Oracle® Endeca Server

Installation Guide

Version 7.5.1.1 • May 2013

ORACLE

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Preface

Oracle® Endeca Server is the core search-analytical database. It organizes complex and varied data from disparate source systems into a faceted data model that is extremely flexible and reduces the need for up-front data modeling. This highly-scalable server enables users to explore data in an unconstrained and impromptu manner and to rapidly address new questions that inevitably follow every new insight.

About this guide

This guide contains installation instructions for setting up Oracle Endeca Server on Windows and Linux.

The guide assumes that you are familiar with Oracle WebLogic Server concepts.

Who should use this guide

This guide is intended for system administrators installing Oracle Endeca Server on Windows or Linux.

Conventions used in this guide

The following conventions are used in this document.

Typographic conventions

This table describes the typographic conventions used when formatting text in this document.

Typeface	Meaning
User Interface Elements	This formatting is used for graphical user interface elements such as pages, dialog boxes, buttons, and fields.
`Code Sample`	This formatting is used for sample code phrases within a paragraph.
Variable	This formatting is used for variable values. For variables within a code sample, the formatting is *`Variable`*.
`File Path`	This formatting is used for file names and paths.

Symbol conventions

This table describes the symbol conventions used in this document.

Symbol	Description	Example	Meaning
>	The right angle bracket, or greater-than sign, indicates menu item selections in a graphic user interface.	File > New > Project	From the File menu, choose New, then from the New submenu, choose Project.

Path variable conventions

This table describes the path variable conventions used in this document.

Path variable	Meaning
`$MW_HOME`	Indicates the absolute path to your Oracle Middleware home directory, which is the root directory for your WebLogic installation.
`$DOMAIN_HOME`	Indicates the absolute path to your WebLogic domain home directory. For example, if `endeca_server_domain` is the name of your WebLogic domain, then the `$DOMAIN_HOME` value would be the `$MW_HOME/user_projects/domains/endeca_server_domain` directory.
`$ENDECA_HOME`	Indicates the absolute path to your Oracle Endeca Server home directory, which is the root directory for your Endeca Server installation.

Contacting Oracle Customer Support

Oracle Endeca Customer Support provides registered users with important information regarding Oracle Endeca software, implementation questions, product and solution help, as well as overall news and updates.

You can contact Oracle Endeca Customer Support through Oracle's Support portal, My Oracle Support at *https://support.oracle.com*.

Chapter 1

Before You Install

This section provides information you should know before starting your installation of the Oracle Endeca Server.

About the Oracle Endeca Server software package

The Oracle Endeca Server software provides the query engine that serves as the foundation for all front-end applications utilizing it.

The software includes the Oracle Endeca Server, which is the management facility for administering the Endeca data domains. Front-end applications built on top of the Oracle Endeca Server can answer end-user queries and provide business analytics information to the front-application's users.

Note: The term Oracle Endeca Server is used in two related contexts: On the one hand, it is the name of the entire software package for the server. On the other hand, the Oracle Endeca Server is the management facility for administering your data domains.

The Oracle Endeca Server lets you administer your Endeca data domains. The Endeca data domain is where the source data records are stored after being loaded from your ETL client. With the Oracle Endeca Server, some of the operations you can perform are:

- Create an Endeca data domain, including assigning a name that will later be used to access and manage it.
- Stop and start Endeca data domains.
- View the status of any Endeca data domain.
- Update the spelling dictionary for a specific data domain.

In addition, the Oracle Endeca Server constantly monitors the status of the running Endeca data domains and will automatically restart them (for example, if one crashes).

As the query engine, the Dgraph process of the Oracle Endeca Server uses proprietary data structures and algorithms that allow it to provide real-time responses to client requests issued to the data domain that is

running on the server. The Dgraph process receives client requests via the application tier, queries the data files, and returns the results.

Each Endeca data domain contains a set of versioned Web services for loading, configuring, and querying the data. These Web services, together with the Bulk Load Interface, provide the interfaces to the Oracle Endeca Server.

About the Endeca Server cluster and the data domain cluster

A data domain cluster is composed of a set of nodes (Dgraph processes) all of which can serve query requests. If the data domain cluster is not read-only, one node is identified as the leader node; all other nodes are follower nodes. For read-only data domain clusters, all nodes serve as follower nodes. One copy of the index for the data domain is shared and used by all nodes. The Cluster Coordinator provides communication between the nodes in the data domain cluster. It also notifies the follower nodes about index updates and updates to the configuration.

If one of the data domain cluster nodes fails, queries continue to be processed by other nodes. A data domain cluster also provides increased throughput by the Oracle Endeca Server. By adding Endeca Server instances to an Endeca Server cluster that is hosting the data domain cluster, you can spread the query load across multiple Oracle Endeca Servers without the need to increase storage requirements at the same rate. Endeca Server instances can be added or removed dynamically, without having to stop the data domain cluster.

In the development environment, you can start with a single Oracle Endeca Server that is hosting a data domain (this is essentially a one-node data domain cluster). You can then expand your single instance implementation by adding more Endeca Server instances and expanding the data domain to utilize those instances. When you move to a production environment, you can duplicate a multi-node data domain cluster that you built in the development environment.

For information on installing and deploying an Endeca Server cluster, see the section in this guide.

For more information on the Endeca Server cluster and the data domain cluster, see the *Oracle Endeca Server Cluster Guide*.

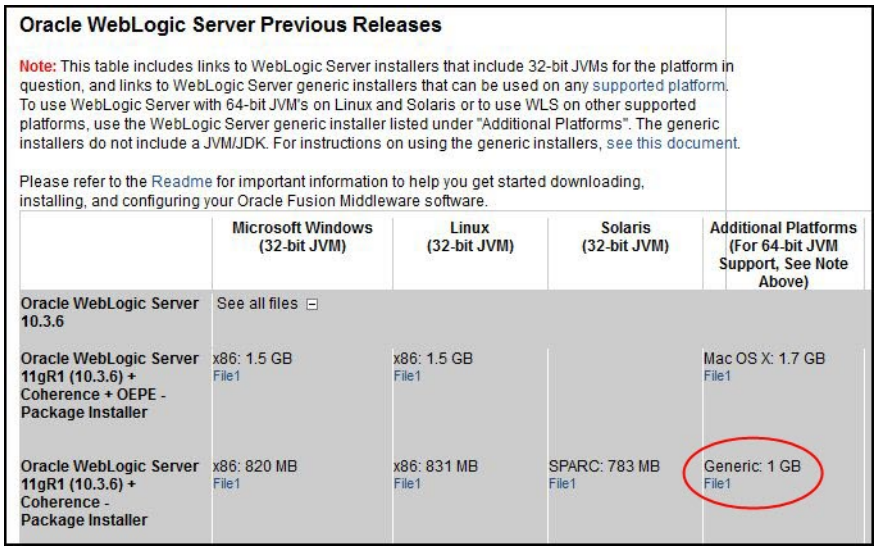
Required Oracle products

An Endeca Server installation requires the WebLogic Server, ADF Runtime, and JDK products.

Oracle WebLogic Server requirement

The supported version of Oracle WebLogic Server is 10.3.6, which is part of the WebLogic Server 11g product. This version is available in the **Oracle WebLogic Server Previous Releases** section of this page: *http://www.oracle.com/technetwork/middleware/ias/downloads/wls-main-097127.html*

Note that this page provides a number of Oracle WebLogic Server 10.3.6 versions. However, the only supported version is the **Generic** version that is listed under the **Additional Platforms** column, as shown in this cropped illustration of the download page:



Oracle WebLogic Server Previous Releases

Note: This table includes links to WebLogic Server installers that include 32-bit JVMs for the platform in question, and links to WebLogic Server generic installers that can be used on any supported platform. To use WebLogic Server with 64-bit JVM's on Linux and Solaris or to use WLS on other supported platforms, use the WebLogic Server generic installer listed under "Additional Platforms". The generic installers do not include a JVM/JDK. For instructions on using the generic installers, see this document.

Please refer to the Readme for important information to help you get started downloading, installing, and configuring your Oracle Fusion Middleware software.

	Microsoft Windows (32-bit JVM)	Linux (32-bit JVM)	Solaris (32-bit JVM)	Additional Platforms (For 64-bit JVM Support, See Note Above)
Oracle WebLogic Server 10.3.6	See all files			
Oracle WebLogic Server 11gR1 (10.3.6) + Coherence + OEPE - Package Installer	x86: 1.5 GB File1	x86: 1.5 GB File1		Mac OS X: 1.7 GB File1
Oracle WebLogic Server 11gR1 (10.3.6) + Coherence - Package Installer	x86: 820 MB File1	x86: 831 MB File1	SPARC: 783 MB File1	Generic: 1 GB File1

The Generic version is used because it is a platform-agnostic installer (i.e., can be used on both Linux and Windows platforms) and also because it allows you to use a 64-bit JVM. The 64-bit JVM is required for the Oracle Endeca Server.

If you have an Oracle account, you can download the Generic installer as follows:

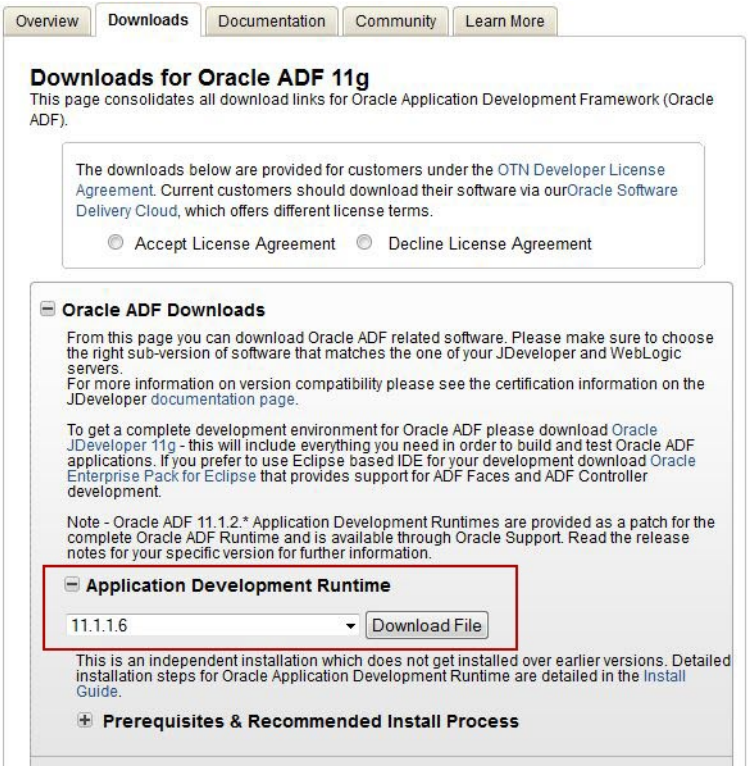
1. Click the **Accept License Agreement** radio button at the top of the page.
2. Click the **File1** link in the Generic cell.
3. If you are not already logged in, sign in (on the Sign In page) with your Oracle username and password.
4. Click **Save File** on the download dialog.

As a result, the `wls_generic.jar` installer is downloaded to your machine. To run this installer, follow the installation instructions in *Installing WebLogic Server on page 11*.

Oracle ADF Runtime requirement

After installing WebLogic Server, you must install version 11.1.1.6 of the Oracle ADF (Application Development Framework) Runtime package. The ADF Runtime installer is available at this page: *http://www.oracle.com/technetwork/developer-tools/adf/downloads/index.html*

The location of the **Application Development Runtime** download link is shown below in this cropped version of the Oracle ADF download page.



If you have an Oracle account, you can download the ADF Runtime installer as follows:

1. Click the **Accept License Agreement** radio button at the top of the page.
2. In the **Application Development Runtime** section, select **11.1.1.6** and click the **Download File** button.
3. If you are not already logged in, sign in (on the Sign In page) with your Oracle username and password.
4. Click **Save File** on the download dialog.

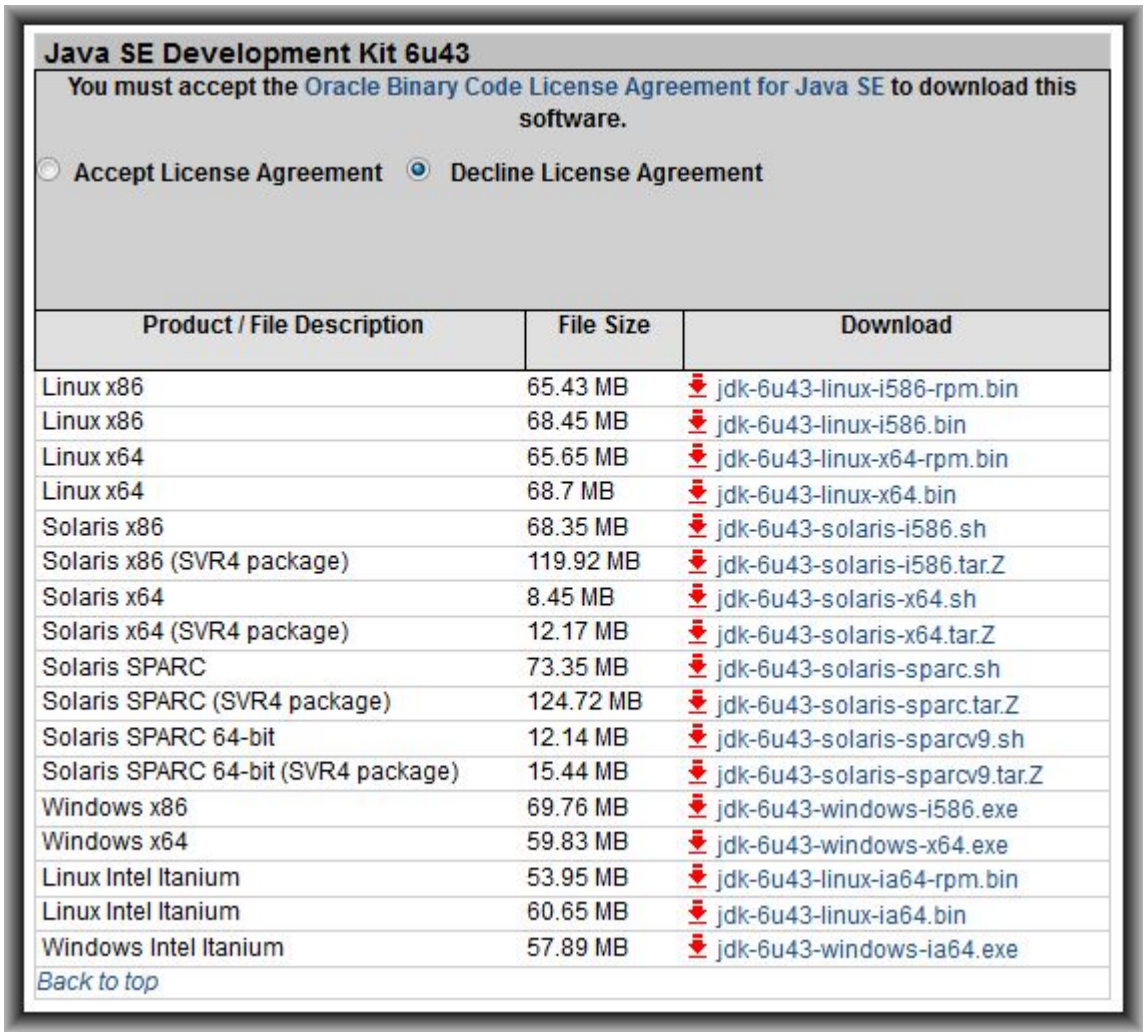
As a result, the `ofm_appdev_11.1.1.6.0_disk1_1of1.zip` file is downloaded to your machine. To run this installer, follow the installation instructions in *Installing Oracle ADF Runtime package on page 22*.

Sun Java 6 JDK requirement

During the WebLogic installation procedure (and later during the WebLogic domain creation procedure), you are prompted for a JDK (Java Development Kit). The JDK provides the JRE (Java run-time environment) needed by the installation program to run. The JDK must be Java version 6 (also called 1.6).

While some WebLogic Server installers include a bundled JDK, the Generic installation program (`wls_generic.jar`) does not have a bundled JDK. Therefore, you must already have a JDK available that you can specify during the installation procedure.

The recommended JDK is Version 6 of the Oracle Sun SE (Standard Edition) Development Kit. This JDK is available from the **Java SE Development Kit 6u43** section of this web page:
http://www.oracle.com/technetwork/java/javasebusiness/downloads/java-archive-downloads-javase6-419409.html



Java SE Development Kit 6u43

You must accept the Oracle Binary Code License Agreement for Java SE to download this software.

Accept License Agreement Decline License Agreement

Product / File Description	File Size	Download
Linux x86	65.43 MB	jdk-6u43-linux-i586-rpm.bin
Linux x86	68.45 MB	jdk-6u43-linux-i586.bin
Linux x64	65.65 MB	jdk-6u43-linux-x64-rpm.bin
Linux x64	68.7 MB	jdk-6u43-linux-x64.bin
Solaris x86	68.35 MB	jdk-6u43-solaris-i586.sh
Solaris x86 (SVR4 package)	119.92 MB	jdk-6u43-solaris-i586.tar.Z
Solaris x64	8.45 MB	jdk-6u43-solaris-x64.sh
Solaris x64 (SVR4 package)	12.17 MB	jdk-6u43-solaris-x64.tar.Z
Solaris SPARC	73.35 MB	jdk-6u43-solaris-sparc.sh
Solaris SPARC (SVR4 package)	124.72 MB	jdk-6u43-solaris-sparc.tar.Z
Solaris SPARC 64-bit	12.14 MB	jdk-6u43-solaris-sparcv9.sh
Solaris SPARC 64-bit (SVR4 package)	15.44 MB	jdk-6u43-solaris-sparcv9.tar.Z
Windows x86	69.76 MB	jdk-6u43-windows-i586.exe
Windows x64	59.83 MB	jdk-6u43-windows-x64.exe
Linux Intel Itanium	53.95 MB	jdk-6u43-linux-ia64-rpm.bin
Linux Intel Itanium	60.65 MB	jdk-6u43-linux-ia64.bin
Windows Intel Itanium	57.89 MB	jdk-6u43-windows-ia64.exe

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You should download the 64-bit version appropriate for your platform:

- Linux: the **Linux x64** product
- Windows: the **Windows x64** product

Important:

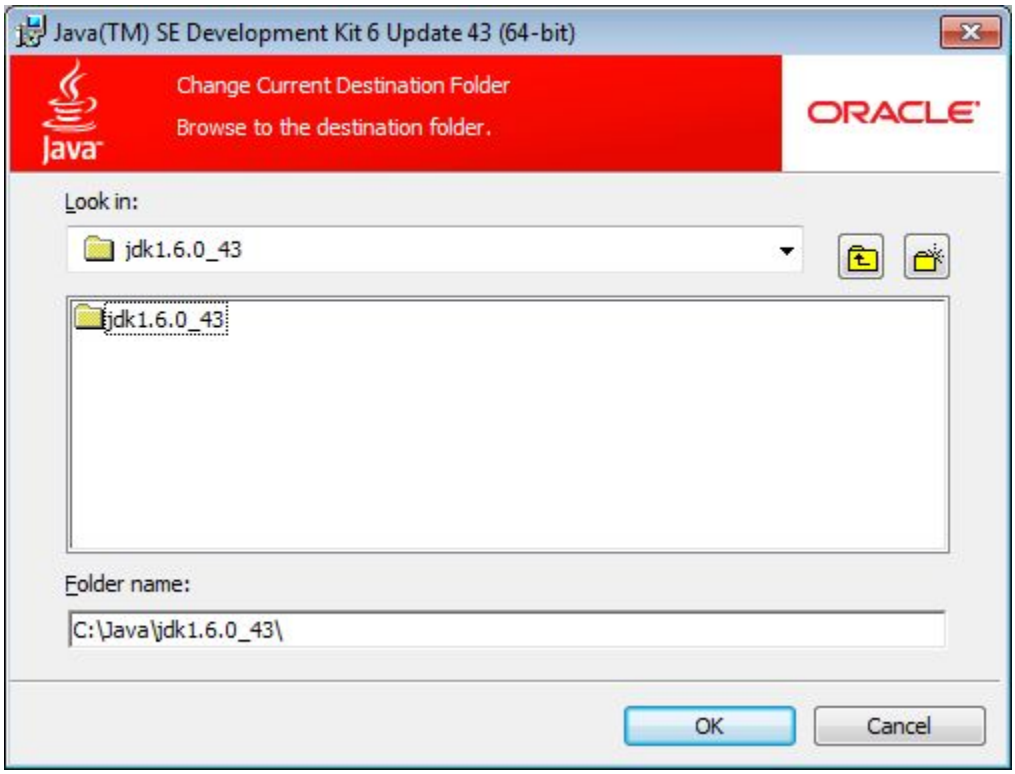
When installing the Sun JDK package, make sure that you install it in a directory path that does not have spaces. For example, the default destination path on Windows is:

```
C:\Program Files\Java\jdk1.6.0_43
```

Because the space in "Program Files" will cause problems with the ADF and Endeca Server installers, you must change the destination path to a directory similar to this example:

```
C:\Java\jdk1.6.0_43
```

The JDK screen for the destination folder path should look like this:



Make sure you specify this path to the `-jreLoc` flag of the ADF and Endeca Server installers and also when prompted for a JDK in an installation screen.

About the Endeca Server integration with the WebLogic Server

The Endeca Server is a J2EE application that runs in a J2EE container in the Oracle WebLogic Server. The Endeca Server uses WebLogic 11g (10.3.6), and Application Development Framework 11g (11.1.1.6). This topic discusses the integration in detail.

The Endeca Server software exposes almost all of its APIs as SOAP web services. Starting with the Endeca Server version 7.5.0, those web services are implemented using the Oracle WebLogic Server 11g (WebLogic Server version 10.3.6), inside a hosted web application called the Endeca Server.

The Endeca Server delegates most of its actual query processing to its own internal component, the Dgraph, which is external to the WebLogic Server, is not Java-based, and must be running in each active Endeca Server instance.

For single-node development environments, you can deploy the Endeca Server instance in the single Admin Server in the WebLogic Server. In the Endeca Server cluster, all Endeca Server instances must be running on the Managed Servers only.

Important: This Installation Guide relies on those components that are available in the WebLogic Server installation under the Oracle Restricted Use License. If your site already has access to the fuller version of the WebLogic Server, additional components may be available to you. However, the instructions in this guide do not guarantee that any other components of the WebLogic Server can be

used with the Endeca Server. Additionally, certain components, such as the Enterprise Manager, are not discussed in this guide.

How the WebLogic Server is used

The Endeca Server application hosted in the WebLogic domain utilizes the following features of the WebLogic Server and Application Development Framework (this list is not guaranteed to be exhaustive):

- The Java Required Files (JRF). The JRF template is used for the domain configuration of the Oracle WebLogic Server targeted for using it with the Endeca Server. (This template is used automatically when you create an Endeca Server domain in the WebLogic Server.)
- The WebLogic deployment tools. You use the Configuration Wizard for creating a WebLogic domain for JRF and the Endeca Server. The Endeca Server uses the Administration Console and WLST (the WebLogic Server Scripting Tool) for starting and stopping the Managed Servers hosting the Endeca Server instances.
- The WebLogic Server security features, for ensuring security of the Endeca Server processing, interfaces, and data.

The Endeca Server does not utilize the following features of the WebLogic Server (this list is not exhaustive):

- The WebLogic Server message catalog and the default Java Logging API are not used for logging from the Endeca Server. Instead, the Endeca Server uses the Oracle Diagnostic Logging (ODL). Note that any messages from the WebLogic domain itself (and not the Endeca Server application running inside it) utilize the default message catalog and the Java Logging API from the WebLogic Server.
- The WebLogic Server JDBC modules or resources are not used in the Endeca Server package (as they are not required).
- The WebLogic Server clusters are not used by the Endeca Server for load balancing and request routing. Instead, the Endeca Server cluster accepts requests on any Endeca Server instance, and utilizes its own routing service. Depending on the deployment strategy, an external load balancer can also be used.

Important: For performance and troubleshooting purposes, it is preferable to dedicate a WebLogic domain to hosting only the Endeca Server Java application. In this case, the `endeca-server` root context is used in the URL pointing to any of the WebLogic Server instances hosting the Endeca Server application.

Hardware requirements

The Oracle Endeca Server has the following hardware requirements.

Note: In this guide, the term "x64" refers to any processor compatible with the AMD64/EM64T architecture. You might need to upgrade your hardware, depending on the data you are processing. All run-time code must fit entirely in RAM. Likewise, hard disk capacity must be sufficient based on the size of your data set. Please contact your Oracle representative if you need more information on sizing your hardware.

Windows and Linux on x64

Minimum hardware requirements:

- x64 processor, minimum 1.8 GHz

- At least 3 GB of RAM, depending on the size of the application data set
- 80 GB hard drive, depending on the size of the application data set

Recommended hardware requirements:

- x64 3.0+ GHz processors; Intel Xeon (including Nehalem) or AMD Opteron processors are recommended
- 8 GB of RAM or more, depending on the size of the application data set
- High performance network-attached storage (for example, attached via a dedicated iSCSI or fibre channel network), or high performance locally-attached RAID storage (for example, a RAID 6 or RAID 0+1 array with battery-backed write caching, operating on 72GB or 146 GB spindles at 10k or 15k RPM spindle speed)
- Gigabit Ethernet

Hardware requirements for running an Endeca Server cluster

These requirements exist:

- Shared file system. All Endeca Server instances deployed on Managed Servers in the WebLogic domain must have write access to a shared file system on which the index for the data domains will be stored. This shared file system is also used by the Cluster Coordinator services that must be running in the Endeca Server cluster.
- Load balancer. Even though, in an Endeca Server cluster, you can issue queries to any WebLogic Server instance hosting one of the Endeca Server instances (and it will be routed accordingly to the designated data domain hosted in this Endeca Server cluster), in most production deployments, it is still desirable to configure an external load balancer between your front-end application and an Endeca Server cluster. For more information load balancing and routing of requests in the Endeca Server cluster, see the *Oracle Endeca Server Cluster Guide*.

For detailed information about prerequisites and for instructions about deploying a cluster, see *Installing and Deploying an Endeca Server Cluster on page 56*.

Supported operating systems

The Oracle Endeca Server supports the following 64-bit operating systems running on servers with x64 capabilities:

Operating System	Description
Oracle Linux 5	Only the Red Hat Compatible Kernel is supported.
Linux RHEL 5	• Red Hat Enterprise Linux Server (version 5 for x64) running on x64 processors. • Red Hat Enterprise Linux Advanced Platform (version 5 for x64) running on x64 processors. For best performance on Red Hat Linux version 5 (Server and Advanced), Oracle recommends the latest version of RHEL 5.
Windows 2008	Windows Server 2008 R2 Enterprise running on x64 processors.

Notes

Windows 7 is not supported for production deployment, but operates sufficiently to enable training and small-scale staging and development work.

Windows XP is not supported.

We recommend turning off hyper-threading for machines on which the Dgraph is running. Because of the way the Dgraph works, it is actually detrimental to cache performance to use hyper-threading.

Disk space requirements

Ensure that adequate disk space is available before installing the Oracle Endeca Server software.

The three products have the following disk sizes after installation:

- Oracle WebLogic Server: 425 MB
- Oracle Application Development Runtime: 1024 MB
- Oracle Endeca Server: 475 MB

Therefore, the total disk size of the entire installation is approximately 1.9 GB.

Each of the three installation programs uses a temporary directory into which they extract the files necessary to install the software on the target system. During the installation process, your temporary directory must contain sufficient space to accommodate these files. As a rule of thumb, the files in the temporary directory require approximately 2.5 times the space that is ultimately required for each installation.

By default, the installation programs use these temporary directories:

- Windows platforms: directory referenced by the `TMP` system variable.
- UNIX platforms: system-dependent temporary directory.

Downloading the software

The Oracle Endeca Server software modules are downloaded from the Oracle Software Delivery Cloud.

To download the Oracle Endeca Server software:

1. Log in to `https://edelivery.oracle.com`.
2. Accept the terms and restrictions.
3. On the **Media Pack Search** page:
   (a) From the **Select a Product Pack** drop-down list, select **Oracle Endeca**.
   (b) From the **Platform** drop-down list, select either **Microsoft Windows x64 (64-bit)** or **Linux x86-64**.
   (c) Click **Go**.

   The list of media packs for the selected product and platform is displayed.
4. Select the media pack for your platform and then click **Continue**:
   - Windows: **Oracle Endeca Server (7.5.1.1) Media Pack for Microsoft Windows x64 (64-bit)**
   - Linux: **Oracle Endeca Server (7.5.1.1) Media Pack for Linux x86-64**

5. On the **Download** page, click **Download** next to the name of package for your platform:
   - **Oracle Endeca Server (7.5.1) for Microsoft Windows x64 (64-bit)**
   - **Oracle Endeca Server (7.5.1) for Linux x86-64**

   Each package contains a ZIP file with the Oracle Endeca Server installer, which is documented in *Installing Oracle Endeca Server on page 32*.
6. You should also download these two packages:
   - **Oracle Endeca Server (7.5.1) Sample Data** contains the Oracle Endeca Server sample data set (documented in *Using the SH sample data on page 80*).
   - **Oracle Endeca Server (7.5.1) Documentation** contains a ZIP file which has this guide, The *Oracle Endeca Server Migration Guide*, the Oracle Endeca Server Licensing Guide, and the release notes for Oracle Endeca Server.

The complete documentation set for Endeca Server is available for online viewing or downloading at: *http://www.oracle.com/technetwork/middleware/endecaserver/documentation/endeca-documentation-1721979.html*

Chapter 2

Installing WebLogic Server and Application Developer Runtime

This section contains instructions for installing the Oracle WebLogic Server and the Oracle Application Developer Runtime products.

Installing WebLogic Server

This topic provides a brief description of how to install Oracle WebLogic Server, which is the Web server container in which the Endeca Server application is hosted.

This topic describes the installation of Oracle WebLogic Server 10.3.6, which is part of the WebLogic Server 11g product. This procedure applies to the Generic version of the installer (the installer file is named `wls1036_generic.jar`).

Note: When installing WebLogic Server on Linux, do not run the installation program as the root user.

Before starting this procedure, make sure that you have downloaded these two components:

1. The Generic version of the WebLogic Server installer, as described in *Oracle WebLogic Server requirement on page 2*.
2. The Java 6 version of the Oracle Sun Java SE JDK, as described in *Sun Java 6 JDK requirement on page 4*.

Note that this procedure will install the minimum Oracle products needed to run Oracle Endeca Server. For example, it will not install the Oracle Coherence product, even though it is included in the installation package.

