Preface ............................................................................................................................................................... vii
  Audience ...................................................................................................................................................... vii
  Related Resources ....................................................................................................................................... vii
  Conventions ................................................................................................................................................ vii

Part I  Understanding the Lifecycle Management Tools

1 About the Lifecycle Management Tools
  1.1 What Are the Lifecycle Management Tools? ................................................................................. 1-1
  1.2 What Can I Do With the Lifecycle Management Tools? ............................................................... 1-2
    1.2.1 Define and Deploy a New Fusion Middleware Environment............................................... 1-2
    1.2.2 Update an Existing Fusion Middleware Environment......................................................... 1-3
  1.3 Understanding the Basics ............................................................................................................... 1-3
    1.3.1 Terms and Concepts ............................................................................................................. 1-3
    1.3.2 How Do I Create a Topology File? ..................................................................................... 1-4
    1.3.3 How Do I Invoke the Standard Actions? ........................................................................... 1-5

2 Getting Started with the Lifecycle Management Tools
  2.1 Locating the Lifecycle Management Tools in a Fusion Middleware Oracle Home.................... 2-1
  2.2 Using the Lifecycle Management Tools Tutorial ........................................................................... 2-2
  2.3 Getting Help While Using Composer ............................................................................................ 2-2
  2.4 Using the Provisioning API JavaDocs .......................................................................................... 2-3

Part II  Tutorial: Installing and Configuring Oracle SOA Suite Using the LCM Tools

3 About the Lifecycle Management Tools Tutorial
  3.1 Overview of the Lifecycle Management Tools Tutorial............................................................ 3-1
    3.1.1 Flow Chart of the Tutorial Steps ....................................................................................... 3-1
    3.1.2 Roadmap Table of the Tutorial Steps ............................................................................. 3-2
  3.2 About the Sample Topology ........................................................................................................ 3-4
  3.3 About the Elements in the Sample Topology ........................................................................... 3-5
8.5 Using Apache Groovy to Run the create-domain Standard Action................................. 8-7
8.6 Starting the Servers............................................................................................................. 8-11

Part III Appendices Additional Information About the Lifecycle Management Tools

A Additional Information About Standard Actions
   A.1 Using the Standard Actions JavaDoc............................................................................ A-1
   A.2 More Information About Commonly Used Standard Actions .................................. A-1
       A.2.1 About the Create Domain Standard Action......................................................... A-2
       A.2.2 About the Install Oracle Home Standard Action .............................................. A-2
       A.2.3 About the Create Schema Standard Action......................................................... A-2
       A.2.4 About the Load Schema Standard Action......................................................... A-2
       A.2.5 About the Start Standard Action........................................................................ A-2
       A.2.6 About the Stop Standard Action........................................................................ A-3
Preface

This document describes how to configure and use the Oracle Fusion Middleware Lifecycle Management Tools to configure and manage a domain.

Audience

This document is intended for administrators who use the Lifecycle Management Tools to install, configure, and manage Oracle Fusion Middleware.

Related Resources

For more information, see these Oracle resources:

- Oracle Fusion Middleware Java API Reference for the Lifecycle Management Action Framework
- Oracle Fusion Middleware Java API Reference for the Lifecycle Management Environment Specification
- Oracle Fusion Middleware Java API Reference for the Lifecycle Management Credential Management

Conventions

The following text conventions are used in this document:

<table>
<thead>
<tr>
<th>Convention</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>boldface</strong></td>
<td>Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.</td>
</tr>
<tr>
<td><em>italic</em></td>
<td>Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.</td>
</tr>
<tr>
<td>monospace</td>
<td>Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.</td>
</tr>
</tbody>
</table>
Part I

Understanding the Lifecycle Management Tools

The following topics describe the concepts and features of the Lifecycle Management Tools.

About the Lifecycle Management Tools
The Lifecycle Management Tools provide the means to install, configure, and manage an Oracle Fusion Middleware environment.

Getting Started with the Lifecycle Management Tools
Use the Lifecycle Management Tools tutorial and the API JavaDocs to help you get started working with the tools.
1

About the Lifecycle Management Tools

The Lifecycle Management Tools provide the means to install, configure, and manage an Oracle Fusion Middleware environment.

**What Are the Lifecycle Management Tools?**
The Oracle Fusion Middleware Lifecycle Management Tools provide a comprehensive set of tools that can automate the deployment and management of specific Oracle Fusion Middleware topologies.

**What Can I Do With the Lifecycle Management Tools?**
With the Oracle Fusion Middleware Lifecycle Management Tools, you can define and deploy a new Fusion Middleware topology. Once you have defined the topology, by creating a topology, you can update the topology.

**Understanding the Basics**
Before you begin using the Lifecycle Management Tools, you should understand some basic concepts and basic tasks you will be performing with the tools.

1.1 **What Are the Lifecycle Management Tools?**
The Oracle Fusion Middleware Lifecycle Management Tools provide a comprehensive set of tools that can automate the deployment and management of specific Oracle Fusion Middleware topologies.

The main components of the Lifecycle Management tools are described in the following table.

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fusion Middleware Environment Specification</td>
<td>The environment specification is a standardized, strongly-typed data structure that describes a Fusion Middleware environment.</td>
</tr>
<tr>
<td>Fusion Middleware Composer</td>
<td>Composer is a client application that provides a graphical user interface for describing a Fusion Middleware topology. A topology can be created from scratch by adding each element to the topology one-by-one.</td>
</tr>
</tbody>
</table>
### Component Description

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
</table>
| Fusion Middleware Action Framework | The Action Framework is a standard mechanism to invoke lifecycle operations across products. Actions can be performed on targets, which are defined by the environment specification. The Lifecycle Management Tools provide a set of standard actions, such as the following:  
- Create an Oracle home  
- Create a Domain  
- Start and stop a server, cluster, and Node Manager. You can also create custom actions. |
| Fusion Middleware Provisioning APIs | The Provisioning APIs include:  
- The Java API for the Lifecycle Management Environment Specification  
- The Java API for the Lifecycle Management Action Framework  
- The Java API for Lifecycle Management Credential Management  
For more information, see Using the Standard Actions JavaDoc |

**1.2 What Can I Do With the Lifecycle Management Tools?**

With the Oracle Fusion Middleware Lifecycle Management Tools, you can define and deploy a new Fusion Middleware topology. Once you have defined the topology, by creating a topology, you can update the topology.

#### Define and Deploy a New Fusion Middleware Environment

You can use the Oracle Fusion Middleware Lifecycle Management Tools to define and deploy a new Oracle Fusion Middleware environment. This is an alternative to manually installing and deploying the software with the Fusion Middleware installer and Configuration Wizard.

#### Update an Existing Fusion Middleware Environment

Besides creating a new environment, you can also update an existing environment. For example, you can extend an existing Oracle Fusion Middleware domain to include additional components.

**1.2.1 Define and Deploy a New Fusion Middleware Environment**

You can use the Oracle Fusion Middleware Lifecycle Management Tools to define and deploy a new Oracle Fusion Middleware environment. This is an alternative to manually installing and deploying the software with the Fusion Middleware installer and Configuration Wizard.

To define and deploy a new Fusion Middleware environment, you need to:

1. Create a topology file that describes the topology you want to create.  
   For more information, see How Do I Create a Topology File?  
2. Use Java or an equivalent scripting language to invoke a set of standard actions that use the data in the topology file to deploy your new environment.
For example, when you are creating a new environment, you will likely use the `create-domain` standard action, which is part of the Lifecycle Management Tools Action Framework.

For more information, see How Do I Invoke the Standard Actions?.

### 1.2.2 Update an Existing Fusion Middleware Environment

Besides creating a new environment, you can also update an existing environment. For example, you can extend an existing Oracle Fusion Middleware domain to include additional components.

To extend or update an existing Fusion Middleware domain, you need to:

1. Create or locate a topology file that describes the topology you want to create.
   
   For more information, see How Do I Create a Topology File?.

2. Use Java or an equivalent scripting language to invoke a set of standard actions that use the data in the topology file to update or extend an existing Oracle Fusion Middleware domain.
   
   For more information, see How Do I Invoke the Standard Actions?.

### 1.3 Understanding the Basics

Before you begin using the Lifecycle Management Tools, you should understand some basic concepts and basic tasks you will be performing with the tools.

#### Terms and Concepts

Before you begin using the Lifecycle Management Tools, you should learn about some important terms and concepts that are specific to the LCM Tools.

**How Do I Create a Topology File?**

The first step in deploying a new Fusion Middleware environment is to create a topology file (XML or JSON) that defines the elements of the topology. You can then use the standard actions to deploy or manage the topology.

**How Do I Invoke the Standard Actions?**

After you have identified a topology file, which defines the characteristics of the environment, you can then invoke one or more standard actions to create or modify the environment.

#### 1.3.1 Terms and Concepts

Before you begin using the Lifecycle Management Tools, you should learn about some important terms and concepts that are specific to the LCM Tools.

As you learn about and use the Lifecycle Management Tools, you should be aware of the following terms and concepts.
### 1.3.2 How Do I Create a Topology File?

The first step in deploying a new Fusion Middleware environment is to create a topology file (XML or JSON) that defines the elements of the topology. You can then use the standard actions to deploy or manage the topology.

