Oracle® Fusion Middleware
System Requirements and Specifications

12*c* (12.2.1.3.0)

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Oracle Fusion Middleware System Requirements and Specifications, 12*c* (12.2.1.3.0)

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Preface

This document lists all the system requirements and the required specifications for the Oracle Fusion Middleware software.

- Audience
- Documentation Accessibility

Audience

In general, this document is intended for administrators of Oracle Fusion Middleware, who need to know the system requirements and specification details in the Oracle Fusion Middleware software.

Documentation Accessibility

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

Access to Oracle Support

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

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System Requirements and Specifications

This document contains system and platform-specific information for Oracle Fusion Middleware products.
The following topics are covered in this document:

- Using This Document with the Certification Matrix and Product Installation Guides
- Processor Requirements
- Java Development Kit (JDK) Requirements
- General Memory and Disk Space Requirements
- Product-Specific Memory and Disk Space Requirements
- Network Requirements
- UNIX Operating System Requirements
- Windows Operating Systems Requirements
- Virtualization Requirements
- Database Requirements

Using This Document with the Certification Matrix and Product Installation Guides

This document is intended for use in conjunction with the various Oracle Fusion Middleware product installation guides and the *Oracle Fusion Middleware 12c Release 1 Certifications*.

Consider the following pre-installation workflow:

Task 1 Find Out What is Certified
The *Oracle Fusion Middleware 12c Release 1 Certifications* can be found in the table on the Oracle Fusion Middleware Supported System Configurations page. Find the `.xls` document that includes your products.
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.
If you use My Oracle Support, you can reference **My Oracle Support Certifications**, which is a self-service certification application which provides a structured display of most common certification data. Go to

```
http://support.oracle.com/
```

and refer to the **Certifications** tab.

Task 2 Verify the Requirements of the Certification
This 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 32-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 therefore also resides outside of the documentation libraries and is available on Oracle Technology Network.

Task 3 Install Your Software
After you have verified that your environment meets the requirements specified in both the certification documents and system requirements, you are ready to begin your installation.
Your product installation guides contain the step-by-step instructions to get your product physically installed and configured on your system. These guides are available only from the documentation library (`http://docs.oracle.com/`) and therefore are not updated unless there is a subsequent product release. Both the certification and system requirement documents can be updated multiple times in between product releases, depending on whether or not new information is available.

Processor Requirements

Oracle Fusion Middleware requires a minimum 1-GHz CPU.

Java Development Kit (JDK) Requirements

To run the installers in the 12 *c* 12.2.1.3.0, you must have a certified JDK already installed on your system. Most Fusion Middleware products are available as platform-generic distributions in `.jar` file format. Some products (for example, Oracle HTTP Server) have a `.bin` (for UNIX operating systems) or `.exe` (for Windows operating systems) installer. In the 12 *c* 12.2.1.3.0, the Fusion Middleware products, the platform-specific distributions no longer include and configure a JDK automatically.

At the time this document was published, the certified JDK was jdk1.8.0_131. For information about the latest certified JDKs, refer to the certification document for your software version listed in Oracle Fusion Middleware Supported System Configurations page.

> **✎ Note:**
>
> It is a best practice to use a separate JDK location than the one installed on the system. One that you can manage and maintain with the Fusion Middleware products. See, Doc ID 1492980.1 **How to Install and Maintain the Java SE Installed or Used with FMW 11***g* **or 12***c* **Products**. This ensures that the Oracle Fusion Middleware software is using the proper version of the JDK software.
>
> For example, if RCU cannot locate the proper JDK software, RCU will fail with the following error: `Cannot Find the File javaw.`

General Memory and Disk Space Requirements

This section contains the general, minimum memory and disk space requirements for Oracle Fusion Middleware, including Oracle Fusion Middleware Infrastructure.

The following topics are covered:

- General Memory Requirements
- Temporary Disk Space Requirements

General Memory Requirements

The following sections provide general information about how to determine the amount of memory required to run the Oracle Fusion Middleware products you have purchased:

- Minimum Memory Requirement for Installing Oracle Fusion Middleware
- Using a Formula to Determine Memory Requirements for a Specific Deployment
- Example: Determining Memory Requirements for a Development Environment
- Example: Determining Memory Requirements for a Production Environment
- Considering the Impact of Open File and Process Limits on Memory Requirements

Minimum Memory Requirement for Installing Oracle Fusion Middleware

Unless otherwise noted, Table 1-1 lists the general minimum memory requirements for installing Oracle Fusion Middleware products.

> **Note:**
>
> For the purposes of this document, memory requirements fall into two categories: **physical memory** (the amount of physical RAM installed on host) and the **minimum available memory**, which includes swap space in addition to the physical memory.
>
> The memory requirements listed here are **minimum requirements**. The actual required memory will vary, depending upon the number of Managed Servers and the number of Oracle Fusion Middleware products you configure in the domains on each host. For some guidelines about determining the amount of memory required for a specific deployment, see Using a Formula to Determine Memory Requirements for a Specific Deployment.
>
> If you plan to install and configure a database instance on the same server, you should add at least an additional 2 GB of physical and 2 GB of available memory. For more information about memory requirements for the database, see the documentation for your database software version.

Table 1-1   Memory Requirements for Installing Oracle Fusion Middleware

Operating System	Minimum Physical Memory Required	Minimum Available Memory Required
Linux	4 GB	8 GB
UNIX	4 GB	8 GB
Windows	4 GB	8 GB

Using a Formula to Determine Memory Requirements for a Specific Deployment

Oracle Fusion Middleware installations vary widely in terms of how the Oracle WebLogic Server domains that support them are configured. For example, in some highly available production environments, you might have several Managed Servers running on each host. On the other hand, a single Administration Server, configured in a supported compact domain configuration is adequate for some development purposes.

To estimate the amount of required memory required to run Oracle Fusion Middleware 12*c* in a particular deployment configuration, you can consider the amount of memory required by the operating system and other software, and then add a set amount of memory that will be required for each Java Virtual Machine (JVM) that you plan to configure on the host. Each Managed Server configured in a domain represents a single JVM instance.

> **✎ Note:**
>
> It is recommended that for the performance of a well-scaled production environments, the total Java heap memory allocations for all the Managed Servers per host add up to no more than 50% of the total physical memory on the host. If larger JVM heap sizes are required, or more managed servers are needed, physical memory should be increased accordingly.

In general, you can use the following formula as a general guideline to predict the minimum available memory requirements for Oracle Fusion Middleware:

```
    3 GB of available memory for the operating system and other software
 +  3 GB of available memory for each Managed Server
 ---------------------------------------------------
    Total required available memory
```

It is important to note that this is a general guideline and the actual memory required for the operating system or a specific Managed Server can vary widely, depending on the resources and services targeted to the host or to the Managed Server.

Example: Determining Memory Requirements for a Development Environment

When determining memory required for a development environment, consider the type of domain you are using to test your applications.

If you are using the integrated Oracle WebLogic Server domain, which you run directly from Oracle JDeveloper, see Oracle JDeveloper Requirements.

If you are configuring a compact domain for your development system, you can use the general memory formula in Using a Formula to Determine Memory Requirements for a Specific Deployment as a guideline to determine the initial required memory requirements.

In the compact domain scenario, all resources are targeted to the Administration server, so you need enough memory to support the operating system and one Administration Server:

```
   3 GB for the operating system and other software
 + 3 GB for the Administration Server
-------------------------------------
   6 GB of available memory
```

Example: Determining Memory Requirements for a Production Environment

In a production environment, Oracle recommends as a best practice that you target products and services to specific Managed Servers and clusters, based on the resources required by the products and services.

For example, in a typical enterprise deployment of Oracle SOA Suite, you target Oracle Web Services Manager (OWSM) to one cluster and Oracle SOA Suite to another cluster. This can result in a domain with multiple Managed Servers on each host. As you add additional managed clusters, the memory requirements increase.

For example, if you are planning to configure a Oracle WebLogic Server domain with an Administration Server and two Managed Servers, then you could use the following formula to determine the minimum required available memory:

```
   3 GB for the operating system and other software
   3 GB for the Admin Server
 + 6 GB for the two Managed Servers
-------------------------------------
   12 GB
```

Considering the Impact of Open File and Process Limits on Memory Requirements

When determining the memory requirements for a production environment, you should also take into account other operating system settings, including the number of file descriptors (open files) allowed per process and the number of processes required for each product or service that is targeted to a Managed Server.

For information about the recommended minimum open file and process limits for Oracle Fusion Middleware, see Setting the Open File Limit and Number of Processes Settings on UNIX Systems.

For an example of the minimum amount of memory, file descriptors, and processes required for an enterprise deployment in a production environment, see Typical Memory, File Descriptors, and Processes Required for an Oracle SOA Suite Enterprise Deployment in the *Enterprise Deployment Guide for Oracle SOA Suite*.

Temporary Disk Space Requirements

The installation program uses a temporary directory into which it extracts the files that are needed to install the software on the target system. During the installation process, your temporary directory must contain sufficient space to accommodate the compressed Java Run-time Environment (JRE) bundled with the installation program and an uncompressed copy of the JRE that is expanded into the temporary directory. The extracted files are deleted from the temporary directory after the installation process. The files in the temporary directory require approximately 2.5 times the space that is ultimately required for the installation.