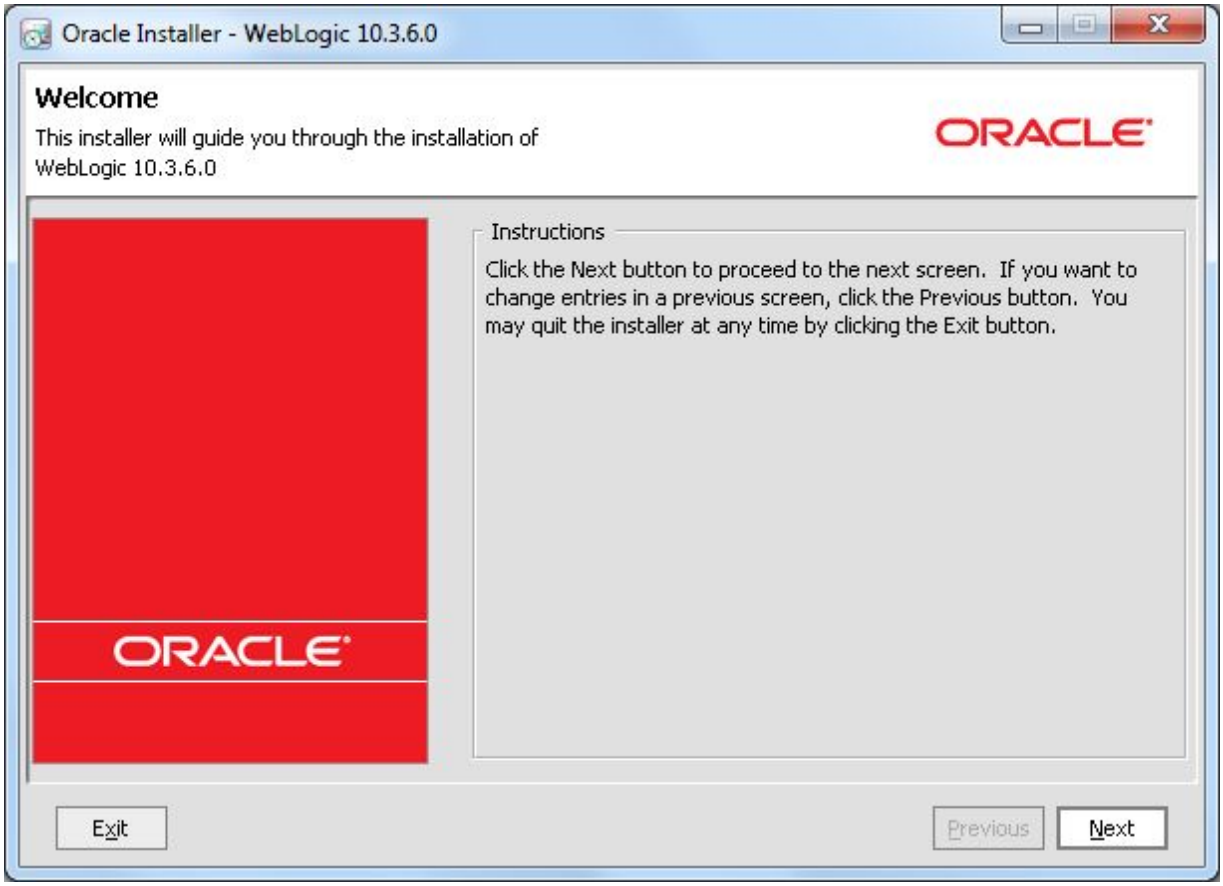
The installation instructions in this topic are a distillation of the complete instructions in the *Oracle Installation Guide for Oracle WebLogic Server*, which is available online at:
http://docs.oracle.com/cd/E23943_01/doc.1111/e14142/toc.htm

These distilled instructions concentrate on installing only those WebLogic Server components that are mandatory for an Endeca Server environment.

To install WebLogic Server:

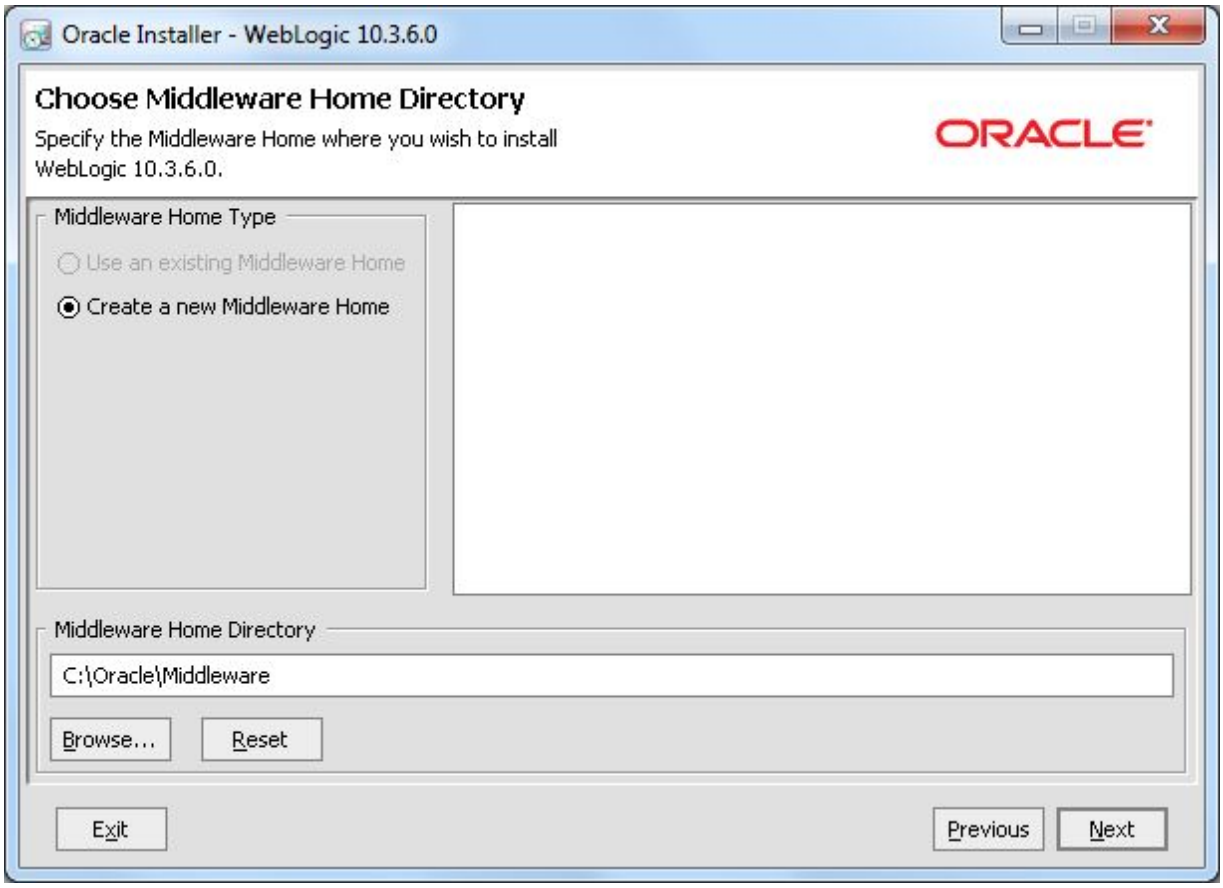
1. Make sure that you have installed the Java 6 version of the Oracle Sun SE 6 JDK on the machine on which you are installing WebLogic Server.
2. From a command prompt, navigate to the directory where the `wls1036_generic.jar` installer file is stored.

3. Launch the installer in Graphical Mode with this command:
   `java -jar wls1036_generic.jar`
   When the installer runs, it displays the installation wizard's **Welcome** screen.
4. At the **Welcome** screen, click **Next**.



5. At the **Choose Middleware Home Directory** screen, do the following:
   (a) Select **Create a new Middleware Home**.
   (b) In the **Middleware Home Directory** field, enter the name of the Middleware home directory. (This will be the `$MW_HOME` directory of your installation.) You can either accept the default location or enter another one. The Oracle Middleware Home Directory name may only contain alphanumeric , hyphen (-) , dot (.), and underscore (_) characters, and it must begin with an alphanumeric character.

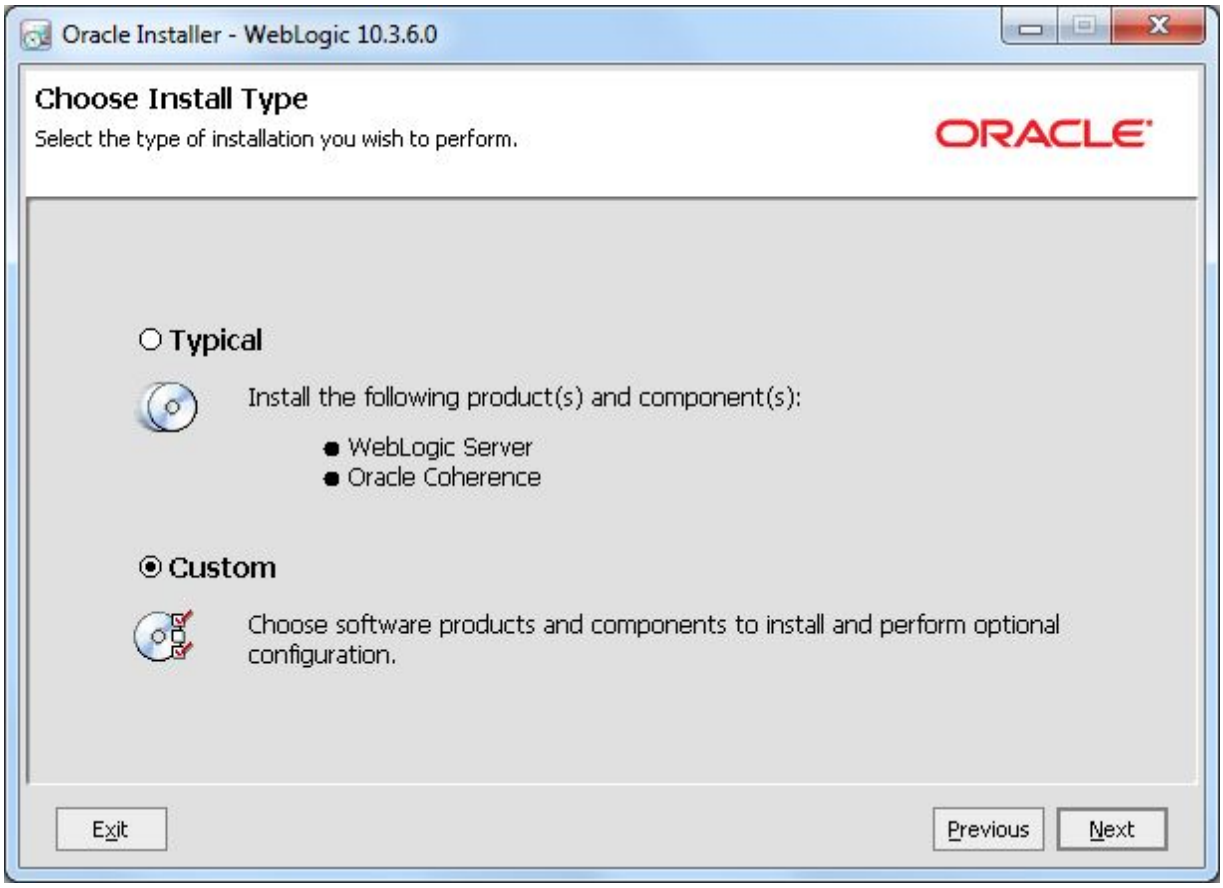
(c) When you have finished, click **Next**.



6. At the **Register for Security Updates** screen, enter your support details if you want to receive security updates and then click **Next**. If you do not want to receive security updates, (or if your machine has no Internet access), you can bypass the screen as follows:
   (a) Click **Next** without entering an email address.
   (b) At the **Email Address Not Specified** pop-up, click **Yes**.
   (c) At the **Are You Sure?** prompt, click **Yes**.

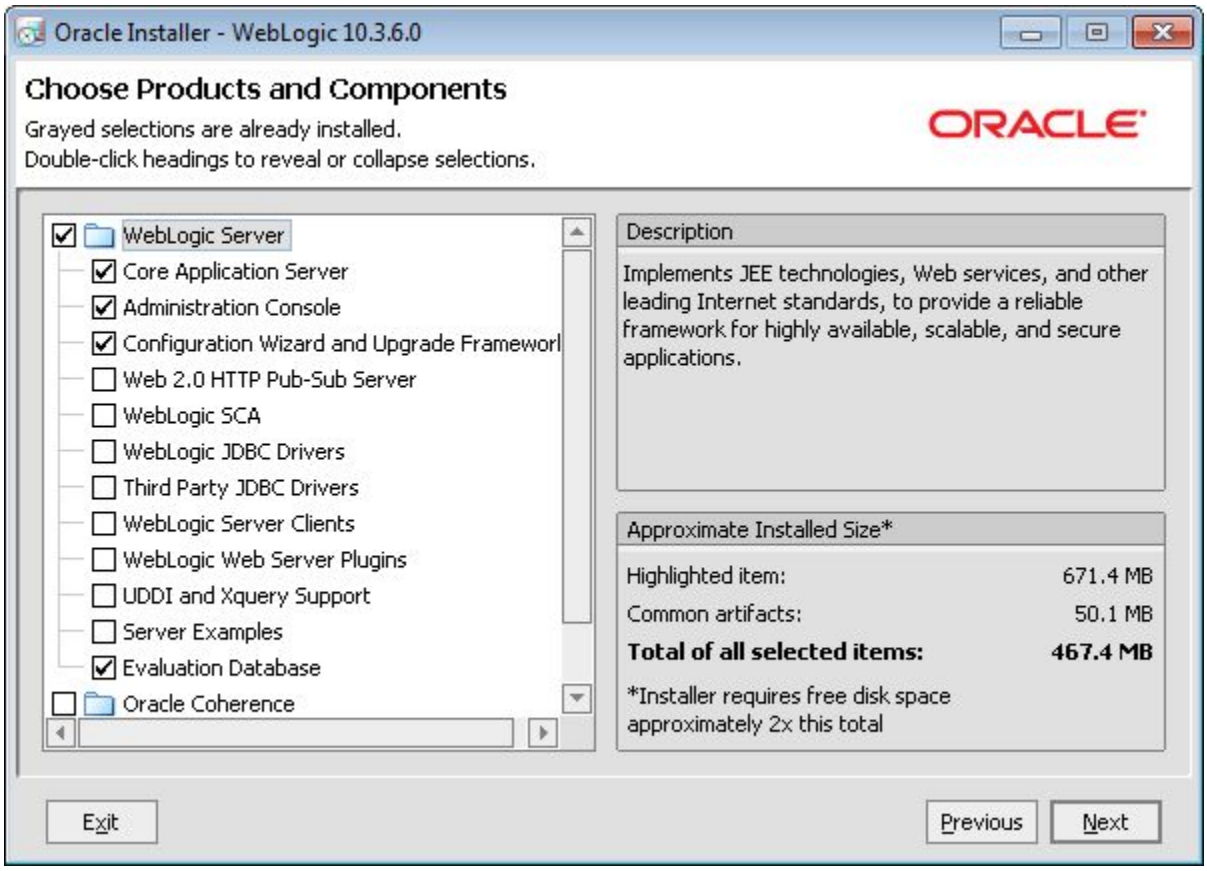
(d) In the **Connection Failed** dialog, click the **I wish to remain uninformed of security issues in my configuration or the machine has no Internet access** checkbox and then click **Continue**.

7. At the **Choose Install Type**, select **Custom** and click **Next**.



8. At the **Choose Products and Components** screen, leave only these products checked and click **Next**:
   (a) Core Application Server
   (b) Administration Console
   (c) Configuration Wizard and Upgrade Framework

(d) Evaluation Database (needed only if the EID Provisioning Service will be installed on this WebLogic instance)

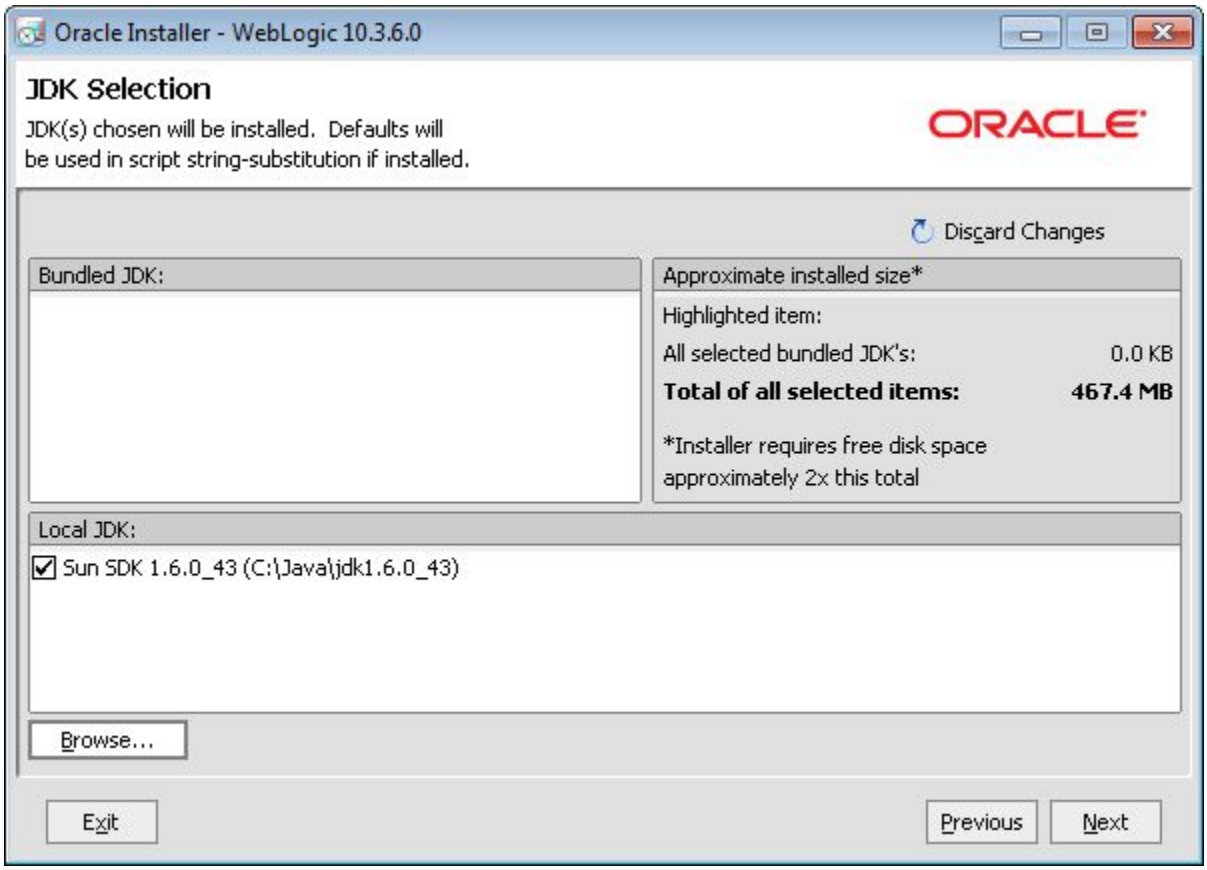


9. At the **JDK Selection** screen, do the following:

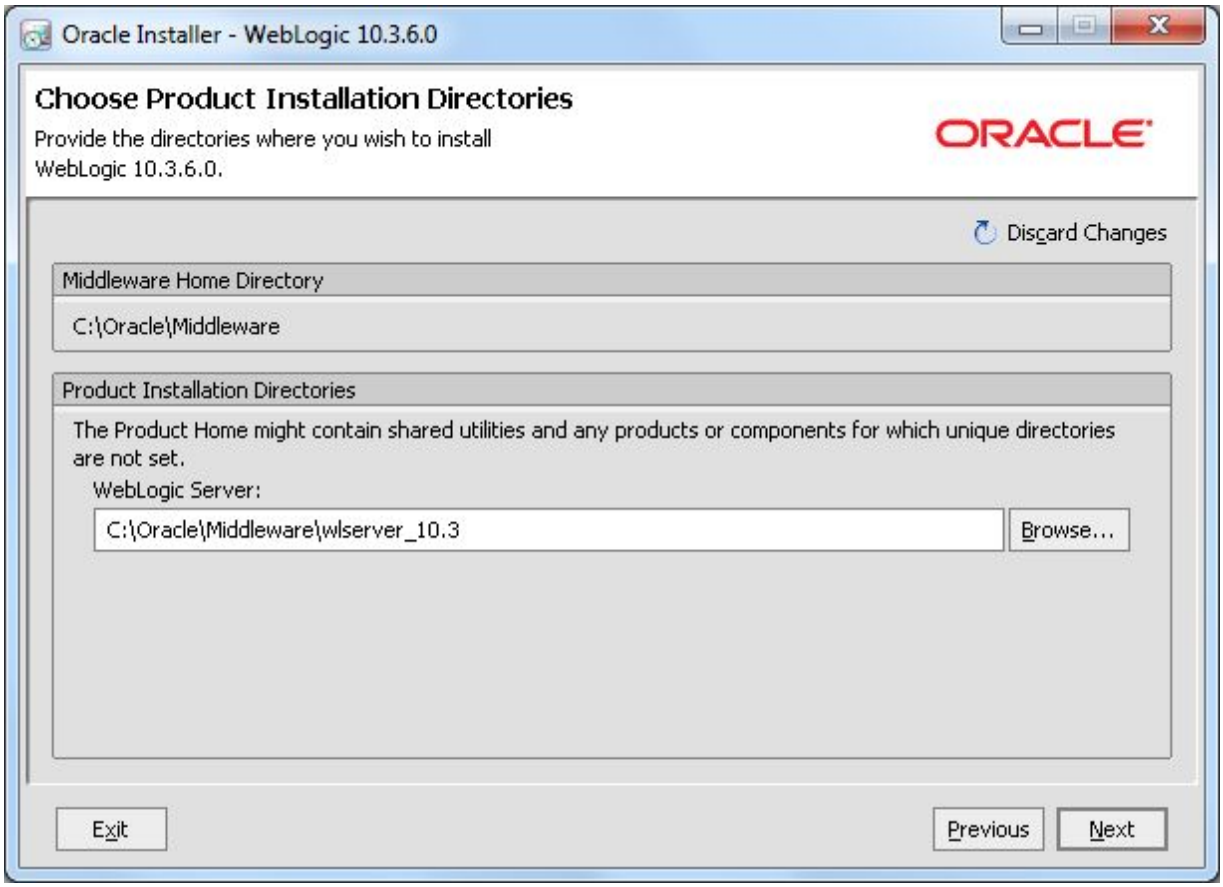
(a) Click the **Browse** button in the **Local JDK** pane.

(b) Browse to a local directory that contains the Oracle Java 6 JDK and select it. (The JDK will appear in the **Local JDK** pane with a checked box next to it.)

(c) Click **Next**.

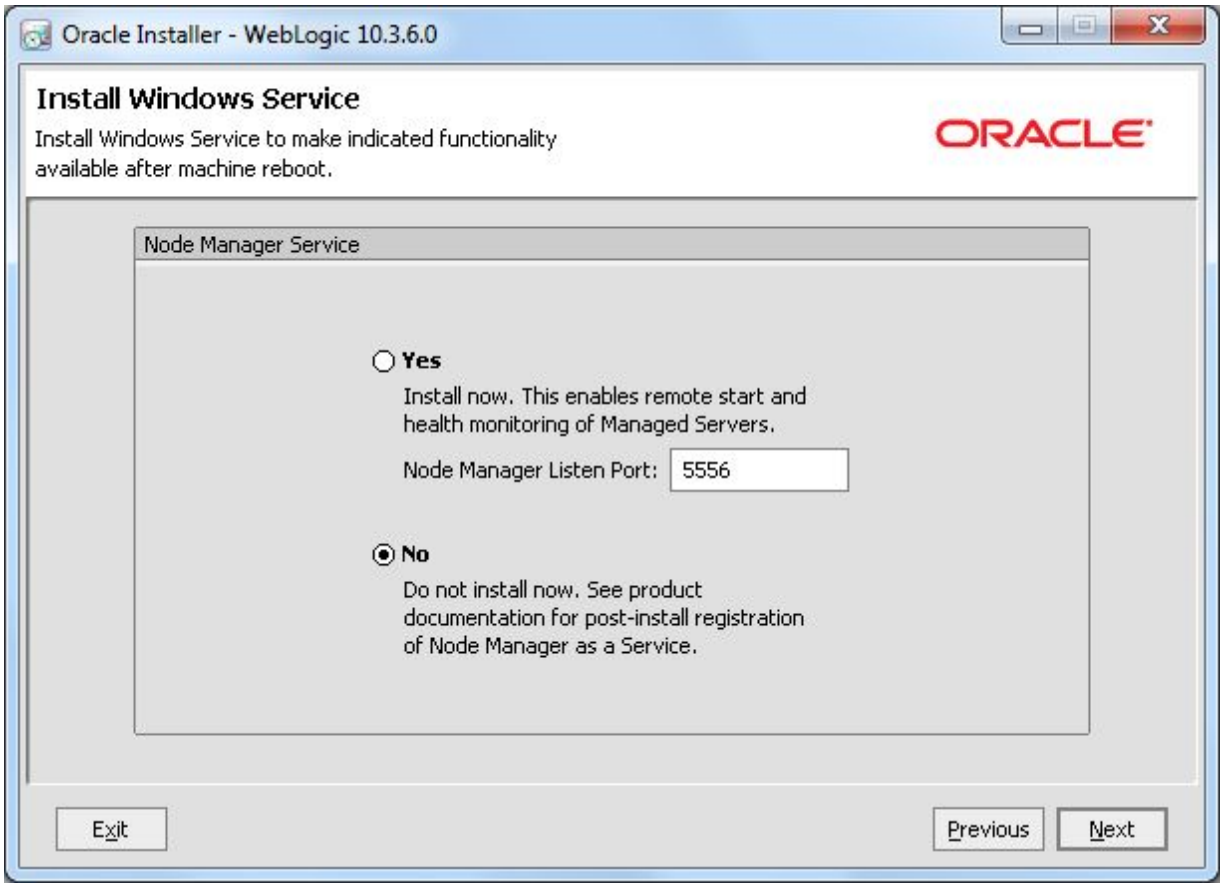

Oracle Installer - WebLogic 10.3.6.0
JDK Selection
JDK(s) chosen will be installed. Defaults will be used in script string-substitution if installed.
ORACLE
Discard Changes
Bundled JDK:
Approximate installed size*
Highlighted item:
All selected bundled JDK's: 0.0 KB
Total of all selected items: 467.4 MB
*Installer requires free disk space approximately 2x this total
Local JDK:
Sun SDK 1.6.0_43 (C:\Java\jdk1.6.0_43)
Browse...
Exit
Previous
Next

10. At the **Choose Product Installation Directories** screen, enter the name of the WebLogic Server installation directory. You can either accept the default installation directory or browse to another one. Then click **Next**.



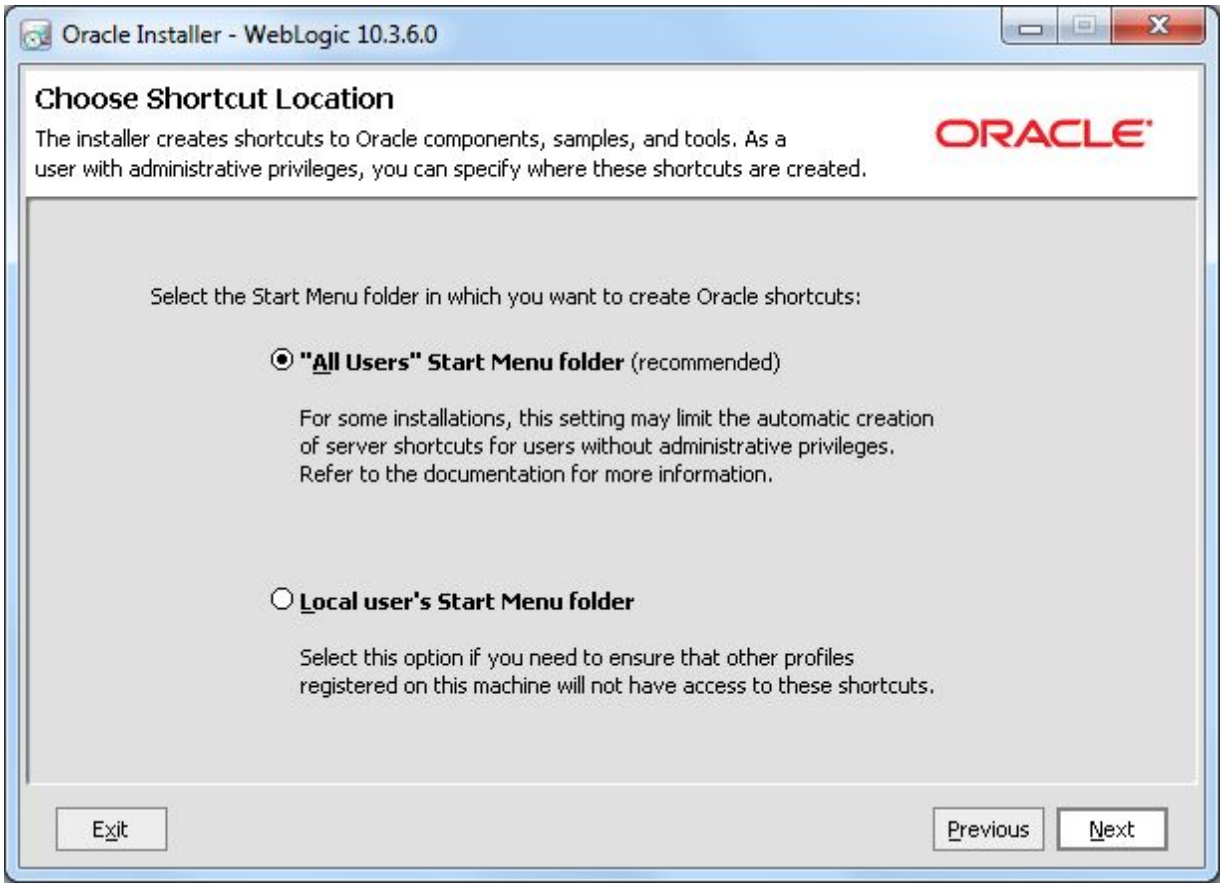
11. At the **Install Windows Service** screen, leave the **No** button selected and click **Next**.

    Note that you may not get this screen. It is typically displayed if all these conditions are true: you have Administrator privileges, you are performing an initial installation, you are installing on Windows, and you are performing a Custom installation.

