Oracle® Fusion Middleware

Planning an Upgrade of Oracle Fusion Middleware

12c (12.2.1)

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

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Oracle Fusion Middleware Planning an Upgrade of Oracle Fusion Middleware, 12c (12.2.1)

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Preface

This preface contains the following sections:

- Audience

- 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 12*c* system administration knowledge

- The configuration and expected behavior of the system or systems being upgraded

Related Documents

For more information, see the following related documentation available in the Oracle Fusion Middleware Release 12c (12.2.1) documentation library:

- *Understanding Oracle Fusion Middleware*

- *Administering Oracle Fusion Middleware*

- *Upgrading with the Upgrade Assistant*

- *Upgrading Oracle WebLogic Server*

- *Upgrading Oracle Data Integrator*

- *Upgrading to the Oracle Fusion Middleware Infrastructure*

- *Upgrading Oracle SOA Suite and Business Process Management*

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

Planning an Upgrade to Oracle Fusion Middleware 12*c*

Before you begin an upgrade, you must understand what can and cannot be upgraded and how the upgrade will impact your production environment.

- Upgrade Planning Roadmap

- Introducing Oracle Fusion Middleware 12c to 11g Users

- Understanding the 12c Upgrade Process Flow

- Understanding the Basic 12c Upgrade Tasks

- Understanding the Standard Upgrade Topology for 12c

- Developing a Backup Strategy for Upgrade

- Developing an Upgrade Testing Strategy

- Planning for System Downtime During an Upgrade

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

- Creating the Required Schemas Before Upgrade

- Understanding the Supported Upgrade Starting Points

- Understanding Your Certification, Compatibility, and Interoperability Requirements

- Understanding Interoperability and Compatibility with Previous Versions

- Understanding Component Upgrade Restrictions

- Understanding Domain Upgrade Restrictions

- Understanding and Obtaining Product Distributions for Your Upgrade

- Understanding and Obtaining the Upgrade and Configuration Tools

1.1 Upgrade Planning Roadmap

This section can be used to help you determine whether an upgrade to Oracle Fusion Middleware 12c (12.2.1) is right for you and your existing environment.

Should I upgrade to this release of Oracle Fusion Middleware?

If this is a question you are currently asking yourself, then take a minute to review the planning steps described in these sections. Upgrades can be complicated and time-

consuming when you are unprepared or unfamiliar with the requirements associated with this release of Oracle Fusion Middleware.

Using this planning guide is your first step in designing your upgrade path. The Oracle Help Center and Oracle Technology Network (OTN) have additional planning resources, such as upgrade videos and links to support communities that may also be useful in your upgrade planning.

The following table describes the tasks you should complete during the planning phase of your upgrade. The order in which you execute your upgrade planning tasks may vary depending on your current environment. Use the list below as a checklist for the most important pre-upgrade considerations to review. It is important to note that some of the tasks may not apply to your environment.

Table 1-1   Upgrade Planning Roadmap

Task	Description	Documentation
Understand the differences between Oracle Fusion Middleware 11*g* and Release 12c (12.2.1)	Oracle Fusion Middleware 11*g* users should understand the conceptual and functional differences between 11*g* and Release 12*c* (12.2.1) before starting the upgrade process.	Introducing Oracle Fusion Middleware 12c to 11g Users
Review the process flow for upgrading to Oracle Fusion Middleware 12c.	The process flow map shows the primary tasks related to the upgrade process.	Understanding the 12c Upgrade Process Flow
Understand the high-level process of upgrading your existing Oracle Fusion Middleware deployment.	Upgrade is a complex process and involves system downtime. Understanding the overall process can help you plan your upgrade.	Understanding the Basic 12c Upgrade Tasks
Develop a backup strategy that includes all system-critical files before you start the upgrade.	You will need to determine which components, files, schemas to back up before you start the upgrade. If a failure occurs, you will need to restore your environment back to the original pre-upgrade state.	Developing a Backup Strategy for Upgrade
Develop a testing strategy.	Moving from a test environment to a production environment can be especially difficult when upgrading. Creating an upgrade testing strategy before you begin the upgrade can prevent unnecessary downtime. For example, consider performing the upgrade on a cloned production environment before executing the actual upgrade.	Developing an Upgrade Testing Strategy
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 can also help you 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 Understanding In-Place versus Out-of-Place Upgrades

Table 1-1 (Cont.) Upgrade Planning Roadmap

Task	Description	Documentation
Verify that you are running a supported hardware and software versions before you upgrade.	The hardware and software hosting your existing Oracle Fusion Middleware deployment must meet certain requirements before upgrading to Oracle Fusion Middleware 12c (12.2.1).	Understanding the Supported Upgrade Starting Points Creating the Required Schemas Before Upgrade
Verify that your database is supported.	The 12c domain requires an Oracle database to store the new schemas. The database version that hosts the schemas used in Fusion Middleware must be supported.	Upgrading and Preparing Your Oracle Databases for 12c (12.2.1)
Understand which of your 11g products and features can be upgraded.	You should understand which of your 11*g* components can be upgraded to 12.2.1. **NOTE**: If you plan to use 11*g* components with upgraded 12c components, you should understand how the upgrade could impact interoperability or compatibility.	"Products and Features Available in Oracle Fusion Middleware 12c" "Products and Features Not Available in Oracle Fusion Middleware 12"
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* (12.2.1) environment, you should review and understand any potential interoperability and compatibility issues.	Understanding Your Certification, Compatibility, and Interoperability Requirements Understanding Interoperability and Compatibility with Previous Versions
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 Component Upgrade Restrictions Understanding Domain Upgrade Restrictions
Understand where to go to get the latest product distributions and upgrade tools.	Before you begin the upgrade, visit the Oracle Help Center and the Oracle Technology Network and become familiar with the location of product documentation, videos, and other important planning resources.	Understanding and Obtaining Product Distributions for Your Upgrade Understanding and Obtaining the Upgrade and Configuration Tools

1.2 Introducing Oracle Fusion Middleware 12c to 11g Users

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

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

- Using the 12c Documentation Library Resources

1.2.1 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".

