Oracle® Retail Pricing

Installation Guide
Release 19.0.1
F44214-01

August 2021

ORACLE

Oracle® Retail Pricing Installation Guide, Release 19.0.1

Primary Author: Amandeep Bhatti

Contributors: Nathan Young, Sravana Kumar, Kuldeep Suthar

Value-Added Reseller (VAR) Language

Oracle Retail VAR Applications

The following restrictions and provisions only apply to the programs referred to in this section and licensed to you. You acknowledge that the programs may contain third party software (VAR applications) licensed to Oracle. Depending upon your product and its version number, the VAR applications may include:

(i) the **MicroStrategy** Components developed and licensed by MicroStrategy Services Corporation (MicroStrategy) of McLean, Virginia to Oracle and imbedded in the MicroStrategy for Oracle Retail Data Warehouse and MicroStrategy for Oracle Retail Planning & Optimization applications.

(ii) the **Wavelink** component developed and licensed by Wavelink Corporation (Wavelink) of Kirkland, Washington, to Oracle and imbedded in Oracle Retail Mobile Store Inventory Management.

(iii) the software component known as **Access Via™** licensed by Access Via of Seattle, Washington, and imbedded in Oracle Retail Signs and Oracle Retail Labels and Tags.

(iv) the software component known as **Adobe Flex™** licensed by Adobe Systems Incorporated of San Jose, California, and imbedded in Oracle Retail Promotion Planning & Optimization application.

You acknowledge and confirm that Oracle grants you use of only the object code of the VAR Applications. Oracle will not deliver source code to the VAR Applications to you. Notwithstanding any other term or condition of the agreement and this ordering document, you shall not cause or permit alteration of any VAR Applications. For purposes of this section, "alteration" refers to all alterations, translations, upgrades, enhancements, customizations or modifications of all or any portion of the VAR Applications including all reconfigurations, reassembly or reverse assembly, re-engineering or reverse engineering and recompilations or reverse compilations of the VAR Applications or any derivatives of the VAR Applications. You acknowledge that it shall be a breach of the agreement to utilize the relationship, and/or confidential information of the VAR Applications for purposes of competitive discovery.

The VAR Applications contain trade secrets of Oracle and Oracle's licensors and Customer shall not attempt, cause, or permit the alteration, decompilation, reverse engineering, disassembly or other reduction of the VAR Applications to a human perceivable form. Oracle reserves the right to replace, with functional equivalent software, any of the VAR Applications in future releases of the applicable program.

Contents

Send Us Your Comments

Oracle Retail Pricing, Installation Guide, Release 19.0.1

Oracle welcomes customers' comments and suggestions on the quality and usefulness of this document.

Your feedback is important, and helps us to best meet your needs as a user of our products. For example:

- Are the implementation steps correct and complete?
- Did you understand the context of the procedures?
- Did you find any errors in the information?
- Does the structure of the information help you with your tasks?
- Do you need different information or graphics? If so, where, and in what format?
- Are the examples correct? Do you need more examples?

If you find any errors or have any other suggestions for improvement, then please tell us your name, the name of the company who has licensed our products, the title and part number of the documentation and the chapter, section, and page number (if available).

> **Note:** Before sending us your comments, you might like to check that you have the latest version of the document and if any concerns are already addressed. To do this, access the new Applications Release Online Documentation CD available on My Oracle Support and www.oracle.com. It contains the most current Documentation Library plus all documents revised or released recently.

Send your comments to us using the electronic mail address: retail-doc_us@oracle.com

Please give your name, address, electronic mail address, and telephone number (optional).

If you need assistance with Oracle software, then please contact your support representative or Oracle Support Services.

If you require training or instruction in using Oracle software, then please contact your Oracle local office and inquire about our Oracle University offerings. A list of Oracle offices is available on our Web site at www.oracle.com.

Preface

Oracle Retail Installation Guides contain the requirements and procedures that are necessary for the retailer to install Oracle Retail products.

Audience

This Installation Guide is written for the following audiences:

- Database administrators (DBA)
- System analysts and designers
- Integrators and implementation staff

Customer Support

- To contact Oracle Customer Support, access My Oracle Support at the following URL:
- https://support.oracle.com
- When contacting Customer Support, please provide the following:
- Product version and program/module name
- Functional and technical description of the problem (include business impact)
- Detailed step-by-step instructions to re-create
- Exact error message received
- Screen shots of each step you take

Review Patch Documentation

When you install the application for the first time, you install either a base release (for example, 19.0) or a later patch release (for example, 19.0.1). If you are installing the base release or additional patch releases, read the documentation for all releases that have occurred since the base release before you begin installation. Documentation for patch releases can contain critical information related to the base release, as well as information about code changes since the base release.

Improved Process for Oracle Retail Documentation Corrections

To more quickly address critical corrections to Oracle Retail documentation content, Oracle Retail documentation may be republished whenever a critical correction is needed. For critical corrections, the republication of an Oracle Retail document may at times **not** be attached to a numbered software release; instead, the Oracle Retail document will simply be replaced on the Oracle Technology Network Web site, or, in the case of Data Models, to the applicable My Oracle Support Documentation container where they reside.

This process will prevent delays in making critical corrections available to customers. For the customer, it means that before you begin installation, you must verify that you have the most recent version of the Oracle Retail documentation set. Oracle Retail documentation is available on the Oracle Technology Network at the following URL:

http://www.oracle.com/technetwork/documentation/oracle-retail-100266.html

An updated version of the applicable Oracle Retail document is indicated by Oracle part number, as well as print date (month and year). An updated version uses the same part number, with a higher-numbered suffix. For example, part number E123456-**02** is an updated version of a document with part number E123456-**01**.

If a more recent version of a document is available, that version supersedes all previous versions.

Oracle Retail Documentation on the Oracle Help Center

Documentation is packaged with each Oracle Retail product release. Oracle Retail product documentation is also available on the following Web site:

https://docs.oracle.com/en/industries/retail/index.html

(Data Model documents are not available through Oracle Help Center. These documents are packaged with released code, or you can obtain them through My Oracle Support.)

> **Note:** In the images or examples below, user details / company name / address / email / telephone number represent a fictitious sample. Any similarity to actual persons, living or dead is purely coincidental and not intended in any manner.

Conventions

Navigate: This is a navigate statement. It tells you how to get to the start of the procedure and ends with a screen shot of the starting point and the statement "the Window Name window opens."

```
This is a code sample
    It is used to display examples of code
```

1

Preinstallation Tasks

Pricing is a client-server application. The server side code runs in the Oracle WebLogic Server and accesses an Oracle Database server.

> **Note:** Oracle Retail assumes that the retailer has applied all required fixes for supported compatible technologies.

Architecture & Capacity Planning

Retailers have many options in designing the physical architecture. Every retailer will have different physical architecture requirements based on:

- Budget
- HA and DR requirements
- Governance practices in the territories they trade in
- Constraints imposed by 3rd party systems that will integrate with Merchandising
- Larger corporate IT strategies
- Fundamental corporate business strategy

The information in this document not intended to replace the advice of retailer IT staff or a knowledgeable System Integration partner. This architecture information is only intended to introduce new customers to deployment topics that retailers that affect the installation process.

Environment Strategy

Retailers implementing Pricing should plan to have multiple environments. Fundamental corporate requirements and the larger context of the implementation program generally drive environment strategy. Common examples of environments and usage include, but are not limited to:

- Development – Generally used to develop integrations. Development environments are often short lived, not sized for production loads and not clustered for HA. Development environments may or may not be fully integrated via Single Sign ON (SSO) and federated identity management.
- User Acceptance Test – Generally used for end user training and testing. UAT environments generally do not have HA and DR requirements, but may be fully integrated via SSO with federated identity management to facilitate full business user training.
- System/Integration Test – System/Integration Test environments are often longer lived, and may in fact be permanent and used after go live to test Pricing patches. System/Integration test environments may be fully sized so they can also be used as performance testing environments.
- Production – Actual production environment, which will be used for day to day Pricing business activities.
- Disaster Recovery – Disaster Recovery (DR) environment is used when a production environment fails. DR environment requirements depend on corporate SLAs.

Different types of environments generally have different integration, HA and DR requirements. These requirements will drive capacity planning and physical architecture. These requirements also affect the Pricing installation process.

High Availability & Disaster Recovery

Retailers will need to determine their availability and disaster recovery requirements before implementing Pricing. These architectural decisions will affect both capacity planning and the installation process.
Oracle's Maximum Availability Architecture (MAA) provides blue prints for achieving various levels of HA and DR. Key technologies involved in MAA include

- Data Tier
  - Oracle Real Application Clusters (RAC)
  - Active Data Guard
- Application Tier
  - WebLogic Clustering

https://www.oracle.com/database/technologies/high-availability/maa.html

Capacity Planning

There is significant complexity involved in the deployment of Oracle Retail applications and capacity planning is site specific. Oracle Retail strongly suggests that before installation or implementation you engage your integrator (such as the Oracle Retail Consulting team) and infrastructure vendor to request a storage and capacity planning effort.

Sizing estimates are based on a number of factors, including the following:

- Workload and peak concurrent users and batch transactions
- Hardware configuration and parameters
- Data sparsity
- Application features utilized
- Length of time history is retained

Additional considerations during this process include your HA requirements, backup policies and DR requirements.

Additional Components

This document discusses the requirements for the core database and application servers required for Merchandising. Additional technical components are also required for production. Most retailers will already have these some of these components (SFTP server, federated IDM, and so on) in place, and the installation and implementation activity will be to link these components to Merchandising.

In other cases, retailers may need to procure or assign infrastructure to Merchandising. These dedicated Merchandising components should be considered in capacity planning.

Technical Requirements

Web Tier

Oracle maintains a consistent web browser support policy for all applications.

https://www.oracle.com/technetwork/indexes/products/browser-policy-2859268.html

Per this policy, at the time of this document (January 2020), Merchandising supports the following browsers:

Browser	Versions
Mozilla Firefox	ESR 78.11.0
Microsoft Edge	91.0.864.54
Internet Explorer	11
Google Chrome	91.0.4472.106

Application Tier

Oracle Retail Pricing requires application servers. General requirements for an application server running Merchandising include the following

Supported on:	
Middleware	Oracle Fusion Middleware 12.2.1.4.0 ▪ FMW 12.2.1.4.0 Infrastructure (WLS and ADF included) ▪ Repository Creation Utility (RCU 12.2.1.4) ▪ Oracle Identity Management 12c(12.2.1.4.0) Java JDK 1.8 **Optional (required for SSO)** ▪ Oracle WebTier/Webgate (12.2.1.4) ▪ Oracle Access Manager (12.2.1.4) Oracle Directory Services Manager (ODSM) 12.2.1.4 **Note:** Oracle Internet Directory (OID) is the supported LDAP directory for Oracle Retail products. For alternate LDAP directories, refer to Oracle WebLogic documentation set.
Deployment	On Premise, Oracle Cloud Infrastructure (OCI) or other Cloud Provider capable of providing supported Oracle Fusion Middleware
OS (On Premise Application Server only)	OS certified with Oracle Fusion Middleware 12.2.1.4.0 Options include: ▪ Oracle Linux 7 ▪ AIX 7.2+ ▪ Solaris 11.2+ ▪ HP-UX Itanium https://docs.oracle.com/en/middleware/lifecycle/12.2.1.4/sysrs/system-requirements-and-specifications.html

Note – Pricing has been validated to run with WebLogic Clustering. Clustering for WebLogic Server 12.2.1.4.0 is managed as an Active-Active cluster accessed through a Load Balancer. Validation has been completed utilizing a RAC 19.3.0.0 Oracle Internet Directory database with the WebLogic 12.2.1.4.0 cluster. It is suggested that a Web Tier 12.2.1.4 installation be configured to reflect all application server installations if SSO will be utilized. For more information, see:

Oracle Fusion Middleware High Availability Guide, 12c Part Number E95104-03

Data Tier

The PRICING database tables are installed with the RMS database schema. RMS 19.0.1 is a prerequisite of the PRICING 19.0.1 installation. The RMS database requires:

Supported on:	
Database	Oracle Database 19c (19.3.0+) with additional features/options: Partitioning ▪ Advanced Compression ▪ Tablespace Encryption Note – Installation assumes Oracle Multitenant, but limited use license covers one PDB for Merchandising if the customer does not desire additional database consolidation.
Deployment	On Premise, Oracle Cloud Infrastructure (OCI) or other Cloud Provider capable of providing supported Oracle Database 19c Detailed Oracle offerings described below
Database OS (On Premise DB only)	OS certified with Oracle Database 19c Options include: ▪ Oracle Linux 7 ▪ AIX 7.2+ ▪ Solaris 11.2+ ▪ HP-UX Itanium For more details, see https://docs.oracle.com/en/database/oracle/oracle-database/19/install-and-upgrade.html

Check Single Sign-On Requirements

If Pricing will not be deployed in a Single Sign-On environment, skip this section.

If Single Sign-On is to be used, verify the Oracle Identity Management has been installed along with the components listed in the above Application Server requirements section. . Verify the Oracle Access Manager Webgate Agent is registered with the Oracle Access Manager as a partner application.

Check Oracle Retail Software Dependencies

The database portion of the Pricing 19.0 application must be installed prior to installing Pricing.

Supported Oracle Retail Merchandising Products

Requirement	Version
Oracle Retail Merchandising	19.0.1
Oracle Retail Allocation	19.0.1

Supported Oracle Retail On-Premise Products

Requirement	Version
Oracle Retail Xstore Suite	19.0
Oracle Retail Store Inventory Management (SIM)	16.0.2+

Supported Oracle Retail Cloud Service Products

Product	Version
Oracle Retail Store Inventory Operations Cloud Service	18.1+

UNIX User Account Privileges to Install the Software

A UNIX user account is needed to install the software. The UNIX user that is used to install the software should have write access to the WebLogic server installation files.

For example, oretail.

Note: Installation steps will fail when trying to modify files under the WebLogic installation unless the user has write access.

2

Database Installation Tasks

PRICING Schema

The PRICING database tables are installed with the RMS database schema. RMS 19.0.1 is a prerequisite of the PRICING 19.0.1 installation.

3

Application Installation Tasks

Before proceeding, you must install Oracle WebLogic Server 12.2.1.4. The Oracle Retail Price Management application is deployed to a WebLogic Managed server within the WebLogic installation.

It is assumed Oracle Database has already been configured and loaded with the appropriate Oracle Retail Price Management schemas for your installation.

Installing a separate domain is mandated. It can be called "RPMdomain" (or something similar) and will be used to install the managed servers. The ADF libraries should be extended to this domain and the Enterprise Manager should be deployed.

Middleware Infrastructure and WebLogic Server12c (12.2.1.4.0) Installation

Create a directory to install the WebLogic (this will be the ORACLE_HOME):

Example: mkdir -p /u00/webadmin/products/wls_retail

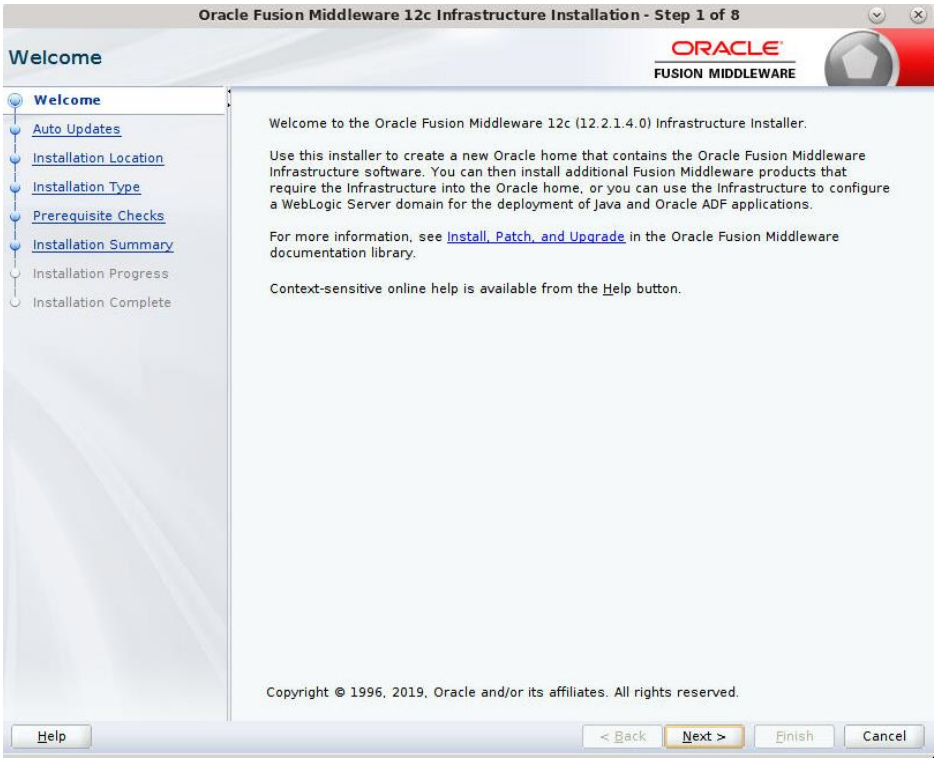
1. Set the ORACLE_HOME, JAVA_HOME and DOMAIN_HOME environment variables:
   - ORACLE_HOME should point to your WebLogic installation.
   - JAVA_HOME should point to the Java JDK 1.8+. This is typically the same JDK which is being used by the WebLogic domain where application is getting installed.

   Example:

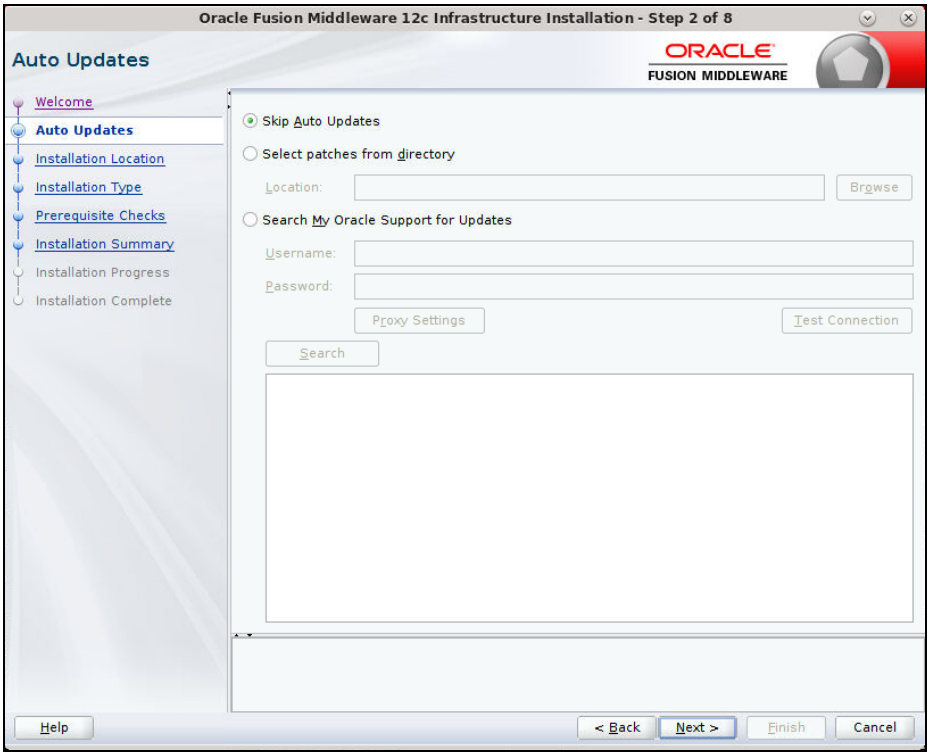
   ```
   $export ORACLE_HOME=/u00/webadmin/products/wls_retail
   $export JAVA_HOME=/u00/webadmin/products/jdk_java
   (This should point to the Java which is installed on your server)
   $export PATH=$JAVA_HOME/bin:$PATH
   ```

   Going forward we will use the above references for further installations.
2. Go to location where the weblogic jar is downloaded and run the installer using the following command:
3. java -jar ./fmw_12.2.1.4.0_infrastructure.jar

4. Welcome screen appears. Click **Next**.



5. Click **Next**.

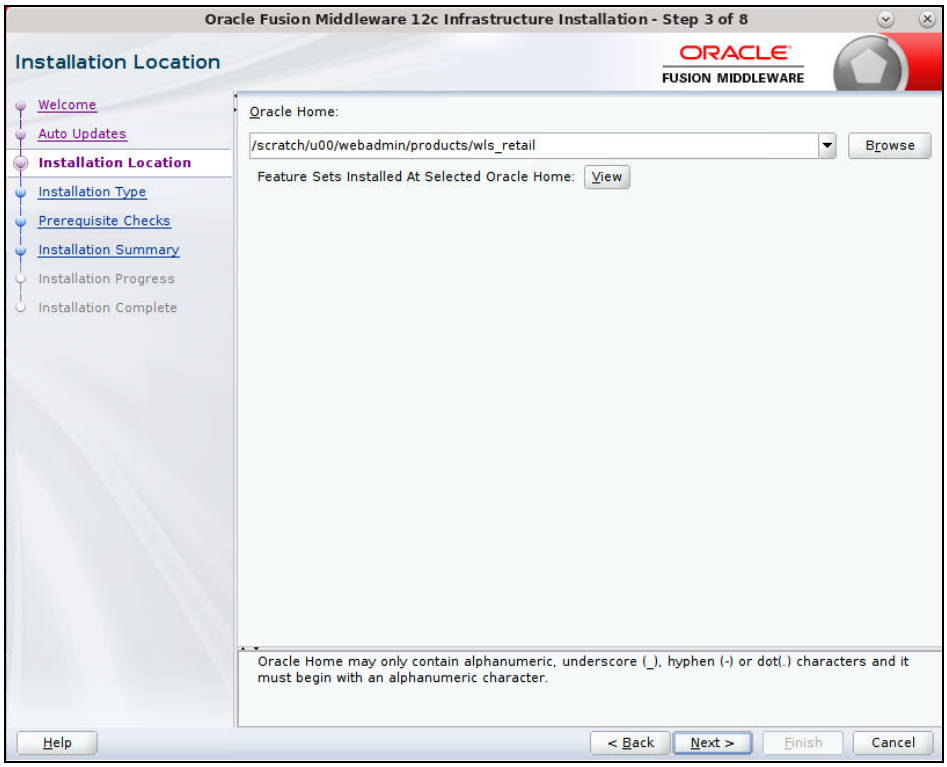


6. Enter the following and click **Next**.

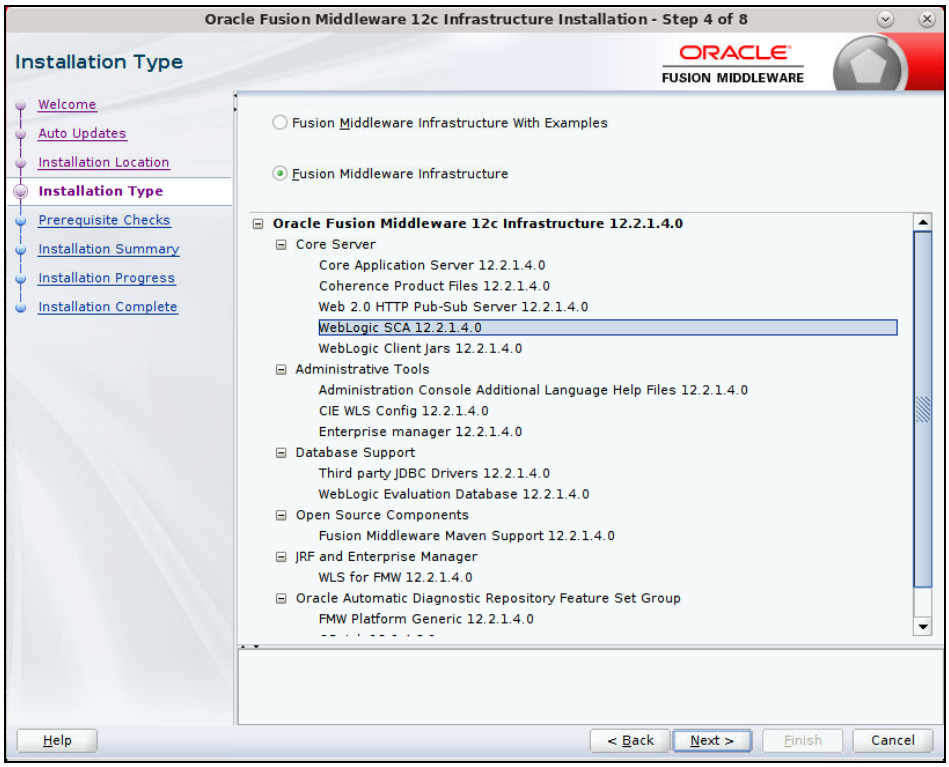
   `Oracle home =<Path to the ORACLE_HOME>`

   Example:

   `/u00/webadmin/products/wls_retail`

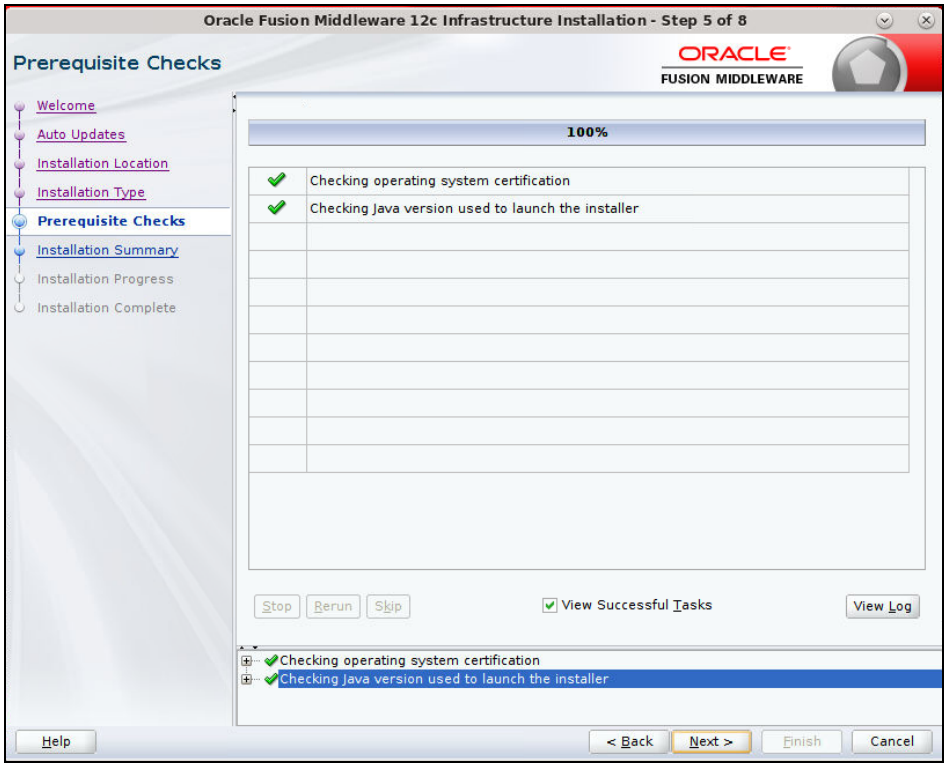


7. Select install type 'Fusion Middleware Infrastructure'. Click **Next**.

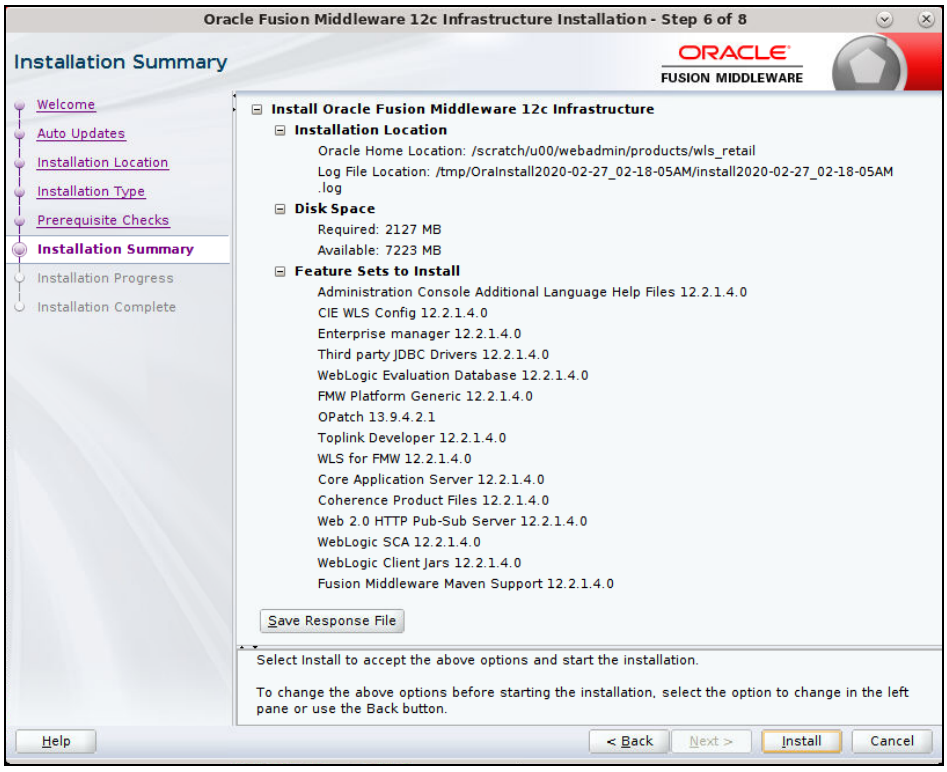


This screen will verify that the system meets the minimum necessary requirements.

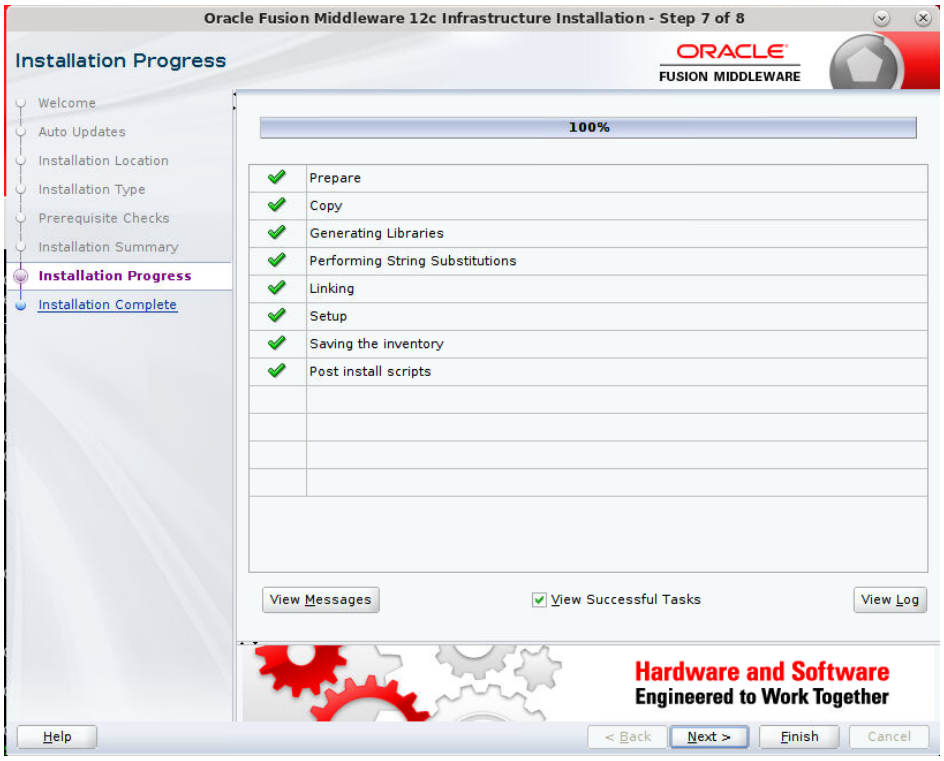
8. Click **Next**.



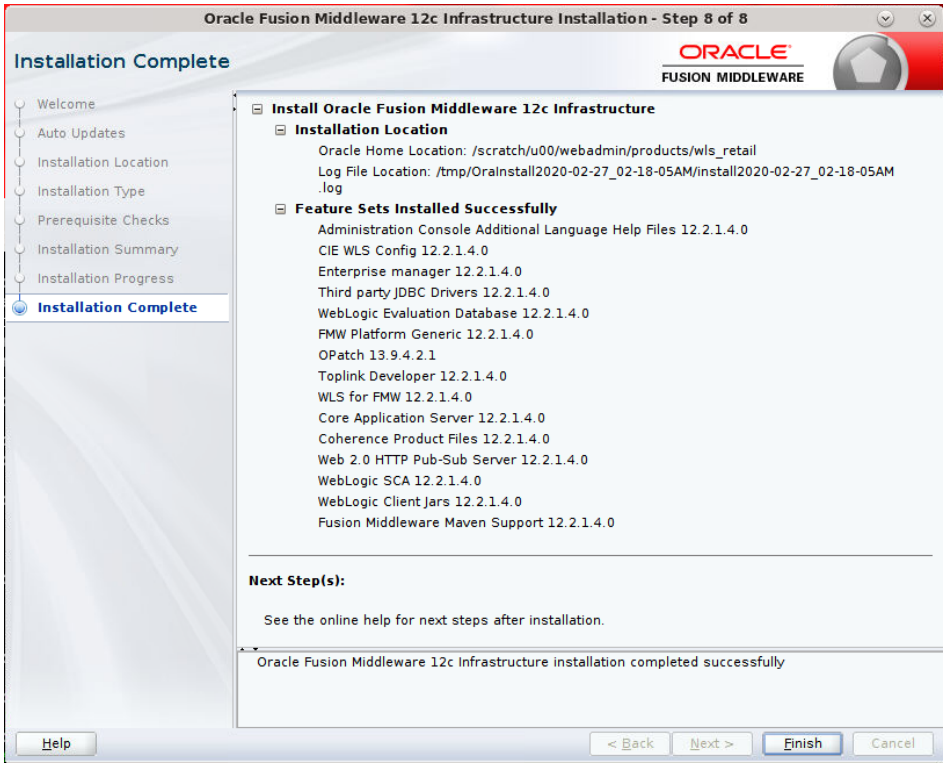
9. Click **Install**.



10. Click Next



11. Click Finish



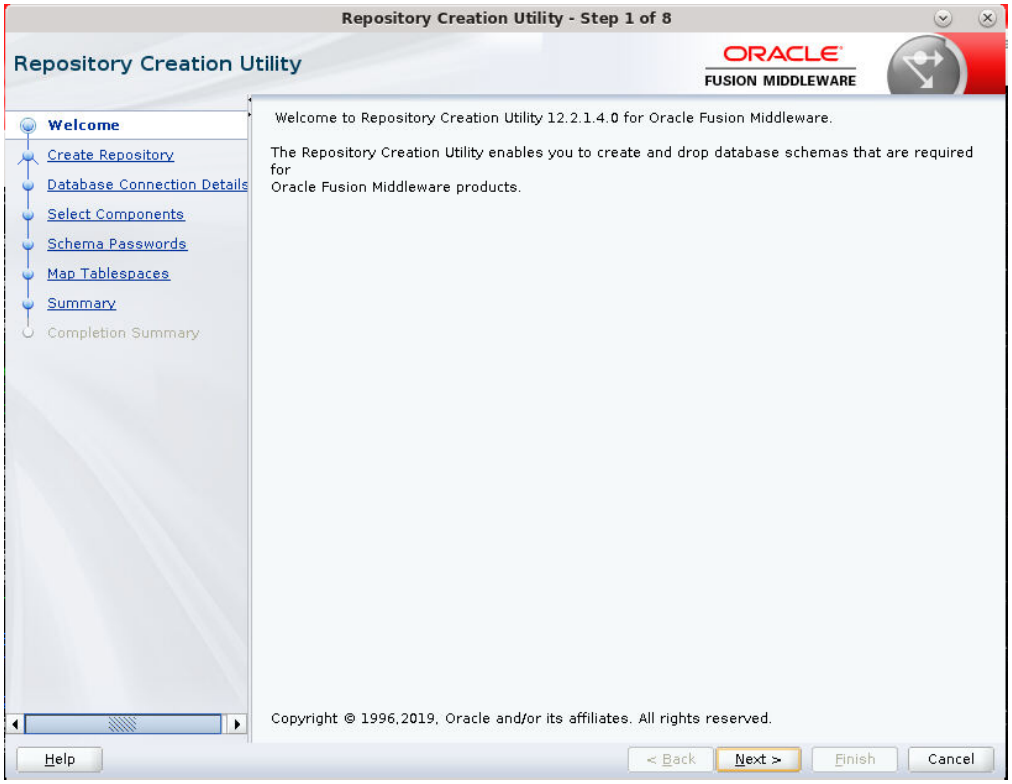
Install RCU Database Schemas

The RCU database schemas are required for the installation of configuration of domain and retail application.

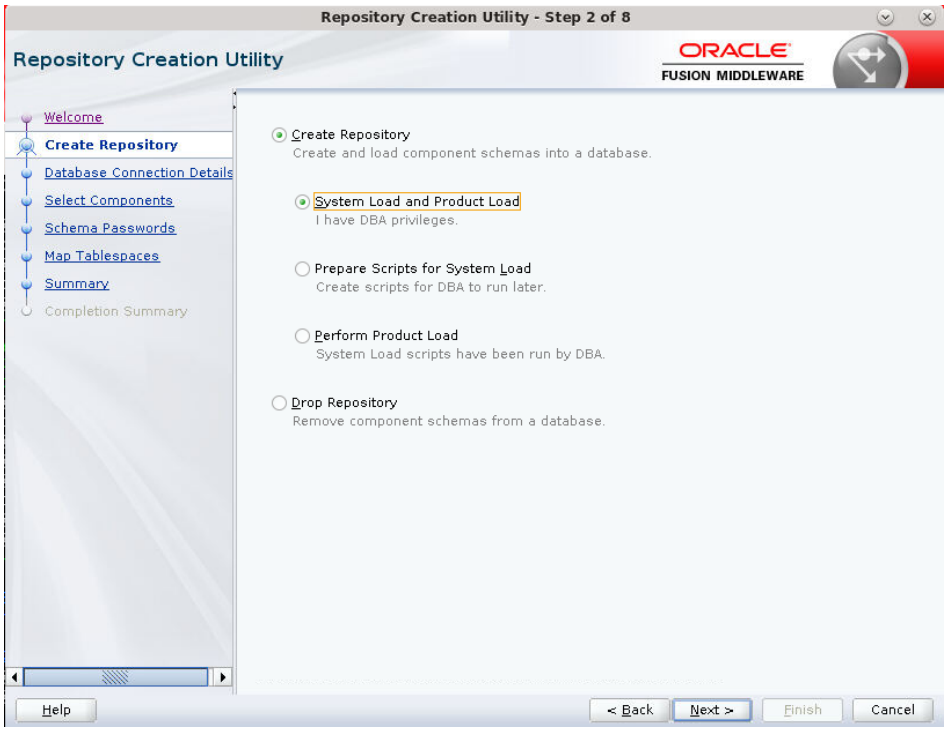
> **Note:** Need user which have sys admin privileges to install the RCU database schemas.

The following steps are provided for the creation of the database schemas:

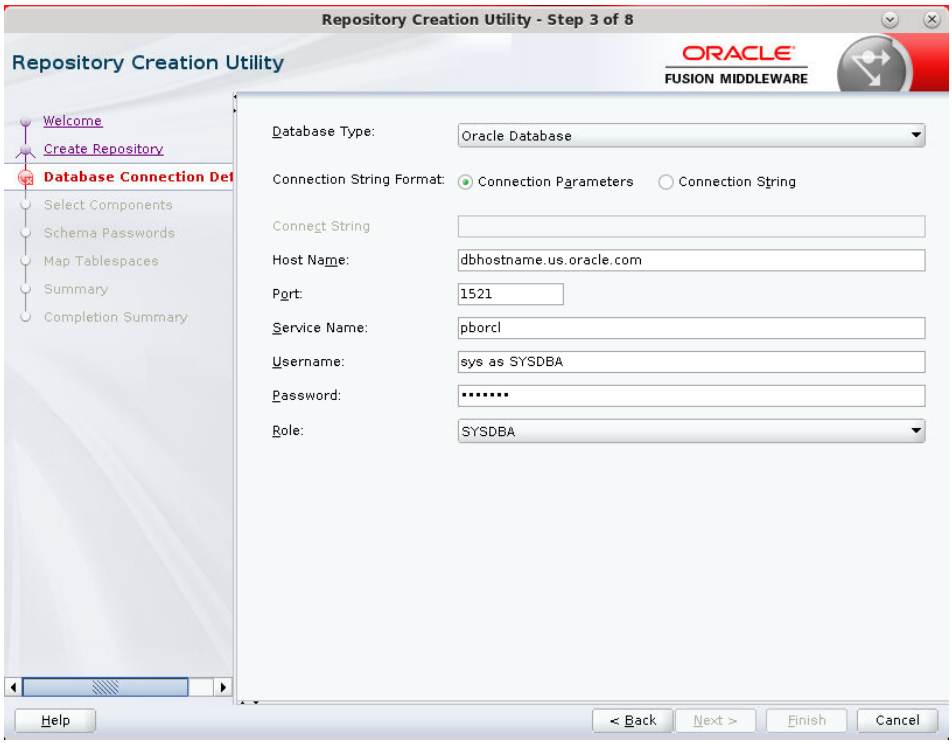
1. Navigate to the directory into which RCU is installed. For example:
   `<ORACLE_HOME>/oracle_common/bin/`
   Run "`./rcu`"
2. Click **Next**.



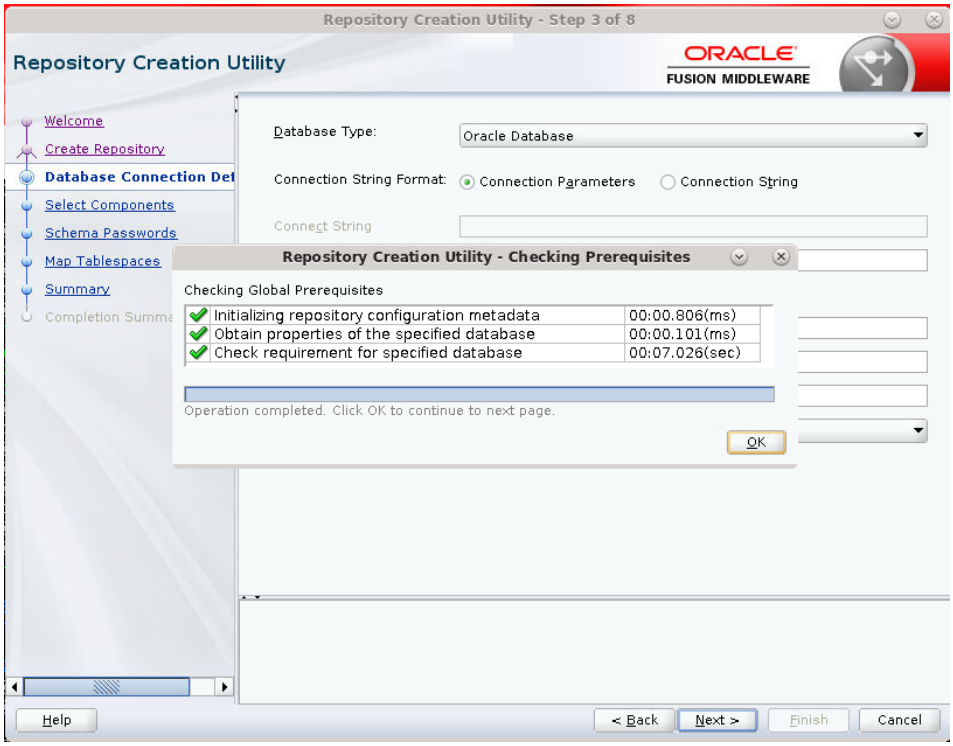
3. Select Create Repository and System Load and Product Load. Click **Next**.



4. Enter database connection details:
   - Database Type: Oracle Database
   - Host Name: dbhostname.us.oracle.com
   - Port: 1521
   - Service Name: dbservicename
   - Username: sys
   - Password: <syspassword>
   - Role: SYSDBA



5. Click The Installer checks prerequisites.
6. When the prerequisite checks are complete, click **OK**. Click **Next**.



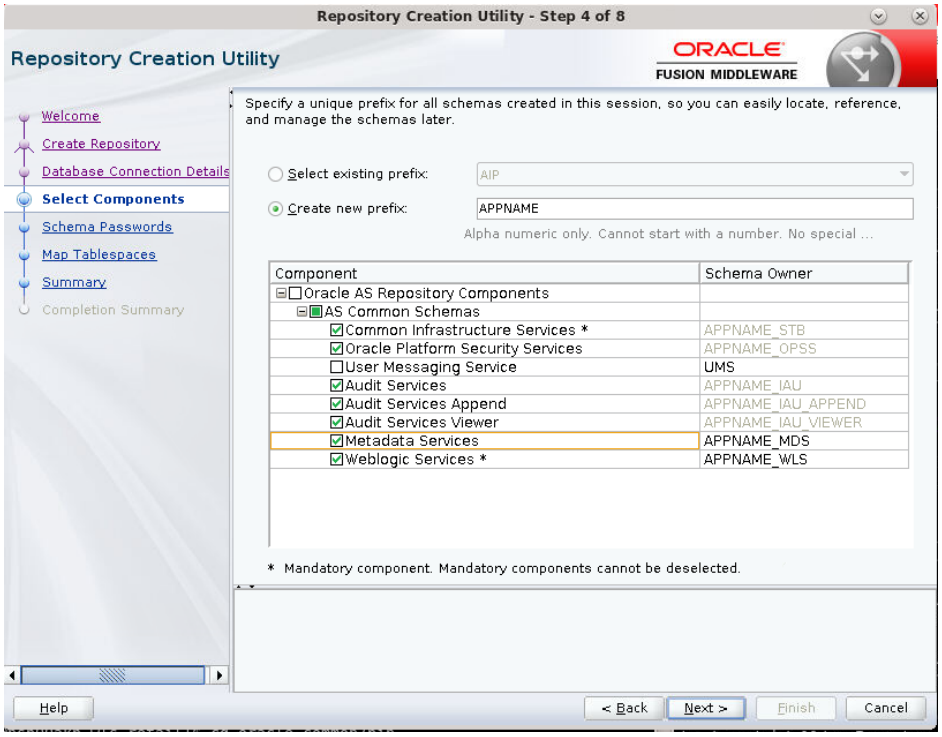
7. Click the **Create a new prefix** option, the prefix name for your schemas should be unique to your application environment.

   Example: ReIM, ALLOC, ReSA, and so on.

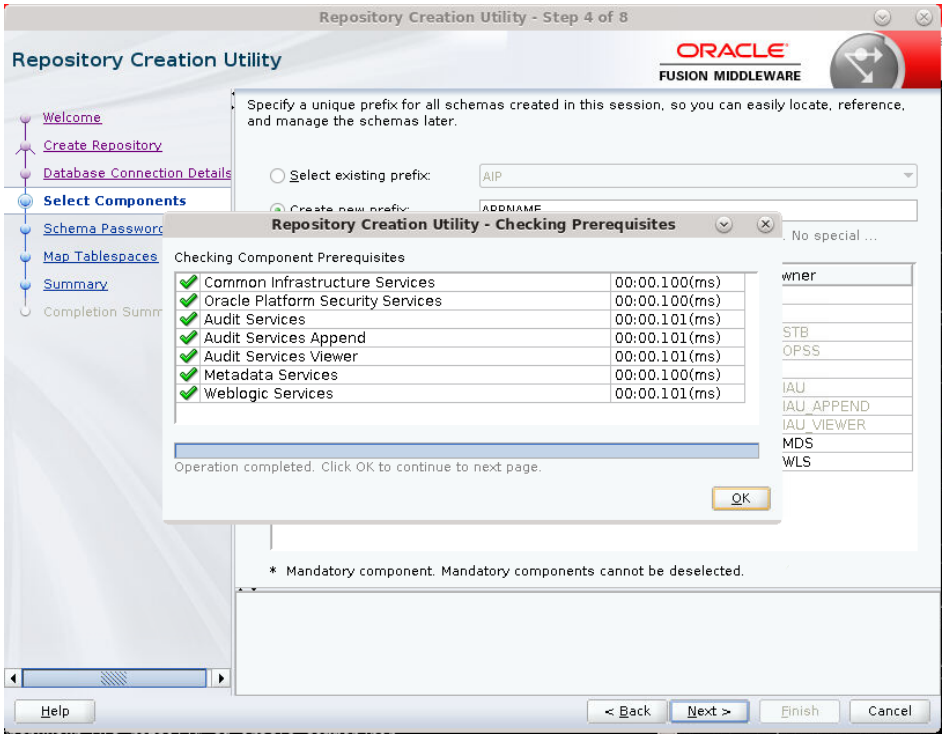
8. Select the components to create:
   - Meta Data Services
   - Oracle Platform Security Services

> **Note:** Once OPSS schema is selected, the following dependent schemas will get selected automatically.
>
> Audit Services
>
> Audit Services Append
>
> Audit Services Viewer

> **Note:** STB schema will be already selected as part of the Common Infrastructure component.

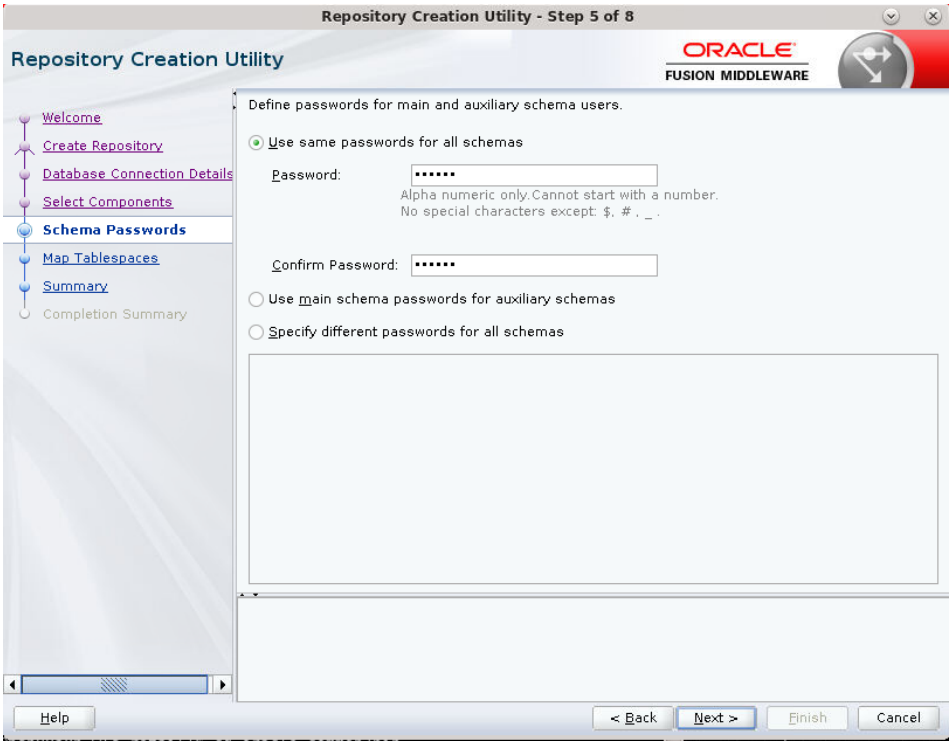


9. Click **Next**.

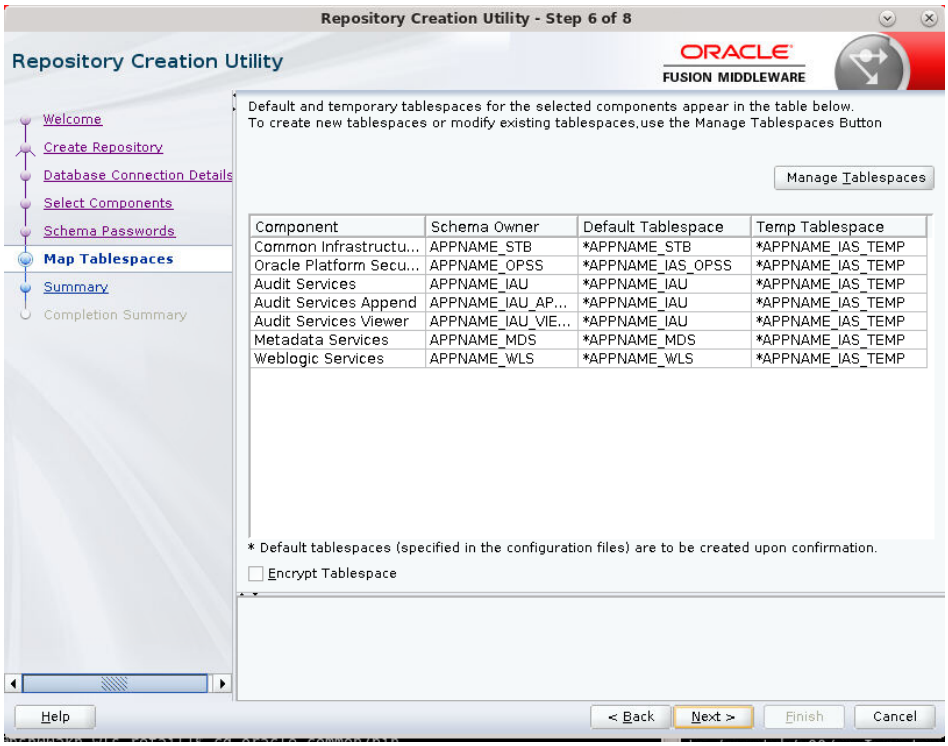


10. Enter password of your choice.

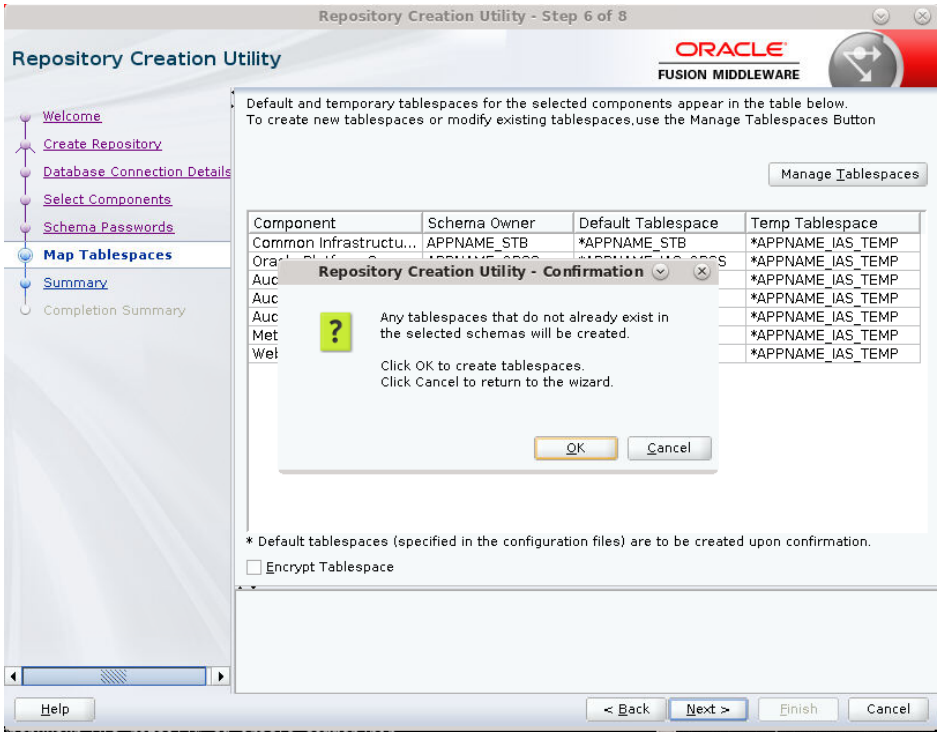
> **Note:** This password is needed at the time of ADF domain creation.