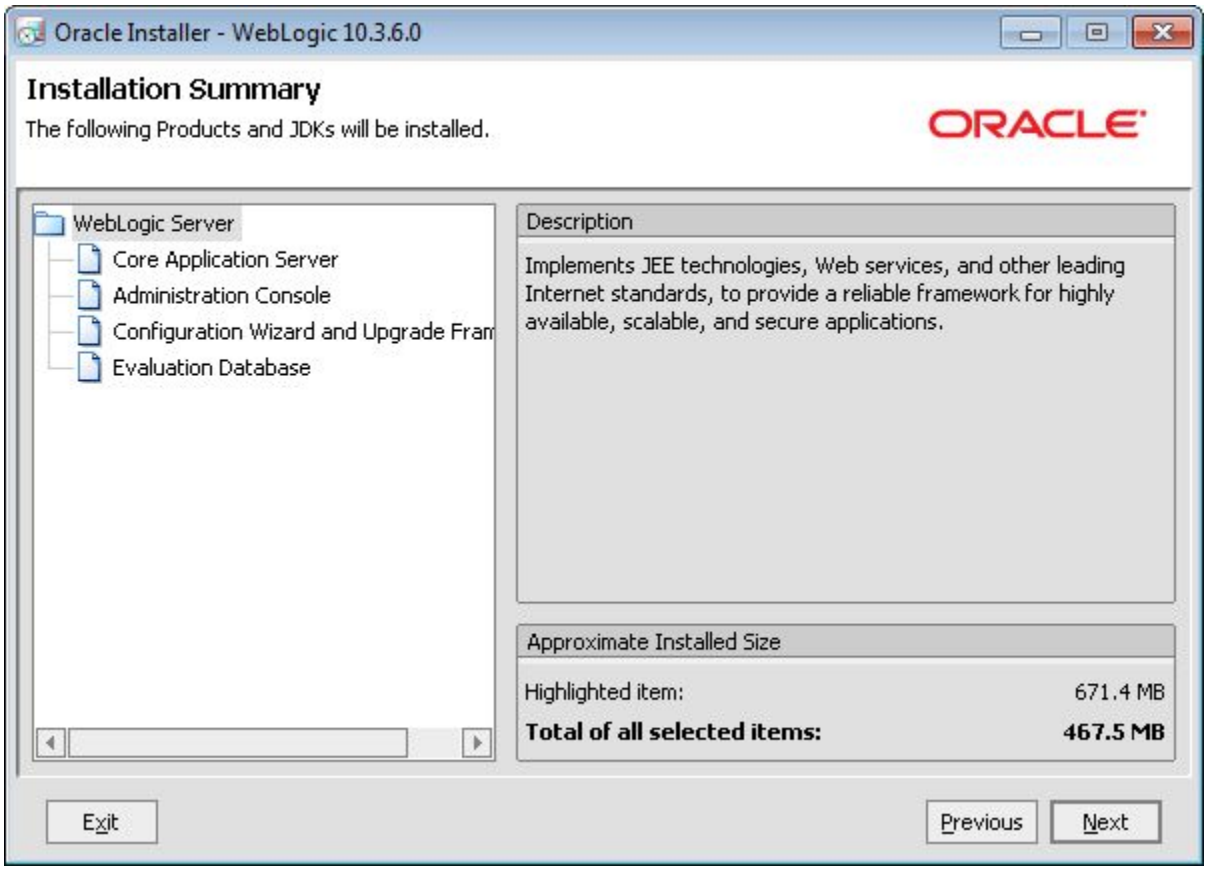


12. At the **Choose Shortcut Location** screen, select the **Start Menu** folder in which to create Oracle shortcuts and then click **Next**.

    Note that you may not get this screen. It is typically displayed if all these conditions are true: you have Administrator privileges, you are performing an initial installation, you are installing on Windows, and you are performing a Custom installation.

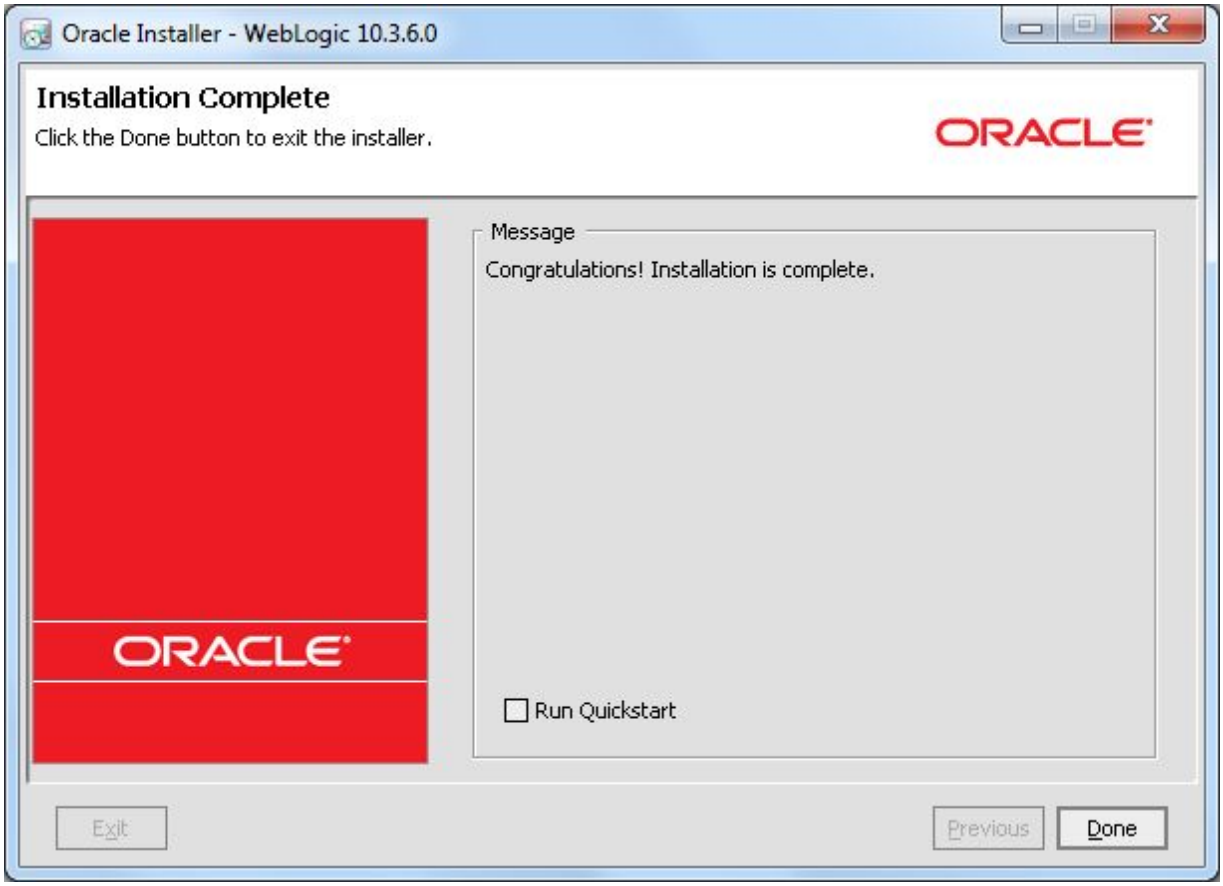


13. At the **Installation Summary** screen, verify that you are installing the correct products, and click **Next**.



14. At the **Installation Complete** screen, de-select **Run Quickstart** and click **Done** to exit the installer.

    Note that you can run the Quickstart application later.



On Windows, an **Oracle WebLogic** shortcut is created in the **Start Menu**. One of the sub-entries in this shortcut is to the WebLogic Server documentation.

The next step is to install the Oracle Application Development Framework Runtime package.

Installing Oracle ADF Runtime package

This topic describes how to install the ADF (Application Development Framework) Runtime 11.1.1.6 product, which contains the JRF on which the Endeca Server package depends.

This topic assumes that you have:

- Installed Oracle WebLogic Server 10.3.6.
- Downloaded the Oracle ADF (Application Development Framework) Runtime 11.1.1.6 product installer, as described on *Oracle ADF Runtime requirement on page 3*.

Important: The installation instructions in this topic are a distillation of the complete instructions in the *Oracle Fusion Middleware Installation Guide for Application Developer*. The complete instructions provide detailed information about installing the software, such as system requirements. The complete instructions are available online at: *http://docs.oracle.com/cd/E23943_01/doc.1111/e14827/toc.htm*

Note: Before proceeding to install Oracle ADF Runtime on Linux, ensure you:

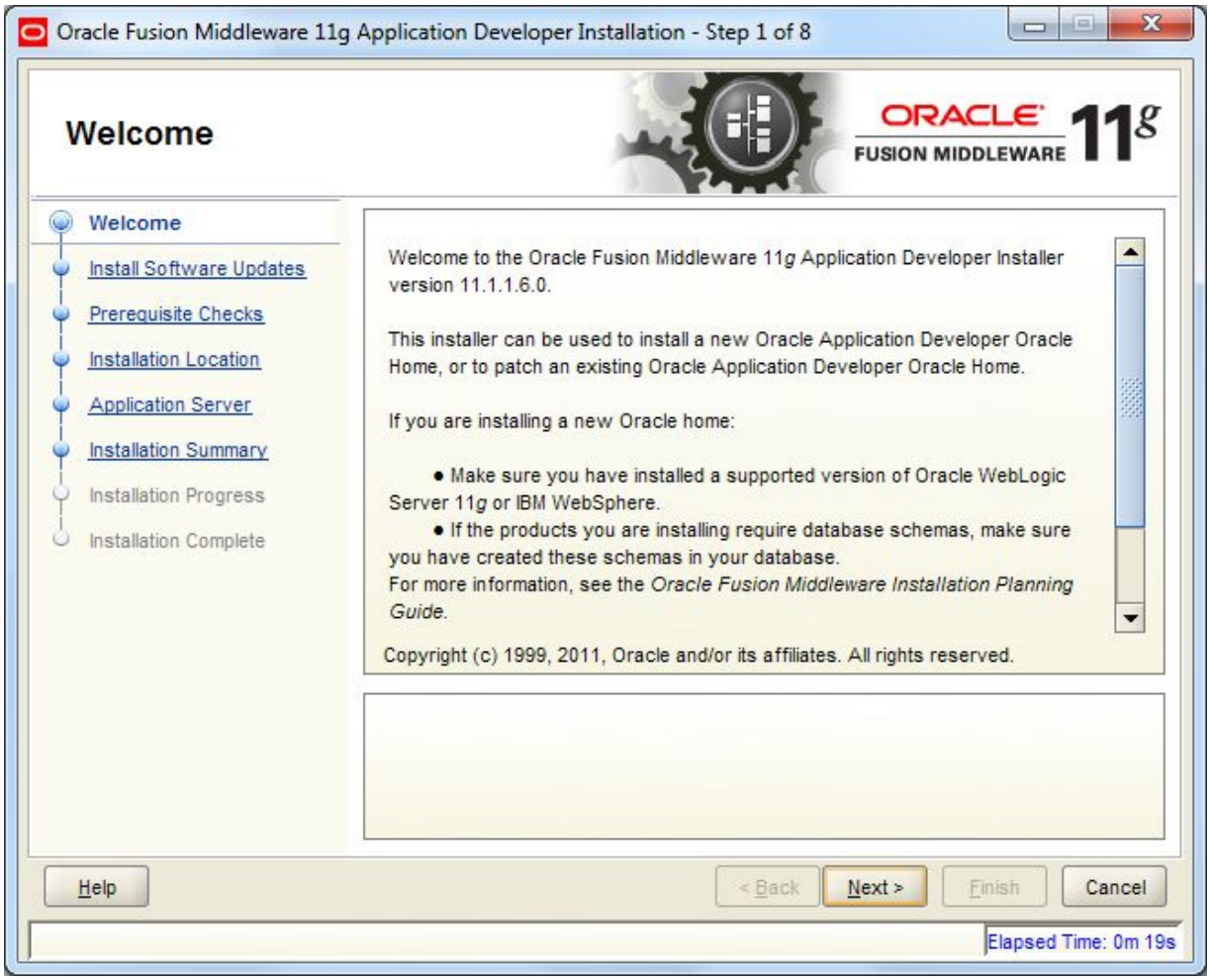
- Do not run the installation program as the root user.
- Have an X-Windows (X11) environment. The installer requires that your monitor must be configured to display at least 256 colors.

To install Oracle ADF Runtime:

1. Unpack the ADF ZIP package.
   As a result, you will see a *readme.htm* file and two sub-directories named `Disk1` and `Disk2`.
2. From a command prompt, change to the `Disk1` directory and run the installer:
   - For Linux, use this command:
     `./runInstaller -jreLoc <jre_location>`
   - For Windows, use this command:
     `setup.exe -jreLoc <jre_location>`

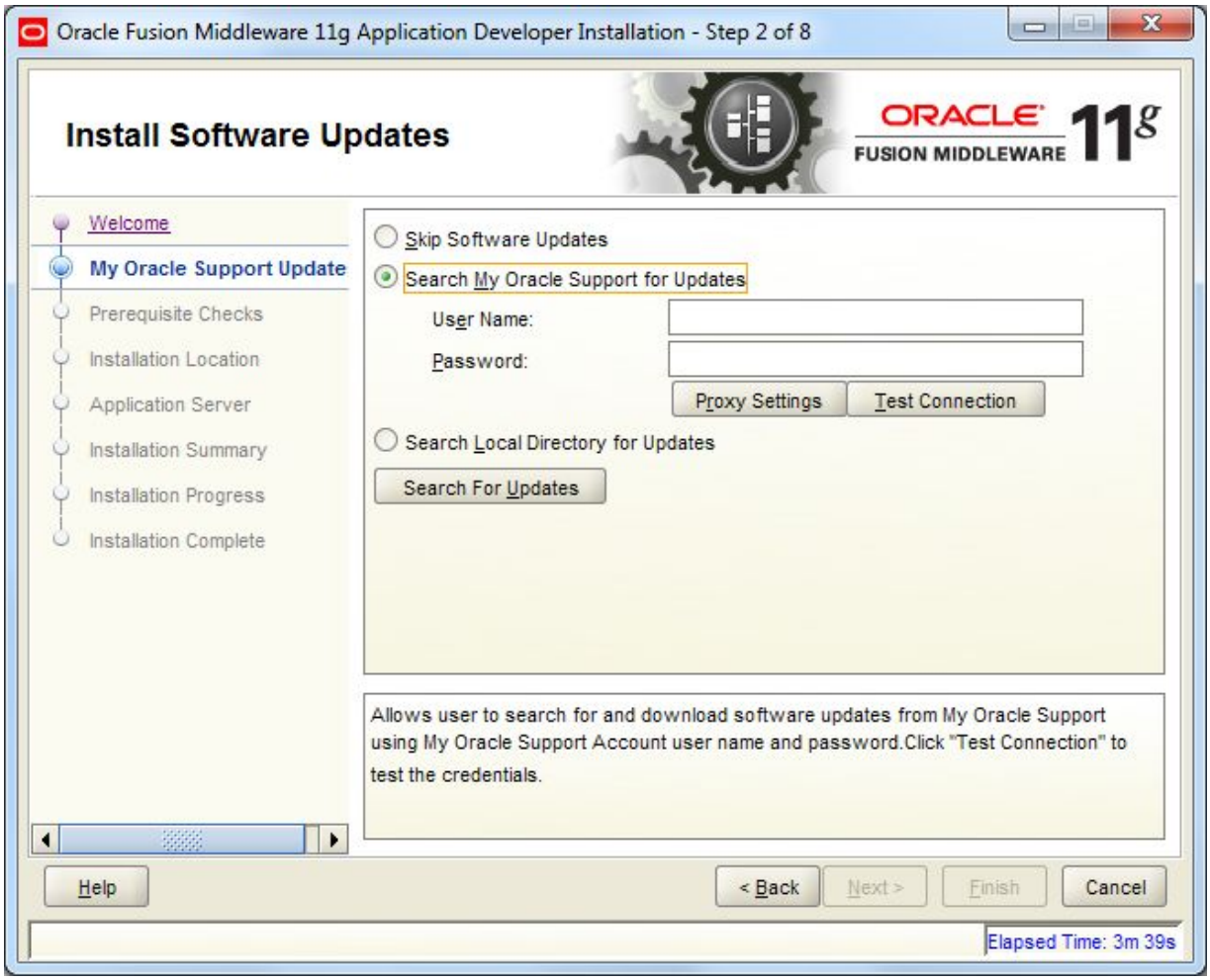
   For both commands, *jre_location* is the full path to the location of a Java 6 JDK directory on your system. Note that the path cannot contain spaces. For example:
   ```
   setup.exe -jreLoc c:\java\jdk1.6.0_43
   ```
3. If you are installing on a Linux system and this is the first time any Oracle product is being installed on your system with the Oracle Universal Installer, you will be asked to provide the location of an inventory directory. This is the location where the installer will set up subdirectories and maintain inventory data for each Oracle product that is installed on this system. Follow the directions on the screen.

4. At the **Welcome** screen, read the information and click **Next**.

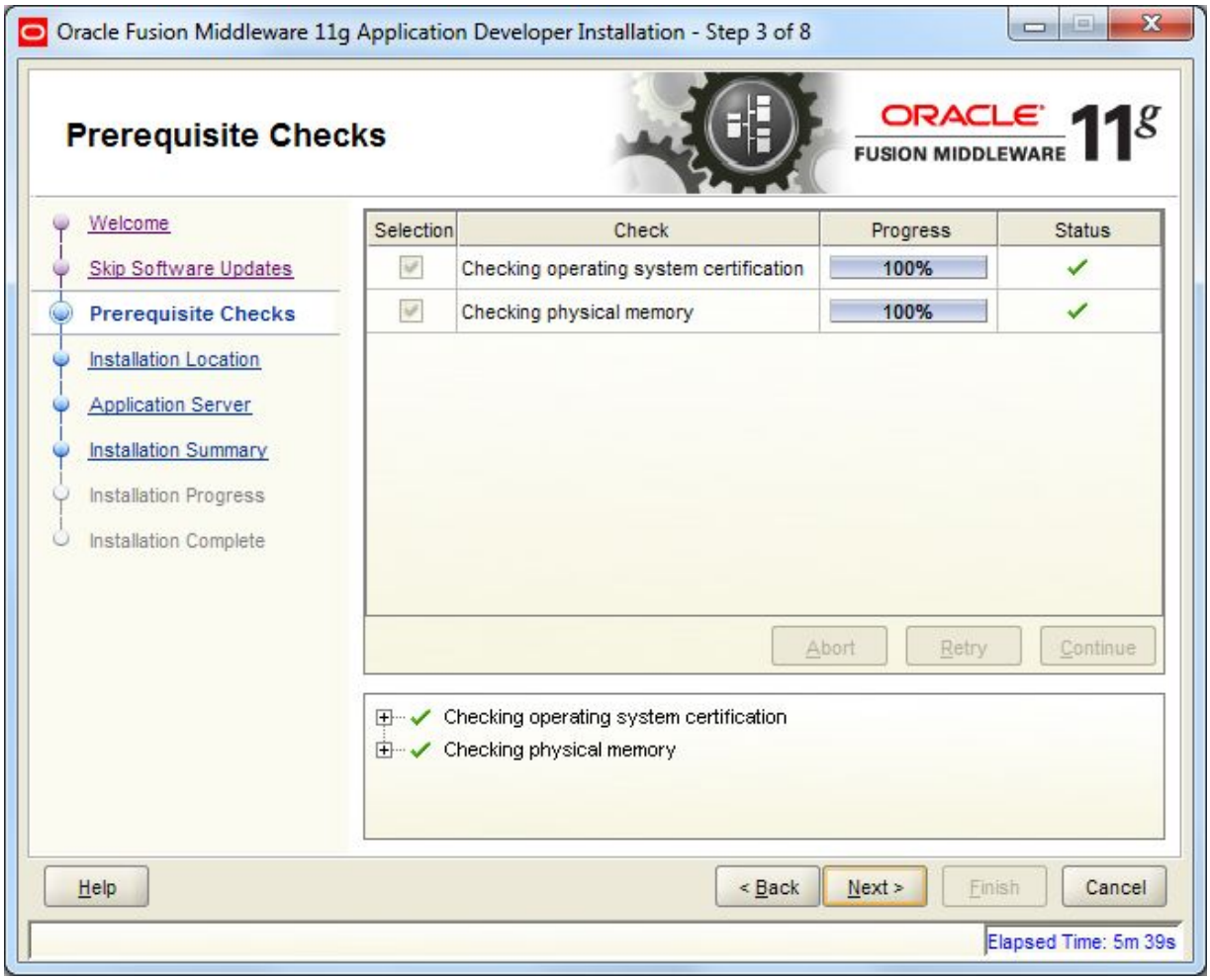


5. At the **Install Software Updates** screen, either select **Skip Software Updates** or search for updates. Then click **Next**.

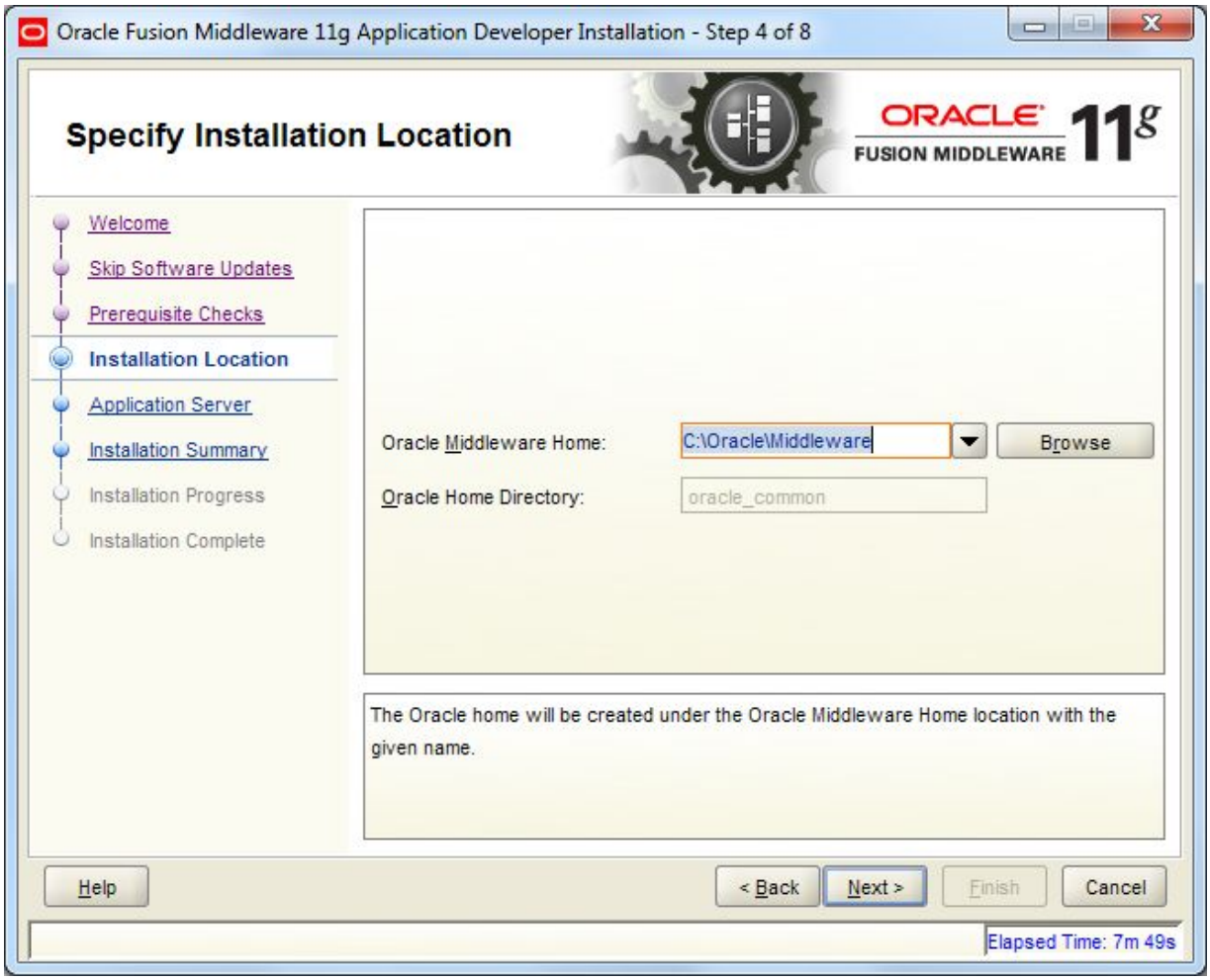
   This procedure assumes that you selected the **Skip Software Updates** option. Keep in mind that you can search for software updates after you finish all the installation steps.



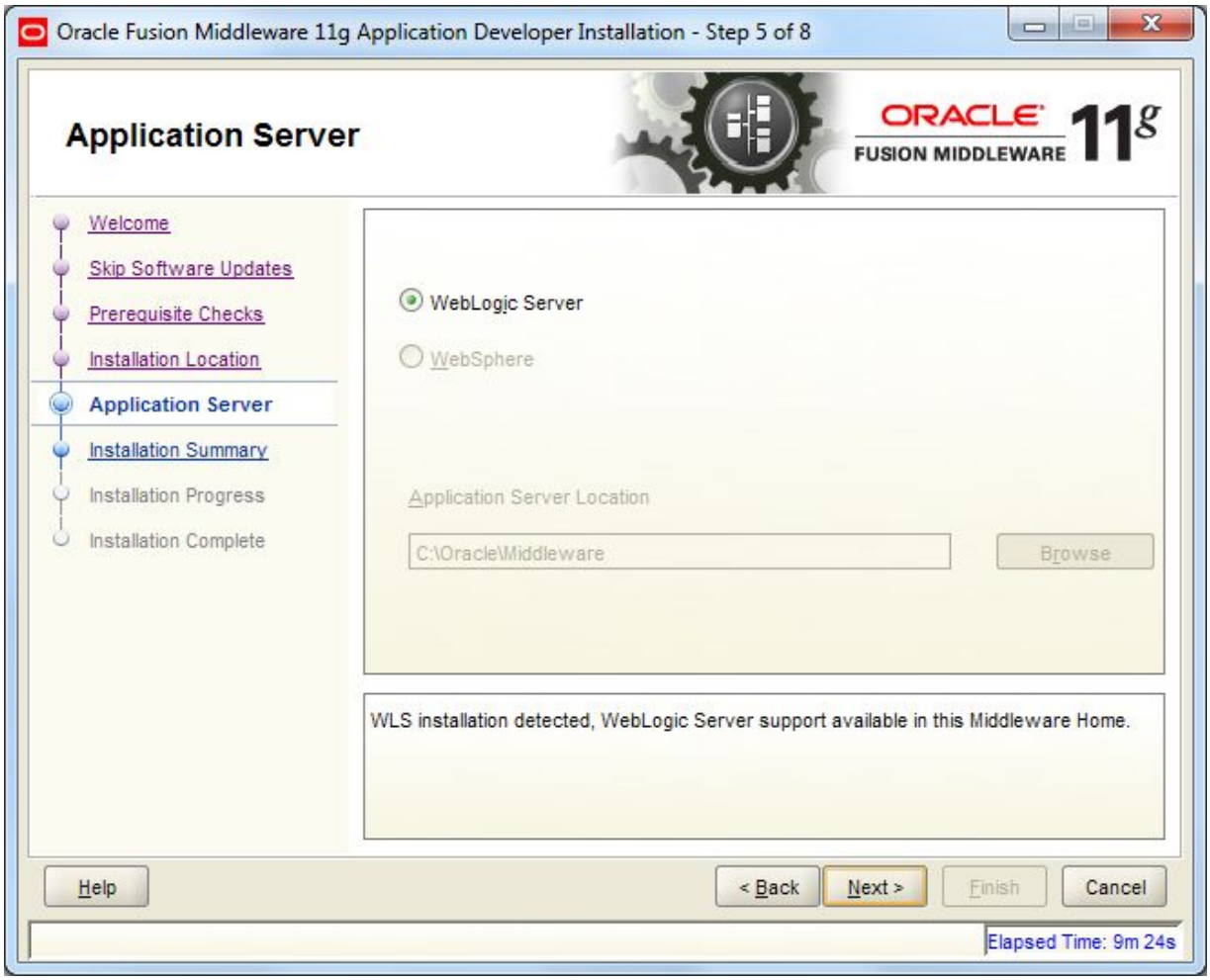
6. At the **Prerequisite Checks** screen, wait until the installation process passes all the necessary checks. It is important that the WebLogic Server passes its "number of file descriptors" check that is part of this step. If everything passes the checks, click **Next**.



7. At the **Specify Installation Location** screen, verify that the Oracle Middleware Home directory is the location to where you installed the WebLogic software. Then click **Next**.