1.2.2 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 11.1.1.7.0 or 11.1.1.9.0 to 12.2.1

    – Moving from 12.1.3 to 12.2.1

- 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*.

1.2.3 Using the 12c Documentation Library Resources

The Oracle Fusion Middleware 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 (12.2.1) Installation Documentation

- Fusion Middleware 12c (12.2.1) Upgrade Documentation

- Fusion Middleware 12c (12.2.1) Administration Documentation

- Fusion Middleware 12c (12.2.1) Release Notes

1.3 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 (12.2.1):

- What is an Upgrade Starting Point?

- Supported Upgrade Starting Points for Oracle Fusion Middleware 12c (12.2.1)

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

1.3.1 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 this version ofOracle Fusion Middleware. 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.

1.3.2 Supported Upgrade Starting Points for Oracle Fusion Middleware 12c (12.2.1)

The following sections provide information about the supported starting points for upgrading to Oracle Fusion Middleware Release 12c (12.2.1):

- Supported Oracle Fusion Middleware Releases

- Supported Oracle WebLogic Releases

- Supported Oracle HTTP Server Releases

- Supported Database Versions

1.3.2.1 Supported Oracle Fusion Middleware Releases

You can upgrade to Oracle Fusion Middleware Release 12*c* (12.2.1) from the following previous versions of Oracle Fusion Middleware:

> **Note:**
>
> Review your component-specific upgrade guides for more information about supported starting points for the components you wish to upgrade.

- Oracle Fusion Middleware 12c Release 1 (12.1.3)

- Oracle Fusion Middleware 12c Release 1 (12.1.2)

- Oracle Fusion Middleware 11g Release 1 (11.1.1.9)

- Oracle Fusion Middleware 11g Release 1 (11.1.1.8)

- Oracle Fusion Middleware 11g Release 1 (11.1.1.7)

- Oracle Fusion Middleware 11g Release 1 (11.1.1.6)

If you are not running a supported version of Oracle Fusion Middleware 11*g*, see What If I'm Not Running Supported Fusion Middleware Components?.

1.3.2.2 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 12.2.1 Compatibility with Previous Releases"

- "Roadmap for Upgrading Your Application Environment"

1.3.2.3 Supported Oracle HTTP Server Releases

You can upgrade your supported Oracle HTTP Server 11g release or 12*c* release to this latest release as part of the Oracle HTTP Server product distribution. For more information about upgrading Oracle HTTP Server to Oracle Fusion Middleware Release 12c (12.2.1), refer to the following:

- "Oracle HTTP Server Interoperability"

- For upgrading HTTP Servers see *Upgrading Oracle HTTP Server*.

1.3.2.4 Supported Database Versions

If you are not using at least the minimum supported database version, you must upgrade your database to one of the supported versions before beginning a Fusion Middleware upgrade.

For information about the latest database versions supported by Oracle Fusion Middleware Release 12*c* (12.2.1), see Upgrading and Preparing Your Oracle Databases for 12c (12.2.1) .

1.3.3 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 12*c* (12.2.1) upgrade process.

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

To determine if your supported 11*g* or 12*c* components will have any compatibility issues in this release, 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 (12.2.1) upgrade documentation to perform the upgrade. For more information, see Locating Your Component-Specific Upgrade Documentation.

1.4 Understanding the 12c Upgrade Process Flow

The process flow shows the high-level upgrade procedures and tools used to upgrade to the 12c Fusion Middleware Infrastructure. The tasks you perform to complete your component-specific upgrade may vary from this example.

Your component-specific upgrade documentation will provide detailed information about the specific tasks that will be required to upgrade the component.
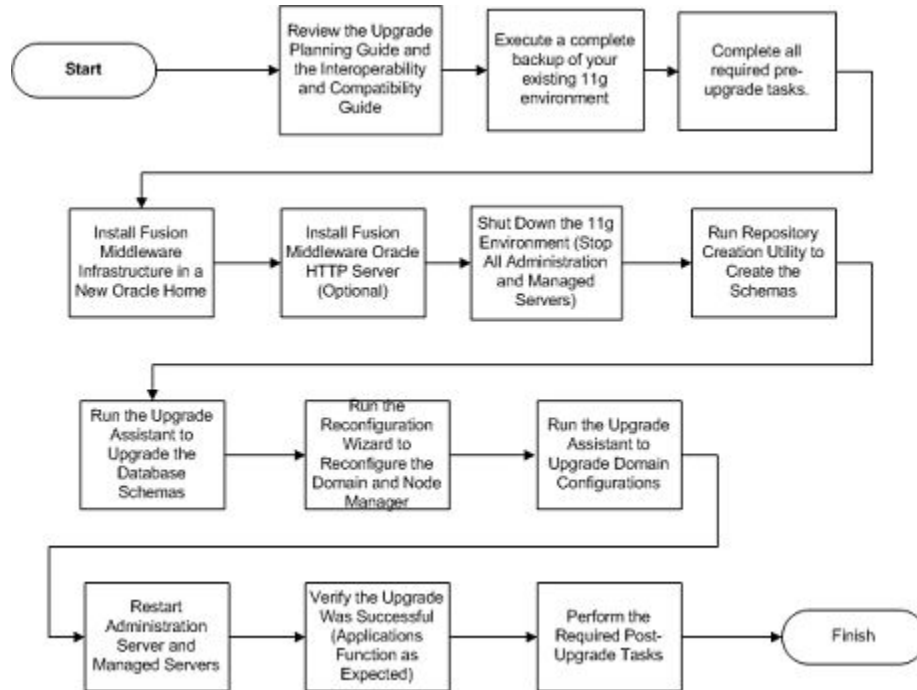
1.5 Understanding the Basic 12c Upgrade Tasks

A typical upgrade of Oracle Fusion Middleware 11g of a previous 12c version to Oracle Fusion Middleware 12c (12.2.1) is described below. There may be additional steps depending on which components you are upgrading.