There are two methods for creating a topology file, as shown in the following table.

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start with a sample file</td>
<td>A sample topology file that represents a typical single-host Oracle SOA Suite domain is available for download from the Oracle Help Center. You can download this sample (or another sample like it) and edit specific values to match the environment you want to create. The Lifecycle Management Tools tutorial describes how to use this method of creating a new topology file.</td>
<td>Tutorial: Installing and Configuring Oracle SOA Suite Using the LCM Tools</td>
</tr>
</tbody>
</table>
### Method & Description

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
</table>
| Use Composer and its built-in tools to "draw" the topology from scratch.| If you don’t want to use a sample file, you can create a new topology file by opening Composer and creating each element of the topology, one-by-one. Oracle recommends that you first familiarize yourself with the Composer user interface by going through the tutorial or by reviewing the online help for the various Composer features. | Tutorial: Installing and Configuring Oracle SOA Suite Using the LCM Tools  
Overview of FMW Composer in FMW Composer Online Help |

### 1.3.3 How Do I Invoke the Standard Actions?

After you have identified a topology file, which defines the characteristics of the environment, you can then invoke one or more standard actions to create or modify the environment.

To invoke a standard action, you must use Java or a similar scripting language.

If you are familiar with Java programming, you can use the *Oracle Fusion Middleware Java API Reference for the Lifecycle Management Action Framework* to learn more about how to reference the standard actions in your Java code.

Note that the examples in this guide use Apache Groovy, which is a simple open source scripting language, that uses concepts similar to Java. See [http://www.groovy-lang.org/index.html](http://www.groovy-lang.org/index.html). To learn more about how to use Groovy to invoke standard actions, see the Tutorial: Installing and Configuring Oracle SOA Suite Using the LCM Tools.
Getting Started with the Lifecycle Management Tools

Use the Lifecycle Management Tools tutorial and the API JavaDocs to help you get started working with the tools.

Locating the Lifecycle Management Tools in a Fusion Middleware Oracle Home
The Lifecycle Management Tools are installed automatically into the Oracle home when you install any Oracle Fusion Middleware product. The files, depending on their purpose and type, are stored in various directories within the Oracle home.

Using the Lifecycle Management Tools Tutorial
The most efficient way to get familiar with the Lifecycle Management Tools is to use the tutorial in this guide.

Getting Help While Using Composer
When you start using Fusion Middleware Composer, you can get online help on each of the key Composer screens. You can use this information to learn about the properties and attributes that must be set for each element of the topology.

Using the Provisioning API JavaDocs
The Lifecycle Management Tools Provisioning APIs are described in the JavaDoc for each API.

2.1 Locating the Lifecycle Management Tools in a Fusion Middleware Oracle Home

The Lifecycle Management Tools are installed automatically into the Oracle home when you install any Oracle Fusion Middleware product. The files, depending on their purpose and type, are stored in various directories within the Oracle home.

The following table lists the locations of the key components of the Lifecycle Management Tools inside a typical Fusion Middleware Oracle home.

<table>
<thead>
<tr>
<th>File or Component</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fusion Middleware Composer</td>
<td>ORACLE_HOME/oracle_common/bin/fmw-composer.sh</td>
</tr>
<tr>
<td>Supporting libraries, the Action Framework, and APIs</td>
<td>ORACLE_HOME/oracle_common/modules/fmwplatform/</td>
</tr>
</tbody>
</table>
2.2 Using the Lifecycle Management Tools Tutorial

The most efficient way to get familiar with the Lifecycle Management Tools is to use the tutorial in this guide.

The tutorial explains, step-by-step, how to use Apache Groovy, a sample topology file, and sample code to deploy a basic Oracle Fusion Middleware domain on a single host. The domain topology is similar to the standard installation topology described in About the Oracle SOA Suite Standard Installation Topology in Oracle Fusion Middleware Installing and Configuring Oracle SOA Suite and Business Process Management.

The tutorial demonstrates how you can:

- Open and edit a topology file in Fusion Middleware Composer.
- Use the sample code to add the Oracle SOA Suite software to an Oracle home and deploy the sample topology.
- Review sample Apache Groovy code that invokes the create-domain standard action.

When you finish the tutorial, you can then apply the concepts to your own environment.

For more information, see Tutorial: Installing and Configuring Oracle SOA Suite Using the LCM Tools.

2.3 Getting Help While Using Composer

When you start using Fusion Middleware Composer, you can get online help on each of the key Composer screens. You can use this information to learn about the properties and attributes that must be set for each element of the topology.

From within Composer, you can get help in the following ways:

- From the Help menu, you can navigate to specific locations in the Lifecycle Management Tools documentation.

  ![Help Menu](image)

  - About the Lifecycle Tools
  - Getting Started
  - Tutorial
  - About

- After you have created or opened a topology file, click the Help icon in the toolbar, and then click an object in the topology, to get help on a specific object in the topology diagram.

- After you select an object in a topology diagram, such as the host or Managed Server, you can then click the help icon in the properties panel for information about the properties and attributes you can set for that object.
• Click the help icon in the validation pane 🔄, at the bottom of the Composer screen, for information about how to use the validation pane to quickly address any missing information that is required for the topology.

2.4 Using the Provisioning API JavaDocs

The Lifecycle Management Tools Provisioning APIs are described in the JavaDoc for each API.

As you develop the required Java code for your environment, you can refer to the JavaDoc for specific information about each of the APIs. In addition, you can review the sample code provided as part of the Lifecycle Management Tools tutorial.

The following JavaDocs are available:

• Oracle Fusion Middleware Java API Reference for the Lifecycle Management Action Framework

• Oracle Fusion Middleware Java API Reference for the Lifecycle Management Environment Specification

• Oracle Fusion Middleware Java API Reference for the Lifecycle Management Credential Management
This tutorial shows you how to use the Lifecycle Management (LCM) Tools to install and configure Oracle SOA Suite on a single host on Oracle Linux.

In this tutorial, you will download a sample zip file that contains sample topology files, make edits to the topology files in FMW Composer, and then use Apache Groovy to invoke Lifecycle Management standard actions on the environment.

The tutorial includes the following topics:

- **About the Lifecycle Management Tools Tutorial**
  The Lifecycle Management Tools tutorial guides you through the steps of obtaining the sample topology and sample code from the Oracle Technology Network (OTN), editing the various elements of the topology, and configuring the topology based on the information you specify in a topology file.

- **Performing Prerequisite Tasks**
  There are several prerequisite tasks you need to complete to prepare your environment for running the examples in this tutorial.

- **Using the Wallet Manager Tool to Set Up a Wallet**
  To perform lifecycle operations using the LCM tools, password credentials must be stored in a wallet. As a result, you need to set up an Oracle wallet that contains the required credentials to run the create-domain action, such as the user name and password used for connecting to the database.

- **Using the Lifecycle Management Tools to Install Oracle SOA Suite**
  Follow these steps to use Apache Groovy to run the install-oraclehome standard action, which will install Oracle SOA Suite into the Infrastructure Oracle home you created.

- **Creating the Database Schemas**
  Before you configure the Oracle SOA Suite domain, use the Repository Creation Utility (RCU) to install the required schemas on a certified database.

- **Using the Lifecycle Management Tools to Configure the SOA Suite Domain**
  After installing Oracle SOA Suite and creating the database schemas, follow these steps to use Apache Groovy to run the create-domain standard action and create the domain.
The Lifecycle Management Tools tutorial guides you through the steps of obtaining the sample topology and sample code from the Oracle Technology Network (OTN), editing the various elements of the topology, and configuring the topology based on the information you specify in a topology file.

**Overview of the Lifecycle Management Tools Tutorial**

The Lifecycle Management Tools tutorial consists of a series of steps, where you perform some prerequisite steps and then use the Lifecycle Management Tools to automatically add Oracle SOA Suite to the Oracle home and create the Weblogic Server domain.

**About the Sample Topology**

The sample topology used for this tutorial is similar to the standard installation topology used for Oracle SOA Suite. It includes a Managed Server, a cluster, and other elements of a typical domain, deployed on a single host.

**About the Elements in the Sample Topology**

The sample topology includes common elements, such as a WebLogic domain, an Administration Server, and a cluster containing one Managed Server.

### 3.1 Overview of the Lifecycle Management Tools Tutorial

The Lifecycle Management Tools tutorial consists of a series of steps, where you perform some prerequisite steps and then use the Lifecycle Management Tools to automatically add Oracle SOA Suite to the Oracle home and create the Weblogic Server domain.

**Flow Chart of the Tutorial Steps**

A flow chart is an effective way to view a summary of the tasks required to complete the tutorial.

**Roadmap Table of the Tutorial Steps**

The roadmap table describes each step in the tutorial and provides links to more information.

### 3.1.1 Flow Chart of the Tutorial Steps

A flow chart is an effective way to view a summary of the tasks required to complete the tutorial.

