Oracle® Fusion Middleware

Upgrading Oracle WebLogic Server

12c (12.2.1.4.0)
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Oracle Fusion Middleware Upgrading Oracle WebLogic Server, 12c (12.2.1.4.0)

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Preface

This document describes how to upgrade an application environment from an earlier version of Oracle WebLogic Server to Oracle WebLogic Server 12.2.1.4.0.

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Diversity and Inclusion

Oracle is fully committed to diversity and inclusion. Oracle respects and values having a diverse workforce that increases thought leadership and innovation. As part of our initiative to build a more inclusive culture that positively impacts our employees, customers, and partners, we are working to remove insensitive terms from our products and documentation. We are also mindful of the necessity to maintain compatibility with our customers' existing technologies and the need to ensure continuity of service as Oracle's offerings and industry standards evolve. Because of these technical constraints, our effort to remove insensitive terms is ongoing and will take time and external cooperation.

Related Documentation

For information about upgrading some of the other Oracle Fusion Middleware products, see:

- *Upgrading to the Oracle Fusion Middleware Infrastructure*
- *Upgrading Oracle SOA Suite and Business Process Management*
- *Upgrading Oracle WebCenter*
- Common Fusion Middleware Upgrade Tasks

Conventions

The following text conventions are used in this document:

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

1

Introduction

You can upgrade WebLogic servers and domains from an earlier version of WebLogic Server to WebLogic Server 12c (12.2.1.4.0). You can also update an existing application to run on Oracle WebLogic Server 12.2.1.4.0.

While upgrading to version 12.2.1.4.0, you might want to change your application or you might have to change the application. However, this document focuses only on issues that you should consider when moving an application to WebLogic Server 12.2.1.4.0 without making any application changes.

The instructions in this document are for the following upgrade scenarios:

- Upgrading from any WebLogic Server 10.3.x release to WebLogic Server 12.2.1.4.0
- Upgrading from WebLogic Server 12.1.x to WebLogic Server 12.2.1.4.0

> **Note:**
>
> If you are upgrading from a release prior to WebLogic Server 10.3.1, see Upgrading From a WebLogic Version Prior to WebLogic Server 10.3.1.
>
> If you are upgrading from version 12.2.1.1.0 and later to version 12.2.1.4.0, the Reconfiguration Wizard only needs to be run when the location of the JDK or the Oracle Home is changed as part of the upgrade. If the Oracle Home and the JDK binaries are in the same location, running Reconfiguration Wizard is not required.

This document also describes how to update (reconfigure) an existing WebLogic Server 10.3.x or 12.1.x domain to be compatible with WebLogic Server 12.2.1.4.0, as well as how to upgrade Web Services.

WebLogic Server generally supports high levels of upgrade capability across WebLogic Server versions. This document is intended to provide WebLogic Server upgrade support and identify issues that may surface during an upgrade so that they can be easily resolved.

> **Note:**
>
> For information about upgrading your Java EE environment and your deployed applications from Oracle Application Server 10*g* and Oracle Containers for Java EE (OC4J) to WebLogic Server 12*c* release (12.2.1.4.0), see Fusion Middleware Upgrade Guide for Java EE.
>
> This document describes the upgrade process for Oracle product installations that include only WebLogic Server. If your installation includes other Oracle Fusion Middleware products, prior to beginning the upgrade, see *Planning an Upgrade of Oracle Fusion Middleware* and the upgrade guides for each Fusion Middleware product in your installation.

WebLogic Server 12.2.1.4.0 includes the Fusion Middleware Reconfiguration Wizard to assist you with upgrading WebLogic Server and your application environments.

Most WebLogic Server applications can be run without modifications in the new WebLogic Server 12.2.1.4.0 application environment.

This chapter includes the following sections:

Version Compatibility

Before you upgrade WebLogic Server, review the WebLogic Server and domain compatibility requirements for WebLogic Server 12.2.1.4.0.

See *Compatibility Within a Domain* in *Understanding Oracle WebLogic Server*.

Within a WebLogic domain, the Administration Server, all Managed Server instances, and the WebLogic domain must be at the same WebLogic Server Major and Minor Version. This means that in WebLogic Server 12.2.1.x, the Administration Server, Managed Servers, and the WebLogic domain must all be at version 12.2.1.x. Versions of WebLogic Server prior to 12.1.2 have slightly different compatibility allowances regarding specific WebLogic Server versions that are supported in a given domain.

Important Terminology

The documentation for upgrading WebLogic Server uses various terms when describing its features and functionality. It is important that you have a good understanding of these terms.

- **Upgrade**—In this document, the term upgrade refers to the process of upgrading WebLogic Server and moving an existing application, unchanged, to a new (upgraded) WebLogic Server version.
- **Reconfiguration**—The process of upgrading a domain that was created with a previous WebLogic Server version so that it is compatible with the WebLogic Server version to which you have upgraded. This can be done using either the Reconfiguration Wizard or WLST.
- **Application Environment**—An application environment includes applications and the WebLogic domains in which they are deployed. It also includes any application data associated with the domain, and may include resources such as database servers, firewalls, load balancers, and LDAP servers.
- **Migrate**—To move an application or domain configuration from a third-party product to an Oracle product.

- **Interoperability**—(1) The ability of an application deployed in one WebLogic Server version to communicate with another application that is deployed in a different WebLogic Server version. (2) The ability of Oracle product components to communicate with third-party software using standard protocols.
- **Compatibility**—The capability of an application built using one WebLogic Server release to run in another WebLogic Server release, regardless of whether the application was rebuilt.

Upgrading From a WebLogic Version Prior to WebLogic Server 10.3.1

To upgrade to WebLogic Server 12.2.1.4.0 from a version prior to 10.3.1, you must first upgrade to WebLogic Server 10.3.6, and then upgrade to 12.2.1.4.0.

If you are currently using a WebLogic version prior to WebLogic Server 10.3.1, upgrading to version 12.2.1.4.0 is a two-stage process:

- Upgrade your installation to WebLogic Server 10.3.6. See Upgrade Guide for Oracle WebLogic Server 10.3.6.

  Be sure to run the WebLogic Server 10.3.6 Domain Upgrade Wizard to upgrade your domains.

  > **Note:**
  >
  > To download a WebLogic Server 10.3.6 upgrade installer, enter the appropriate patch number on My Oracle Support:
  >
  > – Patch 13529623—10.3.6 Generic Upgrade Installer (does not include a bundled JDK)
  > – Patch 13529653—10.3.6 Linux 32-bit Upgrade Installer
  > – Patch 13529639—10.3.6 Windows 32-bit Upgrade Installer
  > – Patch 13529649—10.3.6 Solaris 32-bit Upgrade Installer

- Upgrade WebLogic Server 10.3.6 to WebLogic Server 12.2.1.4.0 per the instructions in this guide.

  > **Note:**
  >
  > As of WebLogic Server 12.1.2, Oracle no longer provides upgrade installers. You must install WebLogic Server 12.2.1.4.0 to a new directory location. You cannot install it over an existing installation.

Overview of the Upgrade Process

You can upgrade all WebLogic Server applications and domains simultaneously, upgrade them in a well-defined sequence, or upgrade some applications and domains while leaving other applications and domains on older WebLogic Server versions.

The process required to upgrade an application environment depends on the scope of the application. An *application environment* includes a WebLogic domain and any applications and application data associated with the domain. It may also include external resources, such as firewalls, load balancers, and LDAP servers. Figure 1-1 shows an example of a WebLogic application environment.

Figure 1-1 Example WebLogic Application Environment

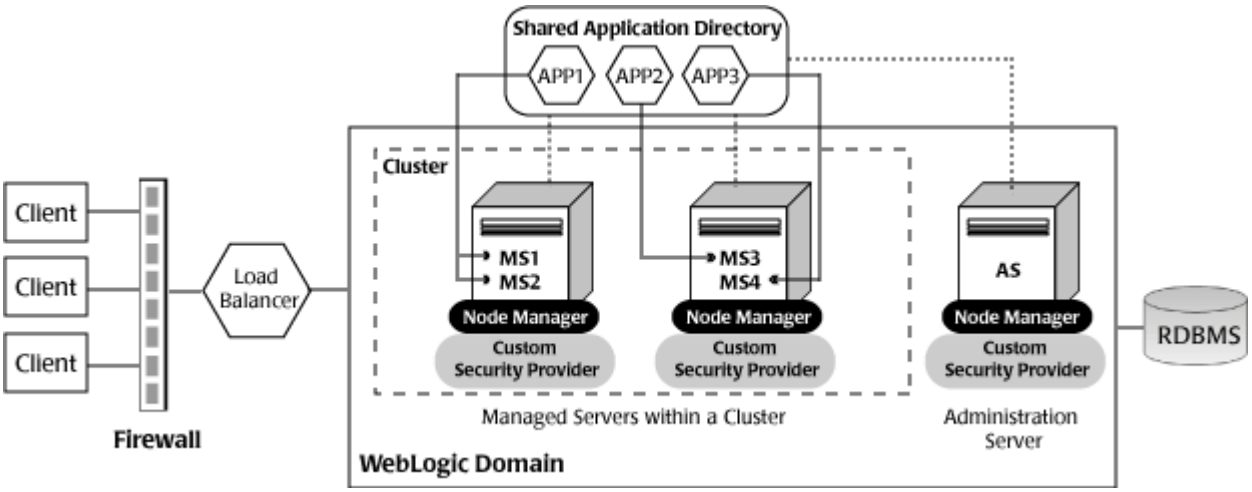


Table 1-1 lists the components of the WebLogic application environment shown in Figure 1-1 and the upgrade requirements for each.

Table 1-1 Upgrade Requirements for Components in Example WebLogic Application Environment

Component	Description	Upgrade Requirements
WebLogic domain	Includes the Administration Server (AS) and optionally one or more Managed Servers (for example, MS1, MS2, MS3, and MS4). The servers in a domain may span multiple machines. Furthermore, you can group Managed Servers into clusters to support load balancing and failover protection for critical applications. For more information about WebLogic domains, see Understanding Oracle WebLogic domains in *Understanding Domain Configuration for Oracle WebLogic Server*.	Upgrade the domain directory on each computer in the domain.
Applications	Any Java EE applications, including Web applications, EJBs, and so on. Typically, applications are deployed to one or more Managed Servers in a domain. Depending on the deployment strategy, applications may reside locally on a computer or be accessible using a shared directory. In addition, external client applications may access the application environment from outside a firewall.	Most WebLogic Server applications can be run without modifications in the new WebLogic Server 12.2.1.4.0 application environment. See Interoperability and Compatibility with Previous Releases.
External resources	Software components, such as databases for storing domain and application data, load balancers, and firewalls.	Verify that all external resources are compatible with WebLogic Server 12.2.1.4.0. See the Oracle Fusion Middleware Supported System Configurations page on the Oracle Technology Network.

Upgrading business applications that are deployed to WebLogic Server may involve upgrading multiple WebLogic Server applications, and in some cases domains, in a coordinated fashion to:

- maintain consistency in the WebLogic Server versions being used
- use the same supported configurations environment across the entire installation
- meet specific interoperability requirements.

Before You Begin

Before you upgrade WebLogic Server, verify that your machine is set up to meet the requirements to upgrade and run WebLogic Server. You must also consider the scope of the environments that you are upgrading and which applications are upgraded in which sequence.

As covering all the permutations of an upgrade is beyond the scope of this document, consider the following items prior to planning your upgrade. These items focus on upgrades that involve a single application running in a single domain. Perform any applicable tasks before you begin the upgrade. Failure to complete the required tasks may result in a failed upgrade or extended system downtime.

- When upgrading a domain to 12c (12.2.1.4.0) from a prior release, if there is no explicit secure mode setting, then the Reconfiguration Wizard will explicitly set secure mode to “disabled” in the upgraded domain. This is to preserve the behavior that was present in the original domain. If there is an explicit secure mode setting, it will be preserved in the upgraded domain.
- Oracle recommends that you upgrade an application in development environments and use a standard QA, testing, and staging process to move upgraded applications to a production environment.
- You typically upgrade an application either by upgrading an existing domain or by creating a new domain, from which you can run the application on the new WebLogic Server version. Sometimes, you prefer to create new domains using the **Fusion Middleware Configuration Wizard** or other configuration tools (such as WLST) to test the applications that you are upgrading.
- When planning a WebLogic Server version upgrade, you should review the Oracle Fusion Middleware Supported Systems Configurations page to ensure that your upgraded environment is supported by Oracle, in particular:
  - current and planned JVM and JDK versions
  - operating system versions
  - database versions
  - Web services versions
  - versions of other products that interoperate with or run on WebLogic Server, to ensure that the upgraded environment is supported by Oracle or other vendors' products that you are using with WebLogic Server.
- On an ongoing basis, Oracle documents APIs and features that have been deprecated (that is, planned for removal in a future release). This is intended to inform you that you should avoid using these APIs and features to ensure upgradability. Oracle also documents the APIs and features that have actually been removed in the current release so that if you are upgrading from prior versions, you can determine if your applications will be affected by an upgrade. See #unique_26

When upgrading, you should review all documentation of deprecated and removed features for all applicable WebLogic Server versions.

- You should consider the impact (if any) that the upgrade process may have on any automation (such as WLST scripts) that you are using to configure, deploy, start/stop, or monitor your WebLogic Server applications. You may need to upgrade such automation along with the applications and domains you are upgrading.
- You should consider the potential impact that may result from the use of third-party libraries in your applications, as they may conflict with different versions of those same libraries that are embedded in WebLogic Server. In particular, new versions of WebLogic Server may change the version of open source libraries that are embedded in WebLogic Server. Applications that may run successfully on earlier WebLogic Server versions may encounter new class conflicts after upgrade.

  If you are upgrading an application that contains embedded third-party libraries, you should consider using the Classloader Analysis Tool, and filtering classloaders when upgrading WebLogic Server applications to WebLogic Server 12.2.1.4.0. This tool enables you to identify, diagnose and resolve such conflicts, and may simplify the upgrade process.
- If you are running applications on prior versions of WebLogic Server, and are using WebLogic Server patches or bug fixes, you should investigate whether or not those patches or bug fixes have been incorporated into the version of WebLogic Server to which you are upgrading.

Interoperability and Compatibility with Previous Releases

Most existing WebLogic Server applications can be run without modification in the new WebLogic Server 12.2.1.4.0 application environment.

To determine whether any feature changes affect the applications in your environment, review the compatibility information described in WebLogic Server 12.2.1.4.0 Compatibility with Previous Releases. If your application uses APIs that have been deprecated or removed, then you may encounter warnings or exceptions at run time.

Troubleshooting an Upgrade

If the upgrade process fails at any step, the Reconfiguration Wizard displays a message indicating the reason for the failure, and then terminates the upgrade process.

To proceed with the upgrade process, perform the following steps:

1. Restore the application environment to its original state using the backup files you created in Step 3: Back Up the Application Environment.
2. Correct the failure reported by the Reconfiguration Wizard.
3. Run the Reconfiguration Wizard again to upgrade the domain.

If you encounter any issues during the upgrade or post upgrade, refer to the Known Issues and Workarounds in *Release Notes for Oracle WebLogic Server* to troubleshoot the issue.

2

Roadmap for Upgrading Your Application Environment

Use the upgrade roadmap to identify the procedure required to upgrade your Oracle WebLogic Server application environment. An upgrade of WebLogic application environment is complete when you upgrade, configure, and deploy your WebLogic application environments.

This document describes the upgrade process for Oracle product installations that include only WebLogic Server. If your installation includes other Oracle Fusion Middleware products, prior to beginning the upgrade, refer to *Planning an Upgrade of Oracle Fusion Middleware* and the upgrade guides for each Fusion Middleware product in your installation.

Complete the following steps to upgrade your application environment:

- Plan for an Upgrade
- Prepare for the Upgrade
- Upgrade Your Application Environment
- Procedure for Upgrading an Application Environment
- Troubleshooting an Upgrade

Plan for an Upgrade

Before upgrading your WebLogic application environment, plan the upgrade path. Planning the upgrade path includes generating an inventory of the application environment, verifying the supported system configurations, reviewing the compatibility information of application environment, and creating an upgrade plan.

To ensure that your plan addresses all the aspects of upgrading that are necessary for your environment, complete the following steps:

- Step 1: Inventory the Application Environment
- Step 2: Verify Supported Configuration Information
- Step 3: Review the Compatibility Information
- Step 4: Create an Upgrade Plan

Step 1: Inventory the Application Environment

Generate an inventory of the application environment by identifying the following components:

- Administration Server and the computer on which it resides
- Managed Servers and the computer(s) on which they reside
- Location of the applications (including all external client applications)
- External resources, for example:
  - Databases used to store persisted and application data

  - Firewalls
  - Load balancers
- Tools, scripts, templates, and source code used for automating the tasks required to create the application environment

You can view a sample application environment in Overview of the Upgrade Process.

Step 2: Verify Supported Configuration Information

Supported configurations (for example, JDK versions, Operating System versions, Web server versions, and database versions) have changed for WebLogic Server 12.2.1.4.0. You may be required to upgrade your environments to the supported versions of these and other products.

For information about supported configurations, see *Oracle Fusion Middleware Supported System Configurations* on Oracle Technology Network (OTN).

For databases, note that:

- As of WebLogic Server 10.3.3, the evaluation database available from the installation program that is provided for use by the sample applications and code examples, and as a demonstration database, is Derby. Derby is an open source relational database management system based on Java, JDBC, and SQL standards. For more information about Derby, see `http://db.apache.org/derby/`.
- As of WebLogic Server 10.3, the Oracle Thin Drivers are included as part of the WebLogic Server installation.
- If you are using an Oracle OCI database driver and want to change to use a Thin database driver, you must remove the `server` property (as illustrated below) from the generated JDBC module. For example:

```
<property>
  <name>server</name>
  <value>servername</value>
</property>
```

- The Oracle Thin Drivers are installed with WebLogic Server and are ready for use. For more information about using these drivers, see JDBC Drivers Installed with WebLogic Server in *Administering JDBC Data Sources for Oracle WebLogic Server*.

Step 3: Review the Compatibility Information

Most existing WebLogic Server applications can be run without modification in the new WebLogic Server 12.2.1.4.0 application environment. However, you should review WebLogic Server 12.2.1.4.0 Compatibility with Previous Releases to determine whether any feature changes affect the applications in your environment.

Step 4: Create an Upgrade Plan

Using the information gathered in the preceding steps, create a plan for upgrading your application environment.

Identify the scope and timing of the upgrade process, based on your business needs. Note the following points:

- Oracle does not recommend upgrading an application environment that is currently deployed in production. Instead, you should upgrade your application environment while it

is under development or test and execute standard procedures for quality assurance and performance tuning before promoting the upgraded environment to production.

- If you start a WebLogic Server after performing a significant upgrade, then the WebLogic Server, the products layered on top of the WebLogic Server, and/or your applications can make irreversible changes to existing data files and database tables. For example, the default file stores may change such that the older versions will no longer be able to load them. Significant upgrade includes upgrade from the major versions, minor versions, and patch sets, or any specific patch/application that changes the files or database formats.
- If your application is complex, for example, if it includes multiple clustered domains and a large number of deployed applications, you may choose to upgrade the components of the application environment in stages.
- You may consider limiting the number of WebLogic Server versions used in any single application environment to minimize the diversity and cost of systems being administered.
- If you plan to use the RDBMS security store in a WebLogic domain, Oracle recommends that you create a new domain in which the RDBMS security store is configured. If you have an existing domain in which you want to use the RDBMS security store, you should create the new domain, and then migrate your security realm to it. Oracle does not recommend "retrofitting" the RDBMS security store to an existing domain. See Managing the RDBMS Security Store in *Administering Security for Oracle WebLogic Server*.

Prepare for the Upgrade

Before you start the upgrade process, you should verify whether there are any upgrade compatibility issues that apply to your applications. You then shut down all running server instances and back up the application components in your domain.

Complete the following tasks before you upgrade the application environment:

- Step 1: Check Your Applications (Undeploy If Necessary)
- Step 2: Shut Down Servers in the Application Environment
- Step 3: Back Up the Application Environment
- Step 4: Install Required Oracle Products
- Step 5: Set Up the Environment

Step 1: Check Your Applications (Undeploy If Necessary)

It is not necessary for WebLogic Server applications to be undeployed before upgrading the domain. In most cases, WebLogic Server applications can be run without modifications in the new WebLogic Server 12.2.1.4.0 application environment. To determine whether any features changes affect the applications in your environment, review the compatibility information in WebLogic Server 12.2.1.4.0 Compatibility with Previous Releases. Note that if you use deprecated or removed APIs in the application, you might encounter warnings or exceptions at run time.

Step 2: Shut Down Servers in the Application Environment

Before you upgrade, you must shut down all servers in the application environment.

Step 3: Back Up the Application Environment

Oracle recommends that before upgrading your application environment, you manually back up the components defined in Table 2-1. You should back up the relevant information on all machines in the domain.