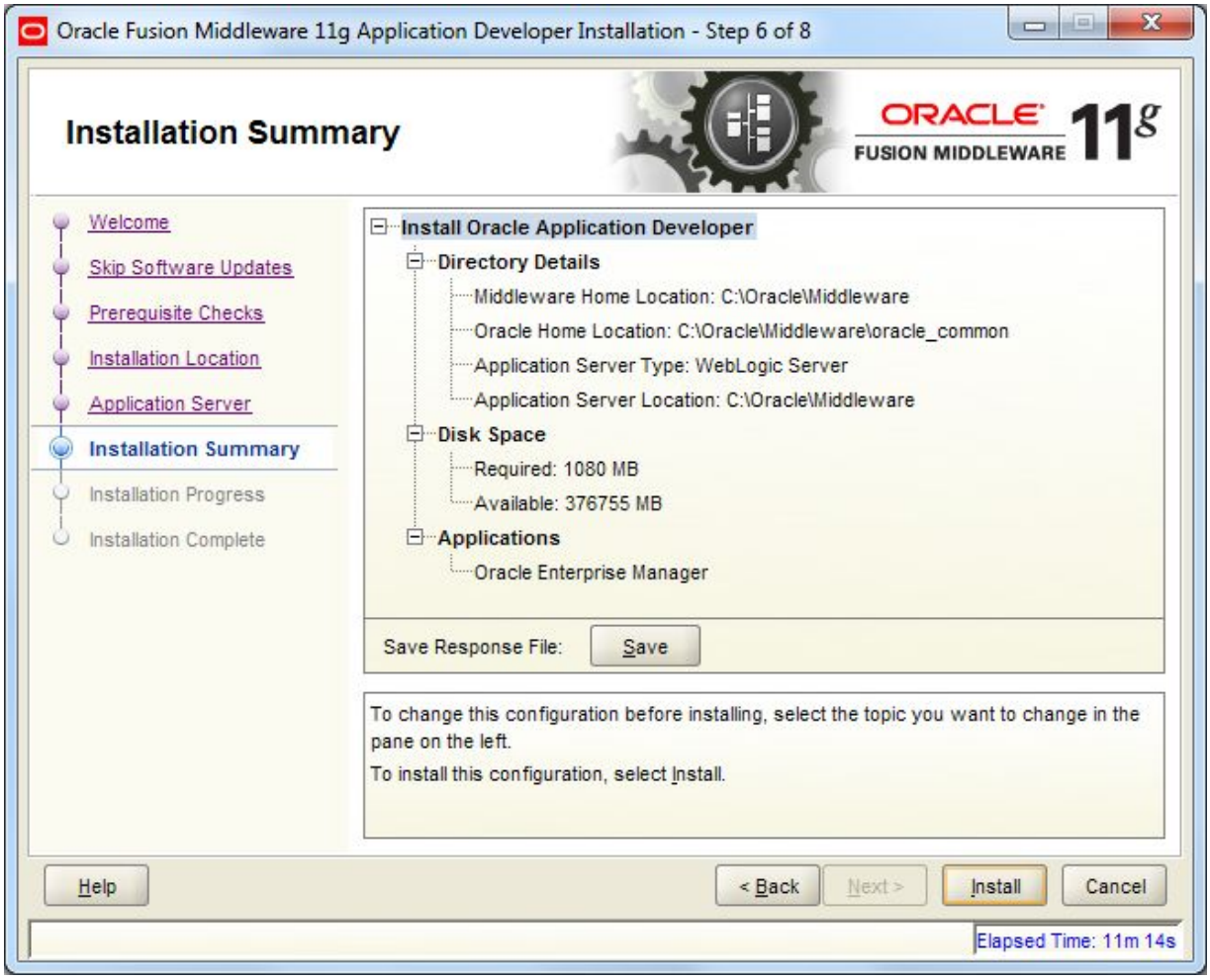


8. At the **Application Server** screen, select **WebLogic Server** and click **Next**.

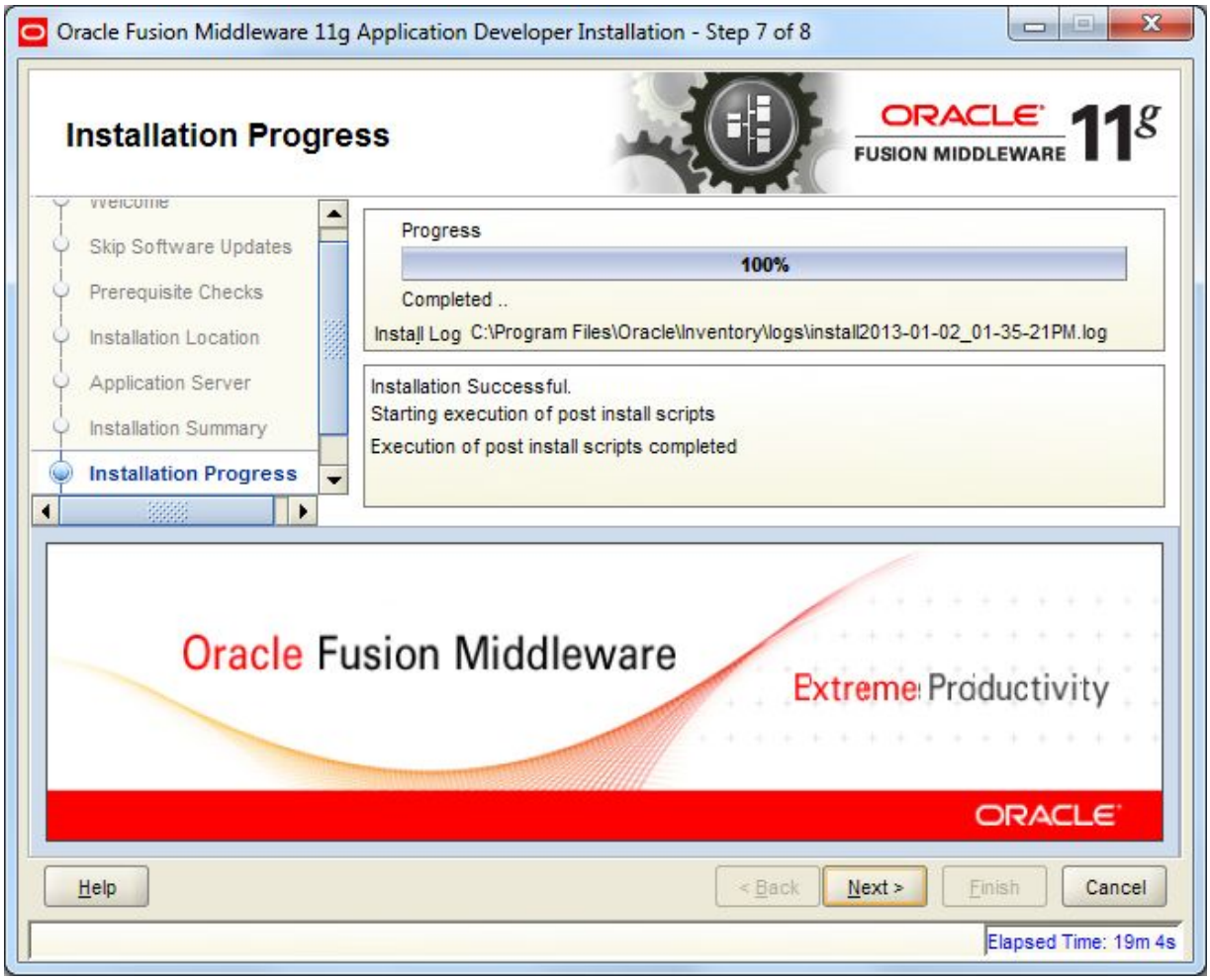


9. At the **Installation Summary** screen, verify the installation details and click **Install**.

   The **Installation Progress** screen shows the progress. When it finishes, the screen should look like this:

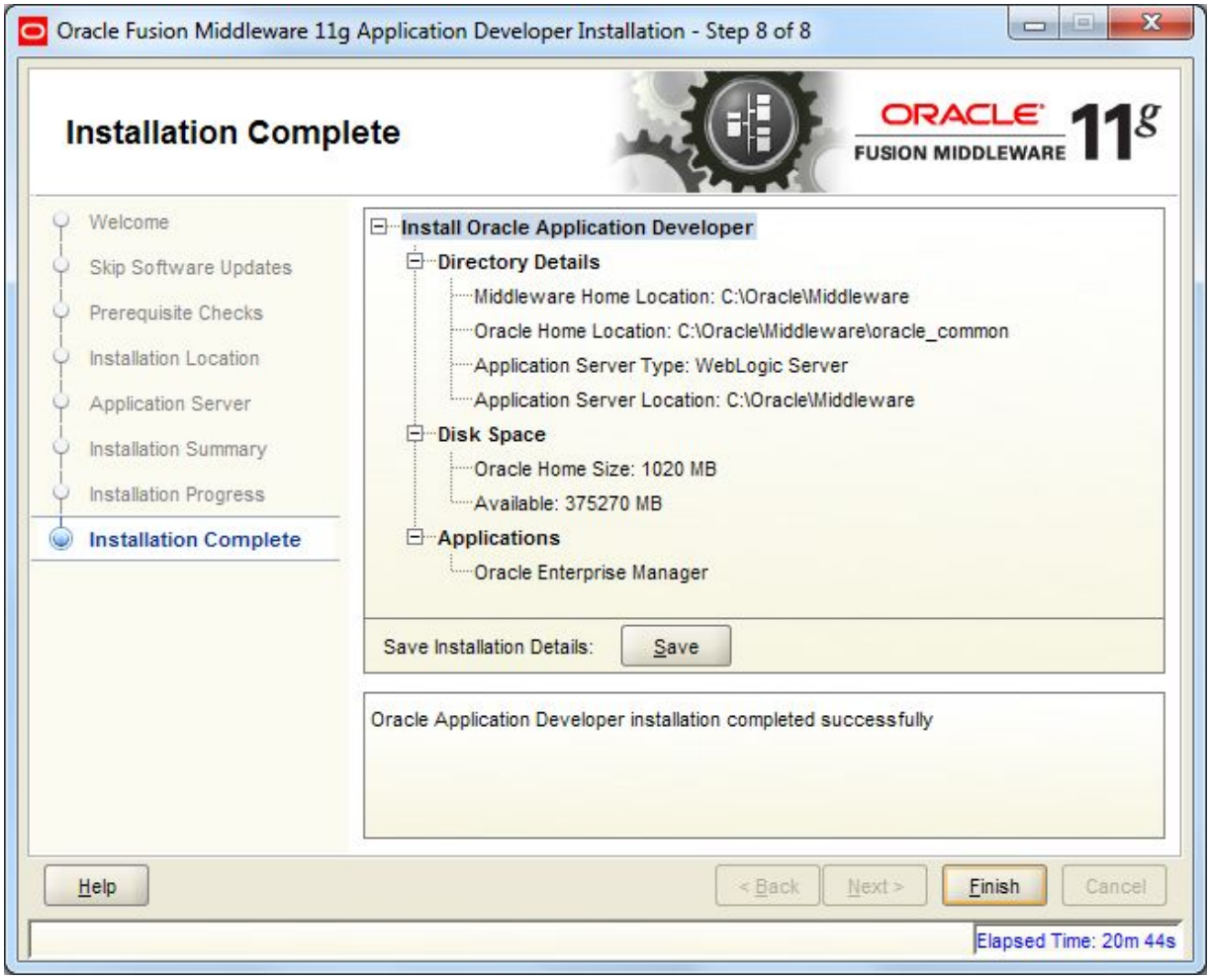


10. At the **Installation Progress** screen, click **Next** when the installation progress has completed.



11. At the **Installation Complete** screen, click **Finish** to exit the installer.

    Before exiting the installer, you have the option of first saving the installation details to a disk file.



On Windows, two shortcuts are created in the **Start Menu**: **Oracle Application Developer 11g** and **Oracle Common Home 11g**.

The next step is to install Oracle Endeca Server.

Chapter 3

Installing Endeca Server on a Single Machine

This section contains instructions for installing the Oracle Endeca Server on a single machine.

Installing Oracle Endeca Server

This topic describes how to install the Oracle Endeca Server package.

Before you install Endeca Server, both Oracle WebLogic Server and the Application Developer Framework Runtime must be installed on the machine.

The order of installation for Oracle Endeca Server is:

1. Run the Endeca Server installer.
2. Create a WebLogic domain for the Endeca Server application. (If you are deploying an Endeca Server cluster, this step is needed only when you install on the machine that will become the Admin Server in the WebLogic domain created for the Endeca Server.)
3. Run the post-installation script to create SSL certificates (if you installed in a secure mode), and generate SSL certificates in your browser. (If you are deploying an Endeca Server cluster, this step needs to be completed on the Admin Server only and before you clone this server to create Managed Servers.)
4. Verify that the Endeca Server application is correctly deployed in WebLogic Server.

Note the following about the Endeca Server installation:

- The Endeca Cluster Coordinator software is installed as part of the package.
- You can install Endeca Server in either secure (SSL) or non-secure mode. Secure mode is highly recommended for production deployments, while non-secure installations can be used for development environments.
- When installing Endeca Server on Linux, do not run the installation program as the root user.
- You must have an X-Windows (X11) environment on Linux. The installer requires that your monitor must be configured to display at least 256 colors.

To install Oracle Endeca Server:

1. Unpack the Endeca Server ZIP file to a temporary directory.
   As a result, you will see an `endecaserver` directory, which has a `Disk1` sub-directory.
2. From a command prompt, change to the `Disk1` directory and run the installer:
   - For Linux, use this command:

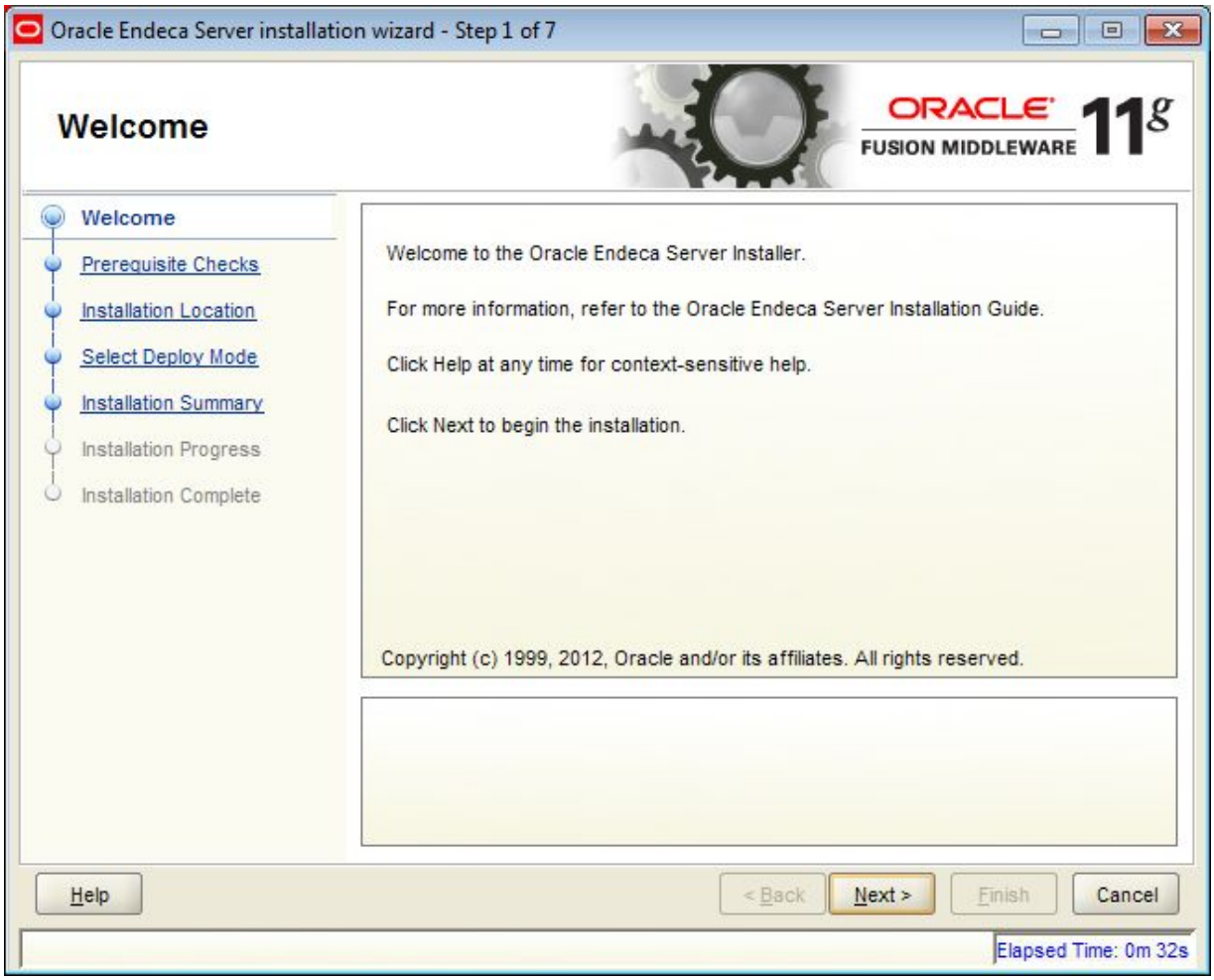
     `./runInstaller -jreLoc <jre_location>`
   - For Windows, use this command:

     `setup.exe -jreLoc <jre_location>`

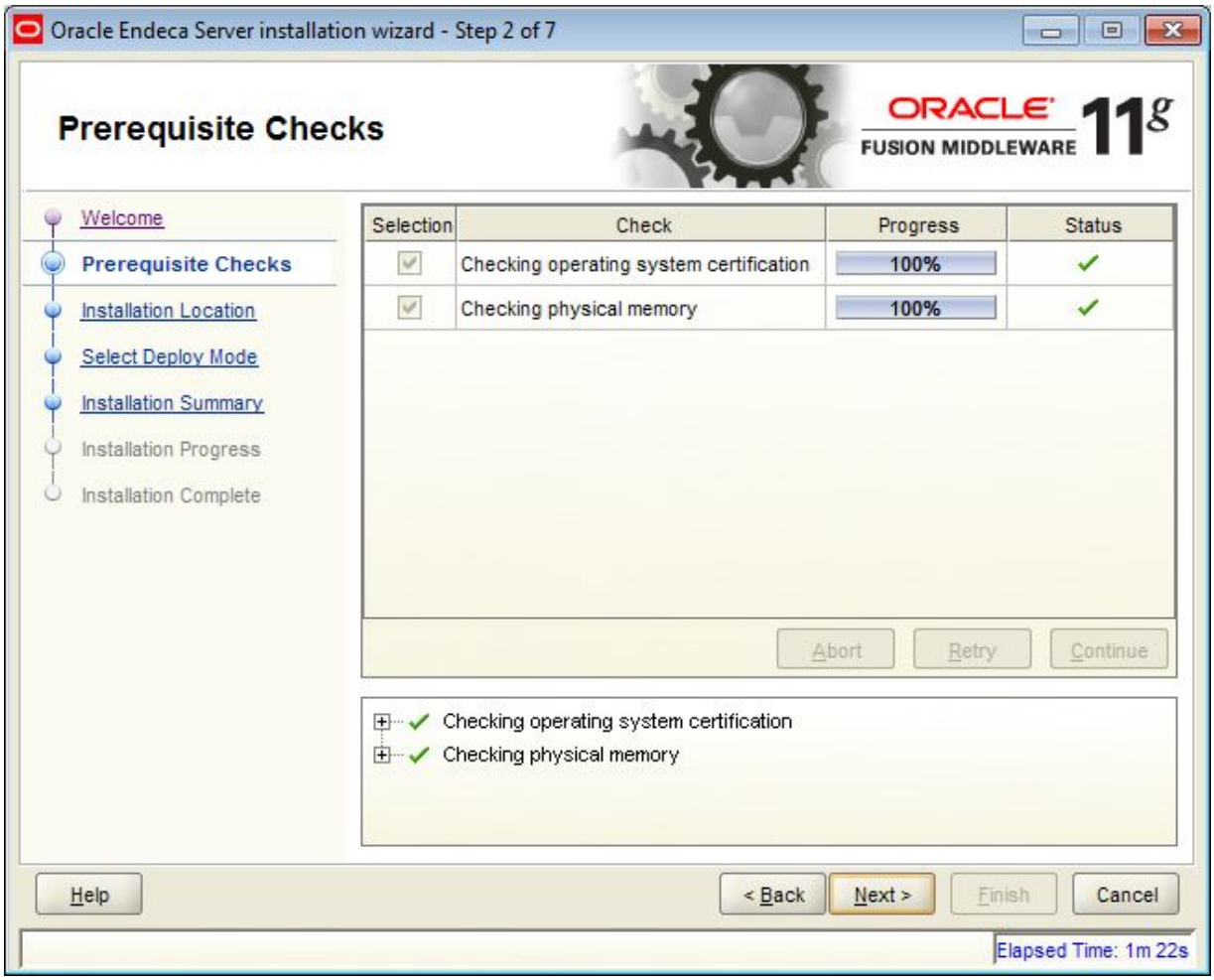
   For both commands, *jre_location* is the full path to the location of a Sun Java SE 6 SDK directory on your system. Note that the path cannot contain spaces. For example on Windows:

   ```
   setup.exe -jreLoc c:\java\jdk1.6.0_43
   ```

   When the installer runs, it displays the installation wizard's **Welcome** screen.
3. At the **Welcome** screen, read the information and click **Next**.

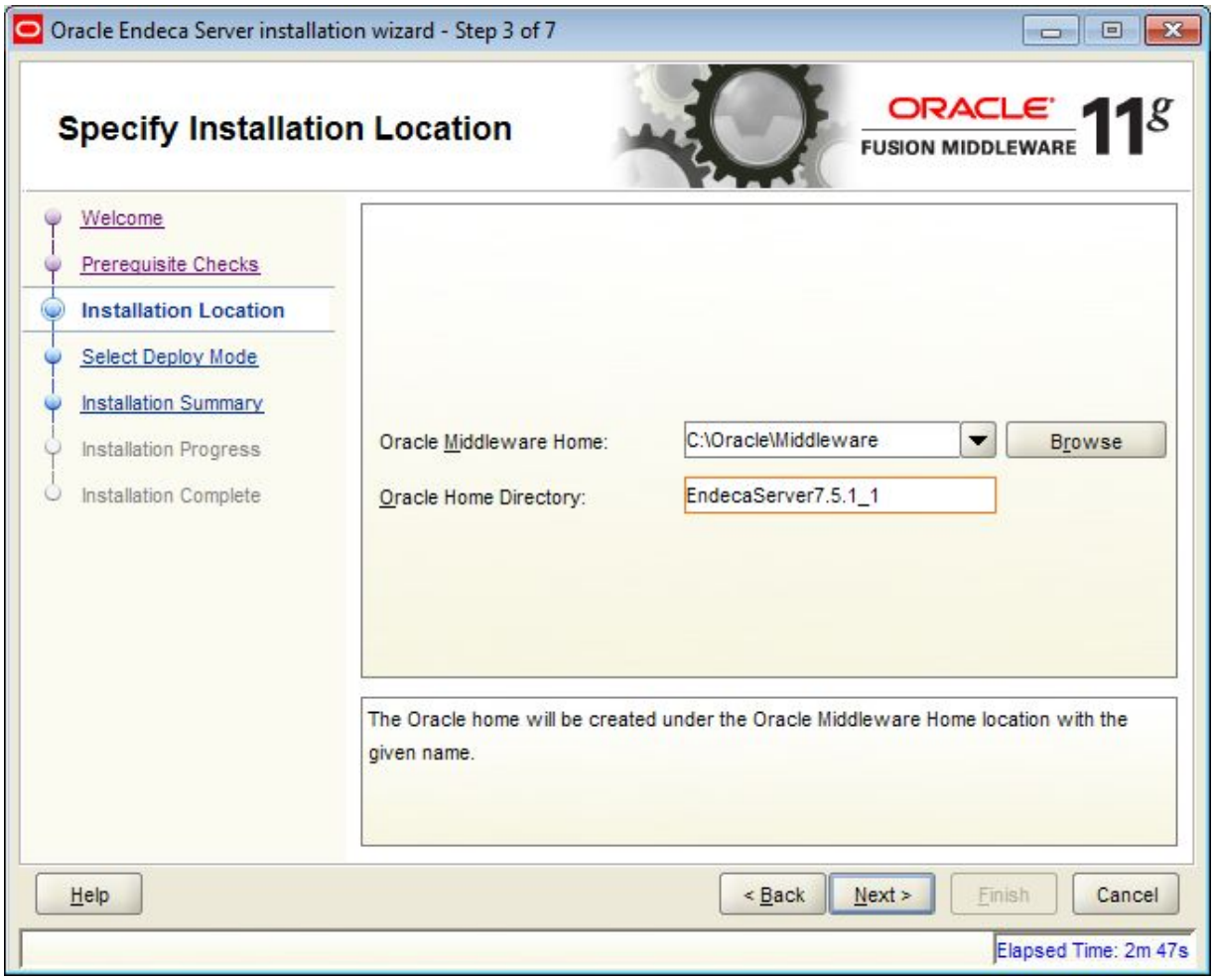


4. At the **Prerequisite Checks** screen, click **Next** if everything passes the checks.

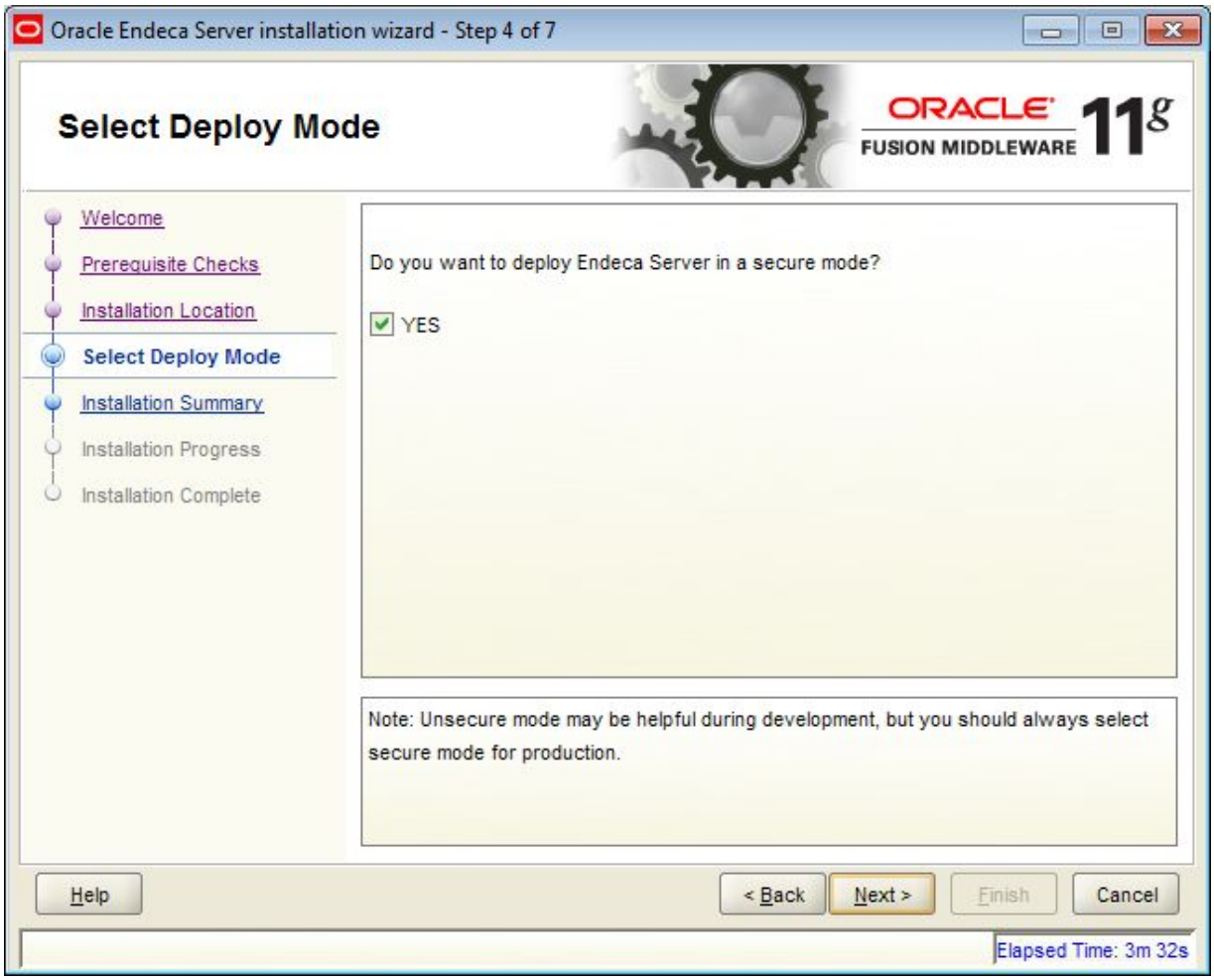


5. At the **Specify Installation Location** screen, do the following:
   (a) In the **Oracle Middleware Home** field, verify the name of the Oracle Middleware home directory. You can either accept the default location or browse to another location.
   (b) In the **Oracle Home Directory** field, enter the name of the Endeca Server home directory. (This will be the root directory of the Endeca Server installation.) You can either accept the default name or enter a new name. The Endeca Server Home directory name may only contain alphanumeric , hyphen (-) , dot (.), and underscore (_) characters, and it must begin with an alphanumeric character.

(c) When you have finished, click **Next**.

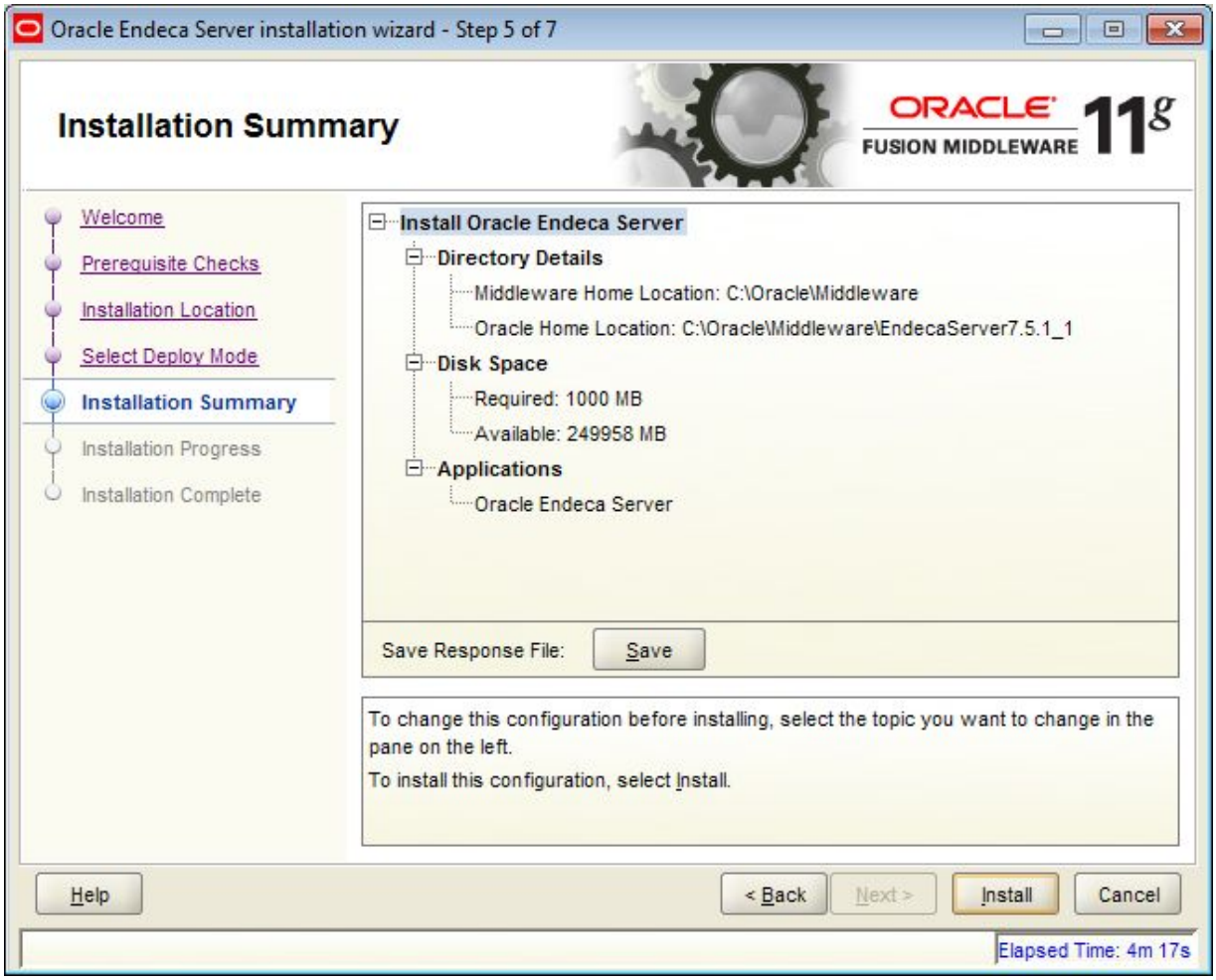


6. At the **Select Deploy Mode** screen, either leave the **YES** checkbox checked (to deploy Endeca Server in an SSL mode) or uncheck it (for a non-SSL mode). Then click **Next**.

