

Oracle® Communications Network Service Orchestration Solution

Getting Started

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This document provides information about the software requirements, installation, integration, and use of Oracle Communications Network Service Orchestration Solution.

About Network Service Orchestration Solution

The Network Service Orchestration solution enables you to create, implement, and manage the life cycles of your network services and their deployment as interconnected virtual network functions (VNFs) on virtual resources. The solution uses Oracle Communications Design Studio, Oracle Communications Unified Inventory Management (UIM) and Oracle Communications ASAP. The solution enables you to quickly create network services and virtual network functions by integrating with Oracle Communications Application Orchestrator, which manages the life cycles of VNFs. The solution is extensible and allows integration with third-party VNF managers.

The Network Service Orchestration solution provides the following functionality:

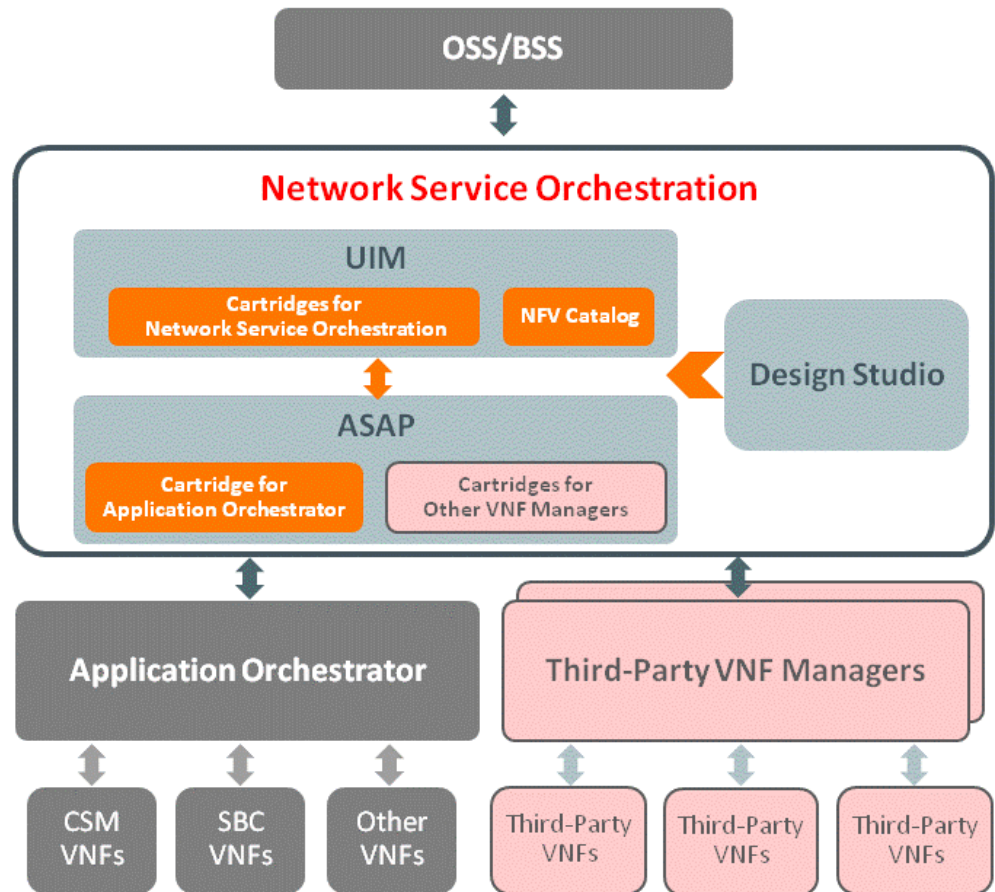
- **Definition of VNFs and Network Services.** You can define and model VNFs and network services depending on the network functions that you want to virtualize on your network. In Network Functions Virtualization (NFV), defining and modeling VNFs and network services is referred to as onboarding VNF descriptors and network service descriptors. See "[Defining VNFs and Network Services](#)" for more information.
- **Instantiation of VNFs and Network Services.** You can quickly create VNFs and network services so that they are active in your network. You can manage the life cycles of your VNFs and network services and control the resources that they use. See "[Creating VNFs and Network Services](#)" for more information.
- **Scaling of VNFs and Network Services.** You can dynamically extend or reduce resources granted to your virtual network functions. See "[Setting VNF Scaling Thresholds](#)" for more information.