The following illustration shows the structure of the Lifecycle Management Tools tutorial.
3.1.2 Roadmap Table of the Tutorial Steps

The roadmap table describes each step in the tutorial and provides links to more information.
<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understand the Sample SOA Topology</td>
<td>Review the sample topology you will configure using the Lifecycle Management Tools.</td>
<td>About the Sample Topology</td>
</tr>
<tr>
<td>Install or Identify a Certified Database</td>
<td>Before you can configure an Oracle Fusion Middleware domain, you must have a supported database where you can install the required product schemas.</td>
<td>Installing a Certified Database</td>
</tr>
<tr>
<td>Download a Certified JDK</td>
<td>Oracle Fusion Middleware and the Lifecycle Management Tools require a certified JDK; otherwise you cannot install or run the product software.</td>
<td>Installing a Certified JDK</td>
</tr>
<tr>
<td>Download and Install Apache Groovy</td>
<td>You can use Java or a Java-compatible scripting language to invoke the standard actions. For this tutorial, we use Apache Groovy, a simple open-source programming language that is similar to Java.</td>
<td>Installing Apache Groovy</td>
</tr>
<tr>
<td>Download the LCM Tools Sample Code</td>
<td>For this tutorial, you will use sample topology files and sample Groovy scripts to update an Oracle home and create a new Oracle SOA Suite domain.</td>
<td>Downloading the Lifecycle Management Tools Sample File</td>
</tr>
<tr>
<td>Use the Installer to Create an Infrastructure Oracle home</td>
<td>Use the Fusion Middleware Infrastructure Installer to create the initial Oracle home. The Infrastructure distribution is a prerequisite for Oracle SOA Suite; it also includes the Lifecycle Management Tools software.</td>
<td>Installing Oracle Fusion Middleware Infrastructure</td>
</tr>
<tr>
<td>Create a Credentials Wallet</td>
<td>Before you can use the Lifecycle Management Tools, you must create a wallet, which is used to store the credentials required for the installation and configuration operations. This includes the Administration Server and database connection credentials.</td>
<td>Creating a Wallet</td>
</tr>
<tr>
<td>Use Composer to open the soa-bootstrap topology file</td>
<td>Composer shows you a diagram of the Oracle home with Oracle SOA Suite software installed.</td>
<td>Starting FMW Composer</td>
</tr>
<tr>
<td>Edit the topology values to match your environment</td>
<td>In this step, you modify the properties of the Oracle home so it points to the Infrastructure Oracle home you created earlier.</td>
<td>Editing the soa-bootstrap-topology-1.0.json File</td>
</tr>
</tbody>
</table>
## 3.2 About the Sample Topology

The sample topology used for this tutorial is similar to the standard installation topology used for Oracle SOA Suite. It includes a Managed Server, a cluster, and other elements of a typical domain, deployed on a single host.

The following diagram shows the sample Oracle SOA Suite topology and the elements in that topology.

Note that this topology is a sample topology and is not the only topology supported for the product. However, this tutorial provides specific instructions for achieving this topology.

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use the install-oraclehome standard action to add SOA to the Oracle home</td>
<td>Edit the sample Groovy script so it references the path to your Oracle home, and then run the script to invoke the standard action.</td>
<td>Using Apache Groovy to Run the install-oraclehome Standard Action</td>
</tr>
<tr>
<td>Use RCU to create the database schemas</td>
<td>Use the Repository Creation Utility to create the required schemas in the database just like you would for a manual installation.</td>
<td>Creating the Database Schemas</td>
</tr>
<tr>
<td>Use Composer to open the soa-topology topology file</td>
<td>Composer displays a diagram of the SOA Suite topology.</td>
<td>Opening the soa-topology-1.0.json File</td>
</tr>
<tr>
<td>Edit the topology values to match your environment</td>
<td>You can use Composer to update the topology properties so they reference the host names, directory paths, and other characteristics of your specific environment.</td>
<td>Editing the soa-topology-1.0.json File</td>
</tr>
<tr>
<td>Use the create-domain standard action to create the domain</td>
<td>Edit the sample Groovy script so it references the path to your Oracle home, and then run the script to invoke the standard action.</td>
<td>Using Apache Groovy to Run the create-domain Standard Action</td>
</tr>
<tr>
<td>Start the servers</td>
<td>After the domain is created successfully, you can start the Administration Server and the Managed Server in the domain to verify the domain configuration.</td>
<td>Starting the Servers</td>
</tr>
</tbody>
</table>
In this topology, Oracle SOA Suite is deployed to the Managed Server.

Note that the topology also requires an external database for the required product schemas.

For information on the elements of this topology, see About the Elements in the Sample Topology.

### 3.3 About the Elements in the Sample Topology

The sample topology includes common elements, such as a WebLogic domain, an Administration Server, and a cluster containing one Managed Server.

The following table describes the elements of the topology illustration:

<table>
<thead>
<tr>
<th>Element</th>
<th>Description and Links to Related Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>APHOST1</td>
<td>A standard term used in Oracle documentation to refer to the an application server host computer.</td>
</tr>
<tr>
<td>DBHOST</td>
<td>A standard term used in Oracle documentation to refer to the database host computer.</td>
</tr>
<tr>
<td>WebLogic Domain</td>
<td>A logically related group of Java components (in this case, the Administration Server, Managed Server, and other related software components). For more information, see What is an Oracle WebLogic Server Domain? in Oracle Fusion Middleware Understanding Oracle Fusion Middleware.</td>
</tr>
</tbody>
</table>
## Element | Description and Links to Related Documentation
---|---
Administration Server | Central control entity of a WebLogic domain. It maintains configuration objects for that domain and distributes configuration changes to Managed Servers. For more information, see What is the Administration Server? in *Oracle Fusion Middleware Understanding Oracle Fusion Middleware*.

Enterprise Manager | Oracle Enterprise Manager Fusion Middleware Control is a primary tool used to manage a domain. For more information, see Oracle Enterprise Manager Fusion Middleware Control in *Oracle Fusion Middleware Understanding Oracle Fusion Middleware*.

Cluster | A collection of multiple WebLogic Server instances running simultaneously and working together. For more information, see Understanding Managed Servers and Managed Server Clusters in *Oracle Fusion Middleware Understanding Oracle Fusion Middleware*.

Managed Server | A host for your applications, application components, web services, and their associated resources. For more information, see Understanding Managed Servers and Managed Server Clusters in *Oracle Fusion Middleware Understanding Oracle Fusion Middleware*.

Infrastructure | Collection of services that include the following:
- Metadata repository (MDS) contains metadata for Oracle Fusion Middleware components, such as the Oracle Application Developer Framework. For more information, see What is the Metadata Repository? in *Oracle Fusion Middleware Understanding Oracle Fusion Middleware*.
- Oracle Application Developer Framework (Oracle ADF)
- Oracle Web Services Manager (OWSM)
Performing Prerequisite Tasks

There are several prerequisite tasks you need to complete to prepare your environment for running the examples in this tutorial.

Before you begin this tutorial, make sure you review and complete the following tasks:

- **Installing a Certified Database**
  
  If you do not already have a database where you can install schemas, you must install and configure a certified database.

- **Installing a Certified JDK**
  
  To install Fusion Middleware and use the Lifecycle Management Tools, you must download and install a certified Java Development Kit (JDK).

- **Obtaining the Oracle Fusion Middleware Software**
  
  To install the Oracle SOA Suite sample topology, you need to obtain the necessary Oracle Fusion Middleware software.

- **Installing Apache Groovy**
  
  After you have a JDK installed, download and install the latest version of Apache Groovy. Groovy is an open source tool that you will use to invoke Lifecycle Management standard actions and configure the sample topology.

- **Downloading the Lifecycle Management Tools Sample File**
  
  The Lifecycle Management Tools sample file contains sample topology files, which you can edit using FMW Composer, and sample Apache Groovy code that will be used to invoke the standard actions.

- **Installing Oracle Fusion Middleware Infrastructure**
  
  Using the Infrastructure distribution and JDK you downloaded, install Infrastructure to create an Oracle home. When you install Infrastructure, the Lifecycle Management Tools are automatically installed into the Oracle home.

### 4.1 Installing a Certified Database

If you do not already have a database where you can install schemas, you must install and configure a certified database.

For a list of certified databases that you can use, refer to the System Requirements and Supported Platforms for Oracle Fusion Middleware 12c certification document for your release, located on the Oracle Fusion Middleware Supported Systems Configuration page.

### 4.2 Installing a Certified JDK

To install Fusion Middleware and use the Lifecycle Management Tools, you must download and install a certified Java Development Kit (JDK).
You should always verify the required JDK version by reviewing the System Requirements and Supported Platforms for Oracle Fusion Middleware 12c certification document for your release, located on the Oracle Fusion Middleware Supported Systems Configuration page.

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


4.3 Obtaining the Oracle Fusion Middleware Software

To install the Oracle SOA Suite sample topology, you need to obtain the necessary Oracle Fusion Middleware software.

To create the Oracle SOA Suite topology, download the following software distributions:

- Oracle Fusion Middleware 12c (12.2.1.2.0) Infrastructure
- Oracle Fusion Middleware 12c (12.2.1.2.0) SOA Suite and Business Process Management

For specific information on the distributions you need to download, see the Oracle Fusion Middleware Download, Installation, and Configuration Readme Files on Oracle Technology Network (OTN).

4.4 Installing Apache Groovy

After you have a JDK installed, download and install the latest version of Apache Groovy. Groovy is an open source tool that you will use to invoke Lifecycle Management standard actions and configure the sample topology.