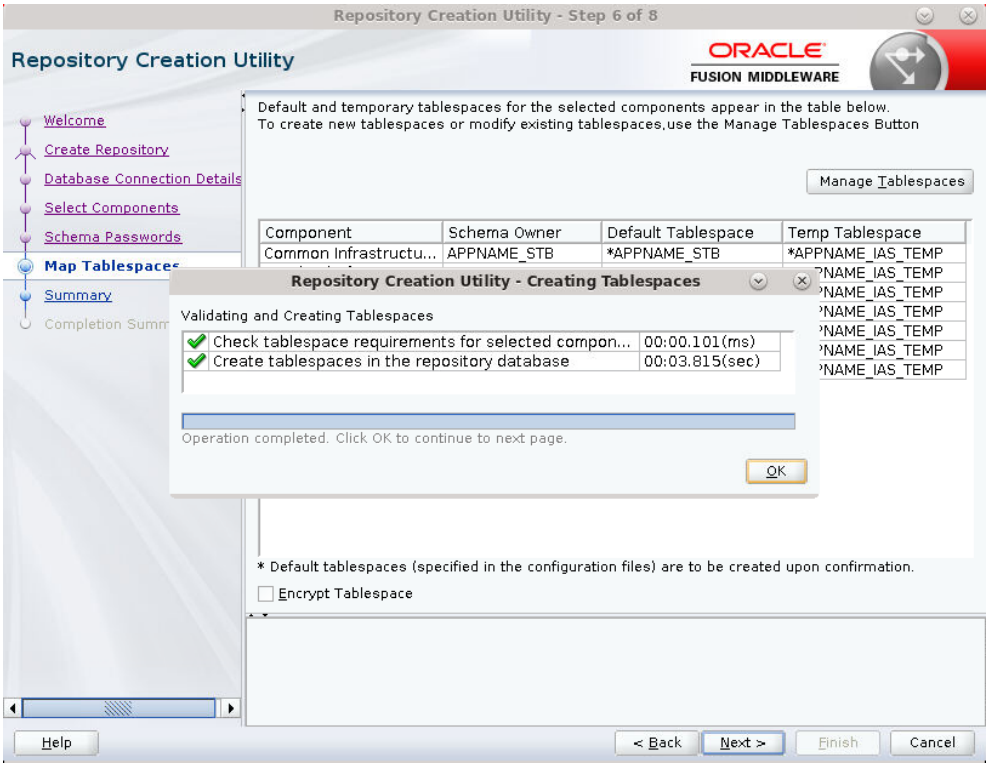
11. Provide the password and Click '**Next**'.



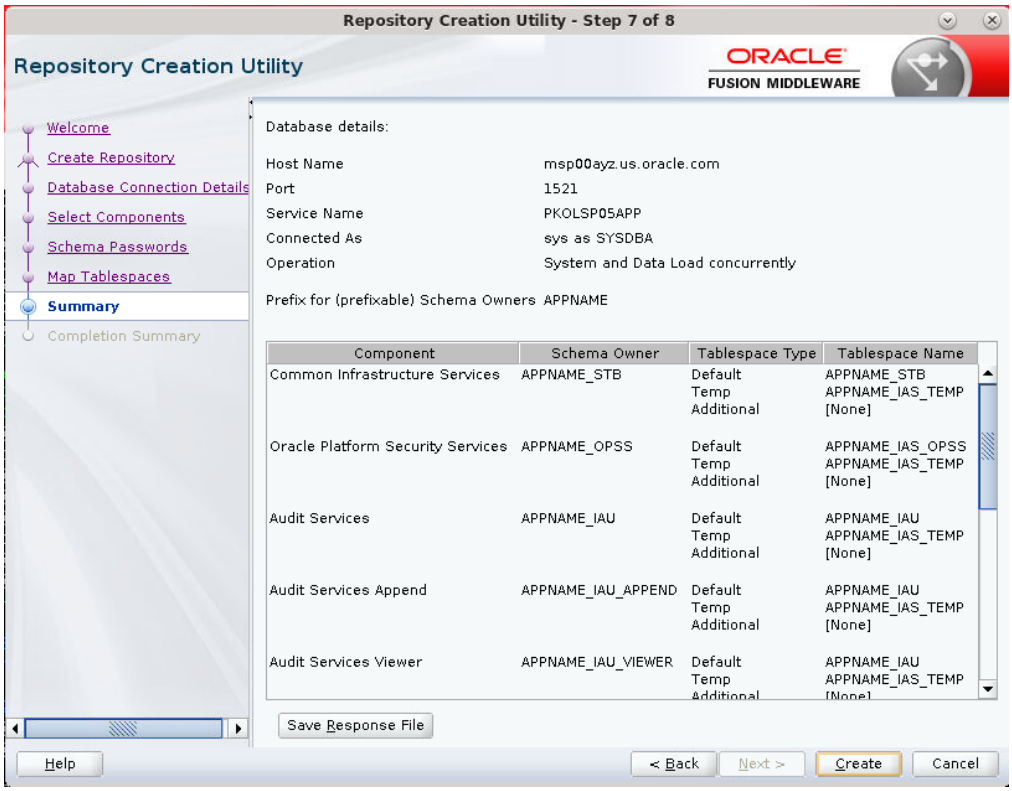
12. Click **Next**. A Repository Creation notification will appear. Click **OK**.



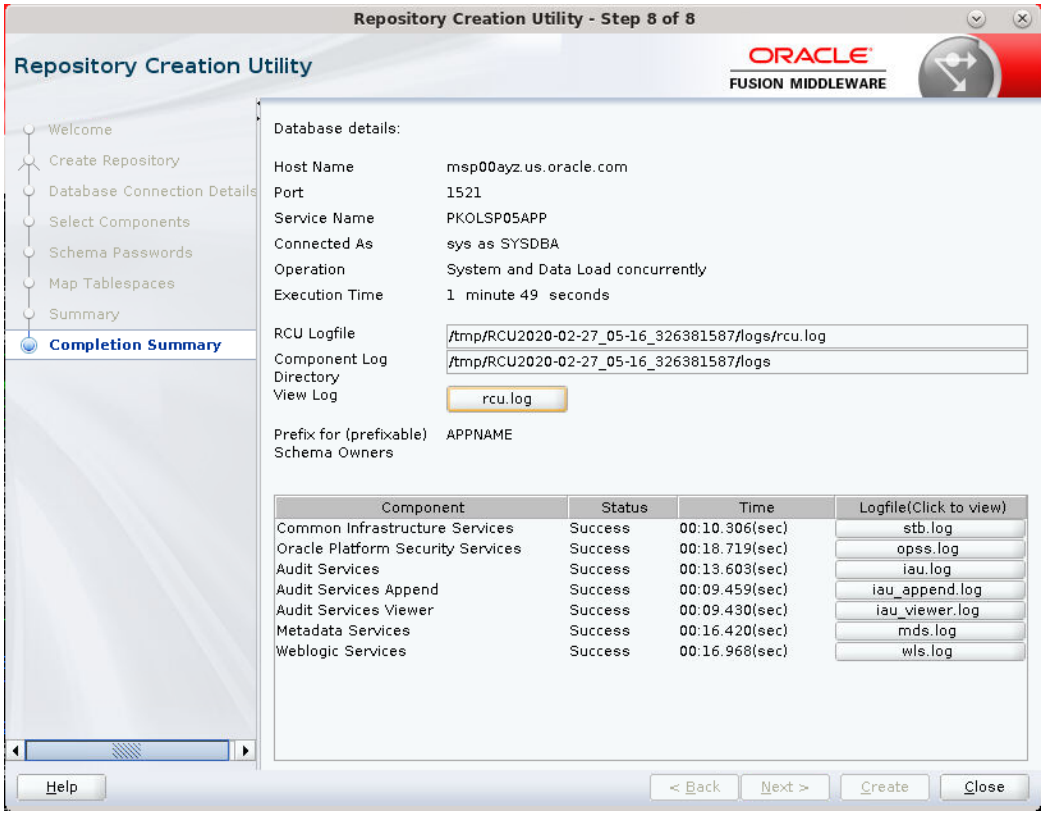
13. Tablespaces are created, and the progress will be displayed in a pop-up notification. When the operation is completed, click **OK**.



14. Click **Create**. The schema is created.



15. Upon successful creation of database schemas, a screen will appear with all the schemas created. Click **Close**.



Create a New ADF Domain (with managed server and EM)

To create a new domain and managed server with ADF libraries and EM, follow the below steps:

1. Set the environment variables:

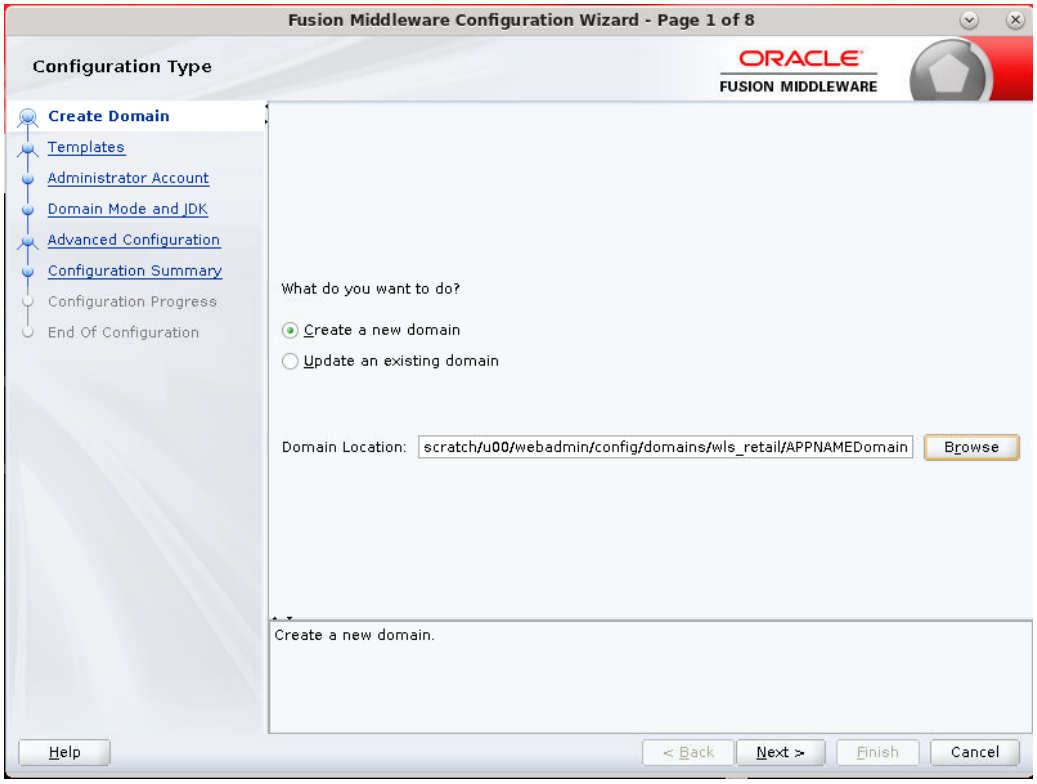
```
export JAVA_HOME=<JDK_HOME>
    (Example:/u00/webadmin/products/jdk_java) [JDK_HOME is the location where
jdk has been installed)
export PATH=$JAVA_HOME/bin:$PATH
export ORACLE_HOME=<ORACLE_HOME>/
 (Example:/u00/webadmin/products/wls_retail)

cd $ORACLE_HOME/oracle_common/common/bin
    (ORACLE_HOMEis the location where Weblogic has been installed.)
```

2. Run the following command:
3. ./config.sh

4. Select Create a New Domain

   Domain location: Specify the path to the <DOMAIN_HOME>
   Example:/u00/webadmin/config/domains/wls_retail/APPNAMEDomain

5. Click **Next**.



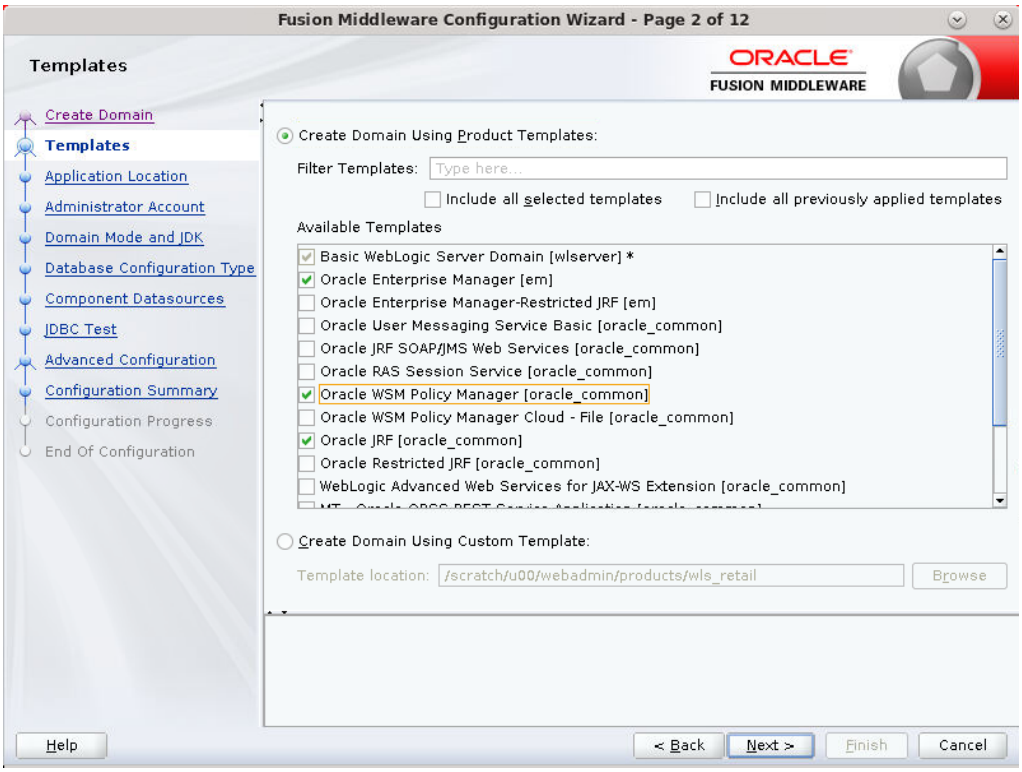
6. Select Create Domain Using Product Templates.
7. Check the following components:

   Oracle Enterprise Manager

   Oracle WSM Policy Manager

> **Note:** When Oracle Enterprise Manager component is selected, the following dependent components are selected automatically:
>
> **Oracle JRF**
>
> **Weblogic Coherence Cluster Extension**

8. Click **Next**.

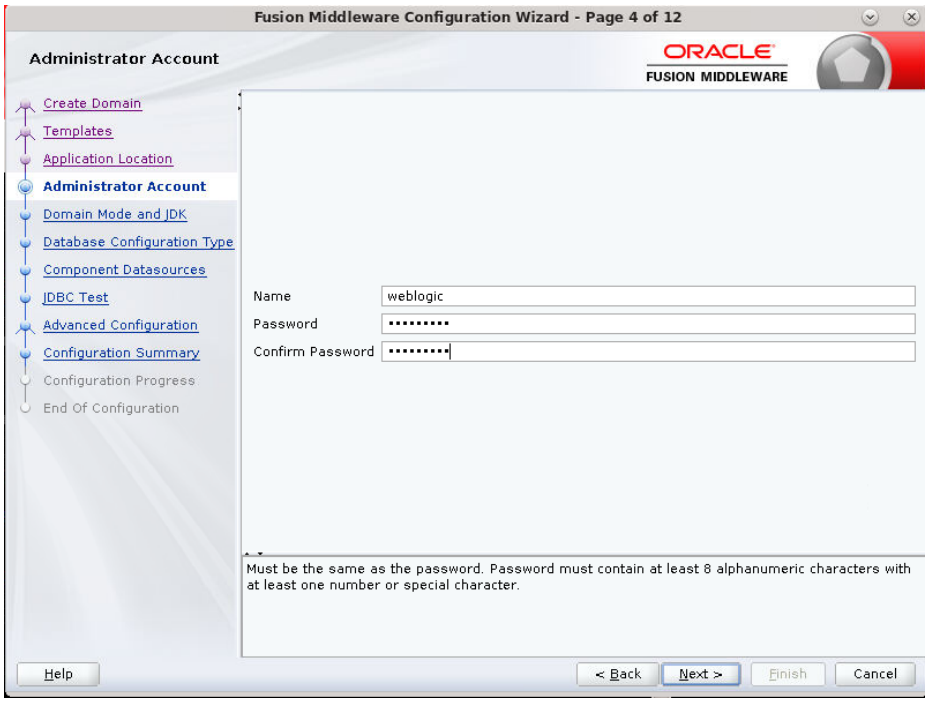


Application location: Application directory location. Example: /u00/webadmin/config/applications/wls_retail/APPNAMEDomain

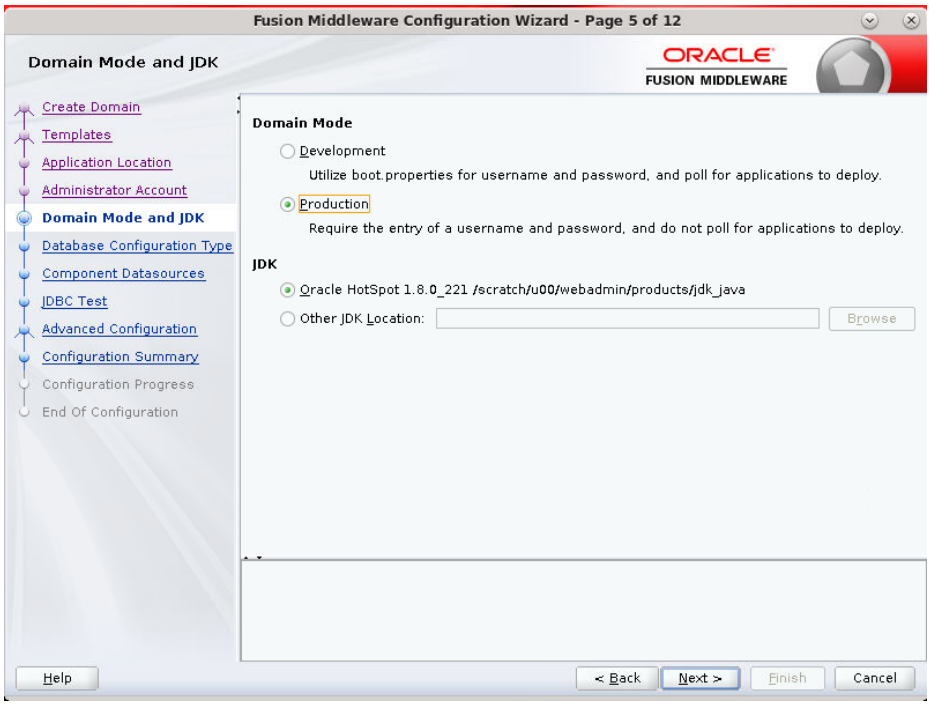
9. Click **Next**.

10. Provide the WebLogic administrator credentials and click **Next**:

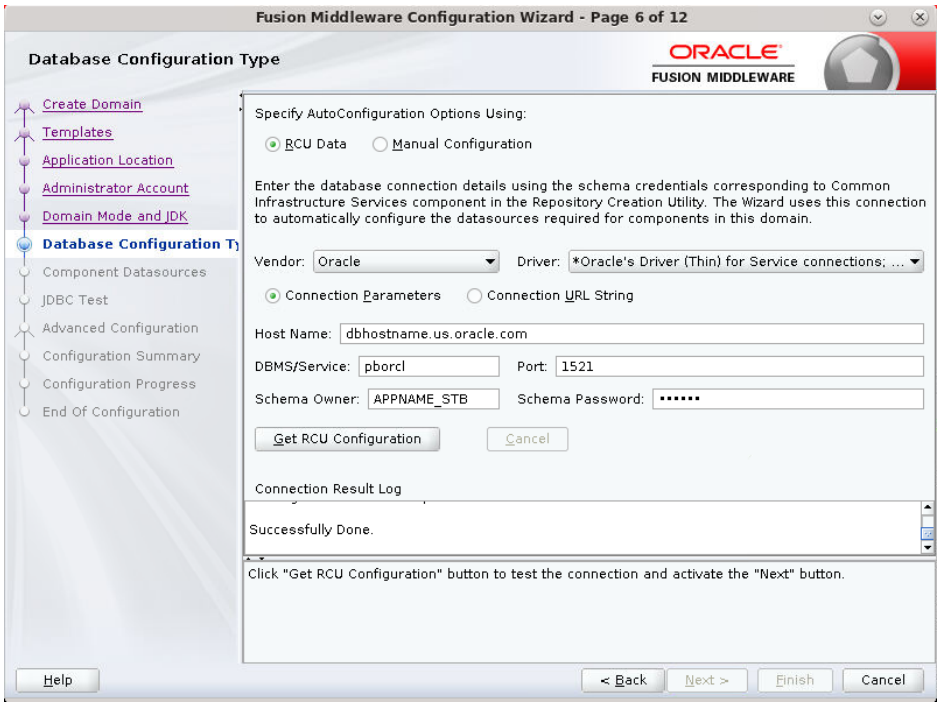
- Username: weblogic
- Password: <Password>



11. Select Domain Mode as Production and the JDK to use (as applicable) and click **Next.**

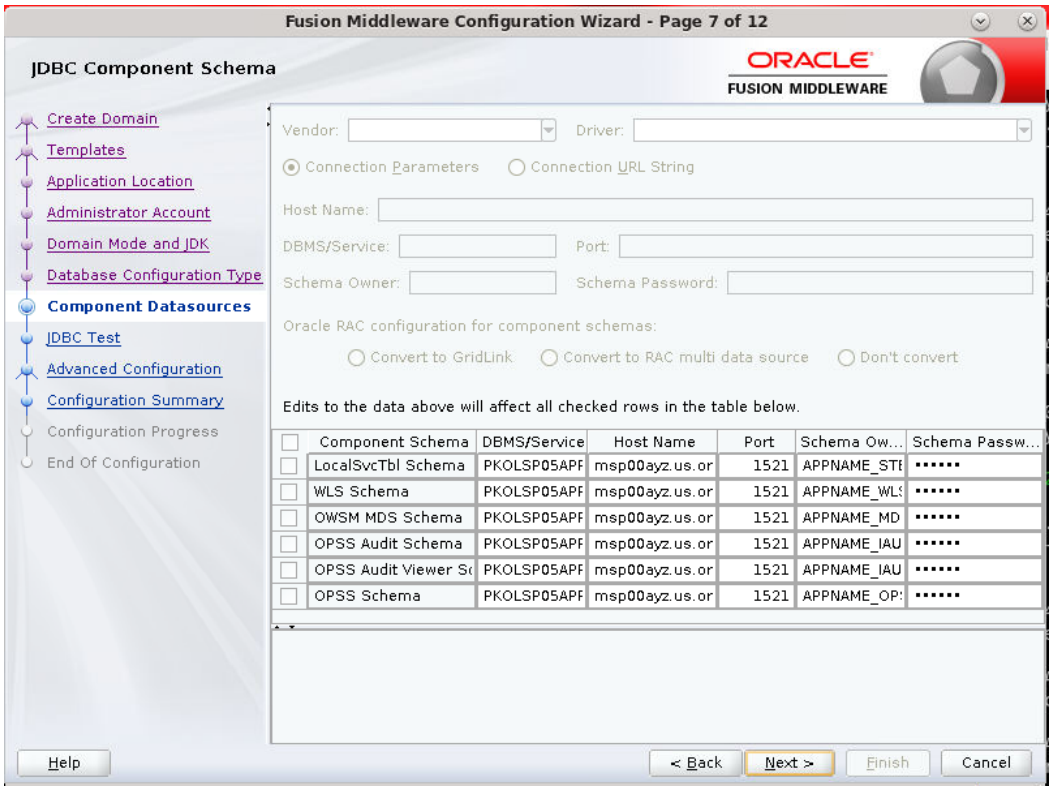


12. Select **RCU Data**.
    - Vendor: Oracle
    - DBMS/Service: dbservicename
    - Host Name: dbhostname.us.oracle.com
    - Port: 1521
    - Schema Owner: APPNAME_STB (Example: ALLOC_STB, ReSA_STB, and so on).
    - Password: <Password>. This password which was used for RCU schema creation.

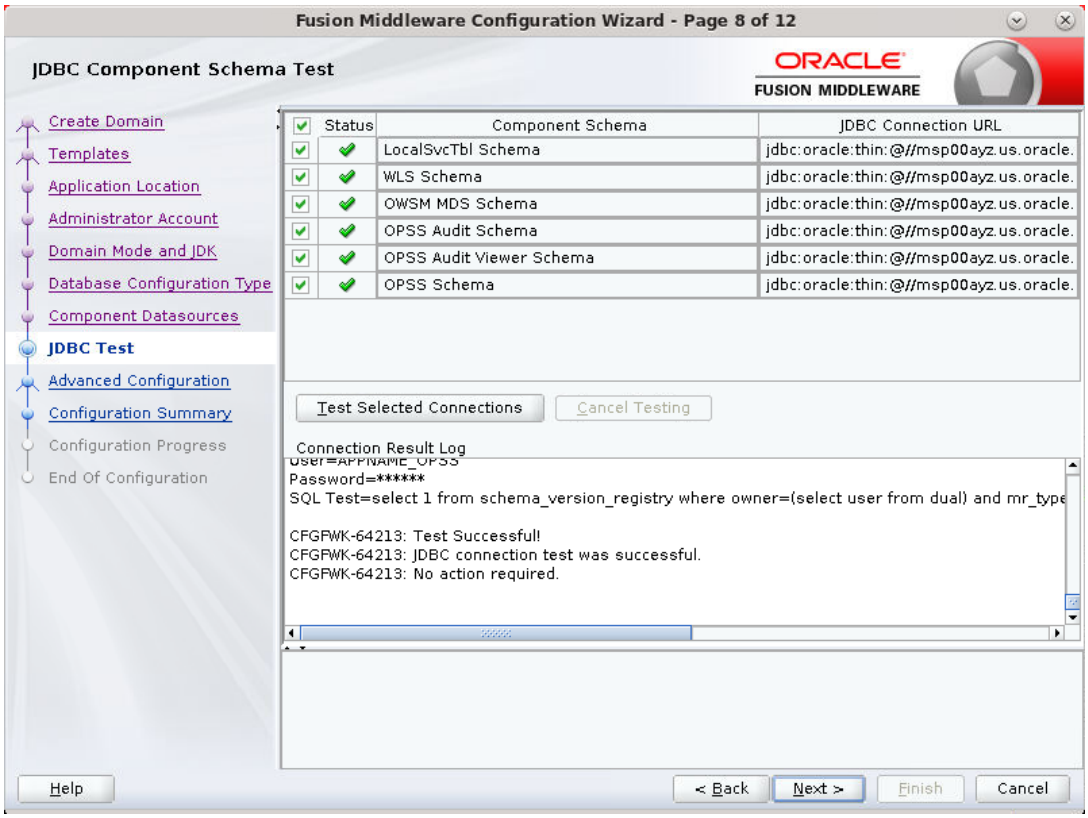


13. Click the Get RCU Configuration button.

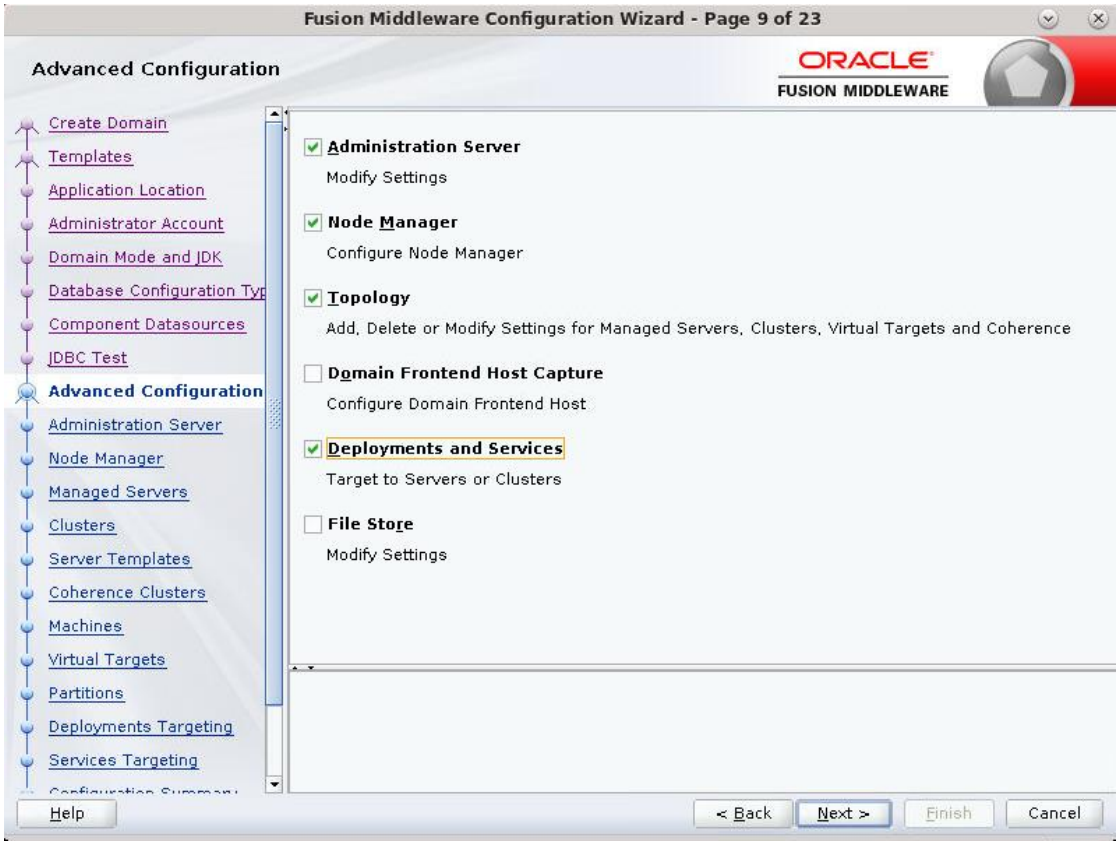
14. Click **Next**.



15. Click **Next** and it will test to make sure it can connect to your datasources.

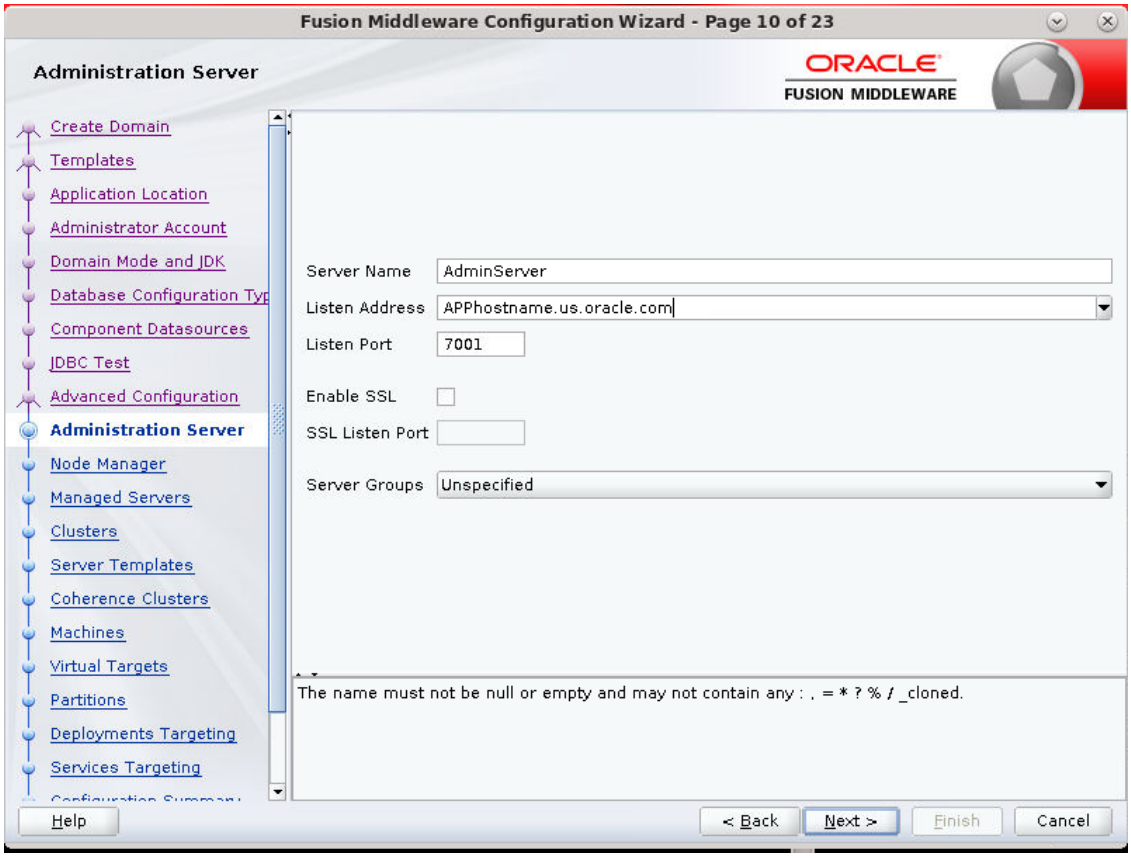


16. Click **Next** to continue
17. Select advanced configuration for:
    - Administration Server
    - Node manager
    - Managed Servers, Clusters and Coherence
    - Deployments and Services

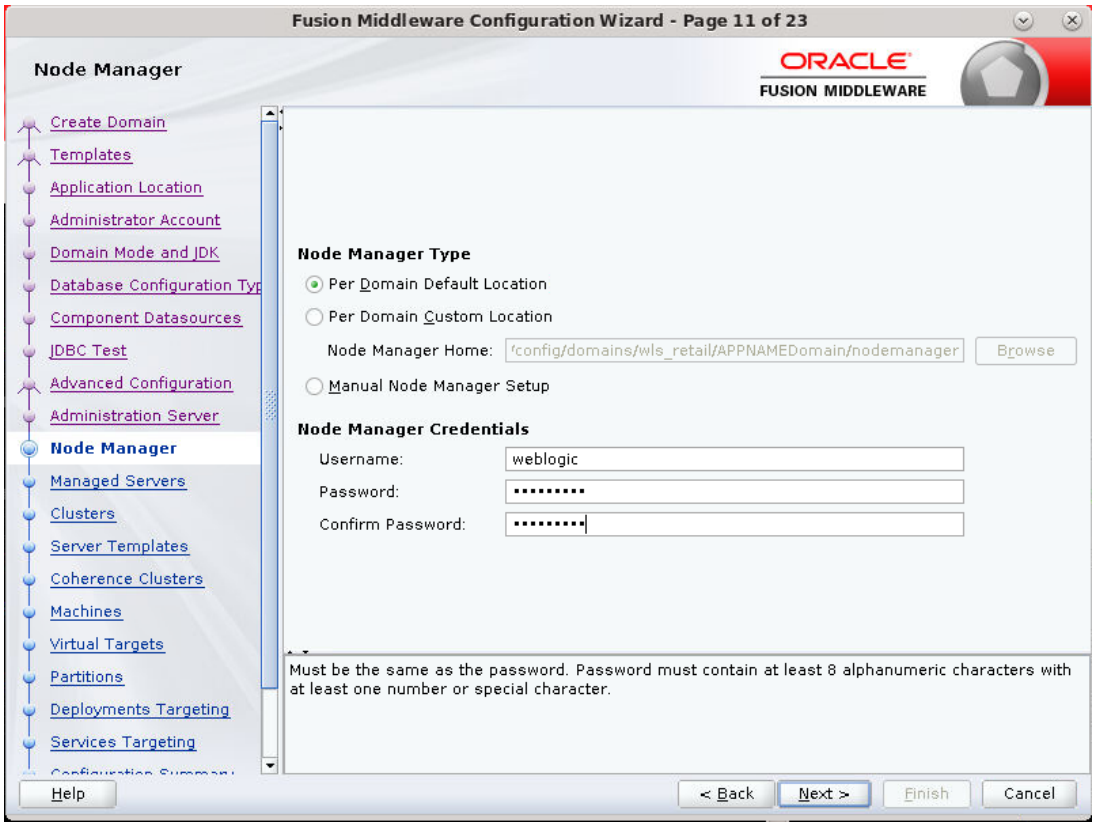


18. Configure the Administration Server:

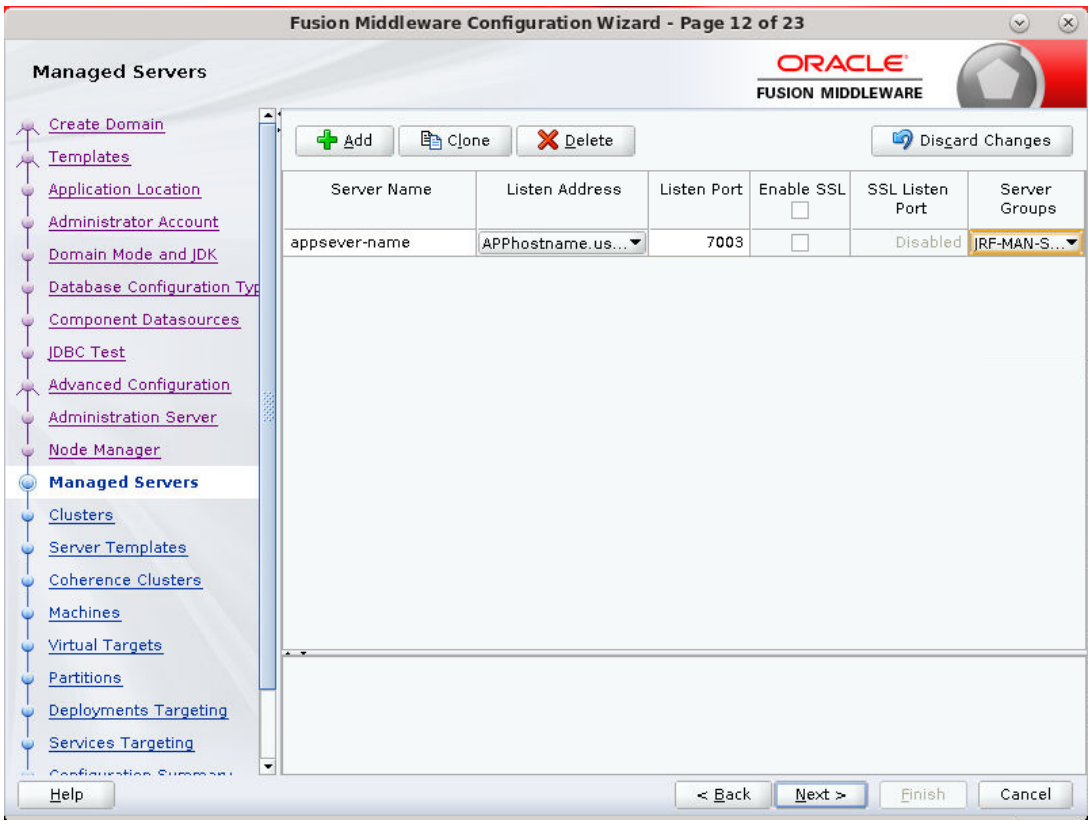
- Server Name: <APP name>_AdminServer
- Listen address: Appserver Hostname or IPAddress of the Appserver Host.
- Listen port: <Port for Admin Server> Note: The port that is not already used.
- Server Groups: Unspecified



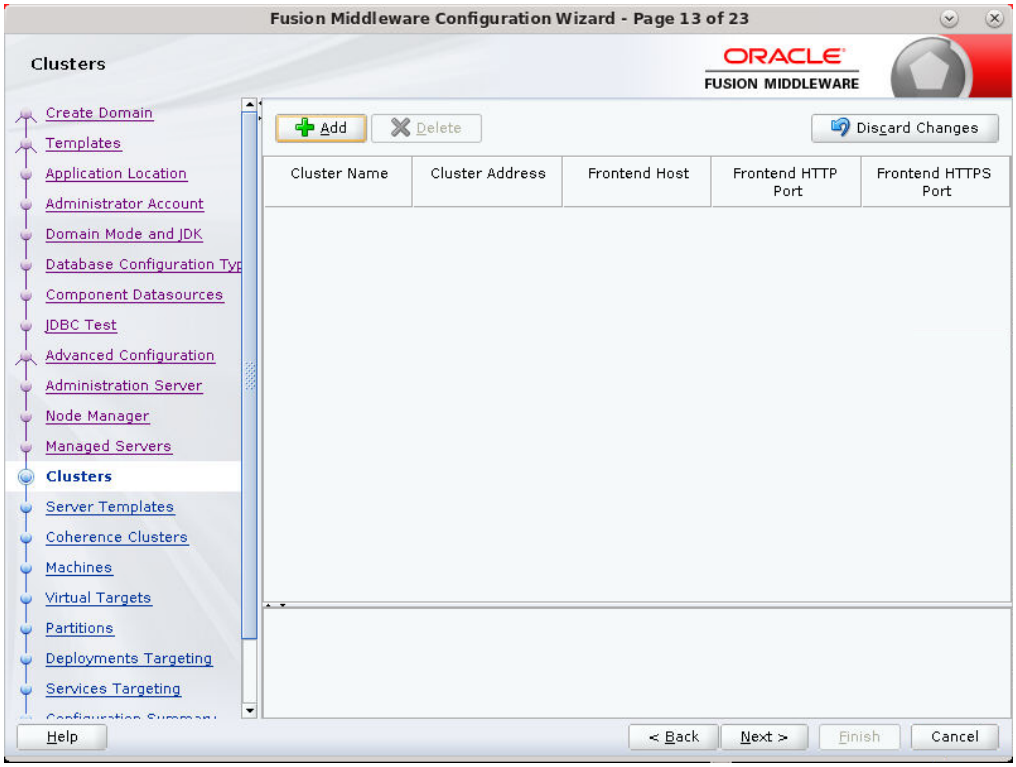
19. Configure Node Manager:
    - Node manager type: Per domain default location
    - Username: weblogic
    - Password: <Password for weblogic>



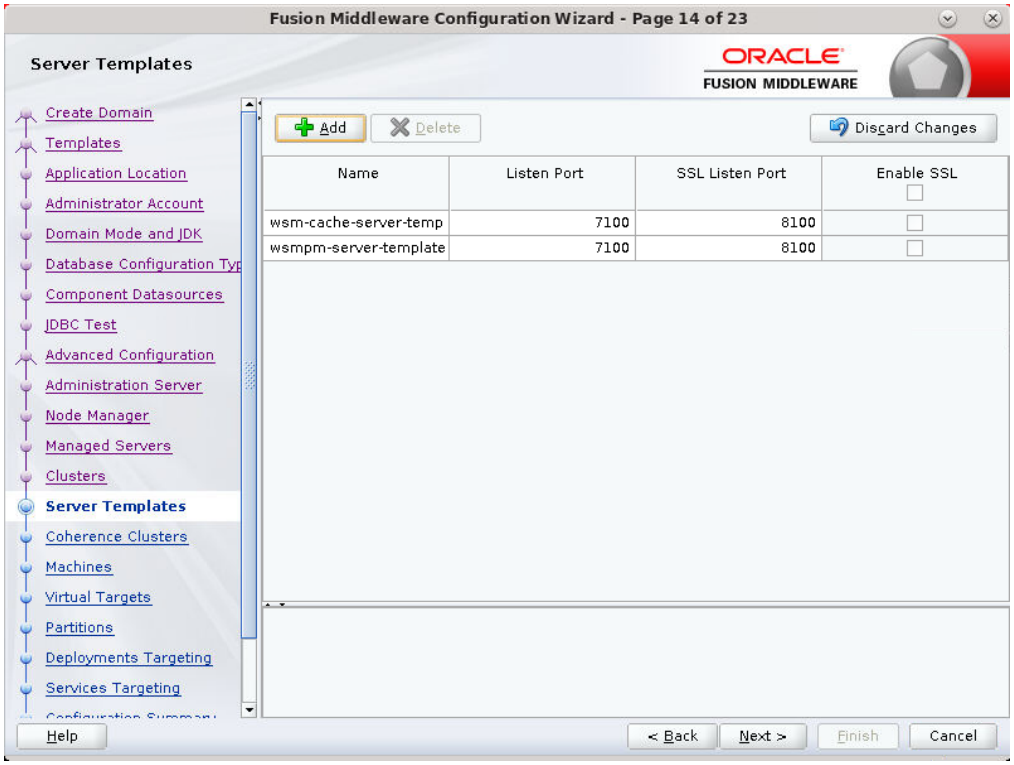
20. Click the **Add** button.
    - Server Name: <appname-server>
    - Listen address: Appserver Hostname or IPAddress of the Appserver Host
    - Listen port: <Port for Managed Server> Note: The port used here must be a free port.
    - Server Groups: JRF-MAN-SVR



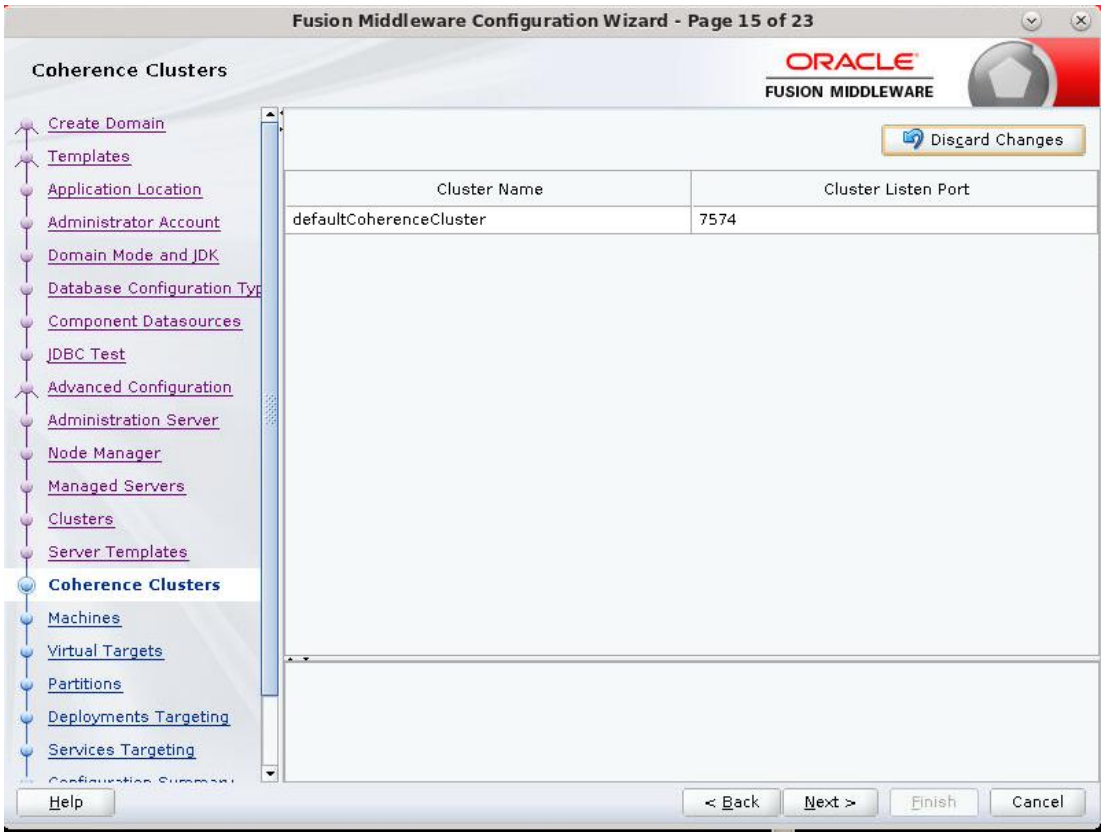
21. Skip Configure Clusters and click **Next**.