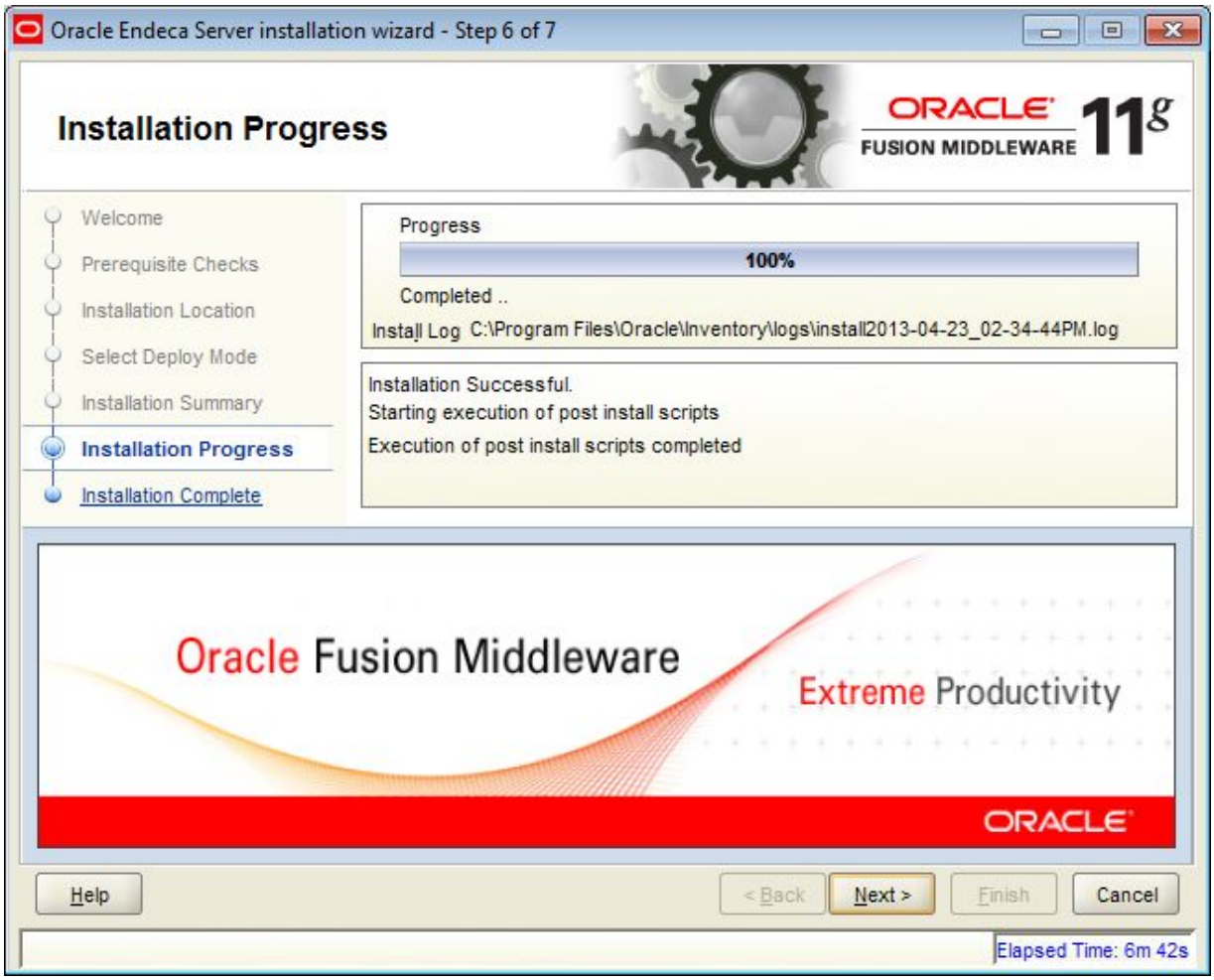


7. At the **Installation Summary** screen, verify the installation details and click **Install**.

   Note that the **Save** button allows you to save a Response File for silent-mode installations.

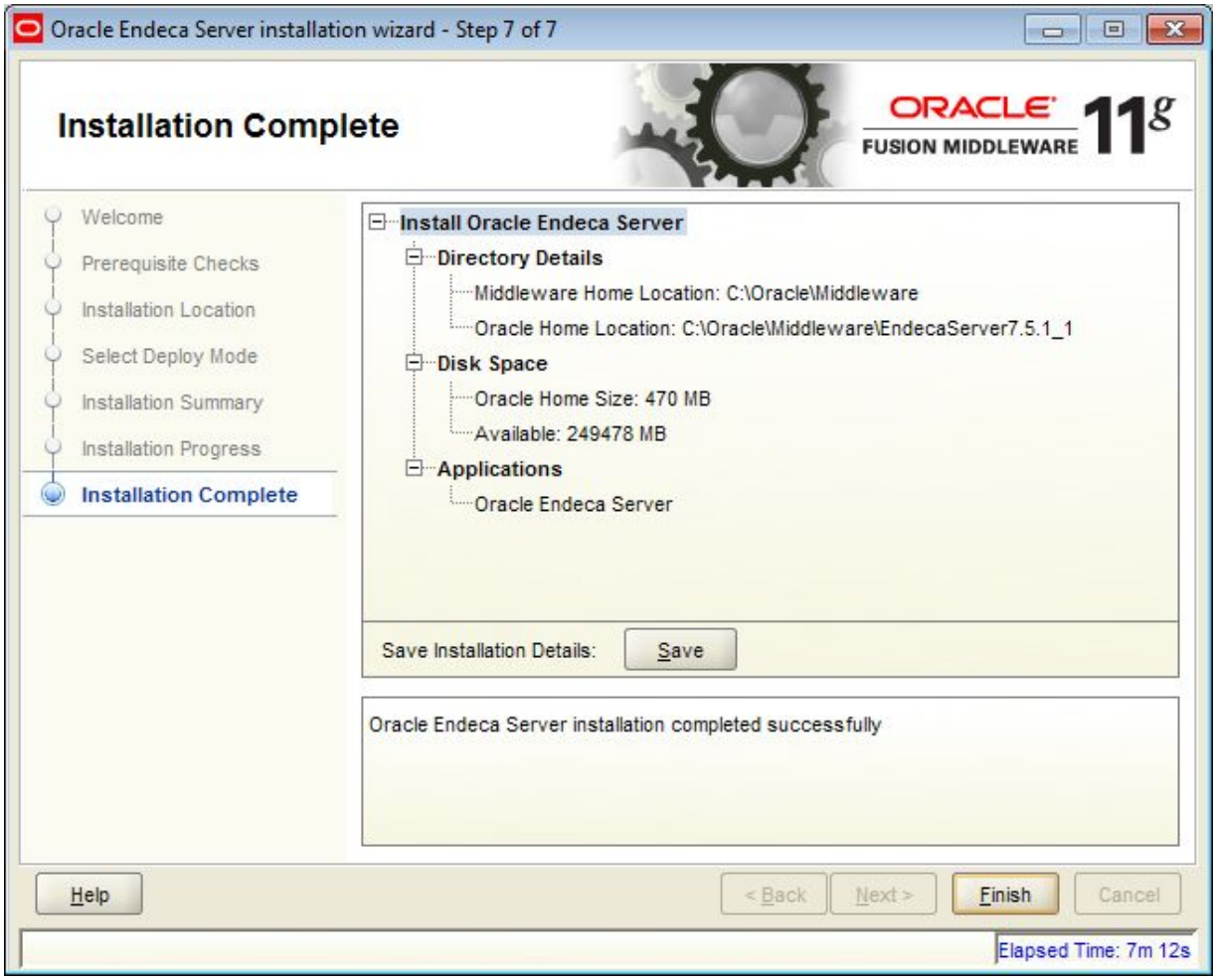


8. At the **Installation Progress** screen, click **Next** when the installation progress has completed.



9. At the **Installation Complete** screen, click **Finish** to exit the installation wizard.

   Before exiting the installation wizard, you have the option of first saving the installation details to a disk file.



When the installation finishes, the Endeca Server files and directories are written to the Oracle Home Location (as indicated in the **Installation Complete** screen).

The next step is to create a WebLogic domain for the Oracle Endeca Server application.

Note: If you are deploying the Endeca Server cluster, then the step for creating a WebLogic domain should occur on the machine that is going to serve as the Admin Server in your WebLogic domain. That is, on those machines that will become the Managed Servers, you do not need to create a WebLogic domain since it has already been created on the machine serving as the Admin Server.

Creating the WebLogic domain for Endeca Server

You must create a WebLogic domain for the Endeca Server application to run in.

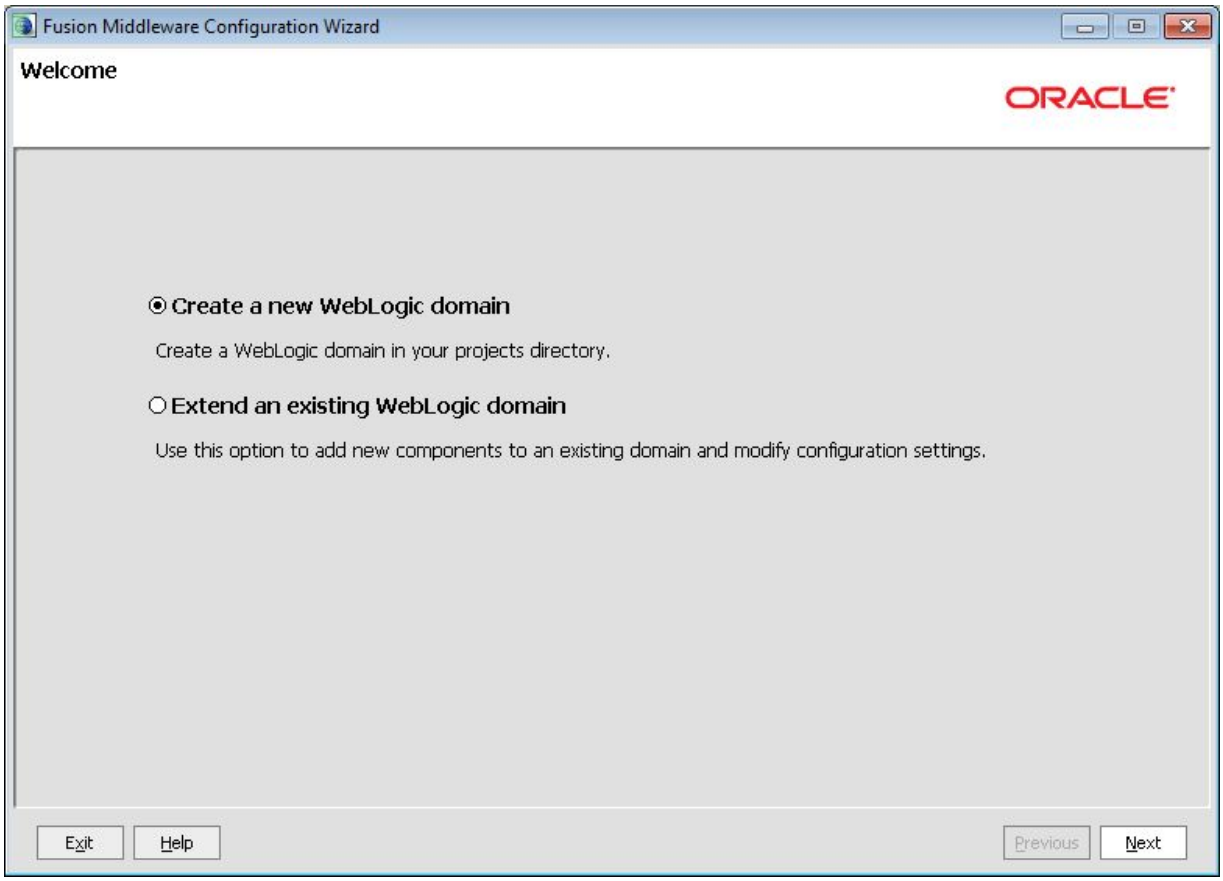
The prerequisites to this task are that WebLogic Server, Application Development Framework Runtime, and Endeca Server must be installed. Note that WebLogic Server does not have to be running for this procedure.

For single-machine development environments, you can deploy the Endeca Server instance in the single Admin Server in the WebLogic domain. You can later use this WebLogic domain when you expand your deployment to an Endeca Server cluster.

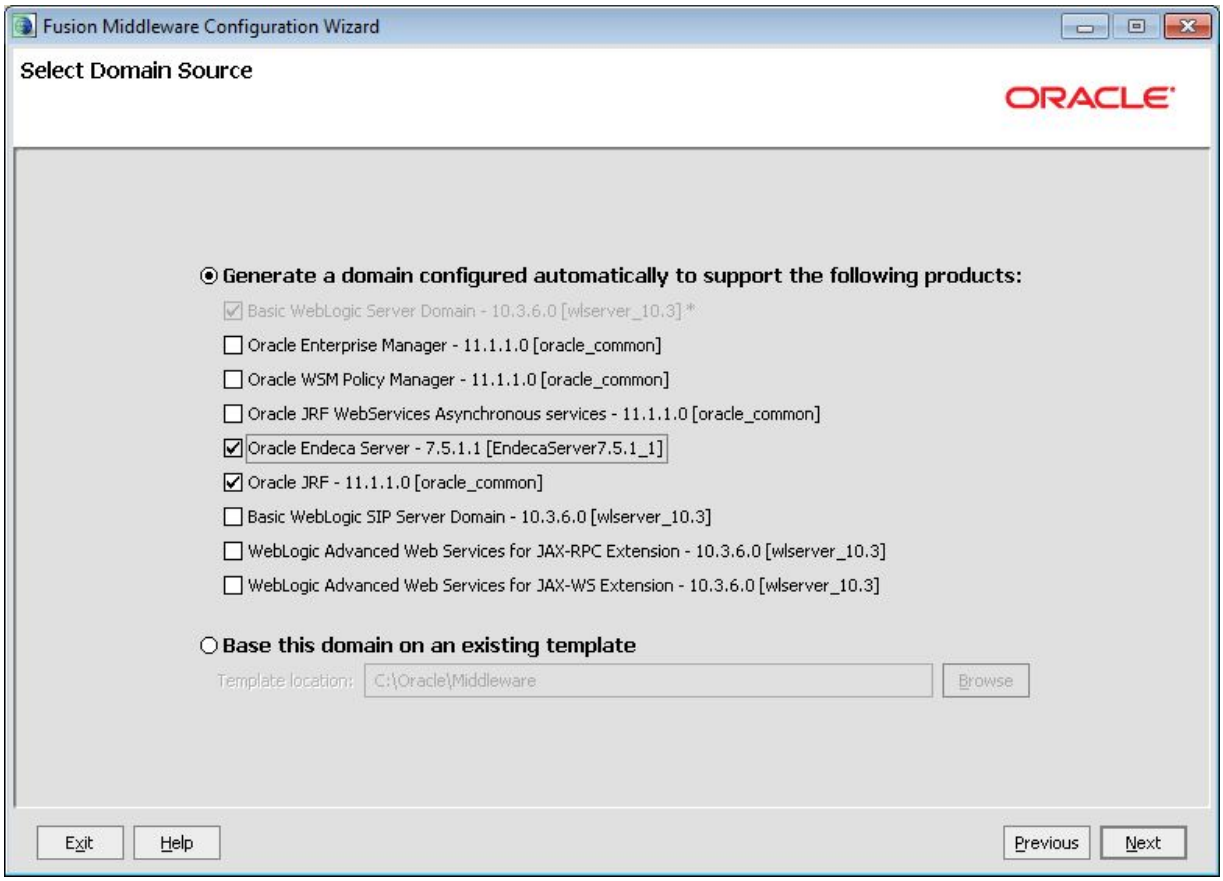
To create a WebLogic domain for the Endeca Server application:

1. From a command prompt, change to the directory that contains the Configuration Wizard start-up program:
   - For Linux: `$MW_HOME/wlserver_10.3/common/bin`
   - For Windows: `$MW_HOME\wlserver_10.3\common\bin`
2. Run the command to start the Configuration Wizard:
   - For Linux: `./config.sh`
   - For Windows: `config.cmd`

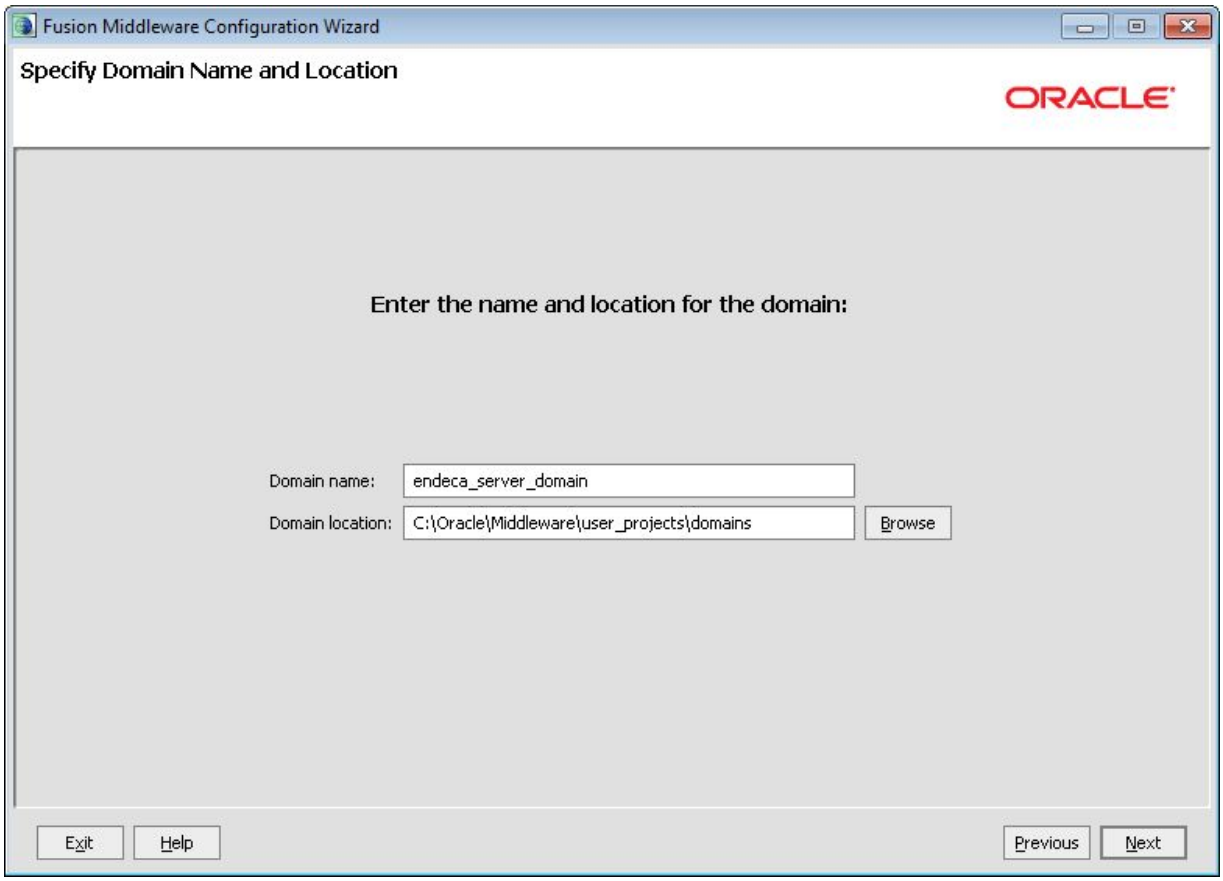
   The Configuration Wizard Welcome screen is displayed.
3. At the Configuration Wizard's **Welcome** screen, select **Create a new WebLogic domain** and click **Next**.



4. At the **Select Domain Source** screen, select **Oracle Endeca Server** (note that this also automatically selects **Oracle JRF**). Then click **Next**.

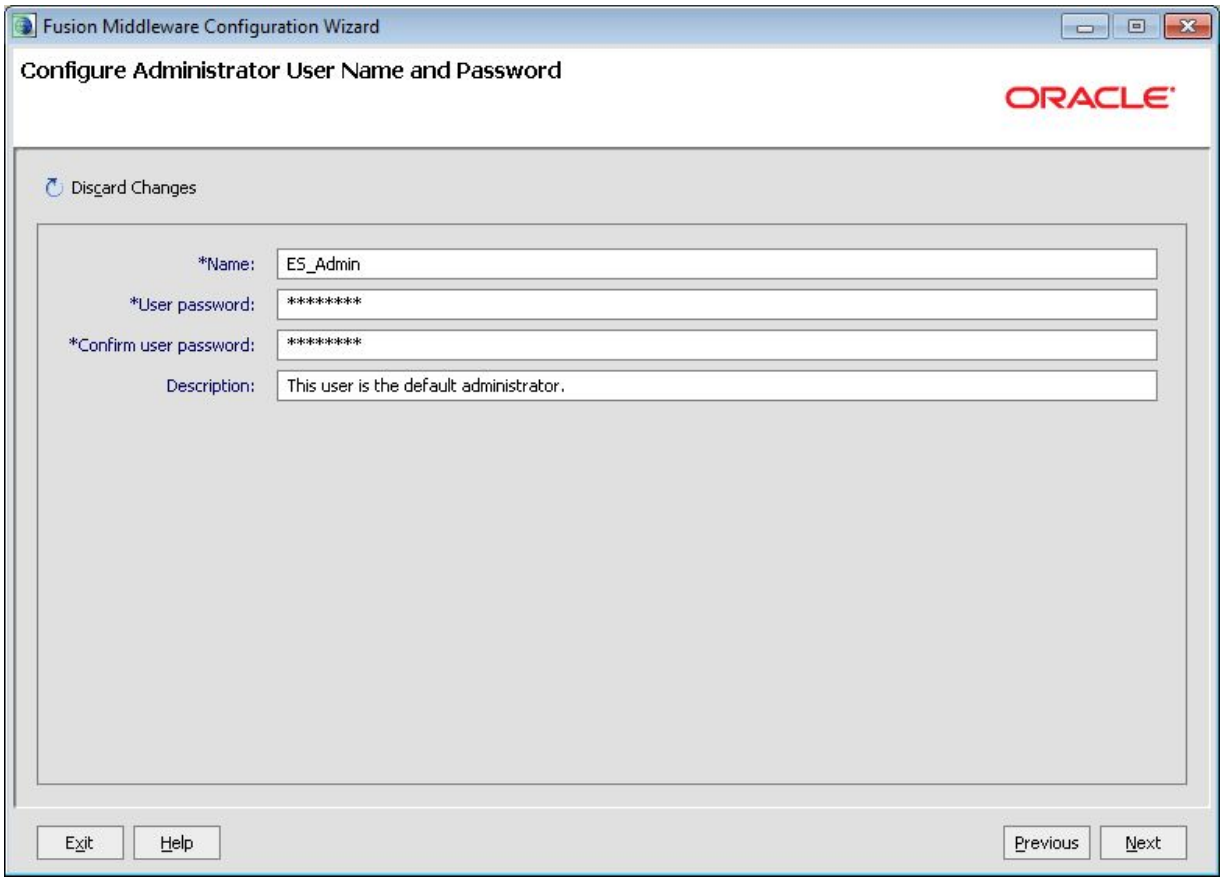


5. At the **Specify Domain Name and Location** screen, specify the domain name (such as `endeca_server_domain`) and keep the default domain location. Then click **Next**.



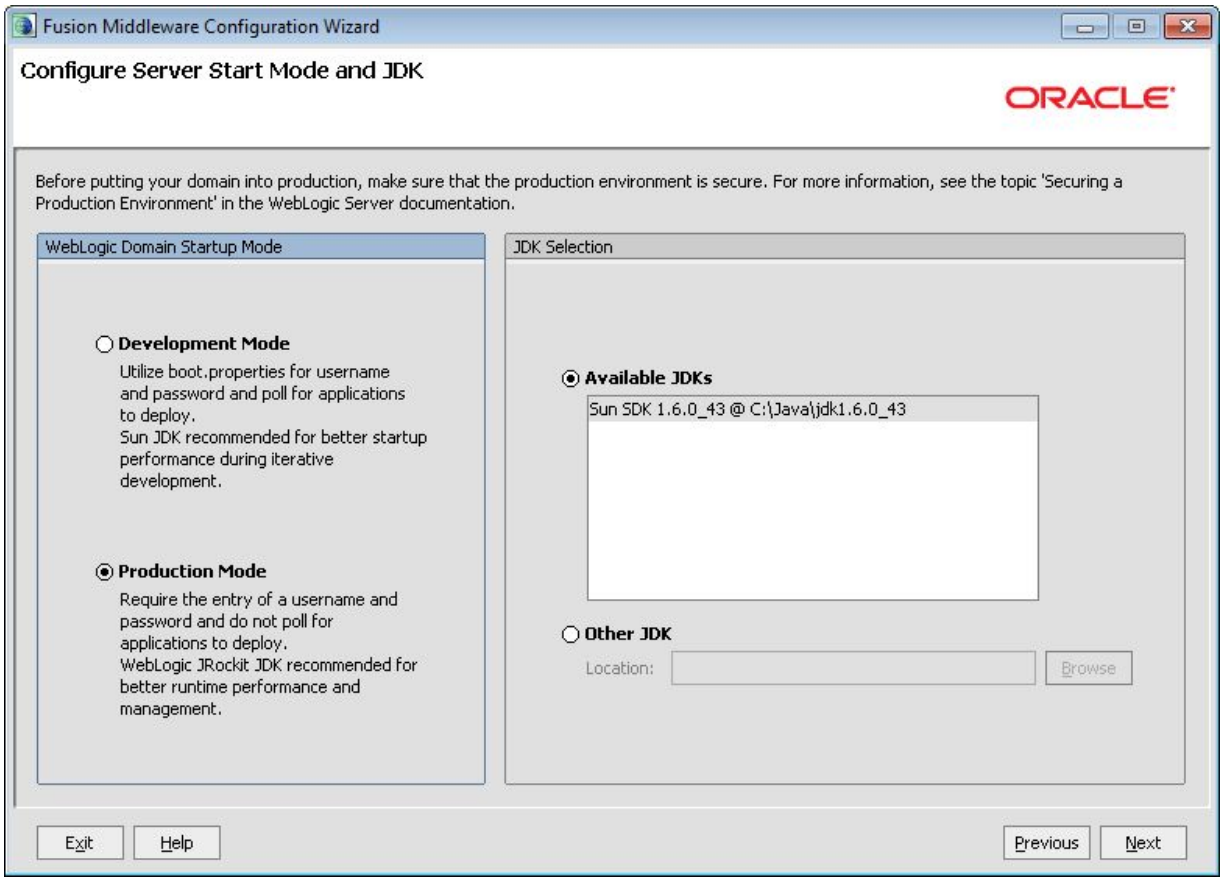
6. At the **Configure Administrator User Name and Password** screen, enter the name and password you want to use for the administrator. Optionally, you can enter a description. Then click **Next**.

   You will be using this name and password to start the WebLogic Server. Note that the password has a minimum length of eight characters.

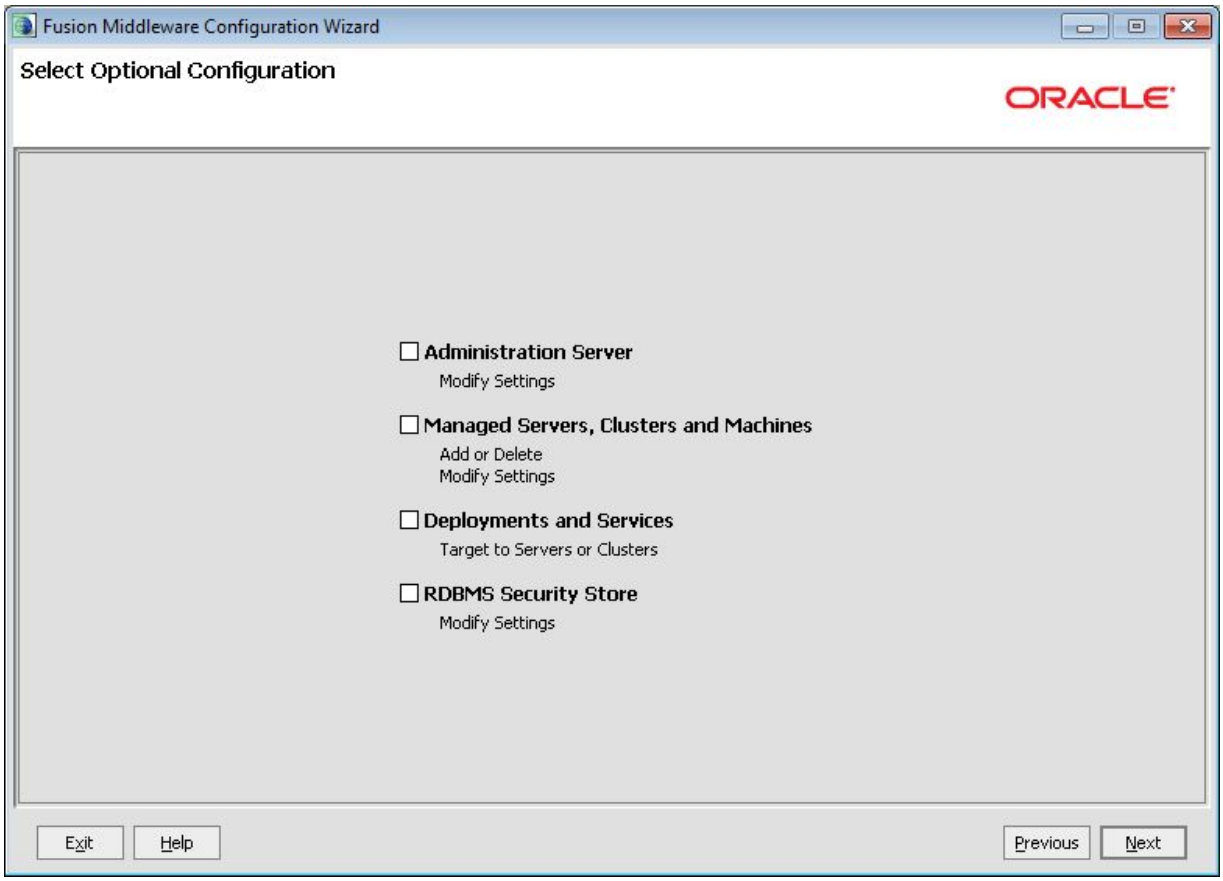


7. At the **Configure Server Start Mode and JDK** screen, do the following:
   (a) In the **WebLogic Domain Startup Mode** pane, select **Production Mode**.
   (b) In the **JDK Selection** pane, click **Available JDKs** and select the **Sun SDK**. (Note that if the Sun JDK is not displayed in this pane, click the **Other JDK** button and browse for the Sun JDK home.)

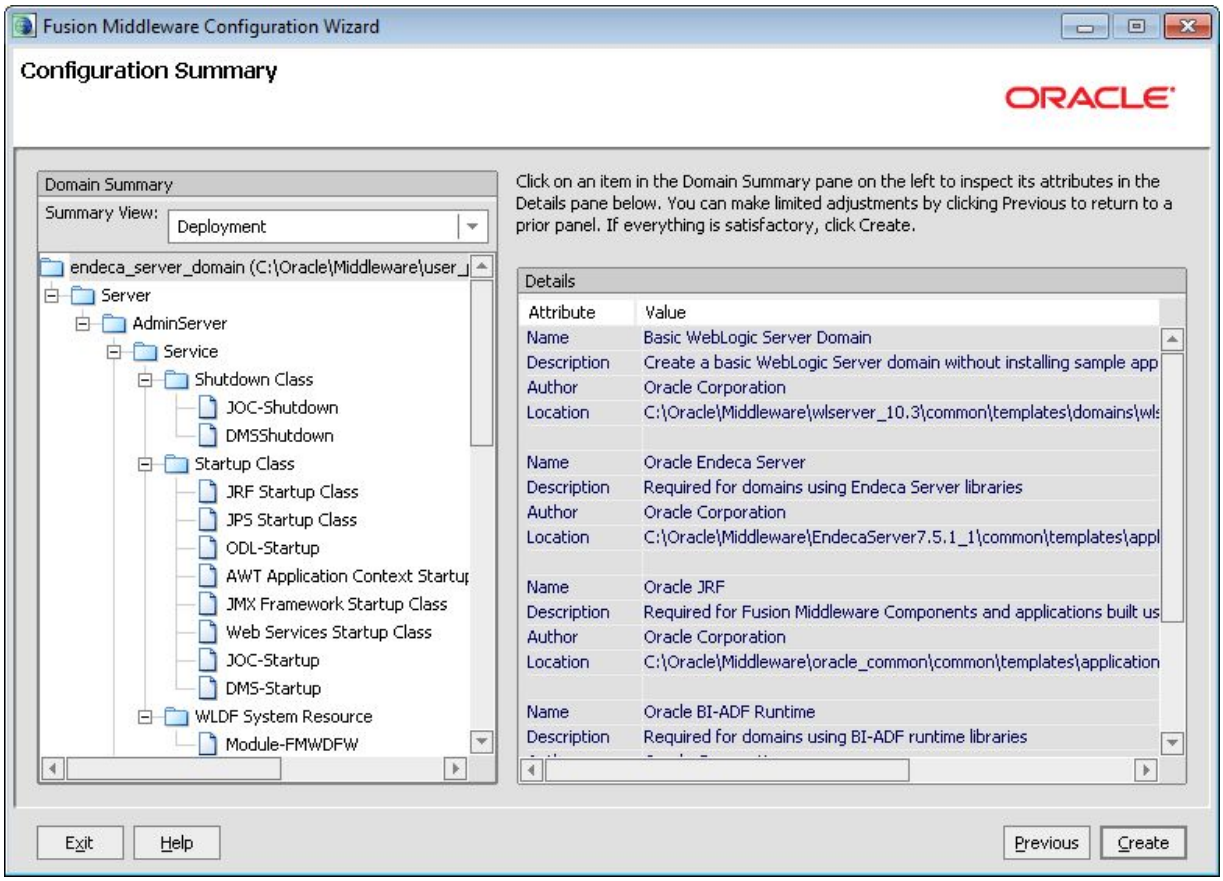
(c) Click **Next**.


