

# Oracle® Communications Service Catalog and Design Solution Designer User's Guide



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The Oracle logo, consisting of a solid red square with the word "ORACLE" in white, uppercase, sans-serif font centered within it.

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# Preface

This guide describes how to use Oracle Communications Service Catalog and Design - Solution Designer to model your services, and resources. Solution Designer is a design tool designed for business users and domain experts from communications service providers. It unifies and accelerates the creation and delivery of services across Oracle Communications and minimizes the cost of ownership for operators and systems integrators.

## Audience

This guide is intended for service specialists, network specialists, inventory specialists, inventory developer and managers who have a understanding of your company's products and services and how they fit into your network solution.

## Documentation Accessibility

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## Diversity and Inclusion

Oracle is fully committed to diversity and inclusion. Oracle respects and values having a diverse workforce that increases thought leadership and innovation. As part of our initiative to build a more inclusive culture that positively impacts our employees, customers, and partners, we are working to remove insensitive terms from our products and documentation. We are also mindful of the necessity to maintain compatibility with our customers' existing technologies and the need to ensure continuity of service as Oracle's offerings and industry standards evolve. Because of these technical constraints, our effort to remove insensitive terms is ongoing and will take time and external cooperation.



# 1

## Getting Started with Solution Designer

Oracle Communications Service Catalog and Design provides a unified environment for designing, testing, and deploying integrated multi-application OSS solutions. Service Catalog and Design offers a visually intuitive and easy-to-use design, enabling business users to configure services through simple drag-and-drop functionality. Its user friendly design and streamlined guided workflows simplify the entire service lifecycle, from initial creation to ongoing management. It simplifies the management and maintenance of products, services, and networks by centralizing service, resource, and network specifications and configurations. Service Catalog and Design comprises the following two components:

- Solution Designer
- Design Studio

### **Solution Designer**

Solution Designer enables you to model products, services, and resources, and the interfaces between them that make up a communications service and network solution. It enables you to create and use solutions quickly by providing a consistent design experience. It enables you to define TM Forum (TMF) aligned PSR (Product-Service-Resource) models to define customer and network services.

Solution Designer provides user journey and persona based design-time user experience. The user interface provides improved efficiency and provides next generation user experience. It brings state-of-the-art, consumer grade user experiences across devices to sophisticated enterprise scenarios.

Service providers can leverage the pre-defined components, specifications, and service templates in the catalog to rapidly assemble and deploy new services. Solution Designer enables service specialists and network specialists to create and manage PSR models that include service models and technology models respectively. You can also create and manage the specifications, data elements, design parameters, characteristics, design policies, and delivery policies to define an end-to-end solution for a service. You don't need specific technical expertise to work in Solution Designer. A PSR model is an information model structured according to TMF principles. A PSR model:

- Shows the relationship of product specifications to customer facing service specifications.
- Shows customer facing service (CFS) specifications as a hierarchical assembly of resource facing service (RFS) specifications, resource specifications, and location specifications.
- Defines the content for aligning architectural interfaces such as design actions on CFSs. By defining a common definition at these interfaces, Solution Designer enforces consistent implementations among the producer, consumer, and intermediate agents such as upstream order definitions and downstream implementations.

The purpose of a model is to visualize an end-to-end solution, to get a high-level understanding of that solution, and to assess changes easily. In Solution Designer, the model shows information received from upstream systems, how it's transformed into the information needed to configure the network for the solution, the related mappings between the upstream system and the characteristics, the corresponding design and assign policies and the delivery policies.

You can also use Solution Designer to maintain solutions and to change them over time. For example, you can quickly change your solution based on ongoing responses from customers, changes in technology, and market analysis. You use Solution Designer to configure solutions at all levels of solution maturity, and over the lifetime of a solution. As requirements change, and as your communications services evolve, Solution Designer enables you to evolve your solutions.

### Design Studio

Design Studio is an integrated tool based on Eclipse IDE. This enables designers and developers to use the fully-featured Java IDE capabilities to further enhance, extend or integrate the solution business logic. This design-time environment enables you to build and configure Oracle service fulfillment and network and resource management solutions. For more information on Design Studio and its capabilities, see *Concepts* guide.