22. Do not change anything and click **Next**.



23. Click Next.

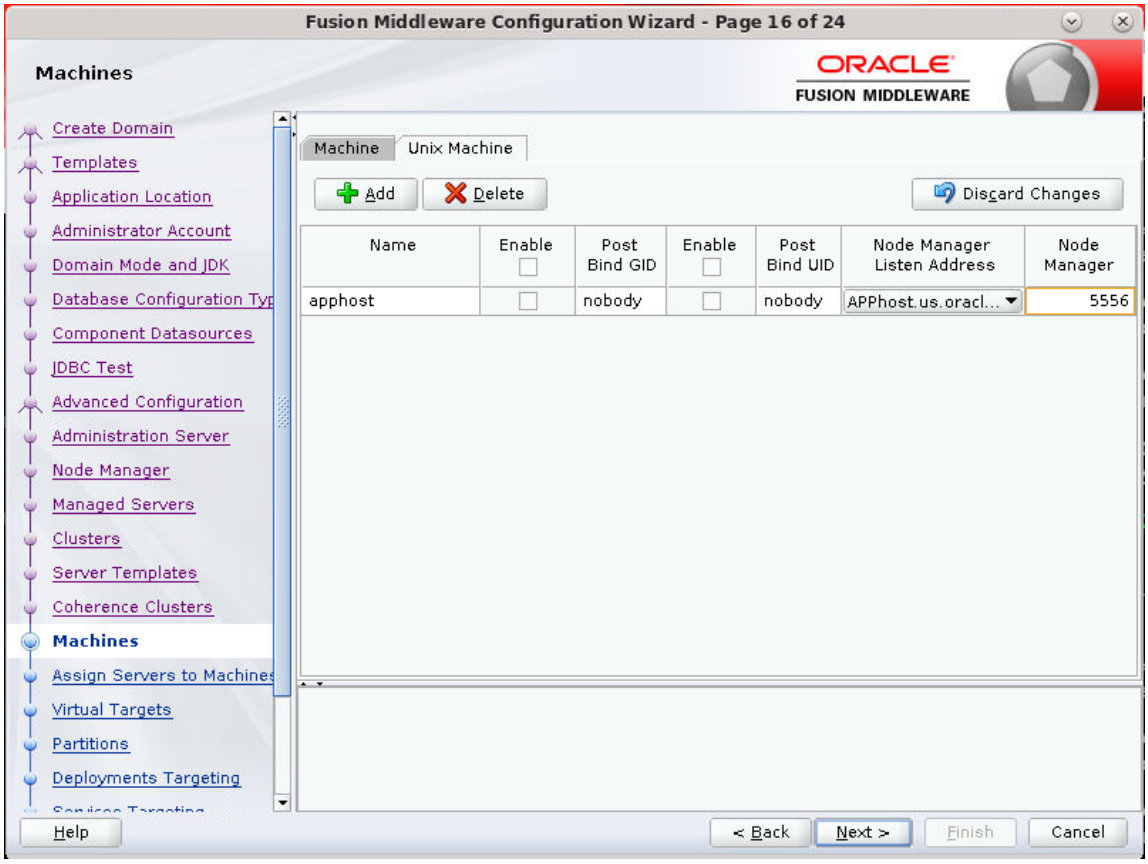


24. Configure Machines

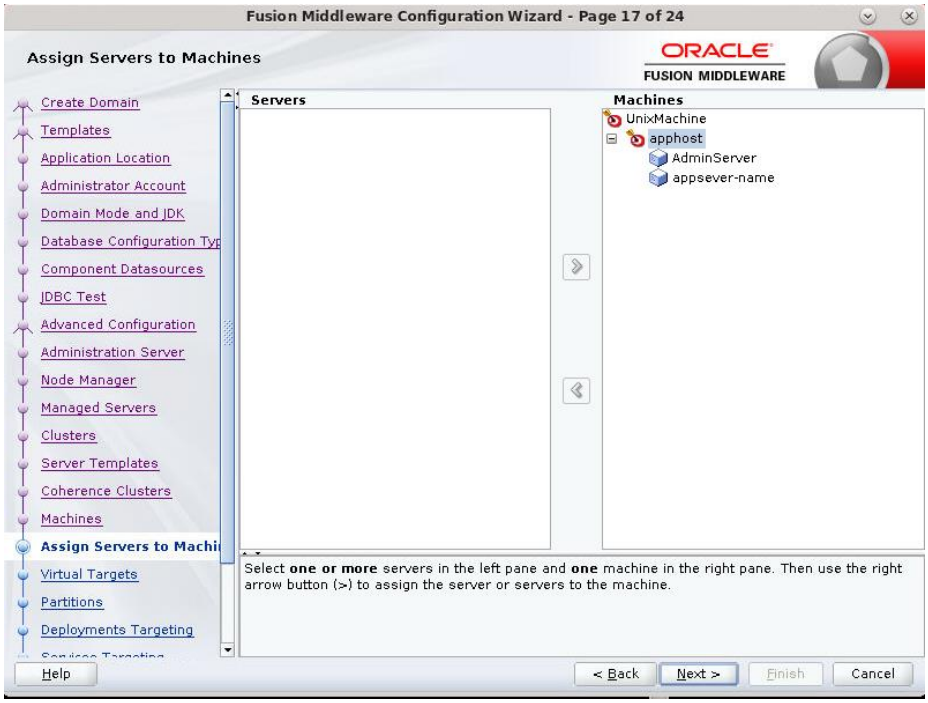
Select unix Machine :

Click the **Add** button.

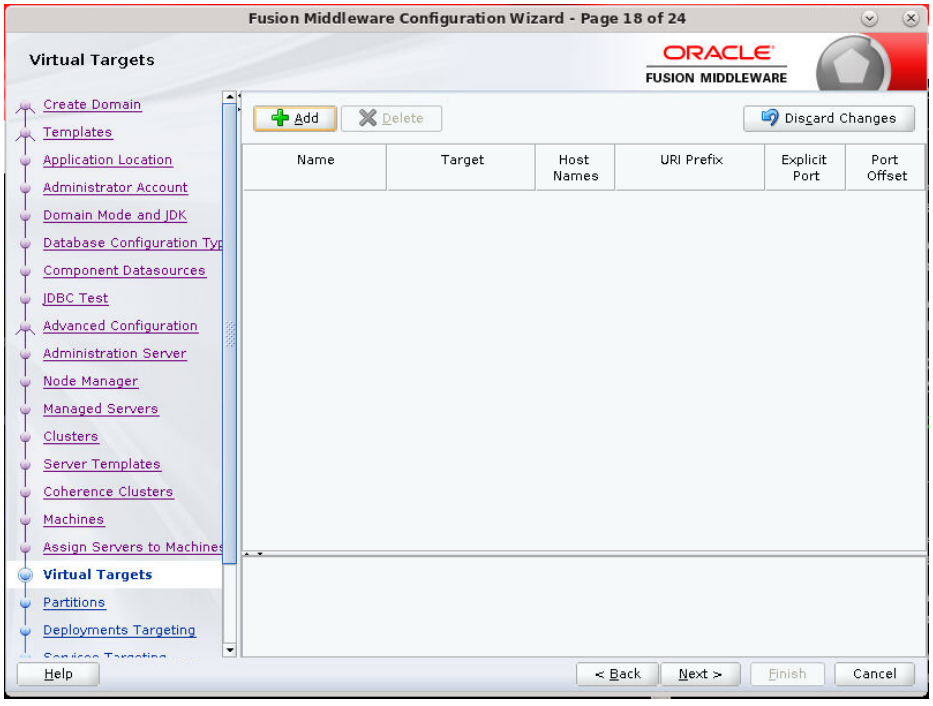
- Name: apphostname_MACHINE
- Listen address: apphostname or IPAddress
- Listen port: <Port for node manager> Note: The port used here must be a free port.



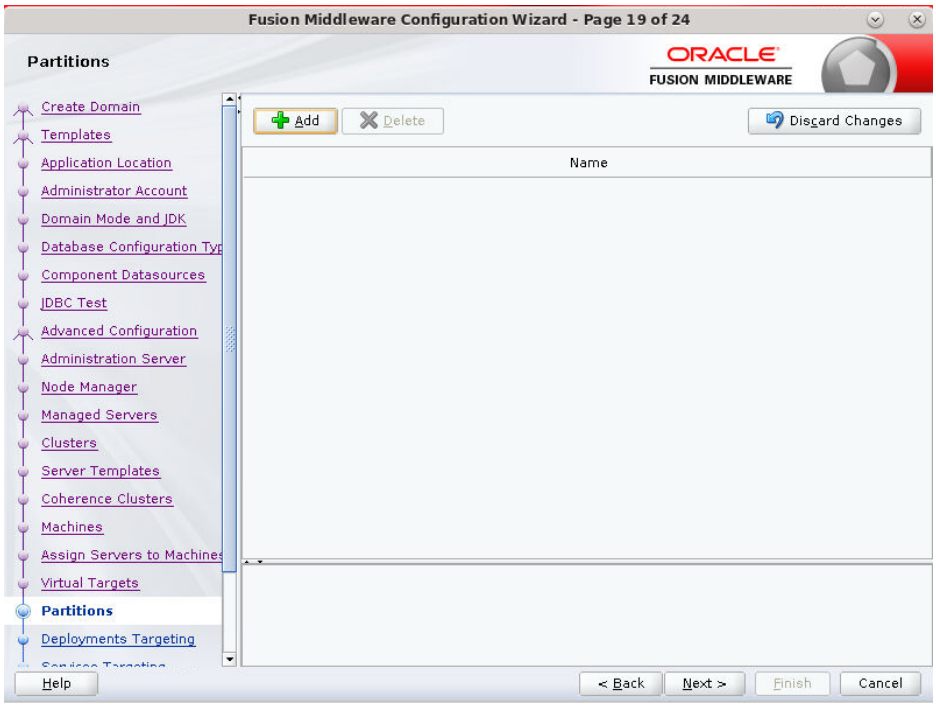
25. Assign the configured Admin server and managed servers to the new machine.



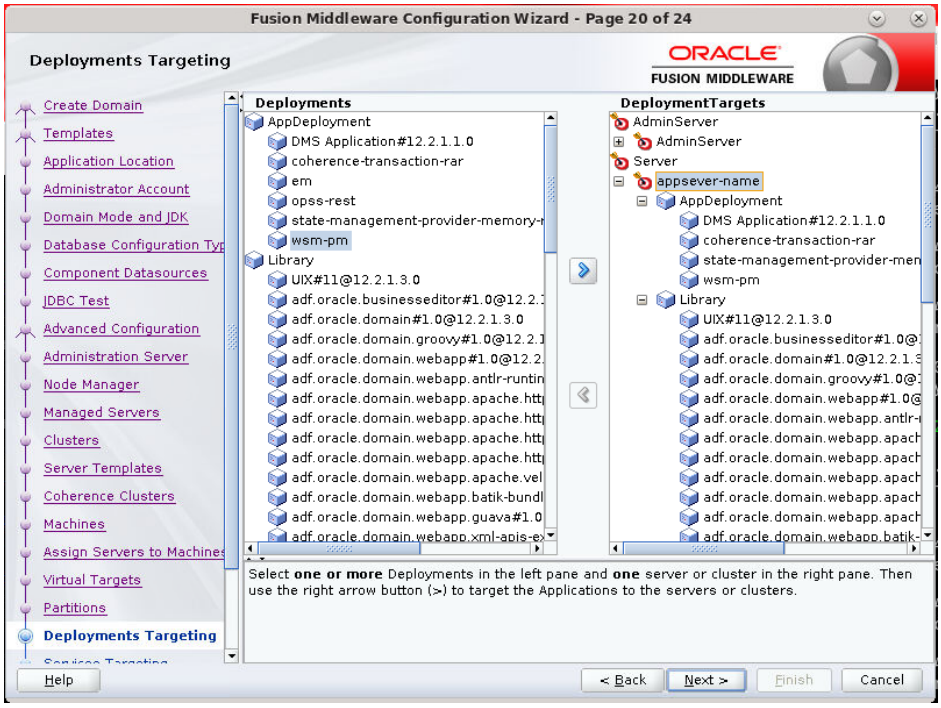
26. Skip Virtual Targets. Click **Next.**



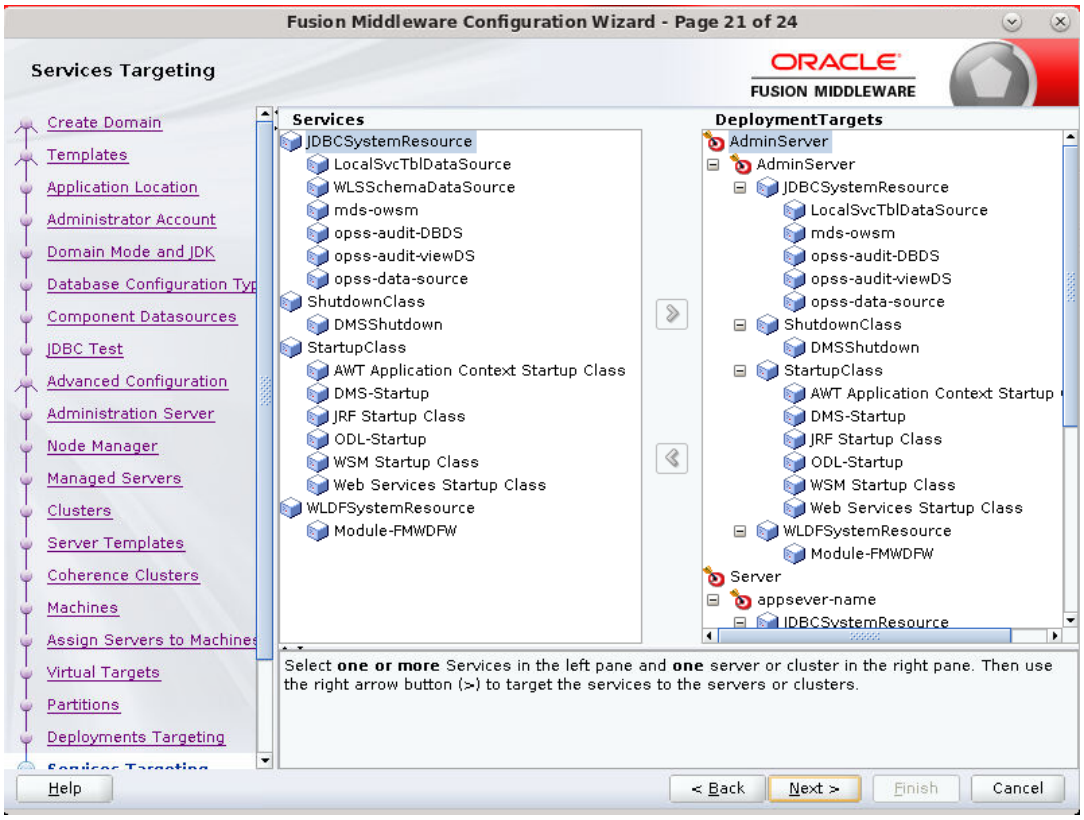
27. Skip Partitions. Click Next.



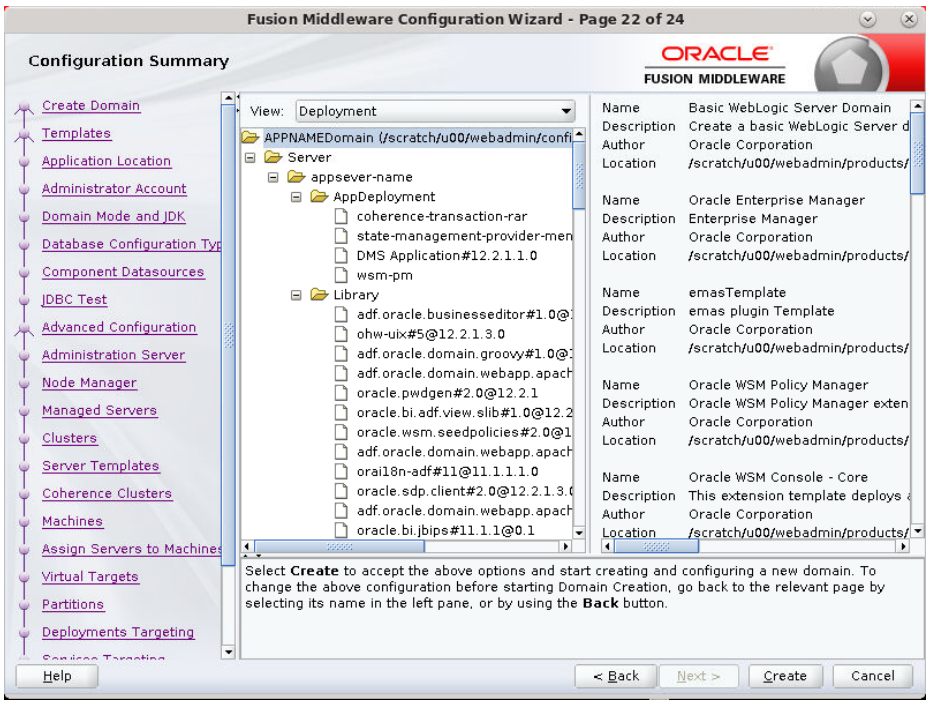
28. Target the "wsm-pm" deployment to APPNAME_AdminServer:



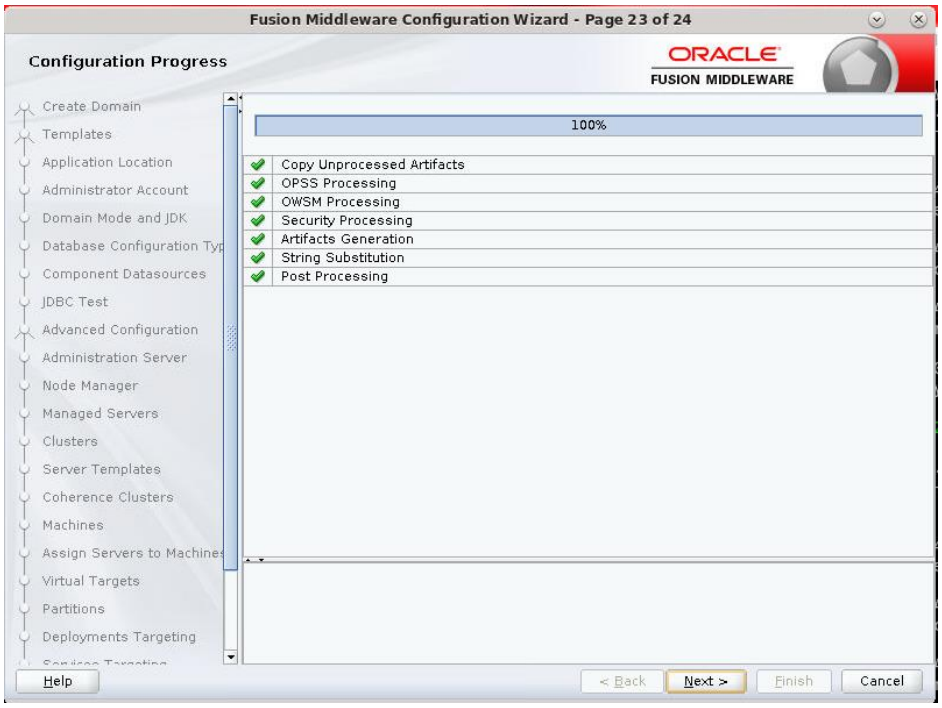
29. Click Next.



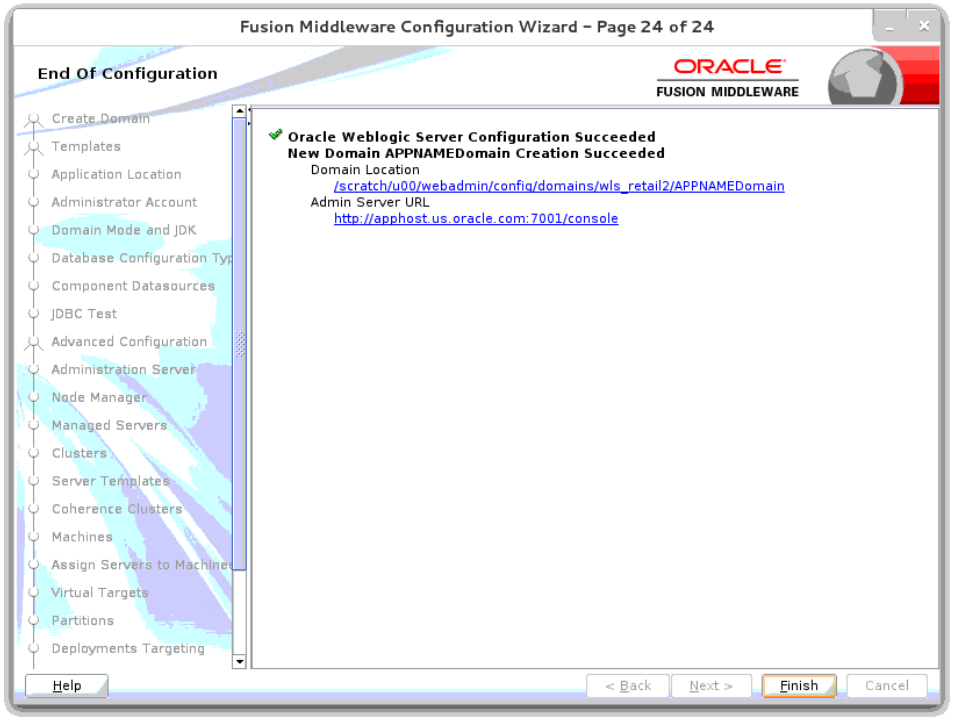
30. Click **Create**.



31. Click Next.



32. When the process completes, click **Finish**.



Update the WebLogic.policy

1. After the APPNAMEdomain has been created, update <MW_HOME>/wlserver/server/lib/weblogic.policy file with the information below.

> **Note:** If copying the following text from this guide to UNIX, ensure that it is properly formatted in UNIX. Each line entry beginning with "permission" must terminate on the same line with a semi colon. Also, the AdminServer must be restarted for these changes to take effect.

> **Note:** <DOMAIN_HOME> in the example below is the full path of the WebLogic domain; <appname-server> is the RPM managed server created.

```
grant codeBase "file:< DOMAIN_HOME>/servers/<appname-
server>/tmp/_WL_user/<context_root>/-" {
permission java.security.AllPermission;
permission oracle.security.jps.service.credstore.CredentialAccessPermission "
credstoressp.credstore", "read,write,update,delete";
permission oracle.security.jps.service.credstore.CredentialAccessPermission "
credstoressp.credstore.*", "read,write,update,delete";
};
grant codeBase "file:<DOMAIN_HOME>/servers/<appname-
server>/cache/EJBCompilerCache/-" {
permission java.security.AllPermission;
permission oracle.security.jps.service.credstore.CredentialAccessPermission
"credstoressp.credstore", "read,write,update,delete";
permission oracle.security.jps.service.credstore.CredentialAccessPermission
"credstoressp.credstore.*", "read,write,update,delete";
};
```

An example of the full entry that might be entered is:

```
grant codeBase
"file:/u00/webadmin/config/domains/wls_retail/RPMdomain/servers/rpm-
server/tmp/_WL_user/rpm16/-" {
permission java.security.AllPermission;
permission oracle.security.jps.service.credstore.CredentialAccessPermission "
credstoressp.credstore", "read,write,update,delete";
permission oracle.security.jps.service.credstore.CredentialAccessPermission "
credstoressp.credstore.*", "read,write,update,delete";
};

grant codeBase "file:/u00/webadmin/config/domains/wls_retail/
RPMdomain/servers/rpm-server/cache/EJBCompilerCache/-" {
permission java.security.AllPermission;
permission oracle.security.jps.service.credstore.CredentialAccessPermission
"credstoressp.credstore", "read,write,update,delete";
permission oracle.security.jps.service.credstore.CredentialAccessPermission
"credstoressp.credstore.*", "read,write,update,delete";
};
```

> **Note:** If RPM application hosted on AIX Operating system, then add below JAVA_OPTIONS in setDomainEnv file.

For Example, Navigate to <DOMAIN_HOME>/bin and add below line in setDomainEnv.sh file.

```
JAVA_OPTIONS="${JAVA_OPTIONS} -
Djavax.xml.validation.SchemaFactory:http://www.w3.org/20
01/XMLSchema=com.sun.org.apache.xerces.internal.jaxp.val
idation.XMLSchemaFactory"

export JAVA_OPTIONS
```

After making changes to the weblogic.policy (and setDomainEnv.sh for AIX) be sure to bounce the whole domain including the AdminServer

Start the Node Manager

1. Start the nodemanager from <DOMAIN_HOME>/bin using the following script:
   ```
   nohup ./startNodeManager.sh &
   ```

Start the AdminServer (admin console)

1. Configure boot.properties for starting the Weblogic domain without prompting to username and password using the following command:
2. Create security folder at <DOMAIN_HOME>/servers/<AdminServer>/ and create boot.properties file under <DOMAIN_HOME>/servers/<AdminServer>/security

   The file 'boot.properties' should have the following:

   ```
   ---------------------------------
   username=weblogic
   password=<password>
   ---------------------------------
   ```

   In the above, the password value is the password of WebLogic domain which is given at the time of domain creation.

   Save the boot.properties file and start WebLogic server.
3. Start the WebLogic Domain (Admin Server) from <DOMAIN_HOME> using the following:

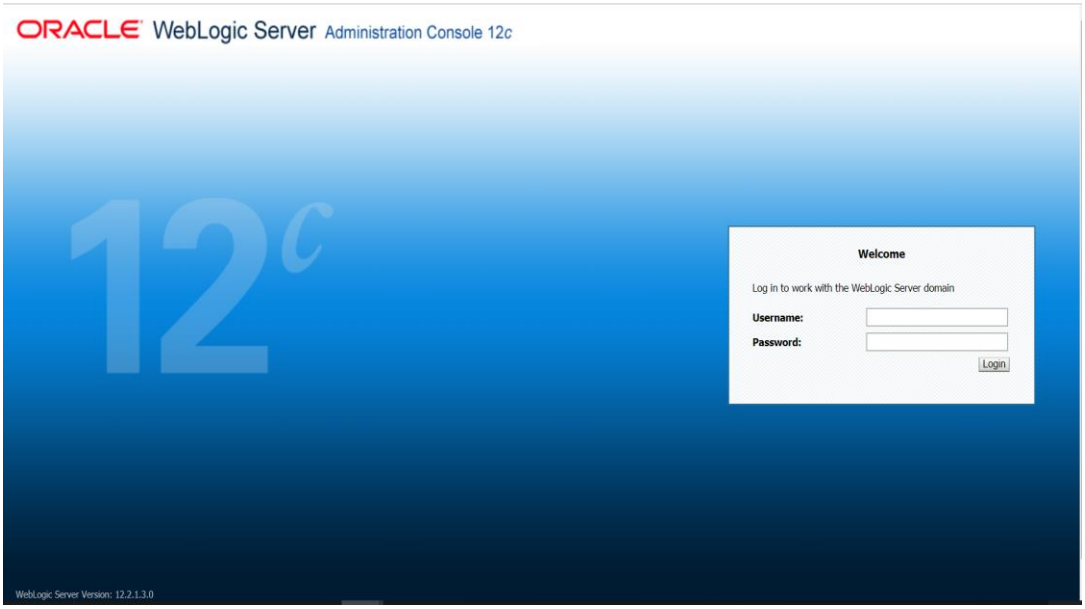
   ```
   nohup ./startWebLogic.sh &
   ```

   Example:

   nohup /u00/webadmin/config/domains/wls_retail1/APPdomain/startWebLogic.sh &
4. Access the Weblogic Admin console

   Example: http://<HOST_NAME>:<ADMIN_PORT>/console

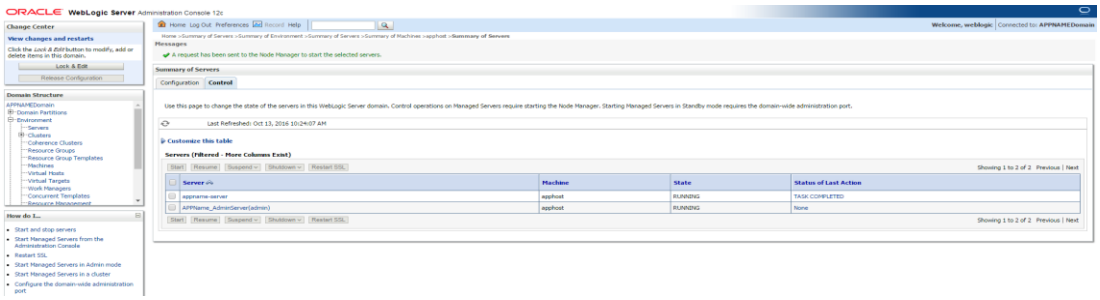
   In the below screen, provide username=weblogic and password=<weblogic password>



Start the Managed Server

After NodeManager is started, the managed servers can be started via the admin console.

1. Navigate to Environments -> Servers and click the Control tab. Select appname-server and click **Start**.

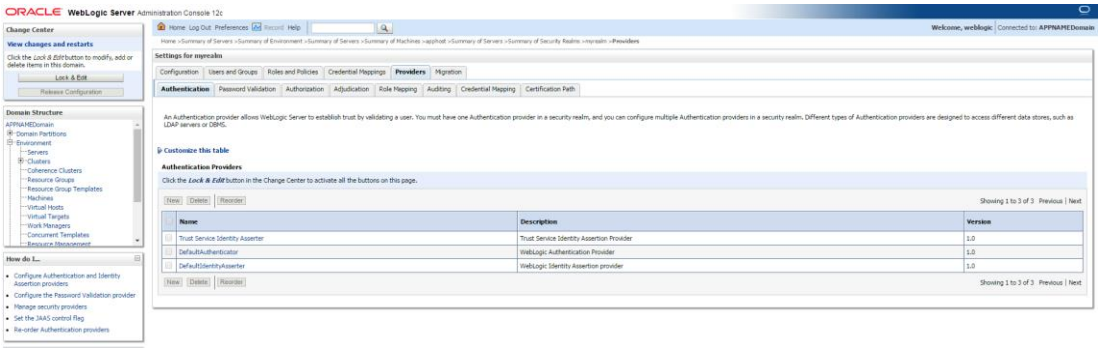


The Managed Server should be up and running before configuring further steps.

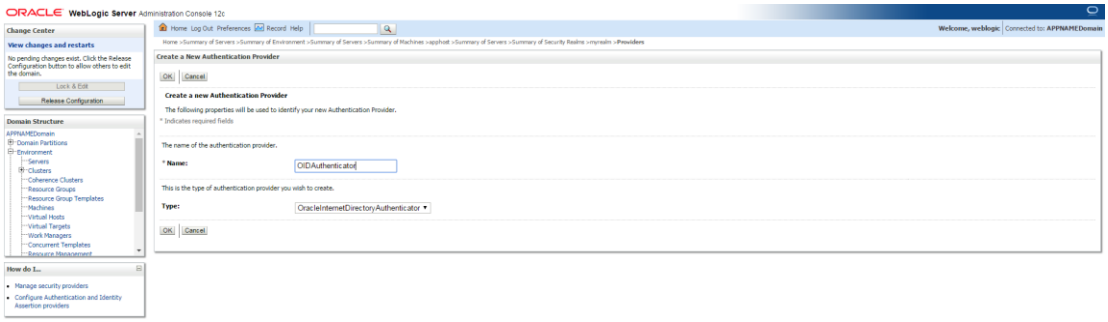
Configuration of OID LDAP Provider in Weblogic Domain:

Perform the following procedure to create LDAP providers in the domains created in the previous steps

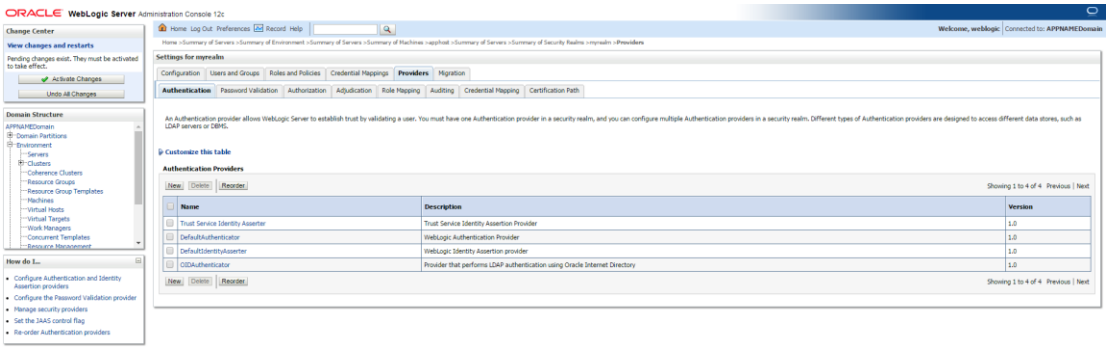
1. Log in to the Administration Console.
   `http://<HOSTNAME>:<ADMIN_PORT>/console`
2. In the Domain Structure frame, click **Security Realms**.
3. In the Realms table, click **myrealm**. The Settings for myrealm page is displayed.
4. Click the Providers tab.



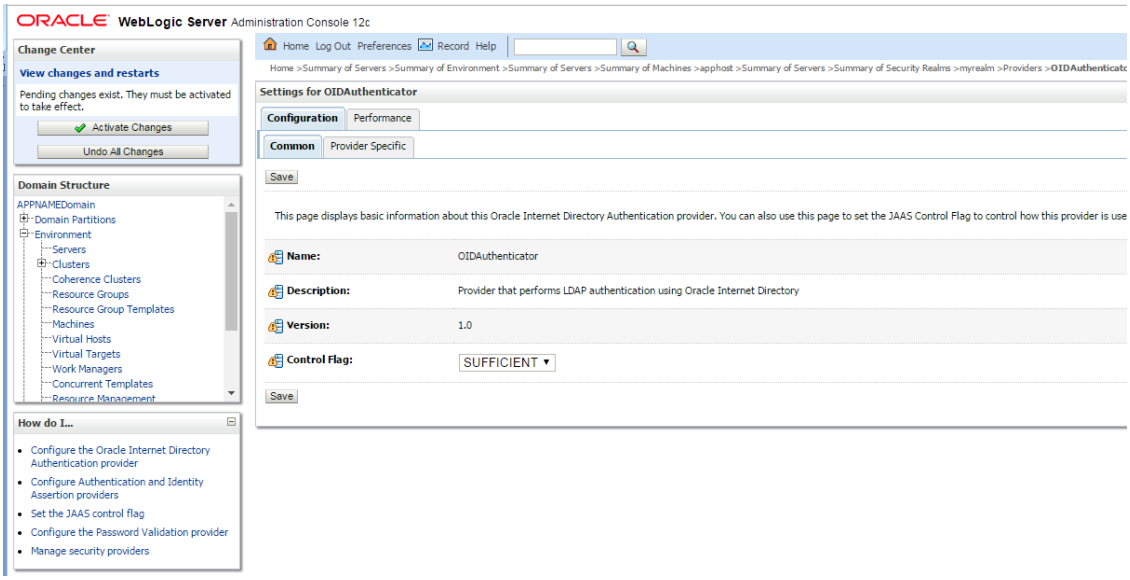
5. Click **Lock & Edit** and then click **New**. The 'Create a New Authentication Provider' page is displayed.



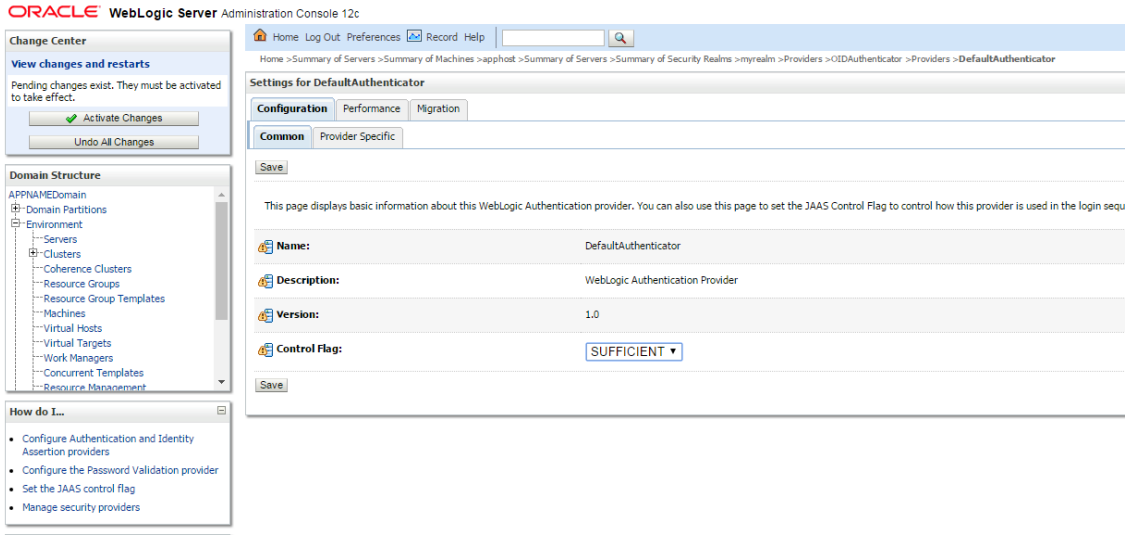
6. Enter OIDAuthenticator in the Name field and select OracleInternetDirectoryAuthenticator as the type. Click **OK**.



7. All the providers are displayed. Click **OID Authenticator**. Settings of OID Authenticator are displayed.



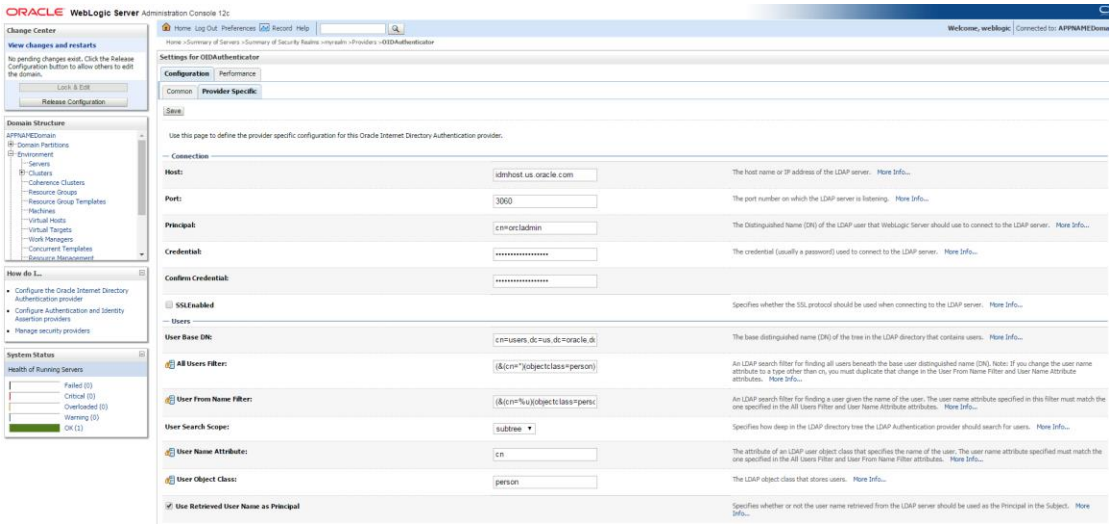
8. Set the Control Flag field to SUFFICIENT and click **Save**.
9. From the Providers tab, click on DefaultAuthenticator -> Configuration tab -> Common tab. Update the Control Flag to SUFFICIENT.
10. Click **Save**.



11. From the Providers tab, click the "OIDAuthenticator" (you just created), in the configuration -> Provider Specific tab enter your LDAP connection details:

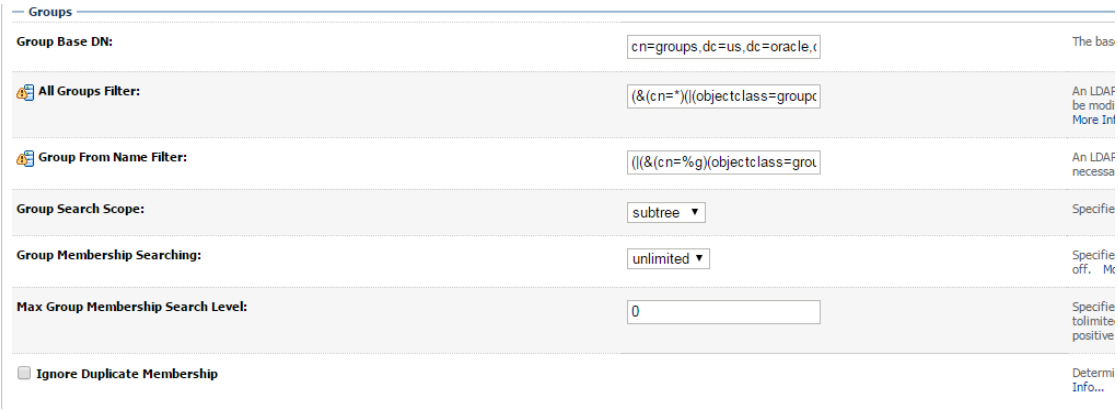
    The values shown below are examples only. You should match the entries to your OID.

    - Host: <*oidhost*>
    - Port: <*oidport*>
    - Principal: cn=orcladmin
    - Credential: <*password*>
    - Confirm Credential: <*password*>
    - User Base DN: cn=users,dc=us,dc=oracle,dc=com
    - Enable 'Use Retrieved User Name as principal.'

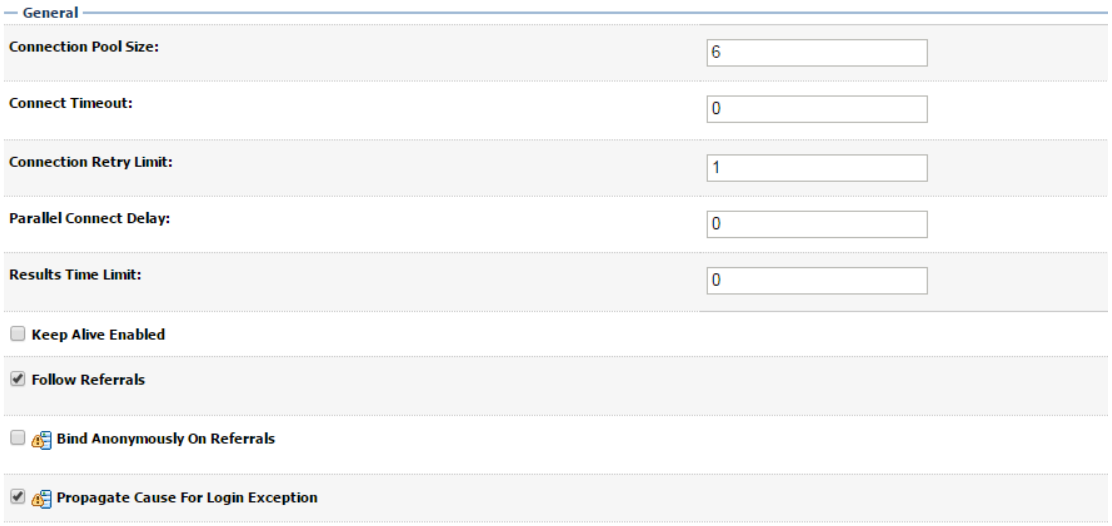


12. Modify the following:

- Group Base DN: cn=Groups,dc=us,dc=oracle,dc=com

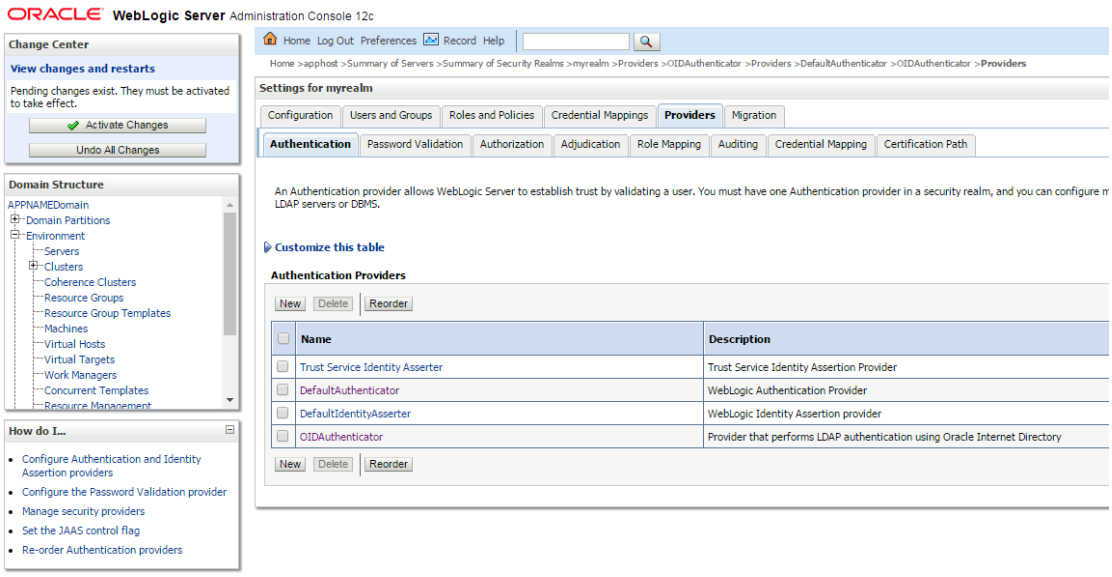


13. Check Propagate Cause For Login Exception

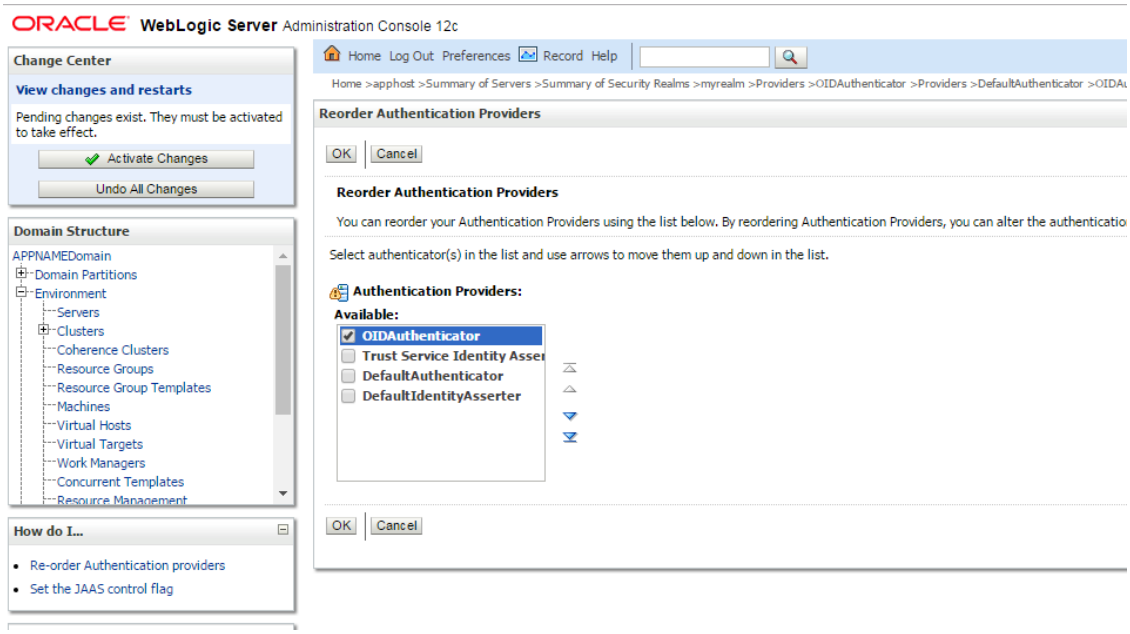


14. Click **Save**.

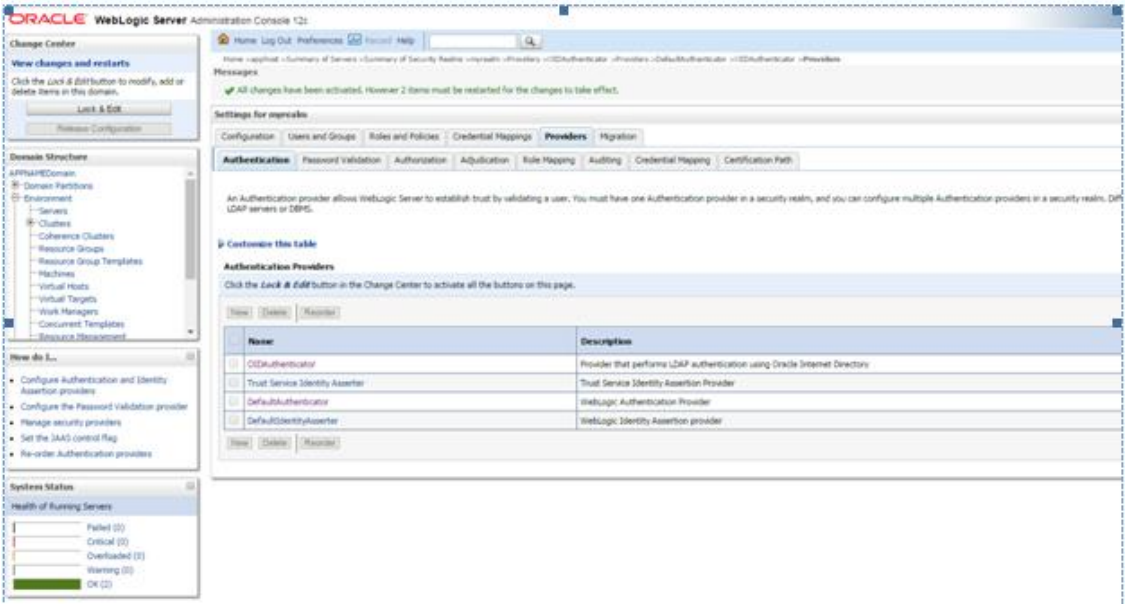
15. Click the Providers tab.



16. Click **Reorder**.
17. Move OIDAuthenticator to the top of the providers list.



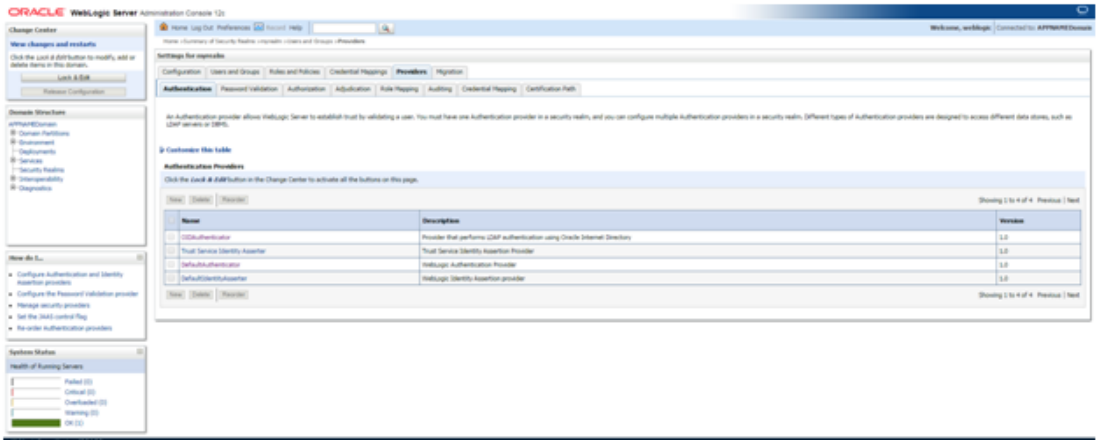
18. Click **OK**.
19. Once your changes are saved, click **Activate Changes**.



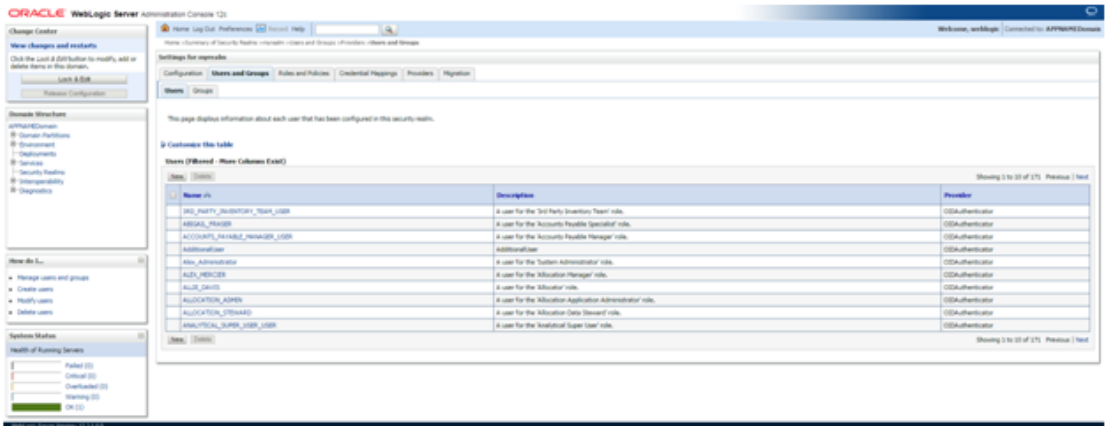
20. Shutdown all servers and restart the admin server using startWebLogic.sh script. Login to Admin Console and restart Managed server.

Verify OID Authenticator

1. Log in to the Administration Console.
   http://<HOST_NAME>:<ADMIN_PORT>/console/
2. In the Domain Structure frame, click Security Realms.
3. In the Realms table, click Default Realm Name. The Settings page is displayed.
4. Click the Providers tab. You must see the OID Provider in that list.



5. Click the Users and Groups tab to see a list of users and groups contained in the configured authentication providers.