You can download the Groovy distribution from the following location:

http://groovy-lang.org/install.html

4.5 Downloading the Lifecycle Management Tools Sample File

The Lifecycle Management Tools sample file contains sample topology files, which you can edit using FMW Composer, and sample Apache Groovy code that will be used to invoke the standard actions.

To obtain the sample file for this tutorial:

1. Download the create-domain-example.zip file on Oracle Technology Network (OTN) to a directory on your system.

2. Open a new terminal window on your host.

3. Change directory to the directory where you downloaded the create-domain-example.zip file.

4. Unzip the create-domain-example.zip file in the current directory.

5. Verify that a folder named create-domain-example appears in the current directory, and note the path to this directory on your system.
4.6 Installing Oracle Fusion Middleware Infrastructure

Using the Infrastructure distribution and JDK you downloaded, install Infrastructure to create an Oracle home. When you install Infrastructure, the Lifecycle Management Tools are automatically installed into the Oracle home.

To install Oracle Fusion Middleware Infrastructure:

1. Log in to your host.

2. Go to the directory where you downloaded the installation program.

3. Launch the installation program by running the `java` executable from the JDK directory on your system, as shown in the following example:

   ```
   /home/Oracle/products/jdk1.8.0_101/bin/java -jar
   fmw_12.2.1.2.0_infrastructure_generic.jar
   ```

   Replace the JDK location in this example with the actual JDK location on your system.

4. On UNIX operating systems, the Installation Inventory Setup screen appears if this installation is your first Oracle installation on this host. Use this screen to specify the location of the Oracle central inventory directory.

   Make sure that the operating system group name selected has write permissions to the central inventory location. For more information, see About the Oracle Central Inventory in Oracle Fusion Middleware Installing Software with the Oracle Universal Installer.

5. On the Welcome screen, click Next.

6. The Auto Updates screen allows you to search for the latest software updates, including important security updates, via your My Oracle Support account. To skip software updates, select Skip Auto Updates.

7. On the Installation Location screen, specify your Oracle home directory location.

   For more information about selecting an Oracle home directory, see About the Directories for Installation and Configuration in Oracle Fusion Middleware Planning an Installation of Oracle Fusion Middleware.

8. On the Installation Type screen, select Fusion Middleware Infrastructure.

9. Use the Prerequisite Checks screen to verify that your system meets the minimum system requirements.

10. If you have an Oracle Support account, use the Security Updates screen to indicate how you want to receive security updates.

    If you do not have an account and are sure that you want to skip this step, clear the check box and verify your selection in the follow-up dialog box.

11. Verify the installation information on the Installation Summary Screen, and then click Install to begin installation.

12. When the installation progress bar reaches 100%, click Next.
13. Review the information on the Installation Complete screen, and then click **Finish** to dismiss the installer.
To perform lifecycle operations using the LCM tools, password credentials must be stored in a wallet. As a result, you need to set up an Oracle wallet that contains the required credentials to run the create-domain action, such as the user name and password used for connecting to the database.

To do this, you will use the Wallet Manager tool.

**About the Wallet Manager Tool**

You can use the Wallet Manager tool to create and manage the password credentials required to perform various lifecycle operations.

**Creating a Wallet**

This example shows you how to use the Wallet Manager tool to create a wallet and add the necessary password credentials to that wallet.

---

### 5.1 About the Wallet Manager Tool

You can use the Wallet Manager tool to create and manage the password credentials required to perform various lifecycle operations.

The Wallet Manager tool provides a simple command-line interface for building and maintaining an Oracle Wallet file. Depending on your security needs, you can either create an encrypted wallet or an auto-login one.

With this tool, you can:

- Create a new wallet.
- Add new credentials to a wallet.
- Update existing credentials in a wallet.
- Remove existing credentials from a wallet.

This tutorial shows you how to create a new, encrypted wallet. See Creating a Wallet.

If you are familiar with Java programming, you can also use the *Oracle Fusion Middleware Java API Reference for the Lifecycle Management Credential Management* to learn more about how to use the APIs to create a wallet.

### 5.2 Creating a Wallet

This example shows you how to use the Wallet Manager tool to create a wallet and add the necessary password credentials to that wallet.
For this tutorial, use the create-wallet.sh script in the create-domain-example directory to set up a wallet that contains the credentials referenced by the sample topology.

To create a wallet:

1. Change directory to the create-domain-example directory.
   
   ```
   cd path_to_example_directory/create-domain-example
   ```

2. Open the create-wallet.sh file, and specify values for the -password option for each credential.

   Use the following table to define the -password option for the database user, the WebLogic administrator user, and for each schema user in the create-wallet.sh file:

   Make a note of the passwords you define here; you need them later on during the domain creation process.

<table>
<thead>
<tr>
<th>-alias</th>
<th>-user</th>
<th>-password</th>
</tr>
</thead>
<tbody>
<tr>
<td>db1/dba</td>
<td>Database user name (the default user name on Oracle databases is sys)</td>
<td>database user password</td>
</tr>
<tr>
<td>soa/wlsadmin</td>
<td>WebLogic administrator user name (default is weblogic)</td>
<td>WebLogic administrator user password</td>
</tr>
<tr>
<td>db1/soa-infra</td>
<td>${SCHEMA_PREFIX}_SOAINFRA</td>
<td>SOAINFRA schema password</td>
</tr>
<tr>
<td>db1/opss</td>
<td>${SCHEMA_PREFIX}_OPSS</td>
<td>OPSS schema password</td>
</tr>
<tr>
<td>db1/iau</td>
<td>${SCHEMA_PREFIX}_IAU</td>
<td>IAU schema password</td>
</tr>
<tr>
<td>db1/iau-append</td>
<td>$(SCHEMA_PREFIX)_IAU_APPEND</td>
<td>IAU_APPEND schema password</td>
</tr>
<tr>
<td>db1/iau-viewer</td>
<td>$(SCHEMA_PREFIX)_IAU_VIEWER</td>
<td>IAU_VIEWER schema password</td>
</tr>
<tr>
<td>db1/ums</td>
<td>${SCHEMA_PREFIX}_UMS</td>
<td>UMS schema password</td>
</tr>
<tr>
<td>db1/mds</td>
<td>${SCHEMA_PREFIX}_MDS</td>
<td>MDS schema password</td>
</tr>
<tr>
<td>db1/wls</td>
<td>${SCHEMA_PREFIX}_WLS</td>
<td>WLS schema password</td>
</tr>
<tr>
<td>db1/wls-runtime</td>
<td>$(SCHEMA_PREFIX)_WLS_RUNTIME</td>
<td>WLS_RUNTIME schema password</td>
</tr>
<tr>
<td>db1/stb</td>
<td>${SCHEMA_PREFIX}_STB</td>
<td>STB schema password</td>
</tr>
</tbody>
</table>

   The following shows an example of the create-wallet.sh file:

   ```
   "$JAVA" "$JRE_OPTIONS" -cp "$JRE_CP"
   oracle.fmwplatform.credentials.wallet.WalletManager add -walletDirectory .
   -alias db1/dba -user sys -password database_password -walletPassword $WALLET
   ```

   ```
   "$JAVA" "$JRE_OPTIONS" -cp "$JRE_CP"
   oracle.fmwplatform.credentials.wallet.WalletManager add -walletDirectory .
   ```
-alias soa/wlsadmin -user weblogic -password weblogic_password -walletPassword $WALLET

"$JAVA" "$JRE_OPTIONS" -cp "$JRE_CP"
oracle.fmwplatform.credentialswallet.WalletManager add -walletDirectory .
-alias db1/soa-infra -user ${SCHEMA_PREFIX}_SOAINFRA -password soainfra_password -walletPassword $WALLET

"$JAVA" "$JRE_OPTIONS" -cp "$JRE_CP"
oracle.fmwplatform.credentialswallet.WalletManager add -walletDirectory .
-alias db1/opss -user ${SCHEMA_PREFIX}_OPSS -password opss_password -walletPassword $WALLET

"$JAVA" "$JRE_OPTIONS" -cp "$JRE_CP"
oracle.fmwplatform.credentialswallet.WalletManager add -walletDirectory .
-alias db1/iau -user ${SCHEMA_PREFIX}_IAU -password iau_password -walletPassword $WALLET

"$JAVA" "$JRE_OPTIONS" -cp "$JRE_CP"
oracle.fmwplatform.credentialswallet.WalletManager add -walletDirectory .
-alias db1/iau-append -user ${SCHEMA_PREFIX}_IAU_APPEND -password iau_append_password -walletPassword $WALLET

"$JAVA" "$JRE_OPTIONS" -cp "$JRE_CP"
oracle.fmwplatform.credentialswallet.WalletManager add -walletDirectory .
-alias db1/iau-viewer -user ${SCHEMA_PREFIX}_IAU_VIEWER -password iau_viewer_password -walletPassword $WALLET

"$JAVA" "$JRE_OPTIONS" -cp "$JRE_CP"
oracle.fmwplatform.credentialswallet.WalletManager add -walletDirectory .
-alias db1/ums -user ${SCHEMA_PREFIX}_UMS -password ums_password -walletPassword $WALLET

"$JAVA" "$JRE_OPTIONS" -cp "$JRE_CP"
oracle.fmwplatform.credentialswallet.WalletManager add -walletDirectory .
-alias db1/mds -user ${SCHEMA_PREFIX}_MDS -password mds_password -walletPassword $WALLET

"$JAVA" "$JRE_OPTIONS" -cp "$JRE_CP"
oracle.fmwplatform.credentialswallet.WalletManager add -walletDirectory .
-alias db1/wls -user ${SCHEMA_PREFIX}_WLS -password wls_password -walletPassword $WALLET

"$JAVA" "$JRE_OPTIONS" -cp "$JRE_CP"
oracle.fmwplatform.credentialswallet.WalletManager add -walletDirectory .
-alias db1/wls-runtime -user ${SCHEMA_PREFIX}_WLS_RUNTIME -password wls_runtime_password -walletPassword $WALLET

"$JAVA" "$JRE_OPTIONS" -cp "$JRE_CP"
oracle.fmwplatform.credentialswallet.WalletManager add -walletDirectory .
-alias db1/stb -user ${SCHEMA_PREFIX}_STB -password stb_password -walletPassword $WALLET

3. Save and close the file.

4. Set the ORACLE_HOME environment variable to the full path of the Oracle home where you installed Fusion Middleware Infrastructure.

