# Oracle® Fusion Middleware

Planning an Upgrade of Oracle Fusion Middleware

12c (12.1.3)

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Provides an overview of the upgrade planning process, as well as upgrade concepts and common Fusion Middleware upgrade tasks.

ORACLE

Oracle Fusion Middleware Planning an Upgrade of Oracle Fusion Middleware, 12c (12.1.3)

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# Preface

This preface contains the following sections:


- Audience
- Documentation Accessibility
- Related Documents
- Conventions


## Audience

This manual is intended for Oracle Fusion Middleware system administrators who are responsible for installing and upgrading Oracle Fusion Middleware. It is assumed that the readers of this manual have knowledge of the following:

- Oracle Fusion Middleware 11*g* system administration and configuration information for the existing deployment
- Oracle Fusion Middleware 12c system administration knowledge.
- The configuration and expected behavior of the system or systems being upgraded

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## Related Documents

For more information, see the following related documentation available in the Oracle Fusion Middleware Release 12c (12.1.3) documentation library:

- *Oracle Fusion Middleware Understanding Oracle Fusion Middleware*
- *Oracle Fusion Middleware Upgrading with the Upgrade Assistant*

- *Upgrading Oracle WebLogic Server*
- *Upgrading Oracle Data Integrator*
- *Oracle Fusion Middleware Upgrading to the Oracle Fusion Middleware Infrastructure*
- *Oracle Fusion Middleware Upgrading Oracle SOA Suite*
- *Oracle Fusion Middleware Upgrade Guide for Oracle Enterprise Repository*

# 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 to Oracle Fusion Middleware 12c for 11g Users

This chapter provides information about Oracle Fusion Middleware 12*c* concepts and terminology for existing Oracle Fusion Middleware 11*g* users.

The following topics are described in this chapter:

- Section 1.1, "Understanding the 12c Terminology Changes"
- Section 1.2, "Using the 12c Documentation Library"
- Section 1.3, "Understanding the Standard Upgrade Topology for 12c"
- Section 1.4, "Understanding and Obtaining Product Distributions for Your Upgrade"
- Section 1.5, "Understanding the 12c Upgrade Process"
- Section 1.6, "Understanding and Obtaining the Upgrade and Configuration Tools"

> **See Also:** *Oracle Fusion Middleware Understanding Oracle Fusion Middleware*
>
> *Oracle Fusion Middleware Planning an Installation of Oracle Fusion Middleware*

## 1.1 Understanding the 12c Terminology Changes

Oracle Fusion Middleware 11g users will need to understand the changes to existing 11*g* terms, as well as new terms and concepts introduced in 12*c*.

- Common Fusion Middleware Terminology Changes
- Upgrade and Patching Terminology Changes

### 1.1.1 Common Fusion Middleware Terminology Changes

Several key concepts and terms have been redefined in 12*c*. It is important that you understand the new terminology before you begin your upgrade. In addition, many terms have been deprecated.

See "New and Deprecated Terminology for 12c" in *Oracle Fusion Middleware Understanding Oracle Fusion Middleware*.

### 1.1.2 Upgrade and Patching Terminology Changes

The upgrade and patching definitions used in Fusion Middleware 11*g* Release 1 have been redefined in Release 12*c*. Review the changes to the terms below to ensure you understand which path you should take to update your existing environment:

- A **major release** is comprised of new, innovative, standard-compliant features. A major release may introduce new certifications and language support, as well as a newer Database Required Support Files, JDBC driver, and JDK dependency. For example, upgrading from 11g to 12c is a major release, while 12.1.2 to 12.1.3 is a minor release.
- In Release 12*c*, a **minor release** will consist of a smaller set of significant new features in addition to bug fixes to existing functionality. After upgrading to a minor release, all existing product configurations will be supported and new configuration options may become available.
- In Release 12*c*, an **upgrade** is performed to acquire new features, enhancements, and bug fixes for a supported Fusion Middleware 11*g* deployment. The following examples show supported upgrade paths:
  - Moving from 11.1.1.6.0 or 11.1.1.7.0 to 12.1.3.0.0
  - Moving from 12.1.2.0.0 to 12.1.3.0.0
- In Release 12*c*, a Fusion Middleware **patch set** is released to address bugs. Patch set releases do not contain new features. Patch sets will replace or add a new set of binaries to an existing installation.

  *Patching with OPatch* describes the new patching terminology for Release 12*c* (12.1.3).

## 1.2 Using the 12c Documentation Library

The Oracle Fusion Middleware 12c (12.1.3) Library has been redesigned for 12*c*. Upgrade documentation is now organized by tasks and the task-specific pages provide direct links to common upgrade procedures and related documentation. This guide will reference documents in the following library pages for additional information:

- Fusion Middleware 12c (12.1.3) Installation Documentation
- Fusion Middleware 12c (12.1.3) Upgrade Documentation
- Fusion Middleware 12c (12.1.3) Administration Documentation
- Fusion Middleware 12c (12.1.3) Release Notes

## 1.3 Understanding the Standard Upgrade Topology for 12c

Each Fusion Middleware Release 12*c* (12.1.3) upgrade guide will feature a **standard upgrade topology.** Standard upgrade topologies are based on the **standard installation topology** described in the component-specific installation guides. The standard installation topology is provided as an example and is not the only topology supported for the product. Each install guide provides specific instructions for achieving the standard topology; if your needs differ, then links to supporting documentation are provided for your reference.

The component-specific upgrade guides will provide specific instructions for configuring an upgrade topology; if you choose to customize your selections during installation or configuration, references to supporting documentation will be provided to help you accomplish your tasks.

More information about standard topologies can be found in "Using the Standard Installation Topology as a Starting Point" in *Oracle Fusion Middleware Planning an Installation of Oracle Fusion Middleware*.

## 1.4 Understanding and Obtaining Product Distributions for Your Upgrade

Oracle Fusion Middleware 12*c* software is available as a series of product distributions. A **distribution** is an archive with an installer that installs a pre-defined set of Oracle Fusion Middleware products and feature sets. **Feature sets** include the products and services that are automatically installed when their corresponding product is selected.

For more information on distributions and feature sets, see "Understanding Distributions, Products, and Features" in the *Oracle Fusion Middleware Planning an Installation of Oracle Fusion Middleware*.

Product distributions can be obtained from either the Oracle Software Delivery Cloud or from Oracle Technology Network. For more information on which site you should visit to obtain your distribution, see the *Oracle Fusion Middleware Download, Installation, and Configuration Readme Files* page.

## 1.5 Understanding the 12c Upgrade Process

The tasks you will perform and the tools you will use to execute an upgrade to 12*c* (12.1.3) are different from the procedures and tools you used in 11*g*.

Figure 1–1 shows the high-level upgrade procedures and the tools that are used to upgrade to the 12c (12.1.3) Fusion Middleware Infrastructure. The tasks you perform to complete your component-specific upgrade may vary from this example.

Table 1–1 provides an overview of each of the upgrade steps and links to additional information.

---

**Note:** The following process flow is meant to show how the new procedures and tools work together to complete the 12.1.3 upgrade.

Your component-specific upgrade documentation will provide detailed information about the specific tasks that will be required to upgrade the component.

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***Figure 1–1 High-Level Upgrade Process Overview***

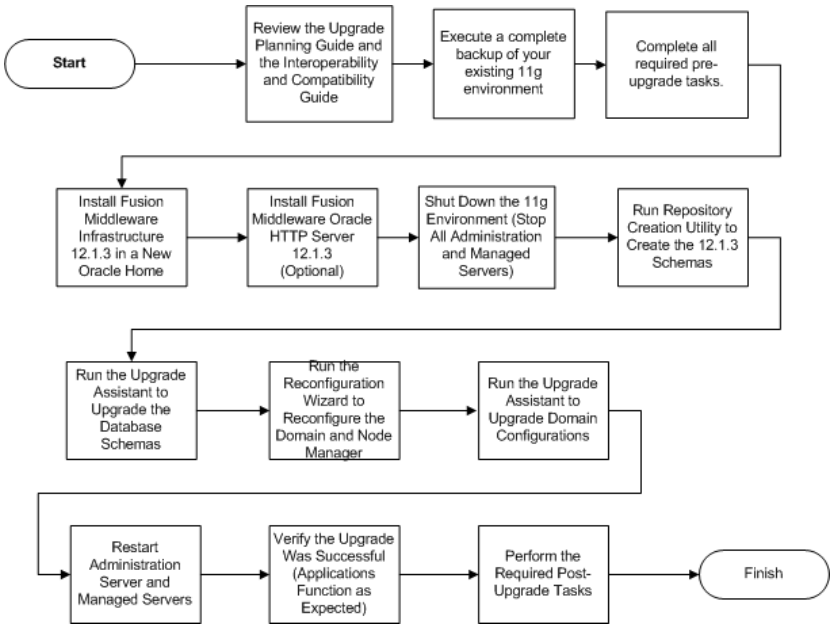



***Table 1–1 Understanding the Basic Upgrade Process and Upgrade Tools***

| Step | Task | Tool Used | Documentation |
|---|---|---|---|
| 1 | Review new concepts, starting points and upgrade topologies used in 12c (12.1.3). | None. | For more information, see Chapter 2, "Developing an Upgrade Strategy" |
| 2 | Prepare your database for an upgrade. For example, purge any unused or unwanted data from your existing environment and increase the size of your schemas. | Varies. | For more information on preparing your database for upgrade, see Chapter 4, "Upgrading and Preparing Your Oracle Databases for 12c (12.1.3)" |
| 3 | Develop and execute a complete backup and recovery strategy. | Varies. | For more information, see Chapter 3, "Backup and Recovery Strategies for Upgrade" |
| 4 | Install the 12.1.3 product distributions in a new Oracle home. | Oracle Universal Installer (OUI) | For information on installing 12.1.3, see your see your component-specific installation documentation.<br>For information on using the Oracle Universal Installer, see *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer* |