Solution Architecture

The Network Service Orchestration solution uses the defined elements and standards of the Network Functions Virtualization (NFV) reference framework.

[Figure 1](#) illustrates the Network Service Orchestration solution architecture.

Figure 1 Network Service Orchestration Solution Architecture



Software Requirements

To implement the Network Service Orchestration solution, you require the following software:

- Oracle Communications Unified Inventory Management 7.3.0
- Oracle Communications ASAP 7.3.0
- Oracle Communications Application Orchestrator 1.0.2
- Oracle Communications Design Studio 7.3.0
- Oracle Communications ASAP Cartridge for Oracle Communications Application Orchestrator 1.0

About Network Service Orchestration Entities

The Network Service Orchestration solution uses the Oracle Communications Information Model to represent inventory items and business practices. The Oracle Communications Information Model is based on industry standards, such as the Shared Information/Data (SID) model developed by the TeleManagement Forum. The information model contains resource entities, service entities, common patterns, definitions, and common business entities.

For specific, technical details, about the Oracle Communications Information Model and the UIM information model, see *Oracle Communications Information Model Reference* and *UIM Information Model Reference*.

The Network Service Orchestration solution maps NFV concepts to UIM model elements. The solution defines a number of NFV descriptors in the form of Design Studio specifications. These specifications are used by UIM and ASAP to create NFV events for managing the life cycles of VNFs and services.

VNF descriptors describe the behavior of virtual functions that are mastered in the Network Service Orchestration cartridges. Network services are assembled from the defined units of behavior provided by the VNFs and Physical Network Functions (PNFs) in the cartridges. Network Service descriptors therefore structure how these network services are populated in the cartridges.

[Table 1](#) describes the NFV entities and their corresponding UIM entities.

Table 1 NFV Entities and UIM Entities

NFV Entity	UIM Entity	Description
Network Service (NS)	Service	Represents a network service formed by VNFs on the NFV Infrastructure.
Virtual Network Function (VNF)	Logical device	Represents a virtual network function.
Network Service Descriptor (NSD)	Service specification	Describes the deployment requirements, operational behavior, and policies required by network services that are created based on this descriptor.
VNF Descriptor (VNFD)	Logical Device specification Service specification	Describes the deployment requirements, operational behavior, and policies required by VNFs that are created based on this descriptor.
Physical Network Function (PNF)	Physical Device specification	Defines a network function that runs on dedicated specialized hardware.
PNF Descriptor (PNFD)	Physical Device specification	Describes the deployment requirements, operational behavior, and policies required by PNFs that are created based on this descriptor.
Network Function Group (NFG)	Device interface	A group of network functions (both physical and virtual) that use the same policies, rules, and binary images.
Virtual Deployment Unit (VDU)	Device interface	A deployable subset of a VNF with a particular operational behavior.

Defining VNFs and Network Services

To define and model VNFs and network services for your network, you work in Design Studio. In Design Studio, you define specifications and properties for your VNFs, network services, and their hierarchical and related components. The specifications form the VNF Descriptors and Network Service Descriptors that are used throughout the Network Service Orchestration Solution.

After you define specifications for your VNFs and network services, you package them into cartridges and deploy them into UIM and ASAP. You use the specifications to create instances of VNFs and network services for your network.

The Network Service Orchestration solution provides cartridges that contain sample specifications that you can use to create VNFs, network services, and other resources for your network. For more information about Network Service Orchestration Solution cartridges, see ["Contents of the Network Service Orchestration JAR and ZIP Files"](#) and ["Deploying the Network Service Orchestration Cartridges"](#).

Creating VNFs and Network Services

Before you create a VNF in UIM, you must have defined and modeled a corresponding VNF specification and other related specifications in Design Studio. See ["Defining VNFs and Network Services"](#).