Table 2-1 Recommendations for Backing Up the Application Environment

Component	Recommendations
Domain directory	Back up the Administration Server and any remote Managed Server domain directories that are defined in the application environment. **Note:** The Domain Upgrade Wizard, which automatically backed up the domain being upgraded, is no longer provided with WebLogic Server. You must manually back up your domain directory prior to upgrading the domain.
Applications and application-persisted data	Back up any applications and data that reside outside of the domain directory.
Log files	If it is important for you to maintain a record of all messages that are logged, back up the log files. As log files can be large, you may want to delete them to conserve disk space if it is not important to retain them.

Step 4: Install Required Oracle Products

Before upgrading your application environment, you must install the Oracle WebLogic Server 12.2.1.4.0 products that you require on each computer in the domain. For more information about installing Oracle WebLogic products, see *Installing and Configuring Oracle WebLogic Server and Coherence*.

Step 5: Set Up the Environment

To set up the environment for an upgrade:

1. Open an MS-DOS command prompt window (on Windows) or a command shell (on UNIX).
2. Add the WebLogic Server classes to the CLASSPATH environment variable and *WL_HOME*`\server\bin` to the PATH environment variable, where *WL_HOME* refers to the top-level installation directory for WebLogic Server.

   You can perform this step by running the *WL_HOME*`\server\bin\setWLSEnv` script.

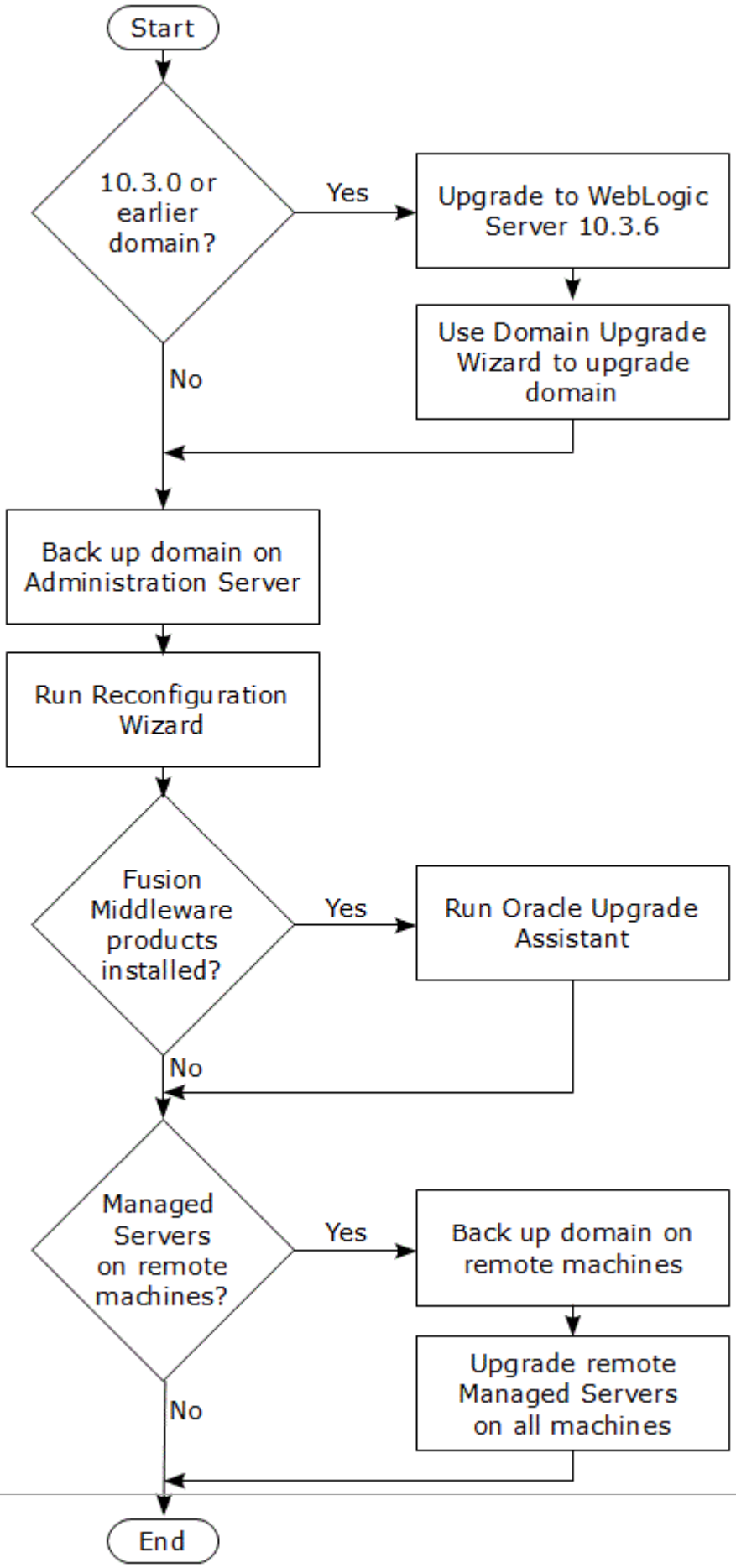
> **Note:**
>
> On UNIX operating systems, the `setWLSEnv.sh` command does not set the environment variables in all command shells. Oracle recommends that you execute this command using the Korn shell or bash shell.

Upgrade Your Application Environment

The specific upgrade steps you perform depend upon whether you are upgrading from WebLogic Server 10.3.0 or earlier, whether other Fusion Middleware products are installed, and whether Managed Servers are installed on remote machines.

Figure 2-1 shows the steps required to upgrade your application environment.

Figure 2-1 Roadmap for Upgrading Your Application Environment



Procedure for Upgrading an Application Environment

To upgrade your application environment to the latest version of WebLogic Server, you may first need to upgrade to 10.3.6. You then back up the domain, upgrade the Administration Server host machine, configure the Node Manager, and upgrade each Managed Server instance.

Table 2-2 summarizes the steps for updating an application environment. Each step that is performed must be done on every computer in the domain and in the given sequence shown in this table.

Table 2-2 Procedure for Upgrading an Application Environment

Task	Description
Upgrade to WebLogic Server 10.3.6	If the domain was created prior to WebLogic Server 10.3.1, you must first upgrade to WebLogic Server 10.3.6. You can do this using the WebLogic Server 10.3.6 installer. See *Installation Guide for Oracle WebLogic Server 10.3.6*.
Run the Domain Upgrade Wizard	If the domain was created prior to WebLogic Server 10.3.1, run the WebLogic Server 10.3.6 Domain Upgrade Wizard to upgrade the domain. See Upgrading Domains Created Prior to WebLogic Server 10.3.1.
Back up the domain	Before upgrading the domain on the Administration Server, ensure to backup the domain. See Backing Up the Domain.
Upgrade WebLogic domain (Administration Server)	Run the Reconfiguration Wizard to upgrade the WebLogic domain on the computer that hosts the Administration Server. See Reconfiguring a WebLogic Domain. **Notes:** Oracle recommends that you completely upgrade the domain on the Administration Server before upgrading the domain on the Managed Servers. Depending on the Node Manager configuration of the original domain and the desired Node Manager configuration of the upgraded domain, you may be able to upgrade Node Manager by using the Reconfiguration Wizard. See Determining Node Manager Upgrade Procedure.
Complete Node Manager configuration	If necessary, configure Node Manager as a per host Node Manager. This is needed only if your existing domain is using a per host Node Manager configuration and you want to continue using a per host Node Manager in the upgraded domain. See Completing the Node Manager Configuration.
Back up the domain on each Managed Server.	Prior to upgrading the domain on a Managed Server, make a backup copy of the domain. See Backing Up the Domain.
Upgrade WebLogic domain (remote Managed Servers)	Use the `pack` and `unpack` commands or the WLST `writeTemplate()` command in online mode to upgrade the WebLogic domain on every computer that hosts any Managed Servers. **See Also**: • Updating a Managed Server Domain on a Remote Machine • *Creating Templates and Domains Using the Pack and Unpack Commands* **Note:** • The `unpack` command works only with the same version used to `pack` the WebLogic domain. • Managed Servers that reside on the same computer as the Administration Server do not require additional upgrade steps.

3

Reconfiguring WebLogic Domains

You can use the Reconfiguration Wizard to upgrade any WebLogic domain that was created with Oracle WebLogic Server 10.3.1 or later, or from Oracle WebLogic Server 12.1.1 or later.

When you use the Reconfiguration Wizard to reconfigure a WebLogic Server domain, the following items are automatically updated, depending on the applications in the domain:

- WLS core infrastructure
- Domain version

> **Note:**
>
> The Reconfiguration Wizard does not update any of your applications that are included in the domain. For information about how to upgrade your applications, see WebLogic Server 12.2.1.4.0 Compatibility with Previous Releases.

Learn how to use the Reconfiguration Wizard to reconfigure WebLogic Server domains.

Before You Begin

Before you run the Reconfiguration Wizard, make sure the domain is upgraded to version WebLogic Server 10.3.6, if necessary. You then perform additional tasks, such as configuring the `CONFIG_JVM_ARGS` environment variable, backing up the domain, and choosing the Node Manager configuration that you want to use with the upgraded domain.

Upgrading Domains Created Prior to WebLogic Server 10.3.1

Domains created with WebLogic Server versions 10.3.1 and later can be upgraded directly to version 12.2.1.4.0. However, if your domain was created prior to WebLogic Server 10.3.1, you must first upgrade it to WebLogic Server 10.3.6.

After upgrading to WebLogic Server 10.3.6, run the Domain Upgrade Wizard to upgrade the domain.

To upgrade to WebLogic Server 10.3.6 and run the Domain Upgrade Wizard, see *Upgrade Guide for Oracle WebLogic Server 10.3.6*.

Setting CONFIG_JVM_ARGS on UNIX and Linux Systems

Prior to running the Reconfiguration Wizard to reconfigure a domain on a UNIX or Linux operating system, if you have not already done so, set the `CONFIG_JVM_ARGS` environment variable to the following value to use the operating system's random number generator:

```
-Djava.security.egd=file:/dev/./urandom
```

This decreases the amount of time it takes for the Reconfiguration Wizard to reconfigure a domain.

Backing Up the Domain

Prior to running the Reconfiguration Wizard, make a backup copy of the domain directory. For example, copy C:\domains\mydomain to C:\domains\mydomain_backup.

Prior to updating the domain on each remote Managed Server, make a backup copy of the domain directory on each remote machine.

If domain reconfiguration fails for any reason, you must copy all files and directories from the backup directory into the original domain directory to ensure that the domain is returned entirely to its original state prior to reconfiguration.

Determining Node Manager Upgrade Procedure

Prior to WebLogic Server 12.1.2, a default Node Manager configuration was provided by WebLogic Server using a default startup script and a default Node Manager home location. By default, any new domains that were created on that machine were associated with the Node Manager in the default Node Manager location. This is commonly referred to as a per host Node Manager.

Starting WebLogic Server 12.1.2, a Node Manager default configuration is a per domain Node Manager configuration. That is, the Node Manager configuration is specific to a given domain. This configuration allows multiple domains on a given machine to have different Node Manager configurations. See Default Node Manager Configuration in *Administering Node Manager for Oracle WebLogic Server*.

Table 3-1 shows the supported Node Manager upgrade paths when upgrading WebLogic Server from version 12.1.1 or earlier to the current version, or when upgrading from version 12.1.2 or later to the current version. Per host in this context means any Node Manager configuration that is outside of your per domain Node Manager configurations.

Table 3-1 Supported Node Manager Upgrade Paths

Node Manager Upgrade Paths	From WebLogic Server 12.1.1 or earlier	From WebLogic Server 12.1.2 or later
Per domain to per domain	Not available	Supported
Per domain to per host	Not available	Not supported
Per host to per domain	Supported	Supported
Per host to per host	Manual configuration	Manual configuration

Table 3-2 shows the Node Manager upgrade details for each supported upgrade path.

Table 3-2 Node Manager Upgrade Details

Per Domain to Per Domain	Per Host to Per Domain	Per Host to Per Host
This is an automatic upgrade for all WebLogic Server 12.1.2 or later releases that are already configured for per domain Node Manager. The environment is updated to standard settings and can be customized later. The upgrade is automatic whether you are using the Reconfiguration Wizard or WLST to upgrade the domain.	In this case, the Reconfiguration Wizard provides a Node Manager screen during domain reconfiguration. Use this screen to select the Node Manager configuration to use for the reconfigured domain. The resulting configuration depends on the combination of options that you select for **Node Manager Type** and **Node Manager Configuration**. You can also use WLST to upgrade the domain and Node Manager configuration as desired. See Reconfiguring a WebLogic Domain Using WebLogic Scripting Tool. If multiple per domain Node Managers run on the same machine, see Configuring Multiple Per Domain Node Managers on the Same Machine. Click the **Help** button on the screen on the Fusion Middleware Reconfiguration Wizard window to see the *Reconfiguration Wizard Context-Sensitve Help*.	Node Manager configuration must be completed manually as described in Completing the Node Manager Configuration. If only some domains are upgraded, you would need to configure a second Node Manager for those upgraded domains. Before starting the reconfiguration process, see Running Two Per Host Node Managers on the Same Machine. After domain reconfiguration, complete the Node Manager configuration as described in Completing the Node Manager Configuration (Two Per Host Node Managers).

Configuring Multiple Per Domain Node Managers on the Same Machine

If you have multiple domains on the same machine using a Per Domain Node Manager configuration, when running the Reconfiguration Wizard, do the following:

- If you are upgrading an 11g domain, the Node Manager screen appears. Select either **Per Domain Default Location** or **Per Domain Custom Location**.
- On the Advanced Configuration screen, select **Managed Servers, Clusters, and Coherence** to reconfigure the existing machines for the 12.2.1.4.0 Node Manager.
- No changes are needed on the Managed Servers and Clusters screens. When the Machines screen appears, ensure that you use a unique Node Manager port for each domain. For example, if you have three per domain Node Managers running on the machine, use port 5556 for Domain 1, port 5557 for Domain 2, and port 5558 for Domain 3.

  Click the **Help** button on the screen on the Fusion Middleware Reconfiguration Wizard window to see the *Reconfiguration Wizard Context-Sensitve Help* .

Running Two Per Host Node Managers on the Same Machine

If all the following items apply to your upgrade scenario, extra steps are needed during the reconfiguration process to create a second Node Manager for the 12.2.1.4.0 domains:

- You want to upgrade only some of your existing domains to 12.2.1.4.0.
- You want to continue using a per host Node Manager for the 12.2.1.4.0 domains.
- Both per host Node Managers are running on the same machine.

When running the Reconfiguration Wizard:

- On the Node Manager screen, select **Manual Node Manager Setup**. This option keeps the Node Manager configuration as a per host Node Manager for the domain being upgraded.
- On the Advanced Configuration screen, select **Managed Servers, Clusters, and Coherence** to reconfigure the existing machines for the 12.2.1.4.0 Node Manager. In addition, select **Deployments and Services** to check machine assignments for your deployments and services.
- No changes are needed on the Managed Servers and Clusters screens. When the Machines screen appears, change the name of each machine to something other than the name that is being used for the existing domains. In addition, enter a Node Manager port number that is different than the Node Manager port number that is being used for the existing Node Manager. Use the same port number for each 12.2.1.4.0 machine in this domain.
- Verify that your deployments and services are assigned to the new machine names.

Reconfiguring a WebLogic Domain

Oracle provides a choice of two tools for reconfiguring a WebLogic domain: the graphical Fusion Middleware Reconfiguration Wizard or the WebLogic Scripting Tool (WLST).

> **Caution:**
>
> Once the domain reconfiguration process starts, it is irreversible. Before using the Reconfiguration Wizard or WLST to upgrade the domain, ensure that you have backed up the domain as described in Backing Up the Domain. If an error or other interruption occurs during the reconfiguration process, you must restore the domain by copying the files and directories from the backup location to the original domain directory. This workaround is the only way to ensure that the domain has been returned to its original state before reconfiguration.

When you reconfigure a domain:

- The domain version number in the config.xml file for the domain is updated to the Administration Server's installed WebLogic Server version major and minor version number (for example, 12.2.1.0).
- Reconfiguration templates for all installed Oracle products are automatically selected and applied to the domain. These templates define any reconfiguration tasks that are required to make the WebLogic domain compatible with the current WebLogic Server version.
- Start scripts are updated.
- After reconfiguring the domain on the Administration Server, you must port the reconfigured domain to all remote Managed Servers in the domain. See Updating a Managed Server Domain on a Remote Machine.
- After reconfiguring a domain to a per host Node Manager by using either WLST or the Reconfiguration Wizard, you must take additional steps to complete the Node Manager configuration. See Completing the Node Manager Configuration and Completing the Node Manager Configuration (Two Per Host Node Managers).

Reconfiguring a WebLogic Domain in Graphical Mode

To reconfigure a domain using the Reconfiguration Wizard, you first launch it from a DOS command prompt or UNIX shell, and then provide the required upgrade details in a sequence of screens that are displayed.

> **Note:**
>
> If you cannot run the Reconfiguration Wizard in GUI mode, Oracle recommends that you use a WLST script to reconfigure your domain. See Reconfiguring a WebLogic Domain Using WebLogic Scripting Tool.

To start the Reconfiguration Wizard in graphical mode from a Windows command prompt or on UNIX systems:

1. Log in to the system on which the domain resides.
2. Open an MS-DOS command prompt window (on Windows) or a command shell (on UNIX).
3. Go to the following directory, where `ORACLE_HOME` is your Oracle home directory:

   On Windows: `ORACLE_HOME\oracle_common\common\bin`

   On UNIX: `ORACLE_HOME/oracle_common/common/bin`
4. Run the following commands:

   On Windows: `reconfig.cmd`

   On UNIX: `sh reconfig.sh`

   > **Note:**
   >
   > When you run the `reconfig.cmd` or `reconfig.sh` command, the following error message appears if the default cache directory is not valid:
   >
   > `*sys-package-mgr*: can't create package cache dir`
   >
   > You can change the cache directory by including the `-Dpython.cachedir=`*`valid_directory`* option in the command.
   >
   > To create a log file of the Reconfiguration Wizard session, include the `-log=reconfig.log -log_priority=debug` parameter in the command. You can specify any file name for the log file, such as `config_today.log`. The log file is stored in the *`logs`* directory of the Oracle Home directory. Other valid values for `log_priority` are `OFF`, `SEVERE`, `WARNING`, `INFO`, `CONFIG`, `FINE`, `FINER`, `FINEST`, and `ALL`.

   The Select Domain screen appears.

The Reconfiguration Wizard displays a sequence of screens in the order listed in Table 3-3.

> **Note:**
>
> Depending on the applications in your domain and other factors, extra configuration screens appear in addition to the screens shown in the following table. For information on these screens, click the **Help** button on the screen.
>
> If the Advanced Configuration screen appears during the reconfiguration process, do not select any options to skip all advanced configuration. If necessary, you can use WLST, the Configuration Wizard, or the WebLogic Server Administration Console later to perform advanced configuration such as adding more servers and clusters or changing deployment targeting.

Table 3-3 Reconfiguring an Existing WebLogic Domain

Screen	When Does This Screen Appear?	Perform the Following Action
Select Domain	Always	Enter the full path to the domain directory or click **Browse** to navigate to and select the domain directory. Click **Next** to continue.
Reconfiguration Setup Progress	Always	Shows the progress of the application of reconfiguration templates. When the process completes, click **Next** to continue.
Reconfiguration Summary	Always	Displays the information about the reconfiguration process for all the reconfigured templates. Click **Next** to continue.
Domain Mode and JDK	Always	Domain mode cannot be changed. Select the JDK to use in the domain or click **Browse** to navigate to the JDK you want to use. Click **Next** to continue.
Additional domain configuration screens may appear at this point	Additional screens depend on the domain configuration	Click the **Help** button on the screen or refer to Reconfiguration Wizard Screens, which describes all the screens in the order in which they are displayed.
Advanced Configuration	Always	Select the check box for each category (if any) for which you want to perform advanced configuration tasks. The available check boxes depend on the domain configuration. Click **Next** to continue.
Configuration Summary	Always	Review the configuration. Click the **Back** button to change the configuration or click the **Reconfig** button to complete the domain reconfiguration process.
Reconfiguration Success	Always	Shows the final status of the reconfiguration process. Click **Finish** to exit the Configuration Wizard.

Reconfiguring a WebLogic Domain Using WebLogic Scripting Tool

To reconfigure a domain using WLST, you use the `readDomainForUpgrade` command. You can also use this command to migrate an existing per host Node Manager configuration to a per domain configuration.

> **Note:**
>
> If the original domain is using a per domain Node Manager configuration, Node Manager is upgraded automatically and no additional steps are needed.
>
> If the original domain is using a per host Node Manager, and you want to continue using that configuration, you must manually reconfigure Node Manager as described in Completing the Node Manager Configuration.

Example 3-1 shows how to reconfigure a domain called `my_domain` using WLST offline.

Example 3-2 shows how to migrate an existing per host Node Manager configuration to a per domain configuration located in *DOMAIN_HOME*/nodemanager.

Example 3-3 shows how to migrate an existing per host configuration located in `/Oracle/Middleware/oracle_common/common/nodemanager` to a per domain configuration located in `/Oracle/Middleware/custom/nodemanager`.