Fusion Middleware Configuration Wizard
Configure Server Start Mode and JDK
ORACLE
Before putting your domain into production, make sure that the production environment is secure. For more information, see the topic 'Securing a Production Environment' in the WebLogic Server documentation.
WebLogic Domain Startup Mode
Development Mode
Utilize boot.properties for username and password and poll for applications to deploy.
Sun JDK recommended for better startup performance during iterative development.
Production Mode
Require the entry of a username and password and do not poll for applications to deploy.
WebLogic JRockit JDK recommended for better runtime performance and management.
JDK Selection
Available JDKs
Sun SDK 1.6.0_43 @ C:\Java\jdk1.6.0_43
Other JDK
Location:
Browse
Exit
Help
Previous
Next

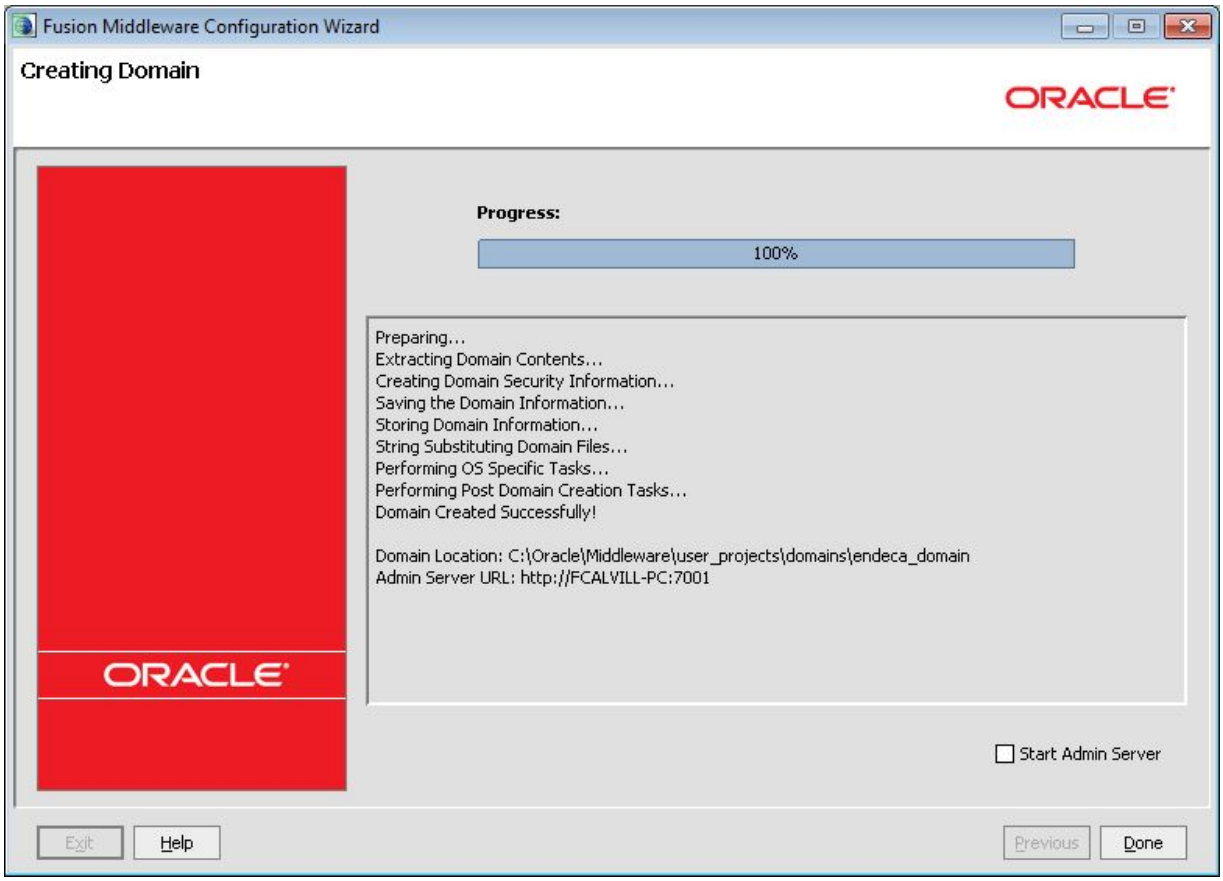
8. At the **Select Optional Configuration** screen, do not select any optional configurations and click **Next**.



9. At the **Configuration Summary** screen, click **Create** to create the domain.



10. At the **Creating Domain** screen, the message `"Domain Created Successfully!"` signifies the end of the create process (as shown in the example below). Click **Done** to exit the Configuration Wizard.



As a result, the WebLogic domain is created with a WebLogic Server port of 7001.

The next step depends on whether you installed Endeca Server in secure (SSL) mode and on whether you are installing and deploying the Endeca Server cluster:

- For secure mode, start WebLogic Server and run the `generate_ssl_keys` utility, as described in the next topic. After that, you can verify the Endeca Server deployment.

  Note: If you are deploying a cluster, make sure to generate SSL keys after you have installed the Endeca Server on the Admin Server, but before you clone the Admin Server to create additional Managed Servers. Additionally, in the Endeca Server cluster, the Endeca Server instance that was running on the Admin Server should be stopped, and the Endeca Server should be started on the Managed Servers in the WebLogic domain that you create. For detailed instructions, see *Installing and Deploying an Endeca Server Cluster on page 56*.

- For non-secure mode, start WebLogic Server and verify the Endeca Server deployment.

Creating SSL certificates

This topic describes how to generate certificates if your Endeca Server deployment is installed in secure (SSL) mode.

The pre-requisite to this task is that you must have installed Endeca Server in SSL mode.

There are specific versions of the `generate_ssl_keys` utility for each operating system:

- Linux: `generate_ssl_keys.sh`
- Windows: `generate_ssl_keys.bat`

The utility is located in the `$DOMAIN_HOME/EndecaServer/bin` directory. For more information on the `generate_ssl_keys` utility, see the *Oracle Endeca Server Security Guide*.

Important: If you are deploying an Endeca Server cluster, make sure to generate SSL certificates after you have installed the Endeca Server on the Admin Server and before you have cloned the Admin Server to create Managed Servers.

To generate SSL certificates:

1. Start the Admin Server for the Endeca Server domain.
2. From a command prompt, change to the `$DOMAIN_HOME/EndecaServer/bin` directory.
3. Run the `generate_ssl_keys` utility with a valid WebLogic administrator name (the `--username` flag), administrator password (the `--password` flag), and a strong passphrase for the keys (the `--sslPassphrase` flag). For example:

   ```
   generate_ssl_keys --username ES_Admin --password welcome1 --sslPassphrase thx1138
   ```

   A successful procedure is indicated when you see a message that ends as follows:

   ```
   The following non-dynamic attribute(s) have been changed on MBeans
   that require server re-start:
   MBean Changed : com.bea:Name=AdminServer,Type=SSL,Server=AdminServer
   Attributes changed : HostnameVerificationIgnored, JSSEEnabled

   Activation completed

   Done! Your WLS server(s) may need to be restarted for
   all changes to take effect.
   ```

4. Stop and then re-start the WebLogic Server.

The `generate_ssl_keys` utility:

- Creates the SSL certificates in the `$DOMAIN_HOME/config/ssl` directory.
- Updates the `EndecaServer.properties` and `EndecaCmd.properties` files (in the `$DOMAIN_HOME/config` directory) with the pathnames of the key files.
- Enables the SSL Listen Port of 7002 in WebLogic Server, and sets 7002 as the port on which Endeca Server is started.

The next task is to import the PKCS12 certificate into your browser.

Keep in mind that when issuing Endeca Server commands, you should use the SSL version of the `endeca-cmd` script, which resides by default in the `$DOMAIN_HOME/EndecaServer/bin` directory.

Configuring SSL certificates in your browser

Configuring SSL certificates in your browser

This topic describes how to import a PKCS12 certificate in your browser.

As a pre-requisite to this task, you must have generated the SSL certificates with the `generate_ssl_keys` utility.

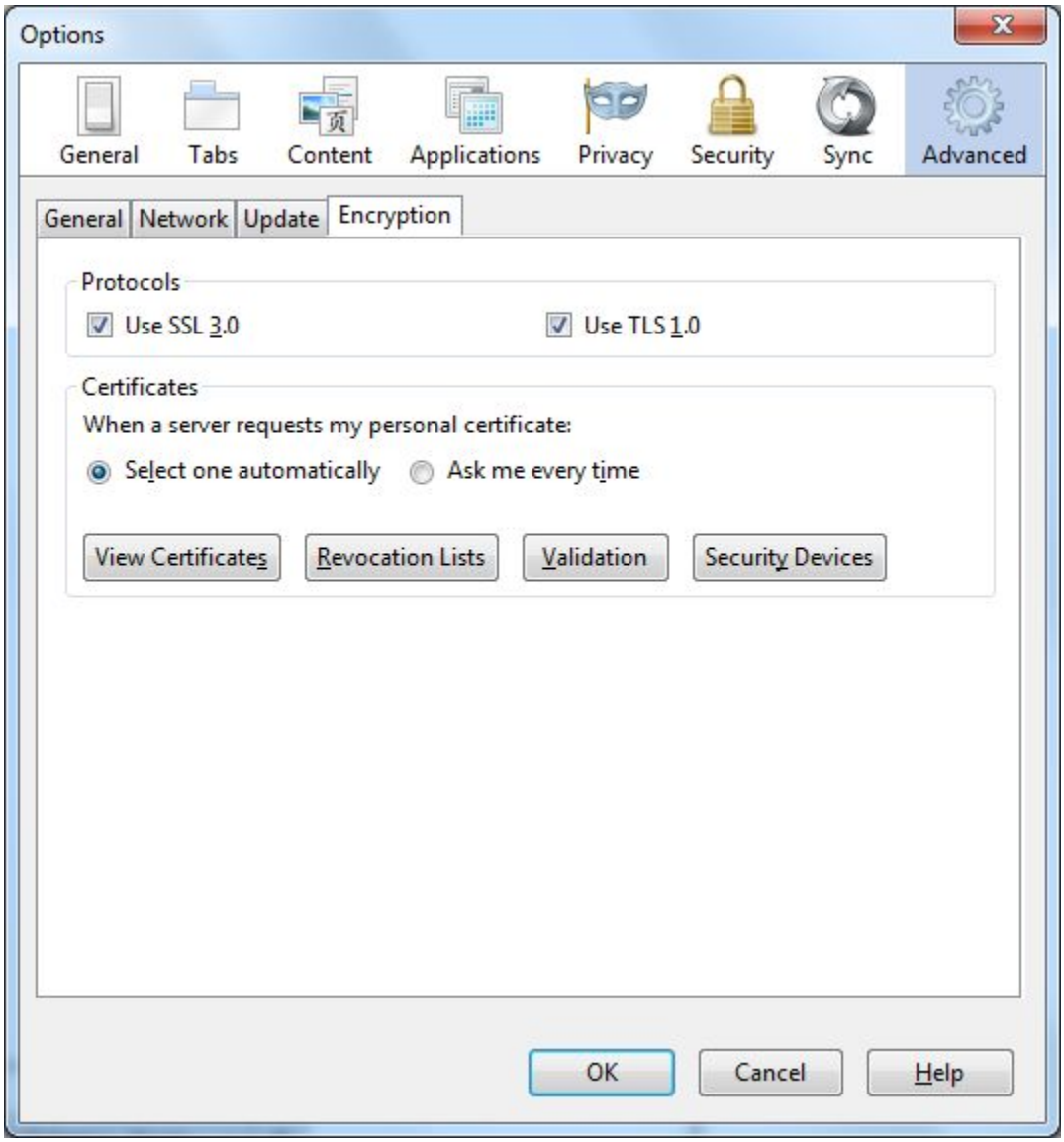
One reason to import the certificate is if you want to use the Dgraph URL operations. Note that this procedure is for the Firefox browser; because the import procedure varies according to the browser, refer to the browser's help for details for your browser.

To configure the SSL certificates in Firefox:

1. Open Firefox.
2. From the Tools menu, select **Options**.

   The Options dialog is displayed.

3. In the Options dialog box, click the **Advanced** icon.



4. Select the **View Certificates** tab.
   The Certificate Manager dialog is displayed.
5. In the Certificate Manager dialog box:
   (a) Select the **Your Certificates** tab.
   (b) Click **Import**.
   (c) In the Certificate File to Import dialog, browse to **esClientCert.p12** (located in the `$DOMAIN_HOME\config\ssl` directory) and select it.
   (d) In the Password Entry Dialog box, enter the certificate password with "clientkey" appended to it and click **OK**. For example, if "endeca" was the password you specified when you generated the keys, enter **endecaclientkey** in the field.

(e) You will see an Alert message that informs you that the certificate was successfully restored. Click **OK** to close the message.

(f) Click **OK** to close the Certificate Manager dialog.

6. Click **OK** to close the Options dialog.

Keep in mind that your must use the HTTPS protocol when accessing Endeca Server pages in secure mode.

Verifying the Endeca Server deployment

After installing the Oracle WebLogic Server and Endeca Server products, you should verify that the Endeca Server application was correctly deployed.

To verify the Endeca Server application deployment:

1. Start the Admin Server for the Endeca Server domain.

   The start-up procedure should ask you for the administrator user name and password that you specified when you created the WebLogic domain.

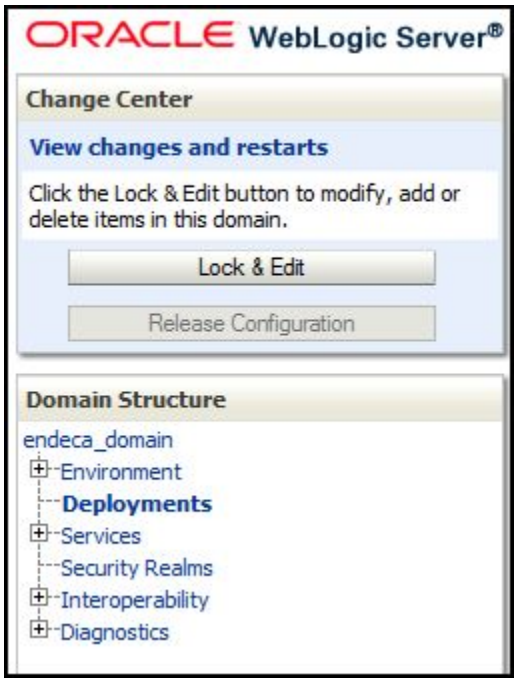
2. From your browser, access the Administration Server console with this syntax:

   ```
   http://admin_server_host:admin_server_port/console
   ```

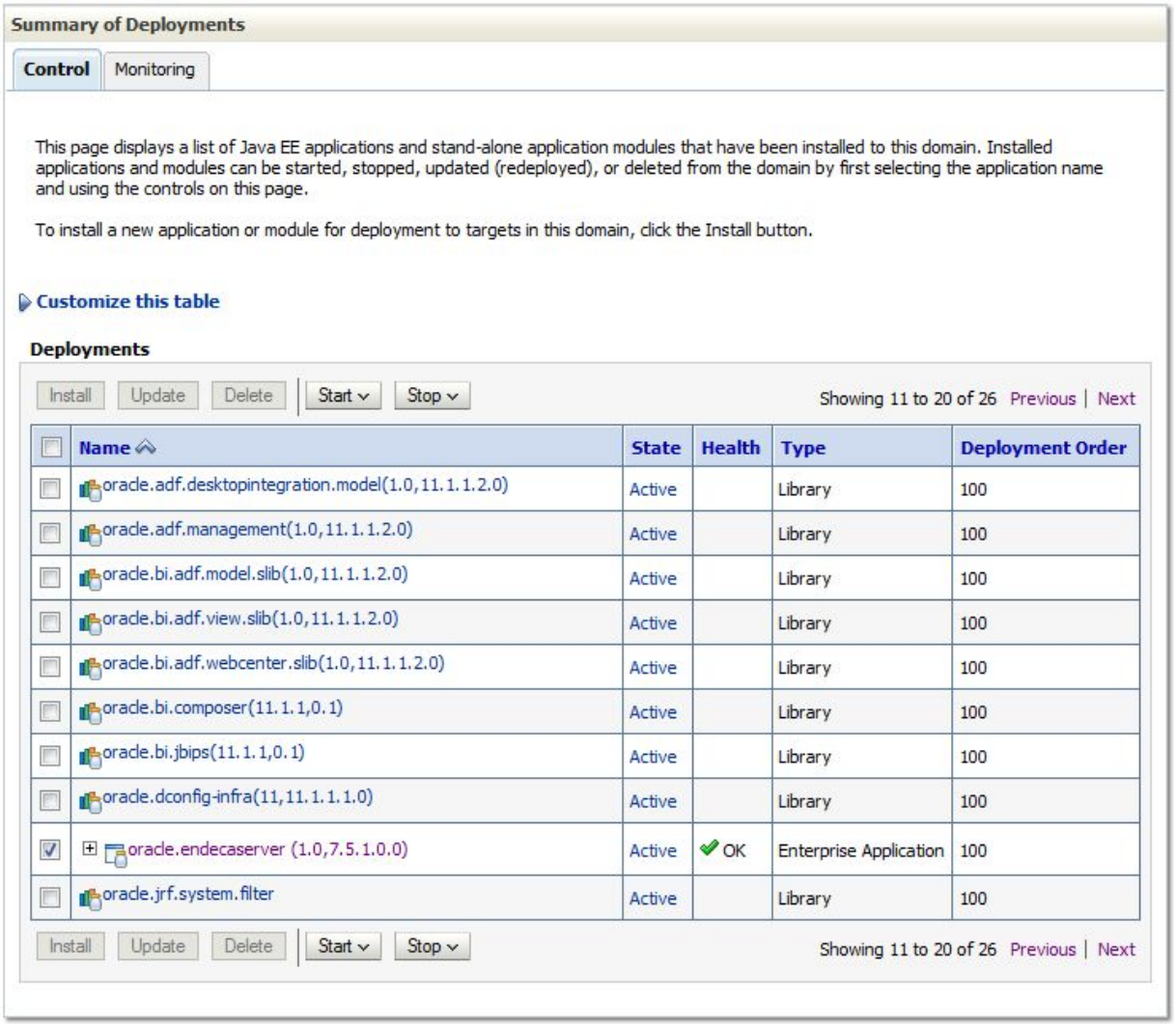
   For example:

   ```
   http://localhost:7001/console
   ```

3. At the **Administration Console** login screen, log in with the administrator user name and password.
4. In the **Domain Structure** pane, click **Deployments** (in the `endeca_server_domain` tree).



5. In the **Deployments** table, check the **oracle.endecaserver** Web application. Its State should be `"Active"` and its Health should be `"OK"`, as in this abbreviated example:



The next step is to verify the Endeca Server application installation by creating an Endeca data domain.

Silent installation on Windows and Linux

The Endeca Server installer's silent mode is useful if you want to add the installation of the Endeca Server to your own install script, or push out the installation on multiple machines.

Silent-mode installation is a way of setting installation configurations only once and then using those configurations to duplicate the installation on many machines. During installation in silent mode, the installation program reads the settings for your configuration from a file that you create before beginning the installation. The installation program does not display any configuration options during the installation process. Silent-mode installation works on both Windows and Linux systems.

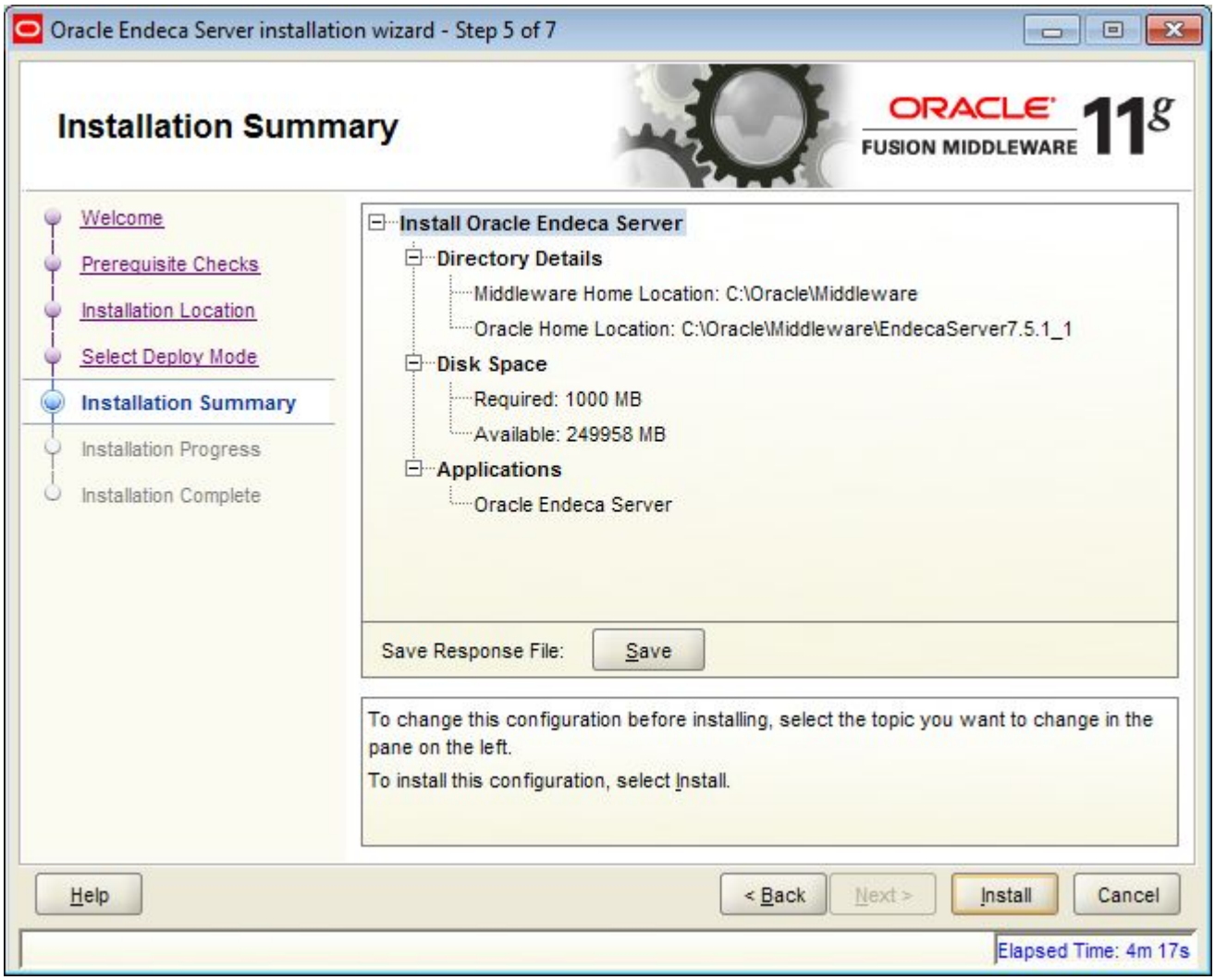
When you are running the installation program in silent mode, keep in mind the following considerations:

- Silent-mode installation requires the same amount of temporary disk space and uses the same temporary storage directories as a standard installation. The installation program does not alert you if there is not enough space in the temporary directory.
- A silent-mode installation takes the same amount of time as a standard installation.
- At the beginning of a silent-mode installation, an initial installation program window or message is displayed briefly, indicating that the installation has started. Brief messages are displayed to indicate that the installation is in progress.

A prerequisite is that you have created a response file via the installer GUI or via a template.

Creating the response file from the GUI

You can created a response file by first running the Endeca Server install GUI, then clicking **Save** on the **Installation Summary** screen:



You will be prompted for a name and location where you want to create this response file. After it is created, you can use it exactly as-is to replicate the installation on other systems.

Creating the response file from a template

A response file template (named `sampleResponse.rsp`) is available in the Endeca Server installer package. After you unpack the installer ZIP file, the `sampleResponse.rsp` template will be in the `endecaserver/Disk1/stage/Response` directory.

Open the template with a text editor and set these fields:

- `ORACLE_HOME` is the absolute path of the Endeca Server home directory.
- `BEA_HOME` is the absolute path of an existing Middleware home directory.
- `ENDECA_ENABLE_SSL` determines whether Endeca Server is installed in secure (SSL) mode (a setting of `true`) or not (a setting of `false`).

Sample response file for Linux:

```
[ENGINE]

#DO NOT CHANGE THIS.
Response File Version=1.0.0.0.0

[GENERIC]

#Provide the Oracle Home location. The location has to be the immediate child under the
# specified Middleware Home location. The Oracle Home directory name may only contain
# alphanumeric , hyphen (-) , dot (.) and underscore (_) characters, and it must begin
# with an alphanumeric character. The total length has to be less than or equal to 128
# characters. The location has to be an empty directory or a valid SOA Oracle Home.
ORACLE_HOME=/home/middleware/EndecaServer7.5.1_1

#Provide existing Middleware Home location.
BEA_HOME=/home/middleware

#Provide true to enable SSL for deploy Endeca Server.
ENDECA_ENABLE_SSL=true

[SYSTEM]
[APPLICATIONS]
[RELATIONSHIPS]
```

Sample response file for Windows:

```


[ENGINE]

#DO NOT CHANGE THIS.
Response File Version=1.0.0.0.0

[GENERIC]

#Provide the Oracle Home location. The location has to be the immediate child under the
# specified Middleware Home location. The Oracle Home directory name may only contain
# alphanumeric , hyphen (-) , dot (.) and underscore (_) characters, and it must begin
# with an alphanumeric character. The total length has to be less than or equal to 128
# characters. The location has to be an empty directory or a valid SOA Oracle Home.
ORACLE_HOME=C:\Oracle\Middleware\EndecaServer7.5.1_1

#Provide existing Middleware Home location.
BEA_HOME=C:\Oracle\Middleware

#Provide true to enable SSL for deploy Endeca Server.
ENDECA_ENABLE_SSL=true
```

```
[SYSTEM]
[APPLICATIONS]
[RELATIONSHIPS]
```

Running the silent installer

Running the silent installer

This topic describes how to run the Endeca Server silent installer from a command prompt.

The prerequisites to this task are:

1. Both Oracle WebLogic Server and the Application Developer Framework Runtime must be installed on the machine.
2. You must have created the response file.

This procedure assumes that you are running the silent installer from a command line. However, you can run it from a batch file or script.

To install silently on either Windows or Linux:

1. From a command prompt, navigate to the directory where you downloaded the Endeca Server installer.
2. Run the installer (either `setup.exe` for Windows or `runInstaller` for Linux) in silent mode with these flags:
   - `-silent` — Specifies a silent-mode operation.
   - `-response` <`path-to-response file`> — Specifies the response file and path to use.
   - `-jreLoc` <`path-to-JRE`> — Specifies the path where the Java Runtime Environment is installed.

   Note that the paths should not contain spaces. The following is an example on a Windows machine:

   ```
   setup -silent -response c:\ES_install\ResponseFile -jreLoc c:\java\jdk1.6.0_43
   ```

A successful installation will end with this message:

```
The installation of Oracle Endeca Server Top Level completed successfully.
```

The silent installer creates a log of the installation process under the name *yyyy-mm-dd_hh-mm-ssXM*.log (where *XM* is either AM or PM). For example:

```
2013-02-14_03-29-39PM.log
```

The logs directory (named `logs` on Windows and `log` on Linux) is stored in the Oracle Inventory directory. On Linux systems, if you do not know the location of your Oracle Inventory directory, you can find it in the `etc/oraInst.loc` file. On Windows, the default location for the inventory directory is `C:\Program Files\Oracle\Inventory\logs`.

Chapter 4

Installing and Deploying an Endeca Server Cluster

This section discusses how to install and deploy an Endeca Server cluster that consists of multiple Endeca Server instances hosted by multiple Managed Servers in a WebLogic domain.

Before you install and deploy a cluster

This section outlines the WebLogic Server requirements, as well as file system and load balancer requirements for deploying data domains in an Endeca Server cluster.

An Endeca Server cluster hosting one or more data domains can be deployed on either Windows or Linux. You cannot create an Endeca Server cluster in which some Endeca Server instances are running on Windows while other instances are running on Linux.

For a full listing of specific supported platforms, see *Supported operating systems on page 8*.

WebLogic domain requirements

The Endeca Server application runs in a WebLogic domain.

The following requirements exist for the Endeca Server cluster to be deployed in the WebLogic domain:

- **Which servers in the WebLogic domain should host the Endeca Server application**. In a development environment, a single-machine deployment of Endeca Server can run on an Admin Server in the WebLogic domain. In production settings, however, the Endeca Server cluster with more than one Endeca Server instance must be deployed on WebLogic Server Managed Servers only.

  The Admin Server in this case does not host the Endeca Server instance (although the Endeca Server should be installed on the Admin Server to facilitate the Endeca Server cluster deployment and to generate SSL certificates for it). If the Admin Server itself is hosted on the same machine as one of the Managed Servers, the Endeca Server instance can run on that Managed Server. See *Cluster deployment diagram on page 59*.

- **How the WebLogic domain is used**. Although it is possible to share the WebLogic container with other applications, for performance and troubleshooting purposes it is recommended to dedicate the WebLogic domain to the Endeca Server application.

In addition, for information on how the Endeca Server software utilizes WebLogic Server, see *About the Endeca Server integration with the WebLogic Server on page 6*.

Load balancer requirements

In most production deployments, it is desirable to configure an external load balancer in front of the Endeca Server cluster hosting one or more data domain clusters. This topic discusses the considerations for this load balancer.

For the load balancer, the following considerations apply:

- Include host names and ports of all Oracle Endeca Server nodes in the load balancer configuration.

  If you add Endeca Server nodes to the cluster, you must update the configuration of the load balancer with the host names and ports of the added nodes.
- You may optionally configure the load balancer to use session affinity. In this case, all queries from a given session are sent to the same Endeca Server node. This allows the Oracle Endeca Server to use its cache to avoid redundant processing of related queries.

  Configuring session affinity also helps minimize consistency problems as updates propagate from the leader to the follower nodes in the data domain cluster (if you are not using outer transactions to run updates).

  In addition, the Endeca Server cluster utilizes its own routing service, which also utilizes session affinity. The routing service recognizes requests sent from the same client and sends them to the same Endeca Server node that processed previous requests from the same client. (This assumes that the Endeca Server node is still hosting the Dgraph node for that data domain that can process the current request; otherwise, the request is sent to a different Endeca Server node.)