By default, the installation program uses the following temporary directories:

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

> **Note:**
>
> If you do not have enough temporary space to run the installation program, you are prompted to specify an alternate directory or exit the installation program.

To make sure that you have adequate temporary space, you may want to allocate an alternate directory for this purpose by doing one of the following (depending on your operating system:

- On Windows operating systems, set the `TMP` system variable to a directory of your choice.
- Run the installation program from the command line and include the `-Djava.io.tmpdir=`*`tmpdirpath`* option, replacing *`tmpdirpath`* with the full path of the directory you want to designate as a temporary storage area for the installation program.

  For example, to set up the temporary directory while running the Oracle Fusion Middleware Infrastructure installer for Windows, run the following command:

  ```
  java -Djava.io.tmpdir=C:\Temp -jar fmw_infra_121200.jar
  ```

  Similarly, to set up the temporary directory while running a platform-specific installer, such as the Oracle HTTP Server installer on a Linux system, run the following command:

  ```
  ./ohs_linux64.bin -J-Djava.io.tmpdir=/scratch/<temp dir>
  ```

Product-Specific Memory and Disk Space Requirements

This section provides memory and disk space requirements for specific Oracle Fusion Middleware products:

- Oracle Universal Installer Requirements
- Repository Creation Utility Requirements
- Oracle WebLogic Server and Coherence Disk Space Requirements

- Oracle Fusion Middleware Infrastructure Disk Space Requirements
- Oracle HTTP Server Disk Space Requirements
- Oracle Data Integrator Requirements
- Oracle JDeveloper Requirements
- Oracle GoldenGate Studio Requirements
- Oracle SOA Suite and Business Process Management Requirements
- Oracle Managed File Transfer Requirements
- Oracle WebCenter Content User Interface Database Driver Requirements
- Oracle Business Intelligence Requirements

Oracle Universal Installer Requirements

This section contains prerequisite information for the Oracle Universal Installer (OUI). The requirements in this section must be met in order for the installer to start:

- Startup Requirements
- Modifying the SHMMAX Parameter on Linux Operating Systems

Startup Requirements

The items in Table 1-2 are verified as the installer is being started:

Table 1-2   Oracle Universal Installer Startup Requirements

Category	Accepted or Minimum Values
Platforms	For a complete list of supported platforms, refer to Oracle Fusion Middleware Supported System Configurations page, as described in Using This Document with the Certification Matrix and Product Installation Guides.
CPU Speed	At least 300MHz.
Monitor	At least 256 colors (this is a requirement for the graphical mode installer only).
Swap Space	At least 512MB.
JDK	See Java Development Kit (JDK) Requirements for more information about JDK verification on your system.

Table 1-2   (Cont.) Oracle Universal Installer Startup Requirements

Category	Accepted or Minimum Values
Temp Space	At least 300MB.

> **Note:**
>
> The temporary space noted here is in addition to the temporary space required for installer extraction as mentioned in Temporary Disk Space Requirements.

Modifying the SHMMAX Parameter on Linux Operating Systems

If you are running Oracle Universal Installer on a certified Linux operating system, you must modify the value of the SHMMAX kernel parameter to avoid seeing errors generated by the Oracle Universal Installer.

> **Note:**
>
> The following examples are for Linux operating systems. Consult your operating system documentation to determine the commands to be used on your system.

To set the SHMMAX kernel parameter:

1. Change the value of SHMMAX to 4294967295 by including the following line in `/etc/sysctl.conf`:

   ```
   kernel.shmmax = 4294967295
   ```

2. Activate the new SHMMAX setting by running the command:

   ```
   /sbin/sysctl -p
   ```

3. Start the Oracle Universal Installer and install your software.

Repository Creation Utility Requirements

This section contains the following topics:

- RCU Supported Platforms
- RCU Requirements for Oracle Databases

RCU Supported Platforms

You can run RCU from any machine to connect to any certified local or remote database in order to create the schemas required by your Oracle Fusion Middleware product. The database can be running on any operating system platform that is supported by that particular database.

RCU Requirements for Oracle Databases

RCU checks for the following on Oracle databases:

- Database version is:

  - Equal to or higher than 11.2.0.4 for 11*g* Release 2 databases

  - Equal to or higher than 12.1.0.1 for 12*c* databases

  > **Note:**
  >
  > Always refer to the appropriate certification document for your release on the Oracle Fusion Middleware Supported System Configurations page for the latest certification information.
  >
  > In some cases, additional database certifications may be added before RCU is updated. When you run RCU, you may receive a warning that the database on which you are installing the schemas is not supported; as long as the database version is listed in the certification document, you can safely ignore this warning.

- Database supported type is Oracle Enterprise Edition.

  > **Note:**
  >
  > Oracle Enterprise Edition is certified for Oracle Fusion Middleware.

- Database is installed with Oracle JVM enabled. Refer to your database documentation for information about how to do this.

- Character set is AL32UTF8.

  If your database does not use the AL32UTF8 character set, you will see the following warning when running RCU:

  ```
  The selected Oracle database is not configured to use the AL32UTF8 character
  set. Oracle strongly recommends using the AL32UTF8 character set for
  databases that support Oracle Fusion Middleware.
  ```

  User can proceed with this warning but it is highly recommended to use the AL32UTF8 character set to avoid any error with RCU.

- The following database parameters are set as specified:

Parameter	Minimum Required Value
SHARED_POOL_SIZE	147,456 KB
SGA_MAX_SIZE	147,456 KB
DB_BLOCK_SIZE	8 KB
session_cached_cursors	100
processes	500
open_cursors	800
db_files	600

For details on Database Requirements, see Database Requirements.

> **✎ Note:**
>
> If the Repository Creation Utility fails to load schemas for SOAINFRA when you run schemas on an Oracle hardened database, see SOAINFRA Schema Creation Fails on a Hardened Database.

Oracle WebLogic Server and Coherence Disk Space Requirements

Table 1-3 lists the disk space requirements for Oracle WebLogic Server and Coherence.

Table 1-3   Oracle WebLogic Server and Coherence Disk Space Requirements

Installation Type	Disk Space Required
Coherence Installation	890 MB
WebLogic Server Installation	913 MB
Complete Installation	1061 MB

Oracle Fusion Middleware Infrastructure Disk Space Requirements

Table 1-4 shows the disk space requirements for Oracle Fusion Middleware Infrastructure.

Table 1-4   Oracle Fusion Middleware Infrastructure Disk Space Requirements

Installation Type	Disk Space required
Fusion Middleware Infrastructure	1.4 GB
Fusion Middleware Infrastructure With Examples	1.5 GB

Oracle HTTP Server Disk Space Requirements

Table 1-5 shows the disk space requirements for Oracle HTTP Server.

Table 1-5   Oracle HTTP Server Disk Space Requirements

Installation Type	Disk Space Required
Standalone HTTP Server	1.5 GB
Colocated HTTP Server	1.5 GB

Oracle Data Integrator Requirements

Table 1-6 shows the system requirements for Oracle Data Integrator.

Table 1-6   Oracle Data Integrator Requirements

Resource	Recommended Minimum Value
CPU	Pentium IV 2 GHz or faster
Available Memory	3 GB of RAM for one agent.
	For environments with no WebLogic server, the amount of memory you want to allocate to each agent is set by the `ODI_MAX_HEAP` parameter in the `DOMAIN_HOME`/bin/setODIDomainEnv.[sh|bat] script. The default value is 256MB, which means you can run more than one agent on a system with 2GB of available memory (for example, two agents would take up 512MB of memory).
	The value set by `ODI_MAX_HEAP` multiplied by the number of agents is the minimum amount of available memory required on your system; the amount of additional memory needed beyond this number depends on the number of other application you have running on your system.
	For environments with WebLogic server, set the memory allocation by modifying the `WLS_MEM_ARGS_64BIT` parameter in the `DOMAIN_HOME`/bin/setDomainEnv.[sh|bat] script.
	See, Tuning Java Virtual Machines (JVMs) in *Performance and Tuning for Oracle WebLogic Server*.
Disk Space	Standalone Installation: 3.5 GB
	Enterprise Installation: 3.5 GB
	Embedded Enterprise Installation (separate installation required for the Standalone Installation to have access to ODI Studio): 2.5 GB
Database Space	The following are the recommended database storage space values:
	• Master Repository: 200 MB
	• Work Repository: 400 MB

Oracle JDeveloper Requirements

This section contains the system requirements for Oracle JDeveloper on various operating systems:

- Oracle JDeveloper Requirements on Windows Operating Systems
- Oracle JDeveloper Requirements on Linux Operating Systems
- Oracle JDeveloper Requirements on MAC OS X Operating Systems

Oracle JDeveloper Requirements on Windows Operating Systems

Table 1-7 lists the recommended CPU, memory, display, and hard drive requirements for Windows operating systems:

Table 1-7   System Requirements for Oracle JDeveloper on Windows Operating Systems

Resource	Recommended Minimum Value
CPU	Intel Core 2 i5 or equivalent
Memory	4 GB of RAM on 64-bit systems
Display	65536 colors, set to at least 1024 X 768 resolution
Hard Drive Space	3 GB for Studio Edition 90 MB for Java Edition

Oracle JDeveloper Requirements on Linux Operating Systems

Table 1-8 lists the recommended CPU, memory, display, and hard drive requirements for Linux operating systems:

Table 1-8   System Requirements for Oracle JDeveloper on Linux Operating Systems

Resource	Recommended Minimum Value
CPU	Intel Core 2 i5 or equivalent
Memory	4 GB of RAM on 64-bit systems
Display	65536 colors, set to at least 1024 X 768 resolution
Hard Drive Space	3 GB for Studio Edition 90 MB for Java Edition

Oracle JDeveloper Requirements on MAC OS X Operating Systems

Table 1-9 lists the recommended CPU, memory, display, and hard drive requirements for MAC OS X operating systems:

Table 1-9   System Requirements for Oracle JDeveloper on MAC OS X Operating Systems

Resource	Recommended Minimum Value
CPU	64-bit Intel processors
Memory	4 GB of RAM
Display	Thousands of colors
Hard Drive Space	3 GB for Studio Edition 90 MB for Java Edition

Oracle GoldenGate Studio Requirements

Table 1-10 shows the system requirements for Oracle GoldenGate Studio.

