3

Installing Oracle SOA Suite 12*c*

Creating the Fusion Middleware Infrastructure

ORACLE

Objectives

After completing this lesson, you should be able to:

- Choose the type of domain and installation approach
- Install the Oracle Fusion Middleware Infrastructure software
- Create a WebLogic domain with Oracle Fusion Middleware Infrastructure
- Configure WebLogic Server to use an external LDAP server (Oracle Unified Directory) for authentication and authorization

Agenda

- Exploring installation types and topology
- Installing the Fusion Middleware Infrastructure software
- Configuring the Fusion Middleware Infrastructure domain
- Propagating the domain to the Managed Server instances
- Starting and stopping the WebLogic Servers
- Integrating an LDAP server as an authentication provider

Installation Topology Types

Oracle SOA Suite 12*c* supports different installation sequences depending on the target environment and topology.

Installation Type	Target Environment	Where to Start
QuickStart	Development and Testing	http://docs.oracle.com/middleware/1213/core/SOAQS/integrated.htm#SOAQS206
Standard Installation Topology	Development, Testing, and Production environments	http://docs.oracle.com/middleware/1213/core/INSOA/toc.htm
Enterprise Deployment	Production for high availability and scalability	http://docs.oracle.com/middleware/1213/soasuite/SOEDG/edg_part_prepare.htm#SOEDG147, and http://docs.oracle.com/middleware/1213/core/ASHIA/toc.htm

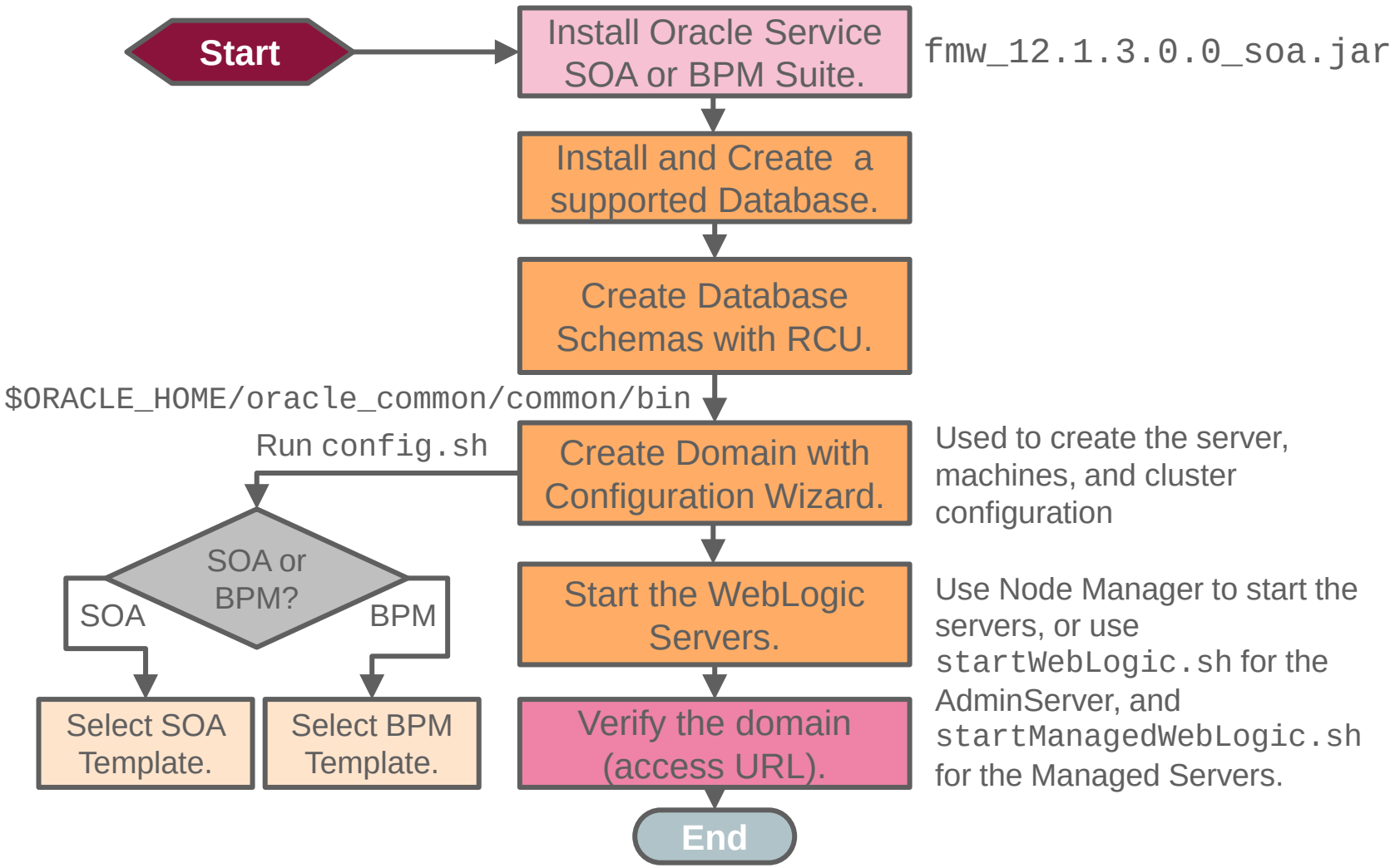
Note: Use appropriate documentation for the chosen topology.

Quick Start Installation: Overview

The QuickStart installer provides three domain configurations:

Domain Type	Recommended use
DefaultDomain	Use for demos or evaluation purposes, because it: • Is configured as an Integrated WebLogic Server that runs within Oracle JDeveloper • Shuts down when you terminate Oracle JDeveloper • Uses JavaDB for persistent data
Standalone Domain	Best for demo and development purposes • Can use Oracle Service Bus Design Time Console instead of Oracle JDeveloper • Can be independently installed from JDeveloper • Uses JavaDB for persistence
Compact Domain	For development, proof of concept, and demo purposes • Allows adding other components, such as Enterprise Scheduler, Managed File Transfer, B2B, and Business Activity Monitoring • Requires an Oracle (or supported) database

