise Edition server. These servers must therefore be up and running.

To set up a replication gateway server instance using the WLST:

1. Set the `PRODUCT_HOME` and `DOMAIN_HOME` environment variables before launching WLST.

   ```
   export PRODUCT_HOME=/scratch/user/middleware/oracle_home
   export DOMAIN_HOME=/scratch/user/middleware/oracle_home/user_projects/domains/
   base_domain
   ```

   `PRODUCT_HOME` is similar to `ORACLE_HOME`. It points to the directory where a user provides at the time of product installation. However, `DOMAIN_HOME` points to the directory where domains that you configure are created.

2. Launch the WLST:

   On UNIX and Linux systems:

   ```
   $ ORACLE_HOME/oracle_common/common/bin/wlst.sh
   ```

   On Windows systems:

   ```
   C:\> ORACLE_HOME\oracle_common\common\bin\wlst.cmd
   ```

   `ORACLE_HOME` is the Oracle home directory you specified at installation.

3. Execute the `oud_createInstance` command with script name `oud-replication-gateway-setup` to create the replication gateway instance.

   ```
   oud_createInstance(scriptName='oud-replication-gateway-
   setup',instanceName='oud_repl',hostname='localhost',
   adminConnectorPort=7444,replicationPortForLegacy=2989,rootUserDN='cn=Directory\
   Manager',
   rootUserPasswordFile='/scratch/user/work/
   password.txt',baseDN='dc=example,dc=com',hostNameLegacy='localhost',portLegacy=4389,
   bindDNLegacy='cn=Directory\ Manager',bindPasswordFileLegacy='/scratch/user/work/
   password.txt',
   adminPasswordFile='/scratch/user/work/
   password.txt',hostNameNg='localhost',portNg=4444,bindDNNg='cn=Directory\ Manager',
   bindPasswordFileNg='/scratch/user/work/
   password.txt',dsccHostLegacy='localhost',dsccPortLegacy=3998,dsccAdminUidLegacy='admi
   n',
   dsccPasswordFileLegacy='/scratch/user/work/password.txt',trustAll='')
   ```

   `scriptName` indicates the setup script based on the flavor of OUD. The value for this parameter can be any one from [`oud-setup`, `oud-proxy-setup`, `oud-replication-gateway-setup`].

   `instanceName` indicates the name of the instance. For example, `oud_repl`.

   > **✎ Note:**
   >
   > Arguments that cannot have a value like `trustAll`, `noPropertiesFile`, and so on, can also be used with the custom WLST commands. You must pass an empty value for these arguments. For example, `trustAll=''` or `noPropertiesFile=''`.

   Gateway instance is created between Oracle Directory Server Enterprise Edition (ODSEE) and Oracle Unified Directory instances. Hence, you must also provide the Oracle Directory Server Enterprise Edition server options while creating a gateway instance.

   See oud-replication-gateway-setup in *Administering Oracle Unified Directory* for the rest of the parameters and their descriptions.

   Output:

   ```
   Initializing basic replication gateway configuration ..... Done.
   The replication gateway will be started now temporarily to be configured
   Starting Replication Gateway ....... Done.
   Updating Registration Information ..... Done.
   Configuring Oracle Unified Directory server localhost:4444 ..... Done.
   Initializing Registration Information ..... Done.
   Configuring Replication Gateway ..... Done.
   Configuring ODSEE server localhost:4389 ..... Done.
   ```

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```
Stopping Replication Gateway ............... Done.

The replication gateway setup has completed successfully
Successfully created OUD instance
```

6

Upgrading the Oracle Unified Directory Software

You can upgrade an Oracle Unified Directory to the latest version without a service interruption. It also describes how to upgrade an individual directory server instance and Oracle Unified Directory Services Manager.

Topics:

- About Starting Points for an Oracle Unified Directory Upgrade
- Prerequisites for Oracle Unified Directory Upgrade
- Upgrading a Directory Server Without Service Interruption
- Upgrading an Existing Oracle Unified Directory Server Instance
- Upgrading Oracle Unified Directory Services Manager
- What to Do If the Upgrade Process Fails

6.1 About Starting Points for an Oracle Unified Directory Upgrade

In this release, Oracle Unified Directory 12c (12.2.1.4.0) can be upgraded to 14c (14.1.2.1.0) release. The upgrade procedures in this guide explain how to upgrade an existing Oracle Unified Directory 12c (12.2.1.4.0) to Oracle Unified Directory 14c (14.1.2.1.0).

6.2 Prerequisites for Oracle Unified Directory Upgrade

Before you begin to upgrade Oracle Unified Directory 12*c* (12.2.1.4.0), you must stop the servers and back up your current environment.

You must complete the following prerequisites for upgrading to the Oracle Unified Directory 14*c* (14.1.2.1.0) environment:

> **✎ Note:**
>
> This applies only to collocated installations and does not apply to standalone OUD 14.1.2.1.0 installations.
>
> - Apply the ADF patch (search for Bug ID 37376076 at https://support.oracle.com) manually using OPatch to the OUD 14.1.2.1.0 `ORACLE_HOME` before performing the reconfiguration step.
>
> - Apply the one-off EM patch (search for Bug ID 37476292 at https://support.oracle.com) manually using OPatch to the OUD 14.1.2.1.0 `ORACLE_HOME` before performing the reconfiguration step.

1. Stop all the Directory Server instances and domains where Oracle Unified Directory Services Manager (OUDSM) is installed, depending upon the domain configuration.

Stop the Standalone Oracle Unified Directory Server

If you have installed Oracle Unified Directory in a Standalone Oracle Unified Directory Server (Managed independently of WebLogic server) mode, stop all the Directory Server instances using the `stop-ds` command.

Unix

```
ORACLE_HOME/INSTANCE_NAME/OUD/bin/stop-ds
```

Windows

```
ORACLE_HOME\INSTANCE_NAME\OUD\bat\stop-ds.bat
```

Stop the Collocated Oracle Unified Directory Server

If you have installed Oracle Unified Directory in a Collocated Oracle Unified Directory Server (Managed through WebLogic server) mode, complete the following steps:

a. Stop the OUD instance by running the following command from command line interface.
Unix

```
DOMAIN_HOME/bin/stopComponent.sh INSTANCE_NAME
```

Windows

```
DOMAIN_HOME\bin\stopComponent.bat INSTANCE_NAME
```

b. Stop the node manager.
Unix

```
DOMAIN_HOME/bin/stopNodeManager.sh
```

Windows

```
DOMAIN_HOME\bin\stopNodeManager.cmd
```

c. Stop the Oracle WebLogic Administration Server.
Unix