To create an instance of a VNF, you work in UIM. In UIM, you create entities based on the specifications that were defined and modeled in Design Studio.

The Network Service Orchestration cartridges contain sample specifications that you can use to create VNFs, services, and other resources for your network.

Before you create a VNF, ensure that you have configured VDUs and NF Groups in manual scaling mode in Application Orchestrator. See *Application Orchestrator 1.0 User Guide*.

To create a VNF:

1. In UIM, create a business interaction based on the NFV Service Request specification. See UIM Online Help for information about creating entities in UIM.
2. Create a logical device based on a VNF specification to represent the VNF.
For example, in an IMS Core network, a logical device in UIM can represent a Core Session Manager (CSM).
3. Under the VNF logical device entity, create a device interface based on an NF Group specification.
4. Under the NF Group device interface, create a device sub-interface based on a VDU specification. While creating the device sub-interface, specify a valid IP address for the device sub-interface that represents a virtual machine (VM).
5. Create a service based on the VNF Descriptor service specification and associate the VNF logical device that you created in step 2 with the service.
6. Under the service, create a service configuration based on the appropriate Service Configuration specification.
7. Associate the NFV Service Request business interaction that you created in step 1 with the Service configuration.
8. For the Service configuration, update each configuration item as appropriate:
 - Reference the NF Group device interface that you created in step 4.
 - Assign the VDU device interface.
9. Approve and issue the NFV Service Request business interaction.
UIM sends the request to ASAP, which deploys the VNF on the virtual machines in the network.

After the successful deployment of a VNF in the network, UIM receives a response from ASAP and completes the NFV service request automatically.

A network service comprises multiple interconnected VNFs. To create a network service comprising multiple VNFs:

1. In UIM, create a business interaction based on the NFV Service Request specification.
2. Create a service based on the Network Service specification and create a corresponding service configuration to represent the overall network service.
3. Associate the NFV Service Request business interaction that you created in step 1 with the Service configuration for the network service.
4. Associate the VNF services that you created earlier to the Network Service configuration.
5. Approve and issue the NFV Service Request business interaction to create the network service and its constituent VNFs.

Setting VNF Scaling Thresholds

The solution provides scaling capabilities that enable you to scale up or scale down your network services and VNFs.

To automatically scale up or scale down a VNF, you configure Key Performance Indicator (KPI) thresholds. Application Orchestrator scales up or scales down a VNF based on the threshold parameters. Before you configure KPI thresholds in UIM, you must set the scaling mode to **Auto** at the NF Group level in Application Orchestrator.

To configure KPI thresholds:

1. In UIM, create a business interaction based on the NFV Service Request specification. See UIM Online Help for information about creating entities in UIM.
2. Create an NF Group service for the NF Group for which you want to configure KPI thresholds.
3. Configure KPI thresholds for the NF Group service. For example, configure the following KPI thresholds:
 - **Calls Per Second**
 - **Active Sessions**
 - **Active Local Contacts**
 - **CPU Utilization**
 - **Memory Utilization**
4. Approve and issue the NFV Service Request business interaction.

For more information about KPI thresholds, see *Application Orchestrator 1.0 User Guide*.

You can also manually add, remove, and replace resources in a network service by creating and deleting VNFs using new NFV Service Request business interactions.

Terminating a VNF

You can terminate a VNF that is no longer needed on the network. When you terminate a VNF, the VNF is removed and its resources are released from the network.

To terminate a VNF:

1. In UIM, create a business interaction based on the NFV Service Request specification.
2. Specify the VNF service that you want to terminate and disconnect the VNF service.

UIM creates a service configuration automatically.

3. Associate the NFV Service Request business interaction with the service configuration.
4. Approve and issue the NFV Service Request business interaction.

UIM sends the request to ASAP, which terminates the VNF and undeploys the VMs on the network.

After ASAP undeploys the VM in the network, UIM completes the NFV Service Request business interaction automatically.