***Table 1–1 (Cont.) Understanding the Basic Upgrade Process and Upgrade Tools***

| Step | Task | Tool Used | Documentation |
|---|---|---|---|
| 5 | Create new schemas for your Fusion Middleware components. | Repository Creation Utility (RCU) | For information on which schemas are required for your upgrade, see your component-specific upgrade documentation.<br><br>For information on using the Oracle Repository Creation Utility, see *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility* |
| 6 | Upgrade the 11*g* or 12.1.2 database schemas for the components you will be upgrading. | Upgrade Assistant (UA) | For more information on using UA to upgrade your database schemas, see your component-specific upgrade documentation.<br><br>For general information about using UA to upgrade database schemas, see *Oracle Fusion Middleware Upgrading with the Upgrade Assistant* |
| 7 | Reconfigure the domain. | Reconfiguration Wizard | For more information on using the Reconfiguration Wizard to reconfigure your domain, see your component-specific upgrade documentation. |
| 8 | Upgrade component configurations. | Upgrade Assistant (UA) | For more information on using UA to upgrade your domain component configurations, see your component-specific upgrade documentation.<br><br>For general information on using UA to upgrade component configurations, see *Oracle Fusion Middleware Upgrading with the Upgrade Assistant* |
| 9 | Perform all required post-upgrade tasks. | Varies. | For more information on the post-upgrade tasks that are required for your component, see your component-specific upgrade documentation. |
| 10 | Verify that the upgrade was successful. At a minimum, verify that your servers and node manager start and your applications should function as expected. | Varies. | For more information on the verification procedures you should execute for your upgraded environment, see your component-specific upgrade documentation. |

**Note:** As of Fusion Middleware 12c (12.1.3), you do not need to start the Administration Server during the upgrade process. The entire upgrade operation is performed offline.

## 1.6 Understanding and Obtaining the Upgrade and Configuration Tools

Oracle Fusion Middleware Release 12*c* (12.1.3) provides a suite of installation, upgrade and configuration tools that automate many upgrade-related tasks.

These tools are installed as part of the product distribution. See Table 1–2 for information about the tools used during an upgrade. In addition, links to the documentation for each tool is provided.

***Table 1–2 Installation, Upgrade and Configuration Tools***

| Tool Name | Description | Related Documentation |
|---|---|---|
| Oracle Universal Installer (OUI) | During the upgrade process, you will use the Universal Installer to install the 12*c* product distributions and feature sets.<br><br>NOTE: Each major component has its own installation guide. These guides provide specific details about using the Universal Installer with the component. | *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer*<br><br>Release 12c (12.1.3) Library: Installation Guides |
| Oracle Upgrade Assistant (UA) | As of Release 12c (12.1.2), the Upgrade Assistant has been completely redesigned. Now you can use the Upgrade Assistant to update your supported 11*g* and 12c schemas and WebLogic domain component configurations.<br><br>The Patch Set Assistant is no longer used to upgrade schemas and is not included in Fusion Middleware 12c.<br><br>NOTE: Each major component has its own upgrade guide. These guides provide specific details about using Upgrade Assistant with the component. | *Oracle Fusion Middleware Upgrading with the Upgrade Assistant*<br><br>Release 12c (12.1.3) Library: Upgrade Guides |
| Repository Creation Utility (RCU) | The Repository Creation Utility (RCU) is the tool used to create schemas in your database. Depending on what you are upgrading, you may need to create schemas before you can run the Upgrade Assistant. The Repository Creation Utility is included in each 12c distribution, unlike Fusion Middleware 11g, which required a separate download and installation of RCU.<br><br>NOTE: There are new 12c schemas that must be created for all components before an upgrade. Consult your component-specific upgrade documentation for more information. | *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility* |

***Table 1–2 (Cont.) Installation, Upgrade and Configuration Tools***

| Tool Name | Description | Related Documentation |
|---|---|---|
| Oracle Configuration Wizard | Before you can develop and run an application on a WebLogic domain, you must first create the WebLogic domain. The Configuration Wizard simplifies the process of creating and extending a domain.<br><br>**NOTE**: If you are upgrading a standalone system component, such as Oracle HTTP Server (OHS), do not use the Configuration Wizard to configure your domain. The Upgrade Assistant will be used to create and configure the standalone domain. | "Overview of the Configuration Wizard" in *Creating Domains Using the Configuration Wizard*. |
| Oracle Reconfiguration Wizard (New in 12c) | If you are upgrading you a domain that is using Oracle WebLogic Server, then you will need to run the Reconfiguration Wizard to reconfigure the domain.<br><br>When you use the Reconfiguration Wizard to reconfigure a domain, the WLS core infrastructure and domain version are automatically updated.<br><br>**NOTE**: This tool is new to Fusion Middleware as of Release 12*c* (12.1.2). | See your component-specific upgrade documentation for more information.<br><br>Fusion Middleware 12c (12.1.3) Upgrade Documentation |
| OPatch | OPatch is used to apply patches in Release 12c (12.1.3.). The patching nomenclature has changed in 12.1.2. Be sure to review the new patch definitions.<br><br>**NOTE**: There are no patch set installers in 12*c*. The Oracle Universal Installer is used to install all major and minor releases. | *Patching with OPatch* |

# 2

# Developing an Upgrade Strategy

This chapter provides important information about preparing for an upgrade to the latest version of Oracle Fusion Middleware.

The procedures you will need to follow will vary depending on the configuration of your existing system, the components you are upgrading, and the environment you want to create at the end of the upgrade and configuration process.

This chapter contains the following sections:


- Section 2.1, "Planning an Upgrade"
- Section 2.2, "Upgrading a Cloned Environment Before Upgrading a Production Environment (Recommended)"
- Section 2.3, "Developing a Backup Strategy for Upgrade"
- Section 2.4, "Understanding In-Place versus Out-of-Place Upgrades"
- Section 2.5, "Understanding the Basic Rules and Restrictions of Upgrade"
- Section 2.6, "Planning for System Downtime During an Upgrade"
- Section 2.7, "Upgrading from a 32-Bit to a 64-Bit Operating System"
- Section 2.8, "Understanding the New Features and Changes in 12c"
- Section 2.9, "Obtaining Product Distributions"
- Section 2.10, "Understanding the Supported Upgrade Starting Points"
- Section 2.11, "Creating Schemas Before You Upgrade"
- Section 2.12, "Creating an Edition on the Server for Edition-Based Redefinition (Optional)"
- Section 2.13, "Upgrading Security to 12.1.3"
- Section 2.14, "Understanding Your Certification, Compatibility, and Interoperability Requirements"
- Section 2.15, "Understanding Domain Upgrade Restrictions"
- Section 2.16, "Using the Standard Installation and Upgrade Tools"
- Section 2.17, "Locating Your Component-Specific Upgrade Documentation"


## 2.1 Planning an Upgrade

Before you begin an upgrade, you should develop an upgrade plan. Table 2–1 describes some basic Fusion Middleware upgrade planning procedures and upgrade requirements you should carefully consider before you begin an upgrade. The table

also provides information on where to go to get more information on each step in the process.

**Note:** The order in which you execute your pre-upgrade tasks may vary depending on your current environment. Use the list below as a checklist for the most important pre-upgrade considerations to review.