```
DOMAIN_HOME/bin/stopWebLogic.sh
```

Windows

```
DOMAIN_HOME\bin\stopWebLogic.cmd
```

2. Create a complete backup of your pre-upgrade environment before you begin an upgrade.

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> **✎ Note:**
>
> Oracle recommends that you create a complete backup of your pre-upgrade environment before you begin an upgrade. Upgrades cannot be reversed. In most cases, if an error occurs, you must stop the upgrade and restore the entire environment from backup and begin the upgrade process from the beginning.

a. Back up the Oracle Home (`ORACLE_HOME`). For example:

   Unix

   ```
   tar -cf oracle_home_backup_06052017.tar ORACLE_HOME/*
   ```

   Windows

   ```
   jar cMf oracle_home_backup_06052017.jar ORACLE_HOME\*
   ```

b. If your Oracle Unified Directory instance (`OUD_INSTANCE`) resides outside the Oracle Home (`ORACLE_HOME`), then you must back up the instance directory. For example:

   Unix

   ```
   tar -cf oud_instance_backup_06052017.tar oud_instance/*
   ```

   Windows

   ```
   jar cMf oracle_home_backup_06052017.jar ORACLE_HOME\*
   ```

c. If your Java Development Kit (JDK) resides inside the Oracle Home (`ORACLE_HOME`), then you must move it to another location before you perform an upgrade.

6.3 Upgrading a Directory Server Without Service Interruption

Upgrading a replicated Oracle Unified Directory topology involves upgrading the software for each server instance individually. The strategy for maintaining service during an upgrade depends on the specifics of your deployment, but usually, you can upgrade an entire topology without any interruption in service.

Because a particular directory server instance must be stopped during the upgrade process, maintaining service during an upgrade requires alternative servers that can handle client requests while a particular server is down.

If your deployment includes one or more proxy server instances that route client requests to the back-end servers, you can safely take down one directory server at a time and upgrade that server instance. The proxy server will reroute client requests to ensure uninterrupted service. Upgrading the proxy server instance requires more than one proxy server instance with the same configuration.

If your deployment does not include a proxy server, you must configure your client applications to send requests to an alternative server while a specific directory server instance is being upgraded.

The following sections outline the steps to follow for each of these topologies:

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- Upgrading a Topology That Includes a Proxy Server
- Upgrading a Topology That Does Not Include a Proxy Server

6.3.1 Upgrading a Topology That Includes a Proxy Server

Review these topics for the various topologies with the directory servers and replication servers either installed on the same host or different hosts.

Various topologies are possible as explained in the following topics:

- About Topology with the Replication Servers and Directory Servers on the Same Host.
- Upgrading a Topology with the Replication Servers and Directory Servers on the Same Host
- About Topology with Replication Servers and Directory Servers on Different Hosts.
- Upgrading a Topology with Replication Servers and Directory Servers on Different Hosts

6.3.1.1 About Topology with the Replication Servers and Directory Servers on the Same Host

In this topology, the directory servers and replication servers are installed on the same host.

If a single host contains both a replication server and a directory server, and those servers are associated with the same `ORACLE_HOME` directory, the servers are stopped and upgraded at the same time.

In the following figure, Group 1 and Group 2 refer to configured replication groups. For more information about replication groups, see About Replication Groups in *Administering Oracle Unified Directory*.

Figure 6-1   Replicated Topology with Proxy Servers - RS and DS on the Same Host
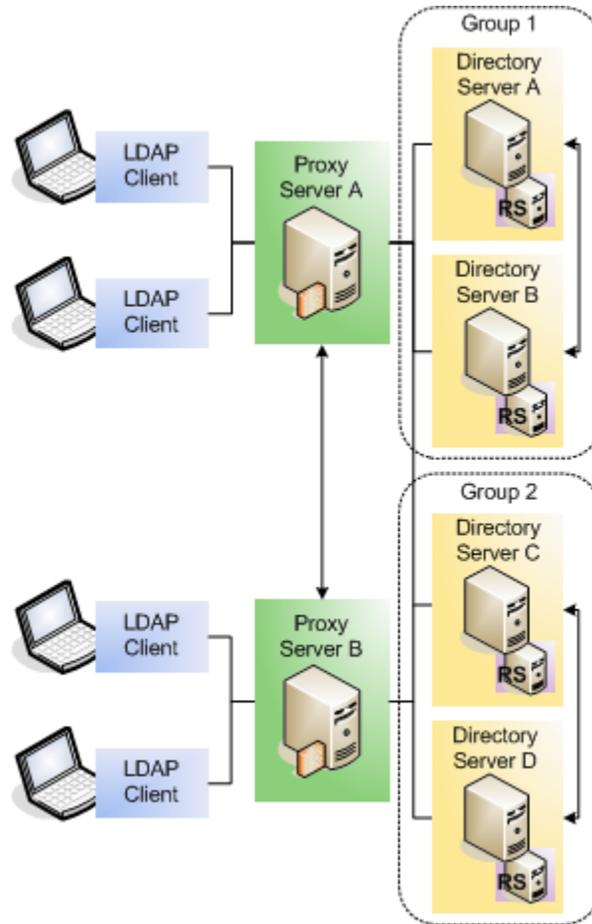
6.3.1.2 Upgrading a Topology with the Replication Servers and Directory Servers on the Same Host

To upgrade a topology with the directory servers and replication servers installed on the same host:

1. Change the configuration of proxy server A so that client requests are not routed to directory server A.

2. Stop directory server A. The replication server running on this host is stopped at the same time.

3. Upgrade directory server A, following the steps in Upgrading an Existing Oracle Unified Directory Server Instance.

4. Restart directory server A.

5. Test that your directory server is working properly before upgrading successive servers.

6. Repeat steps 1-5 for each directory server in that replication group.

7. Follow steps 1-6 for each replication group in the topology.

8. Stop proxy server A.

9. Upgrade proxy server A, following the steps in Upgrading an Existing Oracle Unified Directory Server Instance.

10. Restart proxy server A.

11. Repeat steps 8-10 for the remaining proxy servers in the topology.

6.3.1.3 About Topology with Replication Servers and Directory Servers on Different Hosts

In this topology, the directory servers and replication servers are installed on different hosts. In the following figure, Group 1 and Group 2 refer to configured replication groups. For more information about replication groups, see About Replication Groups in *Administering Oracle Unified Directory*.

Figure 6-2   Replicated Topology with Proxy Servers - RS and DS on Different Hosts

6.3.1.4 Upgrading a Topology with Replication Servers and Directory Servers on Different Hosts

To upgrade a topology with the directory servers and replication servers installed on different hosts:

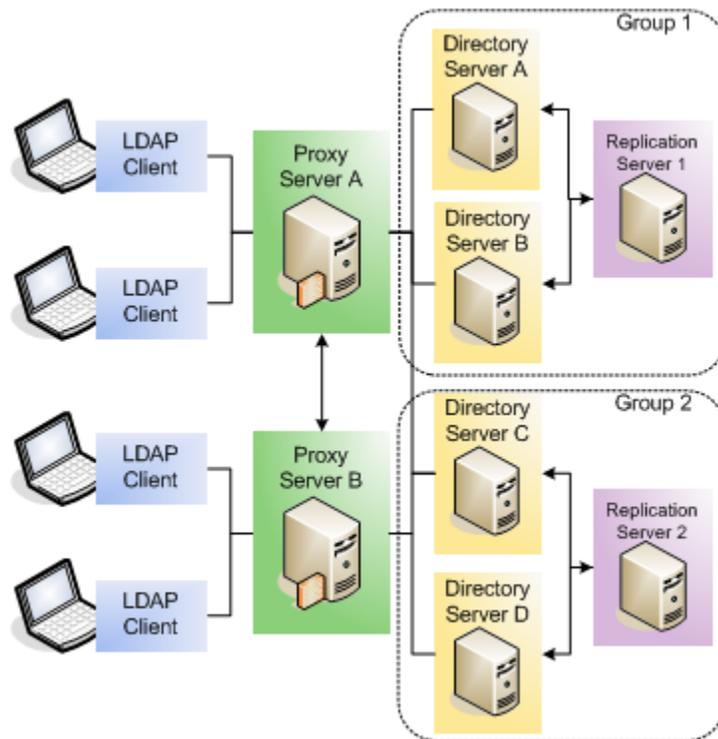1. Change the configuration of proxy server A so that requests are not routed to directory server A.

2. Stop directory server A.

3. Upgrade directory server A, following the steps in Upgrading an Existing Oracle Unified Directory Server Instance.

4. Restart directory server A.

5. Test that your directory server is working properly before upgrading successive servers.

6. Repeat steps 1-5 for each directory server in that replication group.

7. Stop replication server 1.

   The replication mechanism ensures that directory servers A and B now connect to replication server 2.

8. Upgrade replication server 1, following the steps in Upgrading an Existing Oracle Unified Directory Server Instance.

9. Restart replication server 1.

10. Follow steps 1-9 for each replication group in the topology.

11. Stop proxy server A.

12. Upgrade proxy server A, following the steps in Upgrading an Existing Oracle Unified Directory Server Instance.

13. Restart proxy server A.

14. Repeat steps 11-13 for the remaining proxy servers in the topology.

6.3.2 Upgrading a Topology That Does Not Include a Proxy Server

In a topology that does not include any proxy server instances, you must upgrade your client applications so that they point to an alternative directory server each time you take a directory server down for an upgrade.

The following diagram shows a replicated topology that does not include a proxy server. This topology assumes that the directory servers and replication servers are installed on the same `ORACLE_HOME` directory.

In this diagram, Group 1 and Group 2 refer to configured replication groups. See About Replication Groups in *Administering Oracle Unified Directory*.

Figure 6-3   Replicated Oracle Unified Directory Topology Without Proxy Servers
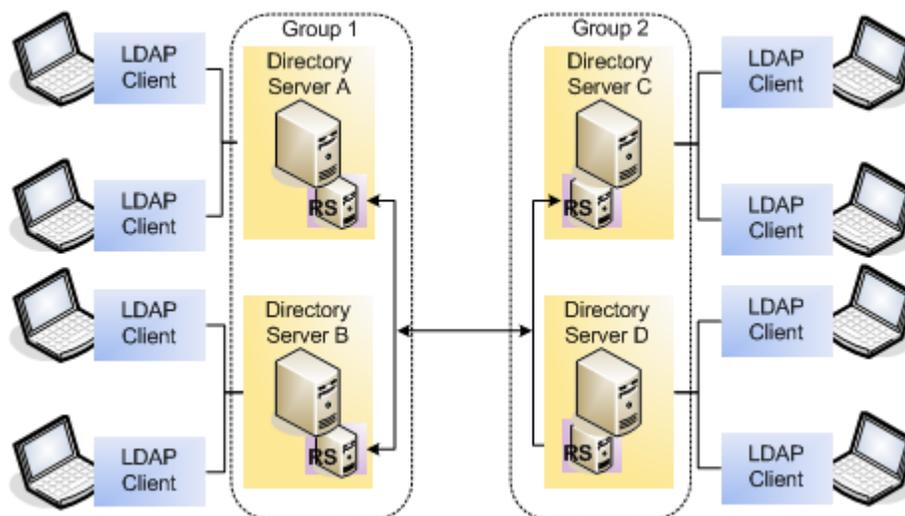
To upgrade a topology that does not include a proxy server:

1. Change your client application configuration so that applications do not access directory server A directly.

2. Stop directory server A. The replication server on this host is stopped and upgraded at the same time.

3. Upgrade directory server A, following the steps in Upgrading an Existing Oracle Unified Directory Server Instance.

4. Restart directory server A.

5. Test that your directory server is working properly before upgrading successive servers.

6. Change your client application configuration so that applications do not access directory server B directly.

7. Stop directory server B.

8. Upgrade directory server B, following the steps in Upgrading an Existing Oracle Unified Directory Server Instance.

9. Follow steps 1-8 for each replication group in the topology.

6.4 Upgrading an Existing Oracle Unified Directory Server Instance

You can upgrade all Oracle Unified Directory server instances that are associated with a specific `ORACLE_HOME` directory.

> **Note:**
>
> - If your Instance Home or Domain Home contains both OUD and OUDSM, you must review both Upgrading an Existing Oracle Unified Directory Server Instance and Upgrading Oracle Unified Directory Services Manager.
>
> - It is mandatory that you create your Oracle Unified Directory instance and Oracle Unified Directory Services Manager domain *outside* of the Oracle Home directory.

To upgrade an existing Oracle Unified Directory server instance:

1. Ensure that you have completed the steps described in Prerequisites for Oracle Unified Directory Upgrade.

2. Uninstall Product Distributions.

    a. Uninstall Oracle Unified Directory.

       See Removing the Oracle Unified Directory Software.

    b. Uninstall Oracle Fusion Middleware Infrastructure.

       See Uninstalling Oracle Fusion Middleware Infrastructure.

3. Install Oracle Unified Directory 14c (14.1.2.1.0).

    a. Download the latest Oracle Unified Directory version from the Oracle Software Delivery Cloud.

       See Obtaining Product Distributions.

b. Navigate to the directory where you downloaded the 14c (14.1.2.1.0) product distribution.

c. Install Oracle Unified Directory 14c (14.1.2.1.0).

Your Oracle Unified Directory 14c (14.1.2.1.0) installation depends on your existing 12c (12.2.1.4.0) installation. If your existing installation is a standalone configuration, then you must install Oracle Unified Directory 14c (14.1.2.1.0) in a standalone mode. Similarly, if you have installed a collocated configuration in 12c (12.2.1.4.0), then you must install Oracle Unified Directory 14c (14.1.2.1.0) in a collocated mode. See Installing Oracle Unified Directory.

4. Before you start the OUD server, you must upgrade all files having references to old JDK location.

a. Upgrade the JDK location in an existing Domain Home.

You'll likely be required to upgrade the location of JDK in the following files:

- (UNIX) `DOMAIN_HOME/bin/setNMJavaHome.sh`

  (Windows) `DOMAIN_HOME\bin\setNMJavaHome.cmd`

- (UNIX) `DOMAIN_HOME/nodemanager/nodemanager.properties`

  (Windows) `DOMAIN_HOME\nodemanager\nodemanager.properties`

- (UNIX) `DOMAIN_HOME/bin/setDomainEnv.sh`

  (Windows) `DOMAIN_HOME\bin\setDomainEnv.cmd`

b. Upgrade the JDK Location in an existing OUD Instance Home.

You'll likely be required to upgrade the location of JDK in the following files:

> **Note:**
>
> During the upgrade from 12c (12.2.1.4.0) to 14c (14.1.2.1.0), ensure that the JDK location is set correctly to JDK 17 Home, excluding the JRE folder location. For instance: `default.java-home=<JDK 17 HOME>`, which could be `default.java-home=/opt/14c_installs/jdk-17.0.13`.

- (UNIX) `OUD/config/java.properties`

  (Windows) `OUD\config\java.properties`

5. Run the following command from Oracle Unified Directory 14c `ORACLE_HOME` to upgrade the OUD 12c (12.2.1.4.0) server instance.