For information about available Node Manager options for the `setOption` command, see setOption in *WLST Command Reference for Oracle WebLogic Server*. For information about available Node Manager WLST commands, see Node Manager Commands in *WLST Command Reference for Oracle WebLogic Server*.

Example 3-1 Reconfiguring a WebLogic Domain

```
# Open the domain for upgrade.
wls:/offline> readDomainForUpgrade('c:/domains/my_domain')

# Save the updated domain.
wls:/offline/my_domain> updateDomain()

# Close the domain.
wls:/offline/my_domain> closeDomain()
```

If your existing domain is using a per host Node Manager and you want to move to a per domain Node Manager configuration, you have several options:

- Create a per domain configuration in the default location (`DOMAIN_HOME/nodemanager`) by migrating an existing per host configuration.
- Create a per domain configuration in the default location (`DOMAIN_HOME/nodemanager`) with a new configuration based on Oracle-recommended defaults.
- Create a per domain configuration in a custom location by migrating an existing per host configuration.
- Create a per domain configuration in a custom location with a new configuration based on Oracle-recommended defaults.

Example 3-2 Creating a New Node Manager Configuration in the Default Location

```
#Read domain for reconfiguration
readDomainForUpgrade('domains/mydomain')

#Set Node Manager username and password.
cd('/')
cd('SecurityConfiguration/mydomain')
cmo.setNodeManagerUsername('username')
cmo.setNodeManagerPasswordEncrypted('password')

#Browse Node Manager properties
cd('/')
cd('NMProperties')

# Create per domain Node Manager with new default configuration. Existing
# Node Manager properties will not be migrated in this case.
setOption('NodeManagerType','PerDomainNodeManager')
setOption('NodeManagerUpgradeType','New')

# Update the domain to commit the changes.
updateDomain()
```

Example 3-3 Migrating an Existing Configuration to a Custom Location

```
#Read domain for reconfiguration
readDomainForUpgrade('/domains/mydomain')

#Set Node Manager username and password.
cd('/')
cd('SecurityConfiguration/mydomain')
cmo.setNodeManagerUsername('username')
cmo.setNodeManagerPasswordEncrypted('password')

#Browse node manager properties
cd('/')
cd('NMProperties')

# Create custom location Node Manager, migrating an existing Node Manager
# configuration with default values for Oracle-recommended default properties.
setOption('NodeManagerType','CustomLocationNodeManager')
setOption('NodeManagerHome','/Oracle/Middleware/custom/nodemanager/')
setOption('NodeManagerUpgradeType','Migrate')
setOption('OldNodeManagerHome','/Oracle/Middleware/Oracle_Home/oracle_common/
common/nodemanager')
setOption('NodeManagerUpgradeOverwriteDefault','true')

# Update the domain to commit the changes.
updateDomain()
```

Completing the Node Manager Configuration

If the domain you reconfigured was using a per host Node Manager configuration and you want to continue using a per host Node Manager for the domain, you must complete a set of configuration tasks for Node Manager.

1. In the new WebLogic Server installation, create the `nodemanager` directory in `ORACLE_HOME/oracle_common/common`.

2. Copy the `nodemanager.properties` and `nodemanager.domains` files from the `WL_HOME/common/nodemanager` directory of your previous WebLogic Server installation to the directory you created in Step 1.
3. If your previous installation includes an `nm_data.properties`, `SerializedSystemIni.data`, or `security/SerializedSystemIni.dat` file, copy it to the directory you created in Step 1. If copying SerializedSystemIni.dat, you must create a `security` directory under the `nodemanager` directory and store the file there.
4. Make the following edits to the `nodemanager.properties` file, where `ORACLE_HOME` is the Oracle home directory for your WebLogic Server installation:
   - Update `DomainsFile` to point to `ORACLE_HOME/oracle_common/common/nodemanager/nodemanager.domains` file.
   - Update `JavaHome` to point to the `jre` directory for the JDK that you are using for WebLogic Server. If the file also contains a `javaHome` property setting (lower-case `j`), remove it as it is not needed.
   - Update `NodeManagerHome` to point to `ORACLE_HOME/oracle_common/common/nodemanager`.
   - Update `LogFile` to point to `ORACLE_HOME/oracle_common/common/nodemanager/nodemanager.log`.
5. If you are using your own security certificates, verify that the location of those certificates is correct in `nodemanager.properties`. You may have to update the path if you moved the certificates to another location.

   If you were using the WebLogic Server demo certificate in your previous installation, you must run `CertGen` to create a demo keystore for this installation:

   a. Run `setWLSEnv`:

      `cd WL_HOME/server/bin`

      `. ./setWLSEnv.sh` (UNIX)

      `setWLSEnv.cmd` (Windows)

      > **Note:**
      >
      > On UNIX operating systems, the `setWLSEnv.sh` command does not set the environment variables in all command shells. Oracle recommends that you execute this command using the Korn shell or bash shell.

   b. Change to the `ORACLE_HOME/oracle_common/common/nodemanager/` directory and create a security directory if it does not exist.

   c. Change to the security directory and enter the following command:

      ```
      java utils.CertGen -certfile democert -keyfile demokey -keyfilepass
      DemoIdentityPassPhrase
      ```

   d. To generate the `DemoIdentity.jks` file, enter the following command:

      ```
      java utils.ImportPrivateKey -certfile democert.pem -keyfile demokey.pem -
      keyfilepass DemoIdentityPassPhrase -keystore DemoIdentity.jks -storepass
      DemoIdentityKeyStorePassPhrase -alias demoidentity
      ```

6. From the `ORACLE_HOME/wlserver/server/bin` directory, run `startNodeManager.cmd` (Windows) or `startNodeManager.sh` (UNIX).
7. Verify that you can start servers using Node Manager. See Using Node Manager to Control Servers in *Administering Node Manager for Oracle WebLogic Server*. To ensure that your `permgen` settings are adequate for starting the servers, you can use any one of the following methods:
   - Start the Managed Servers using the `startManagedWebLogic` script.
   - Set the `StartScriptEnabled` value in `nodemanager.properties` to `true`, which causes the `StartManagedWebLogic` script to be invoked when starting Managed Servers.
   - Use a `setUserOverrides` script to specify `permgen` settings for server startup. See Customizing Domain Wide Server Parameters in *Administering Server Startup and Shutdown for Oracle WebLogic Server*.

Completing the Node Manager Configuration (Two Per Host Node Managers)

If the domain you reconfigured was using a per host Node Manager configuration, you can continue using a per host Node Manager for the 12c domain on a machine that already has a per host Node Manager for 11g domains.

Perform these steps on each machine in the domain.

> **Note:**
>
> Prior to performing the steps in this section, ensure that you have unpacked the domain to each remote machine in the domain. Include the `-nodemanager_type=ManualNodeManagerSetup` and `-overwrite_domain=true` parameters in the command. For example:
>
> ```
> ./unpack.sh -domain=domain_home -template=template_jar -
> nodemanager_type=ManualNodeManagerSetup -overwrite_domain=true
> ```

1. In the new WebLogic Server installation, create the `nodemanager` directory in `ORACLE_HOME/oracle_common/common`.
2. Copy the `nodemanager.domains` and `nodemanager.properties` files from the `WL_HOME/common/nodemanager` directory of your previous WebLogic Server installation to the directory you created in Step 1. If any 11g domains are listed in the `nodemanager.domains` file, delete or comment out those lines.
3. Edit the `nodemanager.properties` file as appropriate on each machine. In particular:
   - Verify that `SecureListener` is set to `true` if using SSL Node Manager, or that it is set to `false` if using Plain Node Manager.
   - Change `DomainsFile` to point to `ORACLE_HOME/oracle_common/common/nodemanager/nodemanager.domains`.
   - Change `PropertiesVersion` to `12.1`.
   - Change `NodeManagerHome` to `ORACLE_HOME/oracle_common/common/nodemanager`.

- Change `JavaHome` to point to the jre directory for the Java installation that you are using for WebLogic Server 12.2.1.2.0.
- Remove the `javaHome` line as it is not needed in 12c.
- Change `ListenPort` to the value you specified on the Machines screen of the Configuration Wizard.
- Change `LogFile` to the desired location and file name. The recommended value is `ORACLE_HOME/oracle_common/common/nodemanager/nodemanager.log`.

4. If you are using your own security certificates, verify that the location of those certificates is correct in `nodemanager.properties`. If you moved the certificates to another location, you have to update the path.

   If you used the WebLogic Server demo certificate in your previous installation, you must run `CertGen` to create a demo keystore for this installation:

   a. Run `setWLSEnv`:

      `cd WL_HOME/server/bin`

      `. ./setWLSEnv.sh` (UNIX)

      `setWLSEnv.cmd` (Windows)

      > **Note:**
      >
      > On UNIX operating systems, the `setWLSEnv.sh` command does not set the environment variables in all command shells. Oracle recommends that you execute this command using the Korn shell or bash shell.

   b. Change to the `ORACLE_HOME/oracle_common/common/nodemanager/` directory and create a security directory if it does not exist.

   c. Change to the security directory and enter the following command:

      ```
      java utils.CertGen -certfile democert -keyfile demokey -keyfilepass
      DemoIdentityPassPhrase
      ```

   d. To generate the `DemoIdentity.jks` file, enter the following command:

      ```
      java utils.ImportPrivateKey -certfile democert.pem -keyfile demokey.pem -
      keyfilepass DemoIdentityPassPhrase -keystore DemoIdentity.jks -storepass
      DemoIdentityKeyStorePassPhrase -alias demoidentity
      ```

5. From the `ORACLE_HOME/wlserver/server/bin` directory, start Node Manager.
6. If the Administration Server is running, restart the Administration Server.
7. Verify that you can start servers using Node Manager. See Using Node Manager to Control Servers in *Administering Node Manager for Oracle WebLogic Server*. To ensure that your `permgen` settings are adequate for starting the servers, you can use any one of the following methods:
   - Start the Managed Servers using the `startManagedWebLogic` script.
   - Set the `StartScriptEnabled` value in `nodemanager.properties` to `true`, which causes the `StartManagedWebLogic` script to be invoked when starting Managed Servers.
   - Use a `setUserOverrides` script to specify `permgen` settings for server startup. See Customizing Domain Wide Server Parameters in *Administering Server Startup and Shutdown for Oracle WebLogic Server*.

Updating a Managed Server Domain on a Remote Machine

If your WebLogic domain contains multiple Managed Servers, and each Managed Server domain directory is located on a machine that is remote to the Administration Server host machine, you can use one of two methods to update the domain on the remote machine.

- Use the `pack` command to generate the domain template JAR. Ensure that you include the `-managed=true` argument in the `pack` command. Move the JAR to the remote machine and then use the `unpack` command on the remote machine to create the Managed Server domain. See Creating Templates and Domains Using the Pack and Unpack Commands.
- Use the WLST `writeTemplate` command in online mode. When you execute the `writeTemplate` command while connected to the Administration Server from a remote machine, it dynamically packs the domain on the Administration Server into a template JAR file and transfers the template JAR to the specified directory.

  The following sample WLST script demonstrates how to use `writeTemplate` to create or update a Managed Server domain on a remote machine. Run the script on each remote machine in the domain. This script does the following tasks:

  – logs in to the Administration Server
  – packs the Administration Server domain into a JAR file and writes it to the specified template directory on the remote machine
  – disconnects from the Administration Server
  – reads the template JAR
  – creates the domain on the remote machine

```
import os

wlsHome = os.getenv('WL_HOME')
mwHome = os.path.join(wlsHome, '..')

#Substitute the administrator user name and password values below as needed
connect('adminuser','adminpassword','admin_server_url')

#Create the path on the local machine where the template will be stored,
#The specified template JAR should not already exist. The timeout value
#specifies the number of milliseconds to elapse before the connection between
#the Administration Server and remote machine times out (default is 120000).
templatePath = '/user_templates/myTemplate.jar'
timeout = '180000'

#get the packed template from the Administration Server
writeTemplate(templatePath, timeout)

#disconnect from online WLST connection to the Administration Server
disconnect()

#read the template that was downloaded from the Administration Server
readTemplate(templatePath)

#specify the domain directory where the domain needs to be created
domainPath = 'domains/myDomain')

#create the domain
writeDomain(domainPath)
```

Important Notes About the Domain Upgrade Process

Bear in mind several key notes about the domain upgrade process, such as whether it is necessary to undeploy WebLogic Server applications, the minimum set of files that must exist in the domain directory, and more.

- It is not always necessary to undeploy WebLogic Server applications. Usually, WebLogic Server applications can run without modifications in the new WebLogic Server 12.2.1.4.0 application environment. Review the compatibility information in WebLogic Server 12.2.1.4.0 Compatibility with Previous Releases to determine whether any features changes affect the applications in your environment. If APIs that have been deprecated or removed are used in the application, then you might encounter warnings or exceptions at run time.
- At a minimum, the domain directory must contain the following files:
  - `config.xml`
  - Security-related files, including `SerializedSystemIni.dat`, `DefaultAuthenticatorInit.ldift`, `DefaultAuthorizerInit.ldift`, and `DefaultRoleMapperInit.ldift`

    If the security-related files are not available, the server fails to start and an authentication error message is logged.
  - Any transaction log (`.tlog`) files that reside in the domain. See Using Transaction Log Files to Recover Transactions in *Developing JTA Applications for Oracle WebLogic Server*.
- All contents of the domain directory on the target computer are updated during this process.
- You must upgrade the domain on every computer in the application environment.
- The reconfiguration wizard does not upgrade your own applications that may exist in the domain during a WebLogic domain upgrade.
- Domains that contain resources for WebLogic Liquid Data, or AquaLogic Data Services Platform cannot be upgraded to WebLogic Server 12.2.1.4.0.
- When you upgrade a domain on a remote Managed Server, a message similar to the following may appear to indicate that the referenced application path does not reside on the system:

  ```
  <Apr 12, 2009 6:42:06 PM EDT> <INFO> <Upgrade> <BEA-800000> <An invalid
  path, 'C:\bea\wlserver_10.3\user_projects\mydomain\medrecEar.ear', was
  specified for application, 'medrecEar'.>
  ```

  You can ignore this message.
- If you upgraded the Avitek Medical Records application from version 8.1 to 12.1.3 on a Solaris computer (only), before starting the server, you must edit the `setDomainEnv.sh` file to remove `-Xverify:none` from the start command. To remove the `-Xverify:none`, set `JAVA_OPTIONS=""` after the following line:

  ```
  . ${WL_HOME}/common/bin/commEnv.sh
  ```

  Otherwise, the server start fails with a JVM error.
- If you are performing a rolling upgrade from 12.2.1.3.0 to 12.2.1.4.0 or a downgrade from 12.2.1.4.0 to 12.2.1.3.0, the newer 12.2.1.4.0 server must be explicitly set to temporarily

allow the older protocol. For more information, see About WebLogic Server Cluster Messaging.

Completing Post-Upgrade Tasks

After you upgrade the application environment, it may be necessary to perform tasks such re-applying customizations to startup scripts, verifying file permissions and remote server startup options, and more.

This section includes the following topics:

- Re-apply Customizations to Startup Scripts
- Verify File Permissions
- Verify Remote Server Startup Options
- Recreating the Windows Node Manager Service
- Promote the Application Environment to Production

Not all these steps are required for all situations. Review the sections to determine which, if any, of these steps are appropriate for your environment. In addition, you should review the compatibility issues in WebLogic Server 12.2.1.4.0 Compatibility with Previous Releases to determine if any of the compatibility issues apply to your environment.

Re-apply Customizations to Startup Scripts

To complete the upgrade of your application environment to 12.2.1.4.0, it might be necessary to re-apply any customizations to startup scripts. The following sections describe how to customize the default startup scripts as well as any custom startup scripts.

Default Startup Scripts

The Reconfiguration Wizard does not carry forward any customizations that have been made to the default startup scripts, such as the setting of the `JAVA_OPTIONS` environment variable. After the upgrade process is complete, you must customize the default scripts again.

Custom Startup Scripts

To update custom startup scripts:

- Set the JDK version to the JDK that you are using with WebLogic Server.
- Update the CLASSPATH variable, as follows:
  - Add WebLogic Server 12.2.1.4.0 classes to the beginning of the variable.
  - Remove all *unused* WebLogic classes prior to version 10.3.

> **Note:**
>
> If you used the PermSize and MaxPermSize JVM arguments in your previous startup scripts, you do not need to add these arguments to your new startup scripts as they are no longer used in JDK 8. Use the MetaspaceSize argument to set the upper limit of native memory as described in the Java Platform, Standard Edition HotSpot Virtual Machine Garbage Collection Tuning Guide .

Verify File Permissions

Verify the file permissions, as follows:

- If you backed up the domain directory as part of the upgrade, you must make your backup files secure because they might contain confidential information.
- During the upgrade process, file permissions are not preserved. If nondefault file permissions are set on files, they must be verified and reset.
- On a UNIX system, ownership and permissions for any new files created during the upgrade process are assigned to the user performing the upgrade. For example, if the upgrade is performed by root, then root is assigned ownership of any new files. As a result, any user who subsequently wants to update these files in the domain must have root privileges. You may want to review or modify the permissions on files created during the upgrade process.

Verify Remote Server Startup Options

When you start the Administration Server, verify that the remote server start options, such as `JAVA_HOME`, `BEA_HOME`, and `CLASSPATH`, reference the WebLogic Server installation on the target Managed Server. This can be accomplished using the WebLogic Server Administration Console, as described in Configure startup arguments for Managed Servers in *Oracle WebLogic Server Administration Console Online Help*.

> **Note:**
>
> If the remote server startup options are not set correctly, when attempting to start a Managed Server using Node Manager, messages similar to the following may be written to the log file. Because these messages may be sent recursively, they may eventually consume all space available on the drive.

```
No config.xml was found.

Would you like the server to create a default configuration and boot? (y/n):
java.io.IOException: The handle is invalid
```

Recreating the Windows Node Manager Service

On Windows systems, if you were running Node Manager as a Windows service for your domain, you must reconfigure it if you want to continue using it.

For information about how to configure the Node Manager service for Windows, see Default Node Manager Configuration in *Administering Node Manager for Oracle WebLogic Server*.

Optionally, you can remove the Node Manager service from your installation by running `uninstallNodeMgrSrv.cmd`. See Default Node Manager Configuration in *Administering Node Manager for Oracle WebLogic Server*.

Promote the Application Environment to Production

Execute standard procedures for quality assurance and performance tuning before promoting an application environment to production. You should test the execution of your applications

(including external client applications) in your test application environment. If your applications use APIs that have been deprecated or removed, then you may encounter warnings or exceptions at run time. If you do, you can make any required modifications before promoting your applications to production.

When all test criteria have been met, you can promote the application environment to production, as outlined in your upgrade plan (defined previously in Step 4: Create an Upgrade Plan).

When the new 12.2.1.4.0 application environment is deployed into production, you can start redirecting requests to the new environment from the existing environment. Gradually, you can bring the existing environment to a safe state for shutdown. This might be accomplished using a load balancer, for example.

4

Upgrading WebLogic Web Services

Learn the procedures for upgrading WebLogic and RESTful Web services from Oracle WebLogic Server 10.*x* to 12.2.*x* . Also, learn how to upgrade 8.1 WebLogic Web services to 12.2.*x* WebLogic JAX-WS Web services.
This chapter includes the following sections:

- Upgrading a 10.3.*x* RESTful Web Service (JAX-RS) to 12.2.1.4.0
- Upgrading a 10.x WebLogic Web Service (JAX-WS) to 12.2.*x*
- Upgrading an 8.1 WebLogic Web Service to the WebLogic JAX-WS Stack
- Upgrading a WebLogic JAX-RPC Web Service to the WebLogic JAX-WS Stack

> **Note:**
>
> 10.3.*x* WebLogic Web services (JAX-WS or JAX-RPC) will continue to run, without any changes, on version 12.2.*x* of WebLogic Server because the associated Web services run time is still supported in this release, although they are deprecated and will be removed from the product in future releases. For this reason, Oracle highly recommends that you follow the instructions in this chapter to upgrade your 10.3.*x* Web services to 12.2.*x*.
>
> The JAX-RPC API has been deprecated in 12.2.*x* and will be removed in a future release. Oracle does not recommend upgrading to the JAX-RPC stack.

Upgrading a 10.3.*x* RESTful Web Service (JAX-RS) to 12.2.1.4.0

In 10.3.*x*, a set of pre-built shared libraries were delivered with WebLogic Server to support Jersey 1.9 and 1.1.5.1 Java API for RESTful Web Services (JAX-RS) Reference Implementations (RIs). In 12.2.1.4.0, WebLogic Server supports Jersey Jersey 2.22 (JAX-RS 2.0 RI) by default.To use the pre-built shared libraries of 10.3.*x*, you needed to register them with the WebLogic Server instance, and modify the `web.xml` and `weblogic.xml` deployment descriptors to use the Jersey servlet and reference the shared libraries, respectively.
In 12.2.1.4.0, as WebLogic Server supports Jersey 2.22 (JAX-RS 2.0 RI) by default, registration as a shared library with WebLogic Server is no longer required.