***Table 2–1 Upgrade Planning Roadmap***

| Task | Description | Documenation |
|---|---|---|
| Understand the differences between Oracle Fusion Middleware 11*g* and Release 12c (12.1.3) | Oracle Fusion Middleware 11*g* users should understand the conceptual differences between 11*g* and Release 12*c* (12.1.3) before starting the upgrade process. | Introduction to Oracle Fusion Middleware 12c for 11g Users |
| Understand which of your 11g products and features can be upgraded to 12.1.3 | You should understand which of your 11*g* components can be upgraded to 12.1.3.<br>NOTE: If you plan to use 11*g* components with upgraded 12.1.3 components, you should understand how the upgrade could impact interoperability or compatibility. | "Products and Features Available in Oracle Fusion Middleware 12c"<br>"Products and Features Not Available in Oracle Fusion Middleware 12"<br>in the *Understanding Interoperability and Compatibility* guide. |
| Verify that your database is supported. | The 12c domain requires a database to store the new schemas. The database that hosts the schemas used in Fusion Middleware must be supported. | Upgrading and Preparing Your Oracle Databases for 12c (12.1.3) |
| Update or replace your 32-Bit operating systems to 64-Bit, if necessary. | If it is determined that your new Release 12*c* (12.1.3) components require a 64-Bit operating system, you should migrate to the new machines before the upgrade. | Upgrading from a 32-Bit to a 64-Bit Operating System |
| Verify that you are running a supported version of Oracle Fusion Middleware 11*g*. | Your existing Oracle Fusion Middleware deployment must meet certain requirements before upgrading to Oracle Fusion Middleware 12c (12.1.3). | Understanding the Supported Upgrade Starting Points |
| Verify that your operating system, existing hardware, and all supporting software has been certified to work with the components you are upgrading. | The system hardware and software that will be used to support your Fusion Middleware 12c (12.1.3) deployment must meet the Fusion Middleware certification requirements. | Verifying Certification and System Requirements |
| Develop a backup and recovery strategy. | Before you begin an upgrade, be sure you have complete copies of your system-critical files; including the database that will host your schemas. | Developing a Backup Strategy for Upgrade |
| Understand the basic rules and any restrictions for your upgrade. | To prevent any potential problems with your upgrade, you should understand some basic rules and restrictions. | Understanding the Basic Rules and Restrictions of Upgrade |
| Consider the impact on deployed 11*g* applications and components. | If you will be using Fusion Middleware 11*g* components in your upgraded 12*c* (12.1.3) environment, you should review and understand any potential interoperability and compatibility issues. | Understanding Interoperability and Compatibility with Previous Versions |

*Table 2–1 (Cont.) Upgrade Planning Roadmap*

| Task | Description | Documenation |
|---|---|---|
| Plan for system downtime during the upgrade process. | The upgrade process involves an "in place" upgrade for most Fusion Middleware components. You will need to prepare for the system to be down during this time. To test backup and recovery in case of a failure and to plan the downtime for the upgrade, test the upgrade process and test the restore functionality. This also help to plan for the scenario if something goes wrong during upgrade and the 11g system needs to be restored. | Planning for System Downtime During an Upgrade |
| Get the product distributions for your upgrade. | You must acquire and install the Release 12c (12.1.3) software before you can begin the upgrade process. You will need to download the appropriate product distributions for your upgrade. | Obtaining Product Distributions |
| Understand how to use the standard installation, configuration and upgrade tools. | Oracle provides a standard suite of tools that can be used to automate many of the installation, upgrade and configuration processes. | Using the Standard Installation and Upgrade Tools |
| Next Steps: After general planning, you will need to obtain the component-specific upgrade documentation for the components you are upgrading. | Each component you upgrade has a set of specific upgrade tasks that must be performed. Some of these tasks are performed after the upgrade. Review the upgrade documentation for your component(s) to ensure you have a successful upgrade. | Locating Your Component-Specific Upgrade Documentation |

## 2.2 Upgrading a Cloned Environment Before Upgrading a Production Environment (Recommended)

Oracle strongly recommends that you create a copy of your actual production environment, upgrade the cloned environment, verify that the upgraded components work as expected, and then (and only then) upgrade your production environment.

For more information on creating a test environment to use to roll out an upgrade, see "Moving from a Test to a Production Environment" in *Oracle Fusion Middleware Administering Oracle Fusion Middleware*.

Performing pre-upgrade testing on a cloned environment provides important data that can be applied to your overall production upgrade plan. Some additional benefits include:

- Uncover and correct any upgrade issues.
- Practice completing an end-to-end upgrade.
- Understand the upgrade performance and how purge scripts can help.
- Understand the time required to upgrade Metadata and Open Instances with the Upgrade Assistant (SOA Upgrades).
- Understand the database resource usage (such as temporary tablespace; PGA, etc).

A complete list of backup considerations and procedures is described in Creating a Backup Strategy. Make sure that you have reviewed this information and executed a complete backup before starting the upgrade.

## 2.3 Developing a Backup Strategy for Upgrade

Before you install any new Release 12*c* (12.1.3) distributions and begin upgrading your Oracle Fusion Middleware 11*g* deployment to Release 12c (12.1.3), be sure you have backed up all system-critical files. Oracle strongly recommends that you execute a complete back-up of your existing deployment; including the database that hosts your Oracle Fusion Middleware schemas.

Refer to Chapter 3, "Backup and Recovery Strategies for Upgrade" for specific information on making sure all the various components of your environment can be restored in the event of a failed upgrade.

## 2.4 Understanding In-Place versus Out-of-Place Upgrades

When upgrading your 11g environment to 12c (12.1.3), you should understand how your pre-upgrade environment will be affected by the upgrade. For example, schemas and domain directory upgrades are performed "in place" which updates the existing 11*g* files during the upgrade. The 12c (12.1.3) Oracle Home binaries are upgraded "out of place" as the binaries are installed in a new directory.

The upgrade to 12c (12.1.3) includes the midtier and the schemas. You cannot perform a midtier-only or schema-only upgrade.

The list below describes how the upgrade is performed on each component:

- Oracle Home Binaries - Upgraded Out of Place

  You will install the Oracle Infrastructure 12c (12.1.3) (which includes WebLogic Server and JRF) and other 12c (12.1.3) distribution binaries in a new Oracle home. The upgrade of binaries is considered "out of place" as the 11g binaries are not overwritten.

- Schemas - Upgraded In Place

  The 11g schemas are upgraded to 12c "in place" which means that the Upgrade Assistant updates and overwrites the schemas during the upgrade process. The servers must be down during this process.

- Instances - Migrated during the schema upgrade (For SOA Upgrades Only)

  The upgrade of active and closed instances from 11g to 12c happens automatically as part of the schema upgrade. You can manage the upgrade using administration scripts.

- Domain Directory Reconfiguration - Upgraded In Place

  The existing domain is upgraded "in place". During the upgrade you will identify the location of the 11g domain and the 11g domain will be reconfigured to point to the new 12c (12.1.3) home directory.

- Domain Component Configuration - Upgraded In Place

  After the reconfiguration of the 11g domain, the Upgrade Assistant is used again to upgrade any remaining domain component configurations that require an upgrade in the new 12c (12.1.3) home directory.

---

**Note:** Oracle recommends that you perform your domain upgrades in place. However, if an out-of-place domain upgrade is required, see "Performing an Out-of-Place Domain Directory Upgrade". Schemas are still upgraded in place.

---

## 2.5 Understanding the Basic Rules and Restrictions of Upgrade

Before you start the upgrade process you should understand some basic rules and restrictions. It is important that you understand which of your integrated components can be upgraded to this version of Fusion Middleware.

Oracle strongly recommends that you practice the upgrade on a cloned production environment before you attempt to upgrade the production environment.

Additional upgrade considerations are documented in the *Understanding Interoperability and Compatibility Guide*.

## 2.6 Planning for System Downtime During an Upgrade

Before you can develop a successful upgrade strategy for your Fusion Middleware deployment, you should understand how your production environments will be impacted during the upgrade. Some upgrade procedures can be time consuming, especially if you are upgrading a large number of artifacts. The size of your database and the speed of your system's infrastructure may also impact the overall downtime during an upgrade.

Carefully consider the following when planning your downtime:

- The Upgrade Assistant requires that you shut down all servers and components in the domain for the entire duration of the upgrade.
- Before upgrading, you need to re-associate 11g domain to OPSS DB based policy store if the 11g domain is not associating to OPSS DB based policy store. This operation restarts the 11g domain.
- After upgrading the component schemas, the Reconfiguration Wizard is used to reconfigure the domain. After the domain is reconfigured, the Upgrade Assistant requires all servers and components to remain shut down during any configuration upgrades. As of 12.1.3, servers and components are down during the entire upgrade process.
- If you encounter an upgrade failure, then you must restart the upgrade process from the beginning. This includes recovering and redeploying from your backup files. This should be a consideration in your downtime planning.

## 2.7 Upgrading from a 32-Bit to a 64-Bit Operating System

If it is determined that your new Release 12*c* (12.1.3) components require a 64-Bit operating system, you must migrate your 32-bit environment to a 64-bit software environment before you upgrade. After you have migrated to a 64 bit environment, validate that the 11g Servers are up and the applications are accessible.

Make sure to validate the migration to ensure all your Oracle Fusion Middleware 11*g* software is working properly on the 64-bit machine, and only then perform the upgrade to Oracle Fusion Middleware 12*c*.

---

**Note:** These steps assume that your database is located on a separate host and will not be moved.

---

Upgrading an operating system typically involves the following:

- Task 1, "Procure the hardware that will support your upgrade's 64-bit software requirement."

- Task 2, "Stop all processes, including the Administration Server, Managed Servers, and Node Manager."
- Task 3, "Back up all files from the 32-bit host machine."
- Task 4, "Set up the target 64-bit machine with the 11g host name and IP address."
- Task 5, "Restore the 11g domain backup from 32bit Host to 64bit Host."
- Task 6, "Install the 12c (12.1.3) product distribution(s) on the target machine."
- Task 7, "Upgrade the target 64-bit environment using the standard upgrade procedure."

---

**Note:** The following steps are provided as an example of the operating system upgrade process and may or may not include all of the procedures you will be required to perform to update your specific operating system. Consult your operating system's upgrade documentation for more information.

In the tasks below, **host** refers to the 32-bit source machine and **target** refers to the new 64-bit target machine.

---

### Task 1 Procure the hardware that will support your upgrade's 64-bit software requirement.

Make sure that you have supported target hardware in place before you begin the upgrade process.