## Planning a PSR Model

You consider the following before you start designing your PSR model:

- Which services offered to customers are you modeling?
- Which entities need to be configured in the network, and which types of applications are responsible for updating these entities?
- Which other services and resources are needed to realize the customer facing services? What is the relationship between them?
- What underlying data do you need in order to define entities, data that is significant in the actual implementation of the service? For example, a Mobile Service needs a MSISDN.

## About Solution Designer Applications

Solution Designer includes the following applications which you can access and work with by using the menu options on the landing page:

**Table 1-1 Solution Designer Applications**

Application	Description
PSR Models	Create and manage PSR models that include service models and technology models. Here you create a design of your service and network model with its design parameters, characteristics, design policies, and delivery policies.
Administration	Create and edit data elements that you use to specify data that help define services and resources in the PSR model. You can also create and edit converters that you use to convert the unit of measurement and valuemap.
Product Specifications	Create and manage product specifications.
Service Specifications	Create and manage service specifications such as CFSSs and RFSSs.
Resource Specifications	Create and manage resource specifications such as Logical Devices, Flow Identifiers, Device Interfaces and so on.
Infrastructure Specifications	Create and manage infrastructure specifications such as Location, Party, Role and Inventory Group.

**Table 1-1 (Cont.) Solution Designer Applications**

Application	Description
Initiatives	Create initiatives and manage initiative life cycles. Anything you create and work on in Solution Designer is part of an initiative.
Domains	Create and manage domains, to organize specifications in meaningful groups or realize the PSR model.
Workspaces	Enables Solution Designer to interact with DevOps engine to generate the required cartridges.

To navigate between these applications, click **Ask Oracle** at the bottom right.

## About Solution Designer User Roles

When you log in to Solution Designer, you enter a user name and a password. Your user name is associated with the roles and privileges that determine which applications you can use based on your job responsibilities. The user interface access is controlled using Role Based Access Control (RBAC) and the users are assigned appropriate roles based on their needs. All the different types of roles are also independent of each other. A user could have access to Initiative entity in Solution Designer, but may not have access to Initiative application to interact with the entity.

See "About Authentication" in *Solution Designer Installation Guide* for more information on various roles that are supported by Solution Designer and assign the roles to the users based on business needs.

## Accessing Solution Designer Application

Solution Designer is a web-based application that you open in a browser. For browser and version compatibility, see *Service Catalog and Design Compatibility Matrix*.

To access Solution Designer, you need a user name and a password provided by a Service Catalog and Design system administrator. See "About Authentication" in *Solution Designer Installation Guide* for more information about setting up users and groups.

To access the Solution Designer application, log in with your user name and password using the following URL:

```
http://hostname:port/apps/scd/
```

The variables in the example have the following values:

- *hostname* is the Solution Designer host name.
- *port* is the port number where Solution Designer is installed.

## About Solution Designer Landing Page

The Solution Designer application's landing page lists the menu options for individual applications. Click any of these applications to work with. On the top-right corner of the landing page, you find a User Menu drop-down list with some options. You can use these options for:

- Opening the Solution Designer application's user's guide using Help.
- Understanding the version of Service Catalog and Design using About.
- Logging out of Solution Designer using Sign Out. This action logs you out of the Solution Designer application and displays the login page.

## About Searching

Solution Designer uses a smart filter for searching. Throughout Solution Designer, you can use the **Search** box to find items. When you click the **Search** box, suggested search results appear.

You can narrow down a collection of items that you're looking for, by typing in the box to filter the list. Click any entity to open the specific entity page. When you navigate back to the search page, the specified search criteria is retained and you can see the results based on the original search criteria. When you navigate to any other application or log out of Solution Designer, you can specify a new search criteria.

## About Naming Rules

In Solution Designer, the entity ID is automatically generated based on the entity name entered and can be modified as required. To avoid errors when generating cartridges, follow these guidelines for entity IDs:

- You can use uppercase and lowercase letters and numbers.
- Use only a letter for the first character.
- You can have underscores within the ID.
- Don't use hyphens or periods within the ID.