Table 1-10   Oracle GoldenGate Studio Requirements

Resource	Recommended Minimum Value
CPU	Pentium IV 2 GHz or faster
Available Memory	4 GB
Database Space	600 MB

Oracle SOA Suite and Business Process Management Requirements

This section contains the following topics:

- Disk Space Requirements
- Task Form Editor Requirements

Disk Space Requirements

Table 1-11 shows the minimum disk space requirements for Oracle SOA Suite and Business Process Management:

Table 1-11   Oracle SOA Suite and Business Process Management Disk Space Requirements

Installation Type	Disk Space Required
BPM	1600 MB
SOA Suite	1200 MB

Task Form Editor Requirements

Task Form Editor has the operating system requirements summarized in Table 1-12.

Table 1-12   Task Form Editor Operating System Requirements

Platform	Minimum Operating System Required
Linux	Oracle Linux 6 or higher
Windows	Windows Vista+ or higher

Oracle Managed File Transfer Requirements

Installation of the Oracle Managed File Transfer distribution requires 200 MB of disk space.

Oracle WebCenter Content User Interface Database Driver Requirements

The MDS data source in WebCenter Content User Interface *cannot* work with XA drivers only.

However, by default, the driver Oracle's DB2 XA (Type 4XA) Versions:7.x and later is selected in the JDBC Datasources screen in the Configuration Wizard. However, multi data source is *not* certified with the DB2 XA driver.

You must select the non-XA Driver, Oracle's DB2 Driver (Type 4) Versions:7.x and later for WebCenter Content User Interface to work properly.

See the 12*c* (12.2.1.3.0) certification document on the Oracle Fusion Middleware Supported System Configurations page for the latest information on certified databases.

Oracle Business Intelligence Requirements

This section contains important information for the system on which you are installing the Oracle Business Intelligence and the database containing the schemas. The following topics are covered:

- Installation System Requirements for Oracle Business Intelligence
- Database Requirements for Oracle Business Intelligence

Installation System Requirements for Oracle Business Intelligence

Following are the recommended hardware and system configuration requirements for an Oracle Business Intelligence installation:

- Disk Space: 20 GB or more
- Available Memory: 8 GB or more for 64-bit operating systems
- Temp Space: 2 GB or more
- Swap Space: 8 GB or more for 64-bit operating systems

Database Requirements for Oracle Business Intelligence

Below are the recommended disk space requirements for the database containing the Oracle Business Intelligence Scheduler database tables.

- 500 MB on Oracle and Microsoft SQL Server databases for standalone and Business Intelligence applications and deployments.
- 500 MB on IBM DB2 databases for standalone deployments.

Network Requirements

Typically, the computer on which you want to install Oracle Fusion Middleware is connected to the network. The computer has local storage to store the Oracle Fusion Middleware installation and also contains a display monitor and DVD drive.

This section describes how to install Oracle Database on computers that do not meet the typical scenario. It describes the following cases:

- Guidelines for a Correct Format of Entries in the /etc/hosts File

- Understanding IPv6 and Oracle Fusion Middleware

- Configuration Requirements for Installing on a DHCP Host

- Configuration Requirements for Installing on a Non-Networked Computer

- Configuration Requirements for Installing on a Multihomed Computer

- Configuration Requirements for Time Synchronization

Guidelines for a Correct Format of Entries in the /etc/hosts File

To ensure that both forward lookup (find the IP address given the hostname) and reverse lookup (finding the hostname given the IP address) return the same results, make sure your `/etc/hosts` file is formatted correctly using the following guidelines:

- The host name may contain only alphanumeric characters, hyphen, and period. The name must begin with an alphabetic character and end with an alphanumeric character.

- Host names should be specified as fully qualified host names (host name with the appended domain name).

- Lines cannot start with a blank space or tab character, but fields may be separated by any number of space or tab characters.

- Comments are allowed and designated by a pound sign (#) preceding the comment text.

- Trailing blank and tab characters are allowed.

- Blank line entries are allowed.

- Only one host entry per line is allowed.

Understanding IPv6 and Oracle Fusion Middleware

Oracle Fusion Middleware supports Internet Protocol Version 4 (IPv4) and Internet Protocol Version 6 (IPv6.) Among other features, IPv6 supports a larger address space (128 bits) than IPv4 (32 bits), providing an exponential increase in the number of computers that can be addressable on the Web.

An IPv6 address is expressed as 8 groups of 4 hexadecimal digits. For example:

```
2001:0db8:85a3:08d3:1319:8a2e:0370:7334
```

This section contains the following additional topics to help you understand IPv6 in Oracle Fusion Middleware:

- Understanding IPv6 Support by Component
- Understanding IPv6 Support by Topology

Understanding IPv6 Support by Component

Table 1-13 describes support for IPv6 by Oracle Fusion Middleware components:

- The column **IPv6 Only** shows whether a component supports using IPv6 only for all communication.
- The column **Dual Stack** shows whether a component supports using both IPv6 and IPv4 for communication. For example, some components do not support using IPv6 only, because some of the communication is with the Oracle Database, which supports IPv4, not IPv6. Those components support dual stack, allowing for IPv6 communication with other components.

Table 1-13   IPv6 Support in Oracle Fusion Middleware

Component	IPv6 Only	Dual Stack	Comments
Oracle Application Development Framework	Yes	Yes	None.
Oracle HTTP Server	Yes	Yes	To configure Oracle HTTP Server for IPv6, see Configuring Oracle HTTP Server for IPv6 in *Administering Oracle Fusion Middleware*.
Oracle WebLogic Server	Yes	Yes	The Oracle WebLogic Server Web Server plug-ins support IPv6, beginning with the 11*g* release.
Oracle Data Integrator	No	Yes	Requires a dual stack because Oracle Database requires IPv4 addresses. The Agent requires IPv4 addresses. The Oracle Data Integrator server can be on a dual-stack host. The browser client can be on either IPv4 or IPv6 hosts.
Oracle Forms Services	No	No	Oracle Forms and Reports are configured with Oracle HTTP Server and `mod_wl_ohs` to proxy requests, which can be configured for IPv6.
Oracle Information Rights Management	No	Yes	Requires a dual stack but the client (the browser) can be on a host configured for IPv6.
Oracle Platform Security Services	No	Yes	Requires a dual stack because Oracle Database requires IPv4 addresses.
Oracle Reports	No	No	Uses reverse proxy to communicate with Oracle HTTP Server, which can be configured for IPv6.
Oracle SOA Suite	No	Yes	Requires a dual stack because Oracle Database requires IPv4 addresses.