For example:

export ORACLE_HOME=/home/Oracle/products/fmw12212
5. Set the JAVA_HOME environment variable to the path of a certified JDK.
   For example:
   ```
   export JAVA_HOME=/home/Oracle/products/jdk1.8.0_101
   ```

6. Change directory to the create-domain-example/mywallet directory.
   ```
   cd path_to_example_directory/create-domain-example/mywallet
   ```
   Remove any existing wallets in this directory. This directory is empty by default.

7. Run the following command to create a wallet in the mywallet directory with the credentials you defined in step 2. Ensure that you have execute permissions if not already.
   ```
   sh ../create-wallet.sh FMWEX -walletPassword wallet_password
   ```
   Where:
   - **FMWEX** is the schema prefix that will be used to create the SOA schemas for the domain and will be referenced throughout this tutorial.
     If you choose a different prefix, replace **FMWEX** with the value of your actual prefix. Make a note of the prefix you enter here; you need to make sure to update the **Prefix** fields for all the schemas when you edit the soa-topology-1.0.json file later.
   - **wallet_password** is the wallet password.

You now have a wallet in the create-domain-example/mywallet directory that contains the required credentials, including your database, WebLogic administrator, and schema user credentials.
Using the Lifecycle Management Tools to Install Oracle SOA Suite

Follow these steps to use Apache Groovy to run the install-oraclehome standard action, which will install Oracle SOA Suite into the Infrastructure Oracle home you created.

**Starting FMW Composer**
Start FMW Composer from the ORACLE_HOME/oracle_common/bin directory.

**Opening the soa-bootstrap-topology-1.0.json File**
After you start FMW Composer, open the sample soa-bootstrap-topology-1.0.json file. You need to provide information about the Oracle home in this file to install SOA Suite.

**Editing the soa-bootstrap-topology-1.0.json File**
After opening the topology file in Composer, you need to enter environment-specific information in the required fields, such as your Oracle home location, the path to a certified JDK, and the location of the SOA Suite installer jar file. This information will be used to install SOA Suite into your Oracle home.

**Using Apache Groovy to Run the install-oraclehome Standard Action**
After editing the soa-bootstrap-topology-1.0.json file, use Apache Groovy to run the create-oracle-home.groovy script. This script executes the install-oraclehome action and installs SOA Suite into your Oracle home based on the information you provided in the topology file.

### 6.1 Starting FMW Composer
Start FMW Composer from the ORACLE_HOME/oracle_common/bin directory.

1. Set the JAVA_HOME environment variable to the path of a certified JDK.
   
   For example:
   ```bash
   export JAVA_HOME=/home/Oracle/products/jdk1.8.0_101
   ```

2. Change directory to the ORACLE_HOME/oracle_common/bin directory and start FMW Composer (fmw-composer.sh).
   ```bash
   cd ORACLE_HOME/oracle_common/bin
   ./fmw-composer.sh
   ```
6.2 Opening the soa-bootstrap-topology-1.0.json File

After you start FMW Composer, open the sample soa-bootstrap-topology-1.0.json file. You need to provide information about the Oracle home in this file to install SOA Suite.

This file is located in the path_to_example_directory/create-domain-example/models/topologies directory.

1. From the File menu, select Open File...

2. In the Open Composer File dialog box, navigate to the path_to_example_directory/create-domain-example/models/topologies directory.

3. Select soa-bootstrap-topology-1.0.json and click Open.

When you open the file, you should see the following topology diagram on the screen:

6.3 Editing the soa-bootstrap-topology-1.0.json File

After opening the topology file in Composer, you need to enter environment-specific information in the required fields, such as your Oracle home location, the path to a certified JDK, and the location of the SOA Suite installer jar file. This information will be used to install SOA Suite into your Oracle home.

1. Select the Oracle Home: soahome box in the Composer topology diagram.

   This displays a panel on the right side of the screen with fields where you can specify information about the SOA Suite Oracle home.

2. In the Path field, enter the full path to the Oracle home where Oracle SOA Suite will be installed. This Oracle home should already contain Fusion Middleware Infrastructure.

   For example:

   /home/Oracle/products/fmw12212

3. In the Java Home field, enter the path to a certified JDK.

   For example:

   /home/Oracle/products/jdk1.8.0_101

4. Under Installations, select the infra (Fusion Middleware Infrastructure) entry and click to remove this entry, as Infrastructure is already installed in this Oracle home.

5. Under Installations, select the soa (SOA Suite) entry and click to edit the installation data for Oracle SOA Suite:
a. For the ID field, keep the default value, soa.

b. For the Install Type field, keep the default value, SOA Suite.

c. In the Installer field, specify the full path and file name of the Oracle SOA Suite installer jar file (`fmw_12.2.1.2.0_soa_generic.jar`) you downloaded (see Obtaining the Oracle Fusion Middleware Software):

```
path_to_soa_jar_file/fmw_12.2.1.2.0_soa_generic.jar
```

d. Click OK.

6. Select File and then Save to save the changes made to the file.

7. After saving the file, select File and then Exit to exit Composer.

### 6.4 Using Apache Groovy to Run the install-oraclehome Standard Action

After editing the `soa-bootstrap-topology-1.0.json` file, use Apache Groovy to run the `create-oracle-home.groovy` script. This script executes the `install-oraclehome` action and installs SOA Suite into your Oracle home based on the information you provided in the topology file.

The `create-oracle-home.groovy` file is located in the `create-domain-example` directory.

To run the action:

1. Change directory to the `create-domain-example` directory.

```
cd path_to_example_directory/create-domain-example
```

2. In the `call-oh.sh` file, update the Oracle home location to point to the SOA Suite Oracle home.

   There are two places in this file where you need to update the Oracle home location, as shown in the following example:

   ```bash
   #!/bin/bash
   groovy -cp "$ORACLE_HOME/oracle_common/modules/features/oracle.fmwplatform.envspec_lib.jar:
   ORACLE_HOME/oracle_common/modules/features/oracle.fmwplatform.common_lib.jar" *
   
   In this example, replace `ORACLE_HOME` with the actual path to your Oracle home directory.

3. In the `create-oracle-home.groovy` file, replace `secret1@` with the actual password of the wallet you created, as shown in the following example:

```
"wallet_password".toCharArray() // the wallet passphrase
```

4. Set the GROOVY_HOME variable to the directory where you installed the Apache Groovy distribution, as shown in the following example:

```
export GROOVY_HOME=/home/Oracle/groovy-2.4.6
export PATH=$PATH:$GROOVY_HOME/bin
```

5. Run the following command from the `create-domain-example` directory to execute the action:
sh call-oh.sh create-oracle-home.groovy

Ensure that you have execute permissions if not already.

If the action is successful, the exit status code is SUCCESS, as shown in the following example:

Aug 18, 2016 8:16:24 AM oracle.fmwplatform.actionframework.v2.internal.ActionBase
setInitializedState
INFO: Action install-oraclehome changed from state CREATED to state NOT_READY
Aug 18, 2016 8:16:24 AM oracle.fmwplatform.actionframework.v2.internal.ActionBase
setCanInvokeState
INFO: Action install-oraclehome changed from state NOT_READY to state READY
Aug 18, 2016 8:16:58 AM oracle.fmwplatform.actionframework.api.v2.ActionResult
logActionResult
INFO: SUCCESS: JAVA_ACTION: Init: FMWPLATFRM-06554
Aug 18, 2016 8:18:44 AM oracle.fmwplatform.actionframework.api.v2.ActionResult
logActionResult
INFO: SUCCESS: JAVA_ACTION: Init: FMWPLATFRM-06554
Aug 18, 2016 8:18:44 AM oracle.fmwplatform.actionframework.v2.internal.ActionBase
setInvokedState
INFO: Action install-oraclehome changed from state READY to state NOT_READY
Aug 18, 2016 8:18:44 AM oracle.fmwplatform.actionframework.v2.internal.ActionBase
setClosedState
INFO: Action install-oraclehome changed from state NOT_READY to state DESTROYED
Aug 18, 2016 8:18:44 AM oracle.fmwplatform.actionframework.v2.internal.ActionBase
setDoneState
INFO: Action install-oraclehome changed from state DESTROYED to state DONE