Standard Installation Topology for Oracle SOA Suite



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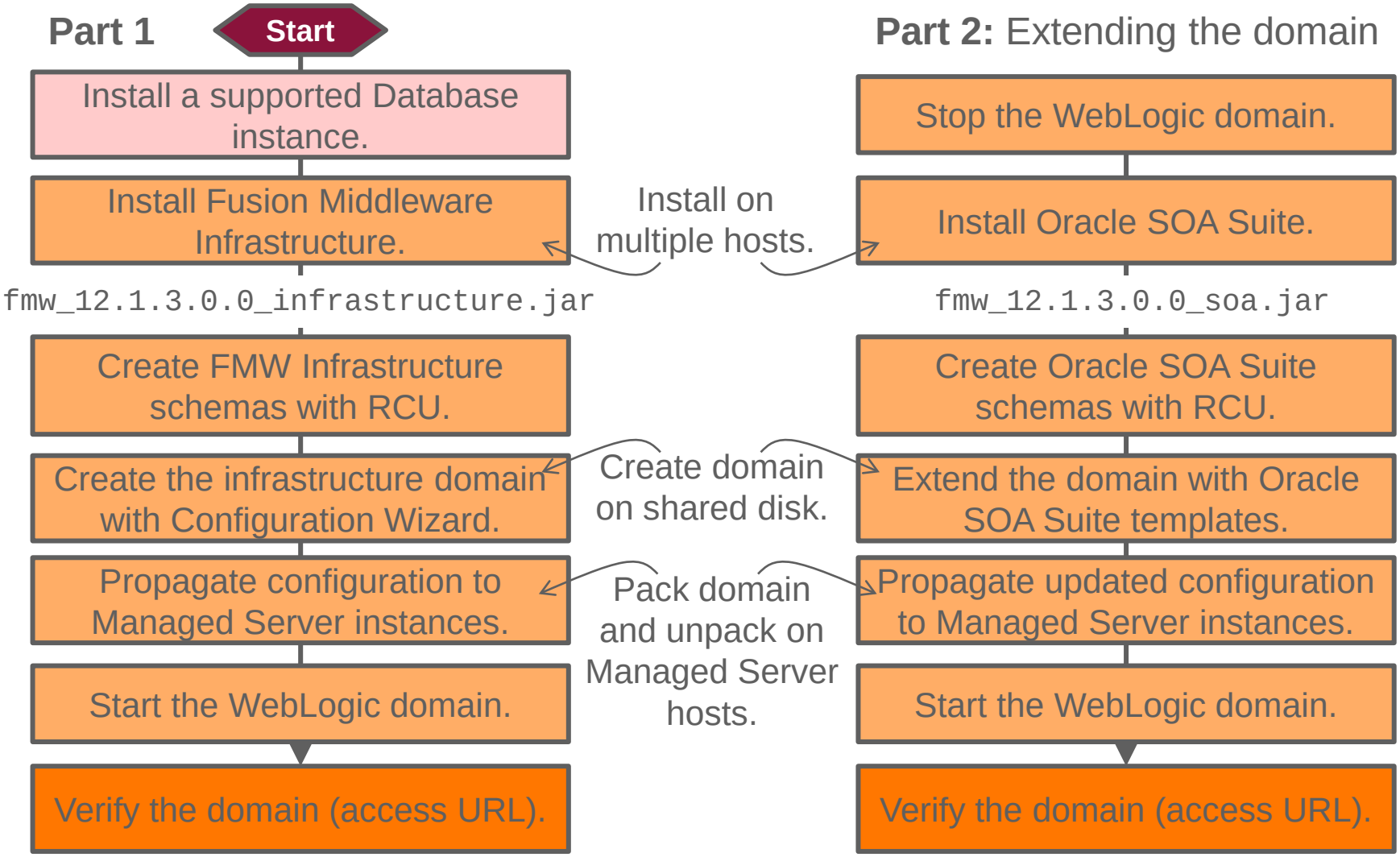
Creating an Enterprise Installation Topology Roadmap



Note: Part 2 is repeated for additional products.

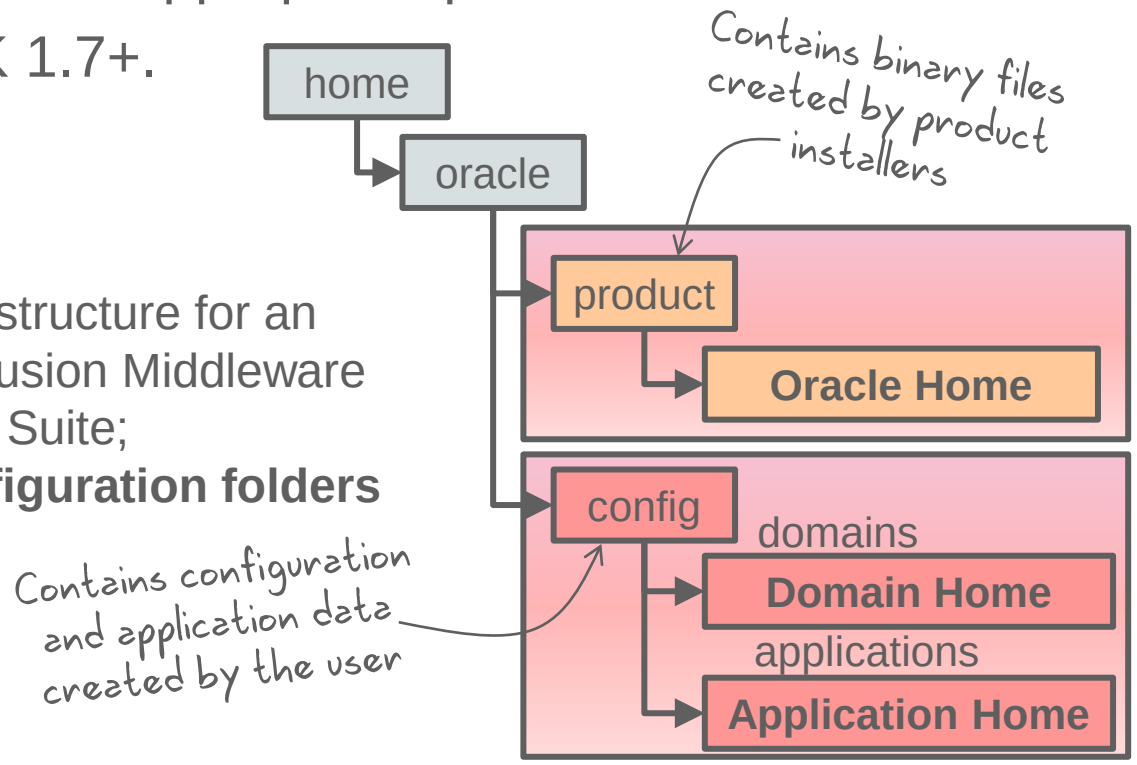
Fusion Middleware Infrastructure Installation Roadmap

- Pre-installation tasks
  - Verify your system environment.
  - Download (obtain) the appropriate software distribution.
  - Plan (determine) your installation directories.
- Installation and configuration of the software environment
  - Install the Oracle Database and JDK 1.7+.
  - Install the Infrastructure WebLogic binaries.
  - Run RCU to create the Infrastructure database schemas.
  - Create the standard Infrastructure clustered domain.
- Post-installation tasks
  - Start the domain servers and verify that you can access services.
  - Configure and integrate an external LDAP server.
  - Typically, install and configure the web tier and load balancer.

Verifying Your Requirements

- Verify certification and system requirements.
- Create or identify a suitable installation user (such as `oracle`).
- Select the installation and configuration directories on your system, and prepare with appropriate permissions.
- Install a certified JDK 1.7+.