Table 1-13   (Cont.) IPv6 Support in Oracle Fusion Middleware

Component	IPv6 Only	Dual Stack	Comments
Oracle WebCenter Content: Imaging	No	Yes	Requires a dual stack, but the client (the browser) can be on a host configured for IPv6.
Oracle WebCenter Portal	No	Yes	Requires a dual stack because Oracle Database requires IPv4 addresses.
Oracle Internet Directory, Oracle Unified Directory and Directory Integration Platform	Yes	Yes	None

Understanding IPv6 Support by Topology

Table 1-14 shows the supported topologies for IPv4 and IPv6 (dual-stack means that the host is configured with both IPv4 and IPv6):

Table 1-14   Supported IPv6 Topologies

Topology	Description
Topology A	This topology includes: • Oracle Database on an IPv4 protocol host • Oracle WebLogic Server on a dual-stack host • Clients on an IPv4 protocol host • Clients on an IPv6 protocol host
Topology B	This topology includes: • Oracle Database on an IPv4 protocol host • One or more of Oracle WebLogic Server or Fusion Middleware Control on dual-stack hosts • Oracle HTTP Server with `mod_wl_ohs` on an IPv6 protocol host
Topology B	This topology includes: • Oracle Database on an IPv4 protocol host • One or more of Oracle WebLogic Server, Fusion Middleware Control, Oracle SOA Suite, Oracle WebCenter Portal, or Oracle Business Activity Monitoring on dual-stack hosts • Oracle HTTP Server with `mod_wl_ohs` on an IPv6 protocol host
Topology C	This topology includes: • Database, such as MySQL, that supports IPv6 on an IPv6 protocol host • Oracle WebLogic Server on an IPv6 protocol host • Clients on an IPv6 protocol host

Table 1-14   (Cont.) Supported IPv6 Topologies

Topology	Description
Topology D	This topology includes: • Oracle Database on an IPv4 protocol host • One or more of Oracle WebLogic Server or Fusion Middleware Control on dual-stack hosts • Clients on an IPv4 protocol host • Clients on an IPv6 protocol host
Topology E	This topology includes: • Oracle Database on an IPv4 protocol host • One or more of Oracle Forms Services or Oracle Reports on dual-stack hosts • Oracle HTTP Server with `mod_proxy` on a dual stack host • Clients on an IPv6 protocol host
Topology F	This topology includes the following: • Oracle Access Manager Release 10.1.4.3 and applications, such as SOA composite applications, on an IPv4 protocol host • Oracle HTTP Server with `mod_proxy` on a dual stack host • Clients on an IPv6 protocol host
Topology D	This topology includes: • Oracle Database on an IPv4 protocol host • One or more of Oracle Identity Management, Fusion Middleware Control, Oracle SOA Suite, Oracle WebCenter Portal, or Oracle Business Activity Monitoring on dual-stack hosts • Clients on an IPv4 protocol host • Clients on an IPv6 protocol host
Topology G	This topology includes: • Oracle Database on an IPv4 protocol host • One or more of Oracle WebLogic Server or Fusion Middleware Control on an IPv4 protocol host • Oracle HTTP Server with `mod_wl_ohs` on a dual-stack host • Clients on an IPv6 protocol host
Topology G	This topology includes: • Oracle Database on an IPv4 protocol host • One or more of Oracle SOA Suite, Oracle WebCenter Portal, Oracle Business Activity Monitoring or Fusion Middleware Control on an IPv4 protocol host • Oracle HTTP Server with `mod_wl_ohs` on a dual-stack host • Clients on an IPv6 protocol host

Configuration Requirements for Installing on a DHCP Host

Dynamic Host Configuration Protocol (DHCP) assigns dynamic IP addresses on a network. Dynamic addressing allows a computer to have a different IP address each time it connects to the network. In some cases, the IP address can change while the computer is still connected. You can have a mixture of static and dynamic IP addressing in a DHCP system.

In a DHCP setup, the software tracks IP addresses, which simplifies network administration. This lets you add a new computer to the network without having to manually assign that computer a unique IP address. However, before installing Oracle Database onto a computer that uses the DHCP protocol, you must install a loopback adapter to assign a static, non-routable IP address to that computer.

If you are installing your Oracle Fusion Middleware products on a DHCP host, refer to your operating system documentation for instructions on how to properly configure a loopback adapter.

Configuration Requirements for Installing on a Non-Networked Computer

You can install your Oracle Fusion Middleware product on a non-networked computer, such as a laptop. Because a non-networked computer has no access to other computers, you have to install all the components that you need on the computer.

In addition, you must follow the instructions in Configuration Requirements for Installing on a DHCP Host to install a loopback adapter and modify the `hosts` file on your system.

Configuration Requirements for Installing on a Multihomed Computer

You can install your Oracle Fusion Middleware product on a multihomed computer. A multihomed computer is associated with multiple IP addresses. This is typically achieved by having multiple network cards on the computer. Each IP address is associated with a host name; additionally, you can set up aliases for each hostname.

The installer picks up the fully qualified domain name from the first entry in `/etc/hosts` (on UNIX operating systems) or `%SYSTEMROOT%\system32\drivers\etc\hosts` (on Windows operating systems) file. So if your file looks like the following (IPv4 example shown below):

```
127.0.0.1 localhost.localdomain localhost
10.1.1.1 examplehost1.example.com examplehost1
10.2.2.2 examplehost2.example.com examplehost2
```

`examplehost1.example.com` would be picked for configuration.

For specific network configuration of a system component, refer to the individual component's configuration documentation.

In any situation where you change any combination of the host name, domain name, or IP address of a host, you also change the information for your Oracle Fusion Middleware components. See "Changing the Network Configuration of Oracle Fusion

Middleware" in *Administering Oracle Fusion Middleware* for more information about additional steps that need to be performed.

Configuration Requirements for Time Synchronization

To ensure proper interoperability between Oracle Fusion Middleware services, databases, and storage, it is critical that all of the computers have synchronized clocks. A common way to achieve this is to use the Network Time Protocol (NTP) and configure redundant synchronization to multiple time servers. Optionally, to achieve fail-safe redundancy, consider configuring the local servers as NTP peers as well.

See Configuring a Host to Use an NTP (time) Server in an Oracle Fusion Middleware Enterprise Deployment Guide for Oracle WebCenter Portal.

UNIX Operating System Requirements

This section contains system requirement information for UNIX operating systems.

In some cases, a particular platform may be de-supported for use with Oracle Fusion Middleware products. While this particular platform's requirements may remain in this document for legacy purposes, it would no longer be listed in the certification information and would no longer be considered a *certified*platform.

See, Using This Document with the Certification Matrix and Product Installation Guides.

All packages listed are minimum versions.

The following topics are covered in this section:

- General UNIX Operating System Requirements
- Linux Operating System Requirements
- Solaris Operating System Requirements
- HP-UX Operating System Requirements
- IBM AIX Operating System Requirements
- IBM Linux on System z Operating System Requirements

General UNIX Operating System Requirements

This section contains the following topics:

- Enabling Unicode Support
- Setting the Open File Limit and Number of Processes Settings on UNIX Systems

Enabling Unicode Support

Your operating system configuration can influence the behavior of characters supported by Oracle Fusion Middleware products.

On UNIX operating systems, Oracle highly recommends that you enable Unicode support by setting the `LANG` and `LC_ALL` environment variables to a locale with the UTF-8 character set. This enables the operating system to process any character in Unicode. Table 1-15 describes these environment variables.

> **Note:**
>
> Ensure that the required locales for the UTF-8 character set are installed on the host computer. This is a prerequisite for the Oracle Business Intelligence software.

Table 1-15   Language Environment Variables on UNIX Operating Systems

Variable	Description
`LANG`	This environment variable sets the installation default locale. For example: `setenv LANG en_US.UTF-8`
`LC_ALL`	This environment variable overrides the value of the `LANG` environment variable and the values of any other `LC_*` environment variables. For example: `setenv LC_ALL en_US.UTF-8`

To check your current locale settings, use the `locale` command on your system. Below is an example:

```
locale
LANG=en_US.UTF-8
LC_CTYPE=en_US.UTF-8
LC_NUMERIC=en_US.UTF-8
LC_TIME=en_US.UTF-8
LC_COLLATE=en_US.UTF-8
LC_MONETARY=en_US.UTF-8
LC_MESSAGES=
LC_PAPER="POSIX"
LC_NAME="POSIX"
LC_ADDRESS="POSIX"
LC_TELEPHONE="POSIX"
LC_MEASUREMENT="POSIX"
LC_IDENTIFICATION="POSIX"
LC_ALL=
```

If the operating system is configured to use a non-UTF-8 encoding, Oracle SOA Suite components may function in an unexpected way. For example, a non-ASCII file name can make the file inaccessible and cause an error. Oracle does not support problems caused by operating system constraints.

In a design-time environment, if you are using Oracle JDeveloper, select **Tools -> Preferences -> Environment -> Encoding -> UTF-8** to enable Unicode support.

Setting the Open File Limit and Number of Processes Settings on UNIX Systems

> **✎ Note:**
>
> The following examples are for Linux operating systems. Consult your operating system documentation to determine the commands to be used on your system.

For more information, see the following topics:

- Viewing the Number of Currently Open Files
- Setting the Operating System Open File and Processes Limit

Viewing the Number of Currently Open Files

You can see how many files are open with the following command:

```
/usr/sbin/lsof | wc -l
```

To check your open file limits, use the commands below.

C shell:

```
limit descriptors
```

Bash:

```
ulimit -n
```

Setting the Operating System Open File and Processes Limit

To change the Open File Limit:

1. Log in as `root` and edit the following file:

   ```
   /etc/security/limits.conf
   ```

2. Add the following lines to the `limits.conf` file.

   ```
   * soft  nofile  4096
   * hard  nofile  65536
   * soft  nproc   2047
   * hard  nproc   16384
   ```

   The `nofiles` values represent the open file limit; the `nproc` values represent the number of processes limit.

3. Save the changes, close the `limits.conf` file.

4. If you are running Oracle Enterprise Linux 6 or Red Hat Linux 6, locate the following operating system configuration file:

   ```
   /etc/security/limits.d/90-nproc.conf
   ```

5. Make sure the same values are added to the `90-nproc.conf` file; otherwise, the values in the `90-nproc.conf` file can override the values in the `limits.conf` file.