```
{  
  "actionResultList" : [ {  
    "statusCode" : "SUCCESS",  
    "messageId" : "FMWPLATFRM-06554",  
    "statusDetail" : "JAVA_ACTION: Init: FMWPLATFRM-06554"  
  }, {  
    "statusCode" : "SUCCESS",  
    "messageId" : "FMWPLATFRM-06554",  
    "statusDetail" : "JAVA_ACTION: Init: FMWPLATFRM-06554"  
  } ]  
}
```

At this point, you should have an Oracle home that contains both Oracle Fusion Middleware Infrastructure and Oracle SOA Suite.
Creating the Database Schemas

Before you configure the Oracle SOA Suite domain, use the Repository Creation Utility (RCU) to install the required schemas on a certified database.

**Starting the Repository Creation Utility (RCU)**
After you have installed Oracle SOA Suite, start the Repository Creation Utility (RCU) from the `ORACLE_HOME/oracle_common/bin` directory to create the SOA Suite schemas for the domain.

**Navigating the RCU Screens to Create the Schemas**
Use the RCU screens to create the database schemas.

**7.1 Starting the Repository Creation Utility (RCU)**
After you have installed Oracle SOA Suite, start the Repository Creation Utility (RCU) from the `ORACLE_HOME/oracle_common/bin` directory to create the SOA Suite schemas for the domain.

To start RCU on Linux operating systems:

```
cd ORACLE_HOME/oracle_common/bin
./rcu
```

**7.2 Navigating the RCU Screens to Create the Schemas**
Use the RCU screens to create the database schemas.

**Introducing RCU**
The Welcome screen is the first screen that appears when you start the RCU.

**Selecting a Method of Schema Creation**
Use the Create Repository screen to select a method to create and load component schemas into the database.

**Providing Database Connection Details**
On the Database Connection Details screen, provide the database connection details for the RCU to connect to your database.

**Specifying a Custom Prefix and Selecting Schemas**
On the Select Components screen, specify a prefix to use for the SOA Infrastructure schema and dependent schemas.

**Specifying Schema Passwords**
On the Schema Passwords screen, specify how you want to set the schema passwords on your database, then enter and confirm your passwords.
Specifying Custom Variables

On the Custom Variables screen, specify the custom variables for the SOA Infrastructure schema.

Verifying Tablespace Information

The Map Tablespaces screen shows the default and temporary tablespaces for the schemas you are about to create.

Completing Schema Creation

On the Summary screen, verify your information, then click Create to begin schema creation.

7.2.1 Introducing RCU

The Welcome screen is the first screen that appears when you start the RCU. Click Next.

7.2.2 Selecting a Method of Schema Creation

Use the Create Repository screen to select a method to create and load component schemas into the database.

On the Create Repository screen:

- If you have the necessary permission and privileges to perform DBA activities on your database, select **System Load and Product Load**. This procedure assumes that you have SYSDBA privileges.
- If you do not have the necessary permission or privileges to perform DBA activities in the database, you must select **Prepare Scripts for System Load** on this screen. This option generates a SQL script that you can give to your database administrator. See Understanding System Load and Product Load in *Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility*.
- If the DBA has already run the SQL script for System Load, select **Perform Product Load**.

7.2.3 Providing Database Connection Details

On the Database Connection Details screen, provide the database connection details for the RCU to connect to your database.

For example:

- **Database Type**: Oracle Database
- **Name**: examplehost.exampledomain.com
- **Port**: 1521
- **Service Name**: Orcl.exampledomain.com
- **User Name**: sys
- **Password**: ******
- **Role**: SYSDBA

Click Next to proceed, then click OK in the dialog window to confirm that connection to the database was successful.
7.2.4 Specifying a Custom Prefix and Selecting Schemas

On the Select Components screen, specify a prefix to use for the SOA Infrastructure schema and dependent schemas.

1. Select Create new prefix, and then enter FMWEX for your prefix. This is the same prefix you used when you created and added the schema credentials to the wallet (see Creating a Wallet).

Note that FMWEX is the schema prefix used for this tutorial. If you used a different prefix, make sure to replace FMWEX with the value of your actual prefix.

Note:

Make a note of the prefix you enter here; you will need this later on during the domain creation process.

The custom prefix logically groups these schemas together for use in this domain only. For more information about custom prefixes, see About Custom Prefixes in Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility.

2. Select the SOA Suite schema. This will automatically select SOA Infrastructure, along with the following schemas as dependencies:

- User Messaging Service
- Metadata Services
- WebLogic Services
- Oracle Platform Security Services
- Audit Services
- Audit Services Append
- Audit Services Viewer

A schema called Common Infrastructure Services is also automatically created; this schema is grayed out (you can’t select it or deselect it). For more information, see About the Service Table Schema in Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility.

For more information about how to organize your schemas in a multi-domain environment, see Planning Your Schema Creation in Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility.

3. Click Next to proceed, then click OK to confirm that prerequisite checking for schema creation was successful.

7.2.5 Specifying Schema Passwords

On the Schema Passwords screen, specify how you want to set the schema passwords on your database, then enter and confirm your passwords.

On this screen, enter the same schema passwords that you created and added to the wallet (see Creating a Wallet).
Tip:
You must make a note of the passwords you set on this screen; you will need them later on during the domain creation process.

7.2.6 Specifying Custom Variables

On the Custom Variables screen, specify the custom variables for the SOA Infrastructure schema.

For the Oracle SOA Suite sample topology, accept both default values for Database Profile (Small) and Healthcare Integration (No).

For more information, see About the Custom Variables Required for the SOA Suite Schemas in Oracle Fusion Middleware Installing and Configuring Oracle SOA Suite and Business Process Management.

Tip:
For more information about the options on this screen, see Custom Variables in Oracle Fusion Middleware Creating Schemas with the Repository Creation Utility.

7.2.7 Verifying Tablespace Information

The Map Tablespaces screen shows the default and temporary tablespaces for the schemas you are about to create.

For this tutorial, review the information on this screen. If you don’t want to make any changes on this screen, click Next to accept the default values.

Click OK on the Confirmation dialog box to begin tablespace creation. When the tablespaces are created, click OK to dismiss the progress window and continue to the Summary screen.

7.2.8 Completing Schema Creation

On the Summary screen, verify your information, then click Create to begin schema creation.

When you reach the Completion Summary screen, click Close to dismiss RCU.
Using the Lifecycle Management Tools to Configure the SOA Suite Domain

After installing Oracle SOA Suite and creating the database schemas, follow these steps to use Apache Groovy to run the create-domain standard action and create the domain.

Starting FMW Composer
Start FMW Composer from the ORACLE_HOME/oracle_common/bin directory.

Opening the soa-topology-1.0.json File
After you start FMW Composer, open the sample soa-topology-1.0.json file. You need to provide information about your environment in this file to create the domain.

Editing the soa-topology-1.0.json File
After opening the soa-topology-1.0.json file in Composer, you need to specify information about the elements of the topology. This information will be used to configure your domain.

Validating and Saving the Topology File
If there any validation errors found in the topology file, these errors are displayed in the validation panel at the bottom of the screen. Correct any issues before continuing.

Using Apache Groovy to Run the create-domain Standard Action
After editing and validating the sample soa-topology-1.0.json file, use Apache Groovy to run the create-domain.groovy script. This script executes the create-domain action and configures your domain based on the information you specified in the topology file.

Starting the Servers
To verify that your domain is properly configured, manually start the Administration Server and Managed Server.

8.1 Starting FMW Composer
Start FMW Composer from the ORACLE_HOME/oracle_common/bin directory.

1. Set the JAVA_HOME environment variable to the path of a certified JDK.
   For example:
   ```
   export JAVA_HOME=/home/Oracle/products/jdk1.8.0_101
   ```

2. Change directory to the ORACLE_HOME/oracle_common/bin directory and start FMW Composer (fmw-composer.sh).
8.2 Opening the soa-topology-1.0.json File

After you start FMW Composer, open the sample soa-topology-1.0.json file. You need to provide information about your environment in this file to create the domain.

This file is located in the path_to_example_directory/create-domain-example/models/topologies directory.

1. From the File menu, select Settings to open the Composer Settings page.
2. On the Composer Settings page, specify the location of the Oracle home where Oracle SOA Suite and the LCM Tools are installed.
   a. Click select next to Oracle Home.
   b. In the Select an Oracle Home dialog box, select the Oracle home directory and click Open.
3. After specifying the Oracle home location, specify the location of the wallet you created in the path_to_example_directory/create-domain-example/mywallet directory.
   a. Click change next to Wallet.
   b. In the Change wallet dialog box, select Select an existing wallet and click OK.
      a. In the Select a Wallet Directory dialog box, select the path_to_example_directory/create-domain-example/mywallet directory and click Open.
      b. Enter the wallet password and click OK.
4. Click OK to close the Settings page.
5. From the File menu, select Open File...
6. In the Open Composer File dialog box, navigate to the path_to_example_directory/create-domain-example/models/topologies directory.
7. Select soa-topology-1.0.json and click Open.

When you open the file, you should see the following topology diagram on the screen:
8.3 Editing the soa-topology-1.0.json File

After opening the soa-topology-1.0.json file in Composer, you need to specify information about the elements of the topology. This information will be used to configure your domain.

Complete the following tasks to fill in the topology file with values specific to your environment:

**Editing the Host Address**
Enter the host address for the host in the Address field.

**Editing the Oracle Home Element**
Specify information about the SOA Suite Oracle home directory, such as the Oracle home and Java JDK locations.

**Editing the Domain Element**
Specify information about the SOA Suite domain, such as the directory locations for where the domain and applications will be created.

**Editing the Administration Server Element**
Specify the listen address and listen port to be used by the WebLogic Administration Server.

**Editing the Managed Server Element**
Specify the listen address and listen port to be used by the Managed Server.

**Editing the Schema Information**
Use the Data Sources tab in Composer to edit and verify the schema and data source information for the topology.

**Editing the Database URL**
Specify the connection information for the database in which you created the schemas.

8.3.1 Editing the Host Address
Enter the host address for the host in the Address field.
Select the **Host: machine1** box in the Composer topology diagram. This will display a panel on the right side of the screen with fields where you can specify information about the host.

In the **Address** field, enter the primary IP address or DNS name of this host. The default value is **127.0.0.1**.

### 8.3.2 Editing the Oracle Home Element

Specify information about the SOA Suite Oracle home directory, such as the Oracle home and Java JDK locations.

1. Select the **Oracle home: soahome** box in the Composer topology diagram.

   This will display a panel on the right side of the screen with fields where you can specify information about the Oracle home.

2. In the **Path** field, enter the full path to the Oracle home where you installed Oracle SOA Suite.

   For example:
   ```
   /home/Oracle/products/fmw12212
   ```

3. In the **Java Home** field, enter the path to a certified JDK.

   For example:
   ```
   /home/Oracle/products/jdk1.8.0_101
   ```

### 8.3.3 Editing the Domain Element

Specify information about the SOA Suite domain, such as the directory locations for where the domain and applications will be created.

1. Select the **Domain: soadomain** box in the Composer topology diagram.

   This will display a panel on the right side of the screen with fields where you can specify information about the domain you will create.

2. In the **Path** field, enter the full path to the domain home directory. This is the directory where the domain will be created and will be referred to as **DOMAIN_HOME** in this guide.

   For example:
   ```
   /home/Oracle/config/domains/soadomain
   ```

   Oracle recommends that you place your domain home outside of the Oracle home directory. For more information on selecting a domain home, see About the Domain Home Directory in *Oracle Fusion Middleware Planning an Installation of Oracle Fusion Middleware*.

   Make a note of the domain location; you need it later to access the scripts that start the servers.

3. In the **Application Path** field, enter the full path to the application home directory. This is the directory where applications associated with the domain will be created and will be referred to as **APPLICATION_HOME** in this guide.

   For example:
Oracle recommends that you place your application home outside of the Oracle home directory. For more information on selecting an application home, see About the Application Home Directory in Oracle Fusion Middleware Planning an Installation of Oracle Fusion Middleware.

4. In the **Admin Server Url** field, enter the URL that will be used to connect to the domain’s Administration Server. Use the following format:

   \[http://adminserver_host:adminserver_port\]

   Make a note of the Administration Server URL; you need it later to access the Administration Server.

**8.3.4 Editing the Administration Server Element**

Specify the listen address and listen port to be used by the WebLogic Administration Server.

1. Select the **Server: AdminServer** box in the Composer topology diagram.

2. On the right side of the screen, verify that the **Is Admin Server** option is checked (checked by default).

3. In the **Name** field, enter a name for the Administration Server. The default name is AdminServerBinding.

4. In the **Listen Address** field, specify the IP address or DNS name of the host where the Administration Server will reside. The default value is 127.0.0.1.

5. In the **Listen Port** field, enter the port number to be used by the Administration Server. The default port is 7001.

**8.3.5 Editing the Managed Server Element**

Specify the listen address and listen port to be used by the Managed Server.

1. Select the **Server: soa_server1** box in the Composer topology diagram.

2. On the right side of the screen, verify that the **Is Admin Server** option is unchecked (unchecked by default).

3. In the **Name** field, enter a name for the Managed Server. The default name is soa_server1Binding.

4. In the **Listen Address** field, specify the IP address or DNS name of the host where the Managed Server will reside. The default value is 127.0.0.1.

5. In the **Listen Port** field, enter the port number to be used by the Managed Server. The default port is 7002.

**8.3.6 Editing the Schema Information**

Use the **Data Sources** tab in Composer to edit and verify the schema and data source information for the topology.

1. Navigate to the **Data Sources** tab, and use the following table to verify the **Prefix** fields for each of the schema components.
Note that FMWEX is the schema prefix used for this tutorial. If you used a different prefix, make sure to replace FMWEX with the value of your actual prefix in each of the Prefix fields.

<table>
<thead>
<tr>
<th>Component</th>
<th>Credential</th>
<th>Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAU</td>
<td>db1/iau</td>
<td>FMWEX</td>
</tr>
<tr>
<td>IAU_APPEND</td>
<td>db1/iau-append</td>
<td>FMWEX</td>
</tr>
<tr>
<td>IAU_VIEWER</td>
<td>db1/iau-viewer</td>
<td>FMWEX</td>
</tr>
<tr>
<td>MDS</td>
<td>db1/mds</td>
<td>FMWEX</td>
</tr>
<tr>
<td>OPSS</td>
<td>db1/opss</td>
<td>FMWEX</td>
</tr>
<tr>
<td>SOAINFRA</td>
<td>db1/soa-infra</td>
<td>FMWEX</td>
</tr>
<tr>
<td>STB</td>
<td>db1/stb</td>
<td>FMWEX</td>
</tr>
<tr>
<td>UCSUMS</td>
<td>db1/ums</td>
<td>FMWEX</td>
</tr>
<tr>
<td>WLS</td>
<td>db1/wls</td>
<td>FMWEX</td>
</tr>
</tbody>
</table>

2. The dummy schema component groups data sources that are not associated with a particular schema in their templates. Similar to the other components, you will need to assign a database to this component as well as credentials to run the action.
   a. Select **Component: dummy**, and on the right side of the screen, click **select** next to the **Credential** field to assign credentials to this component.
      
      A dialog box appears that lists the credentials in the wallet. You can assign an existing credential from the list, or click **New** to add a new one to the wallet for this component.
   
   b. To assign a database, right-click **Component: dummy** on the screen and select **Assign Existing Database to Schema Component ‘dummy’** to select a database for this component.

3. Select the **DS: SOALocalTxDataSource** data source associated with the SOAINFRA component, and deselect the **XA** check box on the right side of the screen.

   Repeat this step to deselect this option for **DS: EDNLocalTxDataSource** as well.

4. The WLSSchemaDataSource data source associated with the WLS component is not defined in any template for the domain. Right-click **DS: WLSSchemaDataSource** on the screen to remove it.

### 8.3.7 Editing the Database URL

Specify the connection information for the database in which you created the schemas.

1. Navigate to the **Data Sources** tab, and select the **Node** element on the screen.

2. In the **Connect String** field, enter the JDBC URL to the database repository in the following format:

   `jdbc:oracle:thin:@db_host:db_port/service_name`
Where \textit{db\_host} is the host name of the machine on which the database resides, \textit{db\_port} is the listener port of the database, and \textit{service\_name} is the service name identified for the database.

**8.4 Validating and Saving the Topology File**

If there any validation errors found in the topology file, these errors are displayed in the validation panel at the bottom of the screen. Correct any issues before continuing.

To locate an error in the file, select the error message from the list, and then click . You can also double-click the error message to go straight to the panel that contains the error.

After correcting any errors, save the file and exit Composer.

**8.5 Using Apache Groovy to Run the create-domain Standard Action**

After editing and validating the sample \texttt{soa-topology-1.0.json} file, use Apache Groovy to run the \texttt{create-domain.groovy} script. This script executes the create-domain action and configures your domain based on the information you specified in the topology file.

The \texttt{create-domain.groovy} script is located in the \texttt{create-domain-example} directory.

To run the action:

1. Change directory to the \texttt{create-domain-example} directory.
   
   \texttt{cd path\_to\_example\_directory/create\_domain\_example}

2. In the \texttt{call-domain.sh} file, update the Oracle home location to point to the SOA Suite Oracle home.

   There are two places in this file where you must update the Oracle home location, as shown in the following example.

   ```bash
   #!/bin/bash
   groovy -cp "ORACLE\_HOME/oracle\_common\_modules\_features/oracle\_fmwplatform\_envspec\_lib\_jar:ORACLE\_HOME/oracle\_common\_modules\_features/oracle\_fmwplatform\_common\_lib\_jar" $*
   ```

   In this example, replace \texttt{ORACLE\_HOME} with the actual path to your Oracle home directory.

3. In the \texttt{create-domain.groovy} file in the \texttt{create-domain-example} directory, update the Oracle home location to point to the SOA Suite Oracle home.

   For example:

   ```groovy
   // get ready to run the action
   def af = DefaultActionFactoryLocator.locateActionFactory()
   def action = af.getAction("create-domain", "ORACLE\_HOME")
   def target = ModelTargetFactory.createDomainTarget("soadomain")
   def targets = new ArrayList<ModelTarget>()
   targets.add(target)
   ```

   In this example, replace \texttt{ORACLE\_HOME} with the actual path to your Oracle home directory.
4. In the create-domain.groovy file, replace secret1@ with the actual password of the wallet you created, as shown in the following example:

   "wallet_password".toCharArray()  // the wallet passphrase

5. Verify that the ORACLE_HOME variable is not set in your environment.

   echo $ORACLE_HOME

   If the ORACLE_HOME variable is set in your environment, unset it before running create-domain.groovy:

   unset ORACLE_HOME

6. If not already set, set the JAVA_HOME variable to the path of a certified JDK, as shown in the following example:

   export JAVA_HOME=/home/Oracle/products/jdk1.8.0_101

7. If not already set, set the GROOVY_HOME variable to the directory where you installed the Apache Groovy distribution, as shown in the following example:

   export GROOVY_HOME=/home/Oracle/groovy-2.4.6
   export PATH=$PATH:$GROOVY_HOME/bin

8. Run the following command from the create-domain-example directory to execute the action:

   sh call-domain.sh create-domain.groovy

   If the action is successful, the exit status code is SUCCESS, as shown in the following example:

   May 18, 2016 9:39:28 AM
   oracle.fmwplatform.actionframework.v2.internal.AbstractActionImpl logActionResult
   INFO: SUCCESS: JAVA_WLST_ACTION: Init:
   May 18, 2016 9:39:28 AM oracle.fmwplatform.actionframework.v2.internal.ActionBase
   setInitializedState
   INFO: Action create-domain changed from state CREATED to state NOT_READY
   May 18, 2016 9:39:28 AM oracle.fmwplatform.actionframework.v2.internal.ActionBase
   setCanInvokeState
   INFO: Action create-domain changed from state NOT_READY to state READY
   May 18, 2016 9:39:28 AM
   oracle.fmwplatform.actionframework.v2.logging.internal.ActionsLoggerImpl
   logComponentCall
   INFO: Action create-domain: Calling the component wlst.selectTemplate(Basic WebLogic Server Domain) {"domainName":"soadomain"}
   May 18, 2016 9:39:39 AM
   oracle.fmwplatform.actionframework.v2.logging.internal.ActionsLoggerImpl
   logComponentReturn
   INFO: Action create-domain: Resuming execution upon the return from the component wlst.selectTemplate(Basic WebLogic Server Domain) {"domainName":"soadomain"}
   May 18, 2016 9:39:39 AM
   oracle.fmwplatform.actionframework.v2.logging.internal.ActionsLoggerImpl
   logComponentCall
   INFO: Action create-domain: Calling the component wlst.selectTemplate(Oracle SOA Suite) {"domainName":"soadomain"}
   May 18, 2016 9:39:39 AM
   oracle.fmwplatform.actionframework.v2.logging.internal.ActionsLoggerImpl
   logComponentReturn
   INFO: Action create-domain: Resuming execution upon the return from the component wlst.selectTemplate(Oracle SOA Suite)
Using Apache Groovy to Run the create-domain Standard Action

Using the Lifecycle Management Tools to Configure the SOA Suite Domain 8-9
Using Apache Groovy to Run the create-domain Standard Action

node manager {
  "domainName": "soadomain"
}

drw- AppDeployment
drw- CoherenceClusterSystemResource
drw- Credential
drw- FileStore
drw- JDBCSystemResource
drw- JMServer
drw- JMSSystemResource
drw- Keystore
drw- Library
drw- NMProperties
drw- Security
drw- SecurityConfiguration
drw- SelfTuning
drw- Server
drw- ServerTemplate
drw- ShutdownClass
drw- StartupClass
drw- StartupGroupConfig
drw- WLDFSystemResource
drw- WebAppContainer
drw- AppDeployment
drw- CoherenceClusterSystemResource
drw- Credential
drw- FileStore
drw- JDBCSystemResource
drw- JMServer
drw- JMSSystemResource
drw- Keystore
drw- Library
drw- NMProperties
drw- Security
drw- SecurityConfiguration
drw- SelfTuning
drw- Server
drw- ServerTemplate
drw- ShutdownClass
drw- StartupClass
drw- StartupGroupConfig
drw- WLDFSystemResource
drw- WebAppContainer
drw- AppDeployment
drw- CoherenceClusterSystemResource
drw- Credential
drw- FileStore
drw- JDBCSystemResource
drw- JMServer
drw- JMSSystemResource
drw- Keystore
drw- Library
drw- NMProperties
drw- Security
drw- SecurityConfiguration
drw- SelfTuning
drw- Server
drw- ServerTemplate
drw- ShutdownClass
drw- StartupClass
drw- StartupGroupConfig
drw- WLDFSystemResource
drw- WebAppContainer
8.6 Starting the Servers

To verify that your domain is properly configured, manually start the Administration Server and Managed Server.

1. To start the WebLogic Administration Server, change directory to the `DOMAIN_HOME/bin` directory and run the following command:

```
./startWebLogic.sh
```
2. To verify that the Administration Server is running, enter the following URL in a browser to access the WebLogic Administration Console:

   http://adminserver_host:adminserver_port/console

   Log in using the WebLogic administrator credentials that you created and added to the wallet for this tutorial. See Creating a Wallet.

3. After starting the Administration Server, start the Managed Server from the `DOMAIN_HOME/bin` directory:

   `./*startManagedWebLogic.sh managed_server_name http://adminserver_host:adminserver_port`

   You are prompted for the administrator user login credentials. Enter the WebLogic administrator credentials that you created and added to the wallet.
Part III

Appendices Additional Information About the Lifecycle Management Tools

Additional Information About Standard Actions
The Lifecycle Management Tools provide standard actions that you can use to configure and manage your Oracle Fusion Middleware environment.
Additional Information About Standard Actions

The Lifecycle Management Tools provide standard actions that you can use to configure and manage your Oracle Fusion Middleware environment. This appendix describes important information about each standard action.

Using the Standard Actions JavaDoc
The Lifecycle Management Tools provide a set of Java APIs.

More Information About Commonly Used Standard Actions

A.1 Using the Standard Actions JavaDoc
The Lifecycle Management Tools provide a set of Java APIs.
These APIs are documented in the following JavaDoc:

- Oracle Fusion Middleware Java API Reference for the Lifecycle Management Action Framework
- Oracle Fusion Middleware Java API Reference for the Lifecycle Management Environment Specification
- Oracle Fusion Middleware Java API Reference for the Lifecycle Management Credential Management

A.2 More Information About Commonly Used Standard Actions

About the Create Domain Standard Action
With the create-domain standard action, you can create an Oracle Fusion Middleware domain.

About the Install Oracle Home Standard Action
With the install-oracle-home standard action, you can create an Oracle home for Oracle Fusion Middleware.

About the Create Schema Standard Action
With the create-schema standard action, you can create a schema in the target database. The schema is used by Oracle Fusion Middleware.

About the Load Schema Standard Action
The load-schema standard action loads data into a schema.

About the Start Standard Action
With the start standard action, you can start all servers in a domain, a specific server, a cluster, all servers on a host, or you can start Node Manager.
About the Stop Standard Action
With the stop standard action, you can stop all servers in a domain, a specific server, a cluster, all servers on a host, or you can stop Node Manager.

A.2.1 About the Create Domain Standard Action
With the create-domain standard action, you can create an Oracle Fusion Middleware domain.

The create-domain standard action creates the specified domain by loading any templates used in the definition of that the domain in the model. It creates any data sources and other resources defined in the templates. It also creates the servers, clusters, partitions, and other structures as specified in the domain definition. This standard action does not perform any additional configuration steps, such as component-specific configuration. You can use custom actions to perform the component-specific configuration.

This standard action is equivalent to running the Domain Configuration Wizard.

A.2.2 About the Install Oracle Home Standard Action
With the install-oracle-home standard action, you can create an Oracle home for Oracle Fusion Middleware.

This standard action creates an Oracle Home by installing products as specified by the Installer and Install Types.

A.2.3 About the Create Schema Standard Action
With the create-schema standard action, you can create a schema in the target database. The schema is used by Oracle Fusion Middleware.

This action creates the schema, but does not load data into the newly created schema.

A.2.4 About the Load Schema Standard Action
The load-schema standard action loads data into a schema.

This is equivalent to running the second phase of the Repository Creation Utility (RCU), the -dataLoad operation. This standard action does not create the schema if it does not exist. Use the create-schema standard action to create the schema.

A.2.5 About the Start Standard Action
With the start standard action, you can start all servers in a domain, a specific server, a cluster, all servers on a host, or you can start Node Manager.

You can start the following using the start standard action:
- Domain: All servers within the domain, across all hosts
- Server: A specified server within the domain.
- Cluster: All servers in a specified cluster within the domain across all hosts.
- Host: All servers on a specified host across all domains on the host.
- Node Manager: A specified Node Manager on the local host.
A.2.6 About the Stop Standard Action

With the stop standard action, you can stop all servers in a domain, a specific server, a cluster, all servers on a host, or you can stop Node Manager.

You can stop the following using the stop standard action:

- Domain: All servers within the domain, across all hosts
- Server: A specified server within the domain.
- Cluster: All servers in a specified cluster within the domain across all hosts.
- Host: All servers on a specified host across all domains on the host.
- Node Manager: A specified Node Manager on the local host.