Using the Network Service Orchestration RESTful API to Manage VNFs

The Network Service Orchestration RESTful API provides the northbound interface to the Network Service Orchestration solution. Operation Support Systems (OSS) and VNF managers can query data from the solution's resource inventory.

The root URL for the Network Service Orchestration RESTful API is:

- HTTP Connection: `http://uim_host:port/ocnso/1.0/vnfs`
- SSL Connection: `https://uim_host:port/ocnso/1.0/vnfs`

where *uim_host* is the host on which UIM is installed and *port* is the port number.

You can use the VNF API to retrieve information about VNFs that are configured on your network.

[Table 2](#) describes the VNF API resources.

Table 2 VNF API Resources

Resource	Method	Description
/vnfs?expandDetails=true/false	GET	<p>Retrieves complete details about all the existing VNFs and their VDUs.</p> <p>The output displays the following details about each VNF:</p> <ul style="list-style-type: none"> ■ VNF ID ■ VNF Name ■ VNF Specification ■ VNF Description ■ VNF Assignment State <p>The output displays the following details about each VDU of a VNF:</p> <ul style="list-style-type: none"> ■ VDU ID ■ VDU Name ■ VDU Specification ■ VDU Description ■ VDU Assignment State ■ VDU IP Address <p>The expandDetails parameter is optional.</p>
/vnfs/vnflid	GET	Retrieves details about the specified VNF and the list of VDUs that the VNF contains.

Installing and Integrating the Required Software

To install and integrate the required software:

1. Install UIM on a WebLogic server. See *UIM 7.3 Installation Guide* for UIM installation instructions.

Note: If you are upgrading to UIM 7.3.0 from UIM 7.2.5 or UIM 7.2.4, follow the steps for upgrading from UIM 7.2.x to UIM 7.3 in the *UIM 7.3 Installation Guide*.

2. Install ASAP on a WebLogic server. See *ASAP 7.3 Installation Guide* for ASAP installation instructions.
3. Integrate UIM and ASAP. See "[Integrating UIM and ASAP](#)".
4. Extract the Network Service Orchestration ZIP file and open the **designStudio\sampleBuildScripts\build.properties** file and update the following parameters:
 - WL_HOST: Specify the name of the WebLogic administration server on which UIM is installed.
 - WL_PORT: Specify the port number of the WebLogic administration server on which UIM is installed.
 - WL_SERVER_NAME: Specify the name of the standalone managed server or the cluster server on which UIM is installed.

- CMWS_USER: Specify the user name of the Cartridge Management Web service (CMWS) user.
- CMWS_PASSWORD: Specify the password for the CMWS user.
- EAR_PATH: Specify *UIM_Home/app/7_3_0/custom.ear*, where *UIM_Home* is the directory in which you installed UIM.
- WL_HOME: Specify the path where WebLogic Server is installed.

After you integrate the required software, deploy the Network Service Orchestration cartridges. See "[Deploying the Network Service Orchestration Cartridges](#)" for more information.

Integrating UIM and ASAP

To integrate UIM and ASAP:

- Configure the WebLogic server on which you installed UIM. See "[Configuring the WebLogic Server for UIM](#)" for instructions.
- Configure the WebLogic server on which you installed ASAP. See "[Configuring the WebLogic Server for ASAP](#)" for instructions.

Configuring the WebLogic Server for UIM

To configure the WebLogic server on which you installed UIM:

1. Log in to the Oracle WebLogic Server Administration Console.
2. Deploy the *WLS_Home/common/deployable-libraries/jersey-bundle-1.9.war* file as a library, specifying the standalone managed server or the cluster server on which UIM is installed as the target. See the Oracle WebLogic Server documentation for instructions.
3. Create a work manager component using the **Maximum Threads Constraint** definition type with the following parameters:
 - **Name:** `invSOMaxThreadConstraint`
 - **Count:** 1
 - **Target:** Specify the standalone managed server or the cluster server on which UIM is installed.
4. Create a work manager with the following parameters:
 - **Name:** `asapWSMDBWorkManager`
 - **Target:** Specify the standalone managed server or the cluster server on which UIM is installed.
 - **Maximum Threads Constraint:** `invMaxThreadConstraint`
5. Create another work manager with the following parameters:
 - **Name:** `inventorySOMDBWorkManager`
 - **Target:** Specify the standalone managed server or the cluster server on which UIM is installed.
 - **Maximum Threads Constraint:** `invSOMaxThreadConstraint`.
6. Create a Store-and-Forward Agent with the following parameters:
 - **Name:** `NSO_UIM_Activation_SAF_Agent`