```
./upgrade-oud-instances --instancePath oud-base-location/12cPS4INSTANCE_NAME
```

> **Note:**
>
> The OUD 12c (12.2.1.4.0) instance path must be provided as an argument to this command.

6. Run the `--upgrade` command to upgrade the OUD (12.2.1.4.0) server instance.

- (UNIX) `$ instance-dir/OUD/bin/start-ds --upgrade`

- (Windows) `instance-dir\OUD\bat\start-ds.bat --upgrade`

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> **⚠ Caution:**
>
> If the server instance has large static groups or many total members in all static groups, upgrading the instance to 14c (14.1.2.1.0) can take some time. Therefore, avoid ending the upgrade (such as using `Ctrl-C` to end the process) before it is finished. Ending the upgrade early can leave the server instance in an undetermined state.

The output of the `start-ds --upgrade` command is logged in the `INSTANCE_PATH/logs/server.out` directory.

7. Restart the server instances that you stopped in Step 1.

   - (UNIX) `$` *instance-dir*`/OUD/bin/start-ds`

   - (Windows) *instance-dir*`\OUD\bat\start-ds.bat`

> **✎ Note:**
>
> **In case the upgrade scenario is different from the one described above**.
>
> Note that the `ORACLE_HOME` for 12c (12.2.1.4.0) is different from the Oracle Home for 14c (14.1.2.1.0). So if you want to retain the `ORACLE_HOME` directory for 12c (12.2.1.4.0), you can run the `upgrade-oud-instance` script from the Oracle 12c (12.2.1.4.0) home. This script upgrades the install path of each instance to point to the new Oracle 14c Home.
>
> (UNIX) `$` *Oracle12cPS4Home*`/oud/bin/upgrade-oud-instances --`
> `instancePath=`*oud-base-location/12cPS3INSTANCE_NAME*
>
> (Windows) *Oracle12cPS4Home*`\oud\bat\upgrade-oud-instances.bat --`
> `instancePath=`*oud-base-location/12cPS3INSTANCE_NAME*
>
> - You must set the JAVA_HOME environment variable to Java 8 before executing the script.
>
> - The script takes the backup of the modified files (`install.path`, `set-java-home`, `java.properties`) in their respective directories.
>
> - The list of instances that are successfully upgraded is displayed in the console. However, those failed instances are available in the following logs.
>
>   On UNIX and Linux systems:
>
>   Main log: `/tmp/preUpgradeActions-<timestamp>.log`
>
>   Instance log: `instance-dir/OUD/logs/preUpgradeActions-<timestamp>.log`
>
>   On Windows systems:
>
>   Main log: `<Temp_dir>\preUpgradeActions-<timestamp>.log`
>
>   Instance log: `instance-dir\OUD\logs\preUpgradeActions-<timestamp>.log`

6.4.1 Enabling SCIM and Data REST APIs for an Upgraded 14.1.2.1.0 OUD Instance

You can enable the SCIM and Data REST APIs for upgraded 14.1.2.1.0 OUD instances to perform the REST API operations.

OUD exposes SCIM/Data REST interface through the HTTP and HTTPS connection handlers. You can enable these handlers either during an OUD instance set up or through `dsconfig` for an existing instance.

However, if during the OUD instance set up the LDAPS port is not configured, then you would not be able to set up the HTTPS port. In this scenario, you need to ensure that the configurations for `cn=JKS,cn=Key Manager Providers,cn=config` and `cn=JKS,cn=Trust Manager Providers,cn=config` are enabled, which in turn requires you to create keystore and truststore.

Enabling SCIM/Data REST for an Upgraded 14.1.2.1.0 OUD Instance with LDAPS Not Configured

While setting up the OUD instance if you have not configured the LDAPS port, then perform the following steps to enable support for SCIM/ Data REST API:

1. Create keystore to configure `cn=JKS,cn=Key Manager Providers,cn=config`. See Using JKS Key Manager Provider in *Administering Oracle Unified Directory*.

2. Create truststore to configure `cn=JKS,cn=Trust Manager Providers,cn=config`. See Using the JKS Trust Manager Provider in *Administering Oracle Unified Directory*.

3. Run the following `dsconfig` commands to enable `cn=JKS,cn=Key Manager Providers,cn=config` and `cn=JKS,cn=Trust Manager Providers,cn=config` configurations:

```
dsconfig set-key-manager-provider-prop \
--provider-name "JKS" \
--set enabled:true \
--set "key-store-type:JKS" \
--set "key-store-file:config/jks-keystore" \
--set "key-store-pin-file:config/jks-keystore.pin" \
--hostname localhost \
--port 1444 \
--portProtocol LDAP \
--bindDN "cn=Directory Manager" \
--bindPasswordFile /home/oracle/pwd.txt \
--no-prompt


dsconfig set-trust-manager-provider-prop \
--provider-name "JKS" \
--set enabled:true \
--set "trust-store-type:JKS" \
--set "trust-store-file:config/jks-truststore" \
--hostname localhost \
--port 1444 \
--portProtocol LDAP \
--bindDN "cn=Directory Manager" \
```

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```
--bindPasswordFile /home/oracle/pwd.txt \
--no-prompt
```

4. Run the `dsconfig` command-line utility with `create-connection-handler` subcommand as follows to create the connection handlers:
   Setting Up HTTP Port:

```
dsconfig create-connection-handler \
--handler-name "HTTP Connection Handler" \
--type http \
--set enabled:true \
--set listen-port:1080 \
--hostname localhost \
--port 1444 \
--portProtocol LDAP \
--bindDN "cn=Directory Manager" \
--bindPasswordFile /home/oracle/pwd.txt \
--no-prompt
```