Detailed upgrade procedures are described in the component-specific upgrade guides.

Table 1-2   Understanding the Basic Upgrade Process

Task	Tool Used	Documentation
Complete all of the required pre-upgrade tasks for your environment.	Planning Checklist	Preparing to Upgrade
Install the 12.2.1 product distributions in a new Oracle home.	Oracle Universal Installer (OUI)	For information on installing 12.2.1, see your see your component-specific installation documentation. For information on using the Oracle Universal Installer, see *Installing Software with the Oracle Universal Installer*

Table 1-2   (Cont.) Understanding the Basic Upgrade Process

Task	Tool Used	Documentation
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. For information on using the Oracle Repository Creation Utility, see *Creating Schemas with the Repository Creation Utility*
Upgrade the 11*g* or 12c (12.1.2 or 12.1.3) 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. For general information about using UA to upgrade database schemas, see *Upgrading with the Upgrade Assistant* **NOTE**: You do not need to start the Administration Server during the upgrade process. The entire upgrade operation is performed offline
Reconfigure the domain.	Reconfiguration Wizard	For more information on using the Reconfiguration Wizard to reconfigure your domain, see your component-specific upgrade documentation.
Upgrade component configurations.	Upgrade Assistant (UA)	For more information on using UA to upgrade your domain component configurations, see your component-specific upgrade documentation. For general information on using UA to upgrade component configurations, see *Upgrading with the Upgrade Assistant*
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.
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.

1.6 Understanding the Standard Upgrade Topology for 12c

Each Fusion Middleware Release 12*c* 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".

1.7 Developing a Backup Strategy for Upgrade

Your upgrade plan should include a strategy for creating, storing and restoring a backup in the event the upgrade fails.

You can learn more about Oracle Fusion Middleware backup and recovery strategies in *Administering Oracle Fusion Middleware*:

- "Introducing Backup and Recovery"

- "Backup and Recovery Recommendations for Oracle Fusion Middleware Components"

1.8 Developing an Upgrade Testing Strategy

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).

Part of your testing strategy must include restoring a backup of your pre-upgrade environment. A complete list of backup considerations and procedures is described in Developing a Backup Strategy for Upgrade.

1.9 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 administration and managed servers for the entire duration of the upgrade.

- If the 11g domain is not already associated with a database-based policy store, then you will need to re-associate the 11g domain to a database-based policy store before you upgrade. This operation restarts the 11g domain.

- Run the pre-upgrade readiness check before you begin your actual upgrade to identify potential upgrade issues. If you encounter upgrade issues during the actual upgrade, 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.

- 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. In 12c, servers and components are down during the entire upgrade process.

1.10 Understanding In-Place versus Out-of-Place Upgrades

When upgrading your 11g or previous 12c environment to 12c (12.2.1), 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* or 12c files during the upgrade. The new 12c (12.2.1) Oracle Home binaries are upgraded "out of place" as the binaries are installed in a new directory.

The upgrade to Oracle Fusion Middleware 12c 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 (which includes WebLogic Server and JRF) and other 12c distribution binaries in a new Oracle home. The upgrade of binaries is considered "out of place" as the pre-upgrade binaries are not overwritten.

- Starting Point Schemas - Upgraded In Place

  The schemas in your pre-upgrade deployment are upgraded "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 existing domain and the domain will be reconfigured to point to the new 12c 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.

- 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 home directory.

1.11 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.

1.12 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.

1.13 Understanding Component Upgrade Restrictions

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*.

1.14 Understanding Domain Upgrade Restrictions

Some domains cannot be upgraded to 12c (12.2.1) because of known limitations and configuration changes from previous Fusion Middleware releases.

For example, you cannot upgrade a domain that contains SOA Core Extension (AIAFP) to 12c (12.2.1).

Review your component-specific upgrade guide and the release notes to ensure your domains are not impacted by these restrictions.

1.15 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".

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.

1.16 Understanding and Obtaining the Upgrade and Configuration Tools

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

The following tools are installed as part of the product distribution.

Table 1-3   Installation, Upgrade and Configuration Tools

Tool Name	Use this tool to...	Related Documentation
Oracle Universal Installer (OUI)	Install the 12*c* product distributions and feature sets. NOTE: Each major component has its own installation guide. These guides provide specific details about using the Universal Installer with the component.	*Installing Software with the Oracle Universal Installer* Release 12c (12.2.1) Library: Installation Guides
Oracle Upgrade Assistant (UA)	Upgrade schemas, component configurations, and standalone system component configurations. The separate Patch Set Assistant utility is no longer used for upgrading schemas. **NOTE**: Each major component has its own upgrade guide. These guides provide specific details about using Upgrade Assistant with the component.	*Upgrading with the Upgrade Assistant* Release 12c (12.2.1) Library: Upgrade Guides
Repository Creation Utility (RCU)	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. **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.	*Creating Schemas with the Repository Creation Utility*