Recommended directory structure for an Enterprise Deployment of Fusion Middleware and Oracle SOA Suite;
Separate product and configuration folders



Installation Checklist

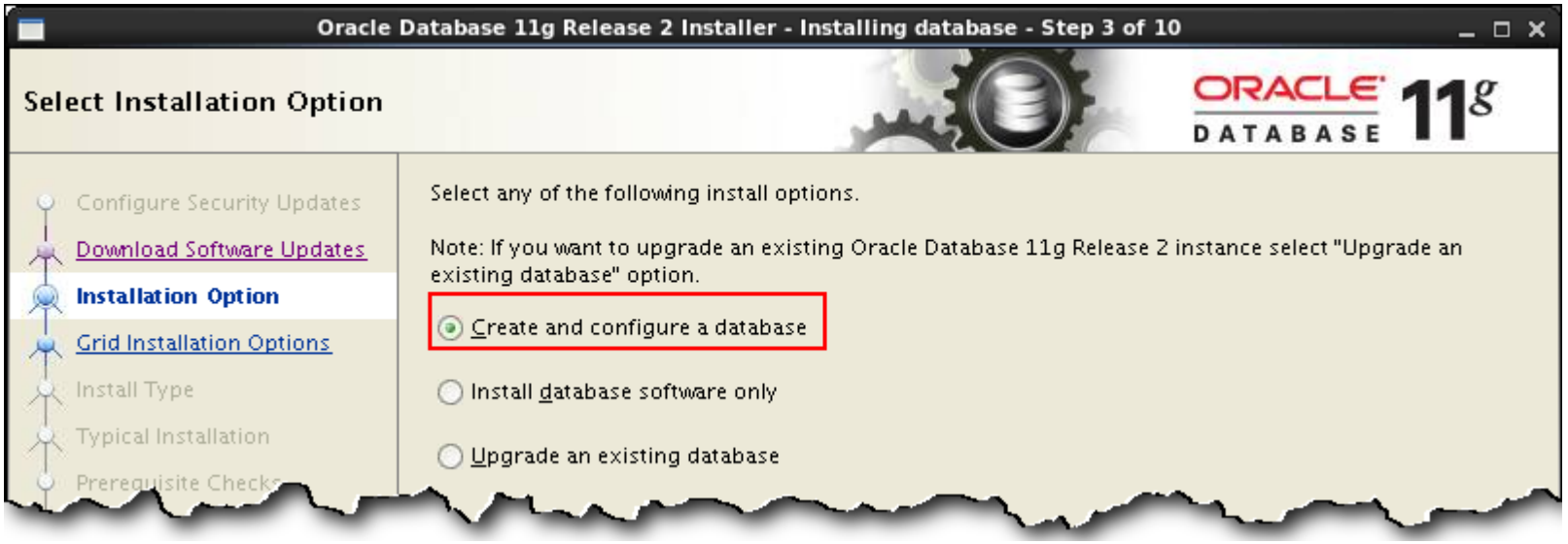
The items that you need to set or document before and during installation include the following:

- Set environment variables:
  - `JAVA_HOME` to reference the JDK home folder
  - `PATH` to include the `JAVA_HOME/bin` folder
- Obtain (from planning documents: SOA Deployment Worksheet) the following:
  - Database host, port, and service name
  - RCU schema prefix and passwords
  - DBA username and password
  - WebLogic Server domain, host names, and ports
  - WebLogic administration username and password
  - `ORACLE_HOME`
  - `DOMAIN_HOME` and `APPLICATION_HOME`

Installing the Oracle Database Software

On the data tier (machine), install the database binaries and create the database instance by using the standard installer and the `oracle` (or as a non-root) user:

```
$ cd /tmp/downloads/database
$ ./runInstaller
```



Installing the Java Development Kit

As the `root` user, run the `rpm` command or perform equivalent steps for your operating system to install the JDK:

```
$ cd /install/java
$ su
Password: su-password
root$ rpm –i [-force] jdk-7u55-linux-x64.rpm
```

Set the following environment variables for the user:

- `JAVA_HOME` to reference the JDK home folder, for example: `/usr/java/jdk1.7.0_55`
- `PATH` to include `$JAVA_HOME/bin`

Installing Oracle Fusion Middleware Infrastructure

Oracle Fusion Middleware Infrastructure software:

- Is required for an Enterprise Deployment topology
- Provides the Oracle WebLogic Server platform and services

```
$ export JAVA_HOME=/usr/java/jdk1.7.0_55
$ export PATH=$JAVA_HOME/bin:$PATH
$ java -jar fmw_12.1.3.0.0_infrastructure.jar
```

- Includes post-installation tasks such as:
  - Verifying the installation logs. Ensure that there are no errors.
  - Checking whether the directory structure is correct
  - Checking the Oracle home contents
- Is installed on each host that runs WebLogic Server instances
  - For Administration Server
  - For each host running a Managed Server in the cluster

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Configuring Oracle Fusion Middleware Infrastructure: Overview

The sequence for configuration includes:

1. Creating the database schemas by using the Repository Creation Utility (RCU) that is installed with the product binaries
2. Running the WebLogic Server Configuration Wizard to create the initial domain
3. Propagating the domain configuration to the hosts that run the Managed Server instances

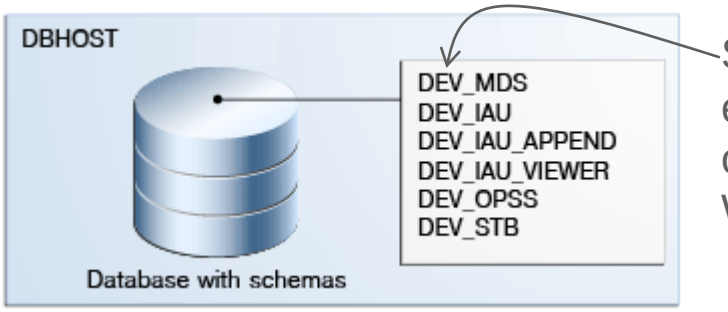
Note: This provides the software foundation to which other products can be added by extending the domain, and supports highly customized configurations of product combinations.

Creating the Infrastructure Schemas (with RCU)

Before creating the Oracle Fusion Middleware Infrastructure domain, create the database schemas with the Oracle Repository Configuration Utility (RCU) assistant:

```
$ export ORACLE_HOME=/u01/oracle/product/fmw
$ cd $ORACLE_HOME/oracle_common/bin
$ ./rcu
```

- Select a method of Schema Creation: System Load and Product Load Concurrently.
- Provide database credentials (SYS, host name, port, and SID).
- Specify a custom prefix for the selected product schemas.