To use the Jersey 2.22.*x* (JAX-RS 2.0 RI), you need to modify your 10.3.*x* RESTful Web service applications as follows:

1. Update your application deployment descriptors to reference the Jersey 2.*x* container. See Servlet-based Deployment in *Jersey 2.22 User Guide*.

> **Note:**
>
> For backward compatibility, references to `com.sun.jersey.spi.container.servlet.ServletContainer`, as shown in the following example, continues to work. However, Oracle recommends that you update your application deployment descriptors to reference the Jersey 2.*x* container instead.

For example, replace `com.sun.jersey.spi.container.servlet.ServletContainer` with `org.glassfish.jersey.servlet.ServletContainer` in the following `<web-app>` content:

```
<web-app>
    <servlet>
        <display-name>My Jersey Application</display-name>
        <servlet-name>MyJerseyApp</servlet-name>
        <servlet-class>com.sun.jersey.spi.container.servlet.ServletContainer</
servlet-class>
        <init-param>
            <param-name>javax.ws.rs.Application</param-name>
            <param-value>myPackage.myJerseyApplication</param-value>
        </init-param>
    </servlet>
    <servlet-mapping>
        <servlet-name>MyJerseyApp</servlet-name>
        <url-pattern>/*</url-pattern>
    </servlet-mapping>
</web-app>
```

For more advanced configuration options, see *Jersey 2.22 User Guide*.

2. If applicable, update all applications that use Jersey 1.*x* server APIs to use the corresponding standard JAX-RS 2.0 or Jersey 2.*x* APIs instead. Support for the Jersey 1.*x* (JAX-RS 1.1 RI) *server* APIs has been removed in this release and applications that reference them will not work.
3. Update your clients to use the `javax.ws.rs.client` API, as described in Developing RESTful Web Service Clients in *Developing and Securing RESTful Web Services for Oracle WebLogic Server*.

> **Note:**
>
> Support for the Jersey 1.18 client packages, including the `com.sun.jersey`package, its nested packages, and the `weblogic.jaxrs.api.client` package, is deprecated in this release of WebLogic Server, but are maintained for backward compatibility. However, many Fusion Middleware components, such as Oracle Web Services Manager, have been migrated to the standard JAX-RS 2.0 client API and are not compatible with the Jersey 1.*x* JAX-RS client APIs. Therefore, Oracle strongly recommends that you update your RESTful client applications as soon as possible to use the standard JAX-RS 2.0 API.
>
> The Jersey 1.*x* JAX-RS RI client APIs are not compatible with Jersey 2.*x* (JAX-RS 2.0 RI).

Upgrading a 10.x WebLogic Web Service (JAX-WS) to 12.2.*x*

No steps are required to upgrade a 10.*x* WebLogic Web service to 12.2.*x*. You can redeploy the JAX-WS Web service to WebLogic Server 12.2.*x* without making any changes or recompiling.

Upgrading an 8.1 WebLogic Web Service to the WebLogic JAX-WS Stack

The 8.1 WebLogic Web services runtime was removed in the 12.1.2 release. If you are using 8.1 WebLogic Web services, you must upgrade the 8.1 WebLogic Web service applications to the JAX-WS (Java API for XML-Based Web Services) stack. The 8.1 WebLogic Web services rely on Apache XMLBeans for mapping XML elements in SOAP payloads into Java objects and vice versa. XMLBeans are not supported in 12.1.2 and later.

> **Note:**
>
> Upgrade 8.1 Web service to JAX-WS on your WebLogic Server release before you upgrade to 12.2.1.4.0. After you upgrade to 12.2.1.4.0, your 8.1 Web services will no longer work.

Upgrading to the JAX-WS stack allows you to take advantage of the latest technologies and standards support in WebLogic Server. This path requires a manual upgrade process, and the level of effort depends on the nature of the existing 8.1 Web service applications. For example, if the applications have little XMLBeans usage, then the upgrade process is relatively easy. For 8.1 Web Service applications with heavy XMLBeans dependencies, you must modify the business logic in the service implementation to use JAXB classes instead of XMLBeans classes. JAX-WS does not support RPC-encoded style. The 8.1 Web Service applications with RPC-encoded style must adopt more interoperable literal style service contracts.

The WebLogic JAX-WS runtime is based on the JAX-WS 2.2 specification and the Web Services for Java EE v1.3 (JSR 109) specifications. These define annotations that are used in a Java Web Service (JWS) source file to define a Web service. Ant tasks are then used to compile the JWS into a Java class and generate all the associated artifacts. The Java Web Service (JWS) is the core of your JAX-WS web service.

Upgrading your 8.1 Web service includes the following high-level tasks:

- Upgrade any Web service EJBs from 2.*x* to 3.*x*.

  JAX-WS supports EJB 3.0 and 3.*x*. It does not support EJB 2.*x*.
- Rewrite the 8.1 Web service class as a JAX-WS JWS file and map any proprietary 8.x features to similar JAX-WS features.

  There is not a one-to-one correspondence between 8.1 Web service features and JAX-WS 12.1.*x* features.
- Update the Ant build script that builds the Web service to call the 12.1.*x* WebLogic Web service Ant task `jwsc` instead of the 8.1 `servicegen` task.
- Generate new JAX-WS clients using the JAX-WS `clientgen` Ant task.

JAX-WS Upgrade Considerations

Before upgrading to JAX-WS, consider the following:

- The JAX-WS specification supports the *document-literal* and *rpc-literal* styles, but not *rpc-encoded*.
- The JAX-WS specification does not support SOAP Arrays.

See *Developing JAX-WS Web Services for Oracle WebLogic Server*.

Upgrading a WebLogic JAX-RPC Web Service to the WebLogic JAX-WS Stack

The WebLogic JAX-WS run time is based on the JAX-WS (The Java API for XML-Based Web Services) 2.2 specification and the Web Services for Java EE v1.3 (JSR 109) specifications. Starting with JAX-WS 2.0, the JAX-WS technology has replaced JAX-RPC in the Java Platform and in WebLogic Server. JAX-RPC Web Services in WebLogic applications should be upgraded to JAX-WS.

> **Note:**
>
> The JAX-RPC API has been deprecated in 12.2.x and will be removed in a future release. Oracle does not recommend upgrading to the JAX-RPC stack.

This section summarizes how to upgrade a WebLogic JAX-RPC Web service to use the WebLogic JAX-WS stack.

Upgrading your WebLogic Server JAX-RPC Web service includes the following high-level tasks:

- Upgrade any Web service EJBs from 2.*x* to 3.*x*.

  JAX-WS supports EJB 3.0 and 3.*x*. It does not support EJB 2.*x*.
- Upgrade your JWS, mapping any proprietary JAX-RPC features to similar JAX-WS features.

  Note that there is not a one-to-one correspondence between WebLogic JAX-RPC Web service features and JAX-WS 12.*x* features.
- Update the Ant build script that builds the Web service to change the value of the `type` attribute on the `jws`, `wsdlc`, and `clientgen` tasks to be `"JAXWS"` (for example, `type="JAXWS"`).
- Generate new JAX-WS clients using the JAX-WS `clientgen` Ant task.

JAX-WS Upgrade Considerations

When upgrading to JAX-WS, you should consider the following:

- The JAX-WS specification supports the *document-literal* and *rpc-literal* styles, but not *rpc-encoded*.
- SOAP Arrays are not supported by JAX-WS.

See *Developing JAX-WS Web Services for Oracle WebLogic Server*.

A

Upgrading Oracle WebLogic Server 10.3.6 to 12.2.1.4 Quick Start

This appendix describes the high-level steps to upgrade a standalone WebLogic Server 10.3.6 single-server domain to be compatible with 12.2.1.4.

This quick start upgrade is intended to help you evaluate upgrading your Oracle WebLogic Server 10.3.6 applications to Oracle WebLogic Server 12.2.1.4. For detailed information about performing this upgrade, see the previous chapters of this guide.

Background

WebLogic Server 10.3.6 has been a widely adopted release of WebLogic Server, successfully meeting user requirements for many years. However, Oracle encourages customers to upgrade to a more current release of WebLogic Server at this time.

Upgrading from WebLogic Server 10.3.6 to WebLogic Server 12.2.1.4 specifically offers compelling benefits for WebLogic Server users:

- Java EE 7 support, including additional support for RESTful applications, JSON processing, use of annotations and dependency injection, WebSocket support, Web Services improvements, JPA updates and more.
- Support for running in cloud native Kubernetes environments, with a set of tools for migrating, deploying, monitoring and managing WebLogic Server applications in Kubernetes.
- New capabilities in areas such as Maven support, automated scaling of WebLogic Server clusters, and management of WebLogic Server configurations using REST, which enable broader automation and DevOps support for the full application development lifecycle.
- Improved scalability of WebLogic Server clusters and applications, particularly when using cloud-friendly unicast messaging protocols.
- High availability enhancements, such as Application Continuity integration, Zero Downtime Patching, and Maximum Availability Architecture solutions.
- Certification with updated environments, allowing for integration with more current operating systems, JDKs, database versions, Web servers and load balancers enabling users to leverage the benefits of these updated products.
- Integration with standard Oracle installation and patching technologies to facilitate product maintenance.

> **Note:**
>
> Many of the above benefits can be leveraged by upgrading existing applications without requiring application changes. Development teams can use new API support to enhance these existing applications and build new applications.

Summary of Changes

Before you begin the upgrade, review some important changes to WebLogic Server.

The following list describes some of the primary changes between Oracle WebLogic Server 10.3.6 and Oracle WebLogic Server 12.2.1.4 that may affect your applications and configurations when performing an upgrade. You should familiarize yourself with these changes.

- Oracle WebLogic Server 12.2.1.4 is certified on JDK 8 (1.8.0_211+) as compared to Oracle WebLogic Server 10.3.6, which was certified on JDK 6 and JDK 7. You will need to upgrade your JDK to JDK 8 in order to upgrade from Oracle WebLogic Server 10.3.6 to Oracle WebLogic Server 12.2.1.4.
  We recommend you upgrade to the most current JDK 8 upgrade level available. For more information, see JDK 8 and Server JRE 8 Certification .
- In Oracle WebLogic Server 12.2.1.4, Oracle Universal Installer (OUI) technology replaces the installer technology used in Oracle WebLogic Server 10.3.6.
- Oracle OPatch replaces the BEA Smart Update (BSU) patching technology used in Oracle WebLogic Server 10.3.6. You will need to modify any installation and patching automation you have created for your Oracle WebLogic Server 10.3.6 environments to adapt to the new installation and patching technologies used in Oracle WebLogic Server 12.2.1.4.
- Oracle Reconfiguration Wizard replaces the WebLogic Upgrade Wizard. The Reconfiguration Wizard modifies the existing 10.3.6 domain home so that it is compatible with WebLogic Server 12.2.1.4.
- The Reconfiguration Wizard does not automatically back up the domain being upgraded like the WebLogic Upgrade Wizard. You must manually back up your domain directory prior to upgrading the domain. If you encounter an issue during the upgrade, you will need to restore your system from backup - there is no rollback option once the process has started.
- The default Node Manager configuration has changed from *per host* to *per domain*. The per domain configuration allows multiple domains on a given machine to have different Node Manager configurations.
  If you want to continue using a per host Node Manager configuration, then after the domain reconfiguration you must manually reconfigure Node Manager as described in Completing the Node Manager Configuration.

For a complete list of changes, see What's New in Oracle WebLogic Server.

Known Issues and Workarounds

Learn about some of the common issues users encounter during an upgrade and how to resolve them.

The following issues are among the most commonly cited issues when upgrading, and are listed below for convenience. For a complete list of issues, see Known Issues and Workarounds in the *Oracle WebLogic Server Release Notes for 12.2.1.4.0*.

- Using MetaspaceSize with JDK 8
  The amount of native memory that can be used for class metadata in JDK 8 is by default unlimited. To maximize performance, use the option MetaspaceSize to put an upper limit on the amount of native memory used for class metadata.

For more JDK 8 tuning considerations, see the Class Metadata section of the Java Platform, Standard Edition HotSpot Virtual Machine Garbage Collection Tuning Guide.

- Reapplying custom start scripts after the upgrade
  When using the Reconfiguration Wizard to perform this evaluation upgrade, the Reconfiguration Wizard will create new start scripts for the domain upgraded to Oracle WebLogic Server 12.2.1.4. These start scripts will reference the new JDK 8 version you have installed and referenced when upgrading your domain using the Reconfiguration Wizard.

  Any customizations to start scripts in the Oracle WebLogic Server 10.3.6 domain will not be present in the start scripts generated for the upgraded domain. You may need to re-apply customizations applied to the start scripts for the Oracle WebLogic Server 10.3.6 domain.

  > **Note:**
  >
  > If you added PermSize and MaxPermSize JVM arguments to your start scripts for JDK 6/7, you do not need to add these arguments to the new start scripts. Use the MetaspaceSize argument to set the upper limit of native memory as described above.

- Thread deadlock detected causing servers to go into Warning state
  Stuck threads in `weblogic.wsee.jaxws.spi.ClientIdentityRegistry` are causing the Managed Server to go into a warning state with the `Deadlock Detected` error message.

  To resolve this issue, apply patch 30965440 and restart the servers.

- Limitation on the size of JSP files
  The Java Virtual Machine (JVM) limits the amount of code to 65536 bytes per Java method, post upgrade. Therefore, when redeploying applications after upgrading to Oracle WebLogic Server 12.2.1.4.0, if the JSP files are embedded with too many scriptlets, the compiler fails to optimize the code, causing the deployment to fail with CompilationException.

  Reduce the size of the JSP files with minimal scriptlets and redeploy the application.

- Changes to Apache Commons FileUpload jar file
  The Java class `org.apache.commons.fileupload.disk.DiskFileItem` in the WebLogic Server bundled Apache Commons FileUpload jar file no longer implements java.io.Serializable in order to prevent the potential security vulnerability.

  See "How to Configure Filtering Class Loader in Weblogic.xml?" (Doc ID 1163020.1).

- If your application uses APIs that have been deprecated or removed, then you might encounter warnings or exceptions at runtime if the applications are not recompiled. For a complete list of deprecated features, see Deprecated Functionality (Oracle WebLogic Server 12c 12.2.1.x)

Verifying System Configurations

Verify that your JDK, operating system, database and other configurations meet the minimum 12.2.1.4 certification requirements.

Category	Minimum Requirements
JDK 8	1.8.0_211+

Category	Minimum Requirements
Operating Systems	Oracle Linux 6+, 7, or 8 Red Hat Enterprise Linux 6+, 7, or 8 SLES 11 SP3+ or SLES 12 SP1+ Microsoft Windows Server 2012, 2012R2, 2016 or 2019 Oracle Solaris 11.2+ HP-UX Itanium 12+ IBM AIX on POWER Systems 7.1+
Databases	IBM DB2 10.1 FP6+ IBM DB2 10.5 FP9+ IBM DB2 11.1 FP2+ Microsoft SQL Server 2012, SP4+ Microsoft SQL Server 2014, SP2+ Microsoft SQL Server 2016, SP1+ Microsoft SQL Server 2017 Microsoft SQL Server 2019 MySQL Database Server 5.7+ or 8.0 Oracle Database 11.2.0.4+ Oracle Database 12.1.0.1+ Oracle Database 12.2.0.1.0 Oracle Database 18c Oracle Database 19c Oracle Database 19c Autonomous Sybase Adaptive Server Enterprise 15.7
Web Servers	Apache HTTP Server 2.4.4+ Microsoft Internet Information Services 8.5+
Browsers	Microsoft Internet Explorer 11.* Google Chrome 84+ Mozilla Firefox 79+ Apple Safari 11+

Note:

Oracle may have introduced new certifications that are not reflected in the table above. In addition, some of the technologies in the table may no longer be supported by the technology vendor. Please consult the applicable vendor documentation.

Creating a Backup of Your Existing Domain

Before any upgrade you'll want to create a complete backup of your existing domain and copy the files to a safe location.

Make sure that your backup includes any customized startup scripts. You may need to re-apply these customizations to the start scripts created for the upgraded domain, as discussed above.

For this upgrade evaluation, use the domain backup files to create a cloned 10.3.6 domain environment. You'll perform the upgrade on the cloned environment.

> **Note:**
>
> You cannot roll back the upgrade once the process has started. You will need to restore the system from your backup files.

Downloading Oracle WebLogic Server 12c (12.2.1.4)

Download the installer package from the Oracle Software Delivery Cloud or Oracle Technical Resources.

If you already have a commercial license, you should download your software from the Oracle Software Delivery Cloud at https://edelivery.oracle.com.

1. Sign in to the Oracle Software Delivery Cloud portal.
2. Select Download Packages from the Categories drop-down menu.
3. Enter

   ```
   WebLogic Server 12c
   ```

   and click **Search**.
4. Select *Oracle WebLogicServer 12.2.1.4.0 (Weblogic Server12c)* to add the package to your Download Queue.
5. Click **Continue** (upper right corner) to select the products you want to install.
6. Specify the platform for each product, then click **Continue** and accept the terms and restrictions.
7. Click **Continue** and review the list of products.
8. Click **Download** (lower right corner) to begin the download process.

Developer and production downloads are also available from Oracle Technical Resources (Formerly Oracle Technology Network) at https://www.oracle.com/middleware/technologies/weblogic-server-downloads.html

There are several installer options available from Oracle Technical Resources:

- Generic Installer (579 MB)
  Recommended installer for most production deployments.
- Quick Installer for Mac OSX, Windows and Linux (225 MB)
  For Oracle WebLogic Server and Oracle Coherence development only.
- Slim Installer (182 MB)
  The Slim Installer does not contain examples, WebLogic Server Administration Console, WebLogic clients, Maven plug-ins or Java DB.

Installing Oracle WebLogic Server 12c (12.2.1.4)

Use the Oracle Universal Installer to install 12.2.1.4 into a new Middleware home.

This is the start of your topic.

1. Launch the installation program by running

   ```
   java -jar
   ```

   from the JDK 8 directory on your system. Specify the full name of the installer you downloaded. For example:

   ```
   $ ORACLE_HOME/jdk/jdk1.8.0_211/bin/java -jar fmw_12.2.1.4.0_wls_lite_generic.jar
   ```

2. When the installation is complete, deselect the option to automatically launch the Configuration Wizard. You do not need to configure a new 12.2.1.4 domain.

For more information about using the Oracle Universal Installer, see Starting the Installation Program in *Installing and Configuring Oracle WebLogic Server and Coherence*.

Upgrading the Oracle WebLogic Server 10.3.6 Domain

Use the Reconfiguration Wizard to upgrade the WebLogic Server 10.3.6 domain to be compatible with 12.2.1.4.

After the upgrade you will continue to use the 10.3.6 domain home, but the WebLogic Server version will be updated to 12.2.1.4.

1. Start the Reconfiguration Wizard from the 12.2.1.4 Middleware home directory.

   ```
   $ MW_HOME/wls12.2.1.4/oracle_common/common/bin/ reconfig.sh
   ```

2. Select the domain directory that has the cloned version of your 10.3.6 domain. The 10.3.6 domain is upgraded in-place and will be overwritten during this phase of the upgrade.
3. Continue through the screens as instructed.
4. When the upgrade is complete, restart the WebLogic Server from the 10.3.6 Middleware home directory. See Starting an Administration Server with a Startup Script

   ```
   $ MW_HOME/user_projects/domains/<1036_domain> startWebLogic.sh
   ```

   If you used customized start scripts in your previous environment, you will need to re-apply the customizations after the upgrade as described in Custom Startup Scripts.

Deploying Your Applications to the New Domain

WebLogic Server applications can typically run without modifications in the new WebLogic Server 12.2.1.4.0 application environment.

To determine whether any feature changes affect the applications in your environment, review the compatibility information in WebLogic Server 12.2.1.4.0 Compatibility with Previous Releases.

Validating the Security Configuration

After the upgrade you may need to configure WebLogic Server security to meet new minimum requirements.

SSL and TLS Support

You may need to configure WebLogic Server to limit the lowest supported versions of SSL and TLS that are enabled for SSL connections. Oracle recommends using TLS V1.2 or later in a production environment.

For more information, review the security standards in *Administering Security for Oracle WebLogic Server*:

- Supported Security Standards
- Specifying the SSL Protocol Version

SSL Certificate Validation

If SSL communications that worked properly in WebLogic Server 10.3.6 start failing unexpectedly, see Troubleshooting Problems with Certificate Validation. The SSL certificates may need to be renewed or replaced after an upgrade.

For detailed information about renewing an expired or expiring SSL certificate configured on Oracle WebLogic Server, see SSL Certificate Validation in Administering Security for Oracle WebLogic Server.

RDBMS Security Store in a WebLogic Domain

If you plan to use the RDBMS security store in a WebLogic domain, Oracle recommends that you create a new domain in which the RDBMS security store is configured. If you have an existing domain in which you want to use the RDBMS security store, you should create the new domain, and then migrate your security realm to it. Oracle does not recommend "retrofitting" the RDBMS security store to an existing domain.

For more information, see Managing the RDBMS Security Store in *Administering Security for Oracle WebLogic Server*.