Table 1-3   (Cont.) Installation, Upgrade and Configuration Tools

Tool Name	Use this tool to...	Related Documentation
Oracle Configuration Wizard	Create the WebLogic domain. The Configuration Wizard simplifies the process of creating and extending a WebLogic Server domain. **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 WebLogic Domains Using the Configuration Wizard*.
Oracle Reconfiguration Wizard (New in 12c)	Reconfigure a domain that is using Oracle WebLogic Server. When you use the Reconfiguration Wizard to reconfigure a domain, the WLS core infrastructure and domain version are automatically updated. **NOTE**: This tool was introduced to Fusion Middleware as of Release 12*c* (12.1.2).	See your component-specific upgrade documentation for more information. Fusion Middleware 12c (12.2.1) Upgrade Documentation
OPatch	Apply patches in 12c. The patching nomenclature has changed in 12*c*. Be sure to review the new patch definitions in Upgrade and Patching Terminology Changes. **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

Preparing to Upgrade

The topics in this section describe the tasks you must perform before you attempt an upgrade to Oracle Fusion Middleware 12*c*.

> **Warning:**
>
> Before you upgrade to Oracle Fusion Middleware 12c, you must preform the required pre-upgrade tasks for your deployed components. Complete only those tasks that apply to your environment.
>
> Failure to perform these tasks may result in a failed upgrade.

2.1 Pre-Upgrade Checklist

The tasks described in this pre-upgrade checklist assume that you read Planning an Upgrade to Oracle Fusion Middleware 12c and understand the requirements of this upgrade.

Complete all applicable tasks before you begin the upgrade process.

> **Note:**
>
> The procedures you perform depend 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.
>
> In addition to the common, pre-upgrade procedures described here, you may also have component-specific tasks to perform. Consult your component-specific upgrade documentation for other required procedures.

Table 2-1   Tasks to Perform Before You Upgrade to Oracle Fusion Middleware 12c

Task	Description	Documentation
Create a complete backup of your pre-upgrade environment.	**REQUIRED FOR ALL UPGRADES.** Back up all system-critical files and database(s) that contain any schemas that will be upgraded before you begin your upgrade. If the upgrade fails, you will need to restore your pre-upgrade environment and begin the upgrade again.	Creating a Complete Backup (Required)

Table 2-1   (Cont.) Tasks to Perform Before You Upgrade to Oracle Fusion Middleware 12c

Task	Description	Documentation
Verify that you are installing and upgrading your product on a supported hardware and software configuration.	As part of the upgrade planning process, you already verified that your hardware and software configurations are supported by the latest certifications and requirements documents. Just before you start the upgrade, verify this information again, as the certification requirements may have changed. **Make sure that you have applied the latest patches to your components before you upgrade.**	Verifying Certification and System Requirements
Remove any outdated or unused data before you upgrade.	To optimize performance, consider purging data and objects that will not be used in the upgraded environment.	Purging Unused Data
Clone your production environment.	In addition to creating a complete backup of your system files, you should also clone your production environment. This environment can be used to test the upgrade.	Cloning Your Production Environment (Recommended)
Verify that you are running a 64-bit operating system. Most Oracle Fusion Middleware 12c components require a 64-Bit operating system.	Required only if you are currently running a 32-bit operating system.	Migrating from a 32-Bit to a 64-Bit Operating System
Depending on your upgrade starting point, you may be required to create new 12c schemas before an upgrade.	Oracle Fusion Middleware 12c requires that you use the Repository Creation Utility (RCU) to create new schemas before you can upgrade your existing environment.	Creating the Required Schemas Before an Upgrade
If you are using a file-based policy store, then you must reassociate it to a database-based policy store.	This step is not required if you are upgrading from a previous 12c release.	Reassociating File-based Policy Stores to Database-based Policy Stores (Required)
Understand the schema requirements when using an OID-based security store.	If you are using an OID-based security store, you will need to create a 12c OPSS schema before you upgrade.	Creating the 12c OPSS Schema for an OID-based Security Store
Oracle recommends that you maintain the highest level of security for all Fusion Middleware security stores.	Before the upgrade, back up your existing security stores and then upgrade them using the security store-specific procedures.	Upgrading Security Stores to the Latest Version

Table 2-1   (Cont.) Tasks to Perform Before You Upgrade to Oracle Fusion Middleware 12c

Task	Description	Documentation
Some of the security algorithms used in Fusion Middleware 12c require additional policy files for the JDK.	Required only if you plan to use enhanced encryption (such as AES 256). Oracle recommends that you apply the required policy files to the JDK before you upgrade.	Using Enhanced Encryption (AES 256)
Create a new Non-SYSDBA user to avoid running the upgrade as SYS/SYSDBA.	Oracle recommends that you create a non-SYSDBA user called fmw to run Upgrade Assistant with only those privileges required by the Upgrade Assistant.	Creating a Non-SYSDBA User
Oracle Database 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* (12.2.1).	This step is required only if you are using an Edition-Based Redefinition (EBR) database.	Creating an Edition on the Server for Edition-Based Redefinition (Optional)
You must download and install into a new Oracle home the new 12c products before you upgrade.	Install the 12c (12.2.1) versions of the products you already have in your pre-upgrade environment. Note that some products have not yet been released for 12c (12.2.1), but will become available in a future release.	Downloading and Installing the 12*c* Oracle Fusion Middleware Product Distributions
Run a pre-upgrade readiness check.	Before you begin the actual upgrade process, run the Upgrade Assistant in -readiness mode to perform a read-only analysis of your pre-upgrade environment. If there are any issues, you must correct them before the upgrade.	Running a Pre-Upgrade Readiness Check
Use the component-specific upgrade documentation to complete your upgrade.	The documentation covers component-specific tasks that are required for the upgrade. Some of the tasks are performed before the upgrade and some are performed after. Always consult your Oracle Fusion Middleware upgrade documentation to ensure you have a successful upgrade.	Locating Your Component-Specific Upgrade Documentation

2.2 Creating a Complete Backup (Required)

Before you install any new Release 12*c* distributions and begin upgrading your Oracle Fusion Middleware 11*g* or 12*c* deployment, be sure you have backed up all system-critical files; including all of the databases that host your Oracle Fusion Middleware schemas.