Loading LDIF into the OID to Login to PRICING Application

1. Make sure that you have access to a working LDAP server.
2. Create an LDAP connection user with the necessary rights to do sub-tree searches on your users and groups respectively. This user can be named anything but "PRICING.ADMIN" is used in this document. This same user should be given as an input for 'Search User DN' on the 'LDAP Directory Server Details' screen while installing the PRICING application. This is the user which PRICING uses to login to LDAP and perform the necessary search in the LDAP.
3. Load the PRICING LDIF files into the OID in order to login to the PRICING application

   The PRICING installation media contains of ldif files with Pricing user and group used to login to the application. They are packed in the PRICING installer directory:

   <INSTALL_DIR>/Pricing/application/Pricing/ldif

   The LDIF files included are just templates and must be modified to fit the structure and conventions of the OID setup for your environment. Once the LDIFs are updated for your configuration they can be loaded into LDAP using the ldapadd tool that is included in the OID installation.
4. Login to OID host and follow the steps

   ```
   # export ORACLE_HOME=/u00/webadmin/products/wls_idm/Oracle_IDM
   # export PATH=$ORACLE_HOME/bin:$PATH
   ```

5. To load the PRICING Users:

   ```
   # ldapadd -v -c -h <OID_HOST> -p 3060 -w <ORCLADMIN PASSWORD> -D cn=orcladmin
   -f  RPM_Users.ldif
   ```

6. To Load the PRICING Group:

   ```
   # ldapadd -v -c -h <OID_HOST> -p 3060 -w <ORCLADMIN PASSWORD> -D cn=orcladmin
   -f  RPM_Group.ldif
   ```

Verify PRICING Users and Groups loaded into the OID

1. Login to OID using ODSM console and verify the loaded PRICING users and groups as shown below.

   For Example:

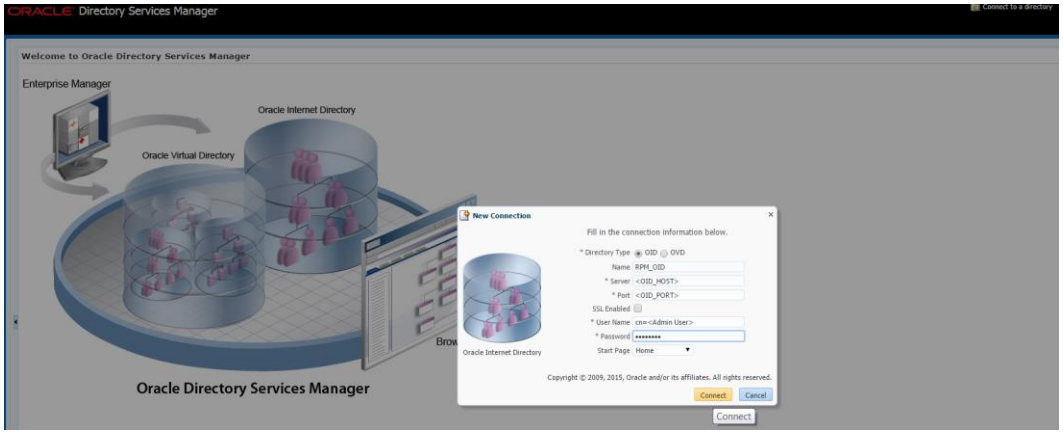
Login to ODSM

`http://<OID_HOST>:<ManagedServer_PORT>/odsm`

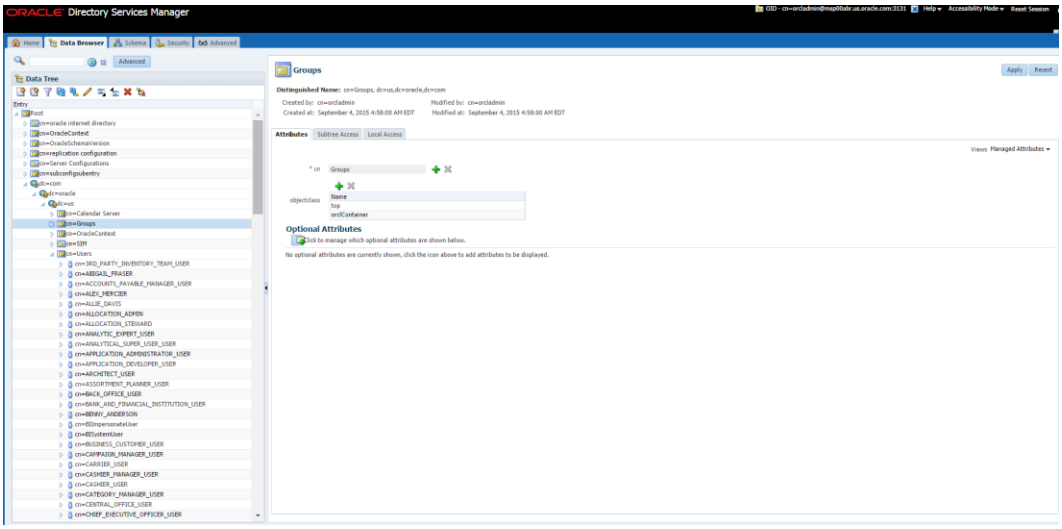
2. Click **Connect to a directory**.

3. Create a new connection with OID_HOST, OID_PORT and Admin username and password

> **Note:** Provide SSL port and enable SSL if connection in a secure environment.



4. Navigate to Data browser tab and click on root in left pane data tree. Verify the loaded PRICING Users and Groups are displaying under the tree as per data structure in your environment.



Expand the PRICING Application Distribution

To expand the PRICING application distribution, do the following.

1. Log into the UNIX server as the user who owns the WebLogic installation. Create a new staging directory for the PRICING application distribution (Pricing19application.zip). There should be a minimum of 5 GB disk space available for the application installation files.

   Example: /u00/webadmin/media/Pricing

   This location is referred to as STAGING_DIR for the remainder of this chapter.
2. Copy Pricing19application.zip to STAGING_DIR and extract its contents.

(Optional) Analyze Changes in the Patch

Note: See Appendix: Analyze Tool for details and instructions to run the Analyze Tool. This appendix also contains screens and fields in the tool.

Clustered Installations – Preinstallation Steps

Skip this section if you are not clustering the application server.

If you are installing the PRICING application to a clustered WebLogic Application Server environment, there are some extra steps you need to take before running the PRICING application installer. In these instructions, the application server node with the ORACLE_HOME you used for the PRICING installer is referred to as the *master node*. All other nodes are referred to as the *remote nodes*.

1. Before starting the PRICING Application Installer, make sure that you are able to start and stop the managed servers that are part of the PRICING Application Cluster from the WebLogic Administration Console.
2. Insert into all remote nodes <MW_HOME>/wlserver/server/lib/weblogic.policy file changes, the same PRICING entries for java security permissions you entered on the master node.

Run the PRICING Application Installer

Once you have a WebLogic instance that is configured and started, you can run the PRICING application installer. This installer configures and deploys the PRICING application.

> **Note:** See Appendix: PRICING Application Installer Screens for details on every screen and field in the application installer. The screenshots contain instructions that are necessary to result in a working application.

1. Change directories to STAGING_DIR/Pricing/application.
2. Set the ORACLE_HOME, DOMAIN_HOME and JAVA_HOME environment variables. ORACLE_HOME should point to your WebLogic installation. JAVA_HOME should point to the Java 8.0 (1.8.) JDK . DOMAIN_HOME should point to your WebLogic domain.
3. If a secured datasource is going to be configured you also need to set "ANT_OPTS" so the installer can access the key and trust store that is used for the datasource security:

```
export ANT_OPTS="-Djavax.net.ssl.keyStore=<PATH TO KEY STORE> -
Djavax.net.ssl.keyStoreType=jks -Djavax.net.ssl.keyStorePassword=<KEYSTORE
PASSWORD> -Djavax.net.ssl.trustStore=<PATH TO TRUST STORE> -
Djavax.net.ssl.trustStoreType=jks -
Djavax.net.ssl.trustStorePassword=<TRUSTSTORE PASSWORD>"
```

An example of this would be:

```
export ANT_OPTS="-
Djavax.net.ssl.keyStore=<MW_HOME>/wlserver/server/lib/msp52278.keystore -
Djavax.net.ssl.keyStoreType=jks -Djavax.net.ssl.keyStorePassword=retail123 -
Djavax.net.ssl.trustStore=/ u00/webadmin/product/wls_retail
/wlserver_10.3/server/lib/msp2278.keystore -Djavax.net.ssl.trustStoreType=jks
-Djavax.net.ssl.trustStorePassword<password>
```

4. If you are using an X server such as Exceed, set the DISPLAY environment variable so that you can run the installer in GUI mode (recommended). If you are not using an X server, or the GUI is too slow over your network, unset DISPLAY for text mode.
5. Run the install.sh script. This launches the installer. After installation is complete, a detailed installation log file is created (Pricinginstall.<timestamp>.log).

> **Note:** The values you enter in the installer screen, "Setup Application Users," have specific requirements for PRICING to work properly. See the screen description in Appendix: PRICING Application Installer Screens for more details. The screenshots contain instructions that are necessary to result in a working application.

Resolving Errors Encountered During Application Installation

If the application installer encounters any errors, it halts execution immediately. You can run the installer in silent mode so that you do not have to retype the settings for your environment. See Appendix: Installer Silent Mode in this document for instructions on silent mode.

See Appendix: Common Installation Errors in this document for some common installation errors.

Because the application installation is a full installation every time, any previous partial installations are overwritten by the successful installation.

Clustered Installations – Post-Installation Steps

If you are installing the PRICING application to a clustered WebLogic Server environment, there are some extra steps you need to take to complete the installation. In these instructions, the application server with the ORACLE_HOME you used for the PRICING installer is referred to as the master server. All other nodes are referred to as the remote servers.

1. If you wish to run the batches on other nodes in the cluster then the RETAIL_HOME location should be copied from the master node to all other nodes in the cluster. This could also be a common mount location between all servers in the cluster.

Review and/or Configure Oracle Single Sign-On

This step is only needed if you plan on setting up the PRICING application using Single Sign On (SSO) authentication. This can be skipped if SSO is not going to be configured for this environment. The Oracle Access manager must be configured and the Oracle http server (Webtier and webgate) must be registered into the Oracle Access Manager

Note:.

In the Webtier/Webgate http server you need to set the mod_wl_ohs.conf file to redirect the http call to where the PRICING application has been deployed.

For example, in mod_wl_ohs.conf set:

```
<Location /Rpm >
 WebLogicCluster
<PRICINGServerhost>:<PRICINGServerport>,<PRICINGServerhost2>:<PRICINGServerport>
 SetHandler weblogic-handler
</Location>

<Location /RetailAppsAdminConsole-RPM>
 WebLogicCluster
<PRICINGServerhost1>:<PRICINGServerport>,<PRICINGServerhost2>:<PRICINGServerport>
 SetHandler weblogic-handler
</Location>
```

Then in Oracle Access Manager, set the protection of the resources in the Application Domain that has been registered for the PRICING application.

Resource URL: /Rpm

Protection Level: Protected

Authentication Policy: Protected Resource Policy

Authorization Policy: Protected Resource Policy

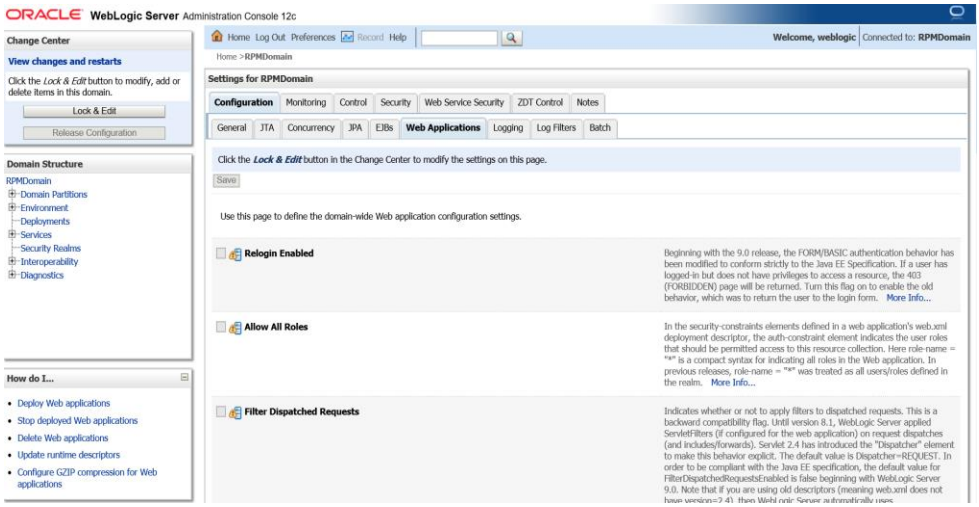
Adding Logout URI

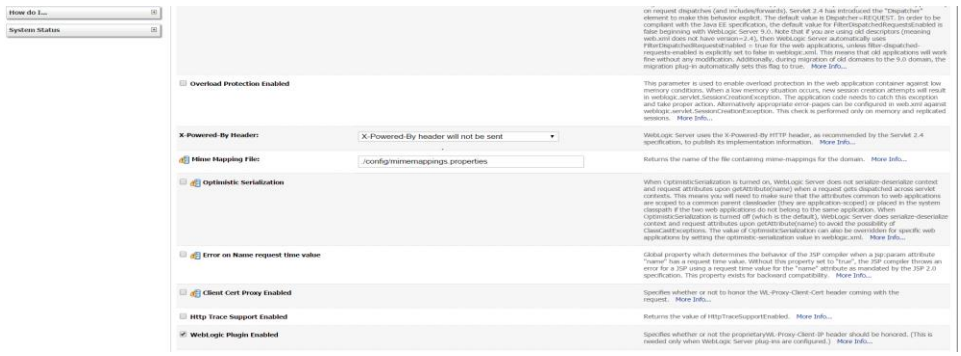
After checking that the default authenticator's control flag is set correctly as per the OAM documentation, and that the order of the providers is correct, follow the below steps to configure PRICING Application SSO url logout using wlst tool

1. Navigate to < ORACLE_HOME>/oracle_common/common/bin and run wlst.sh
2. Connect RPMDomain using admin credentials created during Weblogic domain creation and add OAM SSO Provider.

```
connect('<WEBLOGIC_ADMIN_USERNAME>',
'<<WEBLOGIC_ADMIN_PASSWORD>','t3://<APP_HOSTNAME>:<ADMIN_PORT>')

wls:/crmodsso/serverConfig>domainRuntime()
wls:/crmodsso/serverConfig>addOAMSSOProvider(loginuri="/${app.context}/adf
Authentication",logouturi="/oamsso/logout.html",
autologinuri="/obrar.cgi")
```

3. Login to Weblogic Admin Console and click on Lock & Edit
4. Enable "Weblogic Plugin Enabled" under RPMDomain→Web Applications Tab.





5. Save it and click on Activate Changes
6. Restart RPM Domain servers and verify Application url is logging out properly by displaying OAM page.

Transaction Timeout

This section describes how to establish settings for a transaction timeout. A transaction timeout is the maximum duration, in seconds, for transactions on the application server. Any transaction that is not required to complete before this timeout is rolled back.
To set up transaction timeouts, complete these steps:

1. Log in to the WebLogic Server 12.2.1.4 Administration Console.
2. Click on the Domain link.
3. Under Configuration, click **JTA**.
4. Click **Lock and Edit**.
5. Set the Timeout Seconds (for example, 600 seconds).
6. Click **Activate Changes**.

Test the PRICING Application

After the application installer finishes, a working PRICING application installation should result, if the users were created properly.

If problems occur when trying to start the PRICING application, ensure proxies are turned off.

To launch the application client, open a Web browser and access the Pricing application:

Example: http://appserver1:MS_PORT/Rpm/faces/Home

PRICING Batch Scripts

The PRICING application installer configures and installs the batch scripts under <retail_home>/Pricing-batch. . You will run the PRICING java batch pgms with a java wallet alias (for example, RETAIL.USER1) that you created in the installer screens. The following is an example execution of a PRICING java batch script.

```
./<PRICINGbatchscriptname>.sh BATCH-ALIAS
```

Note: Make sure that JAVA_HOME is set to the appropriate Java JDK (the same JDK that has been used by WebLogic Server) and ORACLE_HOME is set to weblogic installation before running the PRICING batch programs.

PRICING Batch Scripts that call sqlplus (plsql batch)

In some PRICING batch scripts sqlplus is called, so a profile should be set up for this user. A prerequisite for this would be Oracle database or Oracle client installed on the server. The below example assumes that a batch user Pricingbatch was created in the Oracle Wallet (different from the Java wallet) and added to the tnsnames.ora, as explained in Appendix: Setting Up Password Stores with Oracle Wallet.
The batch scripts calling sqlplus are as follows:

```
dataConversionClearance.sh
dataConversionSeedFutureRetail.sh
```

Example profile.sh

```
#!/bin/sh

#Need the Oracle Home set to aim at ORACLE Client or db on which the
server PRICING # is installed on
ORACLE_HOME=/u00/oracle/product/19.3.0.0

#Java Home for the Oracle install
JAVA_HOME=$ORACLE_HOME/jdk

#Add the Oracle and Java bin's to path
PATH=$ORACLE_HOME/bin:$JAVA_HOME/bin:$PATH

export PATH ORACLE_HOME JAVA_HOME

#Path to directory with tnsnames.ora, ewallet.p12, cwallet.sso &
#sqlnet.ora (You will build these files as explained in Appendix E Setting
#Up Password Stores with Oracle Wallet)
TNS_ADMIN=/u00/webadmin/config/domains/wls_retail/RPMDomain/retail/Pricing
16/config/wallet
export TNS_ADMIN
    echo "ORACLE_HOME=${ORACLE_HOME}"
    echo "JAVA_HOME=${JAVA_HOME}"
    echo "PATH=${PATH}"
```

To source the profile above, do the following:

```
$ . ./profile.sh
```

While running the plsql batch script the connect string as follows (/@Pricingbatch that you created using the instructions in "Appendix: Setting Up Password Stores with Oracle Wallet."

```
nightlyBatchCleanup.sh /@Pricingbatch 0 log error
```

Online Help

The application installer automatically installs online help to the proper location. It is accessible from the help links within the application.

4

Patching Procedures

Oracle Retail Patching Process

The patching process for many Oracle Retail products has been substantially revised from prior releases. Automated tools are available to reduce the amount of manual steps when applying patches. To support and complement this automation, more information about the environment is now tracked and retained between patches. This information is used to allow subsequent patches to identify and skip changes which have already been made to the environment. For example, the patching process uses a database manifest table to skip database change scripts which have already been executed.

The enhanced product patching process incorporates the following:

- Utilities to automate the application of Oracle Retail patches to environments.
- Unified patches so that a single patch can be applied against Database, Forms, Java applications, Batch, etc. installations.
- Database and Environment manifests track versions of files at a module level.
- Centralized configuration distinguishes installation types (Database, Forms, Java, Batch, etc.).
- Patch inventory tracks the patches applied to an environment.

These enhancements make installing and updating Oracle Retail product installations easier and reduce opportunities for mistakes. Some of these changes add additional considerations to patching and maintaining Oracle Retail product environments. Additional details on these considerations are found in later sections.

Supported Products and Technologies

Several products and technologies are supported by the enhanced patching process. The utilities, processes and procedures described here are supported with the following products and listed technologies:

Product	Supported Technology
Oracle Retail Merchandising System (RMS)	▪ Database scripts ▪ Batch scripts ▪ RETL scripts ▪ Data Conversion Scripts ▪ BI Publisher Reports ▪ Java Application
Oracle Retail Warehouse Management System (RWMS)	▪ Database scripts ▪ Batch scripts ▪ Forms ▪ BI Publisher Reports

Product	Supported Technology
Oracle Retail Pricing (PRICING)	▪ Database scripts (included with RMS) ▪ Java Application ▪ Batch scripts
Oracle Retail Invoice Matching (ReIM)	▪ Database scripts (included with RMS) ▪ Java Application ▪ Batch scripts
Oracle Retail Allocation	▪ Database scripts (included with RMS) ▪ Java Application ▪ Batch scripts
Oracle Retail Sales Audit (ReSA)	▪ Database scripts (included with RMS) ▪ Java Application
Oracle Retail Insights (RI) Previously called Oracle Retail Analytics (RA)	▪ Database scripts
Oracle Retail Advanced Science Engine (ORASE)	▪ Database scripts ▪ Batch scripts
Oracle Retail Data Extractor (RDE)	▪ Database scripts
Oracle Retail Application Admin Console (ORAAC). Previously called Oracle Retail Application Security Role Manager (RASRM)	▪ Java Application

Patch Concepts

During the lifecycle of an Oracle Retail environment, patches are applied to maintain your system. This maintenance may be necessary to resolve a specific issue, add new functionality, update to the latest patch level, add support for new technologies, or other reasons.

A patch refers to a collection of files to apply to an environment. Patches could be cumulative, such as the 16.0 release, or incremental, such as a hot fix for just a few modules. Patches may contain updates for some or all components of a product installation including database, application code, forms, and batch. In a distributed architecture the same patch may need to be applied to multiple systems in order to patch all of the components. For example, if a patch contains both database and application changes, the patch would need to be applied to both the database server and the application server.

The top-level directory for the installation of an Oracle Retail product is referred to as the RETAIL_HOME. Underneath RETAIL_HOME are all of the files related to that product installation, as well as configuration and metadata necessary for the Oracle Retail Patch Assistant to maintain those files. In some cases the runtime application files also exist under RETAIL_HOME. For example, compiled RMS batch files, the compiled RWMS forms, or Java Application batch scripts.

Patching Utility Overview

Patches are applied and tracked using utilities that are specifically designed for this purpose. The primary utility is described briefly below and additional information is available in later sections.

Oracle Retail Patch Assistant (ORPatch)

ORPatch is the utility used to apply patches to an Oracle Retail product installation. It is used in the background by the installer when creating a new installation or applying a cumulative patch. It is used directly to apply an incremental patch to an environment.

Oracle Retail Merge Patch (ORMerge)

ORMerge is a utility to allow multiple patches to be combined into a single patch. Applying patches individually may require some steps to be repeated. Merging multiple patches together allows these steps to be run only once. For example, applying several incremental patches to database packages will recompile invalid objects with each patch. Merging the patches into a single patch before applying them will allow invalid objects to be recompiled only once.

Oracle Retail Compile Patch (ORCompile)

ORCompile is a utility to compile components of Oracle Retail products outside of a patch. It allows RMS Batch, and RWMS Forms to be fully recompiled even if no patch has been applied. It also contains functionality to recompile invalid database objects in product schemas.

Oracle Retail Deploy Patch (ORDeploy)

ORDeploy is a utility to deploy components of Oracle Retail Java products outside of a patch. It allows PRICING, ReIM, Allocation and ReSA java applications to be redeployed to WebLogic even if a patch has not been applied. It contains functionality to optionally include or not include Java customizations when redeploying.

Changes with 19.0

Some products and technologies are supported by the enhanced patching process for the first time in 16.0. In those cases all of the content in this chapter is new with 19.0.

New technologies

For the 19.0 release Pricing has a new ADF application component that is integrated with Orpatch.

Patching Considerations

Patch Types

Oracle Retail produces two types of patches for their products: cumulative and incremental.

Cumulative Patches

A cumulative patch includes all of the files necessary to patch an environment to a specific level or build a new environment at that level. Examples of cumulative patches would be 16.0, 15.0.2, and so on. Cumulative patches come with a standard Oracle Retail

installer and so can be applied to an environment with the installer rather than with ORPatch or other utilities.

Incremental Patches

An incremental patch includes only selected files necessary to address a specific issue or add a feature. Examples of incremental patches would be a hot fix for a specific defect. Incremental patches do not include an installer and must be applied with ORPatch.

Incremental Patch Structure

An Oracle Retail incremental patch generally contains several files and one or more subdirectories. The subdirectories contain the contents of the patch, while the individual files contain information about the patch and metadata necessary for patching utilities to correctly apply the patch. The most important files in the top-level directory are the README.txt, the manifest files.

README File

The README.txt file contains information about the incremental patch and how to apply it. This may include manual steps that are necessary before, after or while applying the patch. It will also contain instructions on applying the patch with ORPatch.

Manifest Files

Each patch contains manifest files which contain metadata about the contents of a patch and are used by ORPatch to determine the actions necessary to apply a patch. Patches should generally be run against all installations a product in an environment, and ORPatch will only apply the changes from the patch that are relevant to that installation.

> **Note:** Cumulative patches use a different patch structure because they include a full installer which will run ORPatch automatically.

Version Tracking

The patching infrastructure tracks version information for all files involved with a product installation. The RETAIL_HOME contains files which track the revision of all files within the RETAIL_HOME including batch, forms, database, Java archives and other files. In addition, records of database scripts that have been applied to the product database objects are kept within each database schema.

Apply all Patches with Installer or ORPatch

In order to ensure that environment metadata is accurate all patches must be applied to the Oracle Retail product installation using patching utilities. For cumulative patches this is done automatically by the installer. For incremental patches ORPatch must be used directly. This is especially important if database changes are being applied, in order to ensure that the database-related metadata is kept up-to-date.

Environment Configuration

A configuration file in $RETAIL_HOME/orpatch/config/env_info.cfg is used to define the details of a specific Oracle Retail environment. This file defines:

- The location of critical infrastructure components such as the ORACLE_HOME on a database or middleware server.

- The location of Oracle Wallets to support connecting to the database users.
- The type of file processing which is relevant to a particular host. For example, if this is a host where database work should be done, or a host where batch compilation should be done, a host where Java applications should be deployed, etc. This allows a single database, forms and batch patch to be run against all types of hosts, applying only the relevant pieces on each server.
- Other configuration necessary to determine proper behavior in an environment.

Retained Installation Files

The RETAIL_HOME location of an Oracle Retail product installation contains all of the files associated with that installation. This can include database scripts, Java files, Forms, Batch, RETL and Data Conversion files as with previous versions and also includes all database scripts. This allows objects to be reloaded during patching, including any necessary dependencies.

Reloading Content

In order to ensure that database contents and generated files exactly match patched versions, when applying cumulative patches some content is regenerated even if it does not appear to have changed.

On a cumulative patch this includes:

- All re-runnable database content will be reloaded
  - Packages and Procedures
  - Database Types (excluding RIB objects)
  - Control scripts
  - Triggers
  - WebService jars and packages
  - Form Elements
- All RWMS forms files will be recompiled
- All RMS batch files will be recompiled

When applying incremental patches, only changed files will be reloaded. However this does not apply to RMS batch, which is fully recompiled with any change.

Java Hotfixes and Cumulative Patches

When applying cumulative patches to Java applications components with ORPatch, all hotfixes related to base product ear files included with the patch will be rolled back. This increases the likelihood of a successful deployment because hotfixes may not be compatible with updated product ear files, or may already be included with the ear. Before applying a cumulative patch to Java applications, check the patch documentation to determine which hotfixes are not included in the ear. Then work with Oracle Support to obtain compatible versions of the fixes for the updated ear version. In some cases this may be the same hotfix, in which case it can be re-applied to the environment. In other cases a new hotfix may be required.

Backups

Before applying a patch to an environment, it is extremely important to take a full backup of both the RETAIL_HOME file system and the Oracle Retail database. Although ORPatch makes backups of files modified during patching, any database changes cannot

be reversed. If a patch fails which contains database changes, and cannot be completed, the environment must be restored from backup.

Disk Space

When patches are applied to an environment, the old version of files which are updated or deleted are backed up to $RETAIL_HOME/backups/backup-<timestamp>. When applying large patches, ensure there is sufficient disk space on the system where you unzip the patch or the patching process may fail. Up to twice as much disk space as the unzipped patch may be required during patching.

In addition to backups of source files, the existing compiled RWMS Forms and RMS Batch files are saved before recompilation. These backups may be created during patches:

- Batch 'lib' directory in $RETAIL_HOME/oracle/lib/bin-<timestamp>
- Batch 'proc' directory in $RETAIL_HOME/oracle/proc/bin-<timestamp>
- Forms 'toolset' directory in $RETAIL_HOME/base/toolset/bin-<timestamp>
- Forms 'forms' directory in $RETAIL_HOME/base/forms/bin-<timestamp>
- Periodically both types of backup files can be removed to preserve disk space.

Patching Operations

Running ORPatch

ORPatch is used to apply patches to an Oracle Retail product installation. When applying a patch which includes an installer, ORPatch does not need to be executed manually as the installer will run it automatically as part of the installation process. When applying a patch that does not include an installer, ORPatch is run directly.

ORPatch performs the tasks necessary to apply the patch:

- Inspects the patch metadata to determine the patch contents and patch type.
- Reads the environment configuration file to determine which product components exist in this installation.
- Assembles a list of patch actions which will be run on this host to process the patch.
- Executes pre-checks to validate that all patch actions have the necessary configuration to proceed.
- Compares version numbers of files from the patch against the files in the environment.
- Backs up files which will be updated.
- Copies updated files into the installation.
- Loads updated files into database schemas, if applicable.
- Recompiles RMS batch, if applicable.
- Recompiles RWMS forms, if applicable.
- Constructs updated Java archives and deploys them to WebLogic, if applicable
- Updates Java batch files and libraries, if applicable
- Records the patch in the patch inventory.

If a patch does not contain updated files for the database or system, no action may be taken. If a previously failed ORPatch session is discovered, it will be restarted.

Preparing for Patching

Before applying a patch to your system, it is important to properly prepare the environment.

Single Patching Session

It is extremely important that only a single ORPatch session is active against a product installation at a time. If multiple patches need to be applied, you can optionally merge them into a single patch and apply one patch to the environment. Never apply multiple patches at the same time.

Shutdown Applications

If a patch updates database objects, it is important that all applications are shutdown to ensure no database objects are locked or in use. This is especially important when applying changes to Oracle Retail Integration Bus (RIB) objects as types in use will not be correctly replaced, leading to "ORA-21700: object does not exist or marked for delete" errors when restarting the RIB.

Backup Environment

Before applying a patch to an environment, it is important to take a full backup of both the RETAIL_HOME file system and the retail database. Although ORPatch makes

backups of files modified during patching, any database changes cannot be reversed. If a patch which contains database changes fails and cannot be completed, the environment must be restored from backup.

Log Files

When applying a patch, ORPatch will create a number of log files which contain important information about the actions taken during a patch and may contain more information in the event of problems. Log files are created in the $RETAIL_HOME/orpatch/logs directory. Logs should always be reviewed after a patch is applied.

After a patch session the log directory will contain at a minimum an ORPatch log file and may also contain other logs depending on the actions taken. The following table describes logs that may exist.

Log File	Used For
orpatch-<date>-<time>.log	Primary ORPatch log file
detail_logs/dbsql_<component>/invalids/*	Details on the errors causing a database object to be invalid
detail_logs/analyze/details	Detail logs of files that will be created/updated/removed when a patch is applied
detail_logs/compare/details	Detail logs of the differences between two sets of environment metadata
orpatch_forms_<pid>_child_<num>.log	Temporary logs from a child process spawned to compile forms in parallel. After the child process completes, the contents are append to the primary orpatch log file
detail_logs/rmsbatch/lib/*	Detail logs of the compilation of RMS Batch libraries
detail_logs/rmsbatch/proc/*	Detail logs of the compilation of RMS Batch programs
detail_logs/dbsql_rms/rms_db_ws_consumer_jars/*	Detail logs of the loadjava command to install RMS WebService Consumer objects
detail_logs/dbsql_rms/rms_db_ws_consumer_libs/*	Detail logs of the loadjava command to install RMS WebService Consumer libraries
detail_logs/forms/rwms_frm_forms/*	Detail logs of the compilation of each RWMS Forms file
detail_logs/dbsql_rwms/rwms_db_sp _jars/*	Detail logs of the loadjava command to install RWMS SP jars
detail_logs/javaapp_<product>/deploy/*	Detail logs of the deploy of a Java product

Unzip Patch Files

Before executing ORPatch, the patch files must be unzipped into a directory. This directory will be passed to ORPatch as the "-s <source directory>" argument on the command-line when applying or analyzing a patch.

Location of ORPatch

The ORPatch script will be located in $RETAIL_HOME/orpatch/bin.

Command Line Arguments

ORPatch behavior is controlled by several command-line arguments. These arguments may be actions or options. Command and option names can be specified in upper or lower case, and will be converted to upper-case automatically. Arguments to options, for example the source directory patch, will not be modified.

ORPatch command-line actions:

Action	Description
apply	Tells ORPatch to apply a patch, requires the –s option Example: orpatch apply –s $RETAIL_HOME/stage/patch123456
analyze	Tells ORPatch to analyze a patch, requires the –s option Example: orpatch analyze –s $RETAIL_HOME/stage/patch123456
lsinventory	Tells ORPatch to list the inventory of patches that have been applied to this installation
exportmetadata	Tells ORPatch to extract all metadata information from the environment and create a $RETAIL_HOME/support directory to contain it. Requires the –expname option.
Diffmetadata	Tells ORPatch to compare all metadata from the current environment with metadata exported from some other environment. Requires the –expname and –srcname options.
Revert	Tells ORPatch to revert the files related to a patch, requires the –s option Example: orpatch revert –s $RETAIL_HOME/backups/backup-09302013-153010

Note: An action is required and only one action can be specified at a time.

ORPatch command-line arguments:

Argument	Valid For Actions	Description
-s <source dir>	apply analyze	Specifies where to find the top-level directory of the patch to apply or analyze. The source directory should contain the manifest.csv and patch_info.cfg files.
-new	apply	Forces ORPatch to not attempt to restart a failed ORPatch session

Argument	Valid For Actions	Description
-expname	exportmetadata diffmetadata lsinventory	Defines the top-level name to be used for the export or comparison of environment metadata. When used with lsinventory, it allows an exported inventory to be printed.
-srcname	diffmetadata	Defines the 'name' to use when referring to the current environment during metadata comparisons.
-dbmodules	diffmetadata	When comparing metadata at a module-level, compare the dbmanifest information rather than the environment manifest. This method of comparing metadata is less accurate as it does not include non-database files.
-jarmodules	analyze diffmetadata	When used with analyze, requests a full comparison of the metadata of Java archives included in the patch versus the metadata of the Java archives in the environment. This behavior is automatically enabled when Java customizations are detected in the environment. Analyzing the contents of Java archives allows for detailed investigation of the potential impacts of installing a new Java ear to an environment with customizations. When used with diffmetadata, causes metadata to be compared using jarmanifest information rather than the environment manifest. This provides more detailed information on the exact differences of the content of Java archives, but does not include non-Java files.
-selfonly	apply analyze	Only apply or analyze changes in a patch that relate to orpatch itself. This is useful for applying updates to orpatch without applying the entire patch to an environment.
-s <backup dir>	revert	Specifies the backup from a patch that should be reverted to the environment. This restores only the files modified during the patch, the database must be restored separately or the environment will be out-of-sync and likely unusable.

Analyzing the Impact of a Patch

In some cases, it may be desirable to see a list of the files that will be updated by a patch, particularly if files in the environment have been customized. ORPatch has an 'analyze' mode that will evaluate all files in the patch against the environment and report on the files that will be updated based on the patch.

To run ORPatch in analyze mode, include 'analyze' on the command line. It performs the following actions:

- Identifies files in the environment which the patch would remove.
- Compares version numbers of files in the patch to version numbers of files in the environment.

- Prints a summary of the number of files which would be created, updated or removed.
- Prints an additional list of any files that would be updated which are registered as being customized.
- Prints an additional list of any files which are in the environment and newer than the files included in the patch. These files are considered possible conflicts as the modules in the patch may not be compatible with the newer versions already installed. If you choose to apply the patch the newer versions of modules in the environment will NOT be overwritten.
- If a Java custom file tree is detected, prints a detailed analysis of the modules within Java ear files that differ from the current ear file on the system.
- Saves details of the files that will be impacted in $RETAIL_HOME/orpatch/logs/detail_logs/analyze/details.

This list of files can then be used to assess the impact of a patch on your environment.

To analyze a patch, perform the following steps:

1. Log in as the UNIX user that owns the product installation.
2. Set the RETAIL_HOME environment variable to the top-level directory of your product installation.
   ```
   Export RETAIL_HOME=/u00/oretail/tst
   ```
3. Set the PATH environment variable to include the orpatch/bin directory
   ```
   export PATH=$RETAIL_HOME/orpatch/bin:$PATH
   ```
4. Set the JAVA_HOME environment variable if the patch contains Java application files.
   ```
   Export JAVA_HOME=/u00/oretail/java_jdk
   ```
   Note: If the JAVA_HOME environment variable is not specified, the value from RETAIL_HOME/orpatch/config/env_info.cfg will be used.
5. Create a staging directory to contain the patch, if it does not already exist.
   ```
   Mkdir –p $RETAIL_HOME/stage
   ```
6. Download the patch to the staging directory and unzip it.
7. Execute orpatch to analyze the patch.
   ```
   Orpatch analyze –s $RETAIL_HOME/stage/patch123456
   ```
8. Repeat the patch analysis on all servers with installations for this product environment.
9. Evaluate the list(s) of impacted files.

For more information on registering and analyzing customizations, please see the Customization section later in this document.

Applying a Patch

Once the system is prepared for patching, ORPatch can be executed to apply the patch to the environment. The patch may need to be applied to multiple systems if it updates components that are installed on distributed servers.

To apply a patch, perform the following steps:

1. Log in as the UNIX user that owns the product installation.
2. Set the RETAIL_HOME environment variable to the top-level directory of your product installation.

```
Export RETAIL_HOME=/u00/oretail/tst
```

3. Set the PATH environment variable to include the orpatch/bin directory
   ```
   export PATH=$RETAIL_HOME/orpatch/bin:$PATH
   ```
4. Set the DISPLAY environment variable if the patch contains Forms.
   ```
   Export DISPLAY=localhost:10.0
   ```

   Note: If the DISPLAY environment variable is not specified, the value from RETAIL_HOME/orpatch/config/env_info.cfg will be used.

5. Set the JAVA_HOME environment variable if the patch contains Java application files.
   ```
   Export JAVA_HOME=/u00/oretail/java_jdk
   ```

   Note: If the JAVA_HOME environment variable is not specified, the value from RETAIL_HOME/orpatch/config/env_info.cfg will be used.

6. Create a staging directory to contain the patch, if it does not already exist.
   ```
   Mkdir –p $RETAIL_HOME/stage
   ```
7. Download the patch to the staging directory and unzip it.
8. Review the README.txt included with the patch. If manual steps are specified in the patch, execute those steps at the appropriate time.
9. Shutdown applications.
10. Execute ORPatch to apply the patch.
    ```
    Orpatch apply –s $RETAIL_HOME/stage/patch123456
    ```
11. After ORPatch completes, review the log files in $RETAIL_HOME/orpatch/logs.
12. Repeat the patch application on all servers with installations for this product environment.
13. Restart applications.

Restarting ORPatch

If ORPatch is interrupted while applying a patch, or exits with an error, it saves a record of completed work in a restart state file in $RETAIL_HOME/orpatch/logs. Investigate and resolve the problem that caused the failure, then restart ORPatch.

By default when ORPatch is started again, it will restart the patch process close to where it left off. If the patch process should **not** be restarted, add '-new' to the command-line of ORPatch.

Please note that starting a new patch session without completing the prior patch may have serious impacts that result in a patch not being applied correctly. For example, if a patch contains database updates and batch file changes and ORPatch is aborted during the load of database objects, abandoning the patch session will leave batch without the latest changes compiled in the installation.

Listing the Patch Inventory

After a patch is successfully applied by ORPatch the patch inventory in $RETAIL_HOME/orpatch/inventory is updated with a record that the patch was applied. This inventory contains a record of the patches applied, the dates they were applied, the patch type and products impacted.

To list the patch inventory, perform the following steps:

1. Log in as the UNIX user that owns the product installation.
2. Set the RETAIL_HOME environment variable to the top-level directory of your product installation.
   ```
   Export RETAIL_HOME=/u00/oretail/tst
   ```
3. Set the PATH environment variable to include the orpatch/bin directory
   ```
   export PATH=$RETAIL_HOME/orpatch/bin:$PATH
   ```
4. Execute orpatch to list the inventory.
   ```
   Orpatch lsinventory
   ```

Exporting Environment Metadata

ORPatch functionality is driven based on additional metadata that is stored in the environment to define what version of files are applied to the environment, and which database scripts have been applied to database schemas. This environment metadata is used to analyze the impact of patches to environments and controls what actions are taken during a patch. The metadata is stored in several locations depending on the type of information it tracks and in some cases it may be desirable to extract the metadata for analysis outside of ORPatch. For example, Oracle Support could ask for the metadata to be uploaded to assist them in triaging an application problem.

ORPatch provides a capability to export all of the metadata in an environment into a single directory and to automatically create a zip file of that content for upload or transfer to another system. The exact metadata collected from the environment depends on the products installed in the RETAIL_HOME.

ORPatch metadata exported:

Installed Product Component	Exported Metadata	Description
Any	orpatch/config/env_info.cfg orpatch/config/custom_hooks.cfg ORPatch inventory files	ORPatch configuration and settings
Any	All env_manifest.csv and deleted_env_manifest.csv files	Environment manifest files detailing product files installed, versions, customized flags and which patch provided the file
Database Schemas	DBMANIFEST table contents	Database manifest information detailing which database scripts were run, what version and when they were executed
Java Applications	All files from javaapp_<product>/config except jar files	Environment-specific product configuration files generated during installation
Java Applications	Combined export of all META-INF/env_manifest.csv files from all product ear files	Jar manifest information detailing files, versions, customized flags and which patch provided the file
Java Applications	orpatch/config/javaapp_<product>/ant.deploy.properties	Environment properties file created during product installation and used during application deployment

Installed Product Component	Exported Metadata	Description
Java Applications	<weblogic_home>/server/lib/weblogic.policy	WebLogic server java security manager policy file
RMS Batch	orpatch/config/rmsbatch_profile	Batch compilation shell profile
RWMS Forms	orpatch/cofngi/rwsmforms_profile	Forms compilation shell profile

Exports of environment metadata are always done to the $RETAIL_HOME/support directory. When exporting metadata, you must specify the –expname argument and define the name that should be given to the export. The name is used for the directory within $RETAIL_HOME/support and for the name of the zip file.

To extract an environment's metadata, perform the following steps:

1. Log in as the UNIX user that owns the product installation.
2. Set the RETAIL_HOME environment variable to the top-level directory of your product installation.
   ```
   Export RETAIL_HOME=/u00/oretail/tst
   ```
3. Set the PATH environment variable to include the orpatch/bin directory
   ```
   export PATH=$RETAIL_HOME/orpatch/bin:$PATH
   ```
4. Execute orpatch to export the metadata.
   ```
   Orpatch exportmetadata –expname test_env
   ```

This example would export all metadata from the environment to the $RETAIL_HOME/support/test_env directory. A zip file of the metadata would be created in $RETAIL_HOME/support/test_env.zip.

> **Note:** The $RETAIL_HOME/support/<name> directory should be empty or not exist prior to running exportmetadata in order to ensure accurate results.

Comparing Environment Metadata

Once metadata has been exported from an environment, it can be used to compare the environment manifest metadata of two environments. ORPatch provides a capability to compare metadata of the current environment with the exported metadata of another environment. Note that even though there are many types of metadata exported by ORPatch, only environment manifest metadata is evaluated during comparisons. Metadata comparison happens in four phases: product comparison, patch comparison, ORPatch action comparison, and module-level comparison.

Product comparison compares the products installed in one environment with the products installed in another environment. Patch comparison compares the patches applied in one environment with the patches applied in another environment, for common products. This provides the most summarized view of how environments differ. Patches which only apply to products on one environment are not included in the comparison.

Since each patch may impact many files, the comparison then moves on to more detailed analysis. The third phase of comparison is to compare the enabled ORPatch actions between environments. These actions roughly correspond to the installed 'components' of a product. For example, one environment may have database and forms components installed while another has only forms. Action comparison identifies components that

are different between environments. The final phase of comparison is at the module level for actions that are common between environments. Modules which exist only on one environment, or exist on both environments with different revisions, or which are flagged as customized are reported during the comparison.

Differences between environment metadata are reported in a summarized fashion during the ORPatch execution. Details of the comparison results are saved in $RETAIL_HOME/orpatch/logs/detail_logs/compare/details. One CSV file is created for each phase of comparison: product_details.csv, patch_details.csv, action_details.csv and module_details.csv.

In order to be compared by ORPatch, exported metadata must be placed in the $RETAIL_HOME/support directory. The metadata should exist in the same structure that it was originally exported in. For example, if the metadata was exported to $RETAIL_HOME/support/test_env on another system, it should be placed in $RETAIL_HOME/support/test_env on this system.

When reporting differences between two environments, ORPatch uses names to refer to the environments. These names are defined as part of the diffmetadata command. The –expname parameter, which defines the directory containing the metadata, is also used as the name when referring to the exported metadata. The –srcname parameter defines the name to use when referring to the current environment. As an example, if you had exported the 'test' environment's metadata and copied it to the 'dev' environment's $RETAIL_HOME/support/test_env directory, you could run "orpatch diffmetadata –expname test_env –srcname dev_env". The detail and summary output would then refer to things that exist on dev but not test, revisions in the test environment versus revisions in the dev environment, etc.

ORPatch will automatically export the environment's current metadata to $RETAIL_HOME/support/compare prior to starting the metadata comparison.

To compare two environment's metadata, perform the following steps:

1. Export the metadata from another environment using orpatch exportmetadata.
2. Transfer the metadata zip from the other system to $RETAIL_HOME/support.
3. Log in as the UNIX user that owns the product installation.
4. Set the RETAIL_HOME environment variable to the top-level directory of your product installation.

   ```
   Export RETAIL_HOME=/u00/oretail/dev
   ```

5. Set the PATH environment variable to include the orpatch/bin directory

   ```
   export PATH=$RETAIL_HOME/orpatch/bin:$PATH
   ```

6. Unzip the metadata zip file.

   ```
   Unzip test_env.zip
   ```

7. Execute orpatch to compare the metadata

   ```
   orpatch diffmetadata –expname test_env –srcname dev_env
   ```

This example would compare the current environment against the metadata extracted in $RETAIL_HOME/support/test_env directory.

> **Note:** The $RETAIL_HOME/support/compare directory will be automatically removed before environment metadata is exported at the start of the comparison.

Reverting a Patch

In general it is best to either completely apply a patch, or restore the entire environment from the backup taken before starting the patch. It is important to test patches in test or staging environments before applying to production. In the event of problems, Oracle Retail recommends restoring the environment from backup if a patch is not successful.

> **Note:** Reverting patches in an integrated environment can be extremely complex and there is no fully automated way to revert all changes made by a patch. Restoring the environment from a backup is the recommended method to remove patches.

It is, however, possible to revert small patches using the backups taken by ORPatch during a patch. This will restore only the files modified, and it is still necessary to restore the database if any changes were made to it.

> **Note:** Reverting a patch reverts only the files modified by the patch, and does not modify the database, or recompile forms or batch files after the change.

When multiple patches have been applied to an environment, reverting any patches other than the most recently applied patch is strongly discouraged as this will lead to incompatible or inconsistent versions of modules applied to the environment. If multiple patches are going to be applied sequentially it is recommended to first merge the patches into a single patch that can be applied or reverted in a single operation.

To revert a patch, perform the following steps:

1. Log in as the UNIX user that owns the product installation.
2. Set the RETAIL_HOME environment variable to the top-level directory of your product installation.
   ```
   Export RETAIL_HOME=/u00/oretail/tst
   ```
3. Set the PATH environment variable to include the orpatch/bin directory
   ```
   export PATH=$RETAIL_HOME/orpatch/bin:$PATH
   ```
4. Identify the backup directory in $RETAIL_HOME/backups that contains the backup from the patch you want to restore.
   - The backup directory will contain a patch_info.cfg file which contains the name of the patch the backup is from.
   - It is possible to have two directories for the same patch, if ORPatch was updated during the patch. It is not possible to revert the updates to ORPatch. Select the backup directory that does not contain orpatch files.
   - If it is not clear which backup directory to use, restore the environment from backup
5. Execute orpatch to revert the environment using the contents of the backup directory
   ```
   orpatch revert –s $RETAIL_HOME/backups/backup-11232013-152059
   ```
6. Restore the database from backup if the patch made database changes
7. Use the orcompile script to recompile forms if the patch included RWMS forms files
   ```
   orcompile –a RWMS –t FORMS
   ```
8. Use the orcompile script to recompile batch if the patch included RMS batch files
   ```
   orcompile –a RMS –t BATCH
   ```

9. Use the ordeploy script to redeploy the appropriate Java applications if the patch included Java files

```
ordeploy -a PRICING -t JAVA
ordeploy -a REIM -t JAVA
ordeploy -a ALLOC -t JAVA
ordeploy -a RESA -t JAVA
ordeploy -a RMS -t JAVA
```

Merging Patches

When patches are applied individually some ORPatch tasks such as compiling forms and batch files or deploying Java archives are performed separately for each patch. This can be time-consuming. An alternative is to use the ORMerge utility to combine several patches into a single patch, reducing application downtime by eliminating tasks that would otherwise be performed multiple times. Patches merged with ORMerge are applied with ORPatch after the merge patch is created.

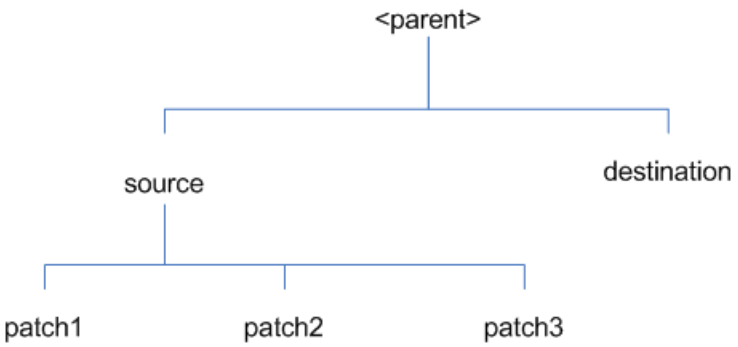
Source and Destination Directories

ORMerge uses source and destination areas in order to merge patch files. The source area is a single directory that contains the extracted patches to merge. The destination area is the location where the merged patch will be created. If a file exists in one or more source patches, only the highest revision will be copied to the merged patch.

The source and destination directories should exist under the same parent directory. That is, both the source and destination directories should be subdirectories of a single top-level directory.

The source directory must have all patches to be merged as immediate child directories. For example if three patches need to be merged the directory structure would look like this:

Source and Destination Directory Example



In the example above, the manifest.csv and patch_info.cfg files for each patch to be merged must exist in source/patch1, source/patch2, and source/patch3.

ORMerge Command-line Arguments

Argument	Required	Description
-s	Yes	Path to source directory containing patches to merge
-d	Yes	Path to destination directory that will contain merged patch

Argument	Required	Description
-name	No	The name to give the merged patch. If not specified, a name will be generated. When the merged patch is applied to a system, this name will appear in the Oracle Retail patch inventory.
-inplace	No	Used only when applying a patch to installation files prior to the first installation. See "Patching prior to the first install" in the Troubleshooting section later, for more information.

Running the ORMerge Utility

To merge patches, perform the following steps:

1. Log in as the UNIX user that owns the product installation.
2. Set the RETAIL_HOME environment variable to the top-level directory of your product installation.
   ```
   Export RETAIL_HOME=/u00/oretail/tst
   ```
3. Set the PATH environment variable to include the orpatch/bin directory
   ```
   export PATH=$RETAIL_HOME/orpatch/bin:$PATH
   ```
4. Create a staging directory to contain the patches.
   ```
   Mkdir –p $RETAIL_HOME/stage/merge/src
   ```
5. Download the patches to the staging directory and unzip them so that each patch is in a separate subdirectory.
6. Review the README.txt included with each patch to identify additional manual steps that may be required. If manual steps are specified in any patch, execute them at the appropriate time when applying the merged patch.
7. Create a destination directory to contain the merged patches.
   ```
   Mkdir –p $RETAIL_HOME/stage/merge/dest
   ```
8. Execute ORMerge to merge the patches.
   ```
   Ormerge –s $RETAIL_HOME/stage/merge/src –d $RETAIL_HOME/stage/merge/dest –name merged_patch
   ```

The merged patch can now be applied as a single patch to the product installation using ORPatch.

Compiling Application Components

In some cases it may be desirable to recompile RWMS Forms or RMS Batch outside of a product patch. The ORCompile utility is designed to make this easy and remove the need to manually execute 'make' or 'frmcmp' commands which can be error-prone. ORCompile leverages ORPatch functions to ensure that it compiles forms and batch exactly the same way as ORPatch. In addition ORCompile offers an option to compile invalid database objects using ORPatch logic.

ORCompile takes two required command line arguments each of which take an option. Arguments and options can be specified in upper or lower case.

ORCompile Command Line Arguments

Argument	Description
-a <app>	The application to compile.

Argument	Description
-t <type>	The type of application objects to compile

ORCompile Argument Options

Application	Type	Description
RMS	BATCH	Compile RMS Batch programs
RWMS	FORMS	Compile RWMS Forms
RMS	DB	Compile invalid database objects in the primary RMS schema
ALLOC	DB-ALC	Compile invalid database objects in the Allocations user schema
ALLOC	DB-RMS	Compile invalid database objects in the RMS schema
REIM	DB	Compile invalid database objects in the RMS schema
RME	DB	Compile invalid database objects in the RME schema
ASO	DB	Compile invalid database objects in the ASO schema
RI	DB-DM	Compile invalid database objects in the RI DM schema
RI	DB-RIBATCH	Compile invalid database objects in the RI batch schema
RI	DB-RMSBATCH	Compile invalid database objects in the RI RMS batch schema
RI	DB-FEDM	Compile invalid database objects in the RI front-end schema
RDE	DB-DM	Compile invalid database objects in the RDE DM schema
RDE	DB-RDEBATCH	Compile invalid database objects in the RDE batch schema
RDE	DB-RMSBATCH	Compile invalid database objects in the RDE RMS batch schema

Note: Compiling RMS type DB, ReIM type DB, and Allocation type DB-RMS, are all identical as they attempt to compile all invalid objects residing in the RMS schema.