AES 256-bit Encryption Used in New Domain

When you use the Reconfiguration Wizard to upgrade the WebLogic Server 10.3.6 domain to 12.2.1.4, the same AES 128-bit encryption used for the source 10.3.6 domain is used in the upgraded 12.2.1.4 domain. However, newly created WebLogic Server 12.2.1.4 domains are created using AES 256-bit encryption, which is more secure than AES 128-bit encryption and recommended in production.

After validating the single-server domain upgrade using the Reconfiguration Wizard, and after validating that applications run properly in the upgraded domain, Oracle recommends that you create the 12.2.1.4 production domains using AES 256-bit encryption. This may be accomplished, for example, by using the Domain Template Builder to create a domain template from the upgraded domain, and using the Configuration Wizard or WLST Offline to create a new domain with AES 256-bit encryption.

Certificate Chains (Deprecated)

The use of file-based certificate chains is deprecated. In the current release of WebLogic Server, the whole certificate chain is imported into the keystore.

For more information, see Configuring Keystores with WebLogic Server.

Compatibility Security (Deprecated)

Make sure your 10.3.6 domain is not using Compatibility security.

For more information about security changes in 12.2.1.4, see Configuring Security for WebLogic Server 12.2.1.4.

Want to Learn More?

Check out these additional resources for Oracle WebLogic Server.

- Oracle WebLogic Server Technical Details
- Release Notes for Oracle WebLogic Server 12c (12.2.1.4.0)

B

WebLogic Server 12.2.1.4.0 Compatibility with Previous Releases

Learn about important compatibility information that you should consider before upgrading to Oracle WebLogic Server 12.2.1.4.0 from the 10.3.*x* or 12.1.*x* release. Also learn about the feature changes in various Oracle WebLogic Server versions that may impact the applications you plan to run in the upgraded environment.
See also:

- WebLogic Server Compatibility in *Understanding Oracle WebLogic Server*. This section provides general information about WebLogic Server compatibility goals and how they apply to this WebLogic Server release.
- *What's New in Oracle WebLogic Server 12.2.1.4.0* for this and prior releases. These documents provide information about new features that are available to you as well as behavior changes that may impact your applications.

Compatibility considerations are provided in the following sections. The sections that apply to your situation depend on the WebLogic Server version from which you are upgrading to WebLogic Server 12.2.1.4.0. See Table B-1for a list of sections to which you should refer based on your current WebLogic Server version.

Table B-1 Sections Applying to Upgrades From Each WebLogic Server Version

If You Are Upgrading From This WebLogic Server Version	Refer to These Sections
12.2.1.3.0	About WebLogic Server Cluster Messaging
12.2.1.0.0	Upgraded Version of Apache Ant Removed the Option to Limit Run-Time Footprint When Starting WebLogic Server
12.1.3	All sections in the above row, plus: Random Number Generator Partitions, Applications, and Container Context Root Assumptions Automatic Binding of the Default CommonJ Work Manager Has Been Removed Parallel Deployment
12.1.2	All sections in the above row, plus: Server Logging Bridge Oracle Database Drivers Oracle Enable JavaNet FastPath
12.1.1	All sections in the above rows, plus: Maximum POST Size WLDF Schema Upgrade jdbc-connection-timeout-secs Element Has Been Removed Commitment of Local Transactions

Table B-1 (Cont.) Sections Applying to Upgrades From Each WebLogic Server Version

If You Are Upgrading From This WebLogic Server Version	Refer to These Sections
10.3.5 and 10.3.6	All sections in the above rows, plus: JVM Settings Node Manager startScriptEnabled Default Value Enterprise Java Beans (EJBs) WebLogic Server 8.1 Web Services Stack Has Been Removed Universal Description and Discover (UDDI) Registry Has Been Removed Certicom SSL Implementation Has Been Removed Oracle Coherence Version Deprecated and Obsolete Web Application Features DataSource Profile Logging ONS Debugging Oracle Type 4 JDBC Drivers From DataDirect Default Message Mode Has Changed Changes to org.apache.commons.fileupload.disk.DiskFileItem Java Class Limitation on the Size of JSP Files
10.3.3 and 10.3.4	All sections in the above rows, plus: Modifications to SSLMBean Evaluation Database Changed From PointBase to Derby New Web Services Features
10.3.2	All sections in the above rows, plus: Introduction of JSSE Performance Enhancements for Security Policy Deployment ActiveCache Class Caching Deprecated JDBC Drivers Changes to weblogic.jms.extension API Persistent Store Updates
10.3.1	All sections in the above rows, plus: Oracle Internet Directory and Oracle Virtual Directory Authentication Providers
10.3.0	All sections in the above rows, plus: CapacityIncrement Attribute Middleware Home Directory Resource Registration Name Servlet Path Mapping

About WebLogic Server Cluster Messaging

In 12.2.1.4.0, WebLogic Server cluster messaging has been enhanced. If all of the servers in a cluster are running the same installation version of WebLogic Server, no changes are required.

When you perform a rolling upgrade from 12.2.1.3.0 to 12.2.1.4.0 or a downgrade from 12.2.1.4.0 to 12.2.1.3.0, the newer 12.2.1.4.0 servers must be explicitly set, to temporarily

allow the older protocol. You can do this by setting the system property `weblogic.upgradeExpirationDate` with an expiration date, which enables the 12.2.1.4.0 server to allow communication on the cluster until that expiration date and time is reached. For example:

```
-Dweblogic.upgradeExpirationDate=2020-01-05T08:47
```

If you want the clusters that are at different versions, to continue to communicate for an extended period of time, you must set the value to a preferred future upgrade date.

> **Note:**
>
> The system property `-Dweblogic.upgradeExpirationDate` must be used in the Server Start arguments for each of the Managed Servers, and not in the `JAVA_OPTIONS` environment variable in the `startWebLogic.sh` or `startWebLogic.cmd` scripts.

Upgraded Version of Apache Ant

Oracle WebLogic Server 12.2.1.3.0 includes Apache Ant 1.9.8, which may have an impact on the use of the `clientgen` Ant task. The `clientgen` Ant task generates, from an existing WSDL file, the client component files that client applications use to invoke both WebLogic and non-WebLogic web services. Note the following when using the `<binding>` child element of this Ant task:

- You use the `<binding>` element the same way as the standard Ant FileSet data type, using the same attributes.
- In Apache Ant 1.9.8, the Ant FileSet data type is changed so that it may specify either a single file, or a single directory. Therefore, if you use the `<binding>` element to specify multiple files or directories, the `clientgen` Ant task might fail.

For more information about specifying the `<binding>` child element, see `binding` in *WebLogic Web Services Reference for Oracle WebLogic Server*.

Removed the Option to Limit Run-Time Footprint When Starting WebLogic Server

When you start a WebLogic Server instance, all services are started including EJB, JMS, Connector, Clustering, Deployment, Management, and so forth. WebLogic Server provides a startup option that you can use to run the lighter weight run-time instance in any WebLogic domain.

This startup mode can result in quicker startup times for WebLogic Server and a smaller resource footprint on the host machine. You can start a lighter weight run-time instance by specifying the following `weblogic.Server` command option:

```
java weblogic.Server -DserverType= {"wlx" | "wls"}
```

As of Oracle WebLogic Server version 12.2.1.0.0, this startup option is removed.

Random Number Generator

Oracle WebLogic Server 12.2.1.4.0 uses a more secure random number generator algorithm than in previous releases. This can result in slow startup of Managed Servers, Configuration Wizard, Node Manager, and WebLogic Java utilities such as `utils.ImportPrivateKey` on low-entropy systems. Therefore, you should take steps to increase system entropy.

On UNIX systems, you use `rng-tools` to replace system entropy. To configure it, edit `/etc/sysconfig/rngd` and add the following line:

```
EXTRAOPTIONS="-i -r /dev/urandom -o /dev/random -b"
```

You can also use the `-t 60` and `-W 2048` parameters. These parameters add bits to the entropy pool every 60 seconds until the pool reaches the size of 2048.

Use the following command to generate entropy manually:

```
rngd -r /dev/urandom -o /dev/random -b
```

Use the following command to check current entropy:

```
cat /proc/sys/kernel/random/entropy_avail
```

Partitions, Applications, and Container Context Root Assumptions

Java EE applications that make assumptions concerning the context root of their web container may need to be modified if they are deployed to a virtual target that has a `uriPrefix` set. In this case, the context path of the application includes the `uriPrefix` of the virtual target.

> **Note:**
>
> WebLogic Server Multitenant domain partitions, resource groups, resource group templates, virtual targets, and Resource Consumption Management are deprecated in WebLogic Server 12.2.1.4.0 and will be removed in the next release.

Some examples of this are:

- The application parses the incoming URL to construct another URL. If this parsing assumes that the URL root ends at `host:port`, the application needs to be updated because the URL root will be `host:port/`*`prefix`* with URI-based routing.

  The MedRec sample application is one example of this. MedRec used to parse the incoming URL to construct another URL, and assumed that the root URL consisted of only `host:port`. To address this, the following changes were made to the MedRec application:

  – The original code in the `JaxWsProperties.java` file for the physician application was:

  ```
  public final static String WSURL = "http://"
              + ServerPropertiesUtils.getServerAddress("physician", "localhost")
              + ":"
              + ServerPropertiesUtils.getServerPort("7001")
              + "/medrec-jaxws-services/";
  ```

This was changed to the following code. `ServerPropertiesUtils.getRegion()` accounts for the possibility of a partition URI prefix in the URL:

```
public final static String WSURL = "http://"
        + ServerPropertiesUtils.getRegion() + "medrec-jaxws-services/";
```

– The original code in the `GettingHostFilter.java` file for the physician web application was:

```
ServerPropertiesUtils.setAddress(request.getServerName());
ServerPropertiesUtils.setPort(String.valueOf(request.getServerPort()));
chain.doFilter(request, response);
```

This was changed to the following code to preserve `host:port` or, if using MT URI-based routing, `host:port/partition` for the web service client:

```
if (ServerPropertiesUtils.getRegion() == null ||
 ServerPropertiesUtils.getRegion().equals("")) {
   StringBuilder builder = new StringBuilder();
   builder.append(request.getServerName());
   builder.append(":");
   builder.append(String.valueOf(request.getServerPort()));
   builder.append(partition);
   ServerPropertiesUtils.setRegion(builder.toString());
```

- The application links to "/" in HTML/JSP code. In a non-MT environment, the application may make an assumption about the context root to which it is deployed. For example, consider an application that is deployed with the context root `/fruits` and that includes a page that refers to:

```
<a href="/fruits/index.html">Back to Fruits List</a>
```

This type of absolute reference does not work if the application is deployed to a partition with a virtual target that uses a URI prefix. The preceding link will try to go to *`host:port`*`/fruits/index.html` instead of *`host:port`*`/partition1/fruits/index.html`. The safest approach is to use relative URLs in links, such as:

```
<a href="index.html">Back to Fruits List</a>
```

Automatic Binding of the Default CommonJ Work Manager Has Been Removed

The Work Manager API, `commonj.work`, provides a set of interfaces that allows an application to execute multiple work items concurrently within a container. Automatic binding of the default CommonJ Work Manager to `java:comp/env/wm/default` has been removed in WebLogic Server 12.2.1 because it is not in compliance with the Java EE 7 platform specification.

If you have an application that attempts to use the default CommonJ Work Manager, you can do either of the following:

- Add a resource-ref entry for `wm/default` in a deployment descriptor. For example:

```
<resource-ref>
      <res-ref-name>wm/default</res-ref-name>
      <res-type>commonj.work.WorkManager</res-type>
      <res-auth>Container</res-auth>
</resource-ref>
```

- Have the CommonJ Work Manager injected into the application component. For example:

```
@Resource commonj.work.WorkManager myWorkManager;
```

Parallel Deployment

WebLogic Server 12.2.1 adds support for parallel deployment of applications and modules, which improves startup and post-running deployment time.

By default, in WebLogic domains that are created with, or upgraded to, WebLogic Server 12.2.1 (or later):

- Parallel deployment of applications is enabled.
- Parallel deployment of modules for all applications in the domain is disabled.

In WebLogic Server 12.1.3 and earlier versions, applications are always deployed serially. The default deployment order is the natural order that is defined in the domain configuration (that is, as established in the `config.xml` file). However, in those earlier WebLogic Server releases, you can explicitly control deployment order by setting the `DeploymentOrder` attribute of the `AppDeploymentMBean`, using the WebLogic Server Administration Console or programmatically as explained in Changing the Deployment Order for Applications and Standalone Modules in *Deploying Applications to Oracle WebLogic Server*. The use of this feature with older releases is important if specific dependencies exist between applications.

If you create a new domain in WebLogic Server 12.2.1.4.0, or upgrade an existing domain to 12.2.1.4.0, you can restore the WebLogic Server 12.1.3 deployment order behavior by disabling the following attributes of the `DomainMBean`:

- `ParallelDeployApplications`: Determines whether applications are deployed in parallel. (This attribute is enabled by default.)
- `ParallelDeployApplicationModules`: Determines whether the modules of applications are deployed in parallel. (This attribute is disabled by default.)

However, disabling the preceding attributes prevents you from being able to take advantage of the significant performance benefits of parallel deployment. Instead of disabling parallel deployment altogether in the domain you are upgrading to WebLogic Server 12.2.1.4.0, Oracle recommends checking to see whether the deployment ordering of any applications or modules has been customized, and if so, whether it is necessary.

See:

- Enabling Parallel Deployment for Applications and Modules in *Deploying Applications to Oracle WebLogic Server*, which contains important considerations regarding application and module dependencies when using parallel deployment.
- Change the server deployment order in *Oracle WebLogic Server Administration Console Online Help*, which explains how to view or change the deployment order of deployments using the WebLogic Server Administration Console.

Server Logging Bridge

The Server Logging Bridge provides a lightweight mechanism for applications that currently use Java Logging or Log4J Logging to have their log messages redirected to WebLogic logging services. As of WebLogic Server 12.1.3, the Server Logging Bridge is added to the root logger of the `java.util.logging` Logger tree when WebLogic Server starts. Therefore, you no longer need to explicitly configure the Server Logging Bridge.

If you have configured the `weblogic.logging.ServerLoggingHandler` as described in Server Logging Bridge in *Configuring Log Files and Filtering Log Messages for Oracle WebLogic Server*:

- If `weblogic.logging.ServerLoggingHandler` is attached to the root logger, Oracle strongly recommends that you remove it from your `logging.properties` file.
- If `weblogic.logging.ServerLoggingHandler` is attached to a logger other than the root, Oracle strongly recommends that you either remove it from the `logging.properties` configuration, or set the `useParentHandlers` attribute to `false` (for example, `com.foo.barUseParentHandlers=false`).

These situations also apply to Log4J. However, the terminology is different:

- `weblogic.logging.log4j.ServerLoggingAppender` is the bridge for Log4J.
- `useParentHandlers` is called `Additivity` in Log4J. It is configured as `log4j.additivity.com.foo.bar=false` in the log4j.properties file.

Oracle Database Drivers

As of release 12.1.2, WebLogic Server installation includes the Oracle Database 12c drivers.

This requires the following changes to your applications:

- Replace references to `wlserver/server/lib/ojdbc6.jar` with `${MW_HOME}/oracle_common/modules/features/com.oracle.db.dbc7-no-dms.jar`. Note that this is automatically included in the class path when using `weblogic.jar`.
- Replace references to `wlserver/server/lib/aqapi.jar` with `${MW_HOME}/oracle_common/modules/oracle.jdbc_12.1.0/aqapi.jar`, which also requires that you use `com.oracle.db.jdbc7-no-dms.jar`.

If you want to continue running with the Oracle Database 11g driver JARs, you must:

- add them to the front of the classpath
- move the Oracle Database 12c driver JARs out of the `MW_HOME/oracle_common/modules/oracle.jdbc_12.1.0` directory.

Oracle Enable JavaNet FastPath

Oracle Enable JavaNet Fastpath enables the Oracle JDBC JavaNet Fastpath to reduce data copies and fragmentation. As of WebLogic Server 12.1.3, this attribute is no longer supported in the WebLogic Server Administration Console.

In previous versions of WebLogic Server, you could configure the **Oracle Enable JavaNet FastPath** attribute on the **Configuration:Oracle** tab in the WebLogic Server Administration Console. To go to the **Configuration:Oracle** tab, click **Domain Structure**, click **Services**, and then click **Data Sources** in the WebLogic Server Administration Console.

Maximum POST Size

A new session descriptor, `max-save-post-size`, has been added in WebLogic Server 12.1.2, which may impact existing applications. This descriptor sets the maximum size, in bytes, of the POST that is saved or buffered by the application container during FORM authentication.

The default value of the `max-save-post-size` descriptor is 4096 bytes.

If your application posts a form for which the size exceeds 4096 bytes during FORM authentication, you must increase `max-save-post-size` to an appropriate value. Otherwise, a `MaxPostSizeExceededException` occurs in the browser.

WLDF Schema Upgrade

If you are using a JDBC-based store for WebLogic Diagnostics Framework (WLDF) event and harvester data, you must update or recreate the WLDF tables in your database.

In the `wls_events` table, change the `THREADNAME` column from `varchar(128)` to `varchar(250)`. In the `wls_hvst` table, add the column `WLDFMODULE varchar(250) default NULL`.

This upgrade applies only to WebLogic Server standalone installations. For installations that include Fusion Middleware products, the schema upgrade process is done through the Oracle Upgrade Assistant.

See Configuring a JDBC-Based Store in *Configuring and Using the Diagnostics Framework for Oracle WebLogic Server*.

jdbc-connection-timeout-secs Element Has Been Removed

The `jdbc-connection-timeout-secs` element in the `weblogic.xml` deployment descriptor has been removed in WebLogic Server 12.1.2. If your application configures the `jdbc-connection-timeout-secs` element, you must remove it from the `weblogic.xml` deployment descriptor to prevent deployment of the application from failing.

Commitment of Local Transactions

As of WebLogic Server 12.1.2, local transactions on non-XA connections that were not committed or rolled back by the application are now explicitly committed by default when the connection is returned to the pool. In addition, the following two parameters have been added to set whether or not local transactions on non-XA and XA connections are committed when the connection pool is closed:

- `-Dweblogic.datasource.endLocalTxOnNonXAConWithCommit=false` can be used to avoid one extra DBMS round-trip with non-XA connections, for applications that are trusted to always complete their transaction explicitly. If this parameter is set to `false`, local transactions on non-XA connections are implicitly committed or rolled back when a connection pool is closed, according to what the particular JDBC driver being used does when `setAutoCommit(true)` is called. Per the JDBC specification, that action is to commit the transaction, but there is varied compliance among drivers. By default, or if the property is set to `true`, these transactions are now committed.
- `-Dweblogic.datasource.endLocalTXOnXAConWithCommit=true` can be used to commit local transactions on XA connections when a connection pool is closed. By default, these transactions are rolled back.

JVM Settings

The Java virtual machine (JVM) is a virtual execution engine instance that executes the bytecodes in Java class files on a microprocessor. How you tune your JVM affects the performance of WebLogic Server and your applications.

After you upgrade to Oracle WebLogic Server 12.2.1.4.0, you may have to reconfigure some of the JVM settings. Review the following topics and change the settings as required:

- Setting the Location of the Java Endorsed Directory
- Using MaxMetaSpaceSize

Setting the Location of the Java Endorsed Directory

In the following situations, you *do not* need to manually set the location of the Java endorsed directory or directories:

- you are using JDK8.
- you are using one of the JDKs that is installed with WebLogic Server 12.1.1.
- you are using WLS 12*c* domains and start scripts that were generated by domain creation via the WebLogic Server 12*c* Configuration Wizard, or your start scripts reference `commEnv.cmd/sh` as installed by the WebLogic Server installer, or both.

If none of these situations apply, and any one of the following situations apply, you must manually set the location of the Java endorsed directory in the command you use to start your Managed Servers:

- you are using Node Manager to start your Managed Servers, but you are not using a start script, that is `startScriptEnabled=false`. Note that as of WebLogic Server 12.1.1, the default value for `startScriptEnabled` is `true`.
- you are using custom start scripts, that is, start scripts that are not provided by Oracle.
- you are trying to create an empty domain using `java.weblogic.Server`.

In any of these cases, include the `java.endorsed.dirs` parameter in the Managed Server startup command.

```
startWeblogic.sh -Djava.endorsed.dirs=WL_HOME/endorsed
```

To specify multiple Java endorsed directories, separate each directory path with a colon (:).

> **Note:**
>
> In all of the options described in this section, you must replace *WL_HOME* with the full path to your WebLogic Server installation.

You can also specify this value when calling `startServer` by passing the values as `jvmArgs`, or when calling `nmstart` by passing them as properties, such as:

```
wls:/nm/mydomain> prps = makePropertiesObject("Arguments=-Djava.endorsed.dirs=/
WL_HOME/endorsed")

wls:/nm/mydomain> nmStart("AdminServer",props=prps)
```

If you are using Node Manager to start the Managed Server, you can include the `-Djava.endorsed.dirs=/WL_HOME/endorsed")` parameter in the ServerStartMBean's `arguments` attribute, either using WLST or the WebLogic Server Administration Console. If using the WebLogic Server Administration Console, enter this parameter in the **Arguments** field on the server's **Configuration > Server Start** tab. This attribute will be applied when you call `start(server_name 'Server')` from a WLST client that is connected to the Administration Server or when you click on the **Start** button for the server in the WebLogic Server Administration Console.