See Backing Up Your Environment for more information.

2.3 Cloning Your 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 *Administering Oracle Fusion Middleware*.

Upgrades cannot be reversed. In most cases, if an error occurs, you must stop the upgrade and restore the entire environment from backup and begin the upgrade process from the beginning. Identifying potential upgrade issues in a development environment can eliminate unnecessary downtime.

> **Note:** You can run the Readiness Check on the cloned production environment to help identify potential upgrade issues.

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

Additional benefits of running an upgrade in a cloned production environment include the following:

- 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 complete the upgrade.

- Understand the database resource usage (such as temporary tablespace; PGA, etc).

2.4 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.

- Verify Your Environment Meets Certification Requirements

- Verify System Requirements and Specifications

- Verify that the database hosting Oracle Fusion Middleware is supported.

- Verify that the JDK is certified for this release of Oracle Fusion Middleware.

NOTE: When checking the certification, system requirements, and interoperability information, be sure to check specifically for any 32-bit or 64-bit system requirements. It is important for you to download software specifically designed for the 32-bit or 64-bit environment, explicitly.

WARNING: Make sure that your current environment has been patched to the latest patch set BEFORE you begin the upgrade. Certifications are based on fully patched environments unless stated otherwise.

2.4.1 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 (12.2.1).

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.

2.4.2 Verify System Requirements and Specifications

The Oracle Fusion Middleware System Requirements and Specifications document should be used to verify that the requirements of the certification are met. For example, if the certification document indicates that your product is certified for installation on 64-Bit Oracle Linux 7, this document should be used to verify that your Oracle Linux 7 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".

NOTE: When you install the Oracle Fusion Middleware Release 12c 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

2.4.3 Verify that the database hosting Oracle Fusion Middleware is supported.

It is imperative that you understand the Oracle Database requirements when upgrading and ensure that the database hosting Oracle Fusion Middleware is supported and has sufficient space to perform an upgrade. You must have a supported Oracle database configured with the required schemas before you can run Fusion Middleware 12c.

2.4.4 Verify that the JDK is certified for this release of Oracle Fusion Middleware.

Before you can install any Oracle Fusion Middleware product using a generic installer, you must download and install a supported JDK on your system.

Make sure that the JDK is installed outside of the Oracle home. The Oracle Universal Installer validates that the designated Oracle home directory is empty, and the install will not progress until an empty directory is specified. If you install JDK under Oracle home, you will experience issues in future operations. So, it is recommended that you use the `/home/oracle/products/jdk` directory for the location of your JDK installation. You can then use the `java -jar` command to run the installer JAR file.

For more information on the difference between generic and platform-specific installers, "Understanding the Difference Between Generic and Platform-Specific Distributions" in the *Oracle Fusion Middleware Download, Installation, and Configuration Readme Files*.

To download the required JDK, use your browser to navigate to the following URL and download the Java SE JDK:

http://www.oracle.com/technetwork/java/javase/downloads/index.html

2.5 Migrating from a 32-Bit to a 64-Bit Operating System

Most Oracle Fusion Middleware 12c components require a 64-Bit operating system. If you are running a 32-bit environment, then you must migrate your 32-bit environment to a 64-bit software environment before you upgrade.

> **Note:** When checking the certification, system requirements, and interoperability information, be sure to check specifically for any 32-bit or 64-bit system requirements. It is important for you to download software specifically designed for the 32-bit or 64-bit environment, explicitly.

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*.

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

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 (12.2.1) product distribution(s) on the target machine.

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

CAUTION: These 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.

2.5.1 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.