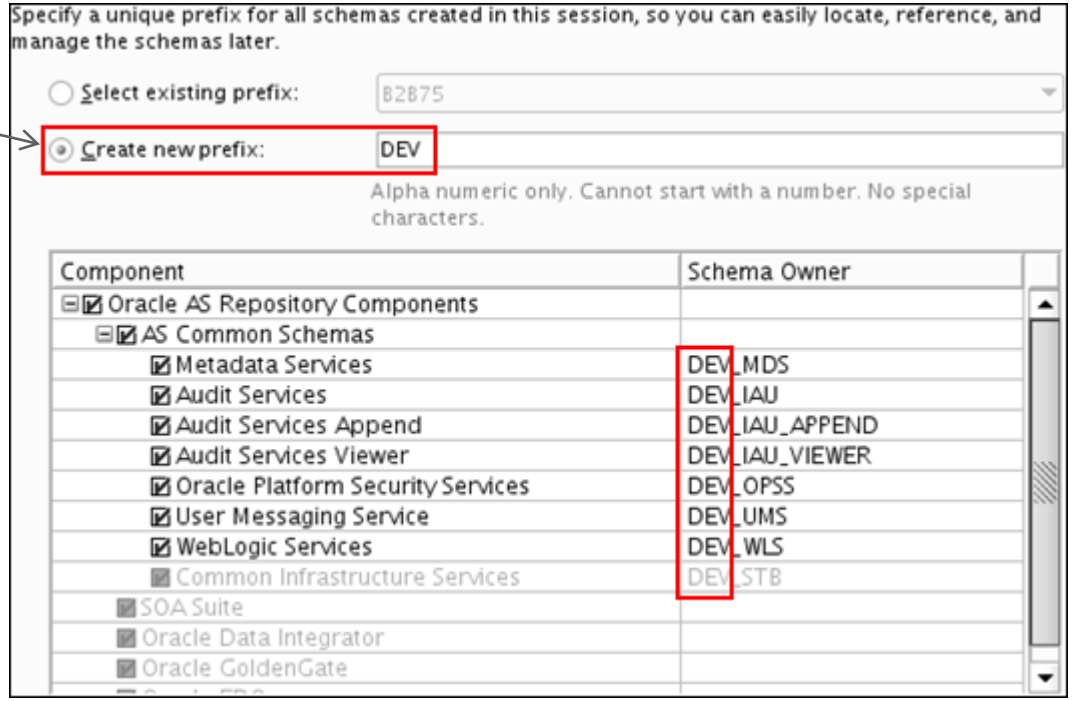


Schema prefix: DEV, for example, is needed when configuring the Oracle WebLogic domain.

Selecting Infrastructure Schemas in RCU

- Most product components have their own database schema to store configuration and runtime information.
- Each schema is typically assigned the select prefix, such as EDG or DEV.

Use “Create new prefix” for Infrastructure schemas.

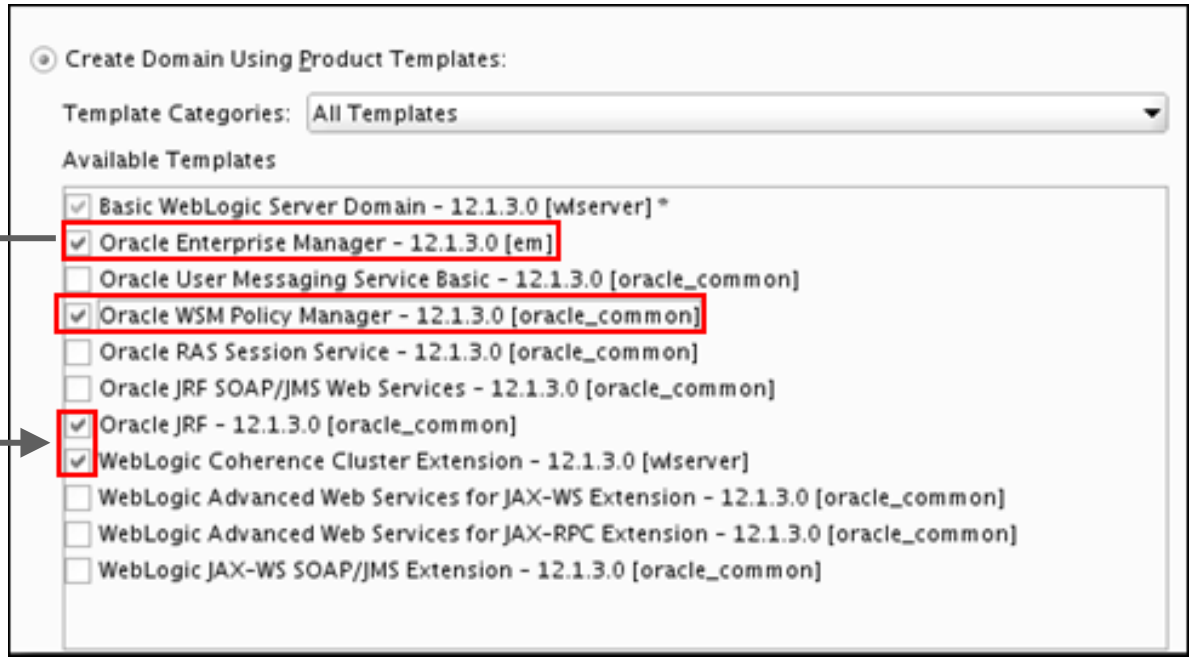


Configuring the Infrastructure Domain

To create the domain by using the WebLogic Domain Configuration Wizard, execute the following commands:

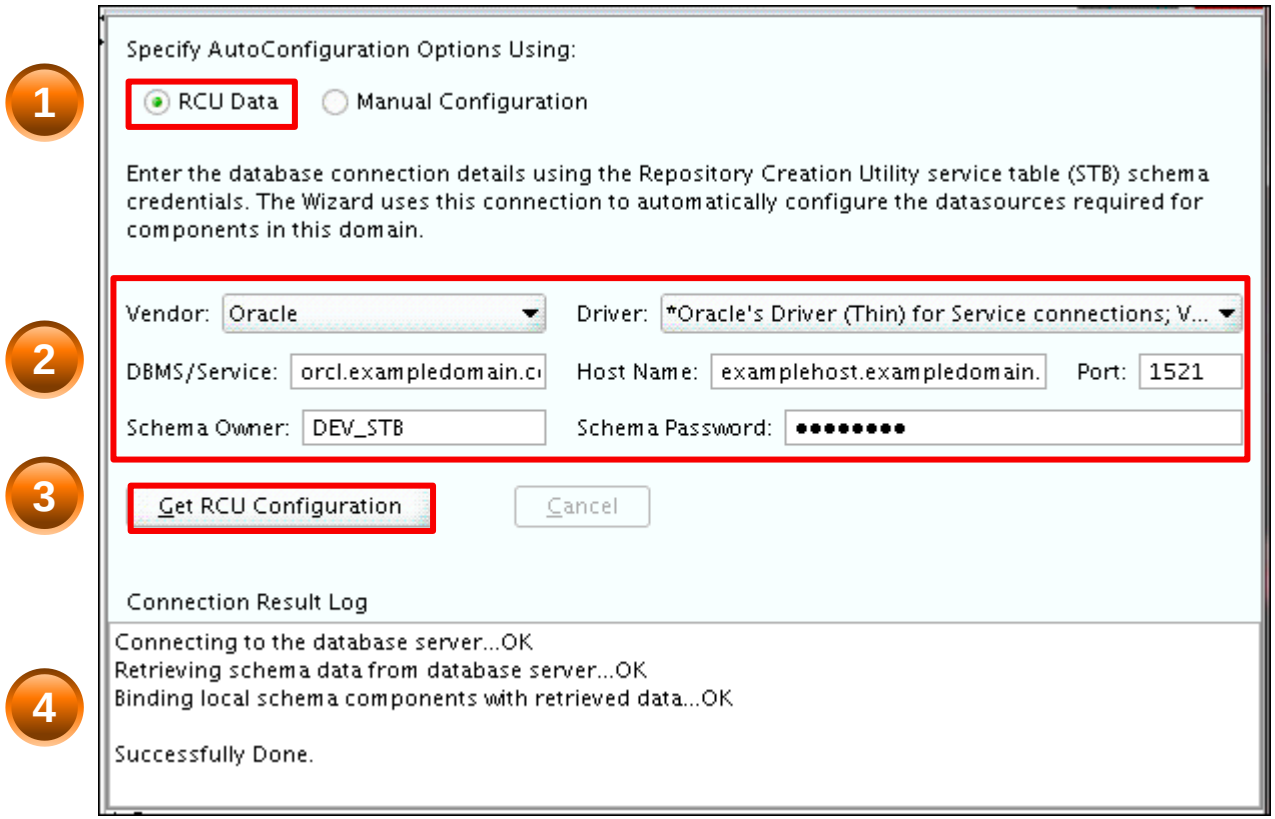
```
$ export ORACLE_HOME=/u01/oracle/product/fmw
$ cd $ORACLE_HOME/oracle_common/common/bin
$ ./config.sh
```