Setting Up HTTPS Port:

```
dsconfig create-connection-handler \
--handler-name "HTTPS Connection Handler" \
--type http \
--set enabled:true \
--set listen-port:1081 \
--set use-ssl:true \
--set trust-manager-provider:JKS \
--set key-manager-provider:JKS \
--hostname localhost \
--port 1444 \
--portProtocol LDAP \
--bindDN "cn=Directory Manager" \
--bindPasswordFile /home/oracle/pwd.txt \
--no-prompt
```

5. Configure the REST endpoints as follows:

   a. Enable the `Token Generator` endpoint.

```
dsconfig set-end-point-prop \
--point-name 'Token Generator' \
--set enabled:true \
--hostname localhost \
--port 1444 \
--portProtocol LDAP \
--trustAll \
--bindDN "cn=Directory Manager" \
--bindPasswordFile /home/oracle/pwd.txt \
--no-prompt
```

   b. Enable the `REST Server` extension.

```
dsconfig set-extension-prop \
--Extension-name 'REST Server' \
```

```
--set enabled:true \
--hostname localhost \
--port 1444 \
--portProtocol LDAP \
--trustAll \
--bindDN "cn=Directory Manager" \
--bindPasswordFile /home/oracle/pwd.txt \
--no-prompt
```

c. Enable the directory endpoint.

```
dsconfig set-directory-end-point-prop \
--set enabled:true \
--hostname localhost \
--port 1444 \
--portProtocol LDAP \
--trustAll \
--bindDN "cn=Directory Manager" \
--bindPasswordFile /home/oracle/pwd.txt \
--no-prompt
```

6. Restart the OUD instance.

Enabling SCIM/Data REST for an Upgraded 14.1.2.1.0 OUD Instance with LDAPS Configured

While setting up the OUD instance if you have configured the LDAPS port, then run the `dsconfig` command-line utility to configure the connection handlers to expose the SCIM/Data REST interface.

1. Run the `dsconfig` command-line utility with `create-connection-handler` subcommand as follows to create the connection handlers:
Setting Up HTTP Port:

```
dsconfig create-connection-handler \
--handler-name "HTTP Connection Handler" \
--type http \
--set enabled:true \
--set listen-port:1080 \
--hostname localhost \
--port 1444 \
--portProtocol LDAP \
--bindDN "cn=Directory Manager" \
--bindPasswordFile /home/oracle/pwd.txt \
--no-prompt
```

Setting Up HTTPS Port:

```
dsconfig create-connection-handler \
--handler-name "HTTPS Connection Handler" \
--type http \
--set enabled:true \
--set listen-port:1081 \
--set use-ssl:true \
--set trust-manager-provider:JKS \
--set key-manager-provider:JKS \
```

```
--hostname localhost \
--port 1444 \
--portProtocol LDAP \
--bindDN "cn=Directory Manager" \
--bindPasswordFile /home/oracle/pwd.txt \
--no-prompt
```

2. Configure the REST endpoints as follows:

   a. Enable the `Token Generator` endpoint.

```
dsconfig set-end-point-prop \
--point-name 'Token Generator' \
--set enabled:true \
--hostname localhost \
--port 1444 \
--portProtocol LDAP \
--trustAll \
--bindDN "cn=Directory Manager" \
--bindPasswordFile /home/oracle/pwd.txt \
--no-prompt
```

   b. Enable the `REST Server` extension.

```
dsconfig set-extension-prop \
--Extension-name 'REST Server' \
--set enabled:true \
--hostname localhost \
--port 1444 \
--portProtocol LDAP \
--trustAll \
--bindDN "cn=Directory Manager" \
--bindPasswordFile /home/oracle/pwd.txt \
--no-prompt
```

   c. Enable the directory endpoint.

```
dsconfig set-directory-end-point-prop \
--set enabled:true \
--hostname localhost \
--port 1444 \
--portProtocol LDAP \
--trustAll \
--bindDN "cn=Directory Manager" \
--bindPasswordFile /home/oracle/pwd.txt \
--no-prompt
```

3. Restart the OUD instance.

6.4.2 Verifying the Oracle Unified Directory Server Instance Upgrade

After completing all the upgrade steps, verify that the upgrade was successful by checking that the Oracle Unified Directory Server version has been properly upgraded.

To verify the version of the Oracle Unified Directory Server instance, run the `start-ds` command.

```
$OUD_INSTANCE_HOME/OUD/bin/start-ds -s | grep 'Oracle Unified Directory'
```

The following shows an example of the result after running the command:

```
Oracle Unified Directory 14.1.2.1.0
```

Verify that the upgraded version matches the latest version number for that Oracle Unified Directory Server.

6.5 Upgrading Oracle Unified Directory Services Manager

Consider these topics if you run Oracle Unified Directory Services Manager on Oracle WebLogic Server to manage Oracle Unified Directory.

> **Note:**
>
> If your Instance Home or Domain Home contains both OUD and OUDSM, you must review both Upgrading an Existing Oracle Unified Directory Server Instance and Upgrading Oracle Unified Directory Services Manager.

- OUDSM Version Requirements
- Stopping the Administration Server
- Creating a Complete Backup
- Uninstalling the 12*c* (12.2.1.4.0) Product Distributions
- Installing the 14*c* (14.1.2.1.0) Product Distributions
- Reconfiguring the 14c (14.1.2.1.0) Product Distributions
- Starting the Administration Server
- Verifying the OUDSM Upgrade

6.5.1 OUDSM Version Requirements

The version of Oracle Unified Directory Services Manager (OUDSM) described in this guide is 14c (14.1.2.1.0). When you upgrade the Oracle Unified Directory software to 14c (14.1.2.1.0), OUDSM is also upgraded to this release.

> **Note:**
>
> The 14c (14.1.2.1.0) OUDSM upgrade is supported only for expanded domains and not for compact domains. To determine if a domain is compact, check the following file: `DOMAIN_HOME/init-info/config-groups.xml`.
> Locate the following tag:
>
> ```
> <config-groups topology-profile="Compact" xmlns="http://
> xmlns.oracle.com/weblogic/config-groups">
> ```
>
> If the tag specifies `Compact` as shown above, then you cannot upgrade the domain.

Several requirements for using OUDSM with Oracle Unified Directory include:

- You can use OUDSM 14c (14.1.2.1.0) to manage only Oracle Unified Directory 14c (14.1.2.1.0).
- You cannot use OUDSM 14c (14.1.2.1.0) to manage previous versions of Oracle Unified Directory, Oracle Internet Directory, or Oracle Virtual Directory. Similarly, you cannot use versions of OUDSM shipped with Oracle Internet Directory or Oracle Virtual Directory to manage any versions of Oracle Unified Directory.

> **Note:**
>
> After you upgrade Oracle Unified Directory, you might encounter problems while trying to access the upgraded version of OUDSM on your browser. This problem usually occurs if you used your browser to access an earlier version of OUDSM.
>
> Therefore, to access the upgraded version of OUDSM, first clear your browser's cache and cookies.

6.5.1.1 Upgrading Multiple Instances of OUDSM

If you have multiple instances of OUDSM in your replication topology, consider the following requirements:

- If you upgrade one OUDSM instance to 14c (14.1.2.1.0), you must upgrade all OUDSM and replicated instances.
- If you upgrade OUDSM to 14c (14.1.2.1.0), Oracle Unified Directory must be the same version. An upgraded OUDSM version is not supported with earlier versions of Oracle Unified Directory.

6.5.2 Stopping the Administration Server

You must stop the Administration Server (the 12.2.1.4.0 WebLogic domain used for OUDSM)

To stop the Administration Server, run the `stopWebLogic` script from the 12.2.1.4.0 `DOMAIN_HOME`:

- UNIX

  ```
  DOMAIN_HOME/bin/stopWebLogic.sh
  ```

- Windows

  ```
  DOMAIN_HOME\bin\stopWebLogic.cmd
  ```

When prompted, enter your user name and password.

6.5.3 Creating a Complete Backup

Before you start an upgrade, back up the Oracle home (`ORACLE_HOME`) and the domain directory (`DOMAIN_HOME`) that includes the WebLogic domain used for 12.2.1.4.0 OUDSM.

To create a backup copy of the domain directory:

1. Back up the Oracle home (`ORACLE_HOME`).

   Example:

   ```
   (UNIX) tar -cf oracle_home_backup_06052017.tar ORACLE_HOME/*
   (Windows) jar cMf oracle_home_backup_06052017.jar ORACLE_HOME\*
   ```

2. Back up the Administration Server domain used for OUDSM.

   For example:

   UNIX

   ```
   tar -cf domain_home_backup_06052017.tar DOMAIN_HOME/*
   ```
   Windows

   ```
   jar cMf domain_home_backup_06052017.jar DOMAIN_HOME\*
   ```

3. Verify that the backed up versions of the domain are complete.

If upgrade fails for any reason, you must copy all files and directories from the backup directory into the original domain directory to ensure that the domain is returned entirely to its original state before upgrade.