6. Reboot the host computer.

Linux Operating System Requirements

Table 1-16 lists the platform, operating system, package, and patch information for Linux operating systems that are either currently supported or were supported in a previous release.

Use the following links to go directly to the row of your choice:

- x86-64 Oracle Linux 7 (UL0+) and Red Hat Linux 7 (UL0+)
- x86-64 Oracle Linux 6 (Update 6) and Red Hat Linux 6 (Update 6)
- x86-64 SUSE 12 (SP1+)
- x86-64 SUSE 11 (SP3+)
- x86-64 SUSE 15 (SP1+)

Table 1-16   Minimum Requirements for the Linux Operating System

Processor	Operating System Version	Required Packages	Required Kernel Version
| X86-64 | Oracle Linux 7 (UL0+) and Red Hat Linux 7 (UL0+) | ```
binutils-2.23.52.0.1
compat-libcap1-1.10
compat-libstdc+
+-33-3.2.3.x86_64
compat-libstdc+
+-33-3.2.3.i686
gcc-4.8.2
gcc-c++-4.8.2
glibc-2.17.x86_64
glibc-2.17.i686
glibc-devel-2.17.x86_64
libaio-0.3.109.x86_64
libaio-
devel-0.3.109.x86_64
libgcc-4.8.2.x86_64
libgcc-4.8.2.i686
libstdc++-4.8.2.x86_64
libstdc++-4.8.2.i686
libstdc++-
devel-4.8.2.x86_64
dejavu-serif-fonts
ksh
make-3.82
sysstat-10.1.5
numactl-2.0.9 for
x86_64[1]
numactl-devel-2.0.9
for x86_64[2]
motif-2.3.4-7 for
x86_64[3]
motif-devel-2.3.4-7
for x86_64[4]
redhat-
lsb-4.1-27.0.1.el7
for x86_64
redhat-lsb-
core-4.1-27.0.1.el7
for x86_64
openssl-1.0.1e
``` | See How to Obtain the Required Kernel Version for Linux Operating Systems. |

Table 1-16   (Cont.) Minimum Requirements for the Linux Operating System

Processor	Operating System Version	Required Packages	Required Kernel Version

x86-64	Oracle Linux 6 (Update 6+)
	Red Hat Linux 6 (Update 6+)
		`binutils-2.20.51.0.2-5.28.el6`
		`compat-libcap1-1.10-1`
		`compat-libstdc++-33-3.2.3-69.el6.x86_64`
		`compat-libstdc++-33-3.2.3-69.el6.i686`
		`gcc-4.4.4-13.el6`
		`gcc-c++-4.4.4-13.el6`
		`glibc-2.12-1.7.el6.x86_64`
		`glibc-2.12-1.7.el6.i686`
		`glibc-devel-2.12-1.7.el6.i686`
		`libaio-0.3.107-10.el6`
		`libaio-devel-0.3.107-10.el6`
		`libgcc-4.4.4-13.el6`
		`libstdc++-4.4.4-13.el6.x86_64`
		`libstdc++-4.4.4-13.el6.i686`
		`libstdc++-devel-4.4.4-13.el6`
		`libXext.i686`
		`libXtst.i686`
		`openmotif-2.2.3.x86_64`
		`openmotif22-2.2.3.x86_64`
		`sysstat-9.0.4-11.el6`
		`redhat-lsb-4.0-7.el6 for x86_64`
		`redhat-lsb-core-4.0-7.el6 for x86_64`
		`openssl-1.0.1e`
			See How to Obtain the Required Kernel Version for Linux Operating Systems.

Table 1-16   (Cont.) Minimum Requirements for the Linux Operating System

Processor	Operating System Version	Required Packages	Required Kernel Version

x86-64	SUSE 12 (SP1+)	`binutils-2.24-2.165`
		`gcc-4.8-6.189`
		`gcc-c++-4.8-6.189`
		`glibc-2.19-17.72`
		`glibc-devel-2.19-17.72`
		`mksh-50-2.13`
		`libaio1-0.3.109-17.15`
		`libaio-devel-0.3.109-17.15`
		`libcap2-2.22-11.709`
		`libstdc++6-4.8.3+r212056-6.3`
		`libstdc++48-devel-4.8.3+r212056-6.3`
		`libstdc++48-devel-32bit-4.8.3+r212056-6.3`
		`libstdc++6-32bit-4.8.3+r212056-6.3`
		`libgcc_s1-4.8.3+r212056-6.3`
		`libgcc_s1-32bit-4.8.3+r212056-6.3`
		`make-4.0-2.107`
		`xorg-x11-libs-7.6-45.14`
		`motif-2.3.4-4.15.x86_64`
		`openssl-1.0.1e`
			3.12.28-4-default

Table 1-16   (Cont.) Minimum Requirements for the Linux Operating System

Processor	Operating System Version	Required Packages	Required Kernel Version

x86-64	SUSE 11 (SP3+)	`binutils-2.19-11.28`
		`gcc-4.3-62.198`
		`gcc-c++-4.3-62.198`
		`gcc-32bit-4.3`
		`glibc-2.9-13.2`
		`glibc-32bit-2.9-13.2`
		`glibc-devel-2.9`
		`glibc-devel-32bit-2.9-13.2`
		`ksh-93t`
		`libaio-0.3.104-140.22`
		`libaio-devel-0.3.104-140.22`
		`libaio-32bit-0.3.104`
		`libaio-devel-32bit-0.3.104`
		`libgcc43-4.3.3_20081022`
		`libstdc++43-4.3.3_20081022-11.18`
		`libstdc++43-devel-4.3.3_20081022-11.18`
		`libstdc++33-3.3.3`
		`libstdc++33-32bit-3.3.3`
		`libstdc++43-32bit-4.3.3_20081022`
		`libstdc++43-devel-32bit-4.3.3_20081022`
		`libstdc++-devel-4.3`
		`make-3.81`
		`openmotif-2.3.1-3.13`
		`openmotif-devel-32bit-2.3.1-3.13`
		`openmotif22-libs-32bit-2.2.4-138.17`
		`openmotif-libs-2.3.1-3.13`
		`openmotif-devel-2.3.1-3.13`
		`openmotif-libs-32bit-2.3.1-3.13`
		`openmotif21-libs-32bit-2.1.30MLI4-143.2`
		`openmotif22-libs-2.2.4-138.17`
		`sysstat-8.1.5-7.8`
		`openssl-1.0.1e`
			3.0.76-0.11-default

Table 1-16   (Cont.) Minimum Requirements for the Linux Operating System

Processor	Operating System Version	Required Packages	Required Kernel Version

x86-64	SUSE 15 (SP1+)	`binutils-2.29.1-4.46.x86_64`
		`gcc7-ada-7.3.1+r258812-2.15.x86_64`
		`gcc-c++-7-1.563.x86_64`
		`gcc-c++-32bit-7-1.563.x86_64`
		`gcc-ada-7-1.563.x86_64`
		`gcc-locale-7-1.563.x86_64`
		`gcc-info-7-1.563.x86_64`
		`gcc-7-1.563.x86_64`
		`gcc7-c++-7.3.1+r258812-2.15.x86_64`
		`gcc7-info-7.3.1+r258812-2.15.noarch`
		`gcc7-7.3.1+r258812-2.15.x86_64`
		`gcc7-locale-7.3.1+r258812-2.15.x86_64`
		`gcc7-c++-32bit-7.3.1+r258812-2.15.x86_64`
		`gcc7-32bit-7.3.1+r258812-2.15.x86_64`
		`gcc-32bit-7-1.563.x86_64`
		`glibc-2.26-11.8.x86_64`
		`linux-glibc-devel-4.15-1.47.noarch`
		`glibc-devel-2.26-11.8.x86_64`
		`glibc-locale-2.26-11.8.x86_64`
		`glibc-extra-2.26-11.8.x86_64`
		`glibc-32bit-2.26-11.8.x86_64`
		`glibc-devel-32bit-2.26-11.8.x86_64`
		`mksh-56c-1.10.x86_64`
		`libaio1-0.3.109-1.25.x86_64`
		`libaio1-32bit-0.3.109-1.25.x86_64`
		`libaio-devel-32bit-0.3.109-1.25.x86_64`	

Table 1-16   (Cont.) Minimum Requirements for the Linux Operating System

Processor	Operating System Version	Required Packages	Required Kernel Version
		libaio-devel-0.3.109-1.25.x86_64 libcap2-2.25-2.41.x86_64 libcap-ng0-0.7.9-1.42.x86_64 libcap2-32bit-2.25-2.41.x86_64 libstdc++6-7.3.1+r258812-2.15.x86_64 libstdc++6-devel-gcc7-7.3.1+r258812-2.15.x86_64 libstdc++6-32bit-7.3.1+r258812-2.15.x86_64 libstdc++6-devel-gcc7-32bit-7.3.1+r258812-2.15.x86_64 libstdc++6-locale-7.3.1+r258812-2.15.x86_64 libstdc++-devel-7-1.563.x86_64 libgcc_s1-7.3.1+r258812-2.15.x86_64 libgcc_s1-32bit-7.3.1+r258812-2.15.x86_64 make-4.2.1-5.48.x86_64 make-lang-4.2.1-5.48.noarch makedumpfile-1.6.3-5.6.x86_64 xorg-x11-7.6_1-1.22.noarch xorg-x11-server-1.19.6-6.19.x86_64 xorg-x11-fonts-7.6-3.9.noarch xorg-x11-driver-video-7.6_1-2.30.x86_64 xorg-x11-Xvnc-1.8.0-11.23.x86_64 xorg-x11-fonts-core-7.6-3.9.noarch xorg-x11-server-extra-1.19.6-6.19.x86_64 xorg-x11-essentials-7.6_1-1.22.n	

Table 1-16   (Cont.) Minimum Requirements for the Linux Operating System

Processor	Operating System Version	Required Packages	Required Kernel Version
		`oarch` `openssl-1.0.1e`	

[1]Required for OBIEE-Essbase

[2] Required for OBIEE-Essbase

[3] Required for Oracle Forms and Reports

[4] Required for Oracle Forms and Reports

> **Note:**
>
> If the processor for your Linux system is x86-64, then by default, all the x86–64 packages are installed. You must explicitly install the 32–bit packages to synchronize both the i686 and x86–64 versions of the package and to avoid any errors in the Installer Prerequisite Checks. Most of the distributions are 64–bit, but there are some 32–bit distributions for a few components.

How to Obtain the Required Kernel Version for Linux Operating Systems

For default kernel information, see the Shipped Kernels Chapter in the release notes mentioned below. The Red Hat Compatible kernel and the Unbreakable Enterprise kernel (default kernel) mentioned for x86–64 are supported.

To identify the required Kernel version for each supported version of Oracle Linux, refer to the following resources:

- Oracle Linux 7 Documentation Library
  - Oracle Linux 7 (UL0) Release Notes
  - Oracle Linux 7 (UL1) Release Notes
  - Oracle Linux 7 (UL3) Release Notes
  - Oracle Linux 7 (UL4) Release Notes
- Oracle Linux 6 Documentation Library
  - Oracle Linux 6 (UL6) Release Notes
  - Oracle Linux 6 (UL7) Release Notes
  - Oracle Linux 6 (UL8) Release Notes
  - Oracle Linux 6 (UL9) Release Notes

For Oracle Linux 6 (UL5+) and Oracle Linux 7 (UL0+) Containers, refer to Table 1 on Supported Virtualization and Partitioning Technologies for Oracle Fusion Middleware on the Oracle Technology Network.

- Obtaining the openmotif Packages on SUSE 11 Operating System

Obtaining the openmotif Packages on SUSE 11 Operating System