Using MaxMetaSpaceSize

Java classes have an internal representation within Java Hotspot VM and are referred to as class metadata. In previous releases of Java Hotspot VM, the class metadata was allocated in the so called permanent generation. In JDK 8, the permanent generation was removed and the class metadata is allocated in native memory.

The amount of native memory that can be used for class metadata is by default unlimited. Use the option `MaxMetaspaceSize` to put an upper limit on the amount of native memory used for class metadata. See Class Metadata in *Java Platform, Standard Edition HotSpot Virtual Machine Garbage Collection Tuning Guide*.

Node Manager startScriptEnabled Default Value

As of WebLogic Server 12.1.1, the default value for `startScriptEnabled` has been changed to `true`. In all previous releases, the default was `false`. If you do not want to use a start script with Node Manager, change this value to `false` after upgrading.

Enterprise Java Beans (EJBs)

Oracle Kodo has been deprecated as of WebLogic Server 10.3.1. As of WebLogic Server 12.1.1, EclipseLink is the default JPA provider, replacing Kodo. Applications that use Kodo as the persistence provider with WebLogic Server 12.1.2 must be updated. See Updating Applications to Overcome Conflicts in *Developing Enterprise JavaBeans for Oracle WebLogic Server*.
As of WebLogic Server 12.1.1, support for JPA 2.0 is built in. JPA 2.0 includes improvements and enhancements to domain modeling, object/relational mapping, `EntityManager` and `Query` interfaces, and the Java Persistence Query Language (JPQL), and more. See Setting the Default Provider for the Domain in *Developing Enterprise JavaBeans for Oracle WebLogic Server*.

WebLogic Server 8.1 Web Services Stack Has Been Removed

In WebLogic Server 12.1.1 release, the WebLogic Server 8.1 Web services stack has been removed. Therefore, WebLogic Server 8.1 Web services applications will no longer work.

Oracle recommends that you upgrade such applications to the WebLogic JAX-RPC or JAX-WS stacks, as described in Upgrading an 8.1 WebLogic Web Service to the WebLogic JAX-WS Stack.

Universal Description and Discover (UDDI) Registry Has Been Removed

In WebLogic Server 12.1.1 release, UDDI has been removed.

If you are still using UDDI and want to upgrade to WebLogic Server 12.1.1, Oracle recommends that you migrate to the Oracle Service Registry (OSR). OSR UDDI 3.0 compliant.

Certicom SSL Implementation Has Been Removed

In WebLogic Server release 12.1.1, the Certicom SSL implementation has been removed.

This change may require you to update system properties and debug switches as described in Command Line Properties for Enabling SSL Debugging and System Property Differences

Between the JSSE and Certicom SSL Implementations in *Administering Security for Oracle WebLogic Server*.

Oracle Coherence Version

The WebLogic Server 12.1.1 installer includes Coherence 3.7.1. All servers in a cluster must use the same version of Coherence. Therefore, all cache servers in the cluster must be upgraded to Coherence 3.7.1.

Deprecated and Obsolete Web Application Features

See the list of Web application features that have been deprecated from, or are no longer supported in, Oracle WebLogic Server 12.1.1.

- Information about deprecated functionality in Oracle WebLogic Server 11*g* Release 1 can be found on My Oracle Support at `https://support.oracle.com/`.

  In the Search Knowledge Base field, enter document ID `888028.1`.
- Information about functionality that is deprecated in Oracle WebLogic Server 12.1.1 can be found on My Oracle Support at `https://support.oracle.com/`. Search for **Deprecated Features**.

Evaluation Database Changed From PointBase to Derby

As of WebLogic Server 10.3.3, the evaluation database available from the WebLogic Server installation program has been changed from PointBase to Apache Derby.

If you select the **Evaluation Database** option on the Choose Products and Components screen, the Derby database is installed in the `WL_HOME\common\derby` directory. If you select a Typical installation, Derby is installed by default.

DataSource Profile Logging

To provide better usability and performance, Oracle WebLogic Server 10.3.6 and later uses a data source profile log to store events. See Monitoring WebLogic JDBC Resources in *Administering JDBC Data Sources for Oracle WebLogic Server*.

ONS Debugging

In Oracle WebLogic Server version 10.3.6 and later, the package names for UCP and ONS are no longer repackaged. For information about how to set UCP and ONS debugging, see Setting Debugging for UCP/ONS in *Administering JDBC Data Sources for Oracle WebLogic Server*.

Oracle Type 4 JDBC Drivers From DataDirect

As of Oracle WebLogic Server 10.3.6, Oracle Type 4 JDBC drivers from DataDirect are referred to as WebLogic-branded DataDirect drivers. Oracle has removed the documentation in *Oracle® Fusion Middleware Type 4 JDBC Drivers for Oracle WebLogic Server* and no longer provides detailed information about DataDirect drivers. Oracle continues to provide information about how WebLogic-branded drivers are configured and used in WebLogic Server environments at Using WebLogic-branded DataDirect Drivers in *Developing JDBC Applications for Oracle WebLogic Server*.

Oracle recommends reviewing DataDirect documentation for detailed information about driver behavior. See *Progress DataDirect for JDBC User's Guide Release 5.1* and *Progress DataDirect for JDBC Reference Release 5.1* at `http://www.datadirect.com/index.html`.

Default Message Mode Has Changed

As of WebLogic Server 12.1.1, the default messaging mode has been changed from multicast to unicast. When creating a new cluster, Oracle recommends the use of unicast for messaging within a cluster. For backward compatibility with previous versions of WebLogic Server, you must use multicast for communications between clusters.

Changes to org.apache.commons.fileupload.disk.DiskFileItem Java Class

In Oracle WebLogic Server Patch Set Update (PSU) version 10.3.6.0.1610180 and later, the Java class `org.apache.commons.fileupload.disk.DiskFileItem` in the Weblogic Server bundled Apache Commons FileUpload jar file is changed, and no longer implements `java.io.Serializable` in order to prevent the potential security vulnerability. When an application tries to serialize this type of object, it fails with `java.io.NotSerializableException`.

For information about the security vulnerabilities of Apache Commons FileUpload, see Apache Commons FileUpload Security Vulnerabilities.

After you upgrade to Oracle WebLogic Server 12.2.1.4.0, you can either modify your application to stop serializing the `org.apache.commons.fileupload.disk.DiskFileItem` object, or configure the Filtering Class Loader to specify the problematic package to be loaded from your application. For information about configuring the Filtering Class Loader, see My Oracle Support document ID 1163020.1 "How to Configure Filtering Class Loader in Weblogic.xml?".

Limitation on the Size of JSP Files

The Java Virtual Machine (JVM) limits the amount of code to 65536 bytes per Java method, post upgrade. Therefore, when redeploying applications after upgrading to Oracle WebLogic Server 12.2.1.4.0, if the JSP files are embedded with too many scriptlets, the compiler fails to optimize the code, causing the deployment to fail with `CompilationException`.

When you run into such issues, reduce the size of the JSP files with minimal scriplets and redeploy the application.

Modifications to SSLMBean

As of WebLogic Server 10.3.5, the `SSLMBean` has been modified to support additional SSL configuration capabilities, including the ability to enable or disable the JSSE adapter. See the following topics:

- For a list of the differences in the way the JSSE SSL implementation handles the WebLogic system properties, see System Property Differences Between the JSSE and Certicom SSL Implementations in *Administering Security for Oracle WebLogic Server*.

- For information about SSL support in WebLogic Server, see SSL: An Introduction in *Understanding Security for Oracle WebLogic Server*.
- For information about JSEE, see *Java Secure Socket Extention (JSEE) Reference Guide*.

New Web Services Features

Oracle WebLogic Server 10.3.3 added several new Web services features, such as support for Web services atomic transactions, enhanced support for clustered environments, the ability to attach Oracle WSM policies to WebLogic Web services using Fusion Middleware Control, and more.

The following new features have been added in WebLogic Server as of release 10.3.3:

- Support for Web services atomic transactions: WebLogic Web services enable interoperability with other external transaction processing systems, such as WebSphere, JBoss, Microsoft .NET.
- Enhanced support for Web services in a clustered environment
- Enhanced monitoring of Web services and clients
- Attachment of Oracle WSM policies to WebLogic Web services using Fusion Middleware Control
- EclipseLink DBWS support for declarative Web service solution for accessing relational databases
- Method-Level policy attachment behavior change: Before WebLogic Server 10.3.3, if a policy was attached, through the WebLogic Server Administration Console, to a method of one Web service, the policy was also attached to all methods of the same name for all Web services in that module. As of WebLogic Server 10.3.3, the policy is attached only to the method of the appropriate Web service.
- `policy:` prefix now removed from OWSM policy names
- Web services WSDL tab now removed: Before WebLogic Server 10.3.3, you could view the WSDL for the current Web service by selecting the **Configuration** > **WSDL** tab. The WSDL tab has been removed as of WebLogic Server 10.3.3.
- New development tools: Oracle JDeveloper and Oracle Enterprise Pack for Eclipse (OEPE)
- Integration with Oracle Enterprise Manager Fusion Middleware Control
- Support for Oracle WebLogic Services Manager (WSM) security policies
- Support for WS-SecureConversation 1.3 on JAX-WS and MTOM with WS-Security on JAX-WS

See *What's New in Oracle WebLogic Server*.

Introduction of JSSE

As of WebLogic Server 10.3.3, Java Secure Socket Extension (JSSE) was introduced as an SSL implementation. JSSE is the Java standard framework for SSL and TLS and includes both blocking-I/O and non-blocking-I/O APIs, and a reference implementation including several commonly-trusted CAs.

Performance Enhancements for Security Policy Deployment

As of release 10.3.3, WebLogic Server includes a deployment performance enhancement for Deployable Authorization providers and Role Mapping providers that are thread safe. WebLogic Server by default supports thread-safe parallel modification to security policy and roles during application and module deployment. For this reason, deployable Authorization and Role Mapping providers configured in the security realm should support parallel calls. The WebLogic deployable XACML Authorization Provider and the WebLogic Server XACML Role Mapping Provider meet this requirement.
However, if your custom deployable Authorization or Role Mapping providers do not support parallel calls, you must disable the parallel security policy and role modification and instead enforce a synchronization mechanism that results in each application and module being placed in a queue and deployed sequentially. You can turn on this synchronization enforcement mechanism from the WebLogic Server Administration Console or by using the `DeployableProviderSynchronizationEnabled` and `DeployableProviderSynchronizationTimeout` attributes of the RealmMBean.

See Enabling Synchronization in Security Policy and Role Modification at Deployment in *Administering Security for Oracle WebLogic Server* .

ActiveCache

As of WebLogic Server 10.3.3, applications deployed on WebLogic Server can easily use Coherence data caches, and seamlessly incorporate Coherence*Web for session management and TopLink Grid as an object-to-relational persistence framework. Collectively, these features are called ActiveCache. See About ActiveCache in *Deploying Applications with Oracle WebLogic Server ActiveCache*.

Class Caching

As of WebLogic Server 10.3.3, you can enable class caching in WebLogic Server. The advantages of using class caching are:

- Server startup time is reduced.
- The package level index reduces search time for all classes and resources.

Class caching is supported in development mode when starting the server using a `startWebLogic` script. Class caching is disabled by default and is not supported in production mode. The decrease in startup time varies among different JRE vendors. See Class Caching With the Policy Classloader in *Developing Applications for Oracle WebLogic Server*.

Deprecated JDBC Drivers

The WebLogic Type 4 JDBC driver for Oracle and Sybase JConnect 5.5 and 6.0 drivers are deprecated.

- WebLogic Type 4 JDBC driver for Oracle

  This driver was deprecated in WebLogic Server 10.3 and is now removed. Instead of using this deprecated driver, use the Oracle Thin Driver that is provided with WebLogic Server. For details about the Oracle Thin Driver, see JDBC Drivers Installed with WebLogic Server in *Administering JDBC Data Sources for Oracle WebLogic Server*.
- Sybase JConnect 5.5 and 6.0 drivers

These drivers are removed from WebLogic Server as of release 10.3.3 due to an Oracle security policy regarding default installation of code samples. You can download the driver from Sybase or you can use the Oracle-branded JDBC driver for Sybase that is packaged with WebLogic Server.

Changes to weblogic.jms.extension API

As of WebLogic Server 10.3.3, the internal methods of the `weblogic.jms.extensions.WLMessage` interface are removed from *Java API Reference for Oracle WebLogic Server*. These methods include the following:

```
public void setSAFSequenceName(String safSequenceName);
public String getSAFSequenceName();
public void setSAFSeqNumber(long seqNumber);
public long getSAFSeqNumber();
```

Your applications should not use these internal methods. Internal methods may change or be removed in a future release without notice.

Persistent Store Updates

As of WebLogic Server 10.3.3, WebLogic file store behavior and tuning have changed for default file stores and custom file stores. For information about the Synchronous Write Policy, which determines the behavior of the write operation of the file store, see Guidelines for Configuring a Synchronous Write Policy in *Administering the WebLogic Persistent Store*.

Oracle Internet Directory and Oracle Virtual Directory Authentication Providers

As of WebLogic Server 10.3.2, two new LDAP authentication providers, the Oracle Internet Directory Authentication Provider and the Oracle Virtual Directory Authentication Provider, are added to WebLogic Server. These authentication providers can store users and groups in and read users and groups from the Oracle Internet Directory and Oracle Virtual Directory LDAP servers, respectively.

For information about configuring and using these new security providers, see Configuring LDAP Authentication Providers in *Administering Security for Oracle WebLogic Server*.

CapacityIncrement Attribute

As of WebLogic Server 10.3.1, the `CapacityIncrement` attribute of the `JDBCConnectionPoolMBean` is no longer configurable and is set to a value of 1.

Middleware Home Directory

As of WebLogic Server 10.3.1, Middleware Home replaces the notion of the BEA Home directory. The default path of this directory is `<drive:>Oracle/Middleware`. This change has the following impact on WebLogic Server:

- A new environment variable is introduced in several WebLogic scripts in 10.3.1 to represent the Middleware Home directory: `MW_HOME`. The directory to which this variable is set generally is the same as `BEA_HOME`, which is also still used in WebLogic Server scripts.

- By default, the WebLogic Server installation program selects `<drive:>Oracle/Middleware` as the root product installation directory. However, if a directory containing an existing WebLogic Server installation is detected, that directory is selected instead by default.
- The WebLogic Server 10.3.1 documentation now uses the term `Middleware Home`, instead of BEA Home. However, this revision is functionally only a change in terminology. This revision does not imply that any WebLogic software, custom domains, or applications must be moved, or that any existing environment variables that represent those locations must be changed.

This change does not affect any existing WebLogic Server installations, custom domains, applications, or scripts on your computer. You can continue to use the `BEA_HOME` environment variable as before.

Resource Registration Name

As of WebLogic Server 10.3.1, the behavior of the resource registration name for XA data source configurations has changed. In previous releases, the Java Transaction API (JTA) registration name was simply the name of the data source. Starting WebLogic Server 10.3.1, the registration name is a combination of data source name and domain.

See Registering an XAResource to Participate in Transactions in *Developing JTA Applications for Oracle WebLogic Server*.

Servlet Path Mapping

As of version 2.3 of the Java Servlet Specification, two additional characters, `/` and `*`, can be used to define mappings.

- A servlet path string that contains only the `/` (slash) character indicates the default servlet of the application. The servlet path resolves to the request URI minus the context path. In this case, the path resolves to `null`.
- A string that begins with an `*` (asterisk) specifies an extension mapping.

These changes introduce a change in behavior with the following `HttpServletRequest` methods:

- `getPathInfo`
- `getServletPath`

To illustrate the change in behavior, consider the request `/abc/def.html` that resolves to ServletA:

- If `/` maps to ServletA, then `servletPath="abc/def.html"` and `pathInfo=null`.
- If `/*` maps to ServletA, then `servletPath=""` and `pathInfo="abc/def.html"`.

To ensure that the path information returned is non-null, replace all occurrences of the `/` (slash) servlet mapping string with `/*`.

If you define a servlet using both the `@WebServlet` annotation and the `<servlet>` element of the `web.xml` deployment descriptor file, you must make sure that the servlet name you specify is the same in both locations. If the names do not match, then an exception is generated that prevents the application from starting. This requirement was not enforced in versions of WebLogic Server 12c before 12.2.1.0.

You can download the Java Servlet Specification from the following location:

http://www.oracle.com/technetwork/java/javaee/servlet/index.html

C

About the Reduced Downtime Upgrade Process

Review the flowchart for an overview of the upgrade process for Oracle Fusion Middleware if you are performing a reduced downtime upgrade.

A reduced downtime upgrade process is different from a standard Fusion Middleware upgrade process. This type of upgrade requires at least a two-node cluster environment and is performed in a rolling fashion so that one node is always up to accomplish the reduced downtime upgrade. In the standard upgrade flow, all servers and processes are stopped prior to initiating the upgrade.

Before you begin the reduced downtime upgrade:

- Back up the database schemas.
- Back up the domain directory and the application directory.
- Back up the UI /similar customizations.

For details about backing up, see Creating a Complete Backup in *Upgrading to the Oracle Fusion Middleware Infrastructure*.

After taking the required back ups, uninstall the previous version of the software to ensure that an empty Oracle Home is available to install the new product distributions. This is the key difference between the two upgrade processes. In addition, if your product requires a schema and/or a config upgrade, you will need to run the Upgrade Assistant twice, once each for schema upgrade and for config upgrade.

> **Note:**
>
> Oracle Fusion Middleware 12c (12.2.1.3) is the only supported starting point for a reduced downtime upgrade. You cannot perform a reduced downtime upgrade if you are upgrading from a supported Fusion Middleware 11g or 12c (12.2.1.2.0 or earlier) release, or if you do not have a multi-node environment. To perform a reduced downtime upgrade from 12c (12.1.3 or 12.2.1.2), you must first upgrade to 12.2.1.3 using the standard upgrade process. See Upgrading Oracle FMW Infrastructure from a Previous 12c Release in *Upgrading to the Oracle Fusion Middleware Infrastructure*.

Figure C-1 Process Flowchart for a Reduced Downtime Upgrade

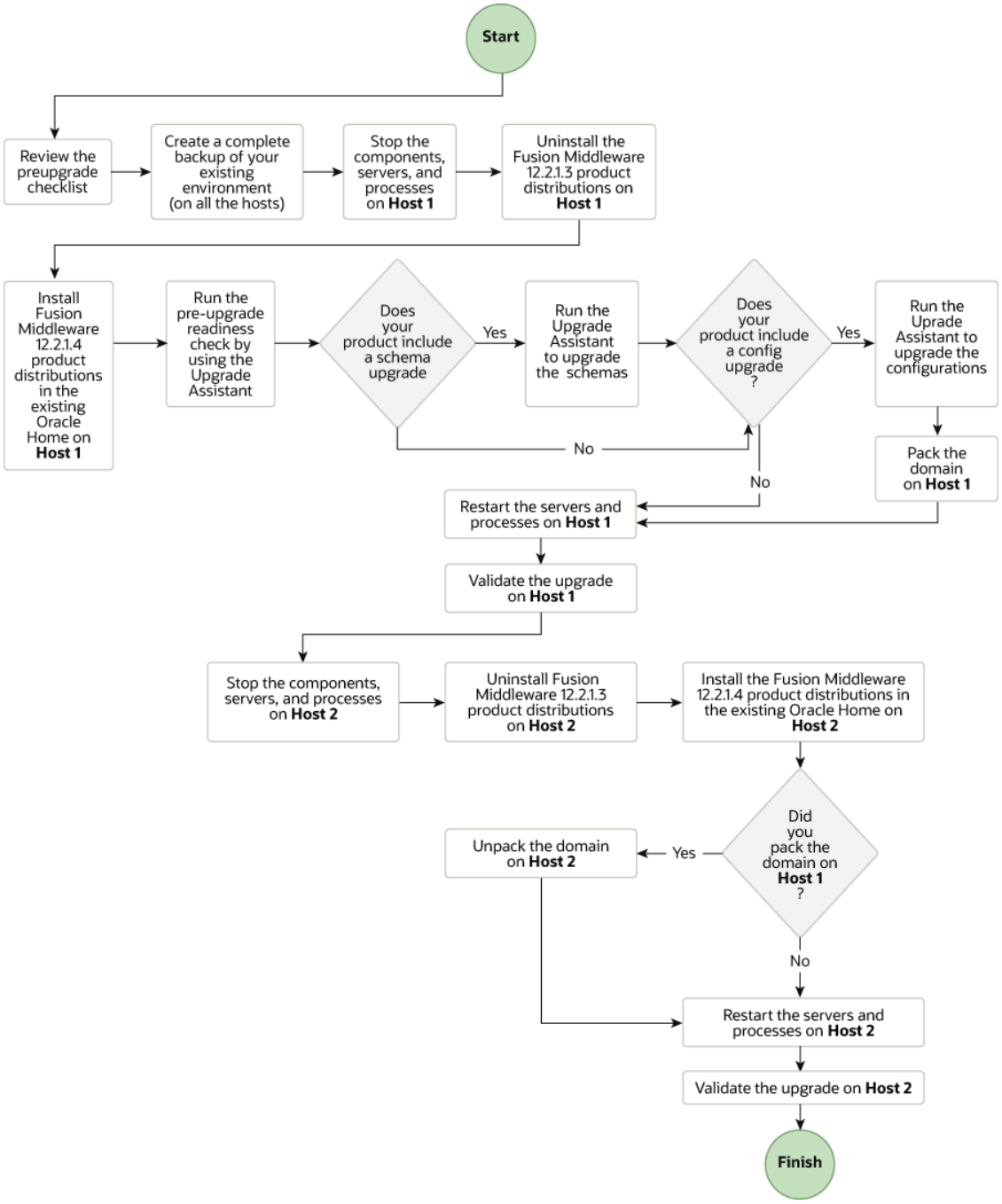


Table C-1 lists the high-level steps that you need to perform for a reduced downtime upgrade of the Oracle Fusion Middleware 12*c* (12.2.1.3.0) release. You must repeat these steps for each additional host.