6.5.4 Uninstalling the 12*c* (12.2.1.4.0) Product Distributions

Uninstall the Oracle Unified Directory and Oracle Fusion Middleware Infrastructure before upgrading your existing Oracle Unified Directory Services Manager 12*c* (12.2.1.4.0)

- Uninstall Oracle Unified Directory, as described in Removing the Oracle Unified Directory Software.
- Uninstall Oracle Fusion Middleware Infrastructure, as described in Uninstalling Oracle Fusion Middleware Infrastructure.

This is the start of your topic.

6.5.5 Installing the 14*c* (14.1.2.1.0) Product Distributions

Install the collocated 14c (14.1.2.1.0) Oracle Unified Directory before upgrading your existing Oracle Unified Directory Services Manager 12c (12.2.1.4.0).

1. Download the latest Oracle Unified Directory version from the Oracle Software Delivery Cloud.

   See Obtaining Product Distributions.

2. Navigate to the directory where you downloaded the 14c (14.1.2.1.0) product distribution.

3. Install Oracle Fusion Middleware Infrastructure 14c (14.1.2.1.0).

   See Installing Oracle Fusion Middleware Infrastructure.

4. Install Oracle Unified Directory 14c (14.1.2.1.0).

   See Installing Oracle Unified Directory.

6.5.6 Reconfiguring the 14c (14.1.2.1.0) Product Distributions

You must reconfigure the OUDSM 12c (12.2.1.4.0) domain before starting the Administration Server.

1. Navigate to the Upgrade directory: `<14c_ORACLE_HOME>/oracle_common/upgrade/bin`

2. Run Readiness Check: `/ua -readiness`

3. Select **Domain Based**, so that you can verify both the schema and the configuration simultaneously.

4. Configure the database as follows:

   • Choose **Oracle** as the Database Type.

   • Provide the necessary schema details to proceed with the readiness check.

5. Invoke Upgrade Assistant (UA): `<14c_ORACLE_HOME>/oracle_common/upgrade/bin/ua`

6. Select **Domain Based** schema upgrade.

7. Select **Oracle DB** and connect using the FMW user credentials.

8. Complete the schema upgrade by entering the required information following the on-screen prompts.

9. Execute reconfiguration (reconfig.sh): `<14c_ORACLE_HOME>/oracle_common/common/bin/reconfig.sh -log=reconfig.log`

6.5.7 Starting the Administration Server

After a successful upgrade, restart all processes and servers, including the Administration Server and any Managed Servers.

To start the Administration Server, use the `startWebLogic` script from the 14.1.2.1.0 Domain home:

• UNIX

   `DOMAIN_HOME/bin/startWebLogic.sh`

• Windows

```
DOMAIN_HOME\bin\startWebLogic.cmd
```

When prompted, enter your user name and password.

6.5.8 Verifying the OUDSM Upgrade

You can verify the OUDSM upgrade by accessing the OUDSM interface and checking the version number.

To verify that the OUDSM upgrade was successful, perform the following steps:

1. Open a browser, and access OUDSM using the following URL format:

   ```
   http://host:port/oudsm
   ```
   where the host and port correspond to the Administration Server on which OUDSM is deployed. The default admin port is `7001`.

2. When the login page appears, navigate to the bottom right pane and click **About**.

   The **About Oracle Unified Directory Services Manager** page is displayed.

3. Verify that the version number of the upgraded OUDSM version matches the latest version number.

6.6 What to Do If the Upgrade Process Fails

If any step in the upgrade process fails, then terminate the upgrade process and restore the environment to its original state using the backup files you created in Prerequisites for Oracle Unified Directory Upgrade.

7

Configuring the JVM, Java, and Database Cache Options for Oracle Unified Directory

Oracle Unified Directory provides several command-line utilities to tune the server and to configure the various options for the Java Virtual Machine (JVM), Java, and database cache.

Topics:

> ✏️ **Note:**
>
> Beginning with 14*c* (14.1.2.1.0), Oracle Unified Directory requires JDK 17.

7.1 Configuring the JVM Using the `dstune` Utility

The `dstune` command-line utility enables you to tune the Oracle Unified Directory server and tools (`import-ldif`, `export-ldif`, `rebuild-index`, and `verify-index`) using criteria such as the data that the directory contains or the amount of system memory to use.

The `dstune` utility provides these options:

- The `data-based` subcommand tunes the server based on the data that the database either already contains or will contain.
- The `mem-based` subcommand tunes the server and tools based on the heap size they will use.
- The `set-runtime-options` subcommand allows you either to use the JVM default values on the system or to directly provide JVM arguments to tune the server and tools.

> ✏️ **Note:**
>
> The `dstune memory-based` and `data-based` options are available only if you run a JVM that uses Java HotSpot, such as Java Platform, Standard Edition (Java SE).

For more information on the `dstune` syntax and tuning examples, see Tuning Java Virtual Machine Settings Using the dstune Utility in *Administering Oracle Unified Directory*.

7.2 Configuring the Default JVM and Java Arguments

Use the Java properties file to configure the Java Virtual Machine, Java options and Java arguments for Oracle Unified Directory server.

- Using the Java Properties File
- Configuring JVM Options
- Specifying the Java Virtual Machine for a Specific Utility
- Specifying the Java Arguments for a Specific Utility

7.2.1 Using the Java Properties File

The `java.properties` file contains the Java configuration properties. Oracle Unified Directory scripts and server commands use these Java configuration properties. This file is located in `instance-dir/OUD/config/` on UNIX and Linux systems or `instance-dir\OUD\config\` on Windows systems.

The properties in the `java.properties` file have these formats:

- `command-name.java-home=JVM-path`
- `command-name.java-args=JVM-arguments`

To use the configuration properties in the `java.properties` file:

1. Edit the properties in the file you want to set.

    For example, you can set the Java properties to specify whether a command runs using the JVM in `-server` mode or `-client` mode.

    Or, for certain commands, including `import-ldif`, `export-ldif`, `backup`, and `restore`, you can specify the Java arguments and a different JVM, if you prefer, depending on whether the command is run in online or offline mode.

2. Run the `dsjavaproperties` (or `dsjavaproperties.bat`) command, which uses the properties in the `java.properties` to update the Oracle Unified Directory scripts and commands, so that they use the specific JVM and JVM arguments specified in `java.properties`.

For examples, see Specifying the Java Virtual Machine for a Specific Utility and Specifying the Java Arguments for a Specific Utility.

See also dsjavaproperties in *Administering Oracle Unified Directory*.

Table 7-1 shows the properties in the `java.properties` file that are relevant to Oracle Unified Directory.

Table 7-1   Properties in the `java.properties` File Relevant to Oracle Unified Directory

Property	Description
`overwrite-env-java-args`	If `true`, the system checks the `default.java-args` property in this properties file before checking the `OPENDS_JAVA_ARGS` environment variable.
	If `false`, the system checks the `OPENDS_JAVA_ARGS` environment variable first.

Table 7-1   (Cont.) Properties in the `java.properties` File Relevant to Oracle Unified Directory

Property	Description
`default.java-home`	Sets the JVM that will be used for the directory server and all of its command-line utilities, unless a different JVM is specified for a particular utility.

7.2.2 Configuring JVM Options

Oracle Unified Directory provides several Java options that can impact the server's performance. Each option is applied for a specific condition and some of these options apply only to the Oracle JVM.

Table 7-2 summarizes the Java options that can impact the server's performance.

Table 7-2   Java Options That Can Affect Oracle Unified Directory Server Performance

Condition	Option	Description
For Server and Offline Import to use server grade JVM runtime optimizations	`-server`	Selects the server application run-time optimizations. The directory server will take longer to start, but it will be better optimized to produce higher throughput.
For 64-bit machines only	`-d64`	For 64-bit machines only. By default, the directory server selects a 32-bit JVM regardless of the architecture. Specify this option when a JVM greater than 4 GB heap is required and the architecture is 64-bit.
For JVM Heap	`-Xms2G -Xmx2G`	Selects the initial and maximum memory sizes available to the JVM, respectively. These values are used for the JVM heap, which reserves memory for the directory server and its database (DB) cache (or caches if more than one).
		Increasing the amount of memory available can improve performance, but increasing it to too high a value can have a detrimental effect in the form of longer pauses for full garbage collection runs. Therefore, the initial and maximum sizes should be set to the same value.
		As a general guideline, examine the size of the Oracle Berkeley Java Edition (JE) database folders (`instance-dir/OUD/db/ userRoot`). Based on the folders' combined size, determine how much memory you want to reserve for the database cache. After determining this value, tune the local DB back-end properties, `db-cache-percent` or `db-cache-size` and other JVM options appropriately.
		Be careful to allow additional memory for the server run time. For example, if you have a single database of 1 GB, which you want to store entirely in memory, then a 2 GB heap with 60% reserved for the database cache should be sufficient for efficient directory server performance.
		You can test this setup by preloading the database with the local database back end by using the `preload-time-limit` property.
		JVM heaps greater than 4 GB require a 64-bit JVM.