- **Persistent Store:** `inv_jms_store`. If UIM is installed in a cluster server, specify any one of the persistent stores. For example, specify `inv_jms_store-0`.
 - **Agent Type:** `Sending-Only`
 - **Target:** Specify the default standalone managed server on which UIM is installed.
- 7. Create a JMS system module with the following parameters:
 - **Name:** `NSO_UIM_Activation_JMS_Module`
 - **Target:** Specify the standalone managed server or the cluster server on which UIM is installed.
- 8. For the `NSO_UIM_Activation_JMS_Module` JMS system module, create a sub-deployment with the following parameters:
 - **Sub-deployment Name:** `NSO_UIM_Activation_JMS_Server`
 - **Target:** `inv_jms_server`. If UIM is installed in a cluster server, specify any one of the JMS servers as target. For example, specify `inv_jms_server-0`.
- 9. For the `NSO_UIM_Activation_JMS_Module` JMS system module configuration:
 - Create a JMS resource with the following parameters:
 - **Name:** `NSO_UIM_Activation_XVTEventTopic`
 - **JNDI Name:** `NSO.UIM.Activation.XVTEventTopic`
 - **Type:** `Queue`
 - **Sub-deployment:** `NSO_UIM_Activation_JMS_Server`
 - **Target:** `inv_jms_server`. If UIM is installed in a cluster server, specify any one of the JMS servers as target. For example, specify `inv_jms_server-0`.
 - Create a JMS resource with the following parameters:
 - **Name:** `inventorySOQueue`
 - **JNDI Name:** `inventorySOQueue`
 - **Type:** `Queue`
 - **Sub-deployment:** `NSO_UIM_Activation_JMS_Server`
 - **Target:** `inv_jms_server`. If UIM is installed in a cluster server, specify any one of the JMS servers as target. For example, specify `inv_jms_server-0`.
- 10. For the `NSO_UIM_Activation_JMS_Module` JMS module:
 - Create a remote SAF context with the following parameters:
 - **Name:** `NSO_UIM_Activation_SAF_Context`
 - **URL:** `t3://asap_hostname:asap_port`, where `asap_hostname` is the host on which ASAP is installed and `asap_port` is the port number
 - **User Name:** Specify the WebLogic server administration user name.
 - **Password:** Specify the WebLogic server administration password.
 - Create an SAF error handling configuration with the following parameters:
 - **Name:** `NSO_UIM_Activation_Error_Handler`
 - **Log Format:** `%header%,%properties%,%body%`

- Create an SAF Imported Destination with the following parameters:
 - **Name:** NSO_UIM_Activation_Imported_Destination
 - **Remote SAF Context:** NSO_UIM_Activation_SAF_Context
 - **SAF Error handling:** NSO_UIM_Activation_Error_Handler
 - **SAF Default Time-to-Live:** 360000
- 11. For the **NSO_UIM_Activation_Imported_Destination** SAF imported destination, create an SAF queue with the following parameters:
 - **Name:** NSO_UIM_Activation_MessageQueue
 - **Remote JNDI Name:** System.*env_ID*.ApplicationType.ServiceActivation.Application.1-0;7-3;ASAP.Comp.MessageQueue, where *env_ID* is the environment ID that you used for your ASAP installation
 - **Local JNDI Name:** NSO.UIM.Activation.MessageQueue
- 12. Activate the changes and restart the WebLogic server on which UIM is installed.