Template dependencies



Domain Configuration and Database Schemas

During domain configuration, use AutoConfiguration Options to obtain RCU data to provide values for component schema fields.



Servers, Clusters, Machines, and Node Managers

The Advanced Configuration page in the Domain Configuration Wizard provides options to display pages for configuring:

- The AdminServer server name, listen address, and listen port, including the SSL ports (if required)
- The Managed Server instance names, listen addresses, and ports
- The cluster name and the Managed Servers that belong to the cluster
- The machine names on which the Node manager instances are started and the Node Manager listen ports. A Node Manager manages the server instance that is assigned to its machine.

Note: These pages are essential for creating the initial Oracle Fusion Middleware Infrastructure domain.

Coherence in Clustered Domain Configurations

Selecting Advanced Configuration also presents a page to configure Coherence by specifying the following options:

- Multicast or unicast (the default) communication mode
- Port used for communication. A port value of zero allows the server to determine the actual port at run time.

Unicast Communication in the Application Tier

Unicast communication is recommended because:

- Cross-network configuration is not required
- Potential network errors are reduced in comparison with multicast address conflicts
- It works out of the box for most topologies

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Propagating Configuration to Managed Servers

An Enterprise Deployment configuration is not complete until the initial domain configuration that is created by the WebLogic Domain Configuration Wizard is propagated to each Managed Server in the cluster. To propagate the domain configuration, perform the following steps:

1. Run the WebLogic `pack.sh` script to create a template JAR file of the Admin Server configuration tree.
2. Run the WebLogic `unpack.sh` script with the template JAR that was created by the pack to create the configuration tree on each Managed Server host.

Propagating the Domain with Pack and Unpack Scripts

To propagate the domain configuration with the pack and unpack scripts, use the following commands:

- Running `pack.sh` to create the template JAR:

```
$ cd $ORACLE_HOME/oracle_common/common/bin
$ ./pack.sh -managed=true –domain=$ADMIN_DOMAIN_HOME
    -template=edgdomain_template.jar
    -template_name=edgdomain
```

- Running `unpack.sh` to create the domain configuration on Managed Servers:

```
$ cd $ORACLE_HOME/oracle_common/common/bin
$ ./unpack.sh –domain=$MANAGED_DOMAIN_HOME
    -overwrite_domain=true
    -template=edgdomain_template.jar
    -log_priority=DEBUG -log=unpack_edgdomain.log
```

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Starting the Servers in an Enterprise Deployment Domain

1. Start the Node Manager on each machine in the domain:

```
$ cd $DOMAIN_HOME/bin
$./startNodeManager.sh
```

2. Start the AdminServer, preferably through Node Manager:

```
$ cd $DOMAIN_HOME/bin
$./startWebLogic.sh
```

3. Start the Managed Servers on their designated hosts:
   A. On SOAHOST01

```
$ cd $DOMAIN_HOME/bin
$./startManagedWebLogic.sh soa_server1
```

   B. On SOAHOST02

```
$ cd $DOMAIN_HOME/bin
$./startManagedWebLogic.sh soa_server2
```

Note: The Managed Servers can be started with administration interfaces after starting the Node Manager and the AdminServer.

Stopping the Servers and the Node Manager

1. Stop the Managed Servers:
   A. On SOAHOST01

```
$ cd $DOMAIN_HOME/bin
$./stopManagedWebLogic.sh soa_server1
```

   B. On SOAHOST02

```
$ cd $DOMAIN_HOME/bin
$./stopManagedWebLogic.sh soa_server2
```

2. Stop the AdminServer:

```
$ cd $DOMAIN_HOME/bin
$./stopWebLogic.sh
```

3. Stop the Node Manager instances on each machine:

```
$ cd $DOMAIN_HOME/bin
$./stopNodeManager.sh
```

Note: The Managed Servers can be stopped with administration interfaces, with the AdminServer and Node Manager running.

Starting and Stopping the Servers with Node Manager

After starting Node Manager, other servers can be controlled with WLST scripts or through the web administration interfaces.

- Starting the Administration Server with WLST:

```
$ $ORACLE_HOME/oracle_common/common/bin/wlst.sh
wls> nmConnect('weblogic','nmpswd','adminvh.example.com',5556,
        'edg_domain','/u02/oracle/config/domains/edg_domain','ssl')
wls> nmStart('AdminServer')
# Note: Use: nmKill('AdminServer') to stop the server
```

- Starting Managed Servers with WLST:

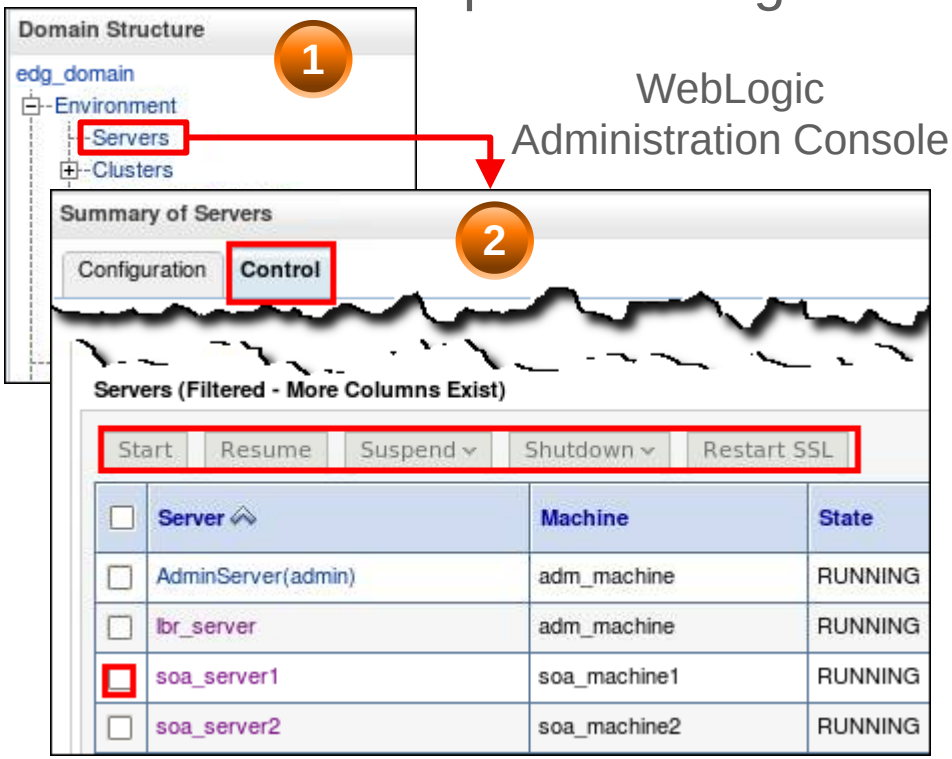
```
$ $ORACLE_HOME/oracle_common/common/bin/wlst.sh
wls> connect('weblogic','password','t3://adminvh.example.com:7001')
wls> start('soa_server1','Server')
wls> start('soa_server2','Server')
# OR start servers by starting the cluster:
wls> start('soa_cluster1','Cluster')
# Use: shutdown('soa_cluster1','Cluster', block="true") to stop servers
# Use: shutdown('soa_server1','Server', block="true") to stop one server
```