### Task 2 Stop all processes, including the Administration Server, Managed Servers, and Node Manager.

You must stop all processes, including the Administration Server, Managed Servers, and Node Manager, if they are started on the host. For example, to stop the Administration Server:

```
DOMAIN_HOME/bin/stopWebLogic.sh username password [admin_url]
```

### Task 3 Back up all files from the 32-bit host machine.

Make sure that you have created a complete backup of your entire 11*g* deployment before you begin the upgrade process. These files can be used if there is an issue during the migration and you have to restart the process.

Note that if the upgrade from 32-bit to 64-bit takes place on the same machine, there is a risk of corrupting the source environment if the upgrade fails.

For more information on backing up your 11g files, see "Backing Up Your Environment" in the *Oracle® Fusion Middleware Administrator's Guide*.

During the upgrade you must have access to the contents of the following:

- 11*g* Domain Home
- 11*g* `/nodemanager` directory located in `MW_HOME/wlserver_10.3/common/`

---

**Note:** Some of the backup and recovery procedures described in "Backing Up Your Environment" in *Oracle® Fusion Middleware Administrator's Guide* are product-specific. Do not proceed with the upgrade until you have a complete backup.

---

**Task 4 Set up the target 64-bit machine with the 11g host name and IP address.**

The host name and IP address of the target machine must be made identical to the host. This will require you to change the IP address and name of the source machine or decommission the source machine to avoid conflicts in the network.

The process of changing an IP address and host name vary by operating system. Consult your operating system's administration documentation for more information.

**Task 5 Restore the 11g domain backup from 32bit Host to 64bit Host.**

Restore the files you backed up in Task 3 using the same directory structure that was used in 11*g*. The directory structure on the target machine must be identical to the structure of the host machine.

For detailed information about restoring your 11g files to the 64-bit target machine, see "Recovering Your Environment" in *Oracle® Fusion Middleware Administrator's Guide*.

**Task 6 Install the 12c (12.1.3) product distribution(s) on the target machine.**

For detailed instructions, see *Oracle Fusion Middleware Planning an Installation of Oracle Fusion Middleware* and the component-specific installation guides for the component(s) you are installing.

**Task 7 Upgrade the target 64-bit environment using the standard upgrade procedure.**

Refer to your component-specific upgrade guides for details on upgrading the component and performing any post-upgrade tasks. For more information, see Locating Your Component-Specific Upgrade Documentation.

---

**Tip:** The Node Manager upgrade procedure requires access to the original Node Manager files. Use the 11*g* Node Manger files that were backed up from the source machine as part of Task 3.

---

## 2.8 Understanding the New Features and Changes in 12c

Before you begin planning your upgrade to Oracle Fusion Middleware Release 12*c* (12.1.3), you should be familiar with the terminology and conceptual differences between 11*g* and Oracle Fusion Middleware 12*c*.

Refer to Chapter 1, "Introduction to Oracle Fusion Middleware 12c for 11g Users" for a list of resources that 11*g* users can use to understand the changes.

## 2.9 Obtaining Product Distributions

Product distributions can be obtained from either the Oracle Software Delivery Cloud or from Oracle Technology Network. For more information on which site you should visit to obtain your distribution, see the *Oracle Fusion Middleware Download, Installation, and Configuration Readme Files* page.

---

**Note:** You will need a certified JDK on your system in order to be able to run the installer. To find a certified JDK, see the certification document for your release on the *Oracle Fusion Middleware Supported System Configurations* page.

---

Once you have downloaded the appropriate product distributions for your upgrade, use the Oracle Fusion Middleware Release 12c (12.1.3) component-specific installation guides to complete the installation. See the Oracle Fusion Middleware Release 12c (12.1.3) documentation library for a list of available guides.

## 2.10 Understanding the Supported Upgrade Starting Points

Refer to the following sections for more information about which Oracle Fusion Middleware 11*g* versions are supported when upgrading to Oracle Fusion Middleware Release 12c (12.1.3):

- What is an Upgrade Starting Point?
- Supported Upgrade Starting Points for Oracle Fusion Middleware 12c (12.1.3)
- Obtaining Product Distributions
- What If I'm Not Running Supported Fusion Middleware Components?

### 2.10.1 What is an Upgrade Starting Point?

An upgrade starting point is a specific version of Oracle Fusion Middleware that you must be running in order to upgrade to Oracle Fusion Middleware 12*c*. If you are not running a version of Oracle Fusion Middleware that is a supported upgrade starting point, then you must first upgrade to a supported starting point using documentation from a previous release.

### 2.10.2 Supported Upgrade Starting Points for Oracle Fusion Middleware 12c (12.1.3)

The following sections provide information about the supported starting points for upgrading to Oracle Fusion Middleware Release 12c (12.1.3):

- Supported Oracle Fusion Middleware Releases
- Supported Oracle WebLogic Releases
- Supported Oracle HTTP Server Releases
- Supported Database Versions

#### 2.10.2.1 Supported Oracle Fusion Middleware Releases

You can upgrade to Oracle Fusion Middleware Release 12*c* (12.1.3) from the following previous versions of Oracle Fusion Middleware:

- Oracle Fusion Middleware 12c Release 1 (12.1.2)
- Oracle Fusion Middleware 11g Release 1 (11.1.1.7.0)
- Oracle Fusion Middleware 11g Release 1 (11.1.1.6.0)

If you are not running a supported version of Oracle Fusion Middleware 11*g*, see Section 2.10.3.

#### 2.10.2.2 Supported Oracle WebLogic Releases

When planning a WebLogic Server version upgrade, you should review the Fusion Middleware Supported Systems Configurations page on Oracle Technology Network (OTN) to ensure that your upgraded environment is supported by Oracle.

For more information, see the following:

- "WebLogic Server 12.1.3 Compatibility with Previous Releases"

- "Roadmap for Upgrading Your Application Environment"

#### 2.10.2.3 Supported Oracle HTTP Server Releases

You can upgrade your Oracle HTTP Server 11g Release 1 (11.1.1.6 or 11.1.1.7) or 12c Release 1 (12.1.2) to Release 12c (12.1.3) as part of the Oracle HTTP Server product distribution. For more information about upgrading Oracle HTTP Server to Oracle Fusion Middleware Release 12c (12.1.3), refer to the following:

- "Oracle HTTP Server Interoperability" in the *Understanding Interoperability and Compatibility*
- For upgrading managed HTTP Servers see, *Oracle Fusion Middleware Upgrading to the Oracle Fusion Middleware Infrastructure*.
- For upgrading Standalone HTTP Servers see, *Upgrading a Standalone Oracle HTTP Server*.

#### 2.10.2.4 Supported Database Versions

For information about the latest database versions supported by Oracle Fusion Middleware Release 12*c* (12.1.3), see Chapter 4, "Upgrading and Preparing Your Oracle Databases for 12c (12.1.3)".

### 2.10.3 What If I'm Not Running Supported Fusion Middleware Components?

You must first upgrade any unsupported Fusion Middleware components within your environment to a supported upgrade starting point before you begin the Release 12*c* (12.1.3) upgrade process.

---

**Caution:** Do not attempt to use any unsupported Fusion Middleware 11*g* or 12.1.2 components in your upgraded environment.

To determine if your supported 11*g* or 12.1.2 component will have any compatibility issues in Release 12*c* (12.1.3), see Understanding Your Certification, Compatibility, and Interoperability Requirements.

---

Patching and upgrade documentation for previous releases is available on the Oracle Technology Network (OTN):

`http://www.oracle.com/technology/documentation/middleware.htm`

After you upgrade to a supported starting point, you can then use the Oracle Fusion Middleware Release 12c (12.1.3) upgrade documentation to perform the upgrade. For more information, see Locating Your Component-Specific Upgrade Documentation.

## 2.11 Creating Schemas Before You Upgrade

After installing your 12.1.3 components, you will need to create the new 12c required schemas in a supported database certified for use with this release of Oracle Fusion Middleware.

**If you are upgrading from a previous 12c release:** If you are upgrading from 12c (12.1.2) you do not need to create new schemas for 12c (12.1.3), rather you will upgrade your 12c (12.12) schemas to 12.1.3 using the Upgrade Assistant.

Always consult the component-specific upgrade guides for each component you are upgrading for detailed schema information.

For example, as of 12c Release 1 (12.1.2) there is a new schema that must be created before you can upgrade. The new **Service Table** schema (*prefix*_STB) stores basic schema configuration information that can be accessed and used by other Oracle Fusion Middleware components during domain creation. For more information, see "Understanding the Service Table Schema" in the *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility*.

In addition, the audit schema now includes two additional schemas which will also need to be created before running 12c. When upgrading audit services (_IAU), make sure that you select _IAU_APPEND and _IAU_VIEWER in addition to _IAU.

To determine which additional schemas need to be created for 12.1.3, compare the component schemas you have in your existing environment to the schemas required for your 12.1.3 upgrade. The component-specific upgrade guides will identify the schemas that are required for your components. If your 11*g* or 12c (12.1.2) environment is missing any of the required schemas, you must create them before you begin the upgrade.