Cluster Coordinator requirements

The Cluster Coordinator service of the Endeca Server cluster must be running on an odd number of machines (with a minimum of three) on which the Endeca Server cluster is running.

The Cluster Coordinator service is installed as part of the Endeca Server. However, in an Endeca Server cluster, its service is required to run on at least three (or any other odd number greater than three) machines, to ensure increased availability of the Endeca Server cluster services, including services for its data domains.

As a result of this requirement, the instructions in this section imply that you will be initially installing and deploying an Endeca Server cluster on three machines, and that on each of these machines, both the Endeca Server and the Cluster Coordinator services will be running.

Note: While it is possible to run a cluster of one on a single machine, or a cluster of two, these Endeca Server clusters do not provide increased availability features, such as automatic leader election for the Endeca data domains.

If after initially deploying a three-machine cluster you would like to extend it, you can add another machine to the WebLogic domain. For the fourth machine, the Cluster Coordinator services should not be running. However, if you add a fifth machine, you can then run the Cluster Coordinator on either three of the five

machines, or on all five machines. Both of these configurations will satisfy the Cluster Coordinator requirements for the Endeca Server cluster.

For full information on the Cluster Coordinator, its functions and requirements, see the *Oracle Endeca Server Cluster Guide*.

Shared file system requirements

This topic describes the requirements for the shared file system in an Endeca Server cluster.

- **Access to a shared file system**. Provision a shared file system on which the index for the data domains will be stored. When you install and deploy the Endeca Server cluster and start the data domain, all machines hosting the Endeca Server nodes must have full (read/write) access to this shared file system.

  On Windows, it is recommended to utilize a file system that uses the CIFS (also known as SMB) protocol. On Linux, it is recommended to use NFS.
- **File system size**. You can start a data domain cluster with a single Dgraph node that serves both as the leader and a follower node. As you add additional follower nodes, file system size requirements (as measured by the high-water mark parameters for shared storage) increase modestly and do not increase proportionally to the number of follower nodes in any data domain.
- **File system performance**. For each data domain cluster hosted in an Endeca Server cluster, the index files are stored on remote shared disks. The index files are accessed at the startup of a data domain cluster, during data and configuration updates, and for answering queries. For regular query processing, the Endeca Server takes advantage of its cache. For updates, in a multi-node data domain cluster, all nodes are accessing the index on remote storage at the same time (the leader node writes updates to the index, but all follower nodes need to acquire read-only access to this updated index). This coordinated access may affect performance for the network or shared file system, especially when large updates are accessed for the first time.

  File system options. Typically, the Endeca Server cluster performs write operations from the Endeca Server instance hosting the leader node for a given data domain. It performs read operations from the Endeca Server instances hosting follower nodes in the data domain.

  To tune the file system performance, you may choose the file system configuration options to suit this pattern. In particular, mounting with `noatime` configuration on Linux will eliminate the cost of frequent access-time file system updates from the follower data domain nodes, and thus improve file system performance. Particular file system types may have further options suited to this pattern of usage.

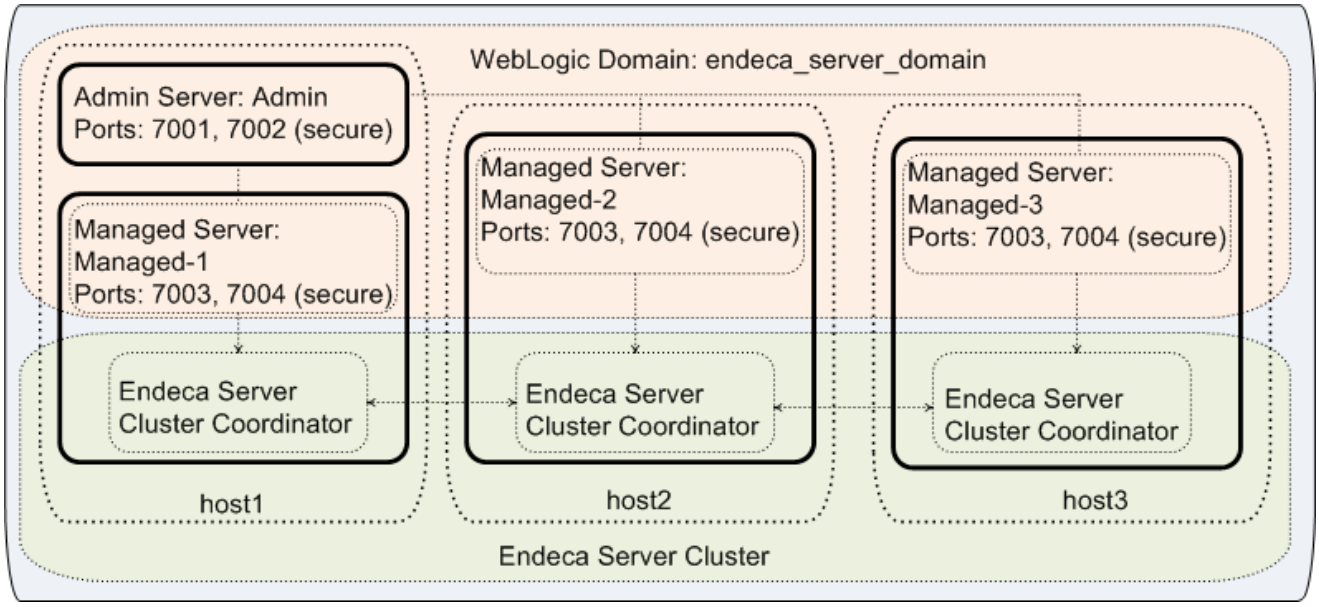
Cluster installation and deployment tasks

This section includes a diagram of the cluster deployment, outlines a high-level cluster installation and deployment procedure, and provides detailed tasks for the installation and deployment of an Endeca Server cluster.

Cluster deployment diagram

The following diagram illustrates a WebLogic domain with one Admin server and three Managed Servers, in which an Endeca Server cluster is deployed on its Managed Servers.

Important: Starting from this topic, all tasks describing the installation and deployment of the Endeca Server cluster use the sample names and ports from this diagram.



In this diagram:

- Three machines with the names `host1`, `host2`, and `host3` are used for the Endeca Server cluster deployment.

  Note: Even though, in the development environment, you can deploy an Endeca Server application in a single Admin Server, the Endeca Server cluster should be deployed on Managed Servers in the WebLogic domain, with Admin Server managing the WebLogic domain but not running an instance of the Endeca Server.

- On each of the host machines, the WebLogic Server, the Application Developer Runtime, and the Endeca Server software is installed.
- On `host1`, the WebLogic domain is created for the Endeca Server deployment. This WebLogic domain will eventually include one Admin Server and three Managed Servers:
  - The WebLogic Admin Server is configured on `host1`. The listen port for the Admin Server is configured in this example as either 7001 (for a non-secure Endeca Server installation), or 7002 (for a secure Endeca Server installation with SSL).

- Three WebLogic Managed Servers are configured: `Managed-1` on `host1`, `Managed-2` on `host2`, and `Managed-3` on `host3`. The listen port for the Managed Servers is configured to be the same on all three host machines; in this example, it is shown to be either 7003 (for the Endeca Server installation that is not secure), or 7004, (for the secure Endeca Server installation with SSL). Note that in this example, `Managed-1` runs on the same host as the Admin Server for the WebLogic domain.

  Important: For the Endeca Server cluster to run, all listen ports for the Managed Servers must be the same on each host machine running a Managed Server. This also means that if any of the Managed Servers is sharing a machine with the Admin Server, the Admin Server ports must differ from the Managed Server ports.

- The Endeca Server application is deployed on the Managed Servers (and not on the Admin Server).
- The Cluster Coordinator service of the Endeca Server is also configured to run on all three Managed Servers running the Endeca Server. (This is a requirement of the Endeca Server cluster. For a full description of this requirement, see the *Oracle Endeca Server Cluster Guide*.)

High-level installation and deployment procedure

This topic lists high-level tasks required for the installation and deployment of the Endeca Server cluster.

This procedure (and the subsequent topics that discuss each task in detail) are based on the following assumptions:

- The procedures are described for Linux. For Windows, the procedures are similar, with path names that use backward slashes and scripts that end with `.cmd`.
- The procedures use the `$DOMAIN_HOME` variable to indicate the location of the WebLogic domain created for the Endeca Server. For example, if `endeca_server_domain` is the name of your WebLogic domain for the Endeca Server, then the default path to it on Linux is:

  ```
  Oracle/Middleware/user_projects/domains/endeca_server_domain
  ```

- The procedures use the port numbers, host names, and server names as displayed in the cluster deployment diagram. See *Cluster deployment diagram on page 59*. You can use your own port numbers and host and server names, as long as port numbers satisfy the deployment requirements for the Endeca Server cluster. These requirements are included in the tasks in this section.
- The procedures assume secure installation (with SSL) of the Oracle Endeca Server. Options for the unsecured installation are included in parenthesis.

Note: This procedure provides a high-level overview of all tasks. The topics that follow this procedure include detailed steps for each task. Therefore, read this procedure first to understand the entire deployment process, and then use the subsequent topics to perform the required steps.

To install and deploy an Endeca Server cluster, perform the following high-level tasks:

1. On three separate machines (`host1`, `host2`, `host3` in the diagram), install WebLogic Server 10.3.6, ADF Runtime, and Endeca Server. On `host1`, deploy a WebLogic domain with the Endeca Server application in it.

   For instructions, see *Step1: Installing required software on multiple machines on page 61*. As a result of this step, you should have the required software installed on three machines, and an Admin Server configured in the WebLogic domain that is created for the Endeca Server application.

2. On the Admin Server running on `host1`, generate SSL certificates for the Endeca Server and create three Managed Servers.

   For instructions, see *Step 2: Creating Admin Server, generating SSL certificates, and cloning Managed Servers on page 62*.

3. Modify `EndecaServer.properties` and `EndecaCmd.properties`.

   For instructions, see *Step 3: Adjusting the cluster configuration on page 66*.

4. Stop the Admin Server and pack the WebLogic domain, using the `pack.*` script.

   This creates the WebLogic domain template. For instructions, see *Step 4: Packing the WebLogic domain on page 68*.

5. On the Managed Server machines `host2` and `host3`, unpack the WebLogic domain using the template you have created.

   For instructions, see *Step 5: Unpacking the WebLogic domain on Managed Servers on page 68*.

6. Restart the Admin Server and change the targets for the Endeca Server application's deployment from the Admin Server to three Managed Servers. On the Managed Server machines `host1`, `host2` and `host3`, start the Managed Server.

   For instructions, see *Step 6: Changing the deployment targets and starting servers on page 69*.

7. Verify the deployment. For instructions, see *Verifying a cluster installation and deployment on page 76*.

Step1: Installing required software on multiple machines

As a first step in the cluster deployment, install WebLogic Server, ADF Runtime, and Endeca Server on each of the three machines on which you will be initially deploying an Endeca Server Cluster.

Before you start the installation, ensure that, on each of the machines:

- The JDK is installed (you will need to point to its location).
- Write access is provided to the shared file system on which the indexes for the data domains will be stored.

For a full list of software requirements, see *Required Oracle products on page 2*.

When you install the required software, only run the installers, but do not run the WebLogic domain configuration wizard.

To install the required software, on each machine:

1. Install WebLogic Server in a secure mode.

   See *Installing WebLogic Server on page 11*.

2. Install ADF Runtime package.

   See *Installing Oracle ADF Runtime package on page 22*.

3. Install the Endeca Server in a secure mode.

   See *Installing Oracle Endeca Server on page 32*.

As a result of this task, you should have three machines on which the required software is installed, but the WebLogic Server is not yet running. Next, you need to create the Admin Server and the WebLogic domain for the Endeca Server application.

Step 2: Creating Admin Server, generating SSL certificates, and cloning Managed Servers

In this step, on the machine known in the diagram as `host1`, you deploy a WebLogic domain with the Endeca Server application in it, start the Admin Server, generate SSL certificates on it, and then create three Managed Servers.

It is assumed that on all three machines, the required software is already installed but the WebLogic Server has not been started.

To create an Admin Server, generate SSL certificates for the Endeca Server on it, and create Managed Servers, do the following:

1. Create a WebLogic domain for the Endeca Server.

   See *Creating the WebLogic domain for Endeca Server on page 39*.

   This procedure assumes that you have created a WebLogic domain `endeca_server_domain`. Once you create this domain, the only machine that is currently configured in it becomes the Admin Server.

2. Start the Admin Server. On `host1`, go to `$DOMAIN_HOME/<domain_name>/bin`, and run:

   ```
   startWebLogic.sh
   ```

3. Generate SSL certificates for the Endeca Server on the Admin Server. See *Creating SSL certificates on page 48*.

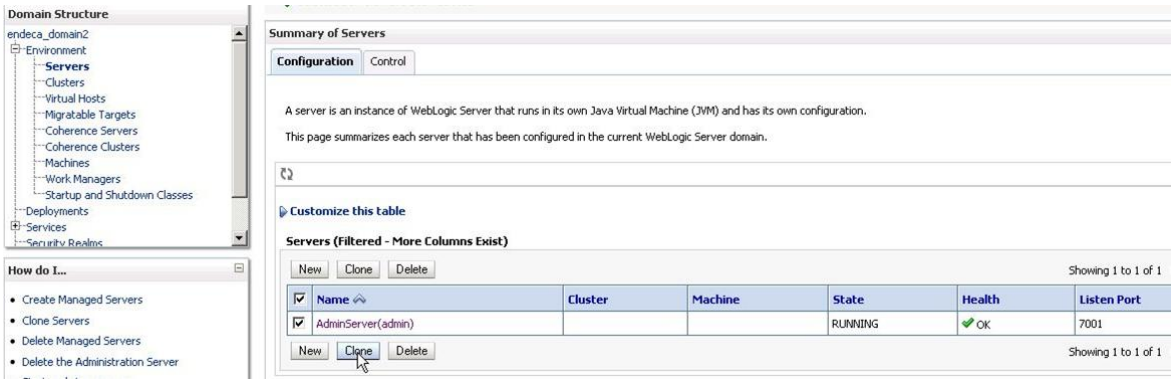
   This step is required only if you have installed the Endeca Server in a secure mode with SSL (this is assumed by this procedure and the subsequent instructions).

   Note: if you previously installed the Endeca Server software on a single machine, the Endeca Server Java application may have been deployed on the Admin Server. This is a valid configuration for single-machine deployments. However, in the Endeca Server cluster deployment, even though you initially start the Endeca Server Java application on the Admin Server to generate the SSL certificates for it, the Endeca Server should be eventually started on Managed Servers only — this will be evident in the final steps of the entire deployment procedure for the Endeca Server cluster.

4. Create the first Managed Server:
   (a) Access the Administration Console: `http://host1:7001/console`.
   (b) Select **Lock & Edit**.
   (c) Go to **Environment>Servers** and select the Admin Server.

   The **Clone** option is activated.

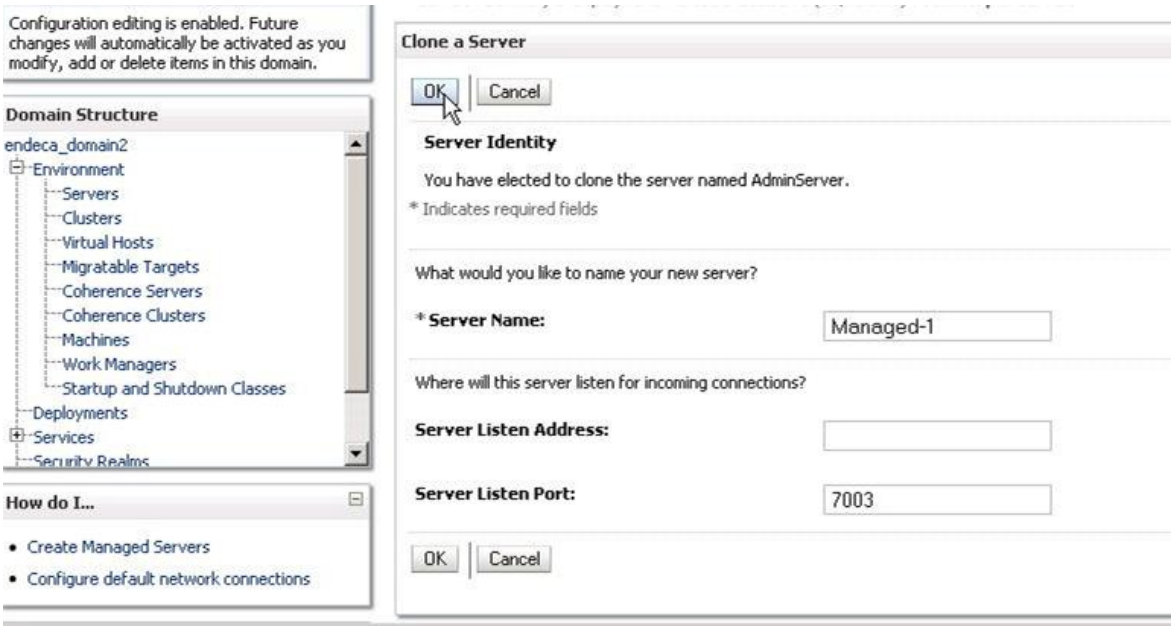


(d) Click **Clone**.

The next window opens.

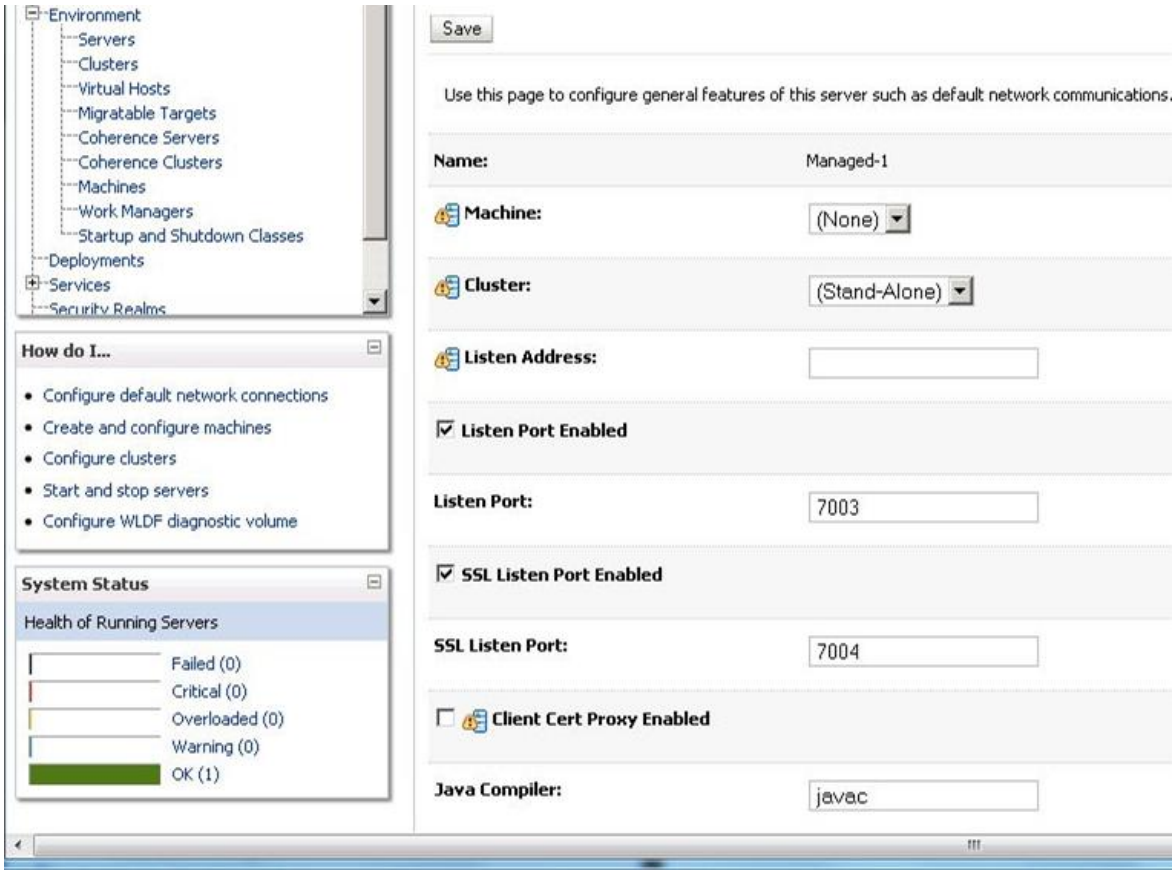
(e) Change the **Server Name** (this is the Managed Server name) to `Managed-1`.

(f) Change the **Server Listen Port** to be 7003, leave the other fields unchanged, and click **OK**.



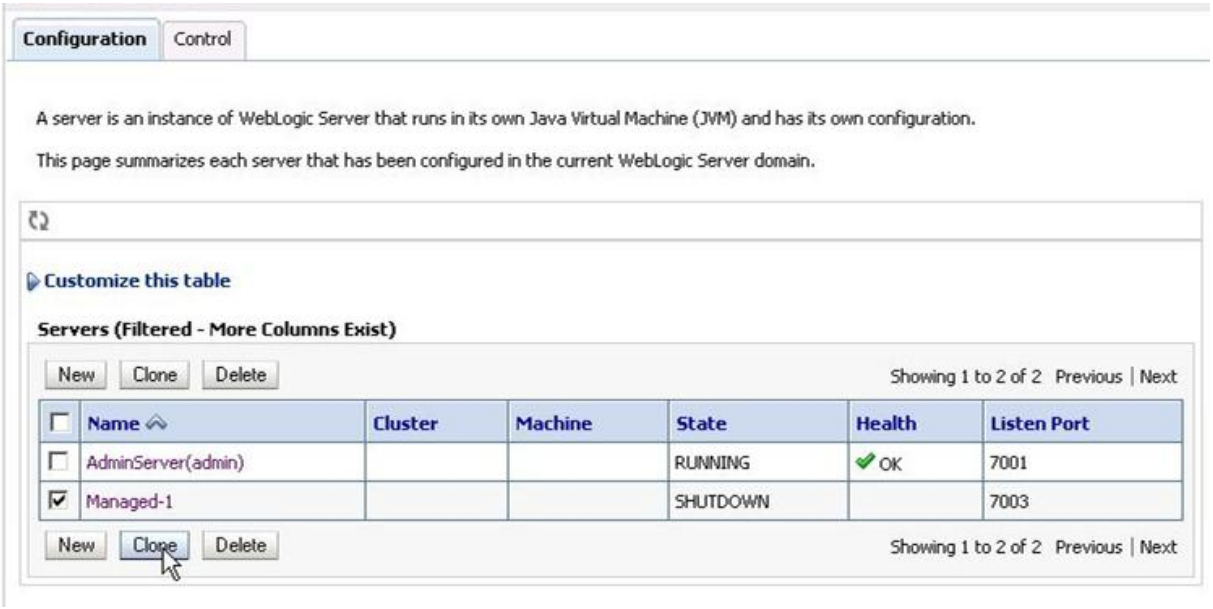
The server named `Managed-1` is created, but its **SSL Listen Port** must be enabled and specified.

(g) Click `Managed-1` to edit it, and in the edit screen, check **SSL Listen Port Enabled**, change **SSL Listen Port** to 7004, leave other options unchanged, and click **Save**.



Proceed to create two more Managed Servers.

5. Create `Managed-2`. Go to **Environment>Servers**, click `Managed-1` and select **Clone**.



6. Change the server name to be `Managed-2`, and its **Listen Port** to be 7003.
7. In the edit screen for this server, verify that the **SSL Listen Port** for it is already enabled and listed as 7004.
8. Save the changes.
9. Create `Managed-3` by repeating steps 5 - 8 for it, changing the name to `Managed-3`, and keeping the ports the same as for `Managed-1` and `Managed-2`.

Important: For the Endeca Server cluster to work, the ports on all three Managed Servers should be the same. Additionally, if one of the Managed Servers shares the machine with an Admin Server (as in the example diagram used in this procedure), then the ports for the Admin Server (7001, 7002) should be different from the ports for the Managed Servers (7003, 7004).

As a result, on `host1`, you should have created a WebLogic domain for the securely installed Endeca Server, in which four servers are configured: one Admin Server and three Managed Servers. One of the Managed Servers, `Managed-1`, is configured to run on the same machine as the Admin Server (`host1`). Note also that while the Admin Server is running on `host1`, the Managed Servers are created but not running yet.

The next steps involve using `pack.*` and `unpack.*` scripts to create a WebLogic Server template based on this configuration, and deploying it on two of the three Managed Servers, on `host2` and `host3`. (There is no need to unpack the domain template on `host1` because it already contains the configuration for this WebLogic domain.)

Step 3: Adjusting the cluster configuration

In order for the Endeca Server cluster to run, two of its configuration files should be configured to list the Managed Servers, the location of the shared file system, and the listen ports for the Managed Servers on which the Endeca Server instances will be running.

The files that you need to modify are:

- `EndecaServer.properties`
- `EndecaCmd.properties`

To locate these files, on `host1`, go to the `$DOMAIN_HOME/config` directory.

Changing settings in EndecaServer.properties

Change the configuration of this file to include the listen port of all three Managed Servers, their host names (for the Cluster Coordinator), and the location of the shared file system.

To modify `EndecaServer.properties`:

1. Go to `$DOMAIN_HOME/config`, and open the `EndecaServer.properties` file in a text editor.
2. Modify the file as follows:
   - `endeca-cluster-coordinator-hosts` must contain comma-separated host names of all three Managed Servers: `host1`, `host2`, and `host3`, in this example. If a machine is set up with a fully qualified domain name, (such as, `host1.us.oracle.com`), the machine name in `EndecaServer.properties` must also be the same fully qualified domain name. However, if the machine name was configured as `host1`, you can use this name in `EndecaServer.properties`.

     Note: If you will later expand the Endeca Server cluster, by adding machines to the WebLogic domain, you should include their host names in this list based on the following requirement — the total number of these machines should be an odd number that is equal to or greater than three. For example, if you will be adding a fourth machine, its host name should not be added to this list. If you will be adding a fifth machine, you can optionally leave the list to contain three host names, or include all five host names — both configurations will satisfy the Cluster Coordinator requirement for the Endeca Server cluster.

   - `endeca-data-dir` and `endeca-offline-dir` should point to the directories on a shared file system to which all three hosts have write access. The file paths should use forward slashes (even if you are installing on Windows).
   - `endeca-cluster-coordinator-dataDir` should also point to another directory on this shared file system. The file paths should use forward slashes (even if you are installing on Windows).
   - `endeca-webserver-port` should be 7004 (this assumes that you installed the Endeca Server in a secure mode). For a non-secure installation, this port should be 7003. (You can use another port number, as long as the port is either the same as an SSL-enabled port configured for the Managed Servers, or their Listen Port, and as long as the port number is not in the `endeca-ds-port` range as shown in the example in this topic.)
3. Leave the other settings unchanged and save the file.

As a result of this task, you have configured the Cluster Coordinator of the Endeca Server cluster to run on at least three machines hosting the Endeca Server instances. This is a requirement that ensures increased availability of the Endeca Server cluster and its data domain services. You have also configured the Endeca Server cluster to host all indexes for its data domains on a shared file system (without this requirement, the Endeca Server cluster will not run).

Example

The following example illustrates the required settings in `EndecaServer.properties`:

```
endeca-require-https=true
endeca-runtime-basedir=C:/Oracle/Middleware/EndecaServer<version>/endeca-server
endeca-data-dir=Q:/data_dir
endeca-offline-dir=Q:/offline_data_dir
endeca-logs-dir=C:/Oracle/Middleware/user_projects/domains/endeca_server_domain/EndecaServer/logs
endeca-dgraph-install=C:/Oracle/Middleware/EndecaServer<version>/endeca-server/dgraph
endeca-webserver-port=7004
endeca-ds-port-min=7012
endeca-ds-port-max=8012
endeca-ds-cert-file=C:/Oracle/Middleware/user_projects/domains/endeca_server_domain/config/ssl
/dgraphCert.pem
endeca-ds-ca-file=C:/Oracle/Middleware/user_projects/domains/endeca_server_domain/config/ssl
/dgraphCA.pem
endeca-secure-mode=true
endeca-cluster-coordinator-dir=C:/Oracle/Middleware/EndecaServer<version>/endeca-server
/cluster-coordinator
endeca-cluster-coordinator-hosts=host1,host2,host3
endeca-cluster-coordinator-clientPort=2181
endeca-cluster-coordinator-tickTime=2000
end eca-cluster-coordinator-initLimit=10
endeca-cluster-coordinator-syncLimit=5
endeca-cluster-coordinator-dataDir=Q:/cc_data_dir
endeca-cluster-coordinator-dataLogDir=C:/Oracle/Middleware/user_projects/domains/endeca_server_domain
/EndecaServer/data
endeca-cluster-coordinator-serverPort=3181
endeca-cluster-coordinator-leaderPort=4181
endeca-cluster-coordinator-maxClientCnxns=0
endeca-cluster-coordinator-minSessionTimeout=4000
endeca-cluster-coordinator-maxSessionTimeout=180000
```

In this example, the `Q` drive indicates the location of the shared file system.

Important: This drive, under the same letter, should exist on all three of the Managed Server machines that will be running the Endeca Server application (in other words, the contents of `EndecaServer.properties` must be identical on all Endeca Server nodes in the cluster.

Changing settings in EndecaCmd.properties

This topic describes how to change the WebLogic Managed Server port in `EndecaCmd.properties`.

This task assumes that you have installed Endeca Server in a secure mode and have run the script to generate SSL certificates.

To modify `EndecaCmd.properties`:

1. Go to `$DOMAIN_HOME/config`, and open the `EndecaCmd.properties` file in a text editor.
2. Change the port to be the port of your Managed Server pool. For the secure Endeca Server installation, the port should be 7004. (For an unsecured installation, the port is 7003.)
3. Leave the other settings unchanged and save the file.

Example

The following example illustrates the required settings in `EndecaCmd.properties`:

```
host=host1
port=7004
root=/endeca-server
keystore=C:/Oracle/Middleware/user_projects/domains/endeca_server_domain/config/ssl
/endecaServerClientCert.ks
truststore=C:/Oracle/Middleware/user_projects/domains/endeca_server_domain/config/ssl
/endecaServerTrustStore.ks
ssl=true
```

In this example, the Endeca Server is installed in a secure mode and the port 7004 is used for communication with Managed Servers on which Endeca Server application will be running as a cluster. This port should be the same port as the one you configured as the SSL-enabled Listen Port for your Managed Servers.

In the next steps, you can pack and unpack the WebLogic domain that includes these settings.

Step 4: Packing the WebLogic domain

To pack the WebLogic domain, use the `pack.*` and `unpack.*` scripts of the WebLogic Server.

For information on these scripts, see *http://docs.oracle.com/cd/E23943_01/web.1111/e14144/tasks.htm*.

To create the WebLogic domain template:

1. Stop the WebLogic Server on the Admin Server. Use the Admin Console, or, on `host1`, go to `$DOMAIN_HOME/bin`, and run:

   ```
   stopWebLogic.sh
   ```

2. On `host1`, run the `pack.*` script:

   ```
   $ORACLE_HOME/Middleware/wlserver_10.3/common/bin/pack.sh
   -managed=true
   -domain=$DOMAIN_HOME
   -template=/tmp/endeca_server_template.jar
   -template_name="Endeca Server"
   ```

   The script creates the WebLogic domain template.