The `openmotif` package is not included by default on SUSE 11 operating system.

If you need to obtain this package, you must go to the Novell website to obtain the package and then perform the installation using the instructions provided by Novell.

Solaris Operating System Requirements

Table 1-17 lists the platform, operating system, package, and patch information for Solaris operating systems that are either currently supported or were supported in a previous release.

> ✎ **Note:**
>
> The SRU 11.3.3.6.0 or later (mandatory patch) is required for the Solaris 11 Update 3 on SPARC or x86-64.

Table 1-17   Solaris Operating System Requirements

Processor	Operating System Version	Required Packages
SPARC64	Oracle Solaris 11.2 Oracle Solaris 11.3 (SRU 11.3.3.6.0 or higher)	`SUNWlibC` `developer/assembler`
	Oracle Solaris 11.4	

		`consolidation/X/X-`
		`incorporation@11.4,5.11-11.4.0.`
		`0.1.14.0:2018`
		`consolidation/cde/cde-`
		`incorporation@11.4,5.11-11.4.0.`
		`0.1.14.0:2018`
		`system/library/c++-`
		`runtime@11.4,5.11-11.4.0.0.1.4.`
		`0:2018`
		`developer/`
		`assembler@11.4,5.11-11.4.0.0.1.`
		`4.0:2018`
		`x11/library/`
		`libxp@1.0.3,5.11-11.4.0.0.1.14.`
		`0:2018`

Solaris x86-64	Oracle Solaris 11.2 Oracle Solaris 11.3 (SRU 11.3.3.6.0 or higher)	`SUNWlibC` `developer/assembler`

Table 1-17   (Cont.) Solaris Operating System Requirements

Processor	Operating System Version	Required Packages
	Oracle Solaris 11.4	

		`consolidation/X/X-incorporation@11.4,5.11-11.4.0.0.1.14.0:2018`
		`consolidation/cde/cde-incorporation@11.4,5.11-11.4.0.0.1.14.0:2018`
		`system/library/c++-runtime@11.4,5.11-11.4.0.0.1.4.0:2018`
		`developer/assembler@11.4,5.11-11.4.0.0.1.4.0:2018`
		`x11/library/libxp@1.0.3,5.11-11.4.0.0.1.14.0:2018`

HP-UX Operating System Requirements

Table 1-18 lists the platform, operating system, package, and patch information for HP-UX operating systems that are either currently supported or were supported in a previous release.

> ✎ **Note:**
>
> On HP_UX systems, you can verify what Motif packages are installed on the machine using the following command:
>
> `/usr/sbin/swlist -l fileset | grep -i motif`

Table 1-18   HP-UX Operating System Requirements

Processor	Operating System Version	Required Packages	Required Operating System Patches

Itanium	HP-UX 11.31 (Update 7)	`B3394BA (version 2.1.0)`
		`Motif 2.1 (Version 2.1)`
			`PHKL_36248`
			`PHKL_36249`
			`PHSS_37202`
			`PHSS_37501`
			`PHCO_38050`
			`PHSS_38139`

IBM AIX Operating System Requirements

Table 1-19 lists the platform, operating system, package, and patch information for IBM AIX operating systems that are either currently supported or were supported in a previous release.

Table 1-19   IBM AIX Operating System Requirements

Processor	Operating System Version	Required Packages

POWER	7.1 (Update 1)	`bos.adt.base`
		`bos.adt.lib`
		`bos.adt.libm`
		`bos.perf.libperfstat`
		`bos.perf.perfstat`
		`bos.perf.proctools`
		`rsct.basic.rte`
		`rsct.compat.clients.rte`
		`xlC.aix61.rte (version 12.1.0.1+)`
		`xlC.rte (version 12.1.0.1+)`

POWER	7.2	`bos.adt.base 7.2.0.0`
		`bos.adt.lib 7.2.0.0`
		`bos.adt.libm 7.2.0.0`
		`bos.perf.libperfstat 7.2.0.0`
		`bos.perf.perfstat 7.2.0.0`
		`bos.perf.proctools 7.2.0.0`
		`rsct.basic.rte 3.2.1.0`
		`rsct.compat.clients.rte 3.2.1.0`
		`xlC.aix61.rte 13.1.2.0`
		`xlC.rte 13.1.2.0`

IBM Linux on System z Operating System Requirements

Table 1-20 lists the platform, operating system, package, and patch information for IBM Linux on System z operating systems that are either currently supported or were supported in a previous release.

Table 1-20   IBM Linux on System z Operating System Requirements

Processor	Operating System Version	Required Packages

System Z (S/390)	Red Hat Linux 7.1	`binutils-2.23.52.0.1-30.el7.s390x`
		`libstdc++-4.8.3-9.el7.s390`
		`libstdc++-4.8.3-9.el7.s390x`
		`compat-libcap1-1.10-7.el7.s390x`
		`gcc-4.8.3-9.el7.s390x`
		`gcc-c++-4.8.3-9.el7.s390x`
		`glibc-2.17-78.el7.s390`
		`glibc-2.17-78.el7.s390x`
		`glibc-devel-2.17-78.el7.s390`
		`glibc-devel-2.17-78.el7.s390x`
		`ksh-20120801-22.el7.s390x`
		`libaio-0.3.109-12.el7.s390`
		`libaio-0.3.109-12.el7.s390x`
		`libaio-devel-0.3.109-12.el7.s390x`
		`libgcc-4.8.3-9.el7.s390`
		`libgcc-4.8.3-9.el7.s390x`
		`libstdc++-4.8.3-9.el7.s390x`
		`libstdc++-devel-4.8.3-9.el7.s390x`
		`libXtst-1.2.2-2.1.el7.s390`
		`libXtst-1.2.2-2.1.el7.s390x`
		`libXi-1.7.2-2.1.el7.s390`
		`libXi-1.7.2-2.1.el7.s390x`
		`libXmu-1.1.1-5.1.el7.s390x`
		`libXaw-1.0.11-6.1.el7.s390x`
		`libXft-2.3.1-5.1.el7.s390x`
		`libXpm-3.5.10-5.1.el7.s390x`
		`make-3.82-21.el7.s390x`

Table 1-20   (Cont.) IBM Linux on System z Operating System Requirements

Processor	Operating System Version	Required Packages

System Z (S/390)	Red Hat Linux 6.6+	`binutils-2.20.51.0.2-5.42.el6.s390x`
		`compat-libstdc++-33-3.2.3-69.el6.s390`
		`compat-libstdc++-33-3.2.3-69.el6.s390x`
		`compat-libcap1-1.10-1.s390x`
		`gcc-4.4.7-11.el6.s390x`
		`gcc-c++-4.4.7-11.el6.s390x`
		`glibc-2.12-1.149.el6.s390`
		`glibc-2.12-1.149.el6.s390x`
		`glibc-devel-2.12-1.149.el6.s390`
		`glibc-devel-2.12-1.149.el6.s390x`
		`ksh-20120801-21.el6.s390x`
		`libaio-0.3.107-10.el6.s390`
		`libaio-0.3.107-10.el6.s390x`
		`libaio-devel-0.3.107-10.el6.s390x`
		`libgcc-4.4.7-11.el6.s390`
		`libgcc-4.4.7-11.el6.s390x`
		`libstdc++-4.4.7-11.el6.s390x`
		`libstdc++-devel-4.4.7-11.el6.s390x`
		`libXtst-1.2.2-2.1.el6.s390`
		`libXtst-1.2.2-2.1.el6.s390x`
		`libXi-1.7.2-2.2.el6.s390`
		`libXi-1.7.2-2.2.el6.s390x`
		`libXmu-1.1.1-2.el6.s390`
		`libXaw-1.0.11-2.el6.s390`
		`libXft-2.3.1-2.el6.s390`
		`libXp-1.0.2-2.1.el6.s390`
		`make-3.81-20.el6.s390x`
		`sysstat-9.0.4-27.el6.s390x`

Table 1-20   (Cont.) IBM Linux on System z Operating System Requirements

Processor	Operating System Version	Required Packages

System Z (S/390)	SUSE 11 (SP3+)	`binutils-2.21.1-0.7.25 (s390x)`
		`gcc-4.3-62.198 (s390x)`
		`gcc-c++-4.3-62.198 (s390x)`
		`glibc-2.11.3-17.31.1 (s390x)`
		`glibc-32bit-2.11.3-17.31.1 (s390x)`
		`glibc-devel-2.11.3-17.31.1 (s390x)`
		`glibc-devel-32bit-2.11.3-17.31.1 (s390x)`
		`ksh-93u-0.6.1 (s390x)`
		`make-3.81-128.20 (s390x)`
		`libaio-0.3.109-0.1.46 (s390x)`
		`libaio-32bit-0.3.109-0.1.46 (s390x)`
		`libaio-devel-0.3.109-0.1.46 (s390x)`
		`libaio-devel-32bit-0.3.109-0.1.46 (s390x)`
		`libcap1-1.10-6.10 (s390x)`
		`libgcc46-4.6.1_20110701-0.13.9 (s390x)`
		`libstdc++33-3.3.3-11.9 (s390x)`
		`libstdc++33-32bit-3.3.3-11.9 (s390x)`
		`libstdc++43-devel-32bit-4.3.4_20091019-0.22.17 (s390x)`
		`libstdc++43-devel-4.3.4_20091019-0.22.17 (s390x)`
		`libstdc++46-32bit-4.6.1_20110701-0.13.9 (s390x)`
		`libstdc++46-4.6.1_20110701-0.13.9 (s390x)`
		`sysstat-8.1.5-7.32.1 (s390x)`
		`xorg-x11-libs-32bit-7.4-8.26.32.1 (s390x)`
		`xorg-x11-libs-7.4-8.26.32.1 (s390x)`
		`xorg-x11-libX11-32bit-7.4-5.9.1 (s390x)`
		`xorg-x11-libX11-7.4-5.9.1 (s390x)`
		`xorg-x11-libXau-32bit-7.4-1.15 (s390x)`
		`xorg-x11-libXau-7.4-1.15 (s390x)`
		`xorg-x11-libxcb-7.4-1.20.34`

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Table 1-20   (Cont.) IBM Linux on System z Operating System Requirements

Processor	Operating System Version	Required Packages

		`(s390x)`
		`xorg-x11-`
		`libxcb-32bit-7.4-1.20.34`
		`(s390x)`
		`xorg-x11-`
		`libXext-32bit-7.4-1.16.21`
		`(s390x)`
		`xorg-x11-libXext-7.4-1.16.21`
		`(s390x)`

System Z (S/390)	SUSE 12 (SP1+)	`binutils-2.25.0-13.1`
		`(s390x)` `–`
		`3.12.49-11-default`
		`gcc-4.8-6.189 (s390x)`
		`gcc-c++-4.8-6.189 (s390x)`
		`glibc-2.19-31.9 (s390x)`
		`glibc-devel-2.19-31.9 (s390x)`
		`mksh-50-2.13 (s390x)`
		`libaio1-0.3.109-17.15 (s390x)`
		`libaio-devel-0.3.109-17.15`
		`(s390x)`
		`libcap2-2.22-11.709 (s390x)`
		`libstdc+`
		`+6-32bit-5.2.1+r226025-4.1`
		`(s390x)`
		`libstdc++6-5.2.1+r226025-4.1`
		`(s390x)`
		`libstdc++48-`
		`devel-32bit-4.8.5-24.1 (s390x)`
		`libstdc++48-devel-4.8.5-24.1`
		`(s390x)`
		`libgcc_s1-5.2.1+r226025-4.1`
		`(s390x)`
		`libgcc_s1-32bit-5.2.1+r226025-4`
		`.1 (s390x)`
		`make-4.0-4.1 (s390x)`
		`xorg-x11-libs-7.6-45.14 (s390x)`

Windows Operating Systems Requirements