Note: By using Node Manager, the servers in the domain can be restarted (or migrated) when Node Manager detects failures.

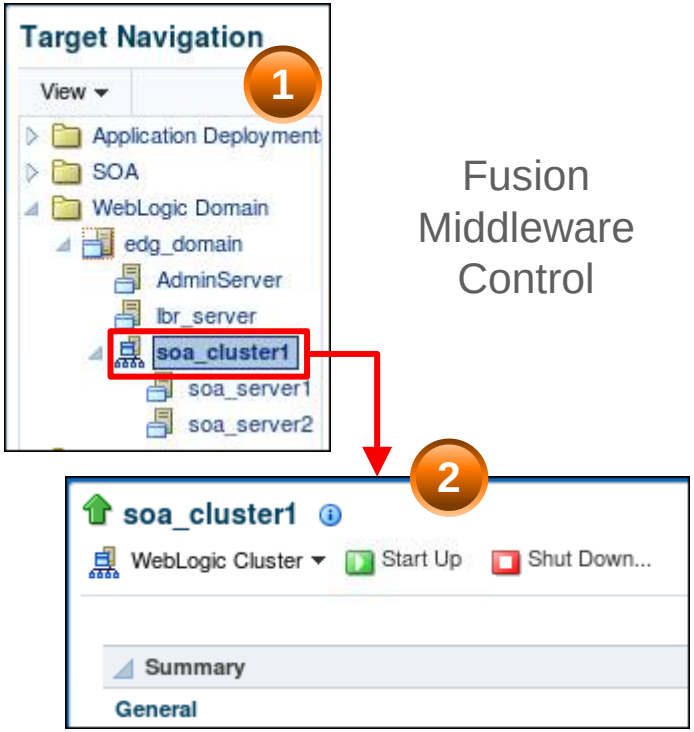
Controlling the Servers with Administration Applications

With the Node Manager and the Administration Server running, you can control the Managed Servers through the following:

- Oracle WebLogic Administration Console
- Oracle Enterprise Manager Fusion Middleware Control



WebLogic Administration Console



Fusion Middleware Control

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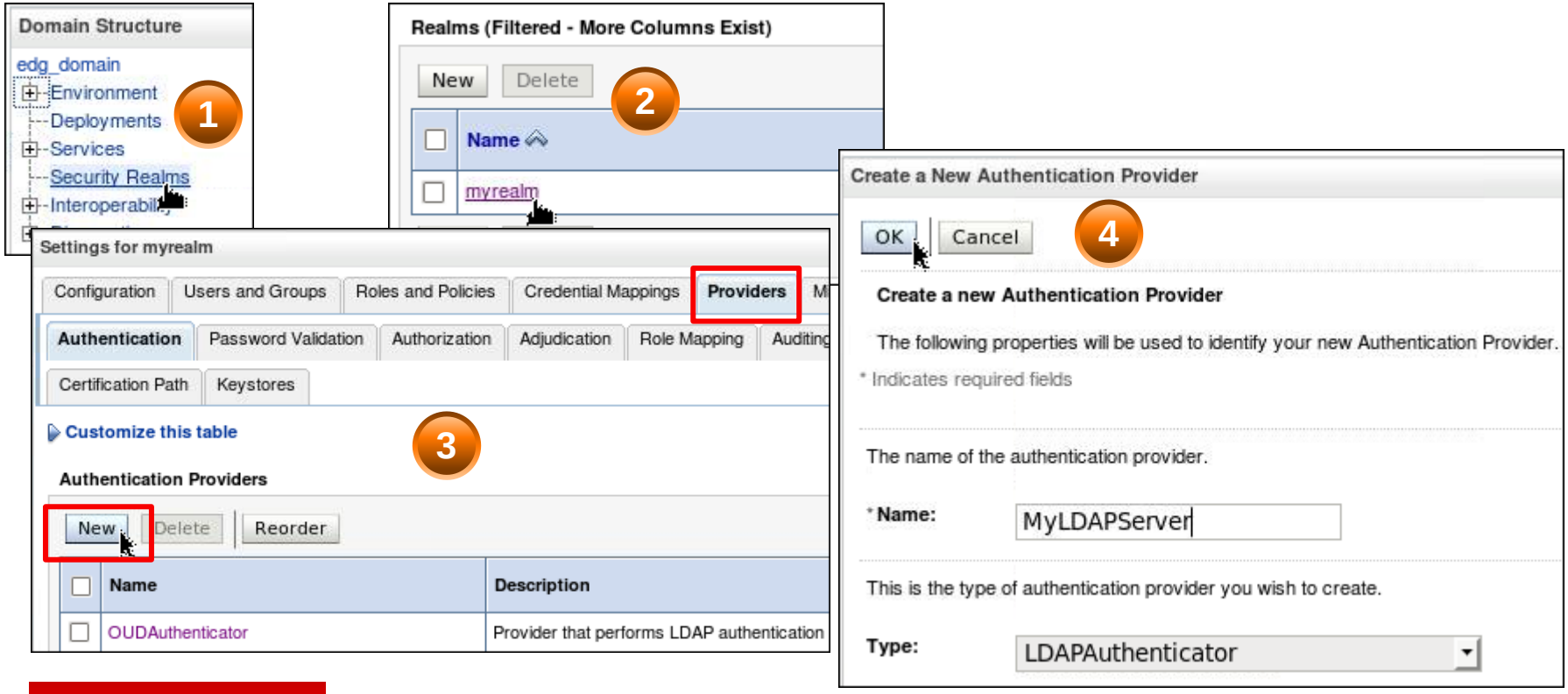
Creating an LDAP Authentication Provider