Configuring the WebLogic Server for ASAP

To configure the WebLogic server on which you installed ASAP:

1. Log in to the Oracle WebLogic Server Administration Console.
2. Deploy the *WL_Home/server/lib/jms-notran-adp.rar* file as an application, specifying the standalone server or the managed server on which ASAP is installed as the target. See the Oracle WebLogic Server documentation for instructions.
3. In the WebLogic server on which you installed ASAP, create a Store-and-Forward Agent with the following parameters:
 - **Name:** NSO_ASAP_UIM_SAF_Agent
 - **Persistent Store:** *env_id*.JMSJDBCStore, where *env_id* is the environment ID that you used for your ASAP installation.
 - **Agent Type:** Sending-Only
 - **Target:** Specify the default standalone managed server on which ASAP is installed.
4. Create a JMS system module with the following parameters:
 - **Name:** NSO_ASAP_UIM_JMS_Module
 - **Target:** Specify the standalone server or the managed server on which ASAP is installed.
5. For the **NSO_ASAP_UIM_JMS_Module** JMS system module:
 - a. Create a remote SAF context with the following parameters:
 - **Name:** NSO_ASAP_UIM_SAF_Context
 - **URL:** t3://*uim_hostname*:*uim_port*, where *uim_hostname* is the host on which UIM is installed and *uim_port* is the port number. If UIM is installed in a cluster server, specify any one of the URLs of the managed server.
 - **User Name:** Specify the WebLogic server administration user name.

- **Password:** Specify the WebLogic server administration password.
- b. Create an SAF error handling configuration with the following parameters:
 - **Name:** NSO_ASAP_UIM_Error_Handler
 - **Log Format:** %header%,%properties%,%body%
 - c. Create an SAF Imported Destination with the following parameters:
 - **Name:** NSO_ASAP_UIM_Imported_Destination
 - **Remote SAF Context:** NSO_ASAP_UIM_SAF_Context
 - **SAF Error Handling:** NSO_ASAP_UIM_Error_Handler
 - **Target:** Specify the standalone server or the managed server on which ASAP is installed.
6. For the **NSO_ASAP_UIM_Imported_Destination** SAF imported destination, create an SAF queue with the following parameters:
 - **Name:** NSO_ASAP_UIM_XVTEventTopic
 - **Remote JNDI Name:** NSO.UIM.Activation.XVTEventTopic
 - **Local JNDI Name:** NSO.ASAP.UIM.ActivationEventForwarder
 - **SAF Default Time-to-Live:** 3600000
 7. Create a JMS source bridge destination with the following parameters:
 - **Name:** NSO_ASAP_UIM_EventTopic_Bridge_Source
 - **Connection URL:** t3://*asap_hostname*:*asap_port*, where *asap_hostname* is the host on which ASAP is installed and *asap_port* is the port number
 - **Connection Factory JNDI Name:** javax.jms.TopicConnectionFactory
 - **Destination JNDI Name:** System.*env_id*.ApplicationType.ServiceActivation.Application.1-0;7-3;ASAP.Comp.XVTEventTopic
 - **Destination Type:** Topic
 - **User Name:** Specify the WebLogic server administration user name.
 - **Password:** Specify the WebLogic server administration password.
 8. Create a JMS destination bridge with the following parameters:
 - **Name:** NSO_ASAP_UIM_EventTopic_Bridge_Target
 - **Connection URL:** t3://*asap_hostname*:*asap_port*, where *asap_hostname* is the host on which ASAP is installed and *asap_port* is the port number
 - **Connection Factory JNDI Name:** javax.jms.TopicConnectionFactory
 - **Destination JNDI Name:** NSO.ASAP.UIM.ActivationEventForwarder
 - **Destination Type:** Queue
 - **User Name:** Specify the WebLogic server administration user name.
 - **Password:** Specify the WebLogic server administration password.
 9. Create a bridge with the following parameters:
 - **Name:** NSO_ASAP_UIM_EventTopic_Bridge