Table 7-2   (Cont.) Java Options That Can Affect Oracle Unified Directory Server Performance

Condition	Option	Description
For `jstatd` or other RMI-based applications	`-XX:+DisableExplicitGC`	Prevents external applications from forcing expensive garbage collections. If you are using `jstatd` or other RMI-based applications to monitor Oracle Unified Directory, consider using this option to avoid unexpected pauses.
For heavy throughput environments	`-XX:NewSize=512M`	In heavy throughput environments, you should consider using this option to increase the size of the JVM young generation.
		By default, the young generation is quite small, and high throughput scenarios can result in a large amount of generated garbage. This garbage collection, in turn, causes the JVM to inadvertently promote short-lived objects into the old generation.
For GC Analysis and Tuning	`-XX:+PrintGCDetails`	Prints the garbage collection details.
Other Applications (for example, `dsconfig`)	`-client`	Selects client application run-time optimizations. The application will be faster to start and more responsive due to lower compilation overheads.
For very low initial JVM Heap size	`-Xms8m`	Selects a low initial JVM heap size for an application.

7.2.3 Specifying the Java Virtual Machine for a Specific Utility

Edit the Java home property in the `java.properties` file to set the Java Virtual Machine for a specific utility.

To set the JVM for a specific utility:

1. Edit the following property in the `java.properties` file.

    command-name`.java-home=`*jvm-location*

    For example, to configure a specific JDK 1.8 for the offline `import-ldif` command, set the property that starts with `import-ldif.offline`. For example:

    `import-ldif.offline.java-home=/usr/java/jdk1.8.0`

2. Run the `dsjavaproperties` utility to apply the property value.

7.2.4 Specifying the Java Arguments for a Specific Utility

Edit the Java arguments property in the `java.properties` file to specify the Java Arguments for a specific utility.

To set the Java arguments for a specific utility:

1. Edit the following property in the `java.properties` file.

    command-name`.java-args=`*arguments*

    For example, to specify that a maximum heap size of 256 MB be used for the online export, set the property that starts with `export-ldif.online`. For example:

    `export-ldif.online.java-args=-Xms256m -Xmx256m`

2. Run the `dsjavaproperties` utility to apply the property value.

7.3 Configuring the Java Run-Time Settings During the Server Setup

You can provide run-time options when you run the directory server setup script (`oud-setup` or `oud-setup.bat`).

- In GUI mode, on the **Providing Runtime Options** screen, click **Change** to change any of the displayed values for the **Server Runtime Settings** or the **Offline Tools Runtime Settings**.

  See Setting Up the Directory Server Using the Graphical User Interface (GUI).

- In CLI mode, you can specify JVM arguments when you tune Oracle Unified Directory server and the off-line tools.

  See Setting Up the Directory Server Using the Command-Line Interface (CLI).

7.4 Database Cache Size

The size of the database cache can affect the overall performance of Oracle Unified Directory server. You must determine your specific memory settings for the database cache depending on your hardware, the number and size of entries in your directory, and the performance requirements for your deployment.

For example, when importing data using the `import-ldif` utility, you can configure the directory server to avoid (or minimize) potential database cache eviction problems. Ideally, you should set the database cache to a value that allows the entire database to fit into the cache.

The size of the required heap depends on the number of entries and their size. For example, if you are importing 200,000 entries of 10 KB each, you might specify two GB for the JVM heap size, and then allocate at least one GB for the directory server run-time environment and the rest for the database cache.

You can set the database cache by configuring the `db-cache-percent` or the `db-cache-size` properties using either the `dsconfig` command-line utility or Oracle Unified Directory Services Manager.

The `db-cache-percent` and the `db-cache-size` properties represent the maximum size that the server can use for the database cache. If the database is smaller than the size set by either of these properties, only the size of the database is allocated to the JVM heap.

> **✎ Note:**
>
> The `db-cache-size` property has precedence over the `db-cache-percent` property, if both properties have values. Therefore, to set the `db-cache-percent` property, the `db-cache-size` property must be set to 0 MB (the default).

See Setting Database Cache Using dsconfig.

7.4.1 Setting Database Cache Using dsconfig

Use the database cache percentage property of the `dsconfig` command to allocate memory to the database cache.

To set the database cache using `dsconfig`:

1. Change to the directory where `dsconfig` is located.

    On UNIX and Linux systems:

    ```
    $ cd instance-dir/OUD/bin
    ```

    On Windows systems:

    ```
    C:\> cd instance-dir\OUD\bat
    ```

2. Run the `dsconfig` command to set the `db-cache-percent` property. For example:

    ```
    $ dsconfig set-workflow-element-prop \
    --element-name userRoot --set db-cache-percent:50 \
    --hostname hostname --port port-number \
    -X -D "cn=Directory Manager" -j /tmp/password -n
    ```

    This example sets the `db-cache-percent` to 50 percent. Thus, for a 2 GB memory allocation, 1 GB of memory will be allocated to the database cache and the rest to the JVM.

7.5 Setting the Database Cache Mode

The database cache mode (`db-cache-mode` property) controls the caching of records in the database cache. You can use the database cache to store Java Edition (JE) nodes (upper, inner and leaf nodes). When a record is stored or retrieved, the database cache mode determines how long the record is subsequently retained in the cache, relative to other records in the cache.

The default database cache mode retains all types of nodes in the cache. The default mode is recommended for most deployments. However, you might consider changing the mode if your performance expectations are not being met or if the memory available to run Oracle Unified Directory cannot hold all entries in the database cache.

Other database cache modes to consider are:

*   `evict-ln` mode evicts leaf nodes from the database cache once they are used. Use this mode only if the default mode does not meet your performance expectations and the memory allocated to Oracle Unified Directory is lower than your database size. Using this mode reduces the memory pressure for Java garbage collection and the elapsed processing time (`etime`) for outliers.

*   `evict-bin` mode evicts bottom inner nodes from the database cache once they are used. Before using this mode, Oracle recommends trying the `evict-ln` mode. Use this mode in staging deployments only if the memory allocated to Oracle Unified Directory is significantly smaller than the database size and you cannot otherwise meet your performance expectations.

For other values that you can specify for the database cache mode, see *DB Local Backend Workflow Element* in *Configuration Reference for Oracle Unified Directory*.

To set the database cache mode, use the `dsconfig` command-line utility. For example to set the mode to `evict-ln`:

```
$ dsconfig set-workflow-element-prop \
  --element-name userRoot \
  --set db-cache-mode:evict-ln \
  --hostname localhost --port 4444 \
  -X -D "cn=Directory Manager" -j password-file -n
```

See also Managing the Database Cache in *Administering Oracle Unified Directory*.

8

Uninstalling Oracle Unified Directory

You can uninstall Oracle Unified Directory server instances you have configured and completely remove the software from your system.

To completely remove the Oracle Unified Directory software from your system, you must follow the procedures in the following sections in order:

- Uninstalling an Oracle Unified Directory Instance

8.1 Uninstalling an Oracle Unified Directory Instance

Follow these procedures to uninstall the server instance for a directory server, a proxy server, and a replication gateway server.

You can remove a server instance using one of the following modes:

- Graphical user interface (GUI) mode.
- Interactive command-line mode.
- Script.
- WebLogic Scripting Tool (WLST)

See uninstall in *Administering Oracle Unified Directory*.

8.1.1 Uninstalling a Directory Server Instance

You can use a graphical user interface, a command-line utility or a script to uninstall a directory server instance.

- Uninstalling a Directory Server Instance Using GUI Mode
- Uninstalling a Directory Server Instance Using the CLI
- Uninstalling a Directory Server Instance Using a Script
- Deleting a Directory Server Instance Using WLST

8.1.1.1 Uninstalling a Directory Server Instance Using GUI Mode

GUI mode is the default and recommended uninstall option. The GUI provides an easy interface for removing a directory server instance.

1. Launch the graphical uninstaller, as follows:

    On UNIX and Linux systems:

    ```
    $ instance-dir/OUD/uninstall
    ```

    On Windows systems:

    ```
    C:\> instance-dir\OUD\uninstall.bat
    ```

2. Deselect any components that you do not want to remove and click **Uninstall**.

By default, all components are selected for removal.

3. If the server is part of a replication topology, click **Yes** to continue the deinstallation.

   The uninstaller starts the server (if it is not already running) and asks you for your Global Administrator login to remove the references to this server in the other replicating directory servers.

4. If the server is a standalone server and is running, a dialog box is displayed, asking to shut down the server before continuing with the deinstall.

   Click **Yes** to have the uninstaller stop the server for you and continue with the uninstallation.

5. Review the logs to confirm the file or directory removals. UNIX and Linux logs the entries at `/var/tmp`, Linux at `/tmp`, and Windows in the location defined by the `TEMP` user environment variable.

   Log files are listed as `oud-uninstall-IDNumber.log`, where *IDNumber* is a system-generated number for your log.