Running the ORCompile utility

To compile files, perform the following steps:

1. Log in as the UNIX user that owns the product installation.
2. Set the RETAIL_HOME environment variable to the top-level directory of your product installation.
   ```
   Export RETAIL_HOME=/u00/oretail/tst
   ```
3. Set the PATH environment variable to include the orpatch/bin directory
   ```
   export PATH=$RETAIL_HOME/orpatch/bin:$PATH
   ```
4. Execute orcompile to compile the desired type of files.
   ```
   Orcompile –a <app> -t <type>
   ```

ORCompile Examples

Compile RMS Batch.

```
Orcompile –a RMS –t BATCH
```

Compile RWMS Forms.

```
Orcompile –a RWMS –t FORMS
```

Compile invalid objects in the RA DM schema.

```
Orcompile –a RI –t DB-DM
```

Compile invalid objects in the RMS owning schema.

```
Orcompile –a RMS –t DB
```

Deploying Application Components

In some cases it may be desirable to redeploy Java applications outside of a product patch. For example, when troubleshooting a problem, or verifying the operation of the application with different WebLogic settings. Another situation might include wanting to deploy the application using the same settings, but without customizations to isolate behavior that could be related to customized functionality.

The ordeploy utility is designed to make this easy and remove the need to re-execute the entire product installer when no configuration needs to change. ORDeploy leverages Oracle Retail Patch Assistant functions to ensure that it deploys applications exactly the same way as ORPatch. In addition ORDeploy offers an option to include or not include custom Java files, to ease troubleshooting.

ORDeploy takes two required command line arguments each of which take an option. Arguments and options can be specified in upper or lower case.

ORDeploy Command Line Arguments

Argument	Description
-a <app>	The application to deploy.
-t <type>	The type of application objects to deploy

ORDeploy Argument Options

Application	Type	Description
ALLOC	JAVA	Deploy the Allocations Java application and Java batch files, including any custom Java files.
ALLOC	JAVANOCUSTOM	Deploy the Allocations Java application and Java batch files, **NOT** including any custom Java files.
REIM	JAVA	Deploy the REIM Java application and Java batch files, including any custom Java files.
REIM	JAVANOCUSTOM	Deploy the REIM Java application and Java batch files, **NOT** including any custom Java files.
RESA	JAVA	Deploy the RESA Java application, including any custom Java files.
RESA	JAVANOCUSTOM	Deploy the RESA Java application, **NOT** including any custom Java files.

Application	Type	Description
PRICING	JAVA	Deploy the PRICING Java application and Java batch files, including any custom Java files.
PRICING	JAVANOCUSTOM	Deploy the PRICING Java application and Java batch files, **NOT** including any custom Java files.

Running the ORDeploy utility

To deploy Java applications, perform the following steps:

1. Log in as the UNIX user that owns the product installation.
2. Set the RETAIL_HOME environment variable to the top-level directory of your product installation.
   ```
   export RETAIL_HOME=/u00/oretail/tst
   ```
3. Set the PATH environment variable to include the orpatch/bin directory
   ```
   export PATH=$RETAIL_HOME/orpatch/bin:$PATH
   ```
4. Execute ORDeploy to deploy the desired Java application.
   ```
   ordeploy –a <app> -t <type>
   ```

ORDeploy Examples

Deploy PRICING.

```
ordeploy -a PRICING -t JAVA
```

Deploy ReIM without including Java customizations.

```
ordeploy -a REIM -t JAVANOCUSTOM
```

Maintenance Considerations

The additional information stored within the RETAIL_HOME and within database schemas adds some considerations when performing maintenance on your environment.

Database Password Changes

Oracle wallets are used to protect the password credentials for connecting to database schemas. This includes all database schemas used during an install. If the password for any of these users is changed the wallet's entry must be updated.

The wallet location is configurable but by default is in the following locations:

Location	Installation Type
$RETAIL_HOME/orpatch/rms_wallet	RMS Database RMS Batch
$RETAIL_HOME/orpatch/rwms_wallet	RWMS Database
$RETAIL_HOME/orpatch/rwms_wallet_app	RWMS Forms
$RETAIL_HOME/orpatch/oraso_wallet	ASO Database
$RETAIL_HOME/orpatch/orme_wallet	RME Database
$RETAIL_HOME/orpatch/ra_wallet	RI (Previously RA) Database
$RETAIL_HOME/orpatch/rde_wallet	RDE Database

The wallet alias for each schema will be <username>_<dbname>. Standard mkstore commands can be used to update the password.

For example:

```
mkstore -wrl $RETAIL_HOME/orpatch/rms_wallet -modifyCredential rms_rmsdb rms01
rmspassword
```

This command will update the password for the RMS01 user to 'rmspassword' in the alias 'rms_rmsdb'.

The Oracle wallets are required to be present when executing ORPatch. Removing them will prevent you from being able to run ORPatch successfully. In addition the Oracle wallet location is referenced in the RMS batch.profile, and in the default RWMS Forms URL configuration, so removing them will require reconfiguration of batch and forms. If batch and forms were reconfigured after installation to use other wallet files, it is possible to backup and remove the wallets, then restore them when running ORPatch.

WebLogic Password Changes

Java wallets are used to protect the password credentials used when deploying Java products. This includes the WebLogic administrator credentials, LDAP connection credentials, batch user credentials and any other credentials used during an install. If the password for any of these users is changed the wallet's entry must be updated, or the Java product installation can be run again.

The wallet location is in the following locations:

Location	Installation Type
$RETAIL_HOME/orpatch/config/javapp_Pricing	PRICING Java
$RETAIL_HOME/orpatch/config/javapp_reim	ReIM Java
$RETAIL_HOME/orpatch/config/javapp_alloc	Allocation Java
$RETAIL_HOME/orpatch/config/javapp_resa	RESA Java
$RETAIL_HOME/orpatch/config/javaapp_rasrm	ORAAC (Previously RASRM) Java
$RETAIL_HOME/orpatch/config/javaapp_rms	RMS Java

The wallet aliases will be stored in the retail_installer partition. The names of the aliases will vary depending on what was entered during initial product installation.

The dump_credentials.sh script can be used to list the aliases in the wallet.

For example:

```
cd $RETAIL_HOME/orpatch/deploy/retail-public-security-api/bin
./dump_credentials.sh $RETAIL_HOME/orpatch/config/javapp_alloc

Apapplication level key partition name:retail_installer
User Name Alias:dsallocAlias User Name:rms01app
User Name Alias:BATCH-ALIAS User Name:SYSTEM_ADMINISTRATOR
User Name Alias:wlsAlias User Name:weblogic
```

The easiest way to update the credential information is to re-run the Java product installer. If you need to manually update the password for a credential, the save_credential.sh script can be used.

For example:

```
cd $RETAIL_HOME/orpatch/deploy/retail-public-security-api/bin
./save_credential.sh -l $RETAIL_HOME/orpatch/config/javapp_alloc -p
retail_installer -a wlsAlias -u weblogic
```

This command will prompt for the new password twice and update the aslias wlsAlias, username weblogic with the new password.

Infrastructure Directory Changes

The RETAIL_HOME/orpatch/config/env_info.cfg file contains the path to the database ORACLE_HOME on database or RMS Batch installations, to the WebLogic Forms and Reports ORACLE_HOME and ORACLE_INSTANCE on RWMS Forms installations, and to the WEBLOGIC_DOMAIN_HOME, WL_HOME and MW_HOME on Java product installations. If these paths change, the related configuration variables in the env_info.cfg file must be updated.

DBManifest Table

The table dbmanifest within Oracle Retail database schemas is used to track the database scripts which have been applied to the schema. It is critical not to drop or truncate this table. Without it, ORPatch will attempt to re-run scripts against the database which have already been applied which can destroy a working environment. Similarly, if copying a schema from one database to another database, ensure that the dbmanifest table is preserved during the copy.

RETAIL_HOME relationship to Database and Application Server

The RETAIL_HOME associated with an Oracle Retail product installation is critical due to the additional metadata and historical information contained within it. If a database or application installation is moved or copied, the RETAIL_HOME related to it should be copied or moved at the same time.

Jar Signing Configuration Maintenance

The PRICING product installation includes an option to configure a code signing certificate so that jar files modified during installation or patching are automatically re-signed. This configuration is optional, but recommended. If it is configured, the code signing keystore is copied during installation to $RETAIL_HOME/orpatch/config/jarsign/orpkeystore.jks. The keystore password and private key password are stored in a Java wallet in the $RETAIL_HOME/orpatch/config/jarsign directory. The credentials are stored in a wallet partition called orpatch:

Alias	Username	Description
storepass	discard	Password for the keystore
keypass	discard	Password for the private key

The keystore file and passwords can be updated using the product installer. This is the recommended way to update the signing configuration.

If only the credentials need to be updated, the sign_jar.sh script can be used.

1. Log in as the UNIX user that owns the product installation.
2. Set the RETAIL_HOME environment variable to the top-level directory of your installation.
   ```
   export RETAIL_HOME=/u00/oretail/tst
   ```
3. Change directories to the location of sign_jar.sh
   ```
   cd $RETAIL_HOME/orpatch/deploy/bin
   ```
4. Execute sign_jar.sh
   ```
   sign_jar.sh changepwd
   ```
5. When prompted, enter the new keystore password
6. When prompted, enter the new private key password

Customization

Patching Considerations with Customized Files and Objects

In general, the additional capabilities provided by the ORPatch should make it easier to evaluate the potential impacts of patches to your customizations of Oracle Retail products. However, the additional metadata maintained by the Oracle Retail patching utilities does add some considerations when making customizations.

General Guidelines

It is always preferred to customize applications by extension rather than by direct modification. For example, adding new database objects and forms rather than modifying existing Oracle Retail objects and forms. You can also leverage built-in extension points such as User Defined Attributes, the Custom Flexible Attribute Solution, or seeded customization points in ADF Applications.

It is strongly discouraged to directly modify Oracle Retail database objects, especially tables, as your changes may be lost during patching or may conflict with future updates. When adding or modifying database objects, Oracle Retail recommends that all objects be added with scripts to ensure that they can be rebuilt if necessary after a patch.

Custom Database Objects

When you create new database objects, Oracle Retail recommends placing them in an Oracle database schema specifically for your customizations. You must use synonyms and grants to allow the Oracle Retail product schema owner and other users to access your objects, and use synonyms and grants to allow your customizations to access Oracle Retail objects. A separate schema will ensure that your customizations are segregated from base Oracle Retail code.

ORPatch expects that there will be no invalid objects in the database schemas it manages after a patch is applied. For this reason adding extra objects to the product schema could result in failures to apply patches as changes to base objects may cause custom objects to go invalid until they are updated. In this situation, manually update the custom objects so that they compile, and restart the patch.

Custom Forms

When creating new custom forms, Oracle Retail recommends placing them in a separate directory specifically for your customizations. This directory should be added to the FORMS_PATH of your RWMS Forms URL configuration to allow the forms to be found by the Forms Server. This will ensure that your customizations are segregated from base Oracle Retail code. If you choose to place customizations in the Forms bin directory, then your custom forms will need to be recopied each time Forms are fully recompiled.

ADF Application Customization

Oracle Retail ADF-based applications such as Allocation and ReSA can be customized using a process called 'seeded customization'. The customization process involves using JDeveloper in Customizer mode to create changes to product configurations, and then building a MAR archive containing the changes. The generated MAR is deployed to the MDS repository used by the application and applied to the application at runtime. These types of customizations are handled outside of ORPatch and are not reported during patch analysis or tracked by the custom file registration utility. More information can be found in the respective product customization guides.

Custom Compiled Java Code

When customizing Oracle Retail Java-based products such as PRICING and ReIM via product source code, ORPatch supports automatically adding compiled customizations into the application ear file prior to deployment. This allows customizations to be applied to the application without directly modifying the base product ear, enabling customizations and defect hotfixes to co-exist when they do not change the same file or a dependent file. See the later "Custom Compiled Java Code" section for additional information and considerations.

Analyze Patches when Customizations are Present

Whenever you have customized a product by directly modifying Oracle Retail files or database objects, it is important to ensure you analyze each the files that will be updated by a patch before applying the patch. This will allow you to identify any customized files which may be overwritten by the patch and either merge your customization with the new version of the file, or re-apply the customization after applying the patch.

Manifest Updates

If you choose to customize Oracle Retail files directly, it is extremely important **not** to update the revision number contained in the env_manifest.csv. This could cause future updates to the file to be skipped, invalidating later patch applications as only a partial patch would be applied. The customized revision number for modified files will need to be tracked separately.

Registering Customized Files

The ORPatch contains utilities and functionality to allow tracking of files that have been customized through direct modification. This process is referred to as 'registering' a customized file. Registration only works for files which are shipped by Oracle Retail. It is not possible to register new files created in the environment as part of extensions or customizations.

When patches are analyzed with ORPatch, special reporting is provided if any registered files would be updated or deleted by the patch. Customized files impacted by the patch are listed at the end of the analysis report from ORPatch. The detail files generated

during the analyze will contain a column called 'customized' which will have a Y for any files which were registered as customized. This allows easier identification of customizations which will be overwritten by a patch.

All files delivered by Oracle Retail are considered 'base' and so when they are applied to an environment any registrations of those files as customized will revert back to un-customized. **Each time a patch overwrites customized files, you must re-register the files as customized once you have applied customizations.**

To register customized files, use the $RETAIL_HOME/orpatch/bin/orcustomreg script.

The orcustomerg script operates in one of two modes: registration and list.

- Registration mode registers or unregisters one or more files as customized.
- List mode lists all files in the environment that are registered as customized.

Command Line Arguments for Registration Mode

Argument	Description
-f <file>	Adds <file> to the list of files that will be registered. Can be specified more than once.
-bulk <file>	Specifies a file to read, containing one filename per line. All filenames listed inside <file> will be registered.
-register	Files specified with -f or -bulk will be registered as 'customized'
-unregister	Files specified with -f or -bulk will be registered as 'base'

Notes:

- At least one of -f or -bulk is required.
- If neither -register nor -unregister is specified, the default is '-register'.
- File names specified with -f must either be fully-qualified or be relative to RETAIL_HOME. The same is true for filenames specified within a -bulk file.

Command Line arguments for list mode

Argument	Description
-list	List all files in the environment registered as customized

Running the orcustomreg Script

Perform the following procedure to run the orcustomreg script:

1. Log in as the UNIX user that owns the product installation.
2. Set the RETAIL_HOME environment variable to the top-level directory of your product installation.
   ```
   export RETAIL_HOME=/u00/oretail/tst
   ```
3. Set the PATH environment variable to include the orpatch/bin directory
   ```
   export PATH=$RETAIL_HOME/orpatch/bin:$PATH
   ```
4. Execute orcustomreg script to register the desired file(s).

```
orcustomreg –register –f <file>
```

Examples of using the orcustomreg Script

Register $RETAIL_HOME/dbsql_rms/Cross_Pillar/control_scripts/source/oga.sql as customized.

```
orcustomreg -f dbsql_rms/Cross_Pillar/control_scripts/source/oga.sql
```

Unregister customizations for $RETAIL_HOME/dbsql_rwms/Triggers/Source/TR_WAVE.trg

```
orcustomreg –unregister –f $RETAIL_HOME/dbsql_rwms/Triggers/Source/TR_WAVE.trg
```

Bulk register several files as customized.

```
echo "$RETAIL_HOME/oracle/proc/src/mrt.pc" > custom.txt
echo "$RETAIL_HOME/oracle/proc/src/saldly.pc" >> custom.txt
echo "$RETAIL_HOME/oracle/proc/src/ccprg.pc" >> custom.txt
orcustomreg –bulk custom.txt
```

List all files registered as customized.

```
orcustomreg –list
```

Custom Compiled Java Code

When customizing Oracle Retail Java-based products such as PRICING and ReIM via product source code, ORPatch supports automatically adding compiled customizations into the application ear file prior to deployment. This allows customizations to be applied to the application without directly modifying the base product ear, enabling customizations and defect hotfixes to co-exist when they do not change the same file or a dependent file

This functionality is enabled by creating a directory called $RETAIL_HOME/javaapp_<app>/custom, where <app> is the application the customizations apply to. Files stored within this directory will be combined with the base product ear files before the application is deployed to WebLogic. ORPatch will attempt to consider customizations stored within the 'custom' directory during patch analysis by triggering more detailed ear file change analysis to assist with identifying which customizations might be impacted by changes in the patches.

> **Note:** It is not possible, nor necessary, to register compiled Java customizations with the orcustomreg tool.

As with other customization techniques for other technologies, Oracle Retail recommends making Java customizations in new files as much as possible, versus overwriting base product or configuration files. In the past it was necessary to build complete replacement product ear files, but this method of customization is no longer required nor recommended. Replacement ear and jar files will not contain the META-INF/env_manifest.csv files which are required in order to be able to apply incremental patches. Instead, compile the specific Java classes being customized and place them along with any custom configuration files in $RETAIL_HOME/javaapp_<app>/custom.

Building Deployable ear files

When constructing the product ear file to deploy to WebLogic, ORPatch applies changes to the ear file in a specific order, with files from later steps overwriting files in earlier steps. The resulting ear is stored in $RETAIL_HOME/javaapp_<app>/deploy, and then deployed to WebLogic.

Sequence for ORPatch Java Product ear file updates

Order	File Type	Location
1	Base product ear	$RETAIL_HOME/javaapp_<app>/base
2	Updated configuration files	$RETAIL_HOME/javaapp_<app>/config
3	Oracle Retail-supplied hotfixes	$RETAIL_HOME/javaapp_<app>/internal
4	Compiled customizations	$RETAIL_HOME/javaapp_<app>/custom

Merging Custom Files

When merging files from the custom directory with the product ear, ORPatch uses the directory path of the files within custom to calculate where the file should be stored within the ear. This allows arbitrary nesting of files, even when placing files within jars stored in jars, stored within the ear. The following examples below use PRICING, but apply to adding compiled customizations to any Java-based product.

Custom directory location and product ear location Examples

File path within javaapp_<app>/custom/	Final Ear File Location
Pricing.ear/company/ui/MyCustom.class	In Pricing.ear: /company/ui/MyCustom.class
Pricing.ear/Pricing.jar/company/bc/MyCustom2.class	In Pricing.ear: In Pricing.jar: /company/bc/MyCustom2.class
Pricing.ear/lib/ourcustomlibs.jar	In Pricing.ear /lib/ourcustomlibs.jar
Pricing.ear/WebLaunchServlet.war/lib/ Pricing.jar/company/bc/MyCustom2.class	In Pricing.ear: In WebLaunchServlet.war: In lib/Pricing.jar: /company/bc/MyCustom2.class

Analyzing patches when customizations are present

When analyzing a patch which contains a base product ear and the custom directory contains files, ORPatch will automatically trigger a more detailed analysis of the changes coming in a patch. This includes calculating what files inside the product ear have been added, removed or updated and which files appear to be customized based on the contents of the 'custom' directory. The detailed results of the ear file comparison during patch analysis will be saved in javaapp_<app>_archive_compare_details.csv. Any custom files which appeared to be impacted by the patch are saved in javapp_<app>_archive_custom_impacts.csv. Both files will be in the $RETAIL_HOME/orpatch/logs/detail_logs/analyze/details directory.

> **Note:** This detailed analysis is not available when analyzing individual hotfixes, so special care must be taken when applying hotfixes to a customized product installation, to ensure there are no conflicts between customizations and hotfix changes.

Customizations and cumulative patches

By default, when applying a cumulative patch, ORPatch will not include customizations in the deployed product ear, even if they are present in the appropriate directory. This allows verification that the application is functioning properly using base code, before applying customizations. After verifying the initial deployment, use ORDeploy with the "-t JAVA" option to construct and deploy the product ear including customizations.

If customizations need to be removed outside of a patch, use ORDeploy with the "-t JAVANOCUSTOM" option to create and deploy an ear containing only Oracle Retail code. To force ORPatch to include customizations in the deployed ear even when applying a cumulative patch, set JAVAAPP_<app>_INCLUDE_CUSTOM=Y in the $RETAIL_HOME/orpatch/config/env_info.cfg file.

Changing configuration files

It is possible to directly change product configuration files in $RETAIL_HOME/javaapp_<app>/config. These updates can be deployed to the environment using the ORDeploy utility. However, the 'config' directory is completely recreated each time the product installer is used. This means that modifications will be lost and must be manually reapplied after each installer run. It is recommended to make configuration changes via the installer where possible, and retain the ant.install.properties file for use in later installer sessions.

Extending Oracle Retail Patch Assistant with Custom Hooks

The default ORPatch actions and processing logic is sufficient to install and patch the base Oracle Retail product code. However there may be situations where custom processing is desired during patching activities such as executing a shell script prior to the start of patching, or running a SQL script at the end of the patch.

ORPatch supports extensions in the form of custom hooks. These hooks allow external scripts to be run at specific points during ORPatch processing.

ORPatch Processing

Action

ORPatch supports a variety of 'actions' which define the steps necessary to apply updates to a particular area of the Oracle Retail application. Each action is generally specific to updates to a single technology or logical component of the environment. For example, one action might handle making updates to the RMS database schema, while a separate action is responsible for compiling RWMS forms, and a different action deploys the PRICING Java application. These actions are enabled and disabled within the environment configuration file, allowing ORPatch to determine what types of changes to apply to each product installation.

ORPatch Actions

Order	Action Name	Description
1	DBSQL_RMSBDIINT	Loads database objects into the RMS BDI Integration schema
2	DBSQL_RMSBDIINFR	Loads database objects into the RMS BDI Infrastructure schema
3	DBSQL_RAF	Loads Retail Application Framework database objects into the RMS schema

Order	Action Name	Description
44	DBSQL_RMS	Loads RMS and PRICING database objects into the primary RMS schema
5	DBSQL_REIM	Loads ReIM database objects into the RMS schema
6	DBSQL_ALCRMS	Loads Allocation database objects into the RMS schema
7	DBSQL_ALLOC	Loads Allocation database objects into the Allocation user schema
8	DBSQL_RMSDEMO	Used to create demo data in the RMS schema if demo data was selected during initial installation
9	DBSQL_RMSDAS	Loads database objects into the RMS Data Access Schema
10	RMSBATCH	Compiles RMS Batch
11	RMSRETLSCRIPTS	Copies Oracle Retail Extract and Load scripts for RMS
12	RMSDCSCRIPTS	Copies Oracle Retail Merchandising System data conversion scripts
13	JAVAAPP_RMS	Deploys the RMS Java application
14	DBSQL_RWMS	Loads database objects into the primary RWMS schema
15	DBSQL_RWMSADF	Loads database objects into the RWMS ADF user schema
16	DBSQL_RWMSUSER	Loads database objects into the RWMS user schema
17	ORAFORMS_RWMS	Compiles RWMS Forms, copies RWMS batch scripts and reports to $RETAIL_HOME
18	JAVAAPP_PRICING	Deploys the PRICING Java application and batch scripts
19	JAVAAPP_REIM	Deploys the REIM Java application and batch scripts
20	JAVAAPP_ALLOC	Deploys the Allocation Java application and batch scripts
21	JAVAAPP_RESA	Deploys the ReSA Java application
22	JAVAAPP_RASRM	Deploys the ORAAC (previously called RASRM) Java application
23	DBSQL_RARMSBATCH	Loads database objects into the RMS Batch schema for RI (previously called RA)
24	DBSQL_RADM	Loads database objects into the RI (previously called RA) Data Mart schema
25	DBSQL_RAFEDM	Loads database objects into the RI (previously called RA) Front-end schema
26	DBSQL_RABATCH	Loads database objects into the RI (previously called RA) Batch schema
27	RACOREBATCH	Copies RA Core batch scripts and libraries
28	DBSQL_RDERMSBATCH	Loads database objects into the RMS Batch schema for RDE
29	DBSQL_RDEDM	Loads database objects into the RDE Data Mart schema
30	DBSQL_RDEBATCH	Loads database objects into the RDE Batch schema

Order	Action Name	Description
31	RDECOREBATCH	Copies RDE Core batch scripts and libraries
32	DBSQL_RASECORE	Loads core database objects into the ORASE schema
33	DBSQL_RASEASO	Loads ASO database objects into the ORASE schema
34	DBSQL_RASERL	Loads RL database objects into the ORASE schema
35	DBSQL_RASECDT	Loads CDT database objects into the ORASE schema
36	DBSQL_RASECIS	Loads CIS database objects into the ORASE schema
37	DBSQL_RASEDT	Loads DT database objects into the ORASE schema
38	DBSQL_RASEAE	Loads AE database objects into the ORASE schema
39	DBSQL_RASEMBA	Loads MBA database objects into the ORASE schema
40	RASECOREBATCH	Copies ORASE core batch scripts and libraries
41	RASEASOBATCH	Copies ORASE ASO batch scripts and libraries
42	RASERLBATCH	Copies ORASE RL batch scripts and libraries
43	RASECDTBATCH	Copies ORASE CDT batch scripts and libraries
44	RASECISBATCH	Copies ORASE CIS batch scripts and libraries
45	RASEDTBATCH	Copies ORASE DT batch scripts and libraries
46	RASEAEBATCH	Copies ORASE AE batch scripts and libraries
47	RASEMBABATCH	Copies ORASE MBA batch scripts and libraries
48	DBSQL_RFM	Loads RFM database objects into the RMS schema

Phase

ORPatch processes patches in phases. Each action relevant to a patch and host is provided an opportunity to process the patch for each phase. The standard phases which allow hooks are:

Restart Phase Number	Phase Name	Description
N/A	PRECHECK	Actions verify that their configuration appears complete and correct. This phase and the associated hooks will be run every time orpatch is executed, even if processing will be restarted in a later phase.
10	PREACTION	Actions do processing prior to when files are copied to the environment. Files are deleted during this phase.
20	COPYPATCH	Actions copy files included in a patch into the destination environment and the environment manifest is updated.
30	PATCHACTION	Actions take the more detailed steps necessary to apply the new files to the environment. For database actions in particular, this is the phase when new and updated sql files are loaded into the database.

Restart Phase Number	Phase Name	Description
40	POSTACTION	Actions do processing after files have been copied and PatchActions are completed. The Forms actions, for example, use this phase to compile the forms files as this must happen after database packages are loaded.
50	CLEANUP	Actions do any additional processing. Currently no actions implement activities in this phase.

Configuring Custom Hooks

Custom hooks are configured in a configuration file RETAIL_HOME/orpatch/config/custom_hooks.cfg. The configuration file is a simple text file where blank lines and lines starting with # are ignored and all other lines should define a custom hook.

To define a custom hook, a line is added to the file in the form:

```
<hook name>=<fully qualified script>
```

The hook name must be in upper case and is in the form:

```
<action name>_<phase name>_<sequence>
```

The action name is any action name understood by ORPatch. The phase name is one of the five phase names from the table above. The sequence is either 'START' or 'END'. Hooks defined with a sequence of 'START' are run before the action's phase is invoked. Hooks defined with a sequence of 'END' are run after the action's phase is invoked.

Multiple scripts can be associated with a single hook by separating the script names with a comma. If a hook name appears in the configuration file multiple times only the last entry will be used.

The script defined as a custom hook must be an executable shell script that does not take any arguments or inputs. The only environment variable that is guaranteed to be passed to the custom hook is RETAIL_HOME. The script must return 0 on success and non-zero on failure.

If an action is a DBSQL action (i.e. has a name like DBSQL_), the custom hook can optionally be a .sql file. In this case the SQL script will be run against the database schema that the DBSQL action normally executes against. The SQL script must not generate any ORA- or SP2- errors on success. In order to be treated as a database script, the extension of the file defined as the custom hook must be .sql in lower-case. Any other extension will be treated as if it is a shell script. If you have database scripts with different extensions, they must be renamed or wrapped in a .sql script.

When using the PRECHECK phase and START sequence, please note that the custom hook will be executed prior to any verification of the configuration. Invalid configuration, such as invalid database username/password or a non-existent ORACLE_HOME, may cause the custom hook to fail depending on the actions it tries to take. However in these cases, the normal orpatch PRECHECK activities would likely have failed as well. All that is lost is the additional context that orpatch would have provided about what was incorrect about the configuration.

Restarting with Custom Hooks

If a custom hook fails, for example a shell script hook returns non-zero or a sql script generates an ORA- error in its output, the custom hook will be treated as failing. A failing custom hook causes ORPatch to immediately stop the patching session.

When ORPatch is restarted it always restarts with the same phase and action, including any START sequence custom hooks. If the START sequence custom hook fails, the action's phase is never executed. With an END sequence custom hook, the action's phase is re-executed when ORPatch is restarted and then the custom hook is re-executed. When an action's phase is costly, for example the DBSQL_RMS action which does a lot of work, this can mean a lot of duplicate processing.

For this reason it is preferred to use START sequence custom hooks whenever possible. If necessary, use a START sequence hook on a later phase or a later action, rather than an END sequence custom hook.

Patch-level Custom Hooks

In addition to action-specific hooks, there are two patch-level hook points available. These hooks allow scripts to be run before any patching activities start and after all patching activities are completed. The hooks are defined in the same configuration file, with a special hook name.

To run a script before patching, define:

```
ORPATCH_PATCH_START=<fully qualified script>
```

To run a script after patching, define:

```
ORPATCH_PATCH_END=<fully qualified script>
```

These hooks only support executing shell scripts, database scripts must be wrapped in a shell script. It is also important to note that these hooks are run on every execution of ORPatch to apply a patch, even when restarting a patch application. If the START sequence patch-level hook returns a failure, patching is aborted. If the END sequence patch-level hook returns a failure, it is logged but ignored as all patching activities have already completed.

Please note that the ORPATCH_PATCH_START hook is executed prior to any verification of the configuration. Invalid configuration may cause the custom hook to fail depending on the actions it tries to take. However in these cases, the normal ORPatchactivities would likely fail as well.

Example Custom Hook Definitions

A shell script that is executed prior to the Pre-Action phase of RMS Batch:

```
RMSBATCH_PREACTION_START=/u00/oretail/prepare_custom_header.sh
```

A shell script that is executed after RETL script files are copied into the RETAIL_HOME:

```
RETLSCRIPTS_COPYPATCH_END=/u00/oretail/copy_custom_files.sh
```

A SQL script that is executed against the RWMS owning schema at the start of the Clean-up Phase:

```
DBSQL_RWMS_CLEANUP_START=/dba/sql/recompile_synonyms.sql
```

Troubleshooting Patching

There is not a general method for determining the cause of a patching failure. It is important to ensure that patches are thoroughly tested in a test or staging system several times prior to attempting to apply the patch to a production system, particularly if the patch is a large cumulative patch. After the test application is successful, apply the patch to the production system.

ORPatch Log Files

ORPatch records extensive information about the activities during a patch to the log files in RETAIL_HOME/orpatch/logs. This includes a summary of the actions that are planned for a patch, information about all files that were updated by the patch, and detailed information about subsequent processing of those files. The ORPatch log files also contain timestamps to assist in correlating log entries with other logs.

Even more detailed logs are available in RETAIL_HOME/orpatch/logs/detail_logs for some activities such as forms compilation, invalid database object errors, and output from custom hooks. If the standard ORPatch log information is not sufficient, it might be helpful to check the detailed log if it exists.

Restarting ORPatch

The restart mechanism in ORPatch is designed to be safe in nearly any situation. In some cases to ensure this, a portion of work may be redone. If the failure was caused by an intermittent issue that has been resolved, restarting ORPatch may be sufficient to allow the patch to proceed.

Manual DBManifest Updates

A possible cause for database change script failures is that a database change was already made manually to the database. In this event, you may need to update the dbmanifest table to record that a specific script does not need to be run. Before doing this, it is extremely important to ensure that all statements contained in the script have been completed.

Use the $RETAIL_HOME/orpatch/bin/ordbmreg script to register database scripts in the dbmanifest table.

Command Line Arguments for ordbmreg

Argument	Description
-f <file>	Adds <file> to the list of files that will be registered. Can be specified more than once.
-bulk <file>	Specifies a file to read, containing one filename per line. All filenames listed inside <file> will be registered.
-register	Files specified with -f or -bulk will be registered in the dbmanifest table
-unregister	Files specified with -f or -bulk will be removed from the dbmanifest table

Notes:

- At least one of -f or -bulk is required.
- If neither -register nor -unregister is specified, the default is '-register'.
- File names specified with -f must either be fully-qualified or be relative to RETAIL_HOME. The same is true for filenames specified within a -bulk file.
- Registering a file in the dbmanifest table will cause it to be completely skipped. Before doing so, ensure that all commands contained in it have been completed.
- Removing a file from the dbmanifest table will cause it to be run again. This will fail if the commands in the script cannot be re-run. For example if they create a table that already exists.

Running the ordbmreg Script

Perform the following procedure to run the ordbmreg script:

1. Log in as the UNIX user that owns the product installation.
2. Set the RETAIL_HOME environment variable to the top-level directory of your product installation.
   ```
   export RETAIL_HOME=/u00/oretail/tst
   ```
3. Set the PATH environment variable to include the orpatch/bin directory
   ```
   export PATH=$RETAIL_HOME/orpatch/bin:$PATH
   ```
4. Execute ordbmreg script to register the desired file(s).
   ```
   ordbmreg -register -f <file>
   ```

Examples of using the ordbmreg Script

Register $RETAIL_HOME/dbsql_rms/Cross_Pillar/db_change_scripts/source/000593_system_options.sql with the dbmanifest table.

```
ordbmreg -f
dbsql_rms/Cross_Pillar/db_change_scripts/source/000593_system_options.sql
```

Remove the dbmanifest row for $RETAIL_HOME/dbsql_radm/ra_db/radm/database_change_scripts/000035_s12733240_w_party_per_d.sql.

```
ordbmreg -unregister -f
$RETAIL_HOME/dbsql_radm/ra_db/radm/database_change_scripts/000035_s12733240_w_party_per_d.sql
```

Bulk register several files in the dbmanifest table.

```
echo "$RETAIL_HOME/dbsql_rwms/DBCs/Source/000294_container.sql" > dbcs.txt
echo "$RETAIL_HOME/dbsql_rwms/DBCs/Source/000457_drop_object.sql" >> dbcs.txt
ordbmreg -bulk dbcs.txt
```

Restarting after registration

Once the row has been added to the dbmanifest table, restart ORPatch and the script will be skipped. If the file is not skipped there are several possibilities:

- The script registered is not the failing script.
- The file type is not a type that is filtered by the dbmanifest. The only file types that skip files listed in the dbmanifest are:
  - Initial install DDL Files
  - Installation scripts that cannot be rerun
  - Database Change Scripts

Manual Restart State File Updates

Oracle Retail strongly discourages manually updating the ORPatch restart state files. Updating the file improperly could cause necessary steps in the patching process to be skipped or patches to be incorrectly recorded as applied.

DISPLAY Settings When Compiling Forms

When compiling RWMS forms, it is necessary to have a valid X-Windows Display. ORPatch allows this setting to come from one of two places:

- DISPLAY environment variable set before executing ORPatch

  or

- DISPLAY setting in RETAIL_HOME/orpatch/config/env_info.cfg

The DISPLAY variable in the environment overrides the env_info.cfg, if both are set. The destination X-Windows display must be accessible to the user running ORPatch, and for best compilation performance it should be on the network 'close' to the server where Forms are installed and compiled. Using a local display or VNC display is preferred. Compiling forms across a Wide-Area Network will greatly increase the time required to apply patches to environments.

JAVA_HOME Setting

When working with Java application jar, ear or war files, it is necessary to have a valid JAVA_HOME setting. ORPatch allows this setting to come from one of two places:

- JAVA_HOME environment variable set before executing ORPatch

  or

- JAVA_HOME setting in RETAIL_HOME/orpatch/config/env_info.cfg

The JAVA_HOME variable in the environment overrides the env_info.cfg, if both are set. The specified Java home location must be accessible to the user running ORPatch and be a full Java Development Kit (JDK) installation. The JAVA_HOME must contain the jar utility and if automatic Jar file signing is configured, must also contain the keytool and jarsigner utilities.

Patching Prior to First Install

In some situations, it may be necessary to apply a patch to product installation files before the initial install. For example, if there is a defect with a script that would be run during the install and prevent proper installation. In this rare situation, it may be necessary to apply a patch to the installation files prior to starting installation.

Note: These steps should only be undertaken at the direction of Oracle Support.

Perform the following steps to patch installation files prior to starting an installation. The steps assume an RMS installation, but apply to any product supported by ORPatch:

1. Unzip the installation files to a staging area.

   Note: The following steps assume the files are in /media/oretail

2. Locate the patch_info.cfg within the product media. The directory it resides in will be used for later steps.
3. find /media/oretail/rms/installer –name patch_info.cfg
4. Output Example:
5. /media/oretail/rms/installer/mom/patch_info.cfg
6. Get the PATCH_NAME for the standard product installation. The patch name to use in subsequent steps will be the portion following the "=" sign.

   ```
   grep "PATCH_NAME=" /media/oretail/rms/installer/mom/patch_info.cfg
   ```

   Output Example:

   PATCH_NAME=**MOM_16_0_0_0**
7. Create a directory that will contain the patch that must be applied, next to the directory with the product installation files.

   Note: The following steps assume this directory is in /media/patch.

8. Unzip the patch into the directory created in step 2.

   Note: This should place the patch contents in /media/patch/<patch num>.

9. Export RETAIL_HOME to point within the installation staging area.

   ```
   export RETAIL_HOME=/media/oretail/rms/installer/mom/Build
   ```
10. Create a logs directory within the installation staging area

    ```
    mkdir $RETAIL_HOME/orpatch/logs
    ```
11. Ensure the ORMerge shell script is executable.

    ```
    chmod u+x $RETAIL_HOME/orpatch/bin/ormerge
    ```
12. Run ORMerge to apply the patch to the installation media, using a –name argument that is the same as what was found in step 3.

    ```
    $RETAIL_HOME/orpatch/bin/ormerge -s /media/patch -d
    /media/oretail/rms/installer/mom –name MOM_16_0_0_0 –inplace
    ```

    Note: The –inplace argument is critical to ensure that the patching replaces files in the mom15 directory.

13. Unset the RETAIL_HOME environment variable.

    ```
    unset RETAIL_HOME
    ```

At this point, the installation files will have been updated with the newer versions of files contained within the patch. Log files for the merge will be in /media/oretail/rms/installer/mom/Build/orpatch/logs.

Providing Metadata to Oracle Support

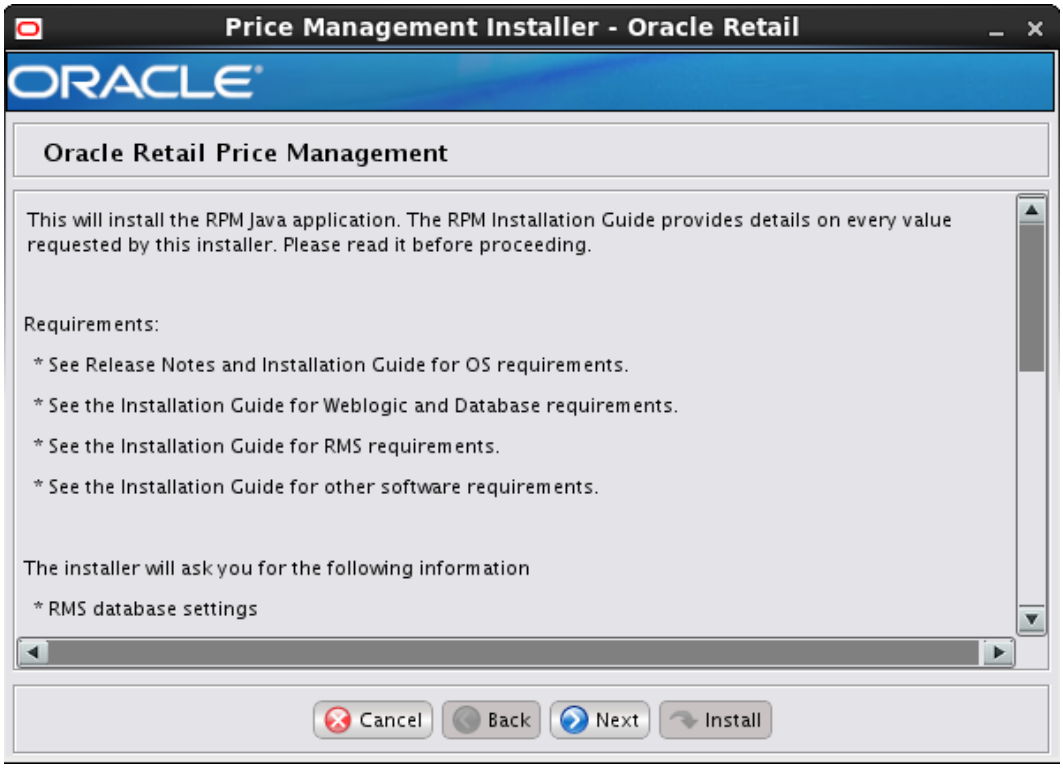
In some situations, it may be necessary to provide details of the metadata from an environment to Oracle support in order to assist with investigating a patching or application problem. ORPatch provides built-in functionality through the 'exportmetadata' action to extract and consolidate metadata information for uploading to Oracle Support or for external analysis. For more information, see the ORPatch 'Exporting Environment Metadata' section.

A

Appendix: Pricing Application Installer Screens

You need the following details about your environment for the installer to successfully deploy the PRICING application. Depending on the options you select, you may not see some screens or fields.

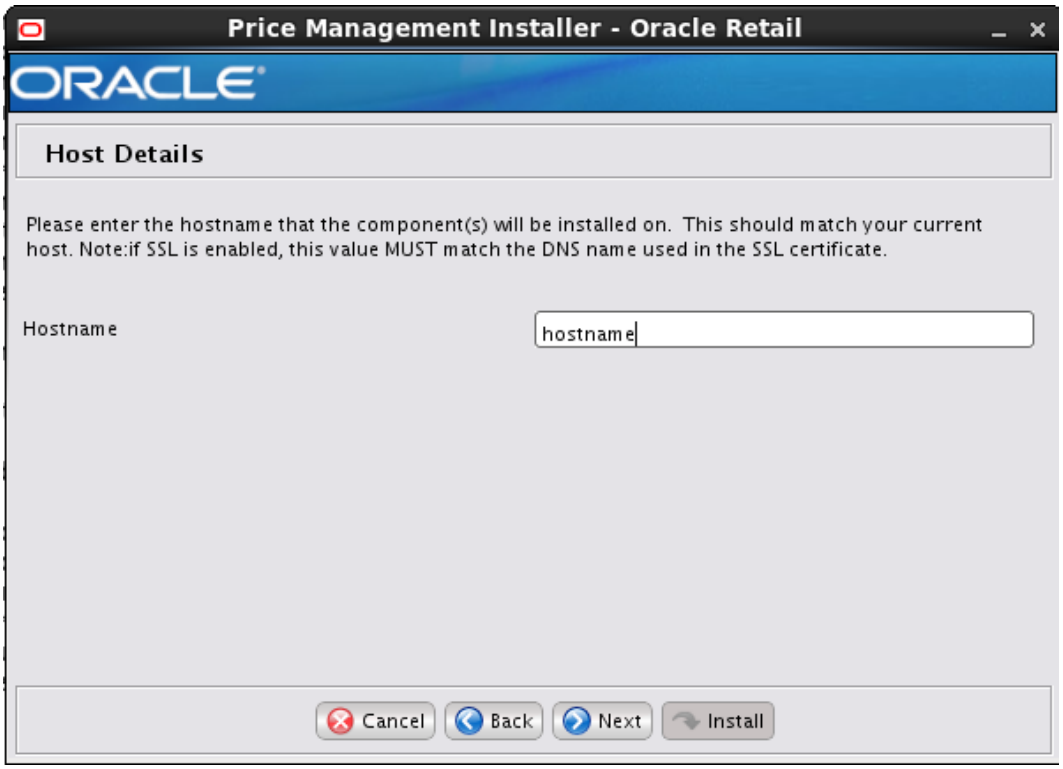
Screen: Installation Introduction Screen



Screen: PRICING Application RETAIL HOME

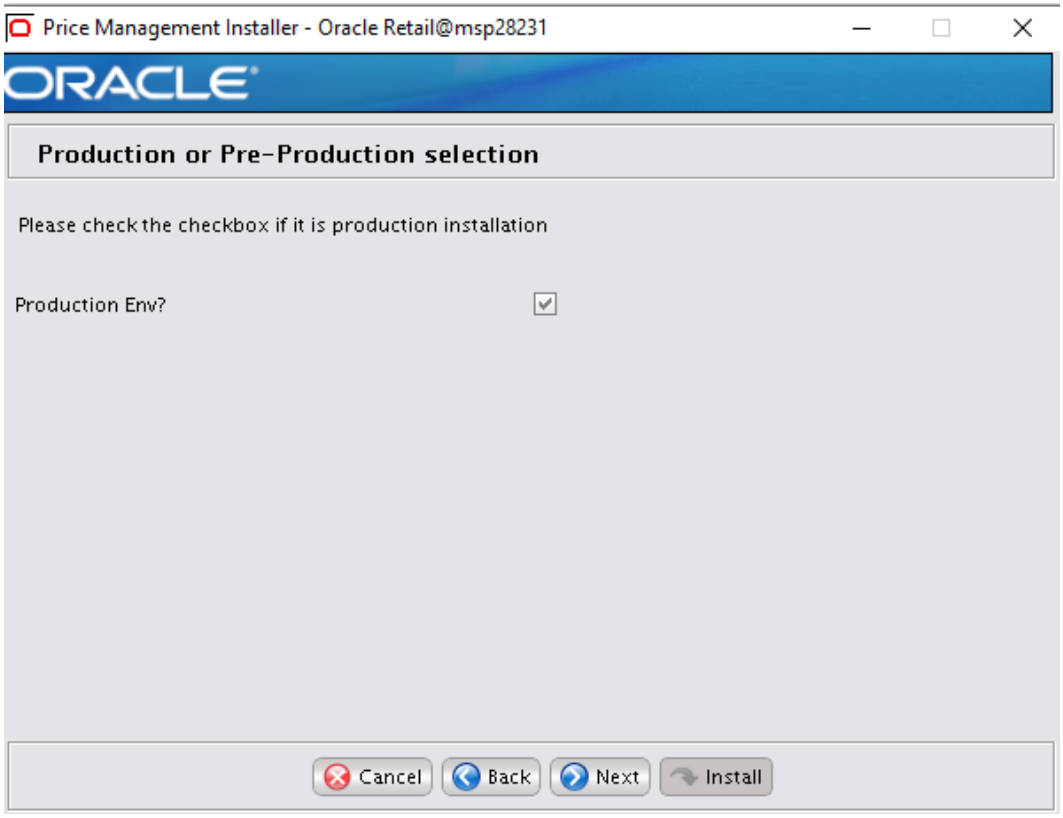
Field Title	PRICING Application RETAIL HOME
Field Description	Retail Home is used to keep Orpatch related files, batches, etc. by default. Please keep track of this directory, it should remain in place after installation and will be used to apply future patches.
Examples	/path/to/Pricing_retail_home

Screen: Host Details



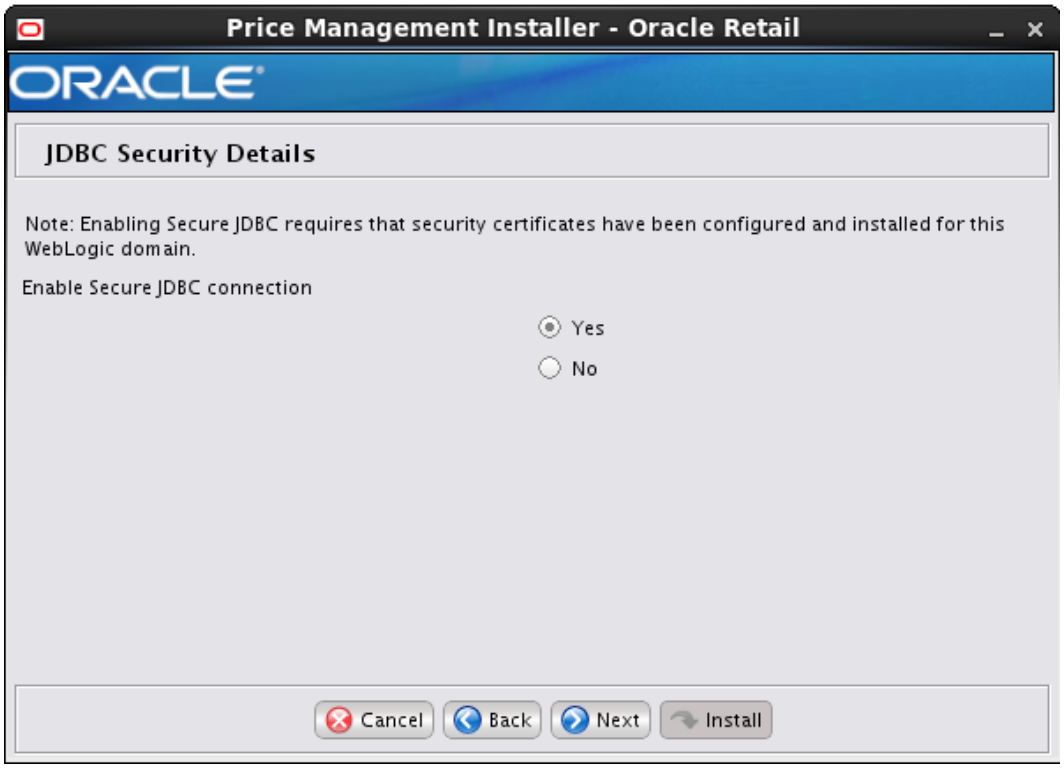
Field Title	Hostname
Field Description	Provide the hostname where the Retail Home, batches will be installed. This shall match your Application server hostname.
Examples	app-hostname.us.oracle.com

Screen: Production or Pre-Production



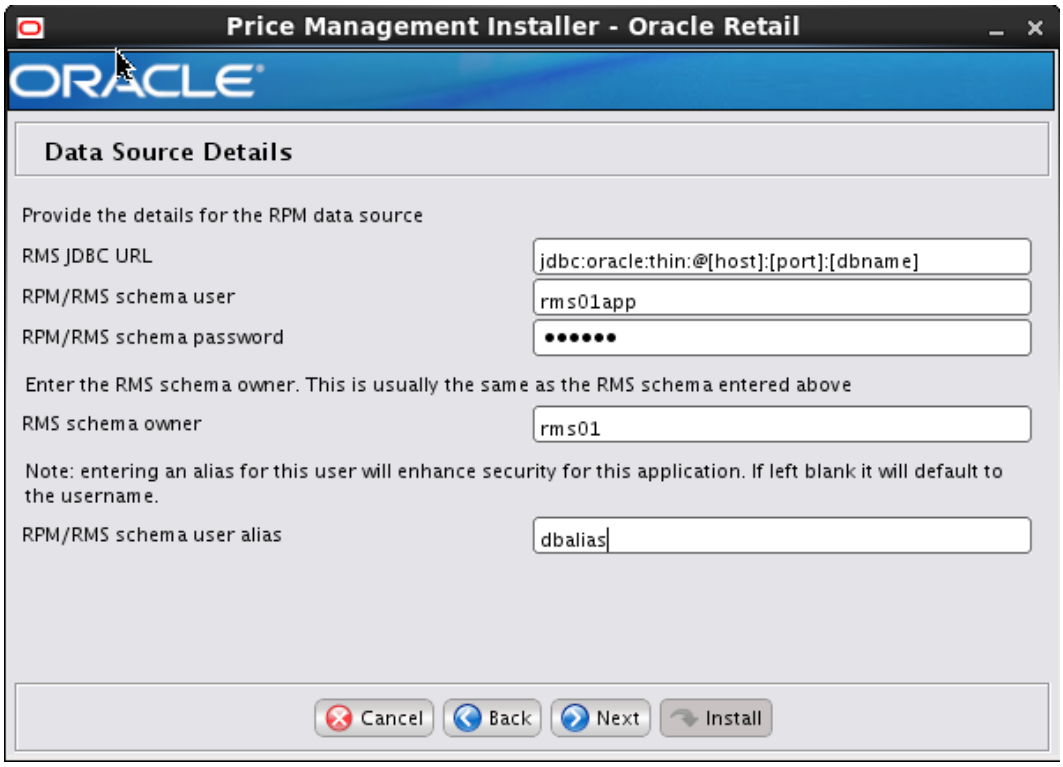
Field Title	Production Env
Field Description	Based on this flag the job roles will have suffix PREPROD. For non Prod the job roles will have PREPROD. This flag is applicable only for IDCS
Examples	True or false

Screen: JDBC Security Details



Field Title	Enable Secure JDBC connection
Field Description	Choose Yes to create secured data sources in WebLogic, otherwise choose No. A secure data base connection must already be set up if you want to create a secure data source.