This section contains the following information regarding Microsoft Windows operating systems:

- Certified Windows Operating Systems
- Disabling Anti-Virus Software
- Installing and Configuring Java Access Bridge
- Installing Microsoft Visual C++ on Windows for System Components
- Installing Microsoft Visual C++ for WebCenter Content on Windows
- Enabling User Account Control (UAC)

- [Understanding the Required Installation Privileges for Oracle Identity Management and Oracle Forms and Reports](#)

Certified Windows Operating Systems

Refer to the certification document for 12*c* (12.2.1) on the Oracle Fusion Middleware Supported System Configurations page for the latest information on certified Windows operating systems.

Disabling Anti-Virus Software

If you encounter issues related to anti-virus software during your Fusion Middleware product installation, disable your anti-virus software for the entire duration of the installation. If the system is restarted before the installation is complete, ensure the anti-virus software was not restarted before continuing with the installation.

Anti-virus software can be re-enabled when the installation is complete.

Installing and Configuring Java Access Bridge

If you are installing on a Windows machine, you have the option of installing and configuring Java Access Bridge for Section 508 Accessibility. This is only necessary if you require Section 508 Accessibility features.

Installation instructions are available in the *Oracle Java Access Bridge Installation and Application Developer's Guide*:

`http://docs.oracle.com/javase/accessbridge/2.0.2/toc.htm`

Installing Microsoft Visual C++ on Windows for System Components

This includes:

- Oracle WebLogic Server Plugin
- Oracle HTTP Server
- Oracle Traffic Director
- Forms and Reports
- OBIEE
- Oracle Internet Directory

On the Windows platform, these components require the Microsoft Visual C++ run-time libraries to be installed on the system.

If these libraries are not installed on your Windows operating system, then you will receive an error during the prerequisite check phase of these components.

To meet this system requirement, download the correct version of Visual C++ Redistributable for Visual Studio by referring to Table 1-21 below.

You can download the software from https://support.microsoft.com/en-us/help/2977003/the-latest-supported-visual-c-downloads.

Table 1-21   MS Visual C++ version for Windows Operating System

Fusion Middleware Products	Visual Studio (VC++) Version
Oracle WebLogic Server Plugin	Visual Studio 2012 (VC++ 11.0)
	Visual Studio 2010 (VC++ 10.0)
Oracle HTTP Server	Visual Studio 2012 (VC++ 11.0)
	Visual Studio 2010 (VC++ 10.0)
Oracle Traffic Director	Visual Studio 2013 (VC++ 12.0)
Forms and Reports	Visual Studio 2010 (VC++ 10.0) SP1
	Visual Studio 2012 (VC++ 11.0)
	Visual Studio 2013 (VC++ 12.0)
OBIEE	Visual Studio 2010 (VC++ 10.0) SP1
Oracle Internet Directory	Visual Studio 2010 (VC++ 10.0) SP1

> **Note:**
>
> The OBIEE installs Visual Studio 2010 (VC++ 10.0) SP1 automatically. For any future reference or maintenance, check the result in the Windows control panel.
>
> The required Microsoft Visual Studio version varies based on the Windows in use as well as the other Microsoft products installed on your system. You must ensure to install the 64-bit system.

Installing Microsoft Visual C++ for WebCenter Content on Windows

For correct operation of WebCenter Content, Inbound Refinery, or Records on a Windows operating system, you need to have the Visual C++ libraries that are included in the Visual C++ Redistributable Package.

To meet this system requirement, download the Microsoft Visual Studio 2012 (VC++ 11.0) software from the following URL:

https://support.microsoft.com/en-us/help/2977003/the-latest-supported-visual-c-downloads

Enabling User Account Control (UAC)

On Microsoft Windows 7, Windows 8.1, Windows Server 2012, Windows Server 2012 R2 Standard, Windows Server 2016, or Windows 10 operating systems, you must enable User Account Control (UAC) so that the correct permissions are applied to the `cwallet.sso` file.

To enable UAC:

1. Run `secpol.msc` from the command prompt.

2. Select **Security Settings > Local Policies > Security Options**.

3. Set the **User Account Control:Run all Administrator in Admin Approval Mode** option to enabled.

4. Restart the host.

5. Restart the servers.

Understanding the Required Installation Privileges for Oracle Identity Management and Oracle Forms and Reports

In order to install **Oracle Identity and Access Management** and **Oracle Internet directory**, **Oracle Forms and Reports**, or use the **Oracle Forms and Reports Builders** after installation on a Microsoft Windows Server 2012 R2 Standard and other supported versions for the 12*c* 12.2.1.3.0 or newer operating system, the operating system user must have Windows *Administrator* privileges.

Even when a user with "Administrator" privileges logs in to the machine, the administrative role is not granted for default tasks. In order to access the Oracle home files and folders, the user must launch the command prompt or Windows Explorer as *Administrator* explicitly, even if the user is logged in as the administrator.

To do so, you can do either one of the following:

- Find the Command Prompt icon (for example, from the Start menu or from the Desktop), right-click on the icon, and select **Run as Administrator**. Then you can run the executables (for example, the WebLogic Server installer) from the command line.

- Start Windows Explorer, find the executable you want to run (for example, `rcu.bat` for RCU, `config.bat` for the Configuration Wizard, or `setup.exe` for the installer), right-click on the executable, and select **Run as Administrator**.

Virtualization Requirements

Every Oracle Fusion Middleware product that is certified on Linux, Windows, or Oracle Solaris as physical operating system is also certified and supported when running as virtual guest on Oracle VM as long as the respective operating system is supported by Oracle VM.

See Supported Virtualization and Partitioning Technologies for Oracle Fusion Middleware on the Oracle Technology Network.

Database Requirements

This sections lists the database requirements for the Fusion Middleware products. For details on the RCU requirements specific for Oracle Database, see RCU Requirements for Oracle Databases.

This section contains the following topics:

- Finding a Certified Database

- Configuring Your Oracle Database for the Metadata Services (MDS) Schema

- Assigning a Default Microsoft SQL Server Database for the Oracle Data Integrator Standalone Agent

- Configuring a Microsoft SQL Server Database for the Metadata Services (MDS) Schema

- [Using Oracle Database 12c with Oracle Identity Management](#)
- [Configuring a DB2 Database for the Metadata Services (MDS) Schema](#)

Finding a Certified Database

Refer to the certification document for 12*c* (12.2.1.3.0) on the Oracle Fusion Middleware Supported System Configurations page for the latest information on certified databases.

Configuring Your Oracle Database for the Metadata Services (MDS) Schema

On Oracle databases, the MDS database user created by Repository Creation Utility (RCU) requires `EXECUTE` privilege on `DBMS_OUTPUT`, `DBMS_STATS`, and `DBMS_LOB`. When you create a metadata repository using RCU, if PUBLIC does not have `EXECUTE` privilege on `DBMS_OUTPUT` and `DBMS_STATS`, the RCU user must have the privilege to grant `EXECUTE` privilege on `DBMS_OUTPUT` and `DBMS_STAT` to the MDS user. The RCU user must have the privilege to grant `EXECUTE` privilege on `DBMS_LOB` to the MDS user.

To ensure that you have the correct privileges, login to RCU as a `SYSDBA` or as a DBA user who has `EXECUTE` privilege with `GRANT OPTION` on `DBMS_OUTPUT` and `DBMS_LOB`.

Assigning a Default Microsoft SQL Server Database for the Oracle Data Integrator Standalone Agent

A default database must be assigned to successfully complete the standalone agent startup with Microsoft SQL server. Run the following MSSQL statement to make this assignment:

```
ALTER LOGIN sql_login WITH DEFAULT_DATABASE = default_database
```

Replace `sql_login` with the login name, and `default_database` with the default database name.

Configuring a Microsoft SQL Server Database for the Metadata Services (MDS) Schema

Note the following about using SQL Server as the database for MDS:

- To create a metadata repository in SQL Server, set READ_COMMITTED_SNAPSHOT to ON for the hosting database. This enables the needed row versioning support. Use the following SQL command ALTER DATABASE, as in the following example:

  ```
  ALTER DATABASE mds SET READ_COMMITTED_SNAPSHOT ON
  ```

- Use case-sensitive collation to support the case-sensitive semantics in the metadata repository. For example, if Latin1_General is used, select the SQL_Latin1_General_CP1_CS_AS collation using the following SQL command:

  ```
  ALTER DATABASE mds COLLATE SQL_Latin1_General_CP1_CS_AS
  ```

In many cases, this command will run successfully. However, the command might fail and generate error messages concerning functions, primary keys, constraints, or indexes. This can be caused if the database already has collation aware objects. In this case, SQL Server does not allow you to change the collation at the database level. In this case, the alternative is to create a new database with the expected collation for MDS to use.

- There are some minor differences between an Oracle schema and a SQL Server schema. The length of the certain text fields are shorter for a SQL Server schema. For example, the full path name of the metadata in SQL Server is limited to 400 characters.

Using Oracle Database 12**c** with Oracle Identity Management

The following packages must be installed as SYS user on Oracle databases prior to creating Oracle Identity Management schemas:

- DBMS_SHARED_POOL
- XAVIEWS

To create the above packages, run the below SQL files from the $ORACLE_HOME/rdbms/admin directory as the SYS user for the connected database (regular or PDB).

- dbmspool.sql
- prvtpool.plb
- xaview.sql

See:

- XAVIEWS — Using JDBC XA Drivers with WebLogic Server in Oracle Fusion Middleware Programming JTA for Oracle WebLogic Server.
- DBMS_SHARED_POOL — Oracle Database PL/SQL Packages and Types Reference.

Configuring a DB2 Database for the Metadata Services (MDS) Schema

Note the following about using DB2 as the database for MDS:

- DB2 9.7 or later must be used for MDS repository to work properly.
- Make sure that CUR_COMMIT is set to `ON`, which is the default value for a newly installed DB2 9.7 database. This setting can be verified using following DB2 command:

```
db2 connect to your_database user admin_user
db2 "get db cfg" | grep -I commit
Curently Committed   (CUR_COMMIT) = ON
```

- Set the lock timeout parameter of the database to a low value. Unlike Oracle databases, with DB2, if one user is updating a row, under some conditions, another user may be blocked when updating a different row and must wait until the transaction is committed or rolled back by the first user. To facilitate better concurrency, do not specify `-1`, which sets the lock timeout to infinity.

To query the lock timeout value for your DB2 database, use the following command:

```
db2 'get database config for database_alias' | grep -i timeout
```

If the value is too high, change it. For example, to change the lock timeout value to 180 seconds, use the following command:

```
db2 'update database config for database_alias using locktimeout 180'
```

Choose a proper value for the locktimeout parameter. If a large value is used, it will affect system throughput, since the transaction has to wait a very long time before giving up. If the value is set too small, users will see many timeout exceptions if the database is processing many long running transactions.

- Set the DB2 registry variables DB2_EVALUNCOMMITTED, DB2_SKIPINSERTED, and DB2_SJIPDELETED to `OFF` to avoid deadlock and locking issues. By default, they are set to `OFF`. To view the current registry variables setting, use the db2set -all command.

  If they are not set to OFF, use the following commands:

  ```
  db2set DB2_EVALUNCOMMITTED=OFF
  db2set DB2_SKIPINSERTED=OFF
  db2set DB2_SKIPDELETED=OFF
  ```

  Then, restart the database server using the using db2stop and db2start commands.

- DB2 may escalate a row lock to a table lock due to memory stress or lock usage. As the result, a user's transaction may be rolled back as a victim of deadlock or lock timeout. To reduce lock escalation, you can increase the size of the MAXLOCKS and LOCKLIST configuration parameters. Use the following commands:

  ```
  db2 'update database config for database_alias using locklist value'
  db2 'update database config for database_alias using maxlocks value'
  ```

  The recommended value for MAXLOCKS is 20, and the recommended value for LOCKLIST is 70000. You should set appropriate values based on your environment and usage.

- The isolation level must be set to Currently Committed. To verify the setting, use the following command:

  ```
  db2 'get database config for database_alias' | grep -i commit
  ```

  To set the isolation level to Currently Committed, use the following command:

  ```
  db2 'update database config for database_alias using CUR_COMMIT ON'
  ```

- If the database transaction log is often full, increase the database configuration parameter to allow for a larger log file. A larger log file requires more space, but it reduces the need for applications to retry the operation. You should set the log file size to at least 10000 and the number of primary log files to at least 50. Use the following commands:

  ```
  db2 'update database config for database_alias using LOGFILSIZ 10000'
  db2 'update database config for database_alias using LOGPRIMARY 50'
  ```

- If the IBM DB2 JCC driver is chosen for the data source, the progressiveStreaming=2 property must be added to the property list of the data

source. In effect, progressive streaming will be disabled. Without this property setting, MDS may run into issues in accessing document contents saved in a large object (LOB) column in the MDS repository.