- **Selector:** `OSS_EVENT_TYPE = 'javax.oss.order.OrderStateChangeEvent'`
`AND OSS_API_CLIENT_ID = 'UIM_NFV'` `AND OSS_ORDER_CURRENT_STATE in ('closed.completed','open.running.suspended.failed')`
 - Specify the messaging bridge to start automatically
 - Source bridge destination: `NSO_ASAP_UIM_EventTopic_Bridge_Source`
 - Target bridge destination: `NSO_ASAP_UIM_EventTopic_Bridge_Target`
 - **Messaging Provider:** WebLogic Server 7.0 or higher
 - **Target:** Specify the name of the server on which you installed ASAP
 - Enable **QOS Degradation Allowed** and **Preserve Msg Property**
10. Activate the changes and start the `jms-notran-adp` resource adapter.
 11. Restart the WebLogic server on which ASAP is installed.

Note: Ensure that the status of the `NSO_ASAP_UIM_EventTopic_Bridge` bridge displays Active.

Deploying the Network Service Orchestration Cartridges

Before you deploy the Network Service Orchestration cartridges, you must install and integrate the required software. See ["Installing and Integrating the Required Software"](#) for more information.

The Network Service Orchestration super JAR file contains the following cartridges:

- OracleComms_UIM_NSO_Common
- OracleComms_UIM_NSO_VNFCatalog
- OracleComms_UIM_NSO_NSCatalog

A cartridge is a collection of entity specifications, characteristics, rulesets, and code that is defined in an Oracle Communications Design Studio project. The project is then compiled into a deployable JAR file known as a cartridge.

When you deploy a cartridge into UIM, the data it contains becomes available in UIM. For example, if you deploy a cartridge that includes several different types of VNF specifications, those specifications become available for the creation of VNF instances in UIM.

You can deploy the Network Service Orchestration super JAR file into a UIM run-time environment by using the Design Studio Cartridge Management Tool or by using the UIM Cartridge Deployer Tool. See *UIM Cartridge Guide* for more information about deploying cartridge packs.

Note: Before deploying the Network Service Orchestration super JAR file, deploy the base cartridges. For information about deploying the base cartridges, see *UIM Cartridge Guide*.

To deploy the Network Service Orchestration cartridges:

1. Deploy the UIM base cartridges into UIM. For information on how to deploy the base cartridges, see *UIM Cartridge Guide*.

2. From a command prompt, navigate to the **designStudio\sampleBuildScripts** directory of the Network Service Orchestration ZIP file and run the following command, which deploys the Network Service Orchestration super JAR:


```
ant deploySolutionCartridge
```
3. Open the *UIM_Home/config/nso.properties* file, where *UIM_Home* is the directory in which UIM is installed, and update the `ASAP_ENV_ID` property value with the ASAP environment ID.
4. From a command prompt, navigate to the **designStudio\sampleBuildScripts** directory of the Network Service Orchestration ZIP file and run the following command, which updates the **custom.ear** file:


```
ant updateApplication
```
5. In WebLogic Server Administration Console, redeploy *UIM_Home/app/7_3_0/custom.ear* as an application.
6. Extract the **OracleComms_ASAP_OCAO.sar** file from the *OCAO_version_release_number.tar* TAR file.
7. In ASAP, deploy the **OracleComms_ASAP_OCAO.sar** ASAP cartridge. See *ASAP Cartridge Development Guide* for instructions about deploying cartridges into ASAP.

Note: Before deploying the ASAP cartridge, ensure that ASAP and WebLogic server are running.

8. Restart the servers on which ASAP is installed.

Contents of the Network Service Orchestration JAR and ZIP Files

Table 3 describes the contents of the Network Service Orchestration JAR and ZIP files.

Table 3 Network Service Orchestration JAR and ZIP File Contents

Directory	Directory Content Description
deploy/ individualJarsForSuperJar	Individual JAR files that comprise the super JAR file. See " Network Service Orchestration Individual JAR Files " for more information.
deploy/ superJarToDeploy	The super JAR file. See " Network Service Orchestration Super JAR File " for more information.
designStudio/ cartridgeZips	Cartridge project ZIP files. See " Network Service Orchestration ZIP Files " for more information.
designStudio/ sampleBuildScripts	Sample Ant build scripts. See " Network Service Orchestration Sample Ant Build Scripts " for more information.