2.5.2 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]
```

2.5.3 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/

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.

2.5.4 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.

2.5.5 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*.

2.5.6 Task 6: Install the 12c (12.2.1) product distribution(s) on the target machine.

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

2.5.7 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 the component-specific upgrade guides for the component(s) you are upgrading.

NOTE: 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: Back up all files from the 32-bit host machine..

2.6 Creating the Required Schemas Before Upgrade

Before you upgrade, you may be required to create new schemas for your 12c deployment.

To determine which additional schemas need to be created for 12c, compare the component schemas you have in your existing environment to the schemas required for your upgrade. The component-specific upgrade guides will identify the schemas that are required for your components.

For more information, see "Identifying Schemas that Can be Upgraded with the Upgrade Assistant".

If you are upgrading from 11g, note the following:

- In 12*c* there is a new schema that must be created before you can upgrade from 11g. 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".

  > **Note:** If you have not created the Service Table schema, you might encounter the error message "UPGAST-00328 : The schema version registry table does not exist on this database." If that happens is it necessary to create the service table schema in order to run Upgrade Assistant.

- 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.

2.7 Purging Unused Data

Purging unused data before an upgrade can optimize the upgrade process. Some components provide automated purge scripts that can be run before an upgrade. If you are using purge scripts, wait until the purge is complete before starting the upgrade process. The upgrade will fail if the purge scripts are running while using the Upgrade Assistant to upgrade your schemas.

NOTE: If a large amount of data needs to be purged, consider partitioning tables or employing other data optimization strategies. Using scripts to remove large amounts of data may impact performance.

For more information, see "Developing a Purging and Partitioning Methodology" and "Developing a Database Growth Management Strategy" in *Administering Oracle SOA Suite and Oracle Business Process Management Suite*.

2.8 Reassociating File-based Policy Stores to Database-based Policy Stores (Required)

Your policy stores must be database-based and not file based. If you are using a file-based or OID-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.

1. Creating 11g OPSS and IAU Schemas

2. Reassociating the 11g Policy Store with the Database-Based Policy Store and OPSS Schema

3. Validating that the Policy Store Reassociation Worked

2.8.1 Creating 11g OPSS and IAU Schemas

Create new 11*g* Oracle Platform Security Services (OPSS) and Audit Schemas (IAU) schemas in a supported Database using the 11*g* Repository Creation Utility.

For more information about creating 11*g* schemas, see "Obtaining and Running Repository Creation Utility" in the 11g version of the *Oracle Fusion Middleware Repository Creation Utility User's Guide*.

2.8.2 Reassociating the 11g 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 the 11g OPSS schema with database-based repository, see "Reassociating the OPSS Security Store".

2.8.3 Validating that the Policy Store 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.

2.9 Creating the 12c OPSS Schema for an OID-based Security Store

If you are using an Oracle Internet Directory (OID)-based security store in 11*g*, use the 12*c* Repository Creation Utility (RCU) to create the new 12*c* OPSS schema. In the Upgrade Assistant, select the OPSS schema; the Upgrade Assistant upgrades the OID-based security store. You do not need to reassociate an OID-based security store before upgrade.

> **Note:**
>
> The 12c OPSS database schema is required so you can reference the 12*c* schema during the reconfiguration of the domain. Your domain will continue to use the OID-based security store after the upgrade.

2.10 Upgrading Security Stores to the Latest Version

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 security 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

2.11 Creating a Non-SYSDBA User

Oracle recommends that you create a user with the privileges required to upgrade the schemas. The privileges listed below must be granted before starting the Upgrade Assistant.

"FMW" is the user you can create to run the Upgrade Assistant. In the example below `welcome1` is the password. Make sure that you specify your actual password when granting privileges.

> **Note:** If you do not already have the v$xatrans$ table, then remove the following line from the script below:
>
> ```
> grant select on v$xatrans$ to FMW with grant option;
> ```
>
> This table is not created by default. If you want to create this table, run the XAVIEW.SQL script before creating this user.

```
create user FMW identified by welcome1;

grant dba to FMW;

grant execute on DBMS_LOB to FMW with grant option;

grant execute on DBMS_OUTPUT to FMW with grant option;

grant execute on DBMS_STATS to FMW with grant option;

grant execute on sys.dbms_aqadm to FMW with grant option;

grant execute on sys.dbms_aqin to FMW with grant option;

grant execute on sys.dbms_aqjms to FMW with grant option;

grant execute on sys.dbms_aq to FMW with grant option;

grant execute on utl_file to FMW with grant option;

grant execute on dbms_lock to FMW with grant option;

grant select on sys.V_$INSTANCE to FMW with grant option;

grant select on sys.GV_$INSTANCE to FMW with grant option;

grant select on sys.V_$SESSION to FMW with grant option;

grant select on sys.GV_$SESSION to FMW with grant option;

grant select on dba_scheduler_jobs to FMW with grant option;

grant select on dba_scheduler_job_run_details to FMW with grant option;

grant select on dba_scheduler_running_jobs to FMW with grant option;

grant select on dba_aq_agents to FMW with grant option;

grant execute on sys.DBMS_SHARED_POOL to FMW with grant option;

grant select on dba_2pc_pending to FMW with grant option;

grant select on dba_pending_transactions to FMW with grant option;

grant execute on DBMS_FLASHBACK to FMW with grant option;
```

```
grant execute on dbms_crypto to FMW with grant option;

grant execute on DBMS_REPUTIL to FMW with grant option;

grant execute on dbms_job to FMW with grant option;

grant select on pending_trans$ to FMW with grant option;

grant select on dba_scheduler_job_classes to fmw with grant option;

grant select on SYS.DBA_DATA_FILES to FMW with grant option;

grant select on SYS.V_$ASM_DISKGROUP to FMW with grant option;

grant select on v$xatrans$ to FMW with grant option;

grant execute on sys.dbms_system to FMW with grant option;

grant execute on DBMS_SCHEDULER to FMW with grant option;

grant select on dba_data_files to FMW with grant option;

grant execute on UTL_RAW to FMW with grant option;

grant execute on DBMS_XMLDOM to FMW with grant option;

grant execute on DBMS_APPLICATION_INFO to FMW with grant option;

grant execute on DBMS_UTILITY to FMW with grant option;

grant execute on DBMS_SESSION to FMW with grant option;

grant execute on DBMS_METADATA to FMW with grant option;

grant execute on DBMS_XMLGEN to FMW with grant option;

grant execute on DBMS_DATAPUMP to FMW with grant option;

grant execute on DBMS_MVIEW to FMW with grant option;

grant select on ALL_ENCRYPTED_COLUMNS to FMW with grant option;
```

Note

Oracle Database 11.2.0.3 Database Users ONLY: You must apply **Oracle Patch 13036331** before you begin the upgrade. Go to My Oracle Support to download the patch.

If you do not apply this patch, then you will have to grant additional privileges for some schemas.

2.12 Using Enhanced Encryption (AES 256)

The Java platform defines a set of APIs spanning major security areas, including cryptography, public key infrastructure, authentication, secure communication, and access control. These APIs allow developers to easily integrate security mechanisms into their application code.

Some of the security algorithms used in Fusion Middleware 12c require additional policy files for the JDK. If you plan to use enhanced encryption (such as AES 256),

Oracle recommends that you apply these policy files to the JDK before you upgrade. For more information, see the following:

Java Cryptography Architecture Oracle Providers Documentation

If you do not apply these policy files to the JDK before you begin the upgrade, the upgrade can fail and you will have to restore the entire pre-upgrade environment and start the upgrade from the beginning.

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

For Oracle Database Users Only: Edition-based redefinition enables you to upgrade an Oracle Database component of an application while it is in use, thereby minimizing or eliminating down time.

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* (12.2.1). The new edition for 12.2.1 must be a child of your existing 11g or 12c 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_2_1 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;
```