Screen: Data Source Details



Field Title	RMS 19 JDBC URL
Field Description	URL used by the PRICING application to access the RMS database schema. See Appendix: URL Reference for expected syntax. **Note:** The PRICING database tables are a part of the RMS schema.
Examples	For Non Secure JDBC Connection: jdbc:oracle:thin:@hostname:1521/dbname For Secure JDBC Connection: jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS_LIST=(ADDRESS=(PROTOCOL=tcps)(HOST=dbhostname)(PORT=2484)))(CONNECT_DATA=(SERVICE_NAME=mydb)))

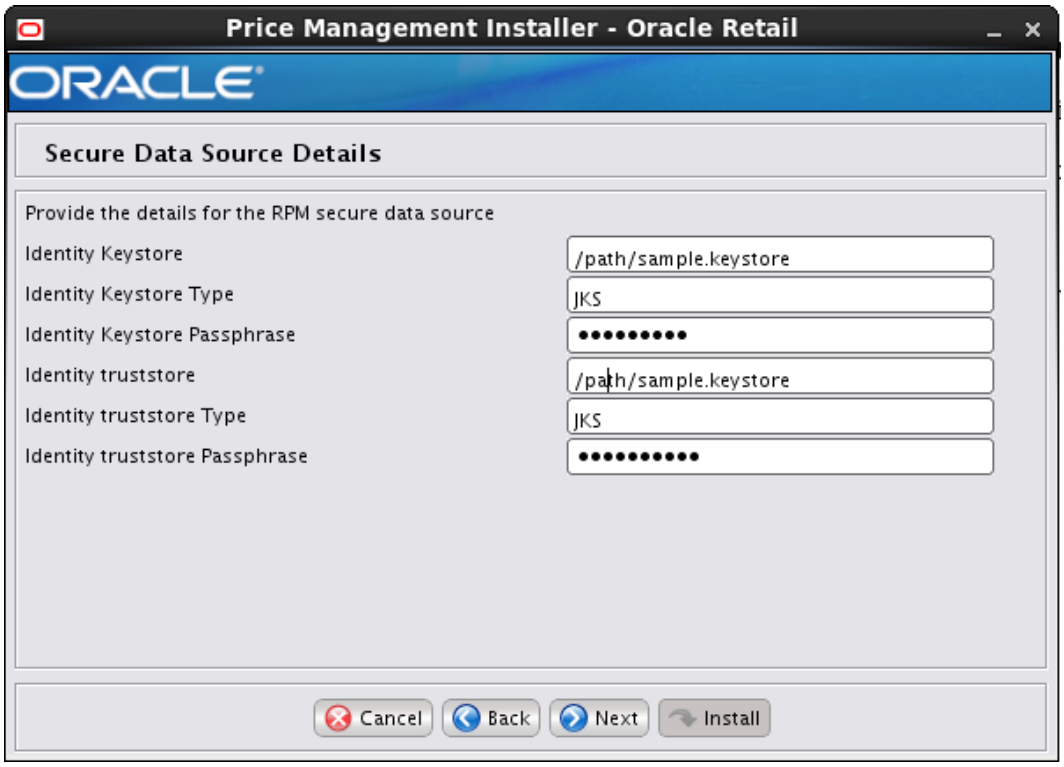
Field Title	PRICING/RMS 19schema user
Field Description	RMS database user for accessing the PRICING tables. This should match what was given in the RMS schema field of the RMS database installer.
Example	rms01app

Field Title	PRICING/RMS 19 schema password
Field Description	Password for the RMS database user entered above to access the PRICING tables.

Field Title	RMS 19 schema owner
Field Description	Database user which owns the RMS and PRICING tables. This is usually the same as the RMS 19 schema above.
Example	rms01

Field Title	PRICING/RMS 19 schema alias
Field Description	The alias to store the schema credentials.
Example	db-alias
Notes	This alias must be unique. Do not use the same value for any other alias fields in the installer. If the same alias is used, entries in the wallet can override each other and cause problems with the application.

Screen: Secure Data Source Details



Note: This screen will appear only if you select Secure JDBC in the above screens.

Field Title	Identity Keystore
Field Description	Keystores ensure the secure storage and management of private keys and trusted certificate authorities (CAs). This screen lets you provide the keystore to be used for datasource connection These settings help you to manage the security of message transmissions. For further information, please refer to the *Oracle Retail Merchandising Operations Management Security Guide*. Location or path where identity keystore file is stored.
Example	/path/sample.keystore

Field Title	Identity Keystore Type
Field Description	The type of the keystore used.
Example	JKS

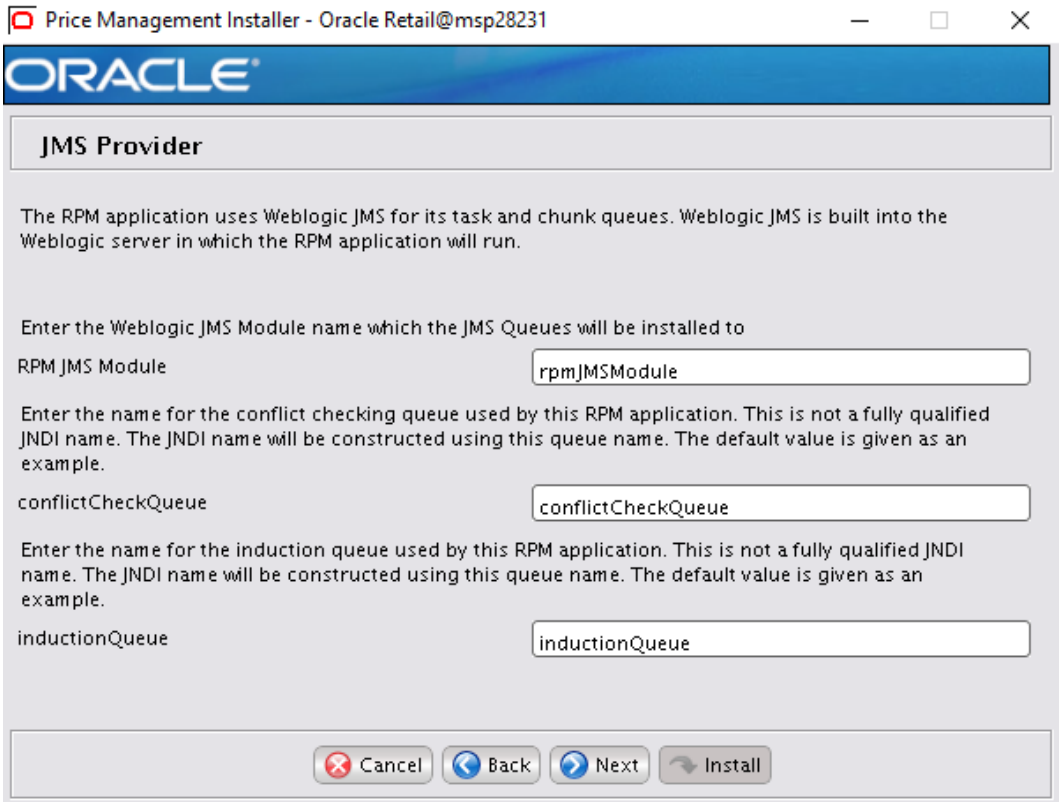
Field Title	Identity Keystore PassPhrase
Field Description	Please provide password to access the keystore mentioned above.

Field Title	Identity TrustStore
Field Description	This is the path of the keystore which contains the ssl root and optionally intermediate certificates as obtained from the certificate authority.
Example	/path/test.keystore

Field Title	Identity TrustStore Type
Field Description	The type of the truststore used
Example	JKS

Field Title	Identity TrustStore PassPhrase
Field Description	Please provide password to access the truststore mentioned above.

Screen: JMS Provider



Field Title	PRICING JMS Module
Field Description	The WebLogic JMS Module name to which the JMS Queues will be installed.
Example	rpmJMSModule

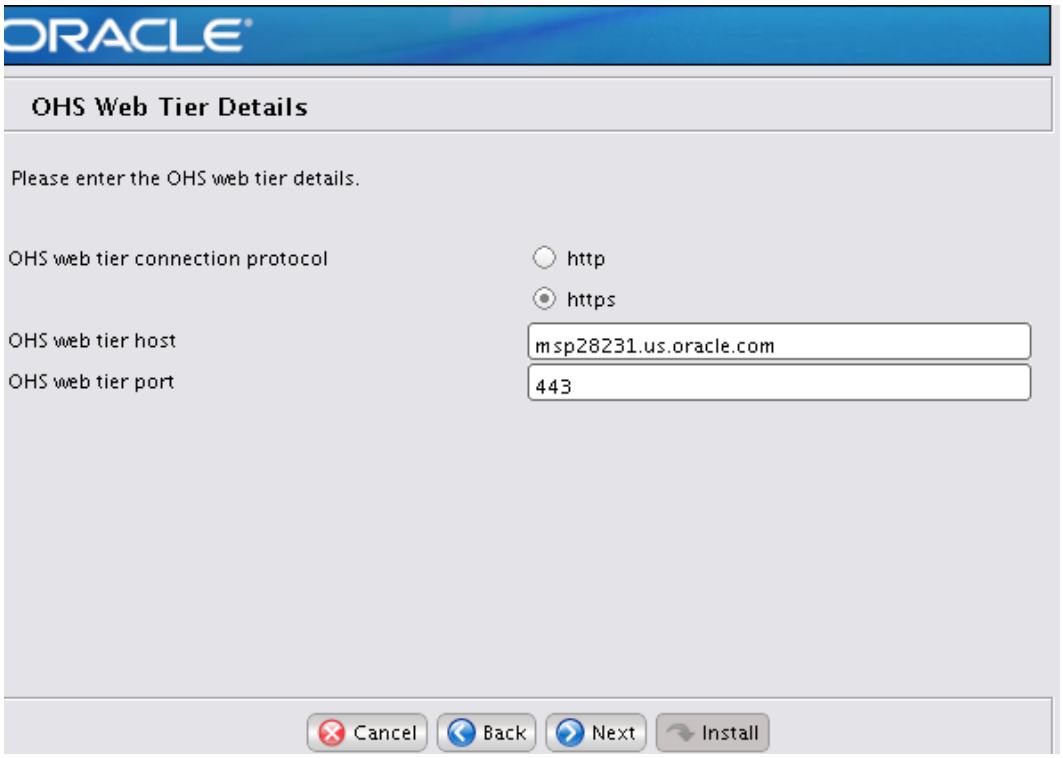
Screen: Queue Details

Field Title	conflictCheckQueueQueue Name
Field Description	This queue is used for processing conflict checking.(without the jms/ prefix).
Example	conflictCheckQueue

Field Title	inductionQueueName
Field Description	This queue is used during induction upload from UI.
Example	inductionQueue

Screen Single Sign-On Details

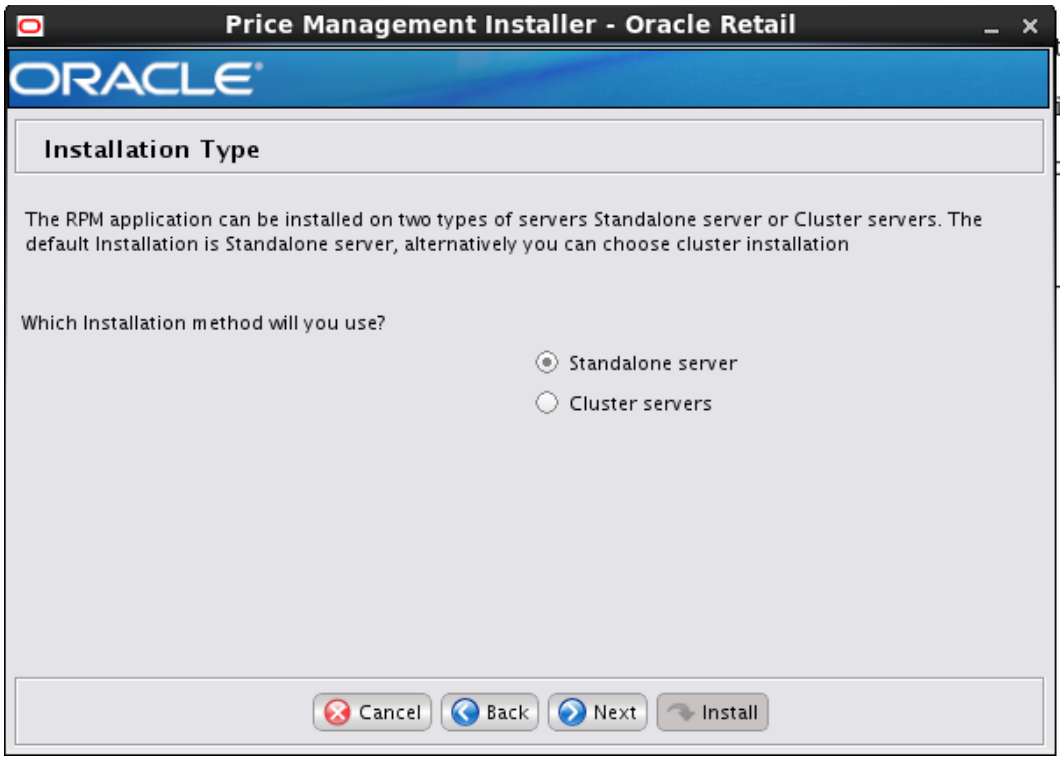
Note: This screen will only be displayed if SSO option was selected in previous step.



Field Title	OSSO Web Tier Server
Field Description	This should have the host name on which the web tier is deployed on.
Example	Appserver1.us.oracle.com

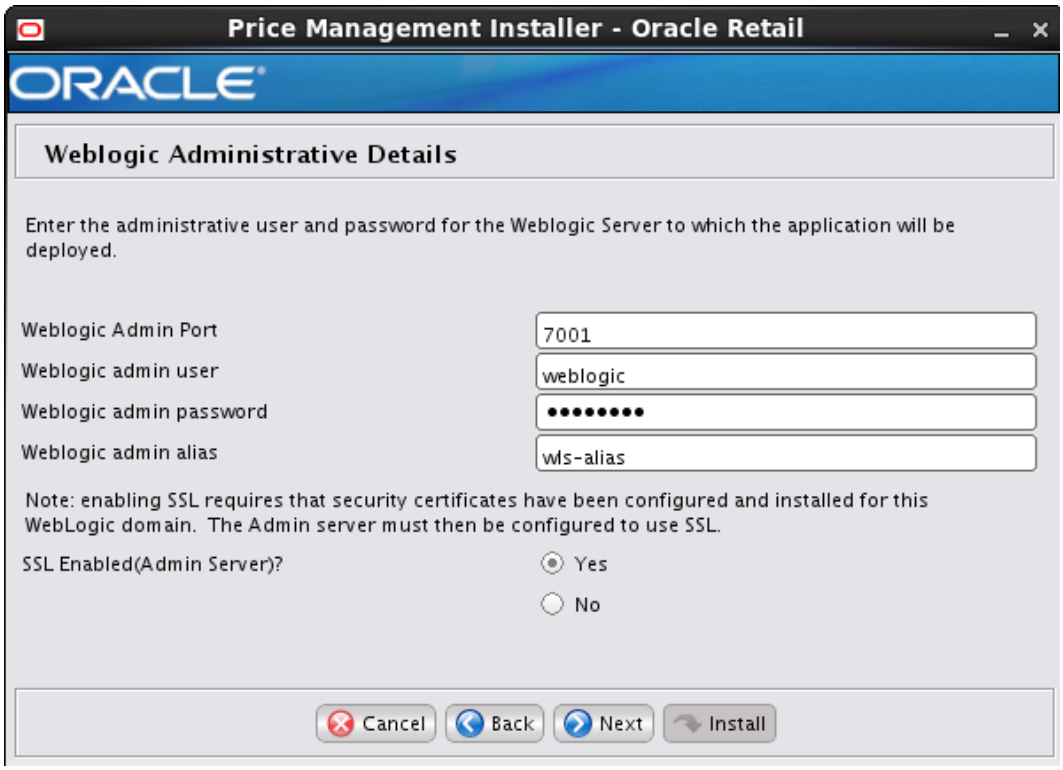
Field Title	OSS Web Tier port
Field Description	The HTTP/HTTPS port of the webtier installation must be mentioned here.
Example	18888

Screen: Installation Type



Field Title	Installation type
Field Description	The default installation type is standalone server. Alternatively you can choose cluster installation.

Screen: WebLogic Administrative Details



Field Title	Weblogic Admin Port
Field Description	The port number of the application server.
Example	7132

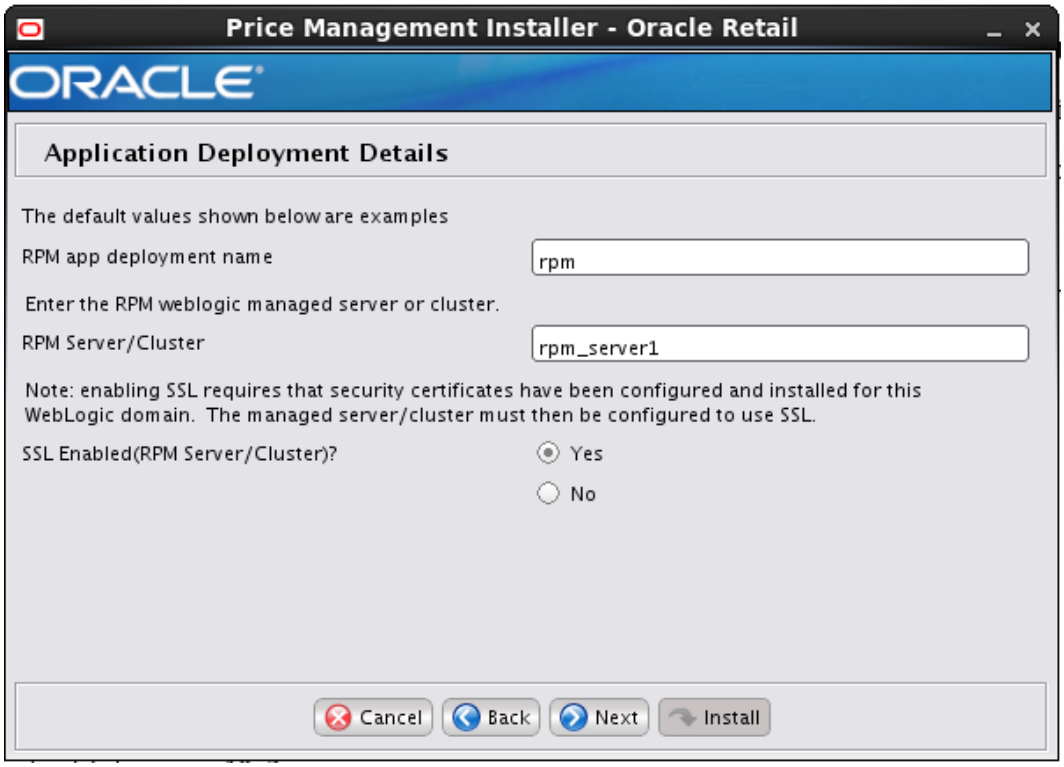
Field Title	WebLogic admin user
Field Description	Username of the admin user for the WebLogic instance to which the PRICING application is being deployed.
Example	Weblogic

Field Title	WebLogic admin password
Field Description	Password for the WebLogic admin user. You chose this password when you created the WebLogic instance or when you started the instance for the first time.

Field Title	WebLogic admin alias
Field Description	An alias for the WebLogic admin user that is used for ORACLE java wallet.
Example	wls-alias
Notes	This alias must be unique. Do not use the same value for any other alias fields in the installer. If the same alias is used, entries in the wallet can override each other and cause problems with the application.

Field Title	SSL enabled admin server
Field Description	Yes- if Admin server is ssl enabled No – if server is not ssl enabled

Screen: Application Deployment Details



Field Title	PRICING app deployment name
Field Description	Name by which this PRICING application is identified in the application server.
Example	Pricing16

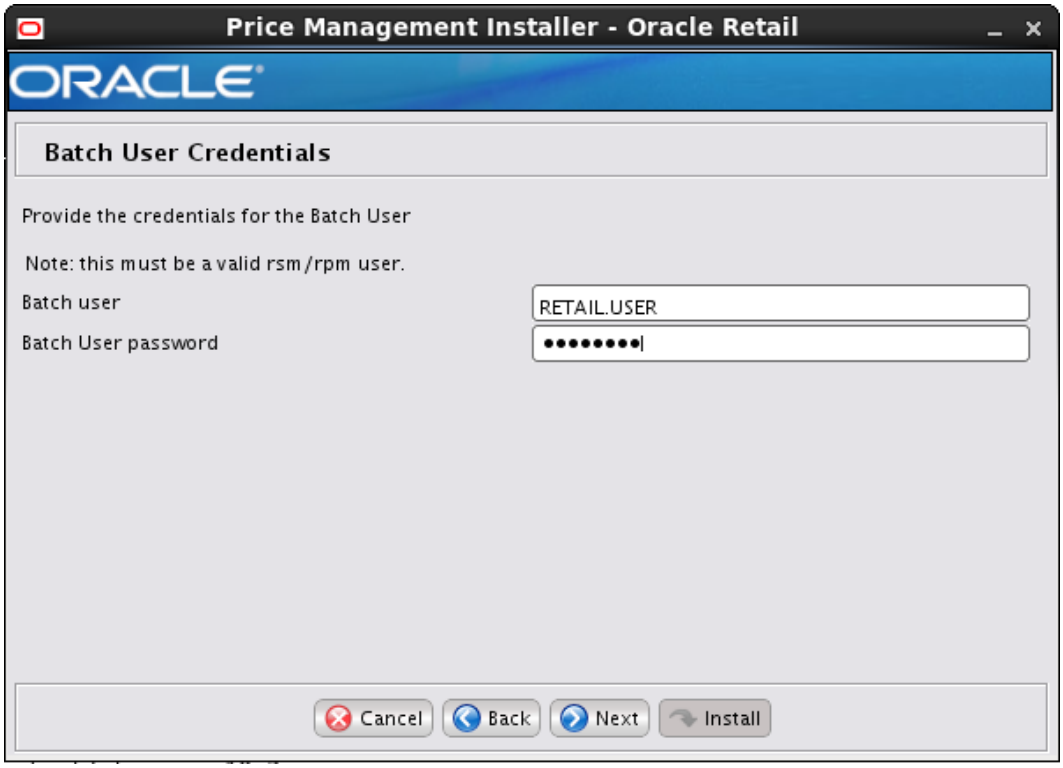
Field Title	PRICING 1server/cluster
Field Description	Name of the server/cluster that was created for this PRICING application. The installer deploys the PRICING application to all instances that are members of this server/cluster. For this reason, you should not use default_group. A new group dedicated to PRICING should be created instead.
Example	Pricing_server1

Field Title	SSL enabled PRICING server/cluster
Field Description	Yes, if the managed server/clusted is ssl enabled. No, otherwise

Screen: Turn off the application managed server/cluster's non-ssl port

Field Title	Disable non-ssl port
Field Description	A value of "Yes" indicates that the application managed server/cluster's non-SSL port will be inactive. A value of No indicates that the application managed server/cluster's non-ssl port will still be active

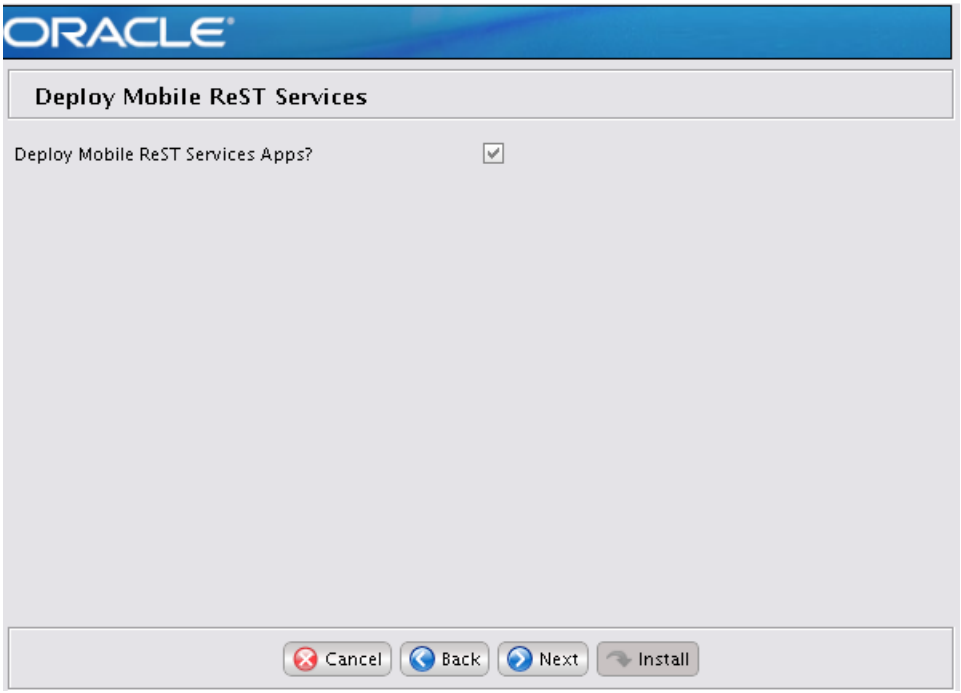
Screen: Batch User Credentials



Field Title	Batch User
Field Description	The PRICING user name of the person running PRICING batch. It must be a valid PRICING user that will be coming through LDAP.
Example	RETAIL.USER

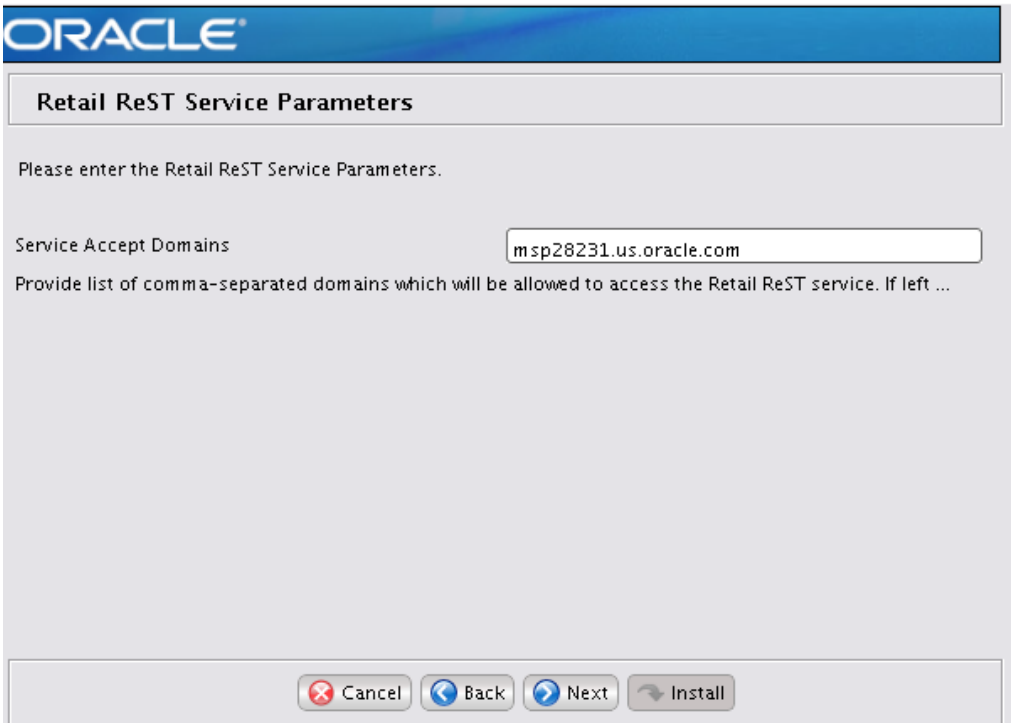
Field Title	Batch User Password
Field Description	The password of the batch user.

Screen : Deploy Mobile ReST Services



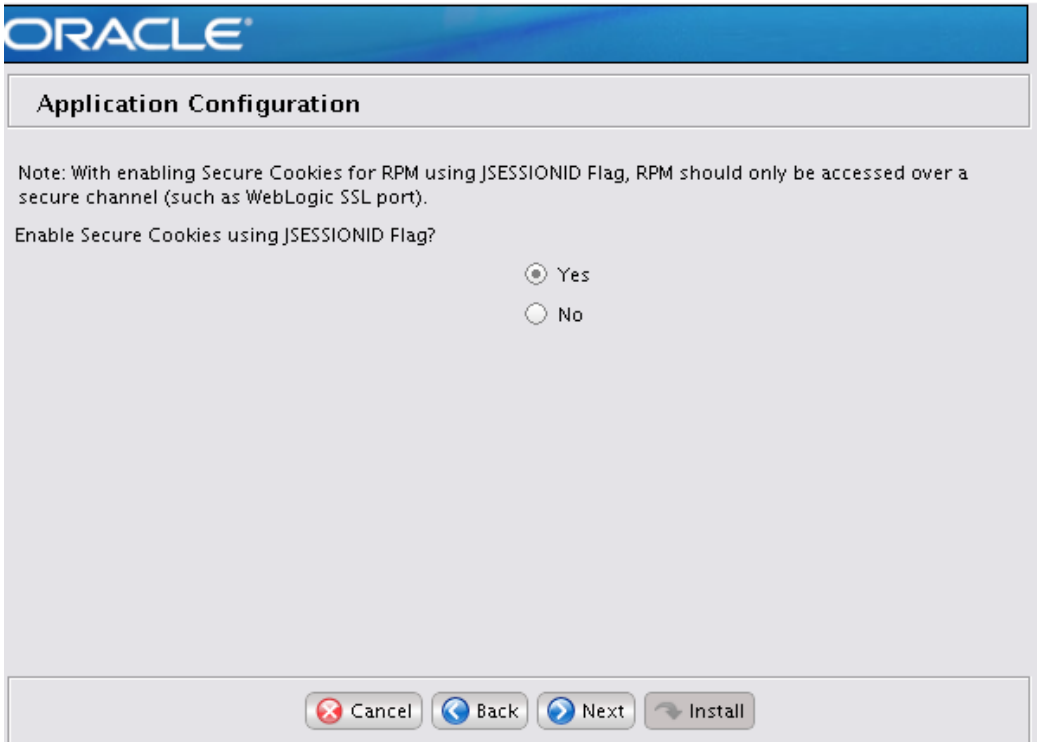
Make the selection whether to deploy the rest service or not.

Screen: Retail ReST Service Parameters

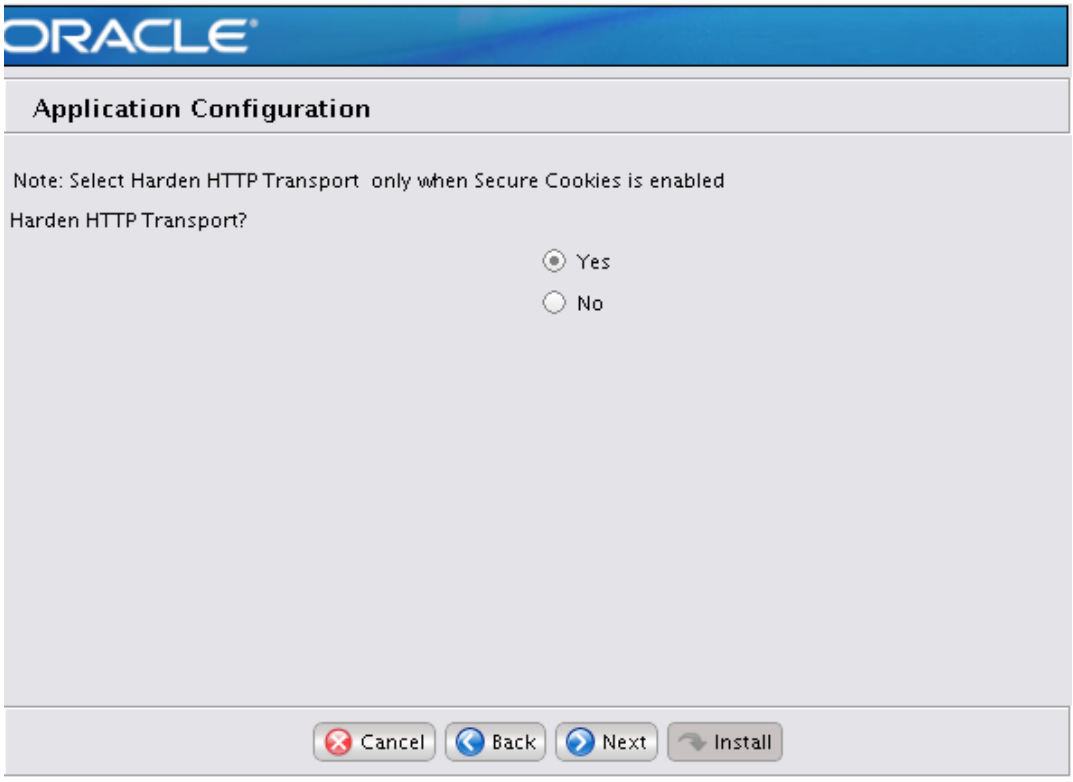


Enter the list of domain names comma separated. The above one is an example.

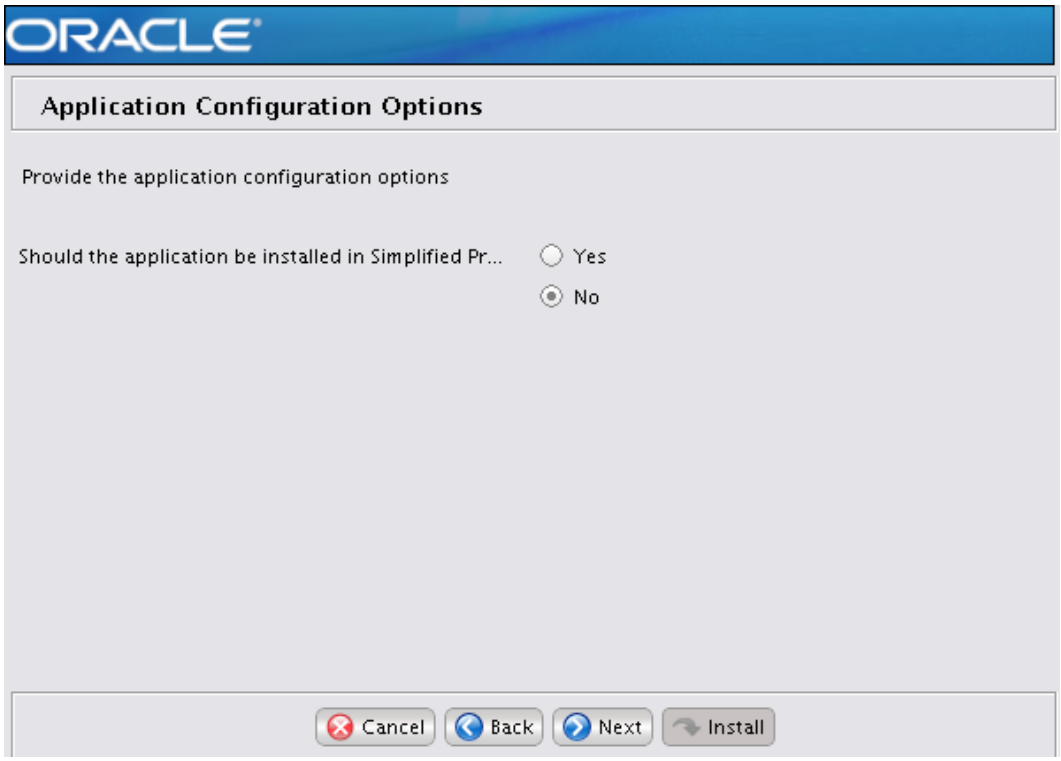
Screen: Application Configuration



Screen: Application Configuration

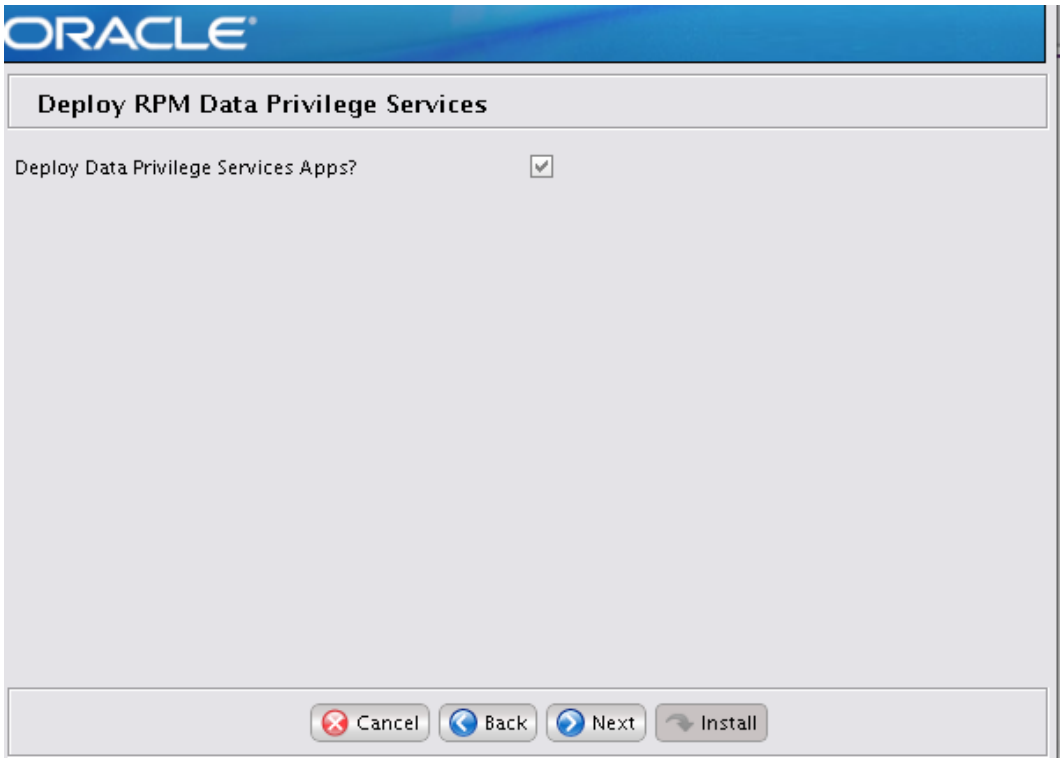


Screen: Application Configuration Options



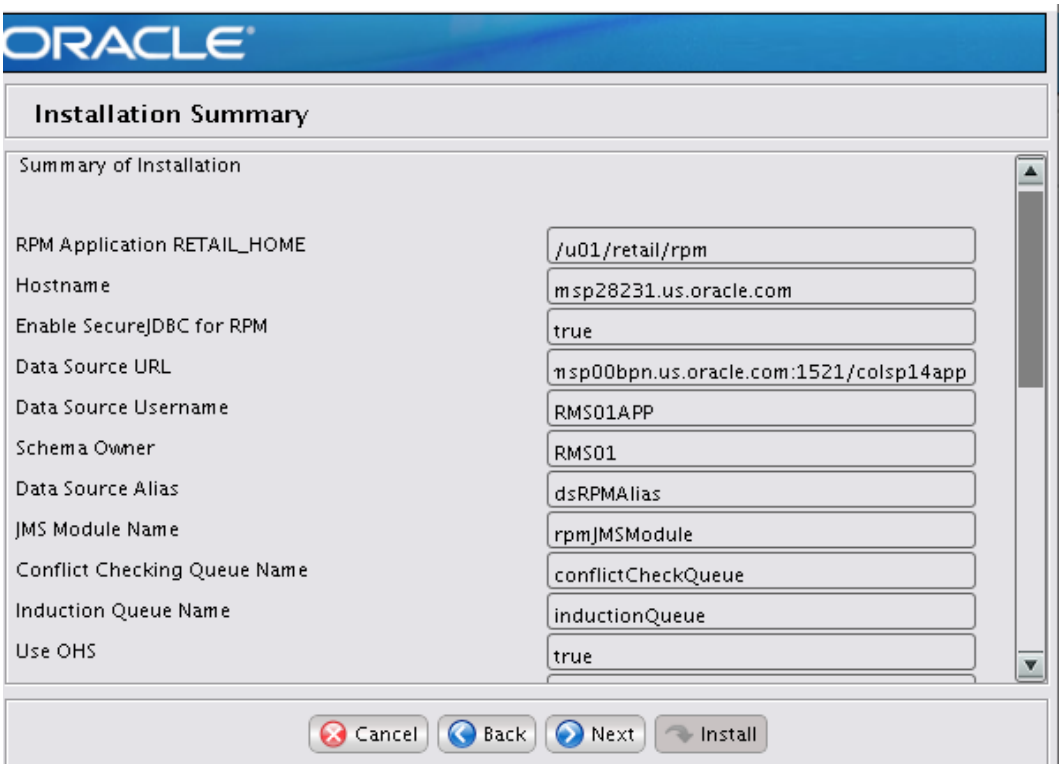
Make the appropriate selection based on the licensing

Screen: Deploy Pricing Data Privileges Services

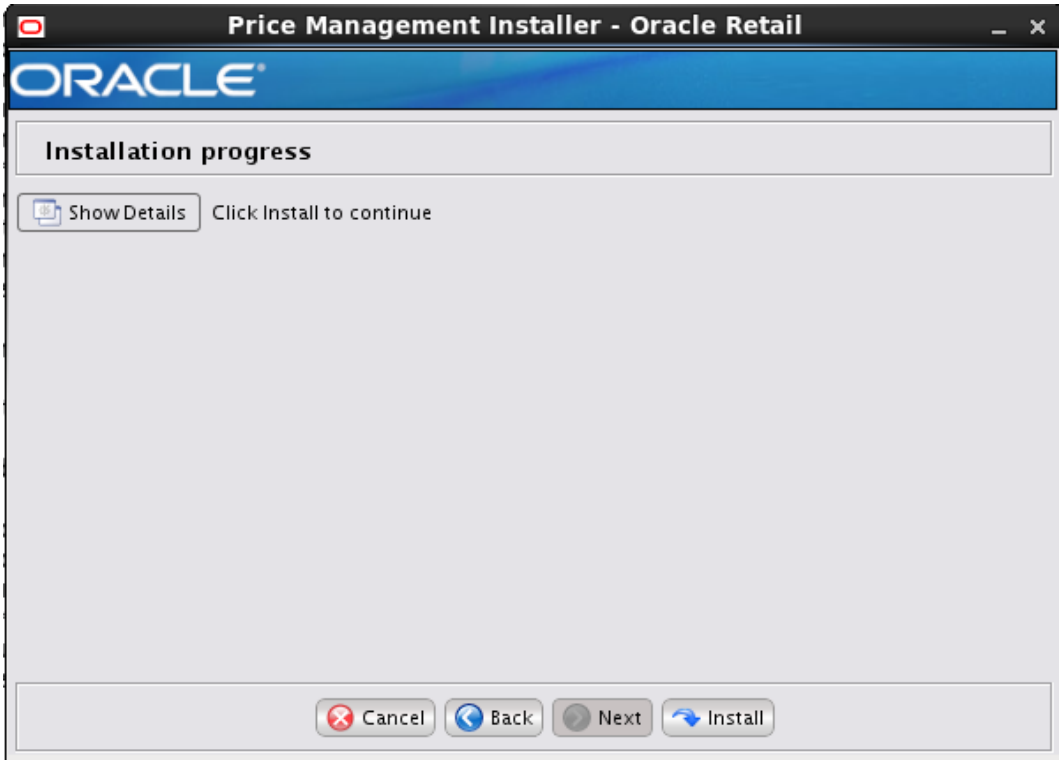


User sensitive data can be masked through the services provided by this feature.

Screen: Installation Summary



Screen: Installation Progress



B

Appendix: Analyze Tool

It may be desirable to see a list of the files that will be updated by a patch, particularly if files in the environment have been customized. The installer has an 'analyze' mode that will evaluate all files in the patch against the environment and report on the files that will be updated based on the patch. See the section "Analyzing the Impact of a Patch" in the chapter "Patching Procedures" for more details.

Run the Analyze Tool

1. Log onto the server as a user with access to the RETAIL_HOME for the installation you want to analyze.
2. Change directories to STAGING_DIR/Pricing/application. STAGING_DIR is the location where you extracted the installer.
3. Set and export the following environment variables.

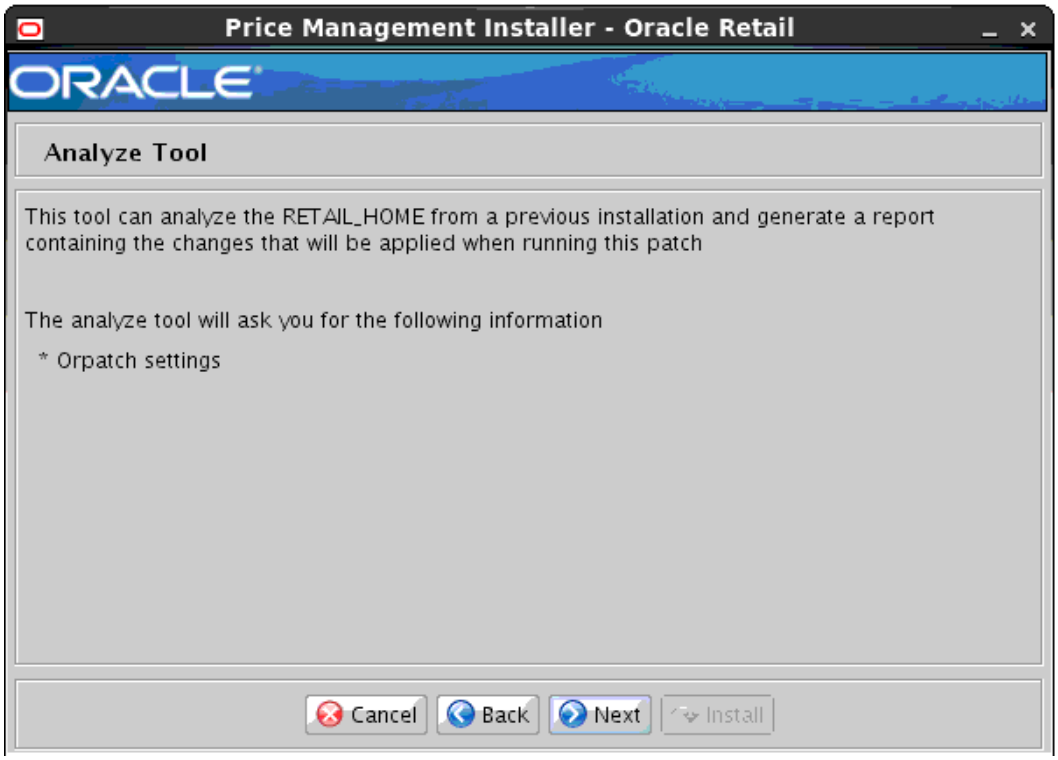
Variable	Description	Example
JAVA_HOME	Location of a Java 1.7+ 64Bit JDK.	JAVA_HOME= /u00/webadmin/java/jdk1.7.0 export JAVA_HOME
DISPLAY	Address and port of X server on desktop system of user running install. Optional when running the Analyze tool	DISPLAY=<IP address>:0.0 export DISPLAY

4. If you are going to run the installer in GUI mode using an X server, you need to have the XTEST extension enabled. This setting is not always enabled by default in your X server. See Appendix: Common Installation Errors for more details.
5. Run the analyze.sh script to start the analyze tool.

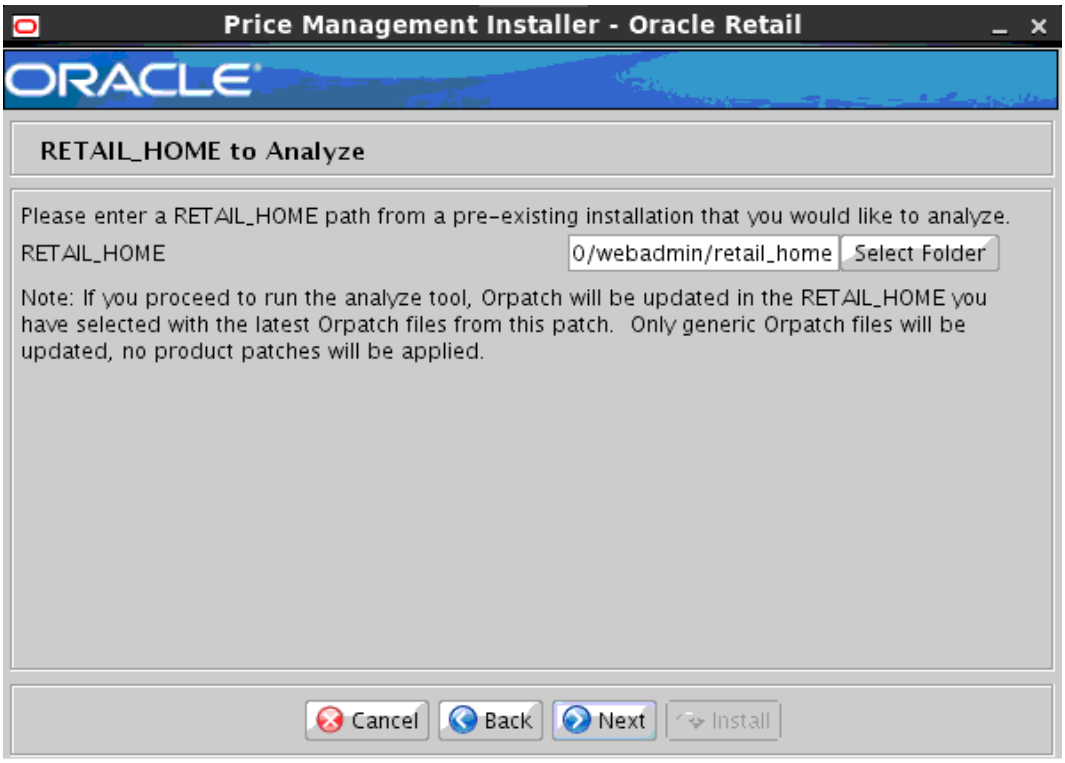
> **Note:** Below are the usage details for analyze.sh. The typical usage for GUI mode is no arguments.
>
> ./analyze.sh [text | silent]

Screen: Introduction Screen

Screen: Analyze Tool

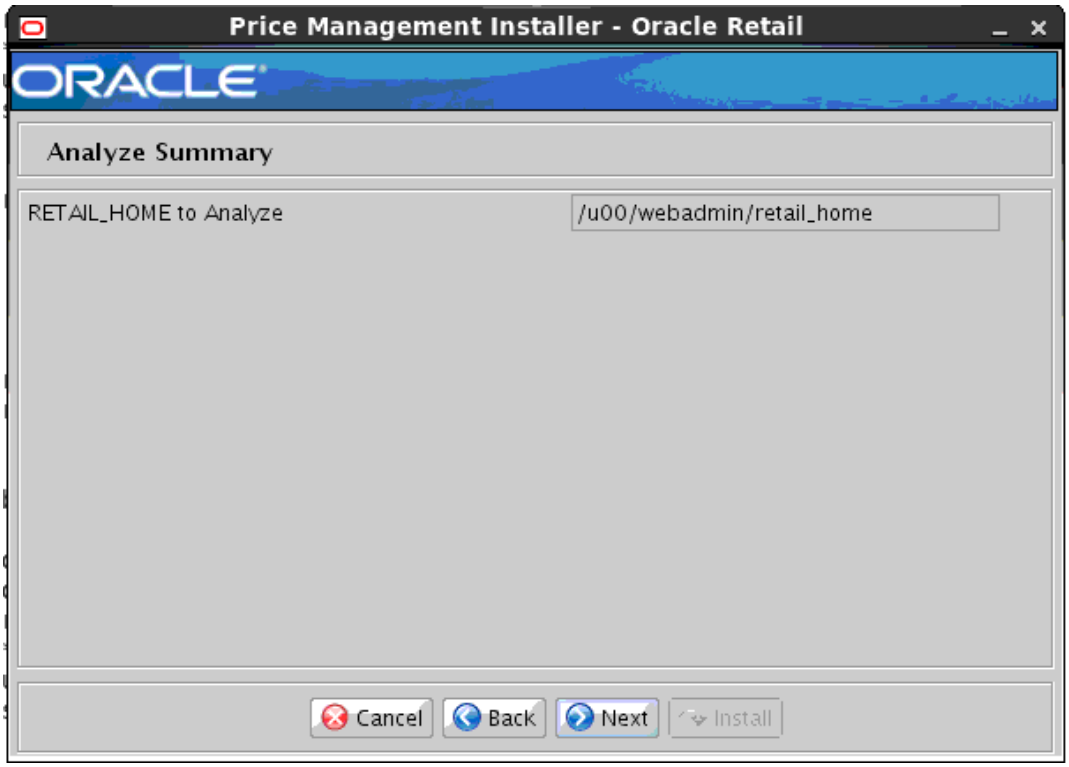


Screen: Analyze Retail Home



Field Title	PRICING Application RETAIL HOME
Field Description	The pre-existing RETAIL_HOME location created and used during PRICING installation. This location should contain directories with your installed files as well as the "orpatch" directory.
Examples	/path/to/Pricing_retail_home

Screen: Analyze Screen



C

Appendix: Installer Silent Mode

Once you have a managed server that is configured and started, you can run the PRICING application installer. This installer configures and deploys the PRICING application.