Network Service Orchestration Individual JAR Files

The Network Service Orchestration cartridge contains individual JAR files that comprise the super JAR file. Each individual JAR file is deployable.

Important: Before deploying the Network Service Orchestration cartridge JAR files, you must deploy the base cartridges if not previously deployed. For information on how to deploy the base cartridges, see *UIM Cartridge Guide*.

Oracle recommends that you deploy the super JAR file. If you deploy the JAR files individually, you must install them in a specific order.

The Network Service Orchestration cartridge individual JAR files must be deployed in the following order:

- OracleComms_UIM_NSO_Common
- OracleComms_UIM_NSO_VNFCatalog
- OracleComms_UIM_NSO_NSCatalog

Network Service Orchestration Super JAR File

The Network Service Orchestration cartridge contains the **OracleComms_UIM_NSO_*.jar** super JAR file.

Note: The asterisk in the JAR file name represents a five-segment release version number followed by a build number. The five-segment release version numbers represent the following:

- Major Version Number
 - Minor Version Number
 - Maintenance Pack
 - Generic Patch
 - Customer Patch
-
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The Network Service Orchestration super JAR file contains the entire contents of the solution and is ready for deployment.

See *UIM Cartridge Guide* for more information about deploying cartridges into UIM.

Network Service Orchestration ZIP Files

The Network Service Orchestration cartridge contains one project ZIP file for every cartridge or model project, and each ZIP file contains a project in its pre-compiled state (the project name is the root directory). Import cartridge ZIP files into Design Studio. See the Design Studio Help for information about importing archive files.

Network Service Orchestration Sample Ant Build Scripts

The Network Service Orchestration cartridge includes sample Ant build scripts for automating cartridge project builds. See *Design Studio System Administrator's Guide* for more information about automating builds.

Related Documentation

For more information, see the following documentation:

- *UIM Installation Guide*: Describes the requirements for installing UIM, installation procedures, and post-installation tasks.
- *UIM System Administrator's Guide*: Describes administrative tasks such as working with cartridges and cartridge packs, maintaining security, managing the database, configuring Oracle Map Viewer, and troubleshooting.
- *ASAP Installation Guide*: Describes the requirements for installing ASAP, installation procedures, and post-installation tasks.
- *Application Orchestrator 1.0. Documentation*: Describes how Application Orchestrator manages the life cycles of VNFs.
- *Design Studio Installation Guide*: Describes the requirements for installing Design Studio, installation procedures, and post-installation tasks.
- *ASAP Cartridge for Application Orchestrator 1.0 Cartridge Guide*: Describes the contents of Oracle Communications ASAP Cartridge for Oracle Communications Application Orchestrator 1.0.
- *UIM Security Guide*: Provides guidelines and recommendations for setting up UIM in a secure configuration.
- *UIM Concepts*: Provides an overview of important concepts and an introduction to using both UIM and Design Studio.
- *UIM Developer's Guide*: Explains how to customize and extend many aspects of UIM, including the data model, life-cycle management, topology, security, rulesets, user interface, and localization.
- *Design Studio Developer's Guide*: Describes how to customize, extend, and work with cartridges.
- *UIM Web Services Developer's Guide*: Describes the UIM Web Service operations and how to use them, and describes how to create custom Web services.
- *UIM Information Model Reference*: Describes the UIM information model entities and data attributes, and explains patterns that are common across all entities.
- *Oracle Communications Information Model Reference*: Describes the Oracle Communications information model entities and data attributes, and explains patterns that are common across all entities. The information described in this reference is common across all Oracle Communications products.
- *UIM Cartridge Guide*: Provides information about how you use cartridges and cartridge packs with UIM. Describes the content of the base cartridges.

For step-by-step instructions to perform tasks, log in to each application to see the following:

- *Design Studio Help*: Provides step-by-step instructions for tasks you perform in Design Studio.
- *UIM Help*: Provides step-by-step instructions for tasks you perform in UIM.

Documentation Accessibility

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