6. For Windows systems, check the Windows registry for any remaining keys ending with `Oracle Unified Directory`. For example:

   ```
   SYSTEM\\CurrentControlSet\\Services\\EventLog\\Application\\Oracle Unified Directory
   ```

8.1.1.2 Uninstalling a Directory Server Instance Using the CLI

You can remove an Oracle Unified Directory instance in interactive, command-line mode by typing `uninstall --cli`. In interactive mode, you are prompted for any required input.

1. Launch the CLI uninstaller, as follows:

   On UNIX and Linux systems:

   ```
   $ instance-dir/OUD/uninstall --cli
   ```

   On Windows systems:

   ```
   C:\> instance-dir\OUD\uninstall.bat --cli
   ```

2. Select the components to be removed.

   a. To remove all components, press Enter or Return to accept the default.

   b. To remove specific components and retain others, type `2`.

      When `uninstall` prompts you to select the components to be deleted, press Enter or Return to accept the defaults.

3. If the server is part of a replication topology, type `Yes` or press Enter or Return to continue the uninstallation.

   The uninstaller starts the server (if it is not already running) and requests your Global Administrator login to remove the references to this server in the other replicating directory servers.

4. If your directory server is a standalone server and is running, the uninstall prompts you to stop the server and remove all files.

   Press Enter or Return to accept the default (`Yes`).

5. To quit the uninstaller without removing files, type `q`.

   The uninstall quits the process and logs the entry.

UNIX and Linux logs the entry at `/var/tmp`, Linux at `/tmp`, and Windows at the location defined by the `TEMP` user environment variable.

6. Check that all files and directories have been removed. If they have not been removed, manually remove them.

7. For Windows systems, check the Windows registry for any remaining keys ending with `Oracle Unified Directory`.

   For example:

   ```
   SYSTEM\\CurrentControlSet\\Services\\EventLog\\Application\\Oracle Unified Directory
   ```

8.1.1.3 Uninstalling a Directory Server Instance Using a Script

The `uninstall` command provides two options, `--quiet` and `--no-prompt`, for simple scripting. Most directory administrators have their preferred scripting language for automating their system tasks. The directory server provides script-friendly options with its command-line utilities to facilitate quick coding.

1. Create an uninstallation script and add the following `uninstall` command.

   Make sure to type the command on a single line.

   ```
   instance-dir/OUD/uninstall --cli \
   --remove-all --no-prompt --forceOnError --quiet
   ```

2. Run the script.

3. Check for remaining directories in the logs, and if any directories or files remain, manually delete them.

8.1.1.4 Deleting a Directory Server Instance Using WLST

You can delete a directory server instance by using the WLST command `oud_deleteInstance`.

To delete a directory server instance by using WLST:

1. Connect to WLST as described in Setting Up the Directory Server Using the WebLogic Scripting Tool.

2. At the command prompt, enter:

   ```
   oud_deleteInstance(instanceName='instanceName')
   ```

   For example, to delete a directory server instance named `oud1` use the following command:

   ```
   oud_deleteInstance(instanceName='oud1')
   ```

   You cannot delete any directory server instance in either an UNKNOWN or a RUNNING state.

8.1.2 Uninstalling a Proxy Server Instance

You can use a graphical user interface, a command-line utility, or a script to uninstall a proxy server instance.

- Uninstalling a Proxy Server Instance Using the GUI
- Uninstalling a Proxy Server Instance Using the CLI
- Uninstalling a Proxy Server Instance Using a Script

- Deleting a Proxy Server Instance Using WLST

8.1.2.1 Uninstalling a Proxy Server Instance Using the GUI

GUI mode is the default and recommended uninstall option. The GUI provides an easy interface for removing a proxy server instance.

1. Launch the graphical uninstaller, as follows:

   On UNIX and Linux systems:

   ```
   $ instance-dir/OUD/uninstall
   ```

   On Windows systems:

   ```
   C:\> instance-dir\OUD\uninstall.bat
   ```

2. Deselect any components that you do not want to remove and click Uninstall.

   By default, all components are selected for removal.

3. If the server is running, a dialog box is displayed, asking to shut down the server before continuing with the uninstall.

   Click `Yes` to have the uninstaller stop the server for you and continue with the uninstallation.

4. Review the logs to confirm the file or directory removals. UNIX and Linux logs the entries at `/var/tmp`, Linux at `/tmp`, and Windows in the location defined by the `TEMP` user environment variable.

   Log files are listed as `oud-uninstall-IDNumber.log`, where *IDNumber* is a system-generated number for your log.

5. For Windows systems, check the Windows registry for any remaining keys ending with `Oracle Unified Directory`. For example:

   ```
   SYSTEM\\CurrentControlSet\\Services\\EventLog\\Application\\Oracle Unified Directory
   ```

8.1.2.2 Uninstalling a Proxy Server Instance Using the CLI

You can remove a proxy instance in interactive, command-line mode by typing `uninstall --cli`. In interactive mode, you are prompted for any required input.

1. Launch the CLI uninstaller, as follows:

   On UNIX and Linux systems:

   ```
   $ instance-dir/OUD/uninstall --cli
   ```

   On Windows systems:

   ```
   C:\> instance-dir\OUD\uninstall.bat --cli
   ```

2. Select the components to be removed.

   a. To remove all components, press Enter or Return to accept the default.

   b. To remove specific components and retain others, type `2`.

      When `uninstall` prompts you to select the components to be deleted, press Enter or Return to accept the defaults.

3. If your proxy server is running, the uninstall prompts you to stop the server and remove all files.

Press Enter or Return to accept the default (`Yes`).

4. To quit the uninstaller without removing files, type `q`.

   The uninstall quits the process and logs the entry.

   UNIX and Linux logs the entry at `/var/tmp`, Linux at `/tmp`, and Windows at the location defined by the `TEMP` user environment variable.

5. Check that all files and directories have been removed. If they have not been removed, manually remove them.

6. For Windows systems, check the Windows registry for any remaining keys ending with `Oracle Unified Directory`.

   For example:

   ```
   SYSTEM\\CurrentControlSet\\Services\\EventLog\\Application\\Oracle Unified Directory
   ```

8.1.2.3 Uninstalling a Proxy Server Instance Using a Script

The `uninstall` command provides two options, `--quiet` and `--no-prompt`, for simple scripting. Most directory administrators have their preferred scripting language for automating their system tasks. Oracle Unified Directory provides script-friendly options with its command-line utilities to facilitate quick coding.

1. Create an uninstallation script and add the following `uninstall` command.

   Make sure to type the command on a single line.

   ```
   instance-dir/OUD/uninstall --cli \
   --remove-all --no-prompt --forceOnError --quiet
   ```

2. Run the script.

3. Check for remaining directories in the logs, and if any directories or files remain, manually delete them.

8.1.2.4 Deleting a Proxy Server Instance Using WLST

You can delete a proxy server instance by using the WLST command `oud_deleteInstance`.

To delete a proxy server instance by using WLST:

1. Connect to WLST as described in Setting Up the Proxy Server Using the WebLogic Scripting Tool.

2. At the command prompt, enter:

   ```
   oud_deleteInstance(instanceName='instanceName')
   ```

   For example, to delete a proxy server instance named `oud_proxy` use the following command:

   ```
   oud_deleteInstance(instanceName='oud_proxy')
   ```

   You cannot delete any proxy server instance in either an UNKNOWN or a RUNNING state.

8.1.3 Uninstalling a Replication Gateway Instance

You can use a graphical user interface, a command-line utility, or a script to uninstall a replication gateway server instance.

This section covers the following topics:

- Uninstalling a Replication Gateway Instance Using the GUI
- Uninstalling a Replication Gateway Instance Using the CLI
- Uninstalling a Replication Gateway Instance Using a Script
- Deleting a Replication Gateway Instance Using WLST

> **Note:**
>
> Should the replication gateway uninstallation fail, for any reason, references to the gateway might remain in the ODSEE server configuration. In this case, remove the following from the ODSEE server configuration manually:
>
> - The replication manager entry that is created automatically when the gateway is installed.
> - The replication agreement(s) to the gateway.

8.1.3.1 Uninstalling a Replication Gateway Instance Using the GUI

GUI mode is the default and recommended uninstall option. The GUI provides an easy interface for removing a replication gateway instance.

1. Launch the graphical uninstaller, as follows:

    On UNIX and Linux systems:

    ```
    $ instance-dir/OUD/uninstall
    ```

    On Windows systems:

    ```
    C:\> instance-dir\OUD\uninstall.bat
    ```

2. On the Oracle Unified Directory Server Settings screen, enter the following information:

    - The host name on which the replication gateway server instance is installed.
    - The UID of the Global Administrator used to connect to the Oracle Unified Directory servers.
    - The password of the Global Administrator.

    Click **Next**.

3. On the ODSEE Server settings screen, enter the following information:

    - The bind DN and password of the user configured to connect to the ODSEE server.
    - The DSCC Directory Server Manager Password

    Click **Next**.