## 2.12 Creating an Edition on the Server for Edition-Based Redefinition (Optional)

Edition-based redefinition enables you to upgrade the database component of an application while it is in use, thereby minimizing or eliminating down time.

To upgrade an application while it is in use, you copy the database objects that comprise the application and redefine the copied objects in isolation. Your changes do not affect users of the application—they continue to run the unchanged application. When you are sure that your changes are correct, you make the upgraded application available to all users.

Before upgrading an Edition-Based Redefinition (EBR) enabled schema you must connect to the database server and create an edition on the database server for 12*c* (12.1.3). The new edition for 12.1.3 must be a child of your 11.1.1.6, 11.1.1.7, or 12.1.3 edition.

To create an edition on the database server, log in as SYS (or another Oracle user that has DBA privileges) and use the following command:

```
SQL> create edition Oracle_FMW_12_1_3 as child of Oracle_FMW_11_1_1_7_0;
Edition created.
```

Note that in the code example above, 'Oracle_FMW_11_1_1_7_0' is used as an example of the edition name you specified in RCU 11.1.1.6 or 11.1.1.7 when the 11.1.1.6 or 11.1.1.7 schemas were created. Be sure to provide the actual name used when creating the edition.

During the upgrade procedure, you will be prompted to launch the Reconfiguration Wizard to reconfigure your existing domain. Before running the Reconfiguration

Wizard, you must specify the database default edition. Use the following SQL to manually setup the default edition name for the database, for example:

```
ALTER DATABASE DEFAULT EDITION = edition_name;
```

For more information on enabling editions-based redefinitions, see "Edition-Based Redefinition" in the *Oracle Database Advanced Application Developer's Guide*.

---

**Note:** Before upgrading an EBR-enabled schema from Fusion Middleware 11g Release 1 (11.1.1.6 or 11.1.1.7) or 12c (12.1.2), you must first connect to the database server and create an edition on the database server for 12c (12.1.3). The new edition for 12.1.3 must be a child of your 11.1.1.6, 11.1.1.7, or 12.1.2 edition.

For more information on creating an edition on the server for edition-based redefinition, see "Creating an Edition on the Server for Edition-Based Redefinition" in *Oracle Fusion Middleware Planning an Upgrade of Oracle Fusion Middleware*.

---

## 2.13 Upgrading Security to 12.1.3

Before upgrading the OPSS security store, back it up so that it can be recovered in case the upgrade fails. For details about backing up the security store, see Backing Up and Recovering the OPSS Security Store.

The upgrade procedure varies depending on the type of security store you start from. The security store to be upgraded can be file-, OID-, or DB-based. Note the procedures vary according to the type of source audit data store (file- or DB-based).

- Upgrading a DB-Based Security Store
- Upgrading an OID-Based Security Store
- Upgrading a Shared Security Store
- Upgrading a File-Based Security Store

### 2.13.1 Using Database-based Policy Stores

Your policy stores must be database-based and not file based. If you are using a file-based policy store, you must reassociate the store to a database-based store prior to upgrade. If you are already using database-based policy store, then you do not have to perform these tasks.

Refer to the following tasks for more information:

- Task 1, "Creating 11g OPSS and IAU Schemas"
- Task 2, "Reassociating the 11g Policy Store with the Database-Based Policy Store and OPSS Schema"
- Task 3, "Validate that the Policy Store is Now Database-Based Reassociation Worked"

#### Task 1 Creating 11*g* OPSS and IAU Schemas

Create new 11*g* Oracle Platform Security Services (OPSS) in a supported Database using the 11*g* Repository Creation Utility. Once you have successfully reassociated OPSS to DB based store using OPSS during upgrade, you can create 12.1.3 IAU schema using 12.1.3 RCU. Note that creating the IAU is optional

For more information about creating 11*g* schemas, see "Obtaining and Running Repository Creation Utility" in the *Oracle Fusion Middleware Repository Creation Utility User's Guide* for 11*g* Release 1 (11.1.1.7.0).

#### Task 2 Reassociating the 11*g* Policy Store with the Database-Based Policy Store and OPSS Schema

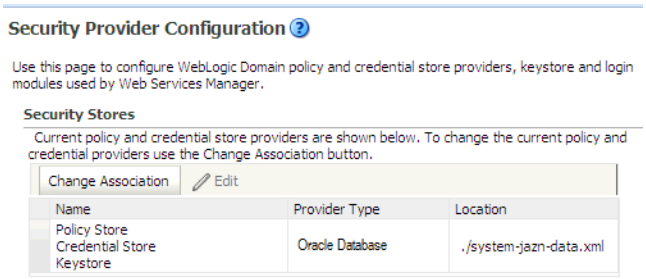
If you are using a file-based policy store in your 11*g* environment, then reassociate the file-based store with the database-based repository and OPSS schema.

For information about reassociating OPSS schema with Database-based repository, see "Reassociating the OPSS Security Store" in the *Oracle Fusion Middleware Application Security Guide* in the 11*g* Release 1 (11.1.1.7.0) documentation library.

#### Task 3 Validate that the Policy Store is Now Database-Based Reassociation Worked

To verify that the policy store reassociation worked, complete the following steps:

1. Log in to Enterprise Manager Fusion Middleware Control.
2. Navigate to **Domain** > **Security** > **Security Provider Configuration**
3. Click **Configure** under the "Audit Service" section of the screen to access the following screen:




4. The table should now display the entry "Oracle Database" in the "Provider Type" field. If the Provider Type displays "File", the reassociation was not successful.

## 2.14 Understanding Your Certification, Compatibility, and Interoperability Requirements

Before you begin upgrading your Oracle Fusion Middleware 11g environment, consider the following:

- For information on supported 32-bit and 64-bit operating systems, databases, web servers, LDAP servers, adapters, IPv6, JDKs, and third-party products, see Verifying Certification and System Requirements.
- For cross-product interoperability and compatibility, see Understanding Interoperability and Compatibility with Previous Versions.

### 2.14.1 Verifying Certification and System Requirements

The certification matrix and system requirements documents should be used in conjunction with each other to verify that your environment meets the necessary requirements for installation.

#### Task 1 Verify Your Environment Meets Certification Requirements

Make sure that you are installing your product on a supported hardware or software configuration. For more information, see Certification Matrix for 12c (12.1.3).

Oracle has tested and verified the performance of your product on all certified systems and environments; whenever new certifications occur, they are added to the proper certification document right away. New certifications can occur at any time, and for this reason the certification documents are kept outside of the documentation libraries and are available on Oracle Technology Network.

#### Task 2 Using the System Requirements Document to Verify Certification

The Oracle Fusion Middleware System Requirements and Specifications document should be used to verify that the requirements of the certification (described above) are met. For example, if the certification document indicates that your product is certified for installation on 64-Bit Oracle Linux 5, this document should be used to verify that your Oracle Linux 5 system has met the required minimum specifications, like disk space, available memory, specific platform packages and patches, and other operating system-specific items. This document is updated as needed and resides outside of the documentation libraries. The latest version is available on Oracle Technology Network.

For a complete description of the system requirements for installing and upgrading to Oracle Fusion Middleware 12*c*, see "Review System Requirements and Specifications" in the *Oracle Fusion Middleware Planning an Installation of Oracle Fusion Middleware*.

---

**Note:** When you install the Oracle Fusion Middleware Release 12c (12.1.3) software in preparation for upgrade, you should use the same user account that you used to install and configure the Oracle Fusion Middleware 11g software. On UNIX operating systems, this will ensure that the proper owner and group is applied to new Oracle Fusion Middleware 12*c* files and directories

---

### 2.14.2 Understanding Interoperability and Compatibility with Previous Versions

Read *Understanding Interoperability and Compatibility* before you begin your upgrade process. This document contains important information regarding the ability of Oracle Fusion Middleware products to function with previous versions of other Oracle Fusion Middleware, Oracle, or third-party products.

## 2.15 Understanding Domain Upgrade Restrictions

Some domains cannot be upgraded to 12c (12.1.3) because of known limitations and configuration changes from previous Fusion Middleware releases. Review the following to ensure your domains are not impacted by these restrictions. Domains that are impacted by these restrictions cannot be upgraded.

- Section 2.15.1, "Upgrading a Domain that was Created Using Test-to-Production Prior to Release 11g (11.1.1.6) (Not Supported)"
- Section 2.15.2, "Upgrading Multiple Components that use UMS in a Single Domain (Not Supported)"

### 2.15.1 Upgrading a Domain that was Created Using Test-to-Production Prior to Release 11g (11.1.1.6) (Not Supported)

If you created a domain using test-to-production scripts prior to Fusion Middleware Release 11g (11.1.1.6), then you will not be able to upgrade this domain to 12c (12.1.3). When you run the Upgrade Assistant to upgrade schemas in the domain, the Upgrade Assistant will run a check to see if the domain can be upgraded. Domains created prior to release 11.1.1.6 using the test-to-production procedure should not be upgraded.

If you have a domain that was created prior to 11.1.1.6.0 using test-to-production and you need to upgrade the domain to 12c (12.1.3), contact Oracle Support for information on how to perform this upgrade. Do NOT attempt to use the Upgrade Assistant to upgrade the schemas within this domain. They will have to be restored from backup as the upgrade will fail.