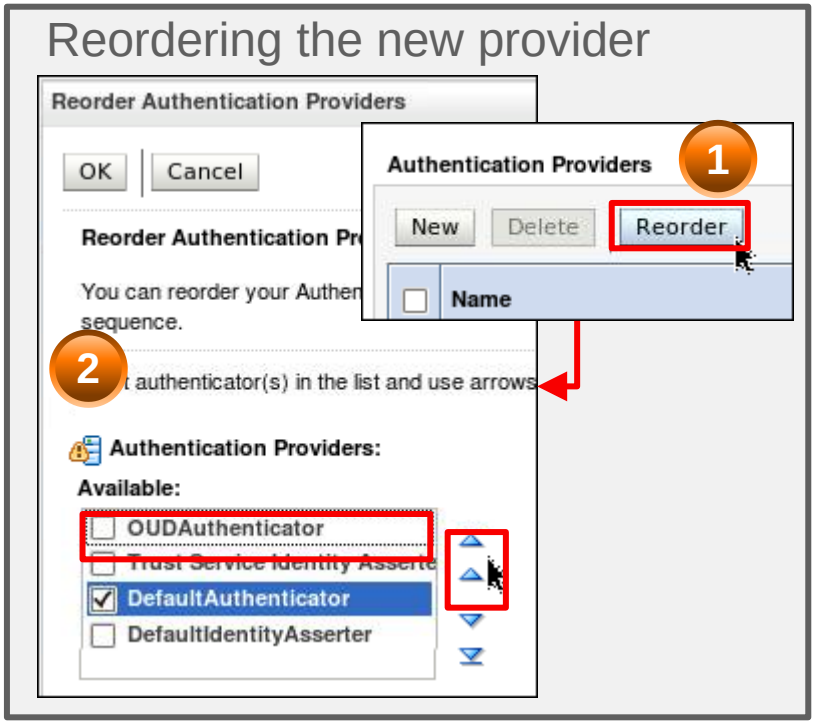
Enterprise Deployment topologies require a centrally managed authentication and authorization service. Use the Oracle WebLogic Administration Console to create an LDAP provider for your LDAP server as a central authentication provider.

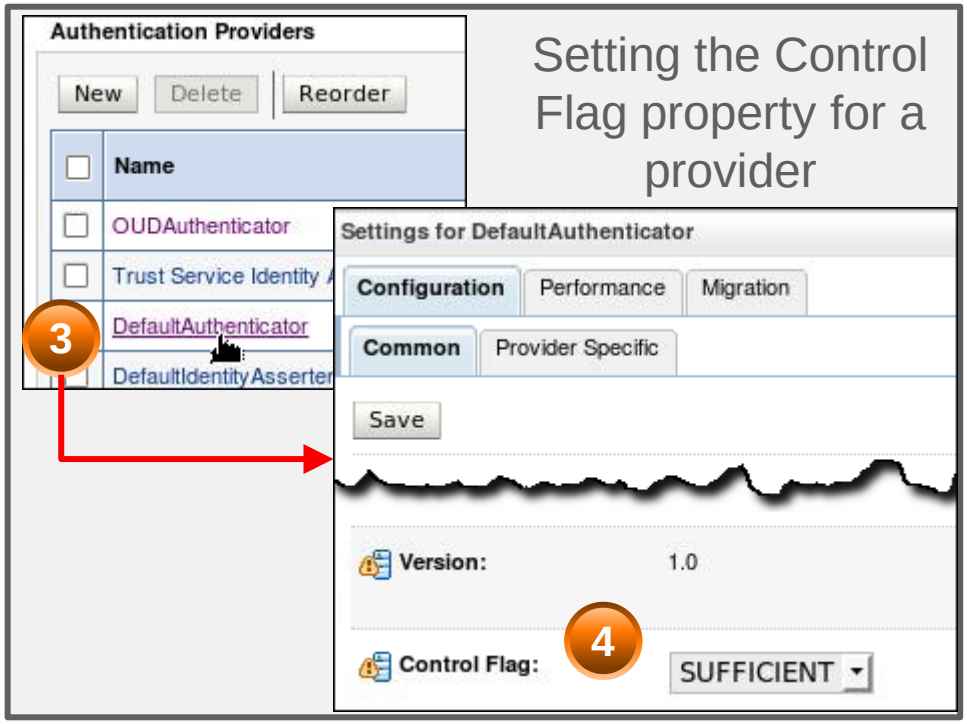


Additional Authentication Provider Configuration

After creating the new authentication provider:

- Reorder the new provider to be the first (topmost) in the list
- Set the Control Flag property to `SUFFICIENT` for *all* LDAP providers (including the DefaultAuthenticator entry)





Creating a SOA Administrator in the LDAP Server

You can create a SOA Administrator user in the LDAP server for administration of the Oracle SOA Suite 12*c* services and applications.

- To create a SOA Administrator:
  - Provision a user to the LDAP server user tree, for example, `weblogic_soa`
  - Provision a group in the LDAP server group tree, for example, `SOA Administrators`

  Note: Provisioning can be done with LDIF files and through the tools provided by the LDAP server.
- To grant administration privileges (authorization) to the new LDAP user, in Oracle Enterprise Manager Fusion Middleware Control, add the SOA Administrators group as an entry for the selected Oracle SOA Suite 12*c* application stripes, and additional products as required.

Authorization Roles for Web Services Manager

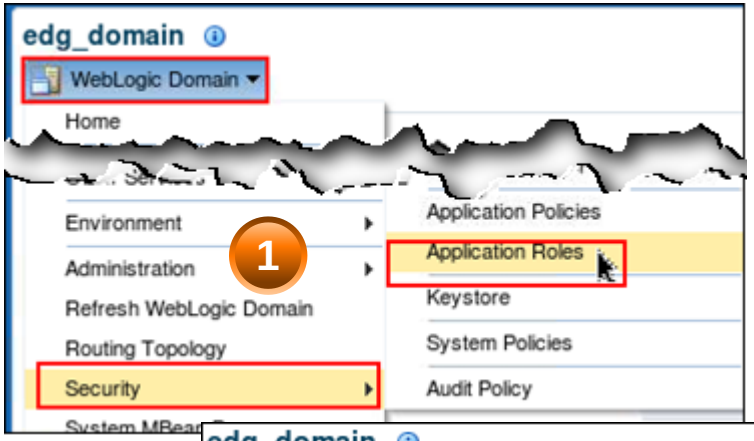
The authorization roles for the Web Services Manager Policy Management (wsm-pm) application stripe are:

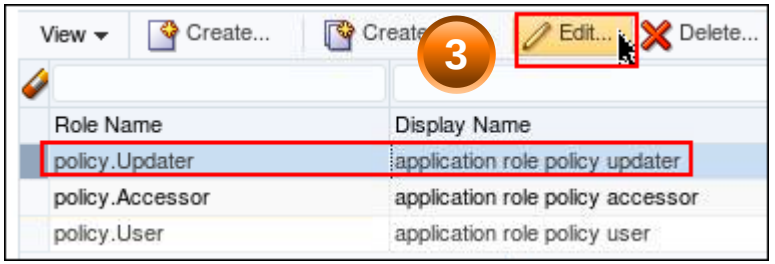
Role	Description	Default User
policy.Updater	Can create, edit, update, and delete policies	Administrators
policy.Accessor	Is used by the Policy Manager to secure the EJBs accessed by the Oracle WSM Agent run time to attach policies	Administrators OracleSystemGroup
policy.User	Provides read-only permission (query and view) on policies	All authenticated users