2.14 Maintaining Custom Domain Environment Settings

Changes made to the setDomainEnv script - or any other startup script - before an upgrade will be overwritten by new, regenerated scripts during the domain reconfiguration process. Consider creating a separate file to store your domain customizations before you upgrade as described in "Maintaining Your Custom setDomainEnv Settings (Optional)".

> **Note:**
>
> If you are unable to create the setUserOverrides script before an upgrade, you will need to reapply your settings as described in "Reapplying Customizations to setDomainEnv".

2.15 Downloading and Installing the 12*c* Oracle Fusion Middleware Product Distributions

Product distributions can be downloaded from either Oracle Technology Network (OTN) or Oracle Software Delivery Cloud. 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.

After you have downloaded all the necessary software, you can then proceed to install and configure your software.

To get started with your installations, refer to the "Install, Patch, and Upgrade" common tasks page in the Oracle Fusion Middleware 12c (12.2.1) Documentation Library on OTN.

NOTE: The Oracle Fusion Middleware Infrastructure distribution must be installed before the component-specific distributions.

2.16 Running a Pre-Upgrade Readiness Check

The Upgrade Assistant can be run in -readiness mode to perform a read-only, pre-upgrade check on your domain. If issues are detected, you can correct them before starting the actual upgrade.

> **Note:** The readiness check can be run with the system online, and depending on how comprehensive the checks are, the readiness checks could run for a long time before completing.

To perform a readiness check on your pre-upgrade environment, you will launch the Upgrade Assistant in -readiness mode as shown below:

1. Change directory to *ORACLE_HOME*/oracle_common/upgrade/bin on Unix operating systems or *ORACLE_HOME*\oracle_common\upgrade\bin on Windows operating systems.

2. Enter the following command to start the Upgrade Assistant.

   On UNIX operating systems:

   ```
   ./ua -readiness
   ```

   On Windows operating systems:

   ```
   ua.bat -readiness
   ```

   Provide the required information in each of the Upgrade Assistant screens. The screens you see will vary depending on the upgrade options you select. The sections below describe the upgrade options and the information you will need to provide.

2.17 Locating Your Component-Specific Upgrade Documentation

You can now begin your upgrade. Use the following table to determine which upgrade-specific tasks you will need to complete for your 12*c* upgrade.

Table 2-2   Documentation for Completing Your Upgrade

Table 2-2   (Cont.) 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.	*Upgrading to the Oracle Fusion Middleware Infrastructure*
Oracle HTTP Server - Managed or Standalone	An Oracle HTTP Server that is configured to work with a WebLogic domain for management functions is a managed server. An Oracle HTTP Server that is not managed by, or registered to, an Oracle WebLogic domain is a standalone server.	*Upgrading Oracle HTTP Server*
Oracle SOA Suite and BPM	SOA Suite components including: Business Process Management (BPM), Oracle Service Bus (OSB), Enterprise Security Services (ESS), Managed File Transfer (MFT), Business Activity Monitoring (BAM), and workflow instance data.	*Upgrading Oracle SOA Suite and Business Process Management*
User Messaging Service	User Messaging Service	*Administering Oracle User Messaging Service*
Oracle Data Integrator	Data Integrator	*Upgrading Oracle Data Integrator*

3

Upgrading and Preparing Your Oracle Databases for 12c (12.2.1)

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

This chapter contains the following sections:

- Understanding Database Certification Changes in 12c

- Verifying Your 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 (12.2.1), your existing database must be used for the upgrade. Do not create a new database.

3.1 Understanding the 12*c* (12.2.1) Database Requirements

Many Oracle Fusion Middleware products require database schemas prior to domain configuration.

To find a certified database for your operating system, see the certification document for your release on the *Oracle Fusion Middleware Supported System Configurations* page.

To make sure your database is properly configured for schema creation, see "Verifying Requirements for Oracle Repository Creation Utility" in the *Oracle Fusion Middleware System Requirements and Specifications* document.

> **Note:**
>
> Only a certified database can be used for the Oracle Fusion Middleware Infrastructure standard installation topology.
>
> The Oracle Platform Security Services (OPSS) schema is not supported on third-party databases for this release.

For SOA Upgrades Only: When installing or identifying a database to use with Oracle SOA Suite, there are additional considerations, including the size and profile of the database and its ability to store data for large numbers of Oracle SOA Suite composite applications. For more information, see the following resources:

- "About the Database Profile Custom Variable" in *Installing and Configuring Oracle SOA Suite and Business Process Management*

- "Introduction to SOA Composite Applications" in *Administering Oracle SOA Suite and Oracle Business Process Management Suite*

- "Identifying the Profile or Size of the Database" in *Administering Oracle SOA Suite and Oracle Business Process Management Suite*

After your database is properly configured, you can create your product schemas:

- The Repository Creation Utility (RCU) is the tool used to create schemas in your database. The Repository Creation Utility is included in each 12c distribution, unlike Fusion Middleware 11g, which required a separate download and installation of RCU. For more information, see *Installing and Configuring the Oracle Fusion Middleware Infrastructure*.