### 2.15.2 Upgrading Multiple Components that use UMS in a Single Domain (Not Supported)

Certain Fusion Middleware components such as SOA, OSB and BAM, for example, have a dependency on User Messaging Service (UMS) in 12c. If you configure more than one of these components within the same 12.1.3 domain, then each of these components must run within its own cluster — even if there is only one server that runs that component. However, a domain with an Admin Server and only one managed server is supported by UMS.

Consider the following scenarios:

- A cluster is not required if you are upgrading a BPM domain that includes only BPM or BPM and one managed server.
- If you have a domain that includes BPM and OSB or multiple servers in the same domain, then these managed servers must be defined in a cluster. Else, they are going to see issues in server start post upgrade, especially with messed up configuration files.

For more information on creating clusters, see "Clusters" in *Creating Domains Using the Configuration Wizard*.

## 2.16 Using the Standard Installation and Upgrade Tools

Depending on your upgrade starting point, and the components you plan to upgrade, you may need to install, upgrade or patch your existing software using the standard Oracle upgrade and installation tools. These tools are included with the product distributions described in Section 2.9.

> **Note:** Be sure to review Understanding and Obtaining the Upgrade and Configuration Tools as some functions of the 11*g* tools have been modified in 12*c* (12.1.3) and new tools have been added.

The following documents provide information on obtaining and using these tools:

- *Oracle Fusion Middleware Installing Software with the Oracle Universal Installer*
- *Oracle Fusion Middleware Upgrading with the Upgrade Assistant*
- *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility*
- *Reconfiguring an Oracle WebLogic Domain with the Reconfiguration Wizard*

- *Patching with OPatch*

## 2.17 Locating Your Component-Specific Upgrade Documentation

This guide, as well as the other upgrade guides available in the Oracle Fusion Middleware Release 12c (12.1.3) documentation library, provide instructions for upgrading from supported versions of Oracle Fusion Middleware 11*g* to the latest Oracle Fusion Middleware 12*c* release.

Once you have completed all of the necessary pre-upgrade steps for your upgrade, use Table 2–2 to determine which upgrade-specific documents you will need to complete your 12*c* upgrade.

***Table 2–2 Documentation for Completing Your Upgrade***

| Product Area | If you are upgrading... | Use this upgrade document... |
|---|---|---|
| Oracle WebLogic Server - Standalone | An Oracle WebLogic Server that is not being managed by or registered to an existing Fusion Middleware 11g domain. | *Upgrading Oracle WebLogic Server* |
| Custom Oracle Application Developer Framework Applications with Oracle WebLogic Server (referred to as Infrastructure in 12c) | A managed 11*g* WebLogic Server domain that has been deployed with a set of custom Oracle Application Developer Framework applications. | *Oracle Fusion Middleware Upgrading to the Oracle Fusion Middleware Infrastructure* |
| Oracle HTTP Server - Managed | An Oracle HTTP Server that is registered to a WebLogic domain for management functions. | *Oracle Fusion Middleware Upgrading to the Oracle Fusion Middleware Infrastructure* |
| Oracle HTTP Server - Standalone | An Oracle HTTP Server that is not managed by or registered to an Oracle WebLogic domain, and you are not upgrading any other 11*g* components. | *Upgrading a Standalone Oracle HTTP Server* |
| Oracle SOA Suite and BPM | SOA Suite components including: Business Process Management (BPM), Oracle Service Bus (OSB), AIAFP (now called SOA Core Extension), Business Activity Monitoring (BAM), and workflow instance data. | *Oracle Fusion Middleware Upgrading Oracle SOA Suite* |
| User Messaging Service | User Messaging Service | *Administering Oracle User Messaging Service* |
| Oracle MapViewer | MapViewer | *Oracle Fusion Middleware User's Guide for Oracle MapViewer* |
| Oracle GoldenGate Veridata | Veridata | *Upgrading Oracle GoldenGate Veridata* |
| Oracle Data Integrator | Data Integrator | *Upgrading Oracle Data Integrator* |
| Oracle GoldenGate Monitor | Monitor | *Upgrading to Oracle GoldenGate Monitor 12.1.3* |
| Enterprise Data Quality (EDQ) | Enterprise Data Quality on WebLogic or Tomcat servers | *Oracle Fusion Middleware Installing and Configuring Enterprise Data Quality* |

# 3

# Backup and Recovery Strategies for Upgrade

This chapter describes some of the backup and recovery strategies you should employ when planning an upgrade.

Before you start the upgrade process, you should have a clear understanding of the backup requirements. These requirements vary somewhat, depending on what is being upgraded.

The following sections provide more information:

- Creating a Backup Strategy
- Backup Strategies for Middleware Upgrades
- Backup Strategies for Database Upgrades
- Creating a Post-Upgrade Backup

> **Note:** If you are upgrading from 11g, you will use the Oracle Fusion Middleware 11g Release 1 (11.1.1) documentation library for backup and recovery procedures. The links in this chapter will direct you to the correct 11g versions of the required documentation.
>
> If you are upgrading from a previous 12c release, refer to your 12c component-specific upgrade documentation for more information.

## 3.1 Creating a Backup Strategy

The ultimate success of your upgrade depends heavily on the design and execution of an appropriate backup strategy.

To develop a backup strategy, consider the following questions:

- How long can the production database remain inoperable before business consequences become intolerable?
- What backup strategy is necessary to meet your availability requirements?
- Are backups archived in a safe, offsite location?
- How quickly can backups be restored (including backups in offsite storage)?
- Have recovery procedures been tested successfully?

Your backup strategy should answer all of these questions and include procedures for successfully backing up and recovering your Fusion Middleware environment, as well as your database.

## 3.2 Backup Strategies for Middleware Upgrades

When you upgrade a Fusion Middleware installation, you install the Oracle Fusion Middleware Release 12c (12.1.3) components into a new Oracle home directory, but the domain configurations are upgraded 'in place'. **Always create a backup copy of your entire pre-upgrade environment before you upgrade.** In addition, consider creating a backup of the new Release 12c (12.1.3) Oracle home before you begin an upgrade. This backup will allow you to restore to a pre-upgrade (that is, newly installed) state. Restoring from backups is an efficient alternative to reinstalling the entire instance, in the event that upgrade results are unsatisfactory.

A useful Release 12c (12.1.3) backup would include both the Oracle home and any additional artifacts created during or after the Release 12c (12.1.3) installation.

For more information on backing up and restoring your Oracle Fusion Middleware 11g environment, see the following sections of the *Oracle® Fusion Middleware Administrator's Guide*:

- Introducing Backup and Recovery

  This chapter provides an introduction to backing up and recovering Oracle Fusion Middleware, including backup and recovery recommendations for Oracle Fusion Middleware components.

- Backing Up Your Environment

  This chapter describes recommended backup strategies for Oracle Fusion Middleware and the procedures for backing up Oracle Fusion Middleware.

- Recovering Your Environment

  This chapter describes recommended recovery strategies and procedures for recovering Oracle Fusion Middleware from different types of failures and outages, such as media failures or loss of host.

### 3.2.1 Backing Up Your 11g Middleware Home and Domain Home and Oracle Instances

After stopping the servers and processes, back up your 11g Middleware Oracle home directory (including the Oracle product home directories inside the Oracle home), your local Domain home directory, your local Oracle instances, and also the Domain home and Oracle instances on any remote systems that use the Middleware Oracle home.

If your upgrade is unexpectedly interrupted, or if you choose to cancel out of the upgrade before it is complete, you may not be able to continue the upgrade process unless you restore your environment to the previous configuration.

For more information on backing up your environment, see "Backing Up Your Environment" in the *Oracle® Fusion Middleware Administrator's Guide*.

### 3.2.2 Recovering the 11g Middleware Home

To recover the 11g Middleware home, stop all servers and processes, restore your 11g Middleware Oracle home directory (including the Oracle product home directories inside the Oracle home), the domain home directory, Oracle instances, OraInventory and the domain home and Oracle instances on any remote systems that use the Middleware Oracle home.

For more information on restoring your environment, see "Recovering Your Environment" in the *Oracle® Fusion Middleware Administrator's Guide*.

## 3.3 Backup Strategies for Database Upgrades

In most cases, when you upgrade your schemas, you must first upgrade the database that hosts the repository to a database version supported by Oracle Fusion Middleware. This section describes some of the recommended backup procedures you should consider before you upgrade.

> **Note:** Always consult the *Oracle Database Backup and Recovery Advanced User's Guide* for comprehensive backup and recovery information.

The following sections provide some best practices when creating a backup plan for your database:

- Backing Up the Database Before Upgrading the Database Version
- Backing Up the Database Before Upgrading the Database Schemas

### 3.3.1 Backing Up the Database Before Upgrading the Database Version

As with any database upgrade, standard procedure dictates that you back up your database before you upgrade to a new database version.

Note that you should also consider backing up the database again, after you have successfully upgraded to a new database version. This way, your backup will reflect the newly upgraded state of the database.

For more information, see the Oracle Database documentation for your platform and database version.

### 3.3.2 Backing Up the Database Before Upgrading the Database Schemas

You should also back up your database before you begin the upgrade procedure. Make sure this back up includes the schema version registry table, as each Fusion Middleware schema has a row in this table. The name of the schema version registry table is `SYSTEM.SCHEMA_VERSION_REGISTRY$`. Refer to your database documentation for instructions on how to do this.