You will use this template to unpack the WebLogic domain on `host2` and `host3`.

Step 5: Unpacking the WebLogic domain on Managed Servers

Before you can start the Managed Servers, unpack the WebLogic domain template on the machines that do not yet contain the WebLogic domain's configuration.

As a prerequisite to this task, make sure that the template you created previously with the `pack.*` script is copied to `host2` and `host3`. In this procedure, it is assumed that the file is copied to `C:/tmp` directory on each of these machines.

You will unpack the WebLogic domain on `host2` and `host3` only (two of the three machines hosting Managed Servers), because the third Managed Server resides on `host1`, together with the Admin Server, and can access the WebLogic domain configuration on this machine.

Important: The paths and the domain names on the Managed Servers should be the same as the ones used on the Admin Server. For example, if you packed the domain that was located in the C: drive, you should unpack it also into the C: drive, replicating the entire path you used on the Admin Server.

To unpack the WebLogic domain:

1. On `host2` and `host3`, run the following command:

   ```
   $ORACLE_HOME/Middleware/wlserver_10.3/common/bin/unpack.sh
   -domain=$DOMAIN_HOME
   -template=/tmp/endeca_server_template.jar
   ```

   where *<domain_name>* is the name of the WebLogic domain you initially created on the Admin Server, such as `endeca_domain`.

   Note: When the script runs, it may notify you that duplicate Server listen ports exist in your WebLogic domain configuration. You can ignore this warning.

   When the script runs successfully, the WebLogic domain's configuration is transferred to the machines on which you will start the Managed Servers.

2. On each machine, go to `$DOMAIN_HOME/config`, and verify the contents of `EndecaServer.properties` and `EndecaCmd.properties`.

   It should be the same as you configured on the Admin Server.

   Note: You may notice that on all machines, including on `host2`, and on `host3`, the host name listed in `EndecaCmd.properties` is `host1`. This is expected — it indicates that you can later run `endeca-cmd` from `$DOMAIN_HOME/EndecaServer/bin` on the Admin Server (`host1`) .

Now you are ready to start the Admin Server and all three Managed Servers.

Step 6: Changing the deployment targets and starting servers

In this step, you change the deployment targets from the Admin Server to Managed Servers and start all servers in the WebLogic domain for the Endeca Server.

Starting the WebLogic Server on which the Endeca Server application is deployed automatically starts the Endeca Server. You can first start the Admin Server, change the deployment targets for the Endeca Server application, and then start the Managed Servers.

To change the deployment targets and start the servers:

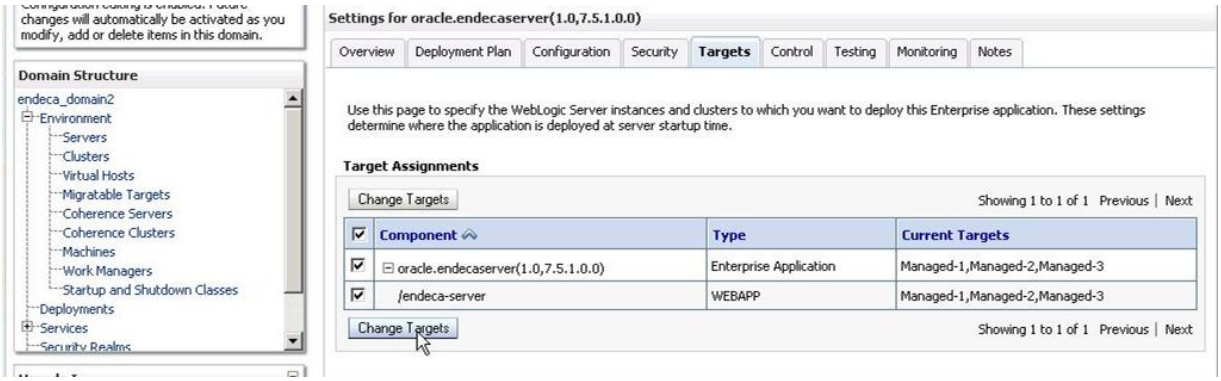
1. Start the Admin Server. On `host1`, go to `$DOMAIN_HOME/bin`, and run:

   ```
   startWebLogic.sh
   ```

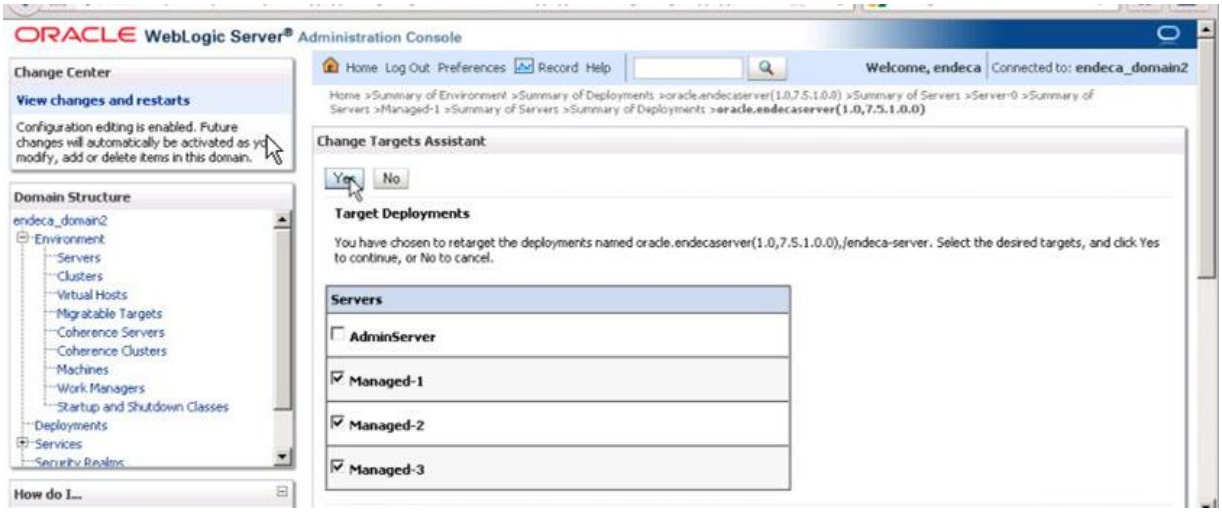
   

   Note: You may notice messages about the Cluster Coordinator failing to establish a connection to other machines running its service. These messages are expected and can be ignored. They indicate that the Cluster Coordinator is attempting to establish its quorum, but only one out of three configured Cluster Coordinator services are running at the moment. The messages will stop after you deploy two more Managed Servers that are running the Cluster Coordinator services.

2. Change the deployment targets. In the Administration Console, go to **Deployments**, click the application `oracle.endecaserver`, click the **Targets** tab, select **Component** (this selects both Endeca Server items under it), then select **Change Targets**:



3. In the **Change Targets Assistant** screen, change targets from the Admin Server to Managed Servers and select **Yes**.



4. Start the Managed Servers.

   On `host2` and `host3`, the `unpack.*` script created scripts to start Managed Servers with the names you specified. You can run:

```
$DOMAIN_HOME/bin start<Managed_Server_name>.sh
```

   For example, once in this directory, you can run:

```
start Managed-2.sh
```

Note: If you use this method, the correlation of the Managed Server name and the machine host name on which it should be started is not enforced by the WebLogic Server scripts. Therefore, be careful to start `Managed-2` on `host2`, and `Managed-3` on `host3`.

   On `host1`, which was not deployed with the `unpack.*` command, the `start <Managed_Server_name>.*` is not created. Therefore, use the following command to start the Managed Server in this case:

```
$DOMAIN_HOME
/bin startManagedWeblogic.sh <managed_server_name> <admin_server_url> <WebLogic Server
console password>
```

Note that you can also use this command on each machine hosting a Managed Server, instead of the `start <Managed_Server_name>.*`.

Once the commands run successfully, you should see the state of the Managed Servers change to `RUNNING`.

5. Verify the deployment of the WebLogic domain. Go to the **Servers** section of the Administration Console and check the state of the Managed Servers.

After you have successfully installed and deployed an Endeca Server cluster, you can verify its status. You can also optionally add additional machines to its WebLogic domain (so that you can start additional Endeca Server instances), and, if you have previously created an Endeca Server data domain in the Endeca Server installed on a single machine, you can migrate this data domain to the Endeca Server cluster.

For information on all these tasks, see *Verifying a cluster installation and deployment on page 76*.

Chapter 5

After You Install

This section contains post-installation tasks, including how to uninstall Oracle Endeca Server.

Package contents and directory structure

The Oracle Endeca Server installation creates the following directory structure.

Endeca Server root directory

The default name of the root directory for the Oracle Endeca Server is `EndecaServer7.5.1_1`. (This root directory may be referred to as `$ENDECA_HOME` in the documentation set for the Endeca Server.) The root directory is typically installed in the Oracle `Middleware` directory.

The Endeca Server root directory contains files and software modules when initially installed:

Directory	Contents
root directory	The release notes (`README.txt`), the *Oracle Endeca Server Licensing Guide*, and the `version.txt` file.
`apis`	The directories for the Oracle Endeca Server API Reference (the `/doc` directory), the Java client examples for sending queries to the Oracle Endeca Server (the `/examples` directory), the WSDL and XSD documents for each Web service packaged with the Oracle Endeca Server (the `/web-services` directory), and the JAR file representing the packaged Bulk Ingest interface.
`endeca-cmd`	The JAR for the `endeca-cmd` command-line interface, as well as the non-SSL version of the command script that calls the Oracle Endeca Server commands. Also, the `lib` directory contains utilities used for the various commands.

Directory	Contents
endeca-server	The EAR (Enterprise ARchive) file for the Endeca Server application.
endeca-server/cluster-coordinator	Software directory for the Cluster Coordinator.
endeca-server/conf	Configuration files used by the generate_ssl_keys script.
endeca-server/dgraph	Software directory for the Dgraph process.
cfgtoollogs, common, diagnostics, install, inventory, OPatch, oui	Directories for Oracle-related software.

Endeca Server domain directories

These directories and files are added when you create a WebLogic domain for the Endeca Server. They reside in either the $DOMAIN_HOME/EndecaServer directory, or the $DOMAIN_HOME/config directory. The variable $DOMAIN_HOME refers to the root of your Endeca domain; for example, if "endeca_server_domain" is the name of your domain, then the default path on Windows is:

```
C:\Oracle\Middleware\user_projects\domains\endeca_server_domain
```

Note: The paths for these directories in this table represent the defaults that may be overridden for a particular installation. For example, $DOMAIN_HOME/EndecaServer/offline is the default offline directory you should be using if you have installed an Endeca Server on a single machine. However, it may be overwritten with your own location (which is required if you are installing and deploying an Endeca Server cluster).

Endeca Server Domain Directory	Contents
$DOMAIN_HOME/EndecaServer/bin	SSL version of the endeca-cmd utility for Endeca commands; Linux and Windows versions of the generate_ssl_keys script.
$DOMAIN_HOME/EndecaServer/data	The default directory for storing the data files for an Endeca data domain. This directory is not intended to be used by the data domain administrators.
$DOMAIN_HOME/EndecaServer/lib	SSL-certificate creation script that is called by the generate_ssl_keys script.
$DOMAIN_HOME/EndecaServer/logs	The logs directory for the Endeca data domains.
$DOMAIN_HOME/EndecaServer/offline	Default location into which the export-dd Endeca Server command exports the index of a specified Endeca data domain.

Endeca Server Domain Directory	Contents
`$DOMAIN_HOME/config`	Two configuration files are added to the root of the `config` directory: `EndecaServer.properties` configuration file for Endeca Server and `EndecaCmd.properties` configuration file for the SSL version of the `endeca-cmd` utility. Both files are described in the *Oracle Endeca Server Administrator's Guide*.
`$DOMAIN_HOME/config/ssl`	Location into which the `generate_ssl_keys` script stores the SSL key files it generates. Note that the `ssl` directory is not created until you run this script.

List of Web services and their versions

Once you install the Oracle Endeca Server and create a data domain in it, you can use the packaged Web services with the specified versions for each of them, to send requests.

The WSDL and XSD documents for the following Web services are installed in the `$ENDECA_HOME/apis/web-services` directory of your installation:

- Data Ingest Web Service 2.0, `ingest` (documented in the *Oracle Endeca Server Data Loading Guide*)
- Configuration Web Service 2.0, `config` (documented in the *Oracle Endeca Server Developer's Guide*)
- Conversation Web Service 2.0 , `conversation` (documented in the *Oracle Endeca Server Developer's Guide*)
- Transaction Web Service 2.0, `transaction` (documented in the *Oracle Endeca Server Developer's Guide*)

In addition to these Web services, additional Web services are available with the Oracle Endeca Server:

- Entity Configuration Web Service 2.0, `sconfig` (documented in the *Oracle Endeca Server Developer's Guide*)
- Manage Web Service 1.0, `manage` (documented in the *Oracle Endeca Server Cluster Guide*)
- Cluster Web Service 1.0, `cluster` (documented in the *Oracle Endeca Server Cluster Guide*)
- LQL Parser Web Service 2.0, `lql_parser`, used by the Conversation Web Service to parse Endeca Query Language queries and filters.

Note: Each Web service is versioned with the major and minor version numbers listed in its WSDL document. If you are planning to use Web service calls directly or use client-side code created with stubs generated from a web service, ensure that you use a supported version of the Web service. For detailed information on Web service versions, see a section in the *Oracle Endeca Server Developer's Guide*.

The Bulk Load Interface is also installed in the `$ENDECA_HOME/apis` directory of your installation. Together with the Data Ingest Web Service, the Bulk Load Interface loads the records into the Oracle Endeca Server. For more information on this interface, see the *Oracle Endeca Server Data Loading Guide*.

Verifying a single-machine installation

To verify the single-machine Endeca Server installation, you can create an Endeca data domain.

It is assumed that in a single-machine Endeca Server installation, you can deploy the Endeca Server application in an Admin Server of the WebLogic domain.

Note: The instructions in this topic are based on Windows. If you installed on Linux, the steps will be similar, though you will need to substitute paths.

To test that the installation succeeded, perform the following steps:

1. Log into the WebLogic Administration Console and verify that the **oracle.endecaserver** Web application has a State of "Active" in the Administration Console.

   You can also verify that the Endeca Server is running by using this URL in your browser to bring up the WSDL for the Manage Web service: `http://localhost:7001/endeca-server/ws/manage?wsdl`

   If Endeca Server is running in SSL mode, use this URL: `https://localhost:7002/endeca-server/ws/manage?wsdl`

2. Open a command prompt.
3. Navigate to one of these directories, depending on whether Endeca Server is running in SSL mode:
   - Non-SSL mode: `C:\Oracle\Middleware\EndecaServer7.5.1_1\endeca-cmd`
   - SSL mode: `C:\Oracle\Middleware\user_projects\domains\endeca_server_domain\EndecaServer\bin`
4. Use this command to create and start an empty Endeca data domain named "test" (you can use another name if you wish):

   ```
   endeca-cmd create-dd test
   ```

5. Use this command to verify that the Endeca data domain is running:

   ```
   endeca-cmd get-dd-health test
   ```

   The Endeca data domain is fully running if you see an output similar to this in the command prompt window:

   ```
   Data domain: test
   Leader Node Health:
       Hostname: Web007
       Port: 7001
       Protocol: HTTP
       Is available
   Follower Nodes Health:
   Detail:[]
   ```

   The "`Is available`" line indicates that the Dgraph is up and running. If you installed in secure (SSL) mode, the Port will be 7002 and the Protocol will be HTTPS.

You can use the `endeca-cmd --help` command to print out the usage for the various commands.

For detailed information on the Oracle Endeca Server and its commands, see the *Oracle Endeca Server Administrator's Guide*.

Verifying a cluster installation and deployment

Use the Administration Console of the WebLogic Server to verify the state of the WebLogic domain running the Endeca Server cluster on three of its Managed Servers.

Before you access the Administration Console, start the Admin Server of the WebLogic domain created for the Endeca Server.

To verify the Endeca Server cluster deployment:

1. Open the Administration Console: `http://<admin_server_host>:port/console`
2. In the left-hand pane's section **Domain Structure**, select **Environment**, then select **Servers**.

   The Administration Console displays the state of all servers in your WebLogic domain for the Endeca Server.
3. Select **Domain Structure>Deployments**. From the list, select the Endeca Server application, and then select the **Monitoring** tab.

Additional cluster tasks

After you have verified the cluster deployment, you can create a data domain, extend the Endeca Server cluster, or import a data domain into the cluster.

Creating a data domain in the Endeca Server cluster

Adding Endeca Server instances to the cluster

Importing a data domain into a cluster

Creating a data domain in the Endeca Server cluster

This task describes how to create an Endeca data domain after you have deployed an Endeca Server cluster.

Before you start, verify the status of the Endeca Server cluster by going to the Admin Server on `host1`, navigating to `$DOMAIN_HOME/EndecaServer/bin` (if you installed the Endeca Server in a secure mode), and running:

```
endeca-cmd list-nodes --password <sslPassphrase>
```

where *<sslPassphrase>* is the password you specified when running the script to generate SSL certificates for the Endeca Server. The command should return a list of host names for all Managed Servers on which the Endeca Server application is running as an Endeca Server cluster.

Important: The `endeca-cmd` command exists in the `$DOMAIN_HOME/EndecaServer/bin` directory only on `host1` which is the Admin Server, so it is important to access this command in this directory only if you are on the machine that is running the Admin Server for the WebLogic domain for Endeca Server (`host1` according to the cluster deployment diagram in this guide). This is the recommended way of accessing `endeca-cmd` if you are running the Endeca Server cluster in a secure mode. Alternatively, if you want to access `endeca-cmd` on any of the Managed Servers in the Endeca Server cluster, go to the directory `$ORACLE_HOME/Middleware/EndecaServer<version>/endeca-cmd`. If you run this command from that directory and have installed the Endeca Server in a secure mode, be sure to specify all the

SSL options on the command line. For full information on running the `endeca-cmd` command, see the *Oracle Endeca Server Administrator's Guide*.

This procedure assumes you have installed the Endeca Server cluster in a secure mode (SSL-enabled).

To create an Endeca data domain in an Endeca Server cluster:

1. On `host1` (this is the machine on which the Admin Server of the WebLogic Server created for Endeca Server is running), go to `$DOMAIN_HOME/EndecaServer/bin`.
2. Create a new data domain profile for the Endeca data domain which will include a total of two nodes. (Each will be allocated to run on a separate Endeca Server instance.) Run the following command:

   ```
   endeca-cmd put-dd-profile my_two_node_dd_profile
   --num-followers 1 --password <sslPassphrase>
   ```

   where `my_two_node_dd_profile` is the name of the data domain profile, and `sslPassphrase` is the password that you specified with the `--sslPassphrase` flag of the `generate_ssl_keys` utility.

   This command creates the data domain profile in which there is one leader node and one follower node in the data domain.
3. Create a data domain using this profile. Run:

   ```
   endeca-cmd create-dd test
   --dd-profile-name my_two_node_dd_profile
   --password <sslPassphrase>
   ```

   This command creates an Endeca data domain `test`, based on the previously configured data domain profile. In this data domain, two nodes (Dgraph processes) are running, each on its own Endeca Server instance.
4. Verify the state of the data domain. Run:

   ```
   endeca-cmd get-dd-health test
   --password <sslPassphrase>
   ```

   The command returns the following information:

   ```
   Data domain: test
   Leader node health:
   Hostname: host1
   Port: 7004
   Protocol: HTTPS
   Is available
   Follower nodes health:
   Hostname: host2
   Port: 7004
   Protocol: HTTPS
   Is available
   ```

   This output indicates that the data domain `test` runs on two nodes, both of which are available. Note that even though you created this data domain from one machine, it is configured to run two nodes on different Endeca Server instances. You can now access this data domain from any Endeca Server instance machine.

Adding Endeca Server instances to the cluster

To add another Endeca Server instance to an already deployed Endeca Server cluster, provision an additional WebLogic Managed Server and deploy the Endeca Server domain to this server.

The instructions in this topic assume that you have already deployed an Endeca Server cluster with three Endeca Server instances running on three Managed Servers in the WebLogic domain created for the Endeca Server.

To add another Endeca Server instance to the Endeca Server cluster:

1. Install the required software on an additional machine. For instructions, see *Installing WebLogic Server and Application Developer Runtime on page 11* and *Installing Endeca Server on a Single Machine on page 32*.
2. Ensure that this machine has write access to the same shared file system to which existing Endeca Server machines have access.
3. In the WebLogic domain for the Endeca Server, create another Managed Server. For instructions, see *Step 2: Creating Admin Server, generating SSL certificates, and cloning Managed Servers on page 62*. Do not generate SSL certificates (as it is assumed you have already generated them).
4. Create a WebLogic domain template and deploy it on machine that will host the additional Managed Server.

   For instructions, see *Step 4: Packing the WebLogic domain on page 68* and *Step 5: Unpacking the WebLogic domain on Managed Servers on page 68*.
5. (Optional.) Add the host name of this node to the list of host names on which the Cluster Coordinator service must be running, in the `EndecaServer.properties` file.

   If you are adding the fourth Endeca Server node, skip this step. If you are adding the fifth Endeca Server node, you can optionally perform this step. This step is needed to ensure that an odd number (that is equal to or greater than three) of the Endeca Server nodes are also running the Cluster Coordinator service. For instructions, see *Changing settings in EndecaServer.properties on page 66*.
6. Specify the directories on the shared file system in the `EndecaServer.properties`. For instructions, see *Changing settings in EndecaServer.properties on page 66*.
7. Start the Managed Server and change the WebLogic domain's deployment targets to include this Managed Server. See *Step 6: Changing the deployment targets and starting servers on page 69*.

Once the additional Managed Server is deployed, the Endeca Server application is started in it. Now you can create data domain profiles that require a greater number of Endeca Server instances; the Endeca data domains that you create using these profiles will be allocated to this additional Endeca Server instance.

Note: Existing data domains will not be dynamically adjusted to take advantage of the additional Endeca Server cluster capacity. In other words, to take advantage of the increased capacity, create new data domain profiles, and use them to create new data domains.

Importing a data domain into a cluster

If you have created an Endeca data domain in a development environment on a single Endeca Server instance, you can export it and import it into an Endeca Server cluster.

This procedure assumes that you have previously created the data domain `MyDD` on an Endeca Server instance running on a single machine that is hosting an Admin Server of the WebLogic Server. This procedure

also assumes that you have used the same version of the Endeca Server for the single-machine data domain deployment as you are using for the Endeca data domain's deployment in the cluster.

This procedure does not assume a secure installation of the Endeca Server. To run `endeca-cmd` in a secure mode, use its global options to also specify `sslPassphrase` on the command line. For information on `endeca-cmd`, see the *Oracle Endeca Server Administrator's Guide*.

To import a data domain into a cluster:

1. Export the data domain. On the host machine of your single-machine deployment of the Endeca Server, go to `$ORACLE_HOME/Middleware/EndecaServer<version>/endeca-cmd` and run:

   ```
   endeca-cmd export-dd MyDD --offline-name MyDD_offline
   ```

   This command exports the index of the data domain `MyDD` to the file `MyDD_offline`, located in the `offline` directory for the data domain.

2. Copy the `MyDD_offline` file to a location of the data domain's offline directory on a shared file system for the Endeca Server cluster.

   To check this location, see the file `EndecaServer.properties` in the `$DOMAIN_HOME/config` directory. The location is specified in this file similar to the following example:

   ```
   endeca-offline-dir=Q:/offline_data_dir
   ```

3. Import the data domain. On the host machine running the Admin Server of the WebLogic Server created for Endeca Server, go to the directory `$DOMAIN_HOME/EndecaServer/bin` and run:

   ```
   endeca-cmd import-dd MyDD --offline-name MyDD_offline --dd-profile-name MyDDProfile
   --is-enabled
   true
   ```

   where `MyDDProfile` is the name of the data domain profile you want to use for creating this data domain in an Endeca Server cluster.

4. To verify the data domain is running, run:

   ```
   endeca-cmd get-dd-health MyDD
   ```

Increasing Linux file descriptors

You should increase the number of file descriptors from the 1024 default.

Having a higher number of file descriptors ensures that the WebLogic Server can open sockets under high load and not abort requests coming in from clients.

To increase the number of file descriptors on Linux:

1. Edit the `/etc/security/limits.conf` file.
2. Modify the **nofile** limit so that **soft** is 4096 and **hard** is 8192. Either edit existing lines or add these two lines to the file:

   ```
   *      soft      nofile      4096
   *      hard      nofile      8192
   ```

   The character "*" is a wildcard that identifies all users.

Using the SH sample data

A Sales History data set is supplied as a sample data set for an Endeca data domain.

The SH (Sales History) data set is used by a sample company that does a high volume of business. It therefore runs business statistics reports to aid in decision making. Many of these reports are time-based and nonvolatile (that is, they analyze past data trends). The statistics in the SH data set include annual, quarterly, monthly, and weekly sales figures by product. The company also runs reports on distribution channels through which its sales are delivered. When the company runs special promotions on its products, it analyzes the impact of the promotions on sales. It also analyzes sales by geographical area.

The SH data set is ready for use out of the box because the files have already been indexed by the Endeca Server. This eliminates the need to load source records into the Endeca Server.

Before you can use the Endeca data domain configured for the SH data set, place the SH indexed files into the offline directory of the Endeca Server and import them into a newly-created Endeca data domain.

To unpack and use the sample data files:

1. Unpack the sample data ZIP file to a directory of your choice.

   A directory named `sh_indexes` is created.

2. Make sure that both WebLogic Server and the Endeca Server application are up and running.
3. Copy the `sh_indexes` directory to the Endeca Server's offline directory.

   The location of the offline directory is set by the `endeca-offline-dir` parameter in the Endeca Server configuration file (named `EndecaServer.properties` located by default in the `$DOMAIN_HOME/config` directory).

4. Use the endeca-cmd `import-dd` command to create and enable an Endeca data domain, using the sh data files.

   You must specify a data domain that is not already in use. For example:

   ```
   endeca-cmd import-dd sh_sample --offline-name sh
   ```

The Endeca data domain named "sh_sample" is ready for use.

Chapter 6

Uninstalling Oracle Endeca Server

This section contains the procedures for uninstalling the Oracle Endeca Server.

Uninstalling Oracle Endeca Server

Follow these steps to uninstall the Oracle Endeca Server from your Linux or Windows machine.

Before you begin the uninstallation process, back up files that you want to retain from the Oracle Endeca Server directory. On Windows, make sure that there no open files in the Oracle Endeca Server directory.

The deinstaller used in this task is located in the `$ENDECA_HOME/oui/bin` directory. For example, the default absolute path on Windows is:

```
C:\Oracle\Middleware\EndecaServer7.5.1_1\oui\bin
```

The deinstaller file is named:

- For Linux: `runInstaller`
- For Windows: `setup.exe`

Important: Do not confuse this deinstaller with the installer with which you installed Endeca Server (that is, the installer in the `endecaserver/Disk1` directory that you unzipped). The file names for both the deinstaller and the installer are the same (`runInstaller` for Linux and `setup.exe` for Windows). However, the deinstaller supports the `-deinstall` option, but not the `-install` option, while the installer is the opposite (it supports the `-install` option, but not the `-deinstall` option).

Also note that this procedure does not delete the Endeca Server domain on the WebLogic Server. Instructions to remove the Endeca Server domain are in the following topic.

To uninstall the Oracle Endeca Server software:

1. Stop the WebLogic Server.

   Stopping the server also stops the Endeca Server application and its data domains.
2. Open a command prompt and change to the `$ENDECA_HOME/oui/bin` directory.
3. Run the deinstaller with this command:
   - For Linux: `./runInstaller -deinstall -jreLoc <jre_location>`

- For Windows: `setup.exe -deinstall -jreLoc <jre_location>`

jre_location is the full path to the location of a Java 6 JRE (Java Runtime Environment) on your system. Note that the path cannot contain spaces. For example, on Windows:

```
setup.exe -deinstall -jreLoc c:\java\jdk1.6.0_43
```

When the deinstaller runs, it displays the deinstallation wizard's Welcome screen.

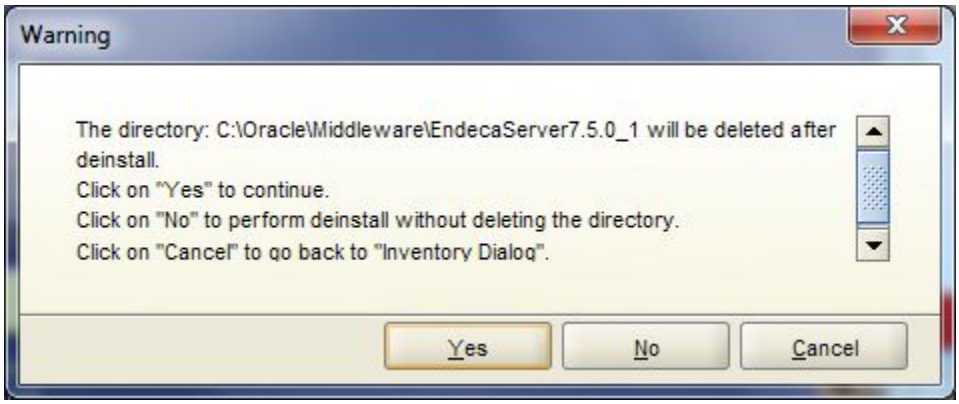
4. Before continuing to the **Welcome** screen, either close the command prompt or change to a directory outside the Endeca Server root directory.

   On Windows, for example, the directory (in which the prompt is open) cannot be completely deleted because of the open command window.

5. At the **Welcome** screen, read the information and click **Next**.

6. At the **Deinstall Oracle Home** screen, verify the deinstallation details and click **Deinstall**.

7. At the confirmation warning message, either click **Yes** (to delete the entire Endeca Server home directory) or No (to deinstall but retain the directory).



8. At the **Deinstallation Complete** screen, click **Finish** to exit the wizard.

This procedure does not remove the Endeca Server domain files from WebLogic Server. Therefore, the next step is to remove the Endeca Server domain from WebLogic Server.

Removing the Endeca Server domain

This topic describes how to manually remove the Endeca Server domain from the WebLogic Server.

The Endeca Server un-installer does not remove the Endeca Server domain files from WebLogic Server. Therefore, you must manually remove the Endeca Server domain from WebLogic Server, as described in this procedure. The procedure will assume that `endeca_server_domain` is the name of the Endeca Server domain.

To remove the Endeca Server domain from WebLogic Server:

1. Stop the WebLogic Server.
2. Using a text editor, open the `$MW_HOME/domain-registry.xml` file and remove the `endeca_server_domain` entry from the file.

```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<domain-registry xmlns="http://xmlns.oracle.com/weblogic/domain-registry">
  <domain location="C:\Oracle\Middleware\user_projects\domains\endeca_server_domain"/>
</domain-registry>
```

3. Delete the `$MW_HOME/user_projects/domains/endeca_server_domain` directory.

Uninstalling an Endeca Server cluster

To uninstall an Endeca Server cluster, follow the steps for uninstalling the Endeca Server instances on each machine, and then remove the Endeca Server domain.

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