> **Note:** It is recommended that the installer be run as the same UNIX account which owns the application server ORACLE_HOME files.

1. Change directories to INSTALL_DIR/Pricing/application.
2. Set the ORACLE_HOME, JAVA_HOME, and WEBLOGIC_DOMAIN_HOME environment variables. ORACLE_HOME should point to your WebLogic installation. . JAVA_HOME should point to the Java JDK 1.8+. This is typically the same JDK which is being used by the WebLogic domain where Application is getting installed. WEBLOGIC_DOMAIN_HOME should point to the full path of the domain into which PRICING will be installed.
3. If a secured datasource is going to be configured you also need to set "ANT_OPTS" so the installer can access the key and trust store that is used for the datasource security:

   ```
   export ANT_OPTS="-Djavax.net.ssl.keyStore=<PATH TO KEY STORE> -
   Djavax.net.ssl.keyStoreType=jks -Djavax.net.ssl.keyStorePassword=<KEYSTORE
   PASSWORD> -Djavax.net.ssl.trustStore=<PATH TO TRUST STORE> -
   Djavax.net.ssl.trustStoreType=jks -
   Djavax.net.ssl.trustStorePassword=<TRUSTSTORE PASSWORD>"
   ```

   An example of this would be:

   ```
   export ANT_OPTS="-
   Djavax.net.ssl.keyStore/u00/webadmin/product/identity.keystore -
   Djavax.net.ssl.keyStoreType=jks -Djavax.net.ssl.keyStorePassword=retail123 -
   Djavax.net.ssl.trustStore/u00/webadmin/product/identity.truststore -
   Djavax.net.ssl.trustStoreType=jks -
   Djavax.net.ssl.trustStorePassword==<TRUSTSTORE PASSWORD>"
   ```

   - Copy the ant.install.properties.sample to ant.install.properties. Provide values for each property including the passwords.
   - Run the installation command "./install.sh silent". This launches the installer in silent mode. A detailed installation log file is created (Pricinginstall.<timestamp>.log).

D

Appendix: Common Installation Errors

This section provides some common errors encountered during installation of PRICING.

Unreadable buttons in the Installer

If you are unable to read the text within the installer buttons, it could mean that your JAVA_HOME is pointed to an older version of the JDK that is supported by the installer. "Set JAVA_HOME with the appropriate JDK (the same jdk that has been used by WebLogic Server)."

Warning: Could not find X Input Context

Symptom

The following text appears in the console window during execution of the installer in GUI mode:

```
Couldn't find X Input Context
```

Solution

This message is harmless and can be ignored.

GUI screens fail to open when running Installer

Symptom

When running the installer in GUI mode, the screens fail to open and the installer ends, returning to the console without an error message. The ant.install.log file contains this error:

```
Fatal exception: Width (0) and height (0) cannot be <= 0
java.lang.IllegalArgumentException: Width (0) and height (0) cannot be <= 0
```

Solution

This error is encountered when Antinstaller is used in GUI mode with certain X Servers. To work around this issue, copy ant.install.properties.sample to ant.install.properties and rerun the installer.

E

Appendix: URL Reference

The application installer for the PRICING product asks for several different URLs. These include the following.

JDBC URL for a Database

Used by the Java application and by the installer to connect to the database.

Thick Client Syntax: jdbc:oracle:oci:@<sid>

<sid>: system identifier for the database

Example: jdbc:oracle:oci:@mysid

Thin Client Syntax: jdbc:oracle:thin:@<host>:<port>/<sid>

<host>: hostname of the database server

<port>: database listener port

<sid>: system identifier for the database

Example: jdbc:oracle:thin:@myhost:1521/mysid

JNDI Provider URL for an Application

Used by the application client to access the application running in the server. This is also used by other applications for server-to-server calls.

Syntax: t3://<host>:<port>:/<app>

- <host>: hostname of the WebLogic environment
- <port>: Port of the managed server to which Pricing has been deployed. This can be found in the <WEBLOGIC_DOMAIN_HOME>/config/config.xml file.
- <app>: Deployment name for the application.

Example: t3:/myhost:17011/Pricing16**Note:** The JNDI provider URL can have a different format depending on your cluster topology. Consult the WebLogic documentation.

F

Appendix: Setting Up Password Stores with wallets/credential stores

As part of an application installation, administrators must set up password stores for user accounts using wallets/credential stores. Some password stores must be installed on the application database side. While the installer handles much of this process, the administrators must perform some additional steps.

Password stores for the application and application server user accounts must also be installed; however, the installer takes care of this entire process.

ORACLE Retail Merchandising applications now have 3 different types of password stores. They are database wallets, java wallets, and database credential stores. Background and how to administer them below are explained in this appendix

About Database Password Stores and Oracle Wallet

Oracle databases have allowed other users on the server to see passwords, just in case database connect strings (username/password@db) were passed to programs. In the past, users could navigate to `ps –ef|grep <username>` to see the password if the password was supplied in the command line when calling a program.

To make passwords more secure, Oracle Retail has implemented the Oracle Software Security Assurance (OSSA) program. Sensitive information such as user credentials now must be encrypted and stored in a secure location. This location is called password stores or wallets. These password stores are secure software containers that store the encrypted user credentials.

Users can retrieve the credentials using aliases that were set up when encrypting and storing the user credentials in the password store. For example, if `username/password@db` is entered in the command line argument and the alias is called `db_username`, the argument to a program is as follows:

```
sqlplus /@db_username
```

This would connect to the database as it did previously, but it would hide the password from any system user.

After this is configured, as in the example above, the application installation and the other relevant scripts are no longer needed to use embedded usernames and passwords. This reduces any security risks that may exist because usernames and passwords are no longer exposed.

When the installation starts, all the necessary user credentials are retrieved from the Oracle Wallet based on the alias name associated with the user credentials.

There are three different types of password stores. One type explain in the next section is for database connect strings used in program arguments (such as `sqlplus /@db_username`). The others are for Java application installation and application use.

Setting Up Password Stores for Database User Accounts

After the database is installed and the default database user accounts are set up, administrators must set up a password store using the Oracle wallet. This involves assigning an alias for the username and associated password for each database user account. The alias is used later during the application installation. This password store must be created on the system where the application server and database client are installed.

This section describes the steps you must take to set up a wallet and the aliases for the database user accounts. For more information on configuring authentication and password stores, see the *Oracle Database Security Guide*.

> **Note:** In this section, `<wallet_location>` is a placeholder text for illustration purposes. Before running the command, ensure that you specify the path to the location where you want to create and store the wallet.

To set up a password store for the database user accounts, perform the following steps:

1. Create a wallet using the following command:

   ```
   mkstore -wrl <wallet_location> -create
   ```

   After you run the command, a prompt appears. Enter a password for the Oracle Wallet in the prompt.

   > **Note:** The `mkstore` utility is included in the Oracle Database Client installation.

   The wallet is created with the auto-login feature enabled. This feature enables the database client to access the wallet contents without using the password. For more information, refer to the *Oracle Database Advanced Security Administrator's Guide.*

2. Create the database connection credentials in the wallet using the following command:

   ```
   mkstore -wrl <wallet_location> -createCredential <alias-name> <database-user-name>
   ```

   After you run the command, a prompt appears. Enter the password associated with the database user account in the prompt.

3. Repeat Step 2 for all the database user accounts.

4. Update the sqlnet.ora file to include the following statements:

   ```
   WALLET_LOCATION = (SOURCE = (METHOD = FILE) (METHOD_DATA = (DIRECTORY = <wallet_location>)))
   SQLNET.WALLET_OVERRIDE = TRUE
   SSL_CLIENT_AUTHENTICATION = FALSE
   ```

5. Update the tnsnames.ora file to include the following entry for each alias name to be set up.

   ```
   <alias-name> =
       (DESCRIPTION =
        (ADDRESS_LIST =
               (ADDRESS = (PROTOCOL = TCP) (HOST = <host>) (PORT = <port>))
           )
           (CONNECT_DATA =
               (SERVICE_NAME = <service>)
            )
        )
   ```

In the previous example, <alias-name>, <host>, <port>, and <service> are placeholder text for illustration purposes. Ensure that you replace these with the relevant values.

Setting up Wallets for Database User Accounts

The following examples show how to set up wallets for database user accounts for the following applications:

- For RMS, RWMS, PRICING Batch using sqlplus or sqlldr, RETL, RMS and RWMS

For RMS, RWMS, PRICING Batch using sqlplus or sqlldr, RETL, RMS, RWMS, and ARI

To set up wallets for database user accounts, do the following.

1. Create a new directory called wallet under your folder structure.

```
cd /projects/rms16/dev/
mkdir .wallet
```

> **Note:** The default permissions of the wallet allow only the owner to use it, ensuring the connection information is protected. If you want other users to be able to use the connection, you must adjust permissions appropriately to ensure only authorized users have access to the wallet.

2. Create a sqlnet.ora in the wallet directory with the following content.

```
WALLET_LOCATION =   (SOURCE =     (METHOD = FILE)     (METHOD_DATA =
(DIRECTORY =  /projects/rms16/dev/.wallet)) )
SQLNET.WALLET_OVERRIDE=TRUE
SSL_CLIENT_AUTHENTICATION=FALSE
```

> **Note**: WALLET_LOCATION must be on line 1 in the file.

3. Setup a tnsnames.ora in the wallet directory. This tnsnames.ora includes the standard tnsnames.ora file. Then, add two custom tns_alias entries that are only for use with the wallet. For example, `sqlplus /@dvols29_rms01user`.

```
ifile = /u00/oracle/product/19.3.0.0/network/admin/tnsnames.ora

Examples for a NON pluggable db:
dvols29_rms01user =
  (DESCRIPTION = (ADDRESS_LIST = (ADDRESS = (PROTOCOL = tcp)
  (host = xxxxxx.us.oracle.com) (Port = 1521)))
    (CONNECT_DATA = (SID = <sid_name> (GLOBAL_NAME = <sid_name>)))

dvols29_rms01user.world =
  (DESCRIPTION = (ADDRESS_LIST = (ADDRESS = (PROTOCOL = tcp)
  (host = xxxxxx.us.oracle.com) (Port = 1521)))
    (CONNECT_DATA = (SID = <sid_name>) (GLOBAL_NAME = <sid_name>)))

Examples for a pluggable db:
dvols29_rms01user =
  (DESCRIPTION = (ADDRESS_LIST = (ADDRESS = (PROTOCOL = tcp)
  (host = xxxxxx.us.oracle.com) (Port = 1521)))
    (CONNECT_DATA = (SERVICE_NAME = <pluggable db name>)))

dvols29_rms01user.world =
  (DESCRIPTION = (ADDRESS_LIST = (ADDRESS = (PROTOCOL = tcp)
  (host = xxxxxx.us.oracle.com) (Port = 1521)))
    (CONNECT_DATA = (SERVICE_NAME = <pluggable db name>)))
```

Note: It is important to not just copy the tnsnames.ora file because it can quickly become out of date. The ifile clause (shown above) is key.

4. Create the wallet files. These are empty initially.
   a. Ensure you are in the intended location.
      ```
      $ pwd
      /projects/rms16/dev/.wallet
      ```
   b. Create the wallet files.
      ```
      $ mkstore -wrl . -create
      ```
   c. Enter the wallet password you want to use. It is recommended that you use the same password as the UNIX user you are creating the wallet on.
   d. Enter the password again.

      Two wallet files are created from the above command:
      - ewallet.p12
      - cwallet.sso
5. Create the wallet entry that associates the user name and password to the custom tns alias that was setup in the wallet's tnsnames.ora file.
   ```
   mkstore -wrl . -createCredential <tns_alias> <username> <password>
   ```

Example: `mkstore -wrl . -createCredential dvols29_rms01user rms01user passwd`

6. Test the connectivity. The ORACLE_HOME used with the wallet must be the same version or higher than what the wallet was created with.
   ```
   $ export TNS_ADMIN=/projects/rms16/dev/.wallet /* This is very import to use
   wallet to point at the alternate tnsnames.ora created in this example */

   $ sqlplus /@dvols29_rms01user

   SQL*Plus: Release 12

   Connected to:
   Oracle Database 12g

   SQL> show user
   USER is "rms01user"
   ```

   Running batch programs or shell scripts would be similar:

   ```
   Ex: dtesys /@dvols29_rms01user
   script.sh /@dvols29_rms01user

   Set the UP unix variable to help with some compiles :

   export UP=/@dvols29_rms01user
   for use in RMS batch compiles, and RMS, RWMS, and ARI forms compiles.
   ```

As shown in the example above, users can ensure that passwords remain invisible.

Additional Database Wallet Commands

The following is a list of additional database wallet commands.

- Delete a credential on wallet

```
mkstore –wrl . –deleteCredential dvols29_rms01user
```

- Change the password for a credential on wallet

```
mkstore –wrl . –modifyCredential dvols29_rms01user rms01user passwd
```

- List the wallet credential entries

```
mkstore –wrl . –list
```

This command returns values such as the following.

```
oracle.security.client.connect_string1
oracle.security.client.user1
oracle.security.client.password1
```

- View the details of a wallet entry

```
mkstore –wrl . –viewEntry oracle.security.client.connect_string1
```

Returns the value of the entry:

```
dvols29_rms01user
mkstore –wrl . –viewEntry oracle.security.client.user1
```

Returns the value of the entry:

```
rms01user

mkstore –wrl . –viewEntry oracle.security.client.password1
```

Returns the value of the entry:

```
Passwd
```

Setting up RETL Wallets

RETL creates a wallet under $RFX_HOME/etc/security, with the following files:

- cwallet.sso
- jazn-data.xml
- jps-config.xml
- README.txt

To set up RETL wallets, perform the following steps:

1. Set the following environment variables:
   - `ORACLE_SID=<retaildb>`
   - `RFX_HOME=/u00/rfx/rfx-13`
   - `RFX_TMP=/u00/rfx/rfx-13/tmp`
   - `JAVA_HOME=/usr/jdk1.6.0_12.64bit`
   - `LD_LIBRARY_PATH=$ORACLE_HOME`
   - `PATH=$RFX_HOME/bin:$JAVA_HOME/bin:$PATH`
2. Change directory to $RFX_HOME/bin.
3. Run setup-security-credential.sh.
   - Enter 1 to add a new database credential.
   - Enter the dbuseralias. For example, `retl_java_rms01user`.
   - Enter the database user name. For example, `rms01user`.
   - Enter the database password.
   - Re-enter the database password.
   - Enter D to exit the setup script.

4. Update your RETL environment variable script to reflect the names of both the Oracle Networking wallet and the Java wallet.

   For example, to configure RETLforRPAS, modify the following entries in `$RETAIL_HOME/RETLforRPAS/rfx/etc/rmse_rpas_config.env`.

   - The RETL_WALLET_ALIAS should point to the Java wallet entry:
     - `export RETL_WALLET_ALIAS="retl_java_rms01user"`
   - The ORACLE_WALLET_ALIAS should point to the Oracle network wallet entry:
     - `export ORACLE_WALLET_ALIAS="dvols29_rms01user"`
   - The SQLPLUS_LOGON should use the ORACLE_WALLET_ALIAS:
     - `export SQLPLUS_LOGON="/@${ORACLE_WALLET_ALIAS}"`
5. To change a password later, run `setup-security-credential.sh`.
   - Enter 2 to update a database credential.
   - Select the credential to update.
   - Enter the database user to update or change.
   - Enter the password of the database user.
   - Re-enter the password.

For Java Applications (SIM, ReIM, PRICING, RIB, AIP, Alloc, ReSA, RETL)

For Java applications, consider the following:

- For database user accounts, ensure that you set up the same alias names between the password stores (database wallet and Java wallet). You can provide the alias name during the installer process.
- Document all aliases that you have set up. During the application installation, you must enter the alias names for the application installer to connect to the database and application server.
- Passwords are not used to update entries in Java wallets. Entries in Java wallets are stored in partitions, or application-level keys. In each retail application that has been installed, the wallet is located in <WEBLOGIC_DOMAIN_HOME>/retail/<appname>/config Example: /u00/webadmin/config/domains/wls_retail/PRICINGDomain/retail/Pricing/config
- Application installers should create the Java wallets for you, but it is good to know how this works for future use and understanding.
- Scripts are located in <WEBLOGIC_DOMAIN_HOME>/retail/<appname>/retail-public-security-api/bin for administering wallet entries.
- Example:
- /u00/webadmin/config/domains/wls_retail/PRICINGDomain/retail/Pricing/retail-public-security-api/bin
- In this directory is a script to help you update each alias entry without having to remember the wallet details. For example, if you set the PRICING database alias to rms01user, you will find a script called update-RMS01USER.sh.

  Note: These scripts are available only with applications installed by way of an installer.

- Two main scripts are related to this script in the folder for more generic wallet operations: dump_credentials.sh and save_credential.sh.

- If you have not installed the application yet, you can unzip the application zip file and view these scripts in <app>/application/retail-public-security-api/bin.
- Example:
- /u00/webadmin/Pricing/application/Pricing/Build/orpatch/deploy/retail-public-security-api/bin

update-<ALIAS>.sh

update-<ALIAS>.sh updates the wallet entry for this alias. You can use this script to change the user name and password for this alias. Because the application refers only to the alias, no changes are needed in application properties files.

Usage:

```
update-<username>.sh <myuser>
```

Example:

```
/u00/webadmin/config/domains/wls_retail/PRICINGDomain/retail/Pricing/retail-
public-security-api/bin> ./update-RMS01USER.sh
usage: update-RMS01USER.sh <username>
<username>: the username to update into this alias.
Example: update-RMS01USER.sh myuser
Note: this script will ask you for the password for the username that you pass in.
/u00/webadmin/config/domains/wls_retail/PRICINGDomain/retail/Pricing/retail-
public-security-api/bin>
```

dump_credentials.sh

dump_credentials.sh is used to retrieve information from wallet. For each entry found in the wallet, the wallet partition, the alias, and the user name are displayed. Note that the password is not displayed. If the value of an entry is uncertain, run save_credential.sh to resave the entry with a known password.

```
dump_credentials.sh <wallet location>
```

Example:

```
dump_credentials.sh location:
/u00/webadmin/config/domains/wls_retail/PRICINGDomain/retail/Pricing/config

Retail Public Security API Utility
==========================================
```

Below are the credentials found in the wallet at the location/u00/webadmin/config/domains/wls_retail/PRICINGDomain/retail/Pricing/config

```
==========================================

Application level key partition name:Pricing
User Name Alias:WLS-ALIAS User Name:weblogic
User Name Alias:RETAIL-ALIAS User Name:retail.user
User Name Alias:LDAP-ALIAS User Name:RETAIL.USER
User Name Alias:RMS-ALIAS User Name:rms16mock
User Name Alias:REIMBAT-ALIAS User Name:Pricingbat
```

save_credential.sh

save_credential.sh is used to update the information in wallet. If you are unsure about the information that is currently in the wallet, use dump_credentials.sh as indicated above.

```
save_credential.sh -a <alias> -u <user> -p <partition name>  -l <path of the
wallet file location where credentials are stored>
```

Example:

```
/u00/webadmin/mock16_testing/Pricing16/application/retail-public-security-api/bin>
save_credential.sh -l wallet_test -a myalias -p mypartition -u myuser

==========================================
Retail Public Security API Utility
==========================================

Enter password:
Verify password:
```

Note: `-p` in the above command is for partition name. You must specify the proper partition name used in application code for each Java application.

save_credential.sh and dump_credentials.sh scripts are the same for all applications. If using save_credential.sh to add a wallet entry or to update a wallet entry, bounce the application/managed server so that your changes are visible to the application. Also, save a backup copy of your cwallet.sso file in a location outside of the deployment path, because redeployment or reinstallation of the application will wipe the wallet entries you made after installation of the application. To restore your wallet entries after a redeployment/reinstallation, copy the backed up cwallet.sso file over the cwallet.sso file. Then bounce the application/managed server.

Usage

```
==========================================
Retail Public Security API Utility
==========================================
usage: save_credential.sh -au[plh]
E.g. save_credential.sh -a rms-alias -u rms_user -p rib-rms -l ./
 -a,--userNameAlias <arg>              alias for which the credentials
needs to be stored
 -h,--help                             usage information
 -l,--locationofWalletDir <arg>        location where the wallet file is
created.If not specified, it creates the wallet under secure-credential-wallet
directory which is already present under the retail-public-security-api/
directory.
 -p,--appLevelKeyPartitionName <arg>   application level key partition name
 -u,--userName <arg>                   username to be stored in secure
credential wallet for specified alias*
```

How does the Wallet Relate to the Application?

The ORACLE Retail Java applications have the wallet alias information you create in an <app-name>.properties file. Below is the reim.properties file. Note the database information and the user are presented as well. The property called datasource.credential.alias=RMS-ALIAS uses the ORACLE wallet with the argument of RMS-ALIAS at the csm.wallet.path and csm.wallet.partition.name = Pricing to retrieve the password for application use.

Reim.properties code sample:

```
datasource.url=jdbc:oracle:thin:@xxxxxxx.us.oracle.com:1521:pkols07
datasource.schema.owner=rms16mock
datasource.credential.alias=RMS-ALIAS
# ===================================================================
# ossa related Configuration
#
# These settings are for ossa configuration to store credentials.
# ===================================================================

csm.wallet.path=/u00/webadmin/config/domains/wls_retail/PRICINGDomain/retail/Prici
ng/config
csm.wallet.partition.name=Pricing
```

How does the Wallet Relate to Java Batch Program use?

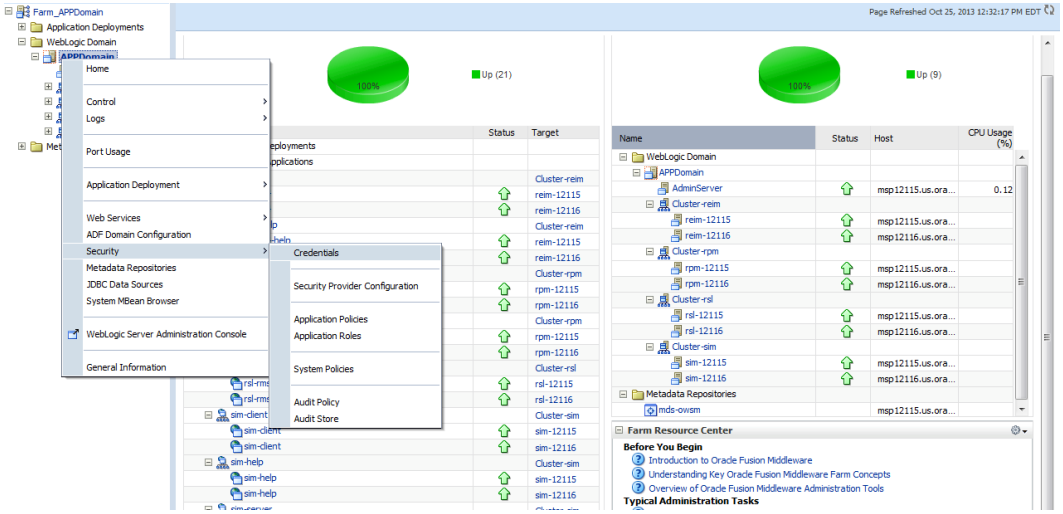
Some of the ORACLE Retail Java batch applications have an alias to use when running Java batch programs. For example, alias REIMBAT-ALIAS maps through the wallet to dbuser RMS01APP, already on the database. To run a ReIM batch program the format would be: reimbatchpgmname REIMBAT-ALIAS <other arguments as needed by the program in question>

Database Credential Store Administration

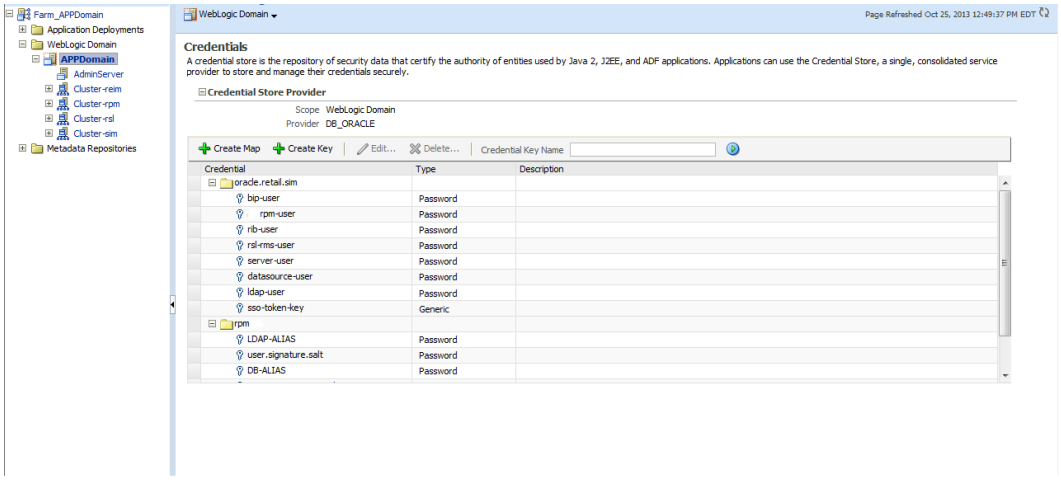
The following section describes a domain level database credential store. This is used in PRICING login processing, SIM login processing, RWMS login processing, RESA login processing and Allocation login processing and policy information for application permission. Setting up the database credential store is addressed in the PRICING, SIM, RESA, RWMS, and Alloc install guides.

The following sections show an example of how to administer the password stores thru ORACLE Enterprise Manger Fusion Middleware Control, a later section will show how to do this thru WLST scripts.

1. The first step is to use your link to Oracle Enterprise Manager Fusion Middleware Control for the domain in question. Locate your domain on the left side of the screen and do a right mouse click on the domain and select **Security > Credentials**

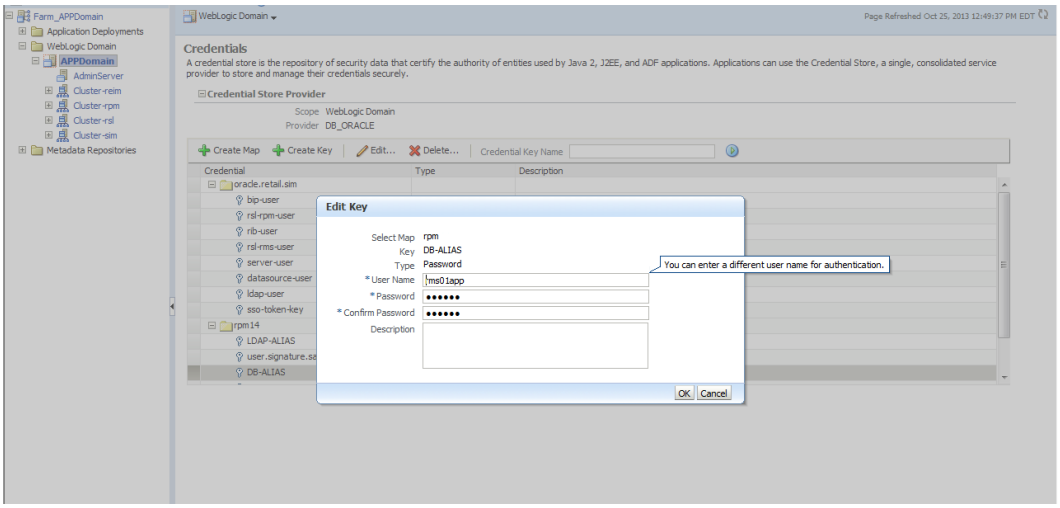


2. Click on Credentials and you will get a screen similar to the following. The following screen is expanded to make it make more sense. From here you can administer credentials.



The Create Map add above is to create a new map with keys under it. A map would usually be an application such as Pricing. The keys will usually represent alias to various users (database user, WebLogic user, LDAP user, etc). The application installer should add the maps so you should not often have to add a map.

Creation of the main keys for an application will also be built by the application installer. You will not be adding keys often as the installer puts the keys out and the keys talk to the application. You may be using EDIT on a key to see what user the key/alias points to and possibly change/reset its password. To edit a key/alias, highlight the key/alias in question and push the edit icon nearer the top of the page. You will then get a screen as follows:



The screen above shows the map (Pricing) that came from the application installer, the key (DB-ALIAS) that came from the application installer (some of the keys/alias are selected by the person who did the application install, some are hard coded by the application installer in question), the type (in this case password), and the user name and password. This is where you would check to see that the user name is correct and reset the password if needed. REMEMBER, a change to an item like a database password WILL make you come into this and also change the password. Otherwise your application will NOT work correctly.

Managing Credentials with WSLT/OPSS Scripts

This procedure is optional as you can administer the credential store through the Oracle enterprise manager associated with the domain of your application install for ReIM, PRICING, SIM, RESA, or Allocation.

An Oracle Platform Security Scripts (OPSS) script is a WLST script, in the context of the Oracle WebLogic Server. An online script is a script that requires a connection to a running server. Unless otherwise stated, scripts listed in this section are online scripts and operate on a database credential store. There are a few scripts that are offline, that is, they do not require a server to be running to operate.

Read-only scripts can be performed only by users in the following WebLogic groups: Monitor, Operator, Configurator, or Admin. Read-write scripts can be performed only by users in the following WebLogic groups: Admin or Configurator. All WLST scripts are available out-of-the-box with the installation of the Oracle WebLogic Server.

WLST scripts can be run in interactive mode or in script mode. In interactive mode, you enter the script at a command-line prompt and view the response immediately after. In

script mode, you write scripts in a text file (with a py file name extension) and run it without requiring input, much like the directives in a shell script.

The weakness with the WLST/OPSS scripts is that you have to already know your map name and key name. In many cases, you do not know or remember that. The database credential store way through enterprise manager is a better way to find your map and key names easily when you do not already know them. A way in a command line mode to find the map name and alias is to run orapki. An example of orapki is as follows:

/u00/webadmin/product/wls_apps/oracle_common/bin> ./orapki wallet display –wallet
/u00/webadmin/product/wls_apps/user_projects/domains/APPDomain/config/fmwconfig

(where the path above is the domain location of the wallet)

Output of orapki is below. This shows map name of Pricing and each alias in the wallet:

Requested Certificates:

User Certificates:

Oracle Secret Store entries:

Pricing@#3#@DB-ALIAS

Pricing@#3#@LDAP-ALIAS

Pricing@#3#@RETAIL.USER

Pricing@#3#@user.signature.salt

Pricing@#3#@user.signature.secretkey

Pricing@#3#@WEBLOGIC-ALIAS

Pricing@#3#@WLS-ALIAS

Trusted Certificates:

Subject: OU=Class 1 Public Primary Certification Authority,O=VeriSign\, Inc.,C=US

OPSS provides the following scripts on all supported platforms to administer credentials (all scripts are online, unless otherwise stated. You need the map name and the key name to run the scripts below

- listCred
- updateCred
- createCred
- deleteCred
- modifyBootStrapCredential
- addBootStrapCredential

listCred

The script `listCred` returns the list of attribute values of a credential in the credential store with given map name and key name. This script lists the data encapsulated in credentials of type password only.

Script Mode Syntax

```
listCred.py -map mapName -key keyName
```

Interactive Mode Syntax

```
listCred(map="mapName", key="keyName")
```

The meanings of the arguments (all required) are as follows:

- `map` specifies a map name (folder).
- `key` specifies a key name.

Examples of Use:

The following invocation returns all the information (such as user name, password, and description) in the credential with map name `myMap` and key name `myKey`:

```
listCred.py -map myMap -key myKey
```

The following example shows how to run this command and similar credential commands with WLST:

```
/u00/webadmin/product/wls_apps/oracle_common/common/bin>
sh wlst.sh

Initializing WebLogic Scripting Tool (WLST)...

Welcome to WebLogic Server Administration Scripting Shell


wls:/offline> connect('weblogic','password123','xxxxxx.us.oracle.com:17001')
Connecting to t3://xxxxxx.us.oracle.com:17001 with userid weblogic ...
Successfully connected to Admin Server 'AdminServer' that belongs to domain
'APPDomain'.

wls:/APPDomain/serverConfig> listCred(map="Pricing",key="DB-ALIAS")
Already in Domain Runtime Tree

[Name : rms01app, Description : null, expiry Date : null]
PASSWORD:retail
*The above means for map Pricing in APPDomain, alias DB-ALIAS points to database
user rms01app with a password of retail
```

updateCred

The script `updateCred` modifies the type, user name, and password of a credential in the credential store with given map name and key name. This script updates the data encapsulated in credentials of type password only. Only the interactive mode is supported.

Interactive Mode Syntax

```
updateCred(map="mapName", key="keyName", user="userName", password="passW",
[desc="description"])
```

The meanings of the arguments (optional arguments are enclosed by square brackets) are as follows:

- `map` specifies a map name (folder) in the credential store.
- `key` specifies a key name.
- `user` specifies the credential user name.
- `password` specifies the credential password.
- `desc` specifies a string describing the credential.

Example of Use:

The following invocation updates the user name, password, and description of the password credential with map name `myMap` and key name `myKey`:

```
updateCred(map="myMap", key="myKey", user="myUsr", password="myPassw")
```

createCred

The script `createCred` creates a credential in the credential store with a given map name, key name, user name and password. This script can create a credential of type password only. Only the interactive mode is supported.

Interactive Mode Syntax

```
createCred(map="mapName", key="keyName", user="userName", password="passW",
[desc="description"])
```

The meanings of the arguments (optional arguments are enclosed by square brackets) are as follows:

- `map` specifies the map name (folder) of the credential.
- `key` specifies the key name of the credential.
- `user` specifies the credential user name.
- `password` specifies the credential password.
- `desc` specifies a string describing the credential.

Example of Use:

The following invocation creates a password credential with the specified data:

```
createCred(map="myMap", key="myKey", user="myUsr", password="myPassw")
```

deleteCred

The script `deleteCred` removes a credential with given map name and key name from the credential store.

Script Mode Syntax

```
deleteCred.py -map mapName -key keyName
```

Interactive Mode Syntax

```
deleteCred(map="mapName",key="keyName")
```

The meanings of the arguments (all required) are as follows:

- `map` specifies a map name (folder).
- `key` specifies a key name.

Example of Use:

The following invocation removes the credential with map name `myMap` and key name `myKey`:

```
deleteCred.py -map myMap -key myKey
```

modifyBootStrapCredential

The offline script `modifyBootStrapCredential` modifies the bootstrap credentials configured in the default jps context, and it is typically used in the following scenario: suppose that the policy and credential stores are LDAP-based, and the credentials to access the LDAP store (stored in the LDAP server) are changed. Then this script can be used to seed those changes into the bootstrap credential store.

This script is available in interactive mode only.

Interactive Mode Syntax

```
modifyBootStrapCredential(jpsConfigFile="pathName", username="usrName",
password="usrPass")
```

The meanings of the arguments (all required) are as follows:

- `jpsConfigFile` specifies the location of the file `jps-config.xml` relative to the location where the script is run. Example location: /u00/webadmin/product/wls_apps/user_projects/domains/APPDomain/config/fmwconfig. Example location of the bootstrap wallet is /u00/webadmin/product/wls_apps/user_projects/domains/APPDomain/config/fmwconfig/bootstrap
- `username` specifies the distinguished name of the user in the LDAP store.
- `password` specifies the password of the user.

Example of Use:

Suppose that in the LDAP store, the password of the user with distinguished name `cn=orcladmin` has been changed to `<password>`, and that the configuration file `jps-config.xml` is located in the current directory. Then the following invocation changes the password in the bootstrap credential store to `<password>`:

```
modifyBootStrapCredential(jpsConfigFile='./jps-config.xml',
username='cn=orcladmin', password='<password>')
```

Any output regarding the audit service can be disregarded.

addBootStrapCredential

The offline script `addBootStrapCredential` adds a password credential with given map, key, user name, and user password to the bootstrap credentials configured in the default jps context of a jps configuration file.

Classloaders contain a hierarchy with parent classloaders and child classloaders. The relationship between parent and child classloaders is analogous to the object relationship of super classes and subclasses. The bootstrap classloader is the root of the Java classloader hierarchy. The Java virtual machine (JVM) creates the bootstrap classloader, which loads the Java development kit (JDK) internal classes and `java.*` packages included in the JVM. (For example, the bootstrap classloader loads `java.lang.String`.)

This script is available in interactive mode only.

Interactive Mode Syntax

```
addBootStrapCredential(jpsConfigFile="pathName", map="mapName", key="keyName",
username="usrName", password="usrPass")
```

The meanings of the arguments (all required) are as follows:

- `jpsConfigFile` specifies the location of the file `jps-config.xml` relative to the location where the script is run. Example location: /u00/webadmin/product/wls_apps/user_projects/domains/APPDomain/config/fmwconfig
- `map` specifies the map of the credential to add.
- `key` specifies the key of the credential to add.
- `username` specifies the name of the user in the credential to add.
- `password` specifies the password of the user in the credential to add.

Example of Use:

The following invocation adds a credential to the bootstrap credential store:

```
addBootStrapCredential(jpsConfigFile='./jps-config.xml', map='myMapName',
key='myKeyName', username='myUser', password =’myPass’)
```

Quick Guide for Retail Password Stores (db wallet, java wallet, DB credential stores)

Retail app	Wallet type	Wallet loc	Wallet partition	Alias name	User name	Use	Create by	Alias Example	Notes
RMS batch	DB	<RMS batch install dir (RETAIL_HOME)>/.wallet	n/a	<Database SID>_<Database schema owner>	<rms schema owner>	Compile, execution	Installer	n/a	Alias hard-coded by installer
RMWS forms	DB	<forms install dir>/base/.wallet	n/a	<Database SID>_<Database schema owner>	<rwms schema owner>	Compile forms, execute batch	Installer	n/a	Alias hard-coded by installer
PRICING batch plsql and sqlldr	DB	<PRICING batch install dir>/.wallet	n/a	<rms schema owner alias>	<rms schema owner>	Execute batch	Manual	rms-alias	PRICING plsql and sqlldr batches
RWMS auto-login	JAVA	<forms install dir>/base/.javawallet							
			<RWMS Installation name>	<RWMS database user alias>	<RWMS schema owner>	RWMS forms app to avoid dblogin screen	Installer	rwms16inst	
			<RWMS Installation name>	BI_ALIAS	<BI Publisher administrative user>	RWMS forms app to connect to BI Publisher	Installer	n/a	Alias hard-coded by installer
AIP app	JAVA	<weblogic domain home>/retail/<deployed aip app name>/config							Each alias must be unique

Retail app	Wallet type	Wallet loc	Wallet partition	Alias name	User name	Use	Create by	Alias Example	Notes
			aip	<AIP weblogic user alias>	<AIP weblogic user name>	App use	Installer	aip-weblogic-alias	
			aip	<AIP database schema user alias>	<AIP database schema user name>	App use	Installer	aip01user-alias	
			aip	<rib-aip weblogic user alias>	<rib-aip weblogic user name>	App use	Installer	rib-aip-weblogic-alias	
PRICING app	DB credential store		Map=Pricing or what you called the app at install time.	Many for app use					<weblogic domain home>/config/fmwconfig/jps-config.xml has info on the credential store. This directory also has the domain cwallet.sso file.
PRICING app	JAVA	<weblogic domain home>/retail/<deployed Pricing app name>/config							Each alias must be unique
			Pricing	<Pricing weblogic user alias>	<Pricing weblogic user name>	App use	Installer	Pricing-weblogic-alias	

Retail app	Wallet type	Wallet loc	Wallet partition	Alias name	User name	Use	Create by	Alias Example	Notes
			Pricing	<Pricing batch user name> is the alias. Yes, here alias name = user name	<Pricing batch user name>	App, batch use	Installer	RETAIL.USER	
	JAVA	<retail_home>/orpatch/config/javaapp_Pricing							Each alias must be unique
			retail_installer	<Pricing weblogic user alias>	<Pricing weblogic user name>	App use	Installer	weblogic-alias	
			retail_installer	<rms schema user alias>	<rms schema user name>	App, batch use	Installer	rms01user-alias	
			retail_installer	<reim batch user alias>	<reim batch user name>	App, batch use	Installer	reimbat-alias	
			retail_installer	<LDAP-ALIAS>	cn=Pricing.admin,cn=Users,dc=us,dc=oracle,dc=com	LDAP user use	Installer	LDAP_ALIAS	
ReIM app	JAVA	<weblogic domain home>/retail/<deployed reim app name>/config							Each alias must be unique
			<installed app name, ex: reim>	<reim weblogic user alias>	<reim weblogic user name>	App use	Installer	weblogic-alias	

Retail app	Wallet type	Wallet loc	Wallet partition	Alias name	User name	Use	Create by	Alias Example	Notes
			<installed app name, ex: reim>	<rms schema user alias>	<rms schema user name>	App, batch use	Installer	rms01user-alias	
			<installed app name, ex: reim>	<reim webservice validation user alias>	<reim webservice validation user name>	App use	Installer	reimwebservice-alias	
			<installed app name, ex: reim>	<reim batch user alias>	<reim batch user name>	App, batch use	Installer	reimbat-alias	
			<installed app name, ex: reim>	<LDAP-ALIAS>	cn=REIM.ADMIN,cn=Users,dc=us,dc=oracle,dc=com	LDAP user use	Installer	LDAP_ALIAS	
	JAVA	<retail_home>/orpatch/config/javaapp_reim							Each alias must be unique
			retail_installer	<reim weblogic user alias>	<reim weblogic user name>	App use	Installer	weblogic-alias	
			retail_installer	<rms schema user alias>	<rms schema user name>	App, batch use	Installer	rms01user-alias	
			retail_installer	<reim webservice validation user alias>	<reim webservice validation user name>	App use	Installer	reimwebservice-alias	
			retail_installer	<reim batch user alias>	<reim batch user name>	App, batch use	Installer	reimbat-alias	

Retail app	Wallet type	Wallet loc	Wallet partition	Alias name	User name	Use	Create by	Alias Example	Notes
			retail_installer	<LDAP-ALIAS>	cn=REIM.ADMIN,cn=Users,dc=us,dc=oracle,dc=com	LDAP user use	Installer	LDAP_ALIAS	
RESA app	DB credential store		Map=resaor what you called the app at install time	Many for login and policies					<weblogic domain home>/config/fmwconfig/jps-config.xml has info on the credential store. This directory also has the domain cwallet.sso file. The bootstrap directory under this directory has bootstrap cwallet.sso file.
RESA app	JAVA	<weblogic domain home>/retail/<deployed resa app name>/config							Each alias must be unique
			<installed app name>	<resa weblogic user alias>	<resa weblogic user name>	App use	Installer	wlsalias	
			<installed app name>	<resa schema db user alias>	<rmsdb schema user name>	App use	Installer	Resadb-alias	

Retail app	Wallet type	Wallet loc	Wallet partition	Alias name	User name	Use	Create by	Alias Example	Notes
			<installed app name>	<resa schema user alias>	<rmsdb schema user name>>	App use	Installer	resa-alias	
	JAVA	<retail_home>/orpatch/config/javaapp_resa							Each alias must be unique
			retail_installer	<resa weblogic user alias>	<resa weblogic user name>	App use	Installer	wlsalias	
			retail_installer	<resa schema db user alias>	<rmsdb schema user name>	App use	Installer	Resadb-alias	
	JAVA	<retail_ home>/orpatch/config/javaapp_rasrm							Each alias must be unique
			retail_installer	<alloc weblogic user alias>	<alloc weblogic user name>	App use	Installer	weblogic-alias	

Retail app	Wallet type	Wallet loc	Wallet partition	Alias name	User name	Use	Create by	Alias Example	Notes
Alloc app	DB credential store		Map=alloc or what you called the app at install time	Many for login and policies					<weblogic domain home>/config/fmwconfig/jps-config.xml has info on the credential store. This directory also has the domain cwallet.sso file. The bootstrap directory under this directory has bootstrap cwallet.sso file.
Alloc app	JAVA	<weblogic domain home>/retail/config							Each alias must be unique
			<installed app name>	<alloc weblogic user alias>	<alloc weblogic user name>	App use	Installer	weblogic-alias	
			<installed app name>	<rms schema user alias>	<rms schema user name>	App use	Installer	dsallocAlias	
			<installed app name>	<alloc batch user alias>	<SYSTEM_ADMINISTRATOR>	Batch use	Installer	alloc14	
	JAVA	<retail_home>/orpatch/config/javaapp_alloc							Each alias must be unique

Retail app	Wallet type	Wallet loc	Wallet partition	Alias name	User name	Use	Create by	Alias Example	Notes
			retail_installer	<alloc weblogic user alias>	<alloc weblogic user name>	App use	Installer	weblogic-alias	
			retail_installer	<rms schema user alias>	<rms schema user name>	App use	Installer	dsallocAlias	
			retail_installer	<alloc batch user alias>	<SYSTEM_ADMINISTRATOR>	Batch use	Installer	alloc14	
	JAVA	<retail_home>/orpatch/config/javaapp_rasrm							Each alias must be unique
			retail_installer	<alloc weblogic user alias>	<alloc weblogic user name>	App use	Installer	weblogic-alias	
SIM app	DB credential store		Map=oracle.retail.sim	Aliases required for SIM app use					<weblogic domain home>/config/fmwconfig/jps-config.xml has info on the credential store. This directory also has the domain cwallet.sso file.
	JAVA	<weblogic domain home>/retail/<deployed sim app name>/batch/resources/conf	oracle.retail.sim	<sim batch user alias>	<sim batch user name>	App use	Installer	BATCH-ALIAS	

Retail app	Wallet type	Wallet loc	Wallet partition	Alias name	User name	Use	Create by	Alias Example	Notes
	JAVA	<weblogic domain home>/retail/<deployed sim app name>/wireless/resources/conf	oracle.retail.sim	<sim wireless user alias>	<sim wireless user name>	App use	Installer	WIRELESS-ALIAS	
RETL	JAVA	<RETL home>/etc/security	n/a	<target application user alias>	<target application db userid>	App use	Manual	retl_java_rms01user	User may vary depending on RETL flow's target application
RETL	DB	<RETL home>/.wallet	n/a	<target application user alias>	<target application db userid>	App use	Manual	<db>_<user>	User may vary depending on RETL flow's target application
RIB	JAVA	<RIBHOME DIR>/deployment-home/conf/security							<app> is one of aip, rfm, rms, Pricing, sim, rwms, tafr
JMS			jms<1-5>	<jms user alias> for jms<1-5>	<jms user name> for jms<1-5>	Integration use	Installer	jms-alias	
WebLogic			rib-<app>-app-server-instance	<rib-app weblogic user alias>	<rib-app weblogic user name>	Integration use	Installer	weblogic-alias	
Admin GUI			rib-<app>#web-app-user-alias	<rib-app admin gui user alias>	<rib-app admin gui user name>	Integration use	Installer	admin-gui-alias	
Application			rib-<app>#user-alias	<app weblogic user alias>	<app weblogic user name>	Integration use	Installer	app-user-alias	Valid only for aip, Pricing, sim
DB			rib-<app>#app-db-user-alias	<rib-app database schema user alias>	<rib-app database schema user name>	Integration use	Installer	db-user-alias	Valid only for rfm, rms, rwms, tafr

Retail app	Wallet type	Wallet loc	Wallet partition	Alias name	User name	Use	Create by	Alias Example	Notes
Error Hospital			rib-<app>#hosp-user-alias	<rib-app error hospital database schema user alias>	<rib-app error hospital database schema user name>	Integra-tion use	Installer	hosp-user-alias	
RFI	Java	<RFI-HOME>/retail-financial-integration-solution/service-based-integration/conf/security							
			<installed app name>	rfiAppServerAdminServerUserAlias	<rfi weblogic user name>	App use	Installer	rfiAppServerAdminServerUserAlias	
			<installed app name>	rfiAdminUiUserAlias	<ORFI admin user>	App use	Installer	rfiAdminUiUserAlias	
			<installed app name>	rfiDataSourceUserAlias	<ORFI schema user name>	App use	Installer	rfiDataSourceUserAlias	
			<installed app name>	ebsDataSourceUserAlias	<EBS schema user name>	App use	Installer	ebsDataSourceUserAlias	
			<installed app name>	smtpMailFromAddressAlias	<From email address>	App use	Installer	smtpMailFromAddressAlias	

G

Appendix: Single Sign-On for WebLogic

Single Sign-On (SSO) is a term for the ability to sign onto multiple Web applications via a single user ID/Password. There are many implementations of SSO. Oracle provides an implementation with Oracle Access Manager.

Most, if not all, SSO technologies use a session cookie to hold encrypted data passed to each application. The SSO infrastructure has the responsibility to validate these cookies and, possibly, update this information. The user is directed to log on only if the cookie is not present or has become invalid. These session cookies are restricted to a single browser session and are never written to a file.

Another facet of SSO is how these technologies redirect a user's Web browser to various servlets. The SSO implementation determines when and where these redirects occur and what the final screen shown to the user is.

Most SSO implementations are performed in an application's infrastructure and not in the application logic itself. Applications that leverage infrastructure managed authentication (such as deployment specifying Basic or Form authentication) typically have little or no code changes when adapted to work in an SSO environment.

What Do I Need for Single Sign-On?

A Single Sign-On system involves the integration of several components, including Oracle Identity Management and Oracle Access Management. This includes the following components:

- An Oracle Internet Directory (OID) LDAP server, used to store user, role, security, and other information. OID uses an Oracle database as the back-end storage of this information.
- An Oracle Access Manager (OAM) and administrative console for implementing and configuring policies for single sign-on.
- A Policy Enforcement Agent such as Oracle Access Manager Agent (WebGate), used to authenticate the user and create the Single Sign-On cookies.
- Oracle Directory Services Manager (ODSM) application in OIM, used to administer users and group information. This information may also be loaded or modified via standard LDAP Data Interchange Format (LDIF) scripts.
- Additional administrative scripts for configuring the OAM system and registering HTTP servers.

Additional WebLogic managed servers will be needed to deploy the business applications leveraging the Single Sign-On technology.

Can Oracle Access Manager Work with Other SSO Implementations?

Yes, Oracle Access Manager has the ability to interoperate with many other SSO implementations, but some restrictions exist.

Oracle Single Sign-on Terms and Definitions

The following terms apply to single sign-on.

Authentication

Authentication is the process of establishing a user's identity. There are many types of authentication. The most common authentication process involves a user ID and password.

Dynamically Protected URLs

A Dynamically Protected URL is a URL whose implementing application is aware of the Oracle Access Manager environment. The application may allow a user limited access when the user has not been authenticated. Applications that implement dynamic protection typically display a Login link to provide user authentication and gain greater access to the application's resources.

Oracle Identity Management (OIM) and Oracle Access Manager (OAM)

Oracle Identity Management (OIM) includes Oracle Internet Directory and ODSM. Oracle Access Manager (OAM)

MOD_WEBLOGIC

mod_WebLogic operates as a module within the HTTP server that allows requests to be proxied from the OracleHTTP server to the Oracle WebLogic server.

Oracle Access Manager (WebGate)

Oracle WebGates are policy enforcement agents which reside with relying parties and delegate authentication and authorization tasks to OAM servers.

Oracle Internet Directory

Oracle Internet Directory (OID) is an LDAP-compliant directory service. It contains user ids, passwords, group membership, privileges, and other attributes for users who are authenticated using Oracle Access Manager.

Partner Application

A partner application is an application that delegates authentication to the Oracle Identity Management Infrastructure. One such partner application is the Oracle HTTP Server (OHS) supplied with Oracle Forms Server or WebTier Server if using other Retail Applications other than Oracle Forms Applications.

All partner applications must be registered with Oracle Access Manager (OAM). An output product of this registration is a configuration file the partner application uses to verify a user has been previously authenticated.

Statically Protected URLs

A URL is considered to be Statically Protected when an Oracle HTTP server is configured to limit access to this URL to only SSO authenticated users. Any unauthenticated attempt to access a Statically Protected URL results in the display of a login page or an error page to the user.

Servlets, static HTML pages, and JSP pages may be statically protected.

What Single Sign-On is not

Single Sign-On is NOT a user ID/password mapping technology.

However, some applications can store and retrieve user IDs and passwords for non-SSO applications within an OID LDAP server. An example of this is the Oracle Forms Web Application framework, which maps Single Sign-On user IDs to a database logins on a per-application basis.