- Refer to your product installation guides for the specific schemas (if any) required by your Oracle Fusion Middleware product along with instructions to create the schemas.

- Refer to *Creating Schemas with the Repository Creation Utility* for more information about the Repository Creation Utility.

3.2 Understanding Database Certification Changes in 12c

It is important that you review the very latest information on certified databases for Oracle Fusion Middleware before proceeding with your database upgrade. For more information, see the Certification Matrix for 12c (12.2.1).

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.

Note the following important changes for 12c:

- Oracle XE is not supported.

- **Oracle Database Users:** Oracle Fusion Middleware only supports schemas in a byte-mode database. The NLS_LENGTH_SEMANTICS initialization parameter, on the database where the schemas reside, must be set to BYTE; setting this parameter to CHAR is not supported.

    If NLS_LENGTH_SEMANTICS is set to CHAR, then the Upgrade Assistant will report the following exception:

    ```
    JDBC SQLException - ErrorCode: 1450SQLState:72000 Message: ORA-01450: maximum key
    length (6398) exceeded
    ```

    To check the values of this parameter using SQL*Plus, you can use the show parameters command:

    ```
    SQL> sqlplus "sys/<password> as sysdba"
    SQL> show parameters nls_length_semantics
    ```

    Replace *<password>* with the actual password for the SYS user.

    Alternatively, you can check the values by querying the V$PARAMETER view:

```
SQL> sqlplus "sys/password as sysdba"
SQL> select name,value from v$parameter;
```

For more information, refer to you database administration documentation.

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.

3.3 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 .

Table 3-1 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 3-1   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: • 9.0.1.3 (or earlier) -> 9.0.1.4 -> 10.2.0.4 -> 11.2 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..
9.2.0.8 10.1.0.5 10.2.0.2 11.1.0.6 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. For release 9.2.0.3, you must first upgrade to an intermediate Oracle Database release, as follows: 9.2.0.3 (or earlier) -> 9.2.0.8 -> 11.1.0.7 9.2.0.3 (or earlier) -> 9.2.0.8 -> 11.2 To upgrade to a new Oracle Database release, follow the instructions in "Upgrading to the New Release of Oracle Database.

3.4 Verifying Your Schemas Are Ready for Upgrade

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

- Task 1: Verifying Schema Versions

- Task 2: Checking for Invalid Database Objects

3.4.1 Task 1: 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.

Before you run the Upgrade Assistant, make sure that you have verified that the schemas you want to upgrade are supported for an upgrade to this version of Oracle Fusion Middleware. Complete instructions for verifying schema version information is described in "Identifying Schemas that Can be Upgraded with the Upgrade Assistant" in *Upgrading with the Upgrade Assistant*.

3.4.2 Task 2: 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.

3.5 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® Application Server Release Notes* .

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

A

Performing an Out-of-Place Domain Directory Upgrade

This section describes the process of upgrading your Fusion Middleware 11g domain directory to Release 12c (12.2.1) in a different domain directory, allowing you to keep your 11g domain directory intact.

The following topics are described in this chapter:

- About Upgrading a Domain Directory Out of Place

- Performing an Out-of-Place Domain Directory Upgrade on the Same Host

- Performing an Out-of-Place Domain Directory Upgrade on a Different Host

- Deinstalling the 11g Applications (Optional)

A.1 About Upgrading a Domain Directory Out of Place

When upgrading Oracle Fusion Middleware to 12c (12.2.1), schemas and domain directory upgrades are performed "in-place" which updates the existing 11*g* or 12c 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 12.2.1 distributions in a new Oracle Home.

- Task 5: Upgrade the cloned environment using the standard upgrade procedures.

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

> **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.

A.2.1 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]
```

A.2.2 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/

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.

A.2.3 Task 3: Restore the 11g domain backup files to a new location.

Copy the files you backed up in Task 2: Backup all files from the 11g domain. 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: Upgrade the cloned environment using the standard upgrade procedures. .

A.2.4 Task 4: Install the 12.2.1 distributions in a new Oracle Home.

You must obtain, install and configure the 12c (12.2.1) product distributions for the components you will be upgrading.

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

A.2.5 Task 5: Upgrade the cloned environment using the standard upgrade procedures.

Perform the upgrade on the domain you created in Task 3: Restore the 11g domain backup files to a new location. .

Each 12c (12.2.1) 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 (12.2.1) topology. The guides are located in the Upgrade tab of the Oracle Fusion Middleware 12c (12.2.1) online library.

A.2.6 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 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. (Host A)

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

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

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

- Task 5: Install the 12.2.1 distributions in a new Oracle Home. (Host B)

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

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

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.

A.3.1 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]
```

A.3.2 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/

A.3.3 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.

A.3.4 Task 4: Restore the 11g domain backup from Host A to Host B.

Restore the files you backed up in Task 2: Backup all files from the host machine. (Host A) 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*.

A.3.5 Task 5: Install the 12.2.1 distributions in a new Oracle Home. (Host B)

You must obtain, install and configure the 12c (12.2.1) product distributions for the components you will be upgrading.

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

A.3.6 Task 6: Upgrade the environment using the standard upgrade procedures. (Host B)

Each 12c (12.2.1) 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 or 12.1.3) infrastructure topology to the new 12c (12.2.1) topology. The guides are located in the Upgrade tab of the Oracle Fusion Middleware 12c (12.2.1) online library.

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

A.3.7 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 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.

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