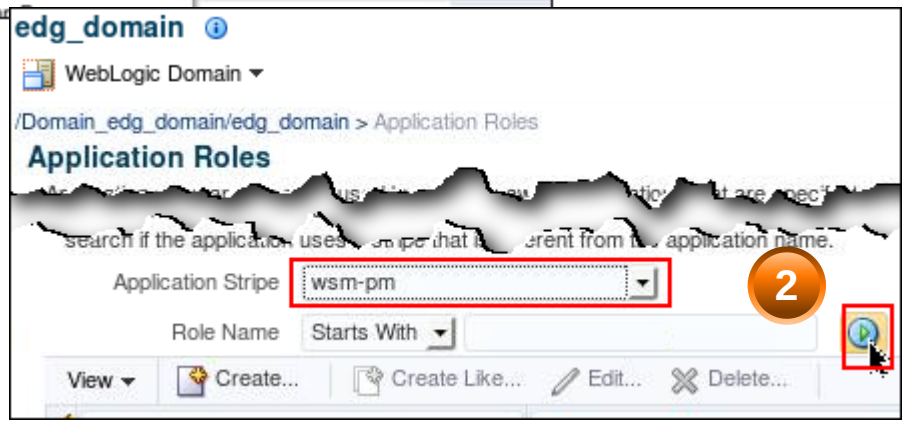
Note: Roles are based on Java permissions.

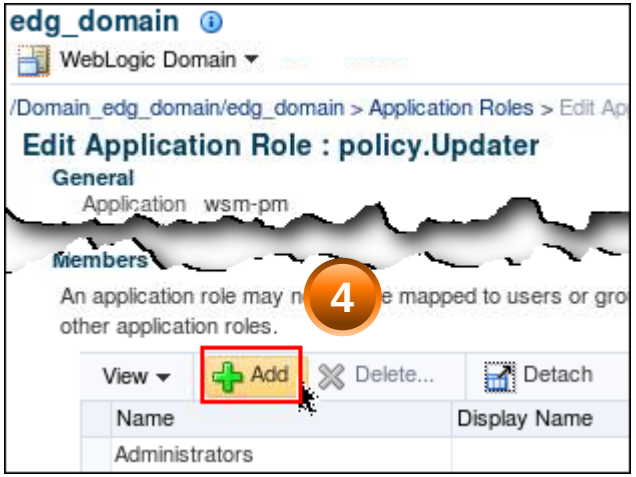
Authorizing Management of WSM-PM Functions

For example, to authorize the SOA Administrators group the rights to manage policies with Web Services Manager Policy Management (WSM-PM) components, add the group to the policy.Updater role.



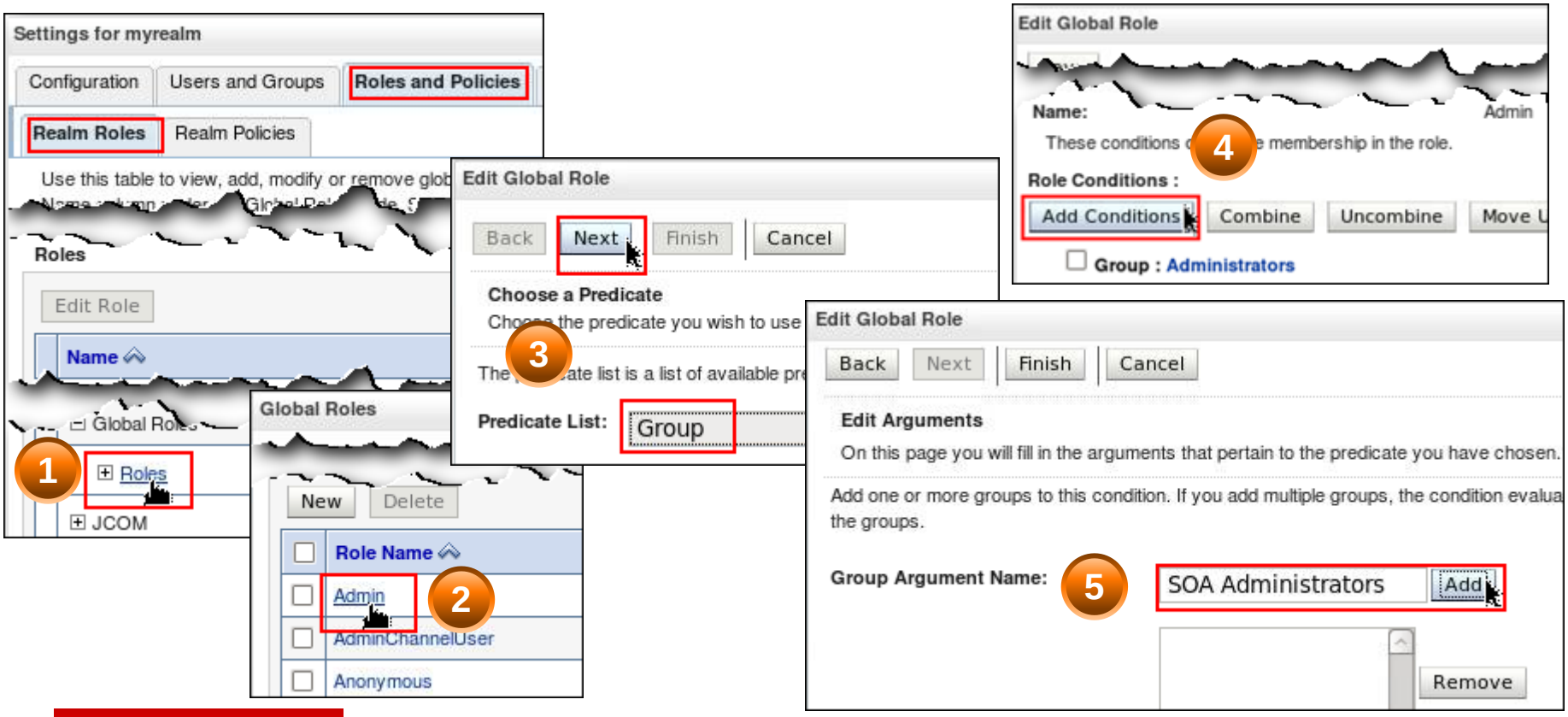






Authorizing a Custom LDAP Group as an Administrator

To add a custom LDAP group such as SOA Administrators, as a WebLogic administrator, in the WebLogic Administrator Console, navigate to Security Realms > myrealm > Roles and Policies.



Summary

In this lesson, you should have learned how to:

- Select the type of domain and installation approach
- Install the Oracle Fusion Middleware Infrastructure software
- Create a WebLogic domain with Oracle Fusion Middleware Infrastructure
- Configure WebLogic Server to use an external LDAP server (Oracle Unified Directory) for authentication and authorization

Practice 3: Overview

This practice covers the following topics

- 3-1: Installing the Oracle Fusion Middleware Infrastructure
- 3-2: Creating a Clustered SOA Domain for the Infrastructure
- 3-3: Integrating an LDAP Provider