4. On the Confirm Replication Gateway Uninstall screen, click **Finish**.

5. Review the logs to confirm the file or directory removals. UNIX and Linux logs the entries at `/var/tmp`, Linux at `/tmp`, and Windows in the location defined by the `TEMP` user environment variable.

    Log files are listed as `oud-uninstall-IDNumber.log`, where *IDNumber* is a system-generated number for your log.

6. For Windows systems, check the Windows registry for any remaining keys ending with `Oracle Unified Directory`. For example:

```
SYSTEM\\CurrentControlSet\\Services\\EventLog\\Application\\Oracle Unified Directory
```

8.1.3.2 Uninstalling a Replication Gateway Instance Using the CLI

You can remove a replication gateway instance in interactive, command-line mode by typing `uninstall --cli`. In interactive mode, you are prompted for any required input.

Before you start the uninstall, you must have the bind credentials for:

- the Global Administrator used to connect to the OUD server instances
- the administrative user who connects to the ODSEE server instance

The following example provides these credentials at the command-line.

1. Launch the CLI uninstaller, as follows:

   On UNIX and Linux systems:

   ```
   $ instance-dir/OUD/uninstall --cli -h server1.example.com \
     --adminUID admin --adminPasswordFile pwd-filename \
     --bindDNLegacy "cn=Directory Manager" --bindPasswordFileLegacy pwd-filename \
     --dsccPasswordFileLegacy pwd-file
   ```

   On Windows systems:

   ```
   C:\> instance-dir\OUD\uninstall.bat --cli -h server1.example.com \
     --adminUID admin --adminPasswordFile pwd-filename \
     --bindDNLegacy "cn=Directory Manager" --bindPasswordFileLegacy pwd-filename \
     --dsccPasswordFileLegacy pwd-file
   ```

2. Type `1` to uninstall the gateway.

3. For Windows systems, check the Windows registry for any remaining keys ending with `Oracle Unified Directory`.

   For example:

   ```
   SYSTEM\\CurrentControlSet\\Services\\EventLog\\Application\\Oracle Unified Directory
   ```

8.1.3.3 Uninstalling a Replication Gateway Instance Using a Script

The `uninstall` command provides two options, `--quiet` and `--no-prompt`, for simple scripting. Most directory administrators have their preferred scripting language for automating their system tasks. Oracle Unified Directory provides script-friendly options with its command-line utilities to facilitate quick coding.

1. Create an deinstallation script and add the following `uninstall` command.

   You must type the command on a single line.

   ```
   instance-dir/OUD/uninstall --cli -h hostname \
   --adminUID admin --adminPasswordFile pwd-filename \
   --bindDNLegacy bindDN --bindPasswordFileLegacy pwd-filename \
   --dsccPasswordFileLegacy pwd-filename --remove-all --no-prompt \
   --forceOnError --quiet
   ```

2. Run the script.

3. Check for remaining directories in the logs, and if any directories or files remain, manually delete them.

8.1.3.4 Deleting a Replication Gateway Instance Using WLST

You can delete a replication gateway instance by using the WLST command `oud_deleteInstance`.

To delete a replication gateway instance by using WLST:

1. Connect to WLST as described in Setting Up the Replication Gateway Using the WebLogic Scripting Tool.

2. At the command prompt, enter:

   ```
   oud_deleteInstance(instanceName='instanceName')
   ```

   For example, to delete a replication gateway instance named `oud_replication_gateway` use the following command:

   ```
   oud_deleteInstance(instanceName='oud_replication_gateway')
   ```

   You cannot delete any replication gateway instance in either an UNKNOWN or a RUNNING state.

8.1.4 Removing the Oracle Unified Directory Software

You can run the `deinstall.sh` script (UNIX) or the `deinstall.cmd` command (Windows) to remove the Oracle Unified Directory software from your system.

To uninstall the Oracle Unified Directory software:

1. Change to the following directory:

   On UNIX or Linux systems:

   ```
   $ cd $ORACLE_HOME/oui/bin
   ```

   On Windows systems, change to:

   ```
   C:\> ORACLE_HOME\oui\bin
   ```

2. Enter the following command:

   On UNIX or Linux systems:

   ```
   ./deinstall.sh
   ```

   On Windows systems:

   ```
   deinstall.cmd
   ```

3. On the Welcome screen, click **Next**.

4. On the Deinstall Oracle Home screen, verify the location of what is being uninstalled and click **Deinstall**.

   You are prompted to check that no Application Server is associated with the `ORACLE_HOME` that you are about to deinstall.

5. A Warning screen that indicates the directories that will be uninstalled is displayed. Click **Yes** to continue with the deinstallation.

6. On the Deinstallation Complete screen, click **Finish**.

   The `ORACLE_HOME` directory and all of its contents are removed.

7. After the uninstaller finishes, you must manually remove your Oracle home directory and any existing sub-directories that the uninstaller did not remove.

   For example, if your Oracle home directory was `/home/Oracle/Products/Oracle_Home` on UNIX operating system:

   ```
   cd /home/Oracle/Products
   rm -rf Oracle_Home
   ```

9
Managing Oracle Unified Directory as a Windows Service

You can enable or disable the Oracle Unified Directory server as a Microsoft Windows service.

Topics:

- Managing the Oracle Unified Directory Server as a Windows Service
- Removing the Oracle Unified Directory Windows Service

9.1 Managing the Oracle Unified Directory Server as a Windows Service

Use the `windows-service` command to enable or disable the Oracle Unified Directory server as a Windows service.

To enable the server as a Windows service, use the following command:

```
C:\> instance-dir\OUD\bat\windows-service.bat -e
```

To disable the server as a Windows service, use the following command:

```
C:\> instance-dir\OUD\bat\windows-service.bat -d
```

See windows-service in *Administering Oracle Unified Directory*.

> **✐ Note:**
>
> You can also specify that the Oracle Unified Directory server should run as a Windows service, if you use the GUI installation. On the installation Review panel, select Run the server as a Windows Service.

See also Configuring the Timeout Value when the Oracle Unified Directory Server Starts.

9.1.1 Configuring the Timeout Value when the Oracle Unified Directory Server Starts

If the system is heavily loaded when it boots, the process that starts the server might time out while waiting for the server to start. By default, the server attempts to start 100 times, with an interval of 5 seconds between attempts.

You can configure the number of attempts that the server makes to start by setting the value of the `OUD_WINDOWS_SERVICE_START_NTRIES` system environment variable.

9.2 Removing the Oracle Unified Directory Windows Service

The uninstall process should cleanly uninstall and remove Oracle Unified Directory from your system. However, for Windows platforms, there might be times when the uninstall fails to remove files due to an active Windows service.

You can remove the remaining Windows service in two ways:

- Removing a Windows Service Using `windows-service.bat`
- Removing the Oracle Unified Directory Service From the Windows Registry

9.2.1 Removing a Windows Service Using `windows-service.bat`

You can use the `windows-service.bat` command to clean up any existing Windows services. This command is located in `instance-dir\OUD\bat`.

To clean up any existing Windows services:

1. Use the `windows-service.bat` command with the `--cleanupService` option.

   Type the `serviceName` that you want to remove.

   ```
   C:\> instance-dir\OUD\bat\windows-service.bat --cleanupService serviceName
   ```

2. Restart Windows to complete the cleanup.

> ✎ **Note:**
>
> This command removes Oracle Unified Directory services only. The command will not clean up another product's services.

9.2.2 Removing the Oracle Unified Directory Service From the Windows Registry

You can manually remove any remaining Windows service entries from the Windows registry.

> ⚠ **Caution:**
>
> Make sure that you know what you are doing when removing entries in your Windows registry. You can permanently damage your operating system.

1. Run the Task Manager, click the Processes tab, and ensure that `opends_service.exe` is not running.

   If it is, select the process and click the End Process button at the bottom right of the Task Manager dialog.

2. Run `regedit` and go down the registry tree following this path.

   ```
   My Computer->HKEY_LOCAL_MACHINE->SYSTEM->CurrentControlSet->Services->Oracle Unified
   Directory
   ```

If you installed more than one instance of Oracle Unified Directory, the added services are named `Oracle Unified Directory-2`, `Oracle Unified Directory-3`, and so on.

Check that the service that you about to remove points to the correct instance.

3. Delete the entry from the Registry.

4. Search the registry for `LEGACY_OUD` control sets that might be saved in other control sets.

   Search the following:

   ```
   HKEY_LOCAL_MACHINE->SYSTEM->ControlSetxyz->Enum->Root-
   >LEGACY_ORACLE_UNIFIED_DIRECTORY-w
   ```

   where w is the number of Oracle Unified Directory instances that you have registered as a service and xyz is the number of configuration profiles saved on the system. This entry is typically found in `ControlSet001`, but it can be located elsewhere.

   Depending on your profile, your system configuration, and the control set you are trying to edit, the registry entries might be protected from deletion. In this case, you might need Administrator privileges to perform this operation, or the system control set might be refreshed the next time Windows starts successfully, thus confirming that the current configuration is valid.

5. Delete the instance directory to ensure that you have completely uninstalled Oracle Unified Directory.

6. Restart Windows.

   The Windows service should be removed.