If you run the Upgrade Assistant to update an existing schema and it does not succeed, you must restore the original schema before you can try again. Make sure you back up your existing database schemas before you run the Upgrade Assistant.

> **Note:** Performing these backups prior to performing a schema upgrade is a prerequisite for running Upgrade Assistant. In the Upgrade Assistant prerequisites GUI screen, you will be required to acknowledge that backups have been performed, before proceeding with the actual upgrade.

## 3.4 Creating a Post-Upgrade Backup

After you have completed and verified the upgrade of your Oracle Fusion Middleware environment, consider backing up your Oracle Fusion Middleware Release 12*c* (12.1.3) installations so you can easily restore your environment to the newly upgraded state, if needed.

In particular, consider backing up the database that hosts your upgraded Oracle Fusion Middleware schemas immediately after the upgrade process. After this initial post-upgrade backup, you can begin your regularly scheduled database backup routine. The initial backup after the upgrade will ensure that you can restore your environment to the newly upgraded 12.1.3 state without repeating the upgrade process.

In addition, after you have moved your development or deployment activities to the newly upgraded Oracle Fusion Middleware installations, be sure to modify your regular backup routine to include the new Oracle Fusion Middleware directories, including the Oracle Fusion Middleware Oracle home directories and Oracle product directories.

# 4

# Upgrading and Preparing Your Oracle Databases for 12c (12.1.3)

This chapter describes how to upgrade your database to a supported version prior to upgrade.

This chapter contains the following sections:

- Understanding the 12c (12.1.3) Database Requirements
- Verifying Your Database and Schemas are Ready for Upgrade
- Determining the Upgrade Path for Upgrading Oracle Database
- Applying the Latest Patch Set Updates and Any Required Patches

> **Note:** When upgrading to 12c (12.1.3), your exiting database must be used for the upgrade. Do not create a new database.

## 4.1 Understanding the 12*c* (12.1.3) Database Requirements

It is important that you review the very latest information on database requirements for Oracle Fusion Middleware before proceeding with your database upgrade. For more information, see the Certification Matrix for 12c (12.1.3).

The certification matrix and system requirements documents should be used in conjunction with each other to verify that your environment meets the necessary requirements for installation. The Oracle Fusion Middleware 12*c* software requirements included in this guide were accurate at the time this manual was published.

For the most up-to-date information about the specific Oracle and third-party database versions supported for Oracle Fusion Middleware 12*c* (12.1.3), as well as other important system requirements, see Section 2.14.1, "Verifying Certification and System Requirements".

> **Note:** The information provided in this chapter was accurate at time of publication. Always refer to the Oracle Fusion Middleware 12c Certifications Matrix for the latest information.

## 4.2 Verifying Your Database and Schemas are Ready for Upgrade

Before running Upgrade Assistant, you should make sure that your database is up and running and that the schemas you want to upgrade are at versions that are supported for upgrade.

### Verifying Schema Versions

When the schemas are created in your database, RCU creates and maintains a table called `schema_version_registry`. This table contains schema information such as version number, component name and ID, date of creation and modification, and custom prefix.

If you are using an Oracle database, connect to the database as *SYS* and run the following from SQL*Plus to get the current version numbers:

```
SET LINE 120
COLUMN MRC_NAME FORMAT A14
COLUMN COMP_ID FORMAT A20
COLUMN VERSION FORMAT A12
COLUMN STATUS FORMAT A9
COLUMN UPGRADED FORMAT A8
SELECT MRC_NAME, COMP_ID, OWNER, VERSION, STATUS, UPGRADED FROM SCHEMA_VERSION_
REGISTRY ORDER BY MRC_NAME, COMP_ID ;
```

If the number in the "VERSION" matches the version number mentioned in Table 1-1 of *Oracle Fusion Middleware Upgrading with the Upgrade Assistant* and the STATUS column is 'VALID', then the schema is supported for upgrade.

---

**CAUTION:** Only the Repository Creation Utility and Upgrade Assistant should modify the contents of the schema version registry table.

Users should not issue any INSERT, UPDATE, DELETE, GRANT or ALTER TABLE statements against the schema version registry with interactive SQL statements or scripts.

---

### Checking for Invalid Database Objects

If you are using an Oracle database, you should recompile database objects before running the Upgrade Assistant to check for invalid objects before the upgrade. Connect to the database as `SYS` and run the following from SQL*Plus:

```
SELECT owner, object_name FROM all_objects WHERE status='INVALID';
```

Take note of any invalid objects and run the following query for more information. The existence of invalid database objects may prevent the upgrade from completing successfully.

```
/rdbms/admin/utlrp.sql
```

To recompile just the objects that belong to a single Oracle Fusion Middleware schema, you can use the Oracle Database stored procedure `dbms_utility.compile_schema` as shown in the example below:

```
SQL> execute
dbms_utility.compile_schema('1213_IAU');
PL/SQL procedure successfully completed
```

**Note:** These procedures should be used again after running the Upgrade Assistant for verification.

## 4.3 Determining the Upgrade Path for Upgrading Oracle Database

The path that you must take to upgrade to a new Oracle Database release depends on the release number of your current database. It might not be possible to directly upgrade from your current release of Oracle Database to the latest release. Depending on your current release, you might be required to upgrade through one or more intermediate releases to upgrade to the new Oracle Database.

For example, if the current database is running release 9*i*, then follow these steps:

1. Upgrade release 9.0.1.4 to release 10.2.0.4 using the instructions in *Oracle Database Upgrade Guide* Release 2 (10.2).
2. Upgrade release 10.2.0.4 to the new Oracle Database 11*g* release using the instructions in *Oracle Database Upgrade Guide*.

Table 4–1 contains the required upgrade path for each release of Oracle Database. Use the upgrade path and the specified documentation to upgrade your database. The information provided below was accurate at time of publication. Always refer to the Oracle Fusion Middleware 12c Certifications Matrix for the latest information.

***Table 4–1 Supported Upgrade Paths for Upgrading Oracle Database***

| Current Release | Upgrade Path |
|---|---|
| 9.0.1.3 (or earlier) | Direct upgrade is *not* supported. Upgrade to an intermediate Oracle Database release before you can upgrade to the new Oracle Database 11*g* release, as follows:<br>▪ 9.0.1.3 (or earlier) -> 9.0.1.4 -> 10.2.0.4 -> 11.2<br>When upgrading to an intermediate Oracle Database release, follow the instructions in the intermediate release's documentation. Then, upgrade the intermediate release database to the new Oracle Database 11*g* release using the instructions in "Upgrading to the New Release of Oracle Database" in *Oracle Database Upgrade Guide*. |
| 9.2.0.8<br>10.1.0.5<br>10.2.0.2<br>11.1.0.6<br>12.1.0.1 | Direct upgrade to Oracle Database 11*g* release is supported from 9.2.0.8 or higher, 10.1.0.5 or higher, 10.2.0.2 or higher, and 11.1.0.6 or higher.<br>For release 9.2.0.3, you must first upgrade to an intermediate Oracle Database release, as follows:<br>9.2.0.3 (or earlier) -> 9.2.0.8 -> 11.1.0.7<br>9.2.0.3 (or earlier) -> 9.2.0.8 -> 11.2<br>To upgrade to a new Oracle Database release, follow the instructions in "Upgrading to the New Release of Oracle Database" in *Oracle Database Upgrade Guide*. |

## 4.4 Applying the Latest Patch Set Updates and Any Required Patches

Potential interoperability and upgrade issues can be avoided by making sure you have applied the latest patch sets, and that you have reviewed the list of recommended patches that are designed to help you avoid any problems during upgrade.

For more information, see the Upgrade chapter of the Release Notes for your platform. For example, if you are using a Linux operating system, refer to "Patches Required to Address Specific Upgrade and Compatibility Requirements" in the *Oracle Fusion Middleware Release Notes for Linux x86*.

For additional information about database patching requirements, see "Review System Requirements and Specifications" in the *Oracle Fusion Middleware Planning an Installation of Oracle Fusion Middleware*.

# A

# Performing an Out-of-Place Domain Directory Upgrade

This chapter describes the process of upgrading your Fusion Middleware 11g domain directory to Release 12c (12.1.3) in a different domain directory, allowing you to keep your 11g domain directory intact.

The following topics are described in this chapter:


- Section A.1, "About Upgrading a Domain Directory Out of Place"
- Section A.2, "Performing an Out-of-Place Domain Directory Upgrade on the Same Host"
- Section A.3, "Performing an Out-of-Place Domain Directory Upgrade on a Different Host"
- Section A.4, "Deinstalling the 11g Applications (Optional)"


## A.1 About Upgrading a Domain Directory Out of Place

When upgrading Oracle Fusion Middleware to 12c (12.1.3), schemas and domain directory upgrades are performed “in-place” which updates the existing 11*g* or 12.1.2 files during the upgrade.

If you prefer to leave your 11*g* domain directory intact, you can perform an out-of-place domain directory upgrade using a new domain directory on the same - or different - host using the steps described in this chapter.

**Caution:** When performing an out-of-place domain directory upgrade, it is important to note that the 11*g* schemas will be upgraded in-place. Your 11*g* environment must be shut down during the out-of-place domain directory upgrade process.