Table C-1 Tasks for Performing a Reduced Downtime Upgrade of Oracle Fusion Middleware 12*c* (12.2.1.3.0) Release

Task	Description
Required Before you begin a reduced downtime upgrade, you must complete the required pre-upgrade tasks.	The pre-upgrade tasks include reviewing the pre-upgrade checklists; backing up the Oracle home, domain directory, and component schemas; and using the appropriate JDK version. For a complete list of the pre-upgrade tasks, see Required Tasks that Must be Completed Before You Begin.
Required Create a complete backup of your existing environment, on all hosts.	See Creating a Complete Backup in *Upgrading to the Oracle Fusion Middleware Infrastructure*.
Required Stop the servers and processes on Host 1.	Before starting the upgrade process, stop all the servers, components, and processes on Host 1. See Stopping Components, Servers and Processes on Host 1.
Required Uninstall the Fusion Middleware 12*c* (12.2.1.3.0) product distributions on Host 1.	Uninstall the Fusion Middleware 12*c* (12.2.1.3.0) product distributions from the exisiting `ORACLE_HOME` so you can install the Fusion Middleware Infrastructure 12*c* (12.2.1.4.0) into the same directory. See Uninstalling the Software.
Required Install 12*c* (12.2.1.4.0) product distributions into the existing Oracle Home on Host 1.	Install Oracle Fusion Middleware Insfrastructure 12*c* (12.2.1.4.0) by using the Oracle Universal Installer. You must install 12c (12.2.1.4.0) product distributions into the same `ORACLE_HOME`. See Installing Oracle Fusion Middleware Infrastructure.
Optional Run the Readiness Check.	Running the Readiness Check by using the Upgrade Assistant helps you determine whether your pre-upgrade environment is ready for upgrade. See Running a Pre-Upgrade Readiness Check.
Required If applicable to your product, perform the schema and config upgrade separately on Host 1, by using the Upgrade Assistant.	**Note:** You do not have to perform schema upgrade for reduced downtime upgrade of WebLogic Server 12c (12.2.1.3.0).
Required If your product included a configuration upgrade, pack the domain on Host 1.	See Packing the Domain on Host 1.
Required Restart the servers and processes on Host 1.	The upgrade process is complete. You can now restart the servers, components, and processes. See Restarting Node Manager, Administration Server, Managed Servers and Components on Host 1 .
Required Validate the upgrade on Host 1.	After you complete the upgrade, perform the upgrade validation tasks. See Validating the Upgrade.

Table C-1 (Cont.) Tasks for Performing a Reduced Downtime Upgrade of Oracle Fusion Middleware 12*c* (12.2.1.3.0) Release

Task	Description
Required Stop the servers and processes on Host 2.	Before starting the upgrade, you must stop the system components, managed servers and node manager on Host 2. See Stopping the Components, Servers and Processes on Host 2.
Required Uninstall Fusion Middleware Insfrastructure 12 *c* (12.2.1.3.0) on Host 2.	Uninstall Fusion Middleware Infrastructure 12*c* (12.2.1.3.0) from the exisiting `ORACLE_HOME` so you can install the Fusion Middleware Infrastructure 12*c* (12.2.1.4.0) into the same directory. See Uninstalling the Software.
Required Install Fusion Middleware Insfrastructure 12*c* (12.2.1.4.0) and any other product distributions that you run in your domain on Host 2.	See Installing the Software in the Existing Oracle Home on Host 2.
Required Restart the servers and processes on Host 2.	After the upgrade is complete, restart the servers and processes. See Restarting the Managed Servers and Processes.
Required Validate the upgrade on Host 2.	After restarting the servers and processes, perform the upgrade validation tasks. See Validating the Upgrade.

Performing a Reduced Downtime Upgrade

If you are upgrading from Fusion Middleware 12c (12.2.1.3) release, you can use this process to upgrade your multi-node domain without shutting down all of the servers at the same time.

The procedures described in this section are based on the Oracle Fusion Middleware Standard Installation Topology (SIT) and require that you have a multi-node environment. The standard installation topology for Oracle Fusion Middleware Infrastructure has a standard WebLogic Server domain that contains an Administration Server and a cluster containing two Managed Servers. **Host 1** is used to describe the procedures performed on the host with the Administration server and **Host 2** is used to describe the procedures performed on the other managed server host(s). If you have more than two hosts in your environment, be sure to complete the procedures on each additional node.

Required Tasks that Must be Completed Before You Begin

Review the following before you begin a reduced downtime upgrade:

- Review the preupgrade checklists for the components in your deployment. The checklists are found in each of the component-specfic upgrade guides. Some products may require additional steps before performing the upgrade.
- Create a complete backup of the Oracle home (on all of the nodes), the entire domain directory (on all of the nodes) and component schemas before performing the upgrade. In addition, Oracle recommends that you create a backup of UI customizations and the applications directory, in addition to domain directory. See Creating a Complete Backup in *Upgrading to the Oracle Fusion Middleware Infrastructure*.

- Make sure that you are using the appropriate JDK version for this release. The minimum JDK version is jdk1.8.0_211.
- If you are upgrading a shared component directory, back up the contents of the shared directory before the upgrade. The configuration upgrade makes changes to these directories.
- Make sure that your backups include any modified scripts, such as `setStartupEnv.sh`, for example. The upgrade will overwrite any customized files and you will lose your changes.

Performing the Upgrade on Host 1

Perform the following tasks on the machine that hosts the Administration server and serves as the primary machine for your deployment.

- Stopping Components, Servers and Processes on Host 1
- Uninstalling the Software
- Installing Oracle Fusion Middleware Infrastructure
- Running a Pre-Upgrade Readiness Check
- Upgrading Product Schemas and Component Configurations
- Packing the Domain on Host 1
- Restarting Node Manager, Administration Server, Managed Servers and Components on Host 1

Stopping Components, Servers and Processes on Host 1

You must shut down all of the system components, processes, servers (including the Administration Server and any managed servers), and the node manager (if running).

> **Note:**
>
> The procedures in this section describe how to stop components, servers, and processes using the WLST command line or a script. You can also use the Oracle Fusion Middleware Control and the Oracle WebLogic Server Administration Console.

An Oracle Fusion Middleware environment can consist of an Oracle WebLogic Server domain, an Administration Server, multiple managed servers, Java components, system components such as Identity Management components, and a database used as a repository for metadata. The components may be dependent on each other, so they must be stopped in the following order:

- System Components (if any)
- Managed Server(s)
- Administration Server
- Node Manager

Stopping System Components

To stop system components, such as , use the `stopComponent` script:

```
(UNIX) DOMAIN_HOME/bin/stopComponent.sh component_name
(Windows) DOMAIN_HOME\bin\stopComponent.cmd component_name
```

Stopping the Managed Servers

To stop a WebLogic Server Managed Server, use the `stopManagedWebLogic` script:

1. Enter the following command:

   (UNIX) *DOMAIN_HOME*`/bin/stopManagedWebLogic.sh` *managed_server_name admin_url*

   (Windows)*DOMAIN_HOME*`\bin\stopManagedWebLogic.cmd` *managed_server_name admin_url*

2. When prompted, enter your user name and password.

Stopping the Administration Server

When you stop the Administration Server, you also stop the processes running in the Administration Server, including the WebLogic Server Administration Console and Fusion Middleware Control.

To stop the Administration Server:

1. Enter the following command:

   (UNIX) *DOMAIN_HOME*`/bin/stopWebLogic.sh`

   (Windows) *DOMAIN_HOME*`\bin\stopWebLogic.cmd`

2. When prompted, enter your user name, password, and the URL of the Administration Server.

Stopping the Node Manager

To stop Node Manager, close the command shell/prompt in which it is running.

Alternatively, after having set the `nodemanager.properties` attribute `QuitEnabled` to `true` (the default is `false`), you can use WLST to connect to Node Manager and shut it down.

Uninstalling the Software

When performing a rolling upgrade, an empty directory is required for installing the new binaries prior to upgrading.

> **Note:**
>
> You must deinstall the upperstack components first, then deinstall JRF. After deinstalling the JRF, back up any remaining files and then delete all files in the directory. The installation directory must be empty.

Follow the instructions in this section to remove the software from the existing `ORACLE_HOME`. You will reinstall the new software into this same directory.

To start the Oracle Universal Installer in deinstallation mode, execute the following command:

UNIX: *`ORACLE_HOME`*`/oui/bin/deinstall.sh`

Windows: *`ORACLE_HOME`*`\oui\bin\deinstall.cmd`

If you want to uninstall the product in a silent (command-line) mode, see Running the Oracle Universal Installer for Silent Uninstallation in *Installing Software with the Oracle Universal Installer*.

Installing Oracle Fusion Middleware Infrastructure

Before starting your upgrade, uninstall the software from the existing Oracle home, then use the Oracle Universal Installer to install the 12c (12.2.1.4.0) product distributions into the same Oracle home on the target system.

You must install the product distributions on each host during the upgrade.

The supported JDK version for 12c (12.2.1.4.0) is 1.8.0_211. Ensure that you upgrade to JDK version 1.8.0_211 or later, before installing the 12c (12.2.1.4.0) software.

> **Note:**
>
> Do not use reduced downtime upgrade if the starting point for the upgrade is not 12c (12.2.1.3.0).

To install Oracle Fusion Middleware Infrastructure distribution:

1. Sign in to the target system.
2. Download the Oracle Fusion Middleware Infrastructure (`fmw_12.2.1.4.0_infrastructure.jar`) from Oracle Technology Network or Oracle Software Delivery Cloud to your target system.
3. Change to the directory where you downloaded the 12c (12.2.1.4.0) product distribution.
4. Start the installation program for Oracle Fusion Middleware Infrastructure :
   - (UNIX) *`JDK_HOME`*`/bin/java -jar fmw_12.2.1.4.0_infrastructure.jar`
   - (Windows) *`JDK_HOME`*`\bin\java -jar fmw_12.2.1.4.0_infrastructure.jar`
5. On UNIX operating systems, the Installation Inventory Setup screen appears if this is the first time you are installing an Oracle product on this host.

   Specify the location where you want to create your central inventory. Make sure that the operating system group name selected on this screen has write permissions to the central inventory location, and click **Next**.

   > **Note:**
   >
   > The Installation Inventory Setup screen does not appear on Windows operating systems.

6. On the Welcome screen, review the information to make sure that you have met all the prerequisites. Click **Next**.
7. On the Auto Updates screen, select an option:
   - **Skip Auto Updates**: If you do not want your system to check for software updates at this time.
   - **Select patches from directory**: To navigate to a local directory if you downloaded patch files.
   - **Search My Oracle Support for Updates**: To automatically download software updates if you have a My Oracle Support account. You must enter Oracle Support credentials then click **Search**. To configure a proxy server for the installer to access My Oracle Support, click **Proxy Settings**. Click **Test Connection** to test the connection.

   Click **Next**.
8. On the Installation Location screen, specify the existing 12c (12.2.1.3.0) Oracle home directory and click **Next**.

   For more information about Oracle Fusion Middleware directory structure, see About the Directories for Installation and Configuration in *Planning an Installation of Oracle Fusion Middleware*.
9. On the Installation Type screen, select **Fusion Middleware Infrastructure** and click **Next**.
10. The Prerequisite Checks screen analyzes the host computer to ensure that the specific operating system prerequisites have been met.

    To view the list of tasks that are verified, select **View Successful Tasks**. To view log details, select **View Log**. If any prerequisite check fails, then an error message appears at the bottom of the screen. Fix the error and click **Rerun** to try again. To ignore the error or the warning message and continue with the installation, click **Skip** (not recommended).
11. On the Security Updates screen, enter your My Oracle Support account information so you can receive the latest product information and security updates via your My Oracle Support account.

    This screen appears the first time you install an Oracle product on a host.

    If you do not have an Oracle Support account and you are sure that you want to skip this step, clear the check box and verify your selection in the follow-up dialog box.
12. On the Installation Summary screen, verify the installation options that you selected.

    If you want to save these options to a response file, click **Save Response File** and enter the response file location and name. The response file collects and stores all the information that you have entered, and enables you to perform a silent installation (from the command line) at a later time.
    Click **Install** to begin the installation.
13. On the Installation Progress screen, when the progress bar displays 100%, click **Finish** to dismiss the installer, or click **Next** to see a summary.
14. The Installation Complete screen displays the Installation Location and the Feature Sets that are installed. Review this information and click **Finish** to close the installer.

Running a Pre-Upgrade Readiness Check

To identify potential issues with the upgrade, Oracle recommends that you run a readiness check before you start the upgrade process. Be aware that the readiness check may not be able to discover all potential issues with your upgrade. An upgrade may still fail, even if the readiness check reports success.

About Running a Pre-Upgrade Readiness Check

You can run the Upgrade Assistant in `-readiness` mode to detect issues before you perform the actual upgrade. You can run the readiness check in GUI mode using the Upgrade Assistant or in silent mode using a response file.

The Upgrade Assistant readiness check performs a read-only, pre-upgrade review of your Fusion Middleware schemas and WebLogic domain configurations that are at a supported starting point. The review is a read-only operation.

The readiness check generates a formatted, time-stamped readiness report so you can address potential issues before you attempt the actual upgrade. If no issues are detected, you can begin the upgrade process. Oracle recommends that you read this report thoroughly before performing an upgrade.

You can run the readiness check while your existing Oracle Fusion Middleware domain is online (while other users are actively using it) or offline.

You can run the readiness check any number of times before performing any actual upgrade. However, do not run the readiness check after an upgrade has been performed, as the report results may differ from the result of pre-upgrade readiness checks.

> **Note:**
>
> To prevent performance from being affected, Oracle recommends that you run the readiness check during off-peak hours.

Starting the Upgrade Assistant in Readiness Mode

Use the `-readiness` parameter to start the Upgrade Assistant in readiness mode.

To perform a readiness check on your pre-upgrade environment with the Upgrade Assistant:

1. Go to the `oracle_common/upgrade/bin` directory:
   - (UNIX) *ORACLE_HOME*`/oracle_common/upgrade/bin`
   - (Windows) *ORACLE_HOME*`\oracle_common\upgrade\bin`
2. Start the Upgrade Assistant.
   - (UNIX) `./ua -readiness`
   - (Windows) `ua.bat -readiness`

> **Note:**
>
> If the `DISPLAY` environment variable is not set up properly to allow for GUI mode, you may encounter the following error:
>
> ```
> Xlib: connection to ":1.0" refused by server
> Xlib: No protocol specified
> ```
>
> To resolve this issue, set the `DISPLAY` environment variable to the system name or IP address of your local workstation, and rerun Upgrade Assistant.
>
> If you continue to receive these errors after setting `DISPLAY`, try launching another GUI tool, such as `vncconfig`. If you see the same errors, your `DISPLAY` environment variable may still not be set correctly.

For information about other parameters that you can specify on the command line, see:

Upgrade Assistant Parameters

When you start the Upgrade Assistant from the command line, you can specify additional parameters.

Table C-2 Upgrade Assistant Command-Line Parameters

Parameter	Required or Optional	Description
`-readiness`	Required for readiness checks **Note**: Readiness checks cannot be performed on standalone installations (those not managed by the WebLogic Server).	Performs the upgrade readiness check without performing an actual upgrade. Schemas and configurations are checked. Do not use this parameter if you have specified the `-examine` parameter.
`-threads`	Optional	Identifies the number of threads available for concurrent schema upgrades or readiness checks of the schemas. The value must be a positive integer in the range 1 to 8. The default is 4.
`-response`	Required for silent upgrades or silent readiness checks	Runs the Upgrade Assistant using inputs saved to a response file generated from the data that is entered when the Upgrade Assistant is run in GUI mode. Using this parameter runs the Upgrade Assistant in *silent mode* (without displaying Upgrade Assistant screens).
`-examine`	Optional	Performs the examine phase but does not perform an actual upgrade. Do not specify this parameter if you have specified the `-readiness` parameter.

Table C-2 (Cont.) Upgrade Assistant Command-Line Parameters

Parameter	Required or Optional	Description
`-logLevel` *attribute*	Optional	Sets the logging level, specifying one of the following attributes: • `TRACE` • `NOTIFICATION` • `WARNING` • `ERROR` • `INCIDENT_ERROR` The default logging level is `NOTIFICATION`. Consider setting the `-logLevel TRACE` attribute to so that more information is logged. This is useful when troubleshooting a failed upgrade. The Upgrade Assistant's log files can become very large if `-logLevel TRACE` is used.
`-logDir` *location*	Optional	Sets the default location of upgrade log files and temporary files. You must specify an existing, writable directory where the Upgrade Assistant creates log files and temporary files. The default locations are: (UNIX) *ORACLE_HOME*`/oracle_common/upgrade/logs` *ORACLE_HOME*`/oracle_common/upgrade/temp` (Windows) *ORACLE_HOME*`\oracle_common\upgrade\logs` *ORACLE_HOME*`\oracle_common\upgrade\temp`
`-help`	Optional	Displays all of the command-line options.

Performing a Readiness Check with the Upgrade Assistant

Navigate through the screens in the Upgrade Assistant to complete the pre-upgrade readiness check.

Readiness checks are performed only on schemas or component configurations that are at a supported upgrade starting point.

To complete the readiness check:

1. On the Welcome screen, review information about the readiness check. Click **Next**.
2. On the Readiness Check Type screen, select the readiness check that you want to perform:

- **Individually Selected Schemas** allows you to select individual schemas for review before upgrade. The readiness check reports whether a schema is supported for an upgrade or where an upgrade is needed.
  When you select this option, the screen name changes to Selected Schemas.
- **Domain Based** allows the Upgrade Assistant to discover and select all upgrade-eligible schemas or component configurations in the domain specified in the **Domain Directory** field.
  When you select this option, the screen name changes to Schemas and Configuration.

  Leave the default selection if you want the Upgrade Assistant to check all schemas and component configurations at the same time, or select a specific option:

  – **Include checks for all schemas** to discover and review all components that have a schema available to upgrade.

  – **Include checks for all configurations** to review component configurations for a managed WebLogic Server domain.

Click **Next**.

3. If you selected **Individually Selected Schemas**: On the Available Components screen, select the components that have a schema available to upgrade for which you want to perform a readiness check.

   If you selected **Domain Based**: On the Component List screen, review the list of components that are present in your domain for which you want to perform a readiness check.

   If you select a component that has dependent components, those components are automatically selected. For example, if you select Oracle Platform Security Services, Oracle Audit Services is automatically selected.

   Depending on the components you select, additional screens may display. For example, you may need to:

   - Specify the domain directory.
   - Specify schema credentials to connect to the selected schema: **Database Type**, **DBA User Name**, and **DBA Password**. Then click **Connect**.

     > **Note:**
     >
     > Oracle database is the default database type. Make sure that you select the correct database type before you continue. If you discover that you selected the wrong database type, do not go back to this screen to change it to the correct type. Instead, close the Upgrade Assistant and restart the readiness check with the correct database type selected to ensure that the correct database type is applied to all schemas.

   - Select the **Schema User Name** option and specify the **Schema Password**.

     > **Note:**
     >
     > The Upgrade Assistant automatically enables default credentials. If you are unable to connect, make sure that you manually enter the credentials for your schema before you continue.

   Click **Next** to start the readiness check.

4. On the Readiness Summary screen, review the summary of the readiness checks that will be performed based on your selections.

   If you want to save your selections to a response file to run the Upgrade Assistant again later in response (or silent) mode, click **Save Response File** and provide the location and name of the response file. A silent upgrade performs exactly the same function that the Upgrade Assistant performs, but you do not have to manually enter the data again.

   For a detailed report, click **View Log**.

   Click **Next**.

5. On the Readiness Check screen, review the status of the readiness check. The process can take several minutes.

   If you are checking multiple components, the progress of each component displays in its own progress bar in parallel.

   When the readiness check is complete, click **Continue**.