How Oracle Single Sign-On Works

Oracle Access Manager involves several different components. These are:

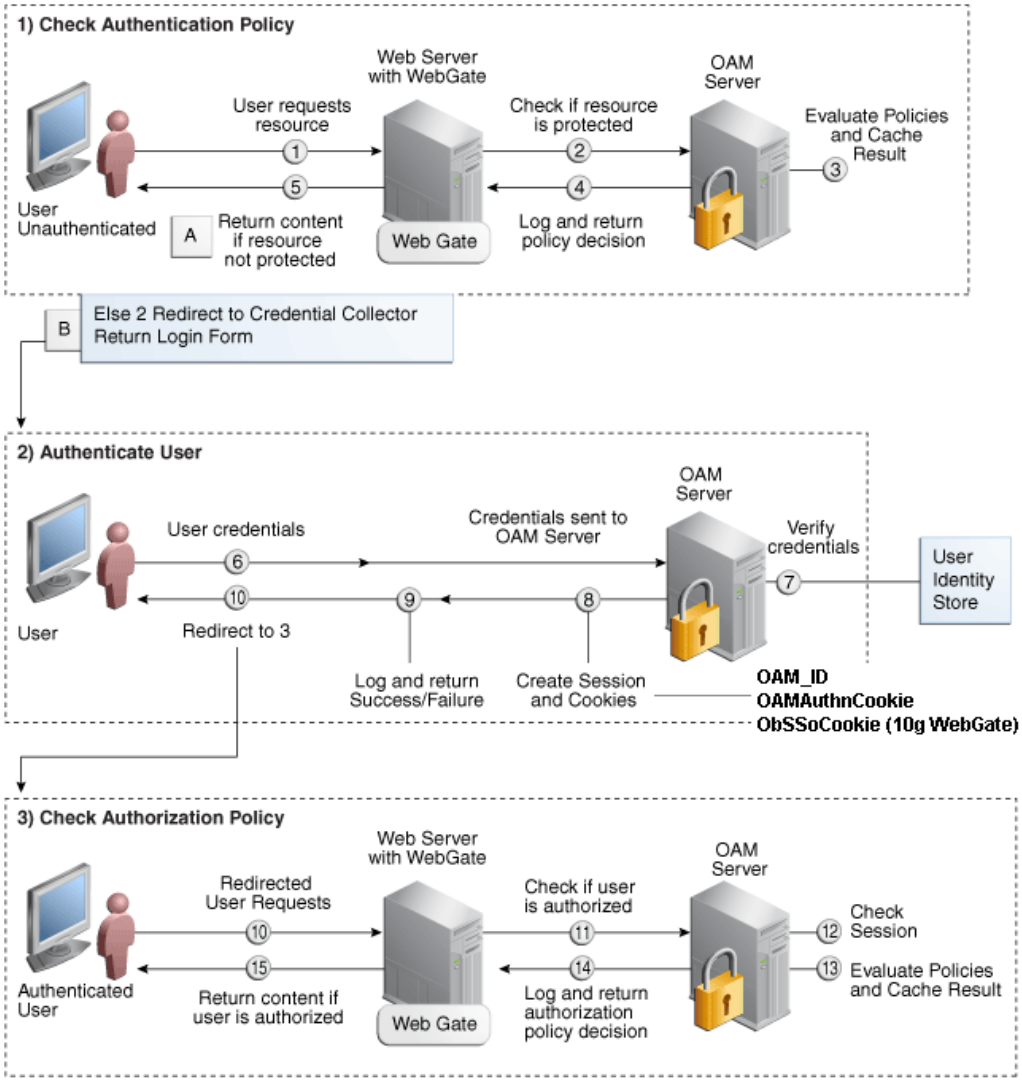
- The Oracle Access Manager (OAM) server, which is responsible for the back-end authentication of the user.
- The Oracle Internet Directory LDAP server, which stores user IDs, passwords, and group (role) membership.
- The Oracle Access Manager Agent associated with the Web application, which verifies and controls browser redirection to the Oracle Access Manager server.
- If the Web application implements dynamic protection, then the Web application itself is involved with the OAM system.

About SSO Login Processing with OAM Agents

1. The user requests a resource.
2. Webgate forwards the request to OAM for policy evaluation
3. OAM:
   a. Checks for the existence of an SSO cookie.
   b. Checks policies to determine if the resource is protected and if so, how?
4. OAM Server logs and returns the decision
5. Webgate responds as follows:
   - **Unprotected Resource:** Resource is served to the user
   - **Protected Resource:**
     Resource is redirected to the credential collector.
     The login form is served based on the authentication policy.
     Authentication processing begins
6. User sends credentials
7. OAM verifies credentials
8. OAM starts the session and creates the following host-based cookies:
   - **One per partner:** OAMAuthnCookie set by WebGates using authentication token received from the OAM Server after successful authentication.
     Note: A valid cookie is required for a session.
   - **One for OAM Server:** OAM_ID
9. OAM logs Success of Failure.
10. Credential collector redirects to WebGate and authorization processing begins.
11. WebGate prompts OAM to look up policies, compare them to the user's identity, and determine the user's level of authorization.
12. OAM logs policy decision and checks the session cookie.
13. OAM Server evaluates authorization policies and cache the result.

14. OAM Server logs and returns decisions
15. WebGate responds as follows:
    - If the authorization policy allows access, the desired content or applications are served to the user.
    - If the authorization policy denies access, the user is redirected to another URL determined by the administrator.

SSO Login Processing with OAM Agents



Installation Overview

Installing an Oracle Retail supported Single Sign-On installation using OAM requires installation of the following:

1. Oracle Internet Directory (OID) LDAP server and the Oracle Directory Services Manager. They are typically installed using the Installer of Oracle Identity Management . The ODSM application can be used for user and realm management within OID.
2. Oracle Access Manager has to be installed and configured.
3. Additional midtier instances (such as Oracle Forms) for Oracle Retail applications based on Oracle Forms technologies (such as RMS). These instances must be registered with the OAM installed in step 2.
4. Additional application servers to deploy other Oracle Retail applications and performing application specific initialization and deployment activities must be registered with OAM installed in step 2.

Infrastructure Installation and Configuration

The Infrastructure installation for Oracle Access Manager (OAM) is dependent on the environment and requirements for its use. Deploying Oracle Access Manager (OAM) to be used in a test environment does not have the same availability requirements as for a production environment. Similarly, the Oracle Internet Directory (OID) LDAP server can be deployed in a variety of different configurations. See the *Oracle Identity Management Installation Guide.*

OID User Data

Oracle Internet Directory is an LDAP v3 compliant directory server. It provides standards-based user definitions out of the box.

Customers with existing corporate LDAP implementations may need to synchronize user information between their existing LDAP directory servers and OID. OID supports standard LDIF file formats and provides a JNDI compliant set of Java classes as well. Moreover, OID provides additional synchronization and replication facilities to integrate with other corporate LDAP implementations.

Each user ID stored in OID has a specific record containing user specific information. For role-based access, groups of users can be defined and managed within OID. Applications can thus grant access based on group (role) membership saving administration time and providing a more secure implementation.

User Management

User Management consists of displaying, creating, updating or removing user information. There are many methods of managing an LDAP directory including LDIF scripts or Oracle Directory Services Manager (ODSM) available for OID.

ODSM

Oracle Directory Services Manager (ODSM) is a Web-based application used in OID is designed for both administrators and users which enables you to configure the structure of the directory, define objects in the directory, add and configure users, groups, and other entries. ODSM is the interface you use to manage entries, schema, security, adapters, extensions, and other directory features.

LDIF Scripts

Script based user management can be used to synchronize data between multiple LDAP servers. The standard format for these scripts is the LDAP Data Interchange Format (LDIF). OID supports LDIF script for importing and exporting user information. LDIF scripts may also be used for bulk user load operations.

User Data Synchronization

The user store for Oracle Access Manager resides within the Oracle Internet Directory (OID) LDAP server. Oracle Retail applications may require additional information attached to a user name for application-specific purposes and may be stored in an application-specific database. Currently, there are no Oracle Retail tools for synchronizing changes in OID stored information with application-specific user stores. Implementers should plan appropriate time and resources for this process. Oracle Retail strongly suggests that you configure any Oracle Retail application using an LDAP for its user store to point to the same OID server used with Oracle Access Manager.

H

Appendix – Pre-installation of Retail Infrastructure in WebLogic

Oracle Retail applications are primarily deployed in the Oracle WebLogic server as the Middleware tier. Java and forms based applications rely on Middleware infrastructure for complete security a part from application specific security features.

This chapter describes the pre-installation steps for security setup of Oracle Retail Infrastructure in WebLogic.

- JDK Hardening for Use with Retail Applications
- Pre-installation - Steps for Secured Setup of Oracle Retail Infrastructure in WebLogic
- Certificate Authority
- Obtaining an SSL Certificate and Setting up a Keystore
- Creating a WebLogic Domain
- Configuring the Application Server for SSL
- Enforcing Stronger Encryption in WebLogic
- Securing Nodemanager with SSL Certificates
- Using Secured Lightweight Directory Access Protocol (LDAP)
- Connecting from Forms Application to Secured Database
- Enabling Access to Secured Database from Forms Oracle Home - Optional

JDK Hardening for Use with Retail Applications

See the following sections on JDK hardening for use with Retail applications

- Upgrading JDK to use Java Cryptography extension
- Disabling weak SSL protocols and obsolete ciphers in JDK

Upgrading JDK to Use Java Cryptography Extension

You need to install the unlimited encryption Java Cryptography Extension (JCE) policy if you want to use the strongest Cipher suite (256 bit encryption) AES_256 (TLS_RSA_WITH_AES_256_CBC_SHA). It is dependent on the Java Development Kit (JDK) version.

Using the following URL, download and install the JCE Unlimited Strength Jurisdiction Policy Files that correspond to the version of your JDK

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

For JDK 8 download from the following URL:

https://www.oracle.com/technetwork/java/javase/downloads/jce8-download-2133166.html

and replace the files in the JDK/jre/lib/security directory.

Pre-installation – Steps for Secured Setup of Oracle Retail Infrastructure in WebLogic

Secured Socket Layer (SSL) protocol allows client-server applications to communicate across a network in a secured channel. Client and server should both decide to use SSL to communicate secured information like user credentials or any other secured information.

The WebLogic Server supports SSL on a dedicated listen port. Oracle Forms is configured to use SSL as well. To establish an SSL connection, a Web browser connects to the WebLogic Server by supplying the SSL port and the Hypertext Transfer Protocol (HTTPS) in the connection URL.

For example: https://myserver:7002

The Retail Merchandising System (RMS) setup is supported in WebLogic in secured mode. For enterprise deployment, it is recommended to use SSL certificates signed by certificate authorities.

> **Note:** You need to obtain a separate signed SSL certificate for each host where the application is being deployed.

The Security Guide focuses on securing Oracle Retail Applications in a single node setup and not on applications deployed in clusters.

Certificate Authority

Certificate Authority or certification Authority (CA) is an organization which provides digital certificates to entities and acts as a trusted third party. Certificates issues by the commercial CAs are automatically trusted by most of the web browsers, devices and applications. It is recommended to have certificates obtained from a trusted CA or commercial CAs to ensure better security.

Obtaining an SSL Certificate and Setting up a Keystore

> **Note:** SSL certificates are used to contain public keys. With each public key there is an associated private key. It is critically important to protect access to the private key. Otherwise, the SSL messages may be decrypted by anyone intercepting the communications.

Perform the following steps to obtain an SSL certificate and set up a Keystore:

1. Obtain an identity (private key and digital certificate) and trust (certificate of trusted certificate authority) for the WebLogic Server.
2. Use the digital certificate, private key and trusted CA certificate provided by the WebLogic Server Kit, the CertGen utility, Sun Microsystem's keytool utility, or a reputed vendor such as Entrust or Verisign to perform the following:
    a. Set appropriate JAVA_HOME and PATH to java, as shown in the following example:

    ```
    export JAVA_HOME=/u00/webadmin/product/jdk
    export PATH=$JAVA_HOME/bin:$PATH
    ```

    b. Create a new keystore

    ```
    Keytool -genkey -keyalg RSA -keysize 2048 -keystore<keystore> -
    alias<alias>
    ```

    For example:

```
keytool -genkey -keyalg RSA -keysize 2048 -keystore hostname.keystore
-alias hostname
```

c. Generate the signing request.

```
keytool -certreq -keyalg RSA -file <certificate request file> -
keystore
<keystore> -alias <alias>
```

For example:

```
keytool -certreq -keyalg RSA -file hostname.csr -keystore hostname.keystore -alias
hostname
```

d. Submit the certificate request to CA

3. Store the identity and trust.

Private keys and trusted CA certificates which specify identity and trust are stored in a keystore.

In the following examples the same keystore to store all certificates are used

a. Import the root certificate into the keystore as shown in the following example:

```
keytool -import -trustcacerts -alias verisignclass3g3ca -file Primary.pem -
keystore  hostname.keystore
```

A root certificate is either an unsigned public key certificate or a self-signed certificate that identifies the Root CA.

b. Import the intermediary certificate (if required into the keystore as shown in the following example.

```
keytool -import -trustcacerts -alias oracleclass3g3ca -file Secondary.pem
-keystore  hostname.keystore
```

c. Import the received signed certificate for this requeste into the keystore as shown in the following example:

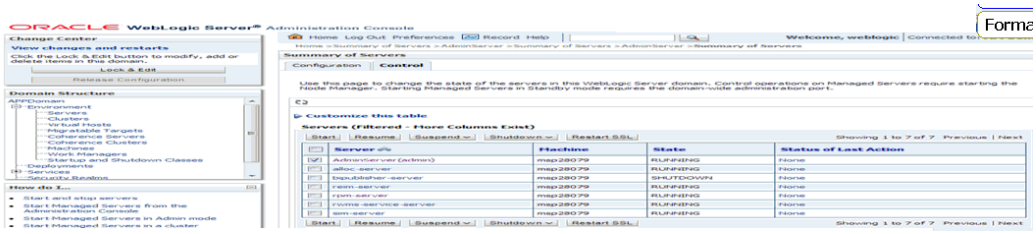
```
keytool -import -trustcacerts -alias hostname -file cert.cer -keystore
hostname.keystore
```

Creating a Weblogic Domain

WebLogic domain is created for Oracle Retail Applications as part of the installation. Different domains are created in different hosts for different applications in situations where applications are being managed by different users or deployed on different hosts. Once the domains are created, you need to enable the SSL ports if not done already.

1. Perform the following steps to enable the SSL:
2. Log in to WebLogic console using Administrator user. For example, weblogic.
3. Navigate to <Domain> > Environment > Servers > < Servername> > Configuration > General tab.
4. Click **Lock & Edit**.
5. Select **SSL Listen Port Enabled** and assign the port number.
6. Click **Save** and **Activate Changes**.
7. Restart SSL to enable the changes.

Figure 1 Restarting the Admin Server



Configuring the Application Server for SSL

Perform the following steps to configure the Application Server for SSL:

1. Configure the identity and trust keystores for WebLogic Server in the WebLogic Server Administration Console.
    a. In the Change Center of the Administration Console, click **Lock & Edit**.
    b. In the left pane of the console, expand Environment and select **Servers.**
    c. Click the name of the server for which you want to configure the identity and trust keystores as shown in the following example:

    ```
    WLS_RMS is for RMS server
    ```

    d. Select **Configuration,** then **Keystores.**

    The following options are available:

    - Demo Identity and Demo Trust - The demonstration identity and trust keystores, located in the BEA_HOME\server\lib directory and the Java Development Kit (JDK) cacerts keystore, are configured by default. You need to use for development purpose only.

    - Custom Identity and Java Standard Trust - A keystore you create and the trusted CAs defined in the cacerts file in the JAVA_HOME\jre\lib\security directory.

    - Custom Identity and Custom Trust [Recommended] - An Identity and trust keystores you create.

    - Custom Identity and Command Line Trust: An identity keystore you create and command-line arguments that specify the location of the trust key.

    e. Select **Custom Identity** and **Custom Trust**.
    f. In the Identity section, define the following attributes for the identity keystore:

    - Custom Identity Keystore - This is the fully qualified path to the identity keystore.

    - Custom Identity Keystore Type - This is the type of the keystore. Generally, this attribute is Java KeyStore (JKS); if it is left blank, it defaults to JKS.

    - Custom Identity Keystore Passphrase - This is the password you must enter when reading or writing to the keystore. This attribute is optional or required depending on the type of keystore. All keystores require the passphrase in order to write to the keystore. However, some keystores do not require the passphrase to read from the keystore. WebLogic Server only reads from the keystore so whether or not you define this property depends on the requirements of the keystore.

    g. In the **Trust** section, define properties for the trust keystore.

If you choose Java Standard Trust as your keystore, specify the password defined when creating the keystore.

h. Confirm the password.

If you choose **Custom Trust [Recommended]** define the following attributes:

- Custom Trust Keystore - This is the fully qualified path to the trust keystore.

- Custom Trust Keystore Type - This is the type of the keystore. Generally, this attribute is JKS; if it is left blank, it defaults to JKS.

- Custom Trust Keystore Passphrase - This is the password that you need to enter when reading or writing to the keystore. This attribute is optional or required depending on the type of keystore. All keystores require the passphrase in order to write to the keystore. However, some keystores do not require the passphrase to read from the keystore. WebLogic Server only reads from the keystore, so whether or not you define this property depends on the requirements of the keystore.

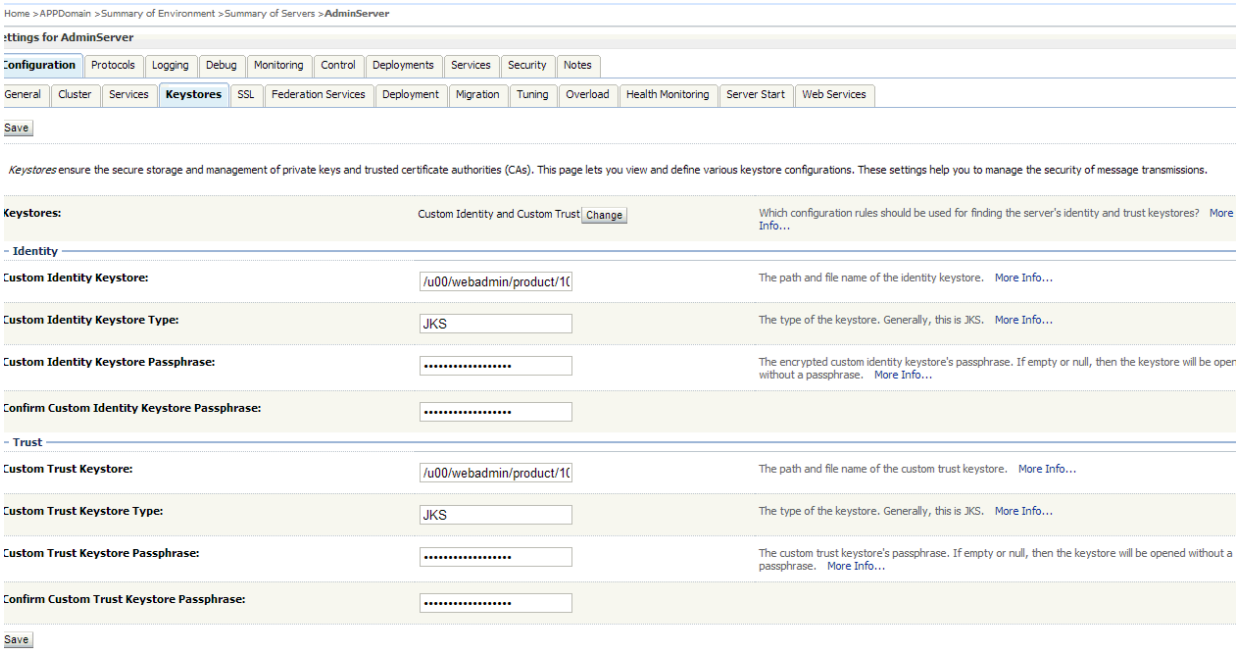
i. Click Save.

j. To activate these changes in the changes, in the change Center of the Administration Console, click Activate Changes.

Note: Not all changes take effect immediately, some require a restart.

Figure 2 shows how to configure the application server for SSL

Figure 2 Configuring the Identity and Trust Keystores for WebLogic Server



For more information on configuring Keystores, see the *Administration Console Online Help*.

2. Set SSL Configuration Options for the private key alias and password in the WebLogic Server Administration Console.

a. In the Change Center of the Administration Console, click **Lock & Edit**.

b. In the left pane of the Console, expand **Environment** and select **Servers**.

c. Click the name of the server for which you want to configure the identity and trust keystores.

d. Select **Configuration**, then select **SSL**.

e. In the Identity and Trust Locations, the Keystore is displayed by default.

f. In the **Private Key Alias**, type the string alias that is used to store and retrieve the server's private key.

g. In the **Private Key Passphrase**, provide the keystore attribute that defines the passphrase used to retrieve the server's private key.

h. Save the changes.

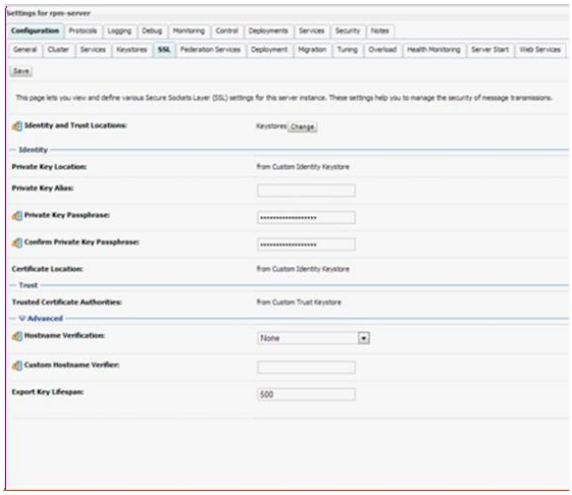
i. Click **Advanced** section of SSL tab.

j. In the Hostname Verification, select None.

   This specifies to ignore the installed implementation of the WebLogic.security.SSL.HostnameVerifier interface (this interface is generally used when this server is acting as a client to another application server).

k. **11.** Save the change

Figure 3 Configuring SSL



For more information on configuring SSL, see the section *Configure SSL* in the *Administration Console Online Help*.

All the server SSL attributes are dynamic; when modified through the Console. They cause the corresponding SSL server or channel SSL server to restart and use the new settings for new connections. Old connections will continue to run with the old configuration. You must reboot WebLogic Server to ensure that all the SSL connections exist according to the specified configuration.

Use the **Restart SSL** button on the **Control**: Start/Stop page to restart the SSL server when changes are made to the keystore files. You have to apply the same for subsequent connections without rebooting WebLogic Server.

Upon restart you can see the following similar entries in the log:

```
< Jan **, 20** 5:18:27 AM CDT> <Notice> <WebLogicServer> <BEA-000365> <Server state changed to
RESUMING>
< Jan **, 20** 5:18:27 AM CDT> <Notice> <Server> <BEA-002613> <Channel "DefaultSecure" is now
ing on 10.141.15.214:57002 for protocols iiops, t3s, ldaps, https.>
<Jan **, 20** 5:18:27 AM CDT> <Notice> <Server> <BEA-002613> <Channel "DefaultSecure[1]" is now
ing on 127.0.0.1:57002 for protocols iiops, t3s, ldaps, https.>
```

```
< Jan **, 20** 5:18:27 AM CDT> <Notice> <WebLogicServer> <BEA-000329> <Started WebLogic Admin
Server "AdminServer" for domain "APPDomain" running in Production Mode>
< Jan **, 20** 5:18:27 AM CDT> <Notice> <WebLogicServer> <BEA-000365> <Server state changed to
RUNNING>
< Jan **, 20** 5:18:27 AM CDT> <Notice> <WebLogicServer> <BEA-000360> <Server started in RUNNING
mode>
```

Note: For complete security of the Weblogic Server, it is recommended to secure both Administration as well as the Managed Server where the application is being deployed. You can choose to disable the non-SSL ports (HTTP. It is recommended to secure the Node Manager.

The steps to secure the Node Manager is provided in the following section.

Configuring WebLogic Scripts if Admin Server is Secured

Perform the following steps to configure the WebLogic scripts if Admin Server is secured:

1. Update the WebLogic startup/shutdown scripts with secured port and protocol to start/stop services.
2. Backup and update the following files in <DOMAIN_HOME>/bin with correct Admin server urls:

   startManagedWebLogic.sh: echo "$1 managedserver1 http://apphost1:7001"

   stopManagedWebLogic.sh: echo "ADMIN_URL defaults to t3://apphost1:7001 if not set as an environment variable or the second command-line parameter."

   stopManagedWebLogic.sh: echo "$1 managedserver1 t3://apphost1:7001

   WebLogic

   stopManagedWebLogic.sh: ADMIN_URL="t3://apphost1:7001"

   stopWebLogic.sh: ADMIN_URL="t3://apphost1:7001"
3. Change the URLs as follows:

   ```
   t3s://apphost1:7002 https://apphost1:7002
   ```

Adding Certificate to the JDK Keystore for Installer

You will need the Oracle Retail Application installer to run Java. In situations where Administration Server is secured using signed certificate, the Java keystore through which the installer is launched must have the certificate installed.

In case the installer is being run using JDK deployed at location

/u00/webadmin/product/jdk, follow the steps as shown in the example below.

Adding certificate to the JDK keystore for Installer

```
apphost1:_apps] /u00/webadmin/ssl> keytool -import -trustcacerts -alias apphost1 -file
/u00/webadmin/ssl/apphost1.cer -keystore
/u00/webadmin/product/jdk/jre/lib/security/cacerts
Enter keystore password: Certificate was added to keystore apphost1:[_apps]
/u00/webadmin/ssl>
```

Enforcing Stronger Encryption in WebLogic

It is recommended to use a stronger encryption protocol in your production environment.

See the following sections to enable the latest SSL and cipher suites.

SSL protocol version configuration

In a production environment, Oracle recommends Transport Layer Security (TLS) Version 1.2 for sending and receiving messages in an SSL connection.

- Set the **WebLogic.security.SSL.minimumProtocolVersion=protocol** system property as an option in the command line that starts WebLogic Server.

This system property accepts one of the following values for protocol:
Figure 4 Values for Protocol of System Property

Value	Description
SSLv3	Specifies SSL V3.0 as the minimum protocol version enabled in SSL connections.
TLSv1	Specifies TLS V1.0 as the minimum protocol version enabled in SSL connections.
TLSv*x.y*	Specifies TLS V*x.y* as the minimum protocol version enabled in SSL connections, where: • *x* is an integer between 1 and 9, inclusive • *y* is an integer between 0 and 9, inclusive For example, TLSv1.2.

- Set the following property in startup parameters in WebLogic Managed server for enabling the higher protocol:

DWebLogic.security.SSL.minimumProtocolVersion=TLSv1.2 -Dhttps.protocols=TLSv1.2

> **Note:** In case protocol is set for Managed servers, the same should be set for the Administration server. Ensure that all the managed servers are down when making changes to the Administration server for setting up the protocol. It is recommended to set the properties in the Administration Server and then Managed Server.

Enabling Cipher inWebLogic SSL Configuration

Configure the <ciphersuite> element in the <ssl> element in the <DOMAIN_HOME>\server\config\config.xml file in order to enable the specific Cipher Suite to use as follows:

> Note: You need to ensure that the tag <ciphersuite> is added immediately after tab <enabled>.

```
<ssl>
<name>examplesServer</name>
<enabled>true</enabled>
<ciphersuite>TLS_RSA_WITH_AES_256_CBC_SHA</ciphersuite>
<-port>17002</-port>
...
</ssl>
```

Securing Nodemanager with SSL Certificates

Perform the following steps for securing the Nodemanager with SSL certificates:

1. Navigate to weblogic 12c domain, the location is **<DOMAIN_HOME>/nodemanager**) and take a backup of nodemanager.properties.
2. Add the following similar entries to nodemanager.properties:

   KeyStores=CustomIdentityAndCustomTrust
   CustomIdentityKeyStoreFileName=/u00/webadmin/ssl/hostname.keystore
   CustomIdentityKeyStorePassPhrase=[password to keystore, this will get encrypted]

CustomIdentityAlias=hostname

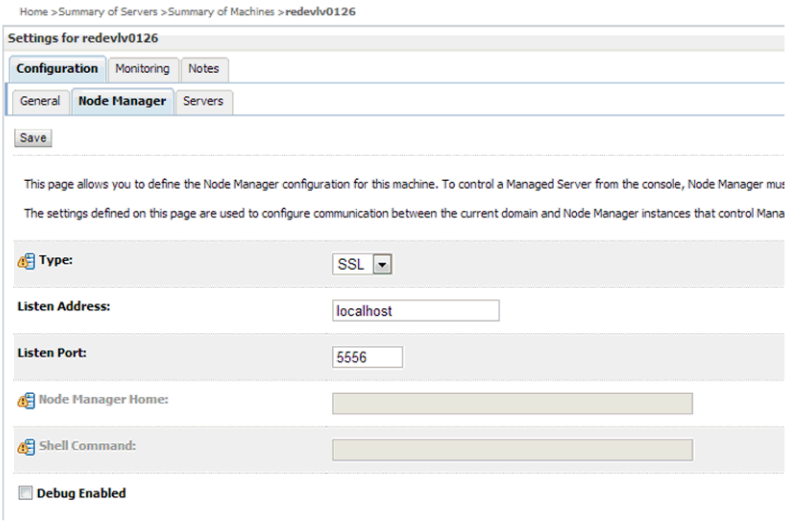
CustomIdentityPrivateKeyPassPhrase=[password to keystore, this will get encrypted]

CustomTrustKeyStoreFileName=/u00/webadmin/ssl/hostname.keystore

SecureListener=true

3. Log in to **WebLogic console**, navigate to **Environment**, and then **Machines**.
4. Select the nodemanager created already and navigate to **Node Manager** tab.
5. In the Change Center, click **Lock & Edit**.
6. In the **Type** field, select **SSL** from the list.
7. Click Save and Activate.

Figure 5 Securing the Nodemanager



8. You need to bounce the entire WebLogic Domain for changes to take effect, after activating the changes.
9. You need to verify if the nodemanager is reachable in **Monitoring** tab after restart.

Using Secured Lightweight Directory Access Protocol (LDAP)

The Application can communicate with LDAP server on a secured port. It is recommended to use the secured LDAP server to protect user names and passwords from being sent in clear text on the network.

For information on Configuring Secure Sockets Layer (SSL), see the *Oracle Fusion Middleware Administration Guide*.

It is important to import the certificates used in LDAP server into the Java Runtime Environment (JRE) of the WebLogic server for SSL handshake, in case the secure LDAP is used for authentication.

For example:

1. Set JAVA_HOME and PATH to the JDK being used by WebLogic Domain.
2. Backup the JAVA_HOME/jre/lib/security/cacerts
   /u00/webadmin/product/jdk/jre/lib/security> cp -rp cacerts cacerts_ORIG
3. Import the Root and Intermediary (if required) certificates into the java keystore.

/u00/webadmin/product/jdk/jre/lib/security> keytool -import -trustcacerts -alias digicertroot -file ~/ssl/Primary.pem -keystore cacerts/u00/webadmin/product/jdk/jre/lib/security> keytool -import -trustcacerts-alias digicertinter -file ~/ssl/Secondary.pem -keystore cacerts

4. Import the User certificate from LDAP server into the java keystore.

   /u00/webadmin/product/jdk/jre/lib/security> keytool -import -trustcacerts -alias hostname -file ~/ssl/cert.cer -keystore cacerts

Note: The default password of the JDK keystore is **changeit**

The deployed application should be able to communicate with LDAP on SSL port after successful SSL Handshake.

Advanced Infrastructure Security

Depending upon your security need for your production environment, infrastructure where Oracle Retail applications are deployed can be secured.

Ensure the following to secure complete protection of environment:

- Securing the WebLogic Server Host
- Securing Network Connections
- Securing your Database
- Securing the WebLogic Security Service
- Securing Applications

For more information on Ensuring the Security of Your Production Environment, see https://docs.oracle.com/middleware/12214/wls/SECMG/toc.htm *Guide*.

I

Appendix – Post Installation of Retail Infrastructure in Database

Oracle Retail applications use the Oracle database as the backend data store for applications. In order to ensure complete environment security the database should be secured.

This chapter describes the post installation steps for secured setup of Retail infrastructure in the Database.

- The following topics are covered in this chapter:
- Configuring SSL Connections for Database Communications
- Configuring the Password Stores for Database User Accounts
- Configuring the Database Password Policies
- Configuring SSL Connection for Oracle Data Integrator (ODI)
- Creating an Encrypted Tablespace in Oracle 19c Container Database
- Additional Information

Configuring SSL Connections for Database Communications

Secure Sockets Layer (SSL) is the standard protocol for secure communications, providing mechanisms for data integrity and encryption. This can protect the messages sent and received by the database to applications or other clients, supporting secure authentication and messaging. Configuring SSL for databases requires configuration on both the server and clients, which include application servers.

This section covers the steps for securing Oracle Retail Application Clusters (RAC) database. Similar steps can be followed for single node installations also.

Configuring SSL on the Database Server

The following steps are one way to configure SSL communications on the database server:

1. Obtain an identity (private key and digital certificate) and trust (certificates of trusted certificate authorities) for the database server from a Certificate Authority.
2. Create a folder containing the wallet for storing the certificate information. For Real Application Cluster (RAC) systems, this directory can be shared by all nodes in the cluster for easier maintenance.

   mkdir-p/oracle/secure_wallet
3. Create a wallet in the path. For example

   ```
   orapki wallet create -wallet /oracle/secure_wallet -auto_login
   ```
4. Import each trust chain certificate into the wallet as shown in the following example:

   ```
   orapki wallet add -wallet /oracle/secure_wallet -trusted_cert -cert <trust
   chain certificate>
   ```
5. Import the user certificate into the wallet, as shown in the following example:

   ```
   orapki wallet add -wallet /oracle/secure_wallet -user_cert -cert <certificate
   file location
   ```

6. .Update the listener.ora by adding a TCPS protocol end-point first in the list of end points.

```
LISTENER1= (DESCRIPTION=
(ADDRESS=(PROTOCOL=tcps)(HOST=<dbserver>)(PORT=2484))
(ADDRESS=(PROTOCOL=tcp)(HOST=<dbserver>)(PORT=1521)))
```

7. Update the listener.ora by adding the wallet location and disabling SSL authentication.

```
WALLET_LOCATION = (SOURCE= (METHOD=File) (METHOD_DATA=
(DIRECTORY=wallet_location))) SSL_CLIENT_AUTHENTICATION=FALSE
```

8. Update the sqlnet.ora with the same wallet location information and disabling SSL authentication.

```
WALLET_LOCATION = (SOURCE= (METHOD=File) (METHOD_DATA=
(DIRECTORY=wallet_location))) SSL_CLIENT_AUTHENTICATION=FALSE
```

9. Update the tnsnames.ora to configure a database alias using TCPS protocol for Connections.

```
<dbname>_secure= (DESCRIPTION= (ADDRESS_LIST=
(ADDRESS=(PROTOCOL=TCPS)(HOST=<dbserver>)(PORT=2484)))
(CONNECT_DATA=(SERVICE_NAME=<dbname>)))
```

10. Restart the database listener to pick up listener.ora changes.
11. Verify the connections are successful to the new >dbname>_secure alias.
12. At this point either the new secure alias can be used to connect to the database, or the regular alias can be modified to use TCPS protocol.
13. Export the identity certificate so that it can be imported on the client systems

```
orapki wallet export -wallet /oracle/secure_wallet -dn <full dn of identity
certificate> -cert <filename_to_create>
```

Configuring SSL on an Oracle Database Client

The following steps are one way to configure SSL communications on the database client:

1. Create a folder containing the wallet for storing the certificate information.

```
Mkdir-p / oracle/secure_wallet
```

2. Create a wallet in the path. For example:

```
orapki wallet create -wallet /oracle/secure_wallet -auto_login
```

3. Import each trust chain certificate into the wallet as shown in the following example:

```
orapki wallet add -wallet /oracle/secure_wallet -trusted_cert -cert <trust
chain certificate
```

4. Import the identity certificate into the wallet, as shown in the following example:

```
orapki wallet add -wallet /oracle/secure_wallet -trusted_cert –cert
<certificate file location>
```

> **Note:** on the client the identity certificate is imported as a trusted certificate, whereas on the server it is imported as a user certificate.

5. Update the sqlnet.ora with the wallet location information and disabling SSL authentication.

```
WALLET_LOCATION = (SOURCE= (METHOD=File) (METHOD_DATA=
(DIRECTORY=wallet_location))) SSL_CLIENT_AUTHENTICATION=FALSE
```

6. Update the tnsnames.ora to configure a database alias using TCPS protocol for connections.

```
<dbname>_secure= (DESCRIPTION=
(ADDRESS_LIST= (ADDRESS=(PROTOCOL=TCPS)(HOST=<dbserver>)(PORT=2484)))
(CONNECT_DATA=(SERVICE_NAME=<dbname>)))
```

7. Verify the connections are successful to the new (dbname)_secure alias.
8. At this point either the new secure alias can be used to connect to the database, or the regular alias can be modified to use TCPS protocol.

Configuring SSL on a Java Database Connectivity (JDBC) Thin Client

The following steps are one way to configure SSL communications for a Java Database

1. Create a folder containing the keystore with the certificate information.

   ```
   mkdir-p /oracle/secure_jdbc
   ```

2. Create a keystore in the path. For example,

   ```
   keytool -genkey -alias jdbcwallet -keyalg RSA -keystore /oracle/secure_
   jdbc/truststore.jks -keysize 2048
   ```

3. Import the database certificate into the trust store as shown in the following example:

   ```
   keytool -import -alias db_cert -keystore /oracle/secure_jdbc/truststore.jks
   -file <db certificate file>
   ```

4. JDBC clients can use the following URL format for JDBC connections:

   ```
   jdbc:oracle:thin:@(DESCRIPTION= (ADDRESS= (PROTOCOL=tcps) (HOST=<dbserver>)
   (PORT=2484))  (CONNECT_DATA=  (SERVICE_NAME=<dbname>)))
   ```

   Note: The <dbname> would be replaced with the service name in case of a multitenant database.

5. You need to set the properties as shown in the table, either as system properties or as JDBC connection properties.

Table 1 Setting the Properties

Property	Value
Javax.net.ssl.trustStore	Path and file name of truststore. for Example, /oracle/secure_jdbc/truststore.jks
Javax.net.ssl.trustStoreType	Jks
Javax.net.ssl.trustStorePasword	password for trust store

Configuring the Password Stores for Database User Accounts

Wallets can be used to protect sensitive information, including usernames and passwords for database connections. The Oracle Database client libraries have built-in support for retrieving credential information when connecting to databases. Oracle Retail applications utilize this functionality for non-interactive jobs such as batch programs so that they are able to connect to the database without exposing user and password information to other users on the same system.

For information on configuring wallets for database access, see the Appendix Setting Up Password Stores with Oracle Wallet in the product installation guide.

Configuring the Database Password Policies

Oracle Database includes robust functionality to enforce policies related to passwords such as minimum length, complexity, when it expires, number of invalid attempts, and so on. Oracle Retail recommends these policies are used to strengthen passwords and lock out accounts after failed attempts.

For example, to modify the default user profile to lock accounts after five failed login attempts, run the following commands as a database administrator:

1. Query the current settings of the default profile select resource_name,limit,resource_type from dba_profiles where profile='DEFAULT';
2. Alter the profile, if failed_login_attempts is set to unlimited: alter profile default limit FAILED_LOGIN_ATTEMPTS 5;

> **Note:** Many other profile settings are available for increased security. For more information, see the Oracle Database Security Guide.

Creating an Encrypted Tablespace in Oracle 19c Container Database

The retail tablespaces can be encrypted in container databases using the following method:

1. Update the SQLNET.ORA file with the following encryption details:
   a. Configure the sqlnet.ora file for a software keystore location
      ```
      ENCRYPTION_WALLET_LOCATION= (SOURCE=
      (METHOD=FILE) (METHOD_DATA= (DIRECTORY=path_to_keystore)))
      ```
   b. Restart the listener
2. Set up the Tablespace Encryption in the container database.
   a. Create Software Keystores as follows:
      ```
      SQL> ADMINISTER KEY MANAGEMENT CREATE KEYSTORE
      '/u03/wallet_cdb' IDENTIFIED BY "val1ue#";
      Kystore altered
      ```
   b. Create an Auto-Login Software Keystore as follows:
      ```
      SQL> ADMINISTER KEY MANAGEMENT CREATE AUTO_LOGIN KEYSTORE FROM KEYSTORE
      '/u03/wallet_cdb' identified by "val1ue#'; Keystore altered.
      ```

      > **Note:** the auto-login software keystore can be opened from different computers from the computer where this keystore resides. However, the [local] auto-login software keystore can only be opened from the computer on which it was created.

   c. Open the software Keystore as follows:
      ```
      SQL> ADMINISTER KEY MANAGEMENT SET KEYSTORE OPEN IDENTIFIED BY
      "val1ue#" Container=ALL;
      Keystore altered.
      ```
   d. Set the Software TDE Master Encryption key as follows:
      ```
      SQL> ADMINISTER KEY MANAGEMENT SET KEY IDENTIFIED BY "val1ue#" WITH
      BACKUP USING 'TDE_ENCRYPTION' Container=all;
      Keystore altered
      ```

Note: One can set the Encryption Key only for a particular PDB if required, by specifying the Container =<PDB>

e. Create the ENCRYPTED TABLESPACE in PDB as follows:

SQL>conn sys / xxxxx@orcl as sysdba Connected

SQL> create tablespace test datafile '+DATA1' size 100m ENCRYPTION DEFAULT STORAGE (ENCRYPT);

Tablespace created.

f. Verify the Encryption:

```
SQL> select * from v$encryption_wallet
```

WRL TYPE	WRL PARAMETER	STATUS	WALLET TYPE	WALLET OR	FULLY BAC	CON id
File	/u03/wallet_cdb	OPEN	PASSWORD	SINGLE	NO	0

3. For more information on Configuring Transparent Data Encryption (TDE) see *Part I Using Transparent Data Encryption*
4. Other information may be useful during maintenance activity.
   a. Close the encryption wallet as follows.

```
SQL> ADMINISTER KEY MANAGEMENT SET KEYSTORE Close
IDENTIFIED BY "val1ue#" Container=ALL
```

Additional Information

For more information on the subjects covered in this section as well as information on other options that are available to strengthen database security, see the *Oracle Database Security guide 19c*

The Oracle Advanced Security Option provides industry standards-based solutions to solve enterprise computing security problems, including data encryption and strong authentication. Some of the capabilities discussed in this guide require licensing the Advanced Security Option.

For more information, see the *Oracle Database Advanced Security Administrator's Guide 19c*

J

Appendix – Post Installation of Retail Infrastructure in WebLogic

This chapter describes the post installation steps for secured setup of Oracle Retail infrastructure in WebLogic.

The following topics are covered in this chapter:

- Retail Application Specific Post installation Steps for Security
- Batch Set Up for SSL Communication
- Oracle Business Intelligence (BI) Publisher - Disable Guest User - Optional
- RMS - Forms Timeout Setting - Optional
- Asynchronous Task JMS Queue Security
- Hardening Use of Headers and Transport Layer Security

Retail Application Specific Post installation Steps for Security

See the following sections for steps to improve security after an Oracle Retail Application has been installed.

Batch Set Up for SSL Communication

Java batch programs communicate with Java applications deployed in WebLogic.

The communication needs to have SSL handshake with the deployed application. You need to import the SSL Certificates into the JAVA_ HOME/jdk/jre/lib/security/cacerts keystore for successful running of the application batches.

Example: Importing certificates into JDK keystore

```
/u00/webadmin/product/jdk/jre/lib/security> cp -rp cacerts cacerts_ORIG
/u00/webadmin/product/jdk/jre/lib/security> keytool -import -trustcacerts -alias
digicertroot -file ~/ssl/Primary.pem -keystore cacerts
/u00/webadmin/product/jdk/jre/lib/security> keytool -import -trustcacerts -alias
digicertinter -file ~/ssl/Secondary.pem -keystore cacerts
/u00/webadmin/product/jdk/jre/lib/security> keytool -import -trustcacerts -alias
hostname -file ~/ssl/cert.cer -keystore cacerts
/u00/webadmin/product/jdk/jre/lib/security> keytool -import -trustcacerts -alias
hostname -file ~/ssl/cert.cer -keystore cacerts
```

Note: The default password of JDK keystore is **changeit**

K

Appendix-Using Self Signed Certificates

Self signed certificates can be used for development environment for securing applications. The generic steps to be followed for creating self signed certificates and configuring for use for Oracle Retail application deployment are covered in the subsequent sections.

The following topics are covered in this chapter:

- Creating a Keystore through the Keytool in Fusion Middleware (FMW) 12c
- Exporting the Certificate from the Identity Keystore into a File
- Importing the Certificate Exported into trust.keystore
- Configuring WebLogic
- Configuring Nodemanager
- Importing Self Signed Root Certificate into Java Virtual Machine (JVM) Trust Store
- Disabling Hostname Verification
- Converting PKCS7 Certificate to x.509 Certificate

Creating a Keystore through the Keytool in Fusion Middleware (FMW) 12c

Perform the following steps to create a keystore through the keytool in Fusion Middleware (FMW) 12c:

1. Create a directory for storing the keystores.

   ```
   $ mkdir ssl
   ```

2. Run the following to set the environment:

   ```
   $ cd $MIDDLEWARE_HOME/user_projects/domains/<domain>/bin
   $ . ./setDomainEnv.sh
   ```

   Example:

   ```
   apphost2:[_apps] /u00/webadmin/product/12c/WLS/user_
   projects/domains/APPDomain/bin> . ./setDomainEnv.sh apphost2:[_apps]
   /u00/webadmin/product/12c/WLS/user_ projects/domains/APPDomain>
   ```

3. Create a keystore and private key, by executing the following command:

   ```
   keytool -genkey -alias <alias> -keyalg RSA -keysize 2048 -dname <dn> -keypass
   <password> -keystore <keystore> -storepass <password> -validity 365
   ```

   Example:

   ```
   apphost2:[_apps] /u00/webadmin/ssl> keytool -genkey -alias apphost2
   -keyalg RSA -keysize 2048 -dname "CN=<Server Name>,OU=<Organization Unit>,
   O=<Organization>,L=<City>,ST=<State>,C=<Country>" -keypass <kpass> -keystore
   /u00/webadmin/ssl/apphost2.keystore -storepass <spass> -validity 365

   apphost2:[_apps] /u00/webadmin/ssl> ls -ltra total 12
   drwxr-xr-x 18 webadmin dba 4096 Apr 4 05:31 ..
   -rw-r--r--  1 webadmin dba 2261 Apr 4 05:46 apphost2.keystore drwxr-xr-x  2
   webadmin dba 4096 Apr 4 05:46 . apphost2:[_apps] /u00/webadmin/ssl>
   ```

Exporting the Certificate fromthe Identity Keystore into a File

Perform the following steps to export the certificate from the identity keystore into a file (for example, pubkey.cer):

1. Run the following command:

```
$ keytool -export -alias selfsignedcert -file pubkey.cer -keystore
identity.jks
-storepass <password>
```

Example:

```
apphost2:[_apps] /u00/webadmin/ssl> keytool -export -alias apphost2 -file
/u00/webadmin/ssl/pubkey.cer -keystore /u00/webadmin/ssl/apphost2.keystore
-storepass <spass>
Certificate stored in file </u00/webadmin/ssl/ropubkey.cerot.cer>
apphost2:[_apps] /u00/webadmin/ssl> ls -l total 8
-rw-r--r-- 1 webadmin dba 2261 Apr 4 05:46 apphost2.keystore
-rw-r--r-- 1 webadmin dba 906 Apr 4 06:40 pubkey.cer apphost2:[_apps]
/u00/webadmin/ssl>
```

Importing the Certificate Exported into trust.keystore

Perform the following steps to import the certificate you exported into trust.keystore

1. Run the following command

```
$ keytool -import -alias selfsignedcert -trustcacerts -file pubkey.cer -
keystore trust.keystore -storepass <password>
```

Example:

```
apphost2:[_apps] /u00/webadmin/ssl> keytool -import -alias apphost2
-trustcacerts -file pubkey.cer -keystore trust.keystore -storepass <spass>
Owner: CN=apphost2, OU=<Organization Unit>, O=<company>,L=<city>,ST=<state or
province>, C=<country>
Issuer: CN=apphost2, OU=<Organization Unit>, O=<company>,L=<city>,ST=<state or
province>, C=<country>
Serial number: 515d4bfb
Valid from: Thu Apr 04 05:46:35 EDT 2013 until: Fri Apr 04 05:46:35 EDT 2014
Certificate fingerprints:
MD5: AB:FA:18:2B:BC:FF:1B:67:E7:69:07:2B:DB:E4:C6:D9
SHA1: 2E:98:D4:4B:E0:E7:B6:73:55:4E:5A:BE:C1:9F:EA:9B:71:18:60:BB

SHA256:2E:98:D4:4B:E0:E7:B6:73:55:4E:5A:BE:C1:9F:EA:9B:71:18:60:BB Signature
algorithm name: SHA256withRSA
Version: 3
Trust this certificate? [no]: yes Certificate was added to keystore
apphost2:[10.3.6_apps] /u00/webadmin/ssl>
```

Configuring WebLogic

You need to enable SSL for WebLogic server's Admin and managed servers by following the steps as provided in Configuring the Application Server for SSL section.

Configuring Nodemanager

You need to secure the Node manager by following the steps in Securing Nodemanager with SSL Certificates section.

Importing Self Signed Root Certificate into Java Virtual Machine (JMM) Trust Store

In order for the Java Virtual Machine (JVM) to trust in your newly created certificate, import your custom certificates into your JVM trust store.

Perform the following steps to import the root certificate into JVM Trust Store:

1. Ensure that JAVA_HOME has been already set up.
2. Run the following command:

```
$keytool -import -trustcacerts -file rootCer.cer -alias selfsignedcert -
keystore cacerts
```

Example

```
apphost2:[_apps] /u00/webadmin/product/jdk/jre/lib/security> keytool -import -
trustcacerts -file
/u00/webadmin/ssl/root.cer -alias apphost2 -keystore
/u00/webadmin/product/ jdk /jre/lib/security/cacerts -storepass
[spass default is changeit]
Owner: CN=apphost2, OU=<Organization Unit>, O=<company>,L=<city>,ST=<state or province>,
C=<country>"
Issuer: CN=apphost2, OU=<Organization Unit>, O=<company>,L=<city>,ST=<state or province>,
C=<country>"
Serial number: 515d4bfb
Valid from: Thu Apr 04 05:46:35 EDT 2013 until: Fri Apr 04 05:46:35 EDT 2014
Certificate fingerprints:
    MD5:  AB:FA:18:2B:BC:FF:1B:67:E7:69:07:2B:DB:E4:C6:D9
    SHA1: 2E:98:D4:4B:E0:E7:B6:73:55:4E:5A:BE:C1:9F:EA:9B:71:18:60:BB
    SHA256:DA:8B:72:24:DB:C2:B5:26:50:30:8F:8E:15:A5:34:56:DD:5D:18:28:11:17:40:6A:B2:69:16:E
    5:B8:26:5D:25
    Signature algorithm name: SHA256withRSA
    Version: 3
Trust this certificate? [no]:  yes Certificate was added to keystore apphost2:[_apps]
/u00/webadmin/product/ jdk /jre/lib/security>
```

Converting PKCS7 Certificate to X.509 Certificate

Certificate authorities provide signed certificates of different formats. However, not all formats of certificates can be imported to Java based keystores. Hence the certificates need to be converted to usable form. Java based Keystores supports x.509 format of certificate.

The following example demonstrates converting certificate PKCS 7 to x.509 format:

1. Copy the PKCS 7 certificate file to a Windows desktop.
2. Rename the file and provide .p7b extension.
3. Open the .p7b file.
4. Click the plus (+) symbol.
5. Click the Certificates directory.

An Intermediary certificate if provided by CA for trust.

> **Note:** If an Extended Validation certificate is being converted you should see three files. The End Entity certificate and the two EV intermediate CAs.

6. Right click on your certificate file.
7. Select All Tasks > Export.
8. Click **Next**.
9. Select Base-64 encoded X.509 (.cer) > click Next.
10. Browse to a location to store the file.
11. Enter a File name.
12. For example, MyCert. The .cer extension is added automatically.
13. Click **Save**.

14. Click **Next**.
15. Click **Save**.

The Certificate can now be imported into Java based keystores.

Example:

```
apphost1:[_apps] /u00/webadmin/ssl> keytool -import -trustcacerts -alias apphost1
-file /u00/webadmin/ssl/cert-x509.cer -keystore
/u00/webadmin/product/jdk/jre/lib/security/cacerts Enter keystore password:
[default is changeit] Certificate was added to keystore apphost1:[_apps]
/u00/webadmin/ssl>
```