## A.2 Performing an Out-of-Place Domain Directory Upgrade on the Same Host

Perform the following tasks to complete the out-of-place domain directory upgrade on the same host at the existing 11g domain:

**Note:** If you are upgrading domain that is on a different host, see Performing an Out-of-Place Domain Directory Upgrade on a Different Host.

- Task 1, "Stop all processes, including the Administration Server, Managed Servers, and Node Manager."
- Task 2, "Backup all files from the 11g domain."
- Task 3, "Restore the 11g domain backup files to a new location."
- Task 4, "Install the 12.1.3 distributions in a new Oracle Home."
- Task 5, "Upgrade the cloned environment using the standard upgrade procedures."

---

**Note:** The Fusion Middleware 12c certification matrix includes 12.1 databases. Hence, the reference to 11 in this chapter is to the Fusion Middleware 11g schemas and not to the Oracle 11g database version.

---

### Task 1 Stop all processes, including the Administration Server, Managed Servers, and Node Manager.

You must stop all processes, including the Administration Server, Managed Servers, and Node Manager, if they are started on the host. For example, to stop the Administration Server:

```
DOMAIN_HOME/bin/stopWebLogic.sh username password [admin_url]
```

### Task 2 Backup all files from the 11g domain.

Make sure that you have created a complete backup of your entire 11*g* deployment before you begin the upgrade process. These files can be used if there is an issue during the migration and you have to restart the process.

For more information on backing up your files, see "Backing Up Your Environment" in the *Oracle® Fusion Middleware Administrator's Guide*.

During the upgrade you must have "read" access to the files in the backup storage:

- 11*g* Domain Home
- The `/nodemanager` directory located in the `MW_HOME/wlserver_10.3/common/`

---

**Note:** For more information, see "Backing Up Your Environment" in the *Oracle® Fusion Middleware Administrator's Guide*. Do not proceed with the upgrade until you have a complete backup.

---

### Task 3 Restore the 11g domain backup files to a new location.

Copy the files you backed up in Task 2 to a new location using the same directory structure that was used for the existing 11*g* environment. The directory structure you create for the upgrade must be identical to the structure used for the original 11g environment.

You will point to this location in Task 5.

### Task 4 Install the 12.1.3 distributions in a new Oracle Home.

You must obtain, install and configure the 12c (12.1.3) product distributions for the components you will be upgrading.

For detailed instructions, see *Oracle Fusion Middleware Planning an Installation of Oracle Fusion Middleware* and the component-specific installation guides for the component(s) you are installing.

**Task 5 Upgrade the cloned environment using the standard upgrade procedures.**

Perform the upgrade on the domain you created in Task 3.

Each 12c (12.1.3) component has an upgrade guide that describes the procedures required to move from your 11g (11.1.1.6 or 11.1.1.7) or 12c (12.1.2) infrastructure topology to the new 12c (12.1.3) topology. The guides are located in the Upgrade tab of the Oracle Fusion Middleware 12c (12.1.3) online library.

**Task 6 Validate that the newly upgraded domain functions as expected.**

Perform the usual administration tasks using the new domain and verify that the components work as expected.

You do not need to decommission the 11g Oracle home, however if you would like to remove it, see Section A.4, "Deinstalling the 11g Applications (Optional)".

## A.3 Performing an Out-of-Place Domain Directory Upgrade on a Different Host

- Task 1, "Stop all processes, including the Administration Server, Managed Servers, and Node Manager."
- Task 2, "Backup all files from the 11g domain."
- Task 3, "Set up the target machine (Host B) with the 11g host name and IP address."
- Task 4, "Install the 12.1.3 distributions in a new Oracle Home."
- Task 5, "Upgrade the cloned environment using the standard upgrade procedures."

> **Note:** The Fusion Middleware 12c certification matrix includes 12.1 databases. Hence, the reference to 11 in this chapter is to the Fusion Middleware 11g schemas and not to the Oracle 11g database version.

**Task 1 Stop all processes, including the Administration Server, Managed Servers, and Node Manager. (Host A)**

You must stop all processes, including the Administration Server, Managed Servers, and Node Manager, if they are started on the host. For example, to stop the Administration Server:

```
DOMAIN_HOME/bin/stopWebLogic.sh username password [admin_url]
```

**Task 2 Backup all files from the host machine. (Host A)**

Make sure that you have created a complete backup of your entire 11*g* deployment before you begin the upgrade process. These files can be used if there is an issue during the migration and you have to restart the process.

For more information on backing up your files, see "Backing Up Your Environment" in the *Oracle® Fusion Middleware Administrator's Guide*.

During the upgrade you must have "read" access to the files in the backup storage:

- 11*g* Domain Home
- The `/nodemanager` directory located in the `MW_HOME/wlserver_10.3/common/`

**Note:** For more information, see "Backing Up Your Environment" in the *Oracle® Fusion Middleware Administrator's Guide*. Do not proceed with the upgrade until you have a complete backup.

#### Task 3 Set up the target machine (Host B) with the 11g host name and IP address.

The host name and IP address of the target machine (Host B) must be made identical to the source host (Host A). This will require you to change the IP address and name of the source machine or decommission the source machine to avoid conflicts in the network.

The process of changing an IP address and host name vary by operating system. Consult your operating system's administration documentation for more information.

#### Task 4 Restore the 11g domain backup from Host A to Host B.

Restore the files you backed up in Task 2 using the same directory structure that was used in 11*g*. The directory structure on Host B must be identical to the structure used on Host A.

For detailed information about restoring your files to the target machine, see "Recovering Your Environment" in *Oracle® Fusion Middleware Administrator's Guide*.

#### Task 5 Install the 12.1.3 distributions in a new Oracle Home. (Host B)

You must obtain, install and configure the 12c (12.1.3) product distributions for the components you will be upgrading.

For detailed instructions, see *Oracle Fusion Middleware Planning an Installation of Oracle Fusion Middleware* and the component-specific installation guides for the component(s) you are installing.

#### Task 6 Upgrade the environment using the standard upgrade procedures. (Host B)

Each 12c (12.1.3) component has an upgrade guide that describes the procedures required to move from your 11g (11.1.1.6 or 11.1.1.7) or 12c (12.1.2) infrastructure topology to the new 12c (12.1.3) topology. The guides are located in the Upgrade tab of the Oracle Fusion Middleware 12c (12.1.3) online library.

**Tip:** The Node Manager upgrade procedure requires access to the original Node Manager files. Use the 11*g* Node Manger files that were backed up from the source machine as part of Task 3.

#### Task 7 Validate that the newly upgraded domain functions as expected.

Perform the usual administration tasks using the new domain and verify that the components work as expected.

You do not need to decommission the 11g Oracle home, however if you would like to remove it, see Section A.4, "Deinstalling the 11g Applications (Optional)".

## A.4 Deinstalling the 11g Applications (Optional)

While not required, you can use these steps to deinstall the 11g application and domain setup after the upgrade. **Do not deinstall a domain that is still being referenced by a non-upgraded component.** If you are unsure, leave the domain intact.

> **Note:** The commands mentioned in this section must be run from the 11g Oracle Home that you are removing and not from the new home that was created as part of the 12c upgrade process.

1. Shutdown all the 11g servers and processes (including the Admin Server, Managed Servers and Node Manager). For more information see "Starting and Stopping Oracle WebLogic Server Administration and Managed Servers" in the *Oracle® Fusion Middleware Administrator's Guide*.
2. To remove the Oracle Home, start the Oracle Universal Installer in -deinstall mode.

   (UNIX) ORACLE_HOME/oui/bin

   ```
   ./runInstaller.sh -deinstall
   ```

   (Windows) ORACLE_HOME\oui\

   ```
   binsetup.exe -deinstall
   ```
3. On the Deinstall screen, specify the 11g Oracle Home to deinstall. Click **Deinstall** to continue.
4. On the Warning screen, select whether or not you want the OUI to remove the Oracle Home directory. Click **Yes** to have OUI remove the software and Oracle Home. There is no undo.
5. To remove the 11g Oracle Common Home, start the Oracle Universal Installer in -deinstall mode from the following directory:

   (UNIX) ORACLE_HOME/oracle_common/oui/bin

   ```
   ./runInstaller -deinstall -jreLoc JRE_LOCATION
   ```

   (Windows) ORACLE_HOME\oracle_common\oui\

   ```
   binsetup.exe -deinstall -jreLoc JRE_LOCATION
   ```
6. On the Deinstall screen, verify the Oracle Common Home that is about to be removed is the correct one and click **Deinstall** to continue.
7. On the Warning screen, select whether or not you want to remove the Oracle Common Home directory. Click **Yes** to remove the software and Oracle Common Home.
8. To remove the WebLogic Server, start the WebLogic Uninstall program from the following directory:

   (UNIX) ORACLE_HOME/utilw/uninstall

   ./uninstall.sh

   (Windows) ORACLE_HOME\utils\uninstall

   uninstall.exe
9. Click **Next** to start the uninstall program.

10. Select the components to uninstall by selecting the check boxes next to the installed components. Note that by default, all installed components are selected.
11. After selecting the components to uninstall, click **Next** to complete the uninstall.