6. On the End of Readiness screen, review the results of the readiness check (**Readiness Success** or **Readiness Failure**):

   - If the readiness check is successful, click **View Readiness Report** to review the complete report. Oracle recommends that you review the Readiness Report before you perform the actual upgrade even when the readiness check is successful. Use the **Find** option to search for a particular word or phrase within the report. The report also indicates where the completed Readiness Check Report file is located.
   - If the readiness check encounters an issue or error, click **View Log** to review the log file, identify and correct the issues, and then restart the readiness check. The log file is managed by the command-line options you set.

Understanding the Readiness Report

After performing a readiness check for your domain, review the report to determine whether you need to take any action for a successful upgrade.

The format of the readiness report file is:

`readiness<timestamp>.txt`

Where, *timestamp* indicates the date and time of when the readiness check was run.

A readiness report contains the following information:

Table C-3 Readiness Report Elements

Report Information	Description	Required Action
Overall Readiness Status: SUCCESS or FAILURE	The top of the report indicates whether the readiness check passed or completed with one or more errors.	If the report completed with one or more errors, search for FAIL and correct the failing issues before attempting to upgrade. You can re-run the readiness check as many times as necessary before an upgrade.
Timestamp	The date and time that the report was generated.	No action required.
Log file location `/oracle_common/upgrade/logs`	The directory location of the generated log file.	No action required.

Table C-3 (Cont.) Readiness Report Elements

Report Information	Description	Required Action
Domain Directory	Displays the domain location	No action required.
Readiness report location `/oracle_common/upgrade/logs`	The directory location of the generated readiness report.	No action required.
Names of components that were checked	The names and versions of the components included in the check and status.	If your domain includes components that cannot be upgraded to this release, such as SOA Core Extension, do not attempt an upgrade.
Names of schemas that were checked	The names and current versions of the schemas included in the check and status.	Review the version numbers of your schemas. If your domain includes schemas that cannot be upgraded to this release, do not attempt an upgrade.
Individual Object Test Status: FAIL	The readiness check test detected an issue with a specific object.	Do not upgrade until all failed issues have been resolved.
Individual Object Test Status: PASS	The readiness check test detected no issues for the specific object.	If your readiness check report shows only the PASS status, you can upgrade your environment. Note, however, that the Readiness Check cannot detect issues with externals such as hardware or connectivity during an upgrade. You should always monitor the progress of your upgrade.
Completed Readiness Check of <Object> Status: FAILURE	The readiness check detected one or more errors that must be resolved for a particular object such as a schema, an index, or datatype.	Do not upgrade until all failed issues have been resolved.
Completed Readiness Check of <Object> Status: SUCCESS	The readiness check test detected no issues.	No action required.

Here is a sample Readiness Report file. Your report may not include all of these checks.

```
Upgrade readiness check completed with one or more errors.

This readiness check report was created on Fri Aug 16 13:29:41 PDT 2019
Log file is located at: /oracle/work/middleware_latest/oracle_common/upgrade/
logs/ua2019-08-16-13-23-36PM.log
Readiness Check Report File: /oracle/work/middleware_latest/oracle_common/
upgrade/logs/readiness2019-08-16-13-29-41PM.txt
Domain Directory: /oracle/work/middleware_1212/user_projects/domains/
jrf_domain

Starting readiness check of components.

Oracle Platform Security Services
   Starting readiness check of Oracle Platform Security Services.
     Schema User Name: DEV3_OPSS
     Database Type: Oracle Database
     Database Connect String:
     VERSION Schema DEV3_OPSS is currently at version 12.1.2.0.0.  Readiness
checks will now be performed.
```

```
   Starting schema test:  TEST_DATABASE_VERSION  Test that the database
server version number is supported for upgrade
     INFO   Database product version: Oracle Database 12c Enterprise Edition
Release 12.1.0.2.0 - 64bit Production
With the Partitioning, OLAP, Advanced Analytics and Real Application Testing
options
   Completed schema test: TEST_DATABASE_VERSION --> Test that the database
server version number is supported for upgrade +++ PASS
   Starting schema test:  TEST_REQUIRED_TABLES  Test that the schema contains
all the required tables
   Completed schema test: TEST_REQUIRED_TABLES --> Test that the schema
contains all the required tables +++ PASS
   Starting schema test:  Test that the schema does not contain any
unexpected tables  TEST_UNEXPECTED_TABLES
   Completed schema test: Test that the schema does not contain any
unexpected tables --> TEST_UNEXPECTED_TABLES +++ Test that the schema does
not contain any unexpected tables
   Starting schema test:  TEST_ENOUGH_TABLESPACE  Test that the schema
tablespaces automatically extend if full
   Completed schema test: TEST_ENOUGH_TABLESPACE --> Test that the schema
tablespaces automatically extend if full +++ PASS
   Starting schema test:  TEST_USER_TABLESPACE_QUOTA  Test that tablespace
quota for this user is sufficient to perform the upgrade
   Completed schema test: TEST_USER_TABLESPACE_QUOTA --> Test that tablespace
quota for this user is sufficient to perform the upgrade +++ PASS
   Starting schema test:  TEST_ONLINE_TABLESPACE  Test that schema
tablespaces are online
   Completed schema test: TEST_ONLINE_TABLESPACE --> Test that schema
tablespaces are online +++ PASS
   Starting permissions test:  TEST_DBA_TABLE_GRANTS  Test that DBA user has
privilege to view all user tables
   Completed permissions test: TEST_DBA_TABLE_GRANTS --> Test that DBA user
has privilege to view all user tables +++ PASS
   Starting schema test:  SEQUENCE_TEST  Test that the Oracle Platform
Security Services schema sequence and its properties are valid
   Completed schema test: SEQUENCE_TEST --> Test that the Oracle Platform
Security Services schema sequence and its properties are valid +++ PASS
   Finished readiness check of Oracle Platform Security Services with status:
SUCCESS.

Oracle Audit Services
   Starting readiness check of Oracle Audit Services.
     Schema User Name: DEV3_IAU
     Database Type: Oracle Database
     Database Connect String:
     VERSION Schema DEV3_IAU is currently at version 12.1.2.0.0.  Readiness
checks will now be performed.
   Starting schema test:  TEST_DATABASE_VERSION  Test that the database
server version number is supported for upgrade
     INFO   Database product version: Oracle Database 12c Enterprise Edition
Release 12.1.0.2.0 - 64bit Production
With the Partitioning, OLAP, Advanced Analytics and Real Application Testing
options
   Completed schema test: TEST_DATABASE_VERSION --> Test that the database
server version number is supported for upgrade +++ PASS
   Starting schema test:  TEST_REQUIRED_TABLES  Test that the schema contains
```

```
all the required tables
   Completed schema test: TEST_REQUIRED_TABLES --> Test that the schema
contains all the required tables +++ PASS
   Starting schema test:  TEST_UNEXPECTED_TABLES  Test that the schema does
not contain any unexpected tables
   Completed schema test: TEST_UNEXPECTED_TABLES --> Test that the schema
does not contain any unexpected tables +++ PASS
   Starting schema test:  TEST_ENOUGH_TABLESPACE  Test that the schema
tablespaces automatically extend if full
   Completed schema test: TEST_ENOUGH_TABLESPACE --> Test that the schema
tablespaces automatically extend if full +++ PASS
   Starting schema test:  TEST_USER_TABLESPACE_QUOTA  Test that tablespace
quota for this user is sufficient to perform the upgrade
   Completed schema test: TEST_USER_TABLESPACE_QUOTA --> Test that tablespace
quota for this user is sufficient to perform the upgrade +++ PASS
   Starting schema test:  TEST_ONLINE_TABLESPACE  Test that schema
tablespaces are online
   Completed schema test: TEST_ONLINE_TABLESPACE --> Test that schema
tablespaces are online +++ PASS
   Starting permissions test:  TEST_DBA_TABLE_GRANTS  Test that DBA user has
privilege to view all user tables
   Completed permissions test: TEST_DBA_TABLE_GRANTS --> Test that DBA user
has privilege to view all user tables +++ PASS
   Starting schema test:  TEST_MISSING_COLUMNS  Test that tables and views
are not missing any required columns
   Completed schema test: TEST_MISSING_COLUMNS --> Test that tables and views
are not missing any required columns +++ PASS
   Starting schema test:  TEST_UNEXPECTED_COLUMNS  Test that tables and views
do not contain any unexpected columns
   Completed schema test: TEST_UNEXPECTED_COLUMNS --> Test that tables and
views do not contain any unexpected columns +++ PASS
   Starting datatype test for table OIDCOMPONENT:  TEST_COLUMN_DATATYPES_V2 --
> Test that all table columns have the proper datatypes
   Completed datatype test for table OIDCOMPONENT: TEST_COLUMN_DATATYPES_V2 --
> Test that all table columns have the proper datatypes +++ PASS
   Starting datatype test for table IAU_CUSTOM_01:  TEST_COLUMN_DATATYPES_V2
--> Test that all table columns have the proper datatypes
   Completed datatype test for table IAU_CUSTOM_01: TEST_COLUMN_DATATYPES_V2
--> Test that all table columns have the proper datatypes +++ PASS
   Starting datatype test for table IAU_BASE:  TEST_COLUMN_DATATYPES_V2 -->
Test that all table columns have the proper datatypes
   Completed datatype test for table IAU_BASE: TEST_COLUMN_DATATYPES_V2 -->
Test that all table columns have the proper datatypes +++ PASS
   Starting datatype test for table WS_POLICYATTACHMENT:
TEST_COLUMN_DATATYPES_V2 --> Test that all table columns have the proper
datatypes
   Completed datatype test for table WS_POLICYATTACHMENT:
TEST_COLUMN_DATATYPES_V2 --> Test that all table columns have the proper
datatypes +++ PASS
   Starting datatype test for table OWSM_PM_EJB:  TEST_COLUMN_DATATYPES_V2 --
> Test that all table columns have the proper datatypes
   Completed datatype test for table OWSM_PM_EJB: TEST_COLUMN_DATATYPES_V2 --
> Test that all table columns have the proper datatypes +++ PASS
   Starting datatype test for table XMLPSERVER:  TEST_COLUMN_DATATYPES_V2 -->
Test that all table columns have the proper datatypes
   Completed datatype test for table XMLPSERVER: TEST_COLUMN_DATATYPES_V2 -->
```

```
Test that all table columns have the proper datatypes +++ PASS
   Starting datatype test for table SOA_HCFP:  TEST_COLUMN_DATATYPES_V2 -->
Test that all table columns have the proper datatypes
   Completed datatype test for table SOA_HCFP: TEST_COLUMN_DATATYPES_V2 -->
Test that all table columns have the proper datatypes +++ PASS
   Starting schema test:  SEQUENCE_TEST  Test that the audit schema sequence
and its properties are valid
   Completed schema test: SEQUENCE_TEST --> Test that the audit schema
sequence and its properties are valid +++ PASS
   Starting schema test:  SYNONYMS_TEST  Test that the audit schema required
synonyms are present
   Completed schema test: SYNONYMS_TEST --> Test that the audit schema
required synonyms are present +++ PASS
   Finished readiness check of Oracle Audit Services with status: FAILURE.

Common Infrastructure Services
   Starting readiness check of Common Infrastructure Services.
     Schema User Name: DEV3_STB
     Database Type: Oracle Database
     Database Connect String:
   Starting schema test:  TEST_REQUIRED_TABLES  Test that the schema contains
all the required tables
   Completed schema test: TEST_REQUIRED_TABLES --> Test that the schema
contains all the required tables +++ PASS
   Completed schema test: ALL_TABLES --> TEST_REQUIRED_TABLES +++ Test that
the schema contains all the required tables
   Starting schema test:  TEST_UNEXPECTED_TABLES  Test that the schema does
not contain any unexpected tables
   Completed schema test: ALL_TABLES --> TEST_UNEXPECTED_TABLES +++ Test that
the schema does not contain any unexpected tables
   Starting schema test:  TEST_REQUIRED_VIEWS  Test that the schema contains
all the required database views
   Completed schema test: ALL_TABLES --> TEST_REQUIRED_VIEWS +++ Test that
the schema contains all the required database views
   Starting schema test:  TEST_MISSING_COLUMNS  Test that tables and views
are not missing any required columns
   Completed schema test: ALL_TABLES --> TEST_MISSING_COLUMNS +++ Test that
tables and views are not missing any required columns
   Starting schema test:  TEST_DATABASE_VERSION  Test that the database
server version number is supported for upgrade
   Starting schema test:  TEST_DATABASE_VERSION  Test that the database
server version number is supported for upgrade
     INFO   Database product version: Oracle Database 12c Enterprise Edition
Release 12.1.0.2.0 - 64bit Production
With the Partitioning, OLAP, Advanced Analytics and Real Application Testing
options
   Completed schema test: TEST_DATABASE_VERSION --> Test that the database
server version number is supported for upgrade +++ PASS
   Completed schema test: ALL_TABLES --> TEST_DATABASE_VERSION +++ Test that
the database server version number is supported for upgrade
   Finished readiness check of Common Infrastructure Services with status:
SUCCESS.

Oracle JRF
   Starting readiness check of Oracle JRF.
   Finished readiness check of Oracle JRF with status: SUCCESS.
```

```
System Components Infrastructure
   Starting readiness check of System Components Infrastructure.
   Starting config test:  TEST_SOURCE_CONFIG  Checking the source
configuration.
     INFO /oracle/work/middleware_1212/user_projects/domains/jrf_domain/opmn/
topology.xml was not found. No upgrade is needed.
   Completed config test: TEST_SOURCE_CONFIG --> Checking the source
configuration. +++ PASS
   Finished readiness check of System Components Infrastructure with status:
ALREADY_UPGRADED.

Common Infrastructure Services
   Starting readiness check of Common Infrastructure Services.
   Starting config test:  CIEConfigPlugin.readiness.test  This tests the
readiness of the domain from CIE side.
   Completed config test: CIEConfigPlugin.readiness.test --> This tests the
readiness of the domain from CIE side. +++ PASS
   Finished readiness check of Common Infrastructure Services with status:
SUCCESS.

Finished readiness check of components.
```

Upgrading Product Schemas and Component Configurations

When upgrading to Fusion Middleware 12 *c* (12.2.1.4.0), if your product component includes a schema and/or a config upgrade, you have to upgrade the supported product schemas and component configurations on Host 1, by using the Upgrade Assistant.

For the list of schemas and component configuration that you can upgrade to 12c (12.2.1.4.0), see the following sections of *Upgrading with the Upgrade Assistant*

- Identifying Schemas that Can Be Upgraded to 12c (12.2.1.4.0)
- Identifying Configurations That Can Be Upgraded with the Upgrade Assistant

Packing the Domain on Host 1

After you have performed a config upgrade for your product component, you must pack the domain on Host 1 by using the `pack` command.

See Packing the Domain on the Primary Node.

For information about the `pack` command, see The Pack Command in *Creating Templates and Domains Using the Pack and Unpack Commands*.

Restarting Node Manager, Administration Server, Managed Servers and Components on Host 1

After the upgrade, you must restart the components, servers, and processes in the correct order.

> **Note:**
>
> The procedures in this section describe how to start servers and processes using the WLST command line or a script. You can also use the Oracle Fusion Middleware Control and the Oracle WebLogic Server Administration Console. See Starting and Starting Administration and Managed Servers and Node Manager in *Administering Oracle Fusion Middleware*.

The components must be started in the following order:

- Node Manager
- Administration Server
- Managed Server(s)
- System Components

> **Note:**
>
> If you are unable to successfully start any of the following components on Host 1, do not proceed with the upgrade on the remaining Hosts. You must first resolve the issues with the components on Host 1.

> **Note:**
>
> Windows Users Only: When restarting the servers on a Windows operating system, the upgraded domain might fail with a parsing exception. To fix this parsing error, add the property "`-Doracle.xml.schema/Ignore_Duplicate_components=true`" to the server startup script setDomainEnv.cmd.

Starting the Node Manager

To start Node Manager:

- Enter the following command:

  (UNIX) *`DOMAIN_HOME`*`/bin/startNodeManager.sh`

  (Windows) *`DOMAIN_HOME`*`\bin\startNodeManager.cmd`

Starting the Administration Server

To start the Administration Server:

1. Enter the following command:

(UNIX) *DOMAIN_HOME*/bin/startWebLogic.sh

(Windows) *DOMAIN_HOME*\bin\startWebLogic.cmd

2. When prompted, enter your user name, password, and the URL of the Administration Server.

Starting the Managed Servers

To start the Managed Servers:

1. Enter the following command:

   (UNIX) *DOMAIN_HOME*/bin/startManagedWebLogic.sh *managed_server_name admin_url*

   (Windows) *DOMAIN_HOME*\bin\startManagedWebLogic.cmd *managed_server_name admin_url*

2. When prompted, enter your user name and password.

Starting Component Processes

When you stopped the Administration Server, you also stopped the processes running in the Administration Server, including the WebLogic Server Administration Console and Fusion Middleware ControlAfter the upgrade, you will need to restart all of these processes.

1. Navigate to the DOMAIN_HOME\bin directory.
2. Execute the following script for each component

   /startComponent.sh *component_name*

Performing the Upgrade on Host 2

After you have completed the upgrade on host 1, perform the following steps on each additional host in your environment. Our standard topology example includes only two hosts, but you may have more.

- Stopping the Components, Servers and Processes on Host 2
- Uninstalling the Software
- Installing the Software in the Existing Oracle Home on Host 2
- Unpacking the Domain on Host 2
- Restarting the Managed Servers and Processes

Stopping the Components, Servers and Processes on Host 2

You must stop the system components, managed servers and node manager running on Host 2.

Stop the system components first, followed by the managed server(s) and then the node manager. Failure to stop the components in the correct order may result in a failed upgrade.

Stopping System Components

To stop system components, , use the `stopComponent` script:

```
(UNIX) DOMAIN_HOME/bin/stopComponent.sh component_name
(Windows) DOMAIN_HOME\bin\stopComponent.cmd component_name
```

Stopping the Managed Servers

To stop a WebLogic Server Managed Server, use the `stopManagedWebLogic` script:

1. Enter the following command:

   (UNIX) *DOMAIN_HOME*`/bin/stopManagedWebLogic.sh` *managed_server_name admin_url*

   (Windows)*DOMAIN_HOME*`\bin\stopManagedWebLogic.cmd` *managed_server_name admin_url*

2. When prompted, enter your user name and password.

Stopping the Node Manager

To stop Node Manager, close the command shell/prompt in which it is running.

Alternatively, after having set the `nodemanager.properties` attribute `QuitEnabled` to `true` (the default is `false`), you can use WLST to connect to Node Manager and shut it down.

Uninstalling the Software

When performing a rolling upgrade, an empty directory is required for installing the new binaries prior to upgrading.

> **Note:**
>
> You must deinstall the upperstack components first, then deinstall JRF. After deinstalling the JRF, back up any remaining files and then delete all files in the directory. The installation directory must be empty.

Follow the instructions in this section to remove the software from the existing `ORACLE_HOME`. You will reinstall the new software into this same directory.

To start the Oracle Universal Installer in deinstallation mode, execute the following command:

UNIX: *ORACLE_HOME*`/oui/bin/deinstall.sh`

Windows: *ORACLE_HOME*`\oui\bin\deinstall.cmd`

If you want to uninstall the product in a silent (command-line) mode, see Running the Oracle Universal Installer for Silent Uninstallation in *Installing Software with the Oracle Universal Installer*.

Installing the Software in the Existing Oracle Home on Host 2

After you have uninstalled the software from the 12c (12.2.1.3) Oracle home, install the 12c (12.2.1.4) binaries into the same Oracle home, on Host 2.

You must install the software on each host in your deployment. Follow the same process that you used to install the software on Host 1. Ensure that you begin with an empty directory.

Unpacking the Domain on Host 2

After completing the config upgrade, you had packed your domain on Host 1. You must now unpack the domain on Host 2 by using the `unpack` command.

See Unpacking the Domain on the Secondary Node.

For information about the `unpack` command, see The Unpack Command in *Creating Templates and Domains Using the Pack and Unpack Commands*.

Restarting the Managed Servers and Processes

After the upgrade is complete on Host 2, restart the managed servers.

To start the Managed Servers:

1. Enter the following command:

   (UNIX) *`DOMAIN_HOME`*`/bin/startManagedWebLogic.sh` *`managed_server_name admin_url`*

   (Windows) *`DOMAIN_HOME`*`\bin\startManagedWebLogic.cmd` *`managed_server_name admin_url`*

2. When prompted, enter your user name and password.

Validating the Upgrade

After you have completet the upgrade on all hosts, complete the standard upgrade verification tasks to ensure that all components will continue to work as expected.

See .

> **Note:**
>
> Only perform those tasks that pertain to your environment, configuration and preferences. These tasks are meant to assist you in verfiying that the upgrade was successful. You may need to perform additional testing based on your configuration.

Recovering from a Failed Upgrade

If your upgrade is unsuccessful, you will need to restore your environment from backup. Make sure that you include your backed up configuration and script files. Restore the backup of the Oracle home (on all of the nodes), the entire domain directory (on all of the nodes) and component schemas. In addition, you will need to restore any UI customizations and the applications directory, in addition to domain directory.

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