## About Cloning Entities

Solution Designer allows you to clone an existing entity and update the details as necessary. Cloning an entity copies the entity and its details such as the configuration, design parameters, characteristics, and general information. The parameter mapping, design policies, and delivery policies are not copied when cloning an entity. The cloning process creates a new copy of the entity with the same name appended with - *Copy* and you can update the entity name. The copy is created within the same initiative. For example, in the *Mobile Service*, the specification *Mobile CFS* is in **Definition** status with an initiative *Mobile Service*. If you clone *Mobile CFS*, a copy is created with the name *Mobile CFS - Copy* with the initiative as *Mobile*. You can update general information, domain, and its details including configuration, design parameters, entity characteristics, parameter mapping, design policies, and delivery policies.

## About Revising Entities

In Solution Designer, a service specialist or a network specialist revises an entity in the **Released** status. When you revise an entity, you create a revision of the entity that you attach to an initiative in **Definition** status. The original entity definition, which is attached to an initiative in the **Released** status, does not change. You can update the details of the revised entity such as the configuration, design parameters, entity characteristics, parameter mappings, design policies, delivery policies, and general information. When you delete a revised specification, only the current revision is deleted and the specification is reverted to the previously released version.

## Using Product Accessibility Features

You can use these accessibility features with Oracle Communications Service Catalog and Design:

- Keyboard shortcuts of your operating system and browser.
- Accessibility tools of screen readers and your browser.

# 2

## Managing Your Design Process with Initiatives

Use initiatives to organize and track your work in Oracle Communications Service Catalog and Design - Solution Designer.

### Topics in this document

- [About Initiatives](#)
- [Creating Initiatives](#)
- [Viewing Initiatives](#)
- [Updating Initiatives](#)
- [Lifecycle of Initiatives](#)

## About Initiatives

Everything you create and manage in the Solution Designer application is part of an initiative, including PSR models, data elements, specifications, and domains. Having an initiative is a prerequisite to any work you do in the Solution Designer application. Initiatives represent the solution development process that contains a set of capabilities that must be delivered in a given phase of OSS transformation.

Initiatives follow a lifecycle that resembles the development lifecycle of a release, a process to manage your team's work from initial design definition through final approval and release. The contents of an initiative are not available to other initiatives until you release the initiative. You can update the contents such as service model, technology model, Customer Facing Services (CFS), Resource Facing Services (RFS), resources, and data elements, when an initiative is not released. After an initiative is released, you can revise its models, specifications, and reuse domains, and data elements. See "[Revising Service Specifications](#)" and "[Revising PSR Models](#)" for details.

A service catalog administrator manages the lifecycles of initiatives. Initiative allows various personas to define the solution and publish the artifacts to run-time systems during various testing cycles and eventually to production. Initiatives have the following phases, which you can adapt to your business process:

- **Definition:** Design definition is in progress.
- **Advanced Configuration:** You can write the implementation code for advanced policies in the extended designer class by downloading the generated Design Studio Workspace and importing it in Design Studio Eclipse environment.
- **Functional Testing:** Functional testing is in progress. You can publish the initiative and perform functional testing by generating the cartridges and deploying it in the respective application such as Oracle Communications Unified Inventory Management (UIM).
- **Acceptance Testing:** Acceptance testing is in progress by deploying the generated cartridges in UIM and provisioning them.
- **Approval:** Approval for rollout is in progress. After an approver reviews the initiative contents and the test results, it is approved for release.
- **Released:** The initiative and its contents are released to production.

You can complete each phase or revert to its previous phase. See "[Lifecycle of Initiatives](#)" for more information.

## Creating Initiatives

You create an initiative using the **Initiatives** application.

To create an initiative:

1. In the Solution Designer landing page, click the **Initiatives** application.
2. In the Initiatives application's landing page, click **Create Initiative**. The **Create Initiative General Information** page appears.
3. Enter the following details.
  - **Name:** Name of the initiative.
  - **Planned Release Date:** The date by when the initiative is planned for release.
  - **Description:** A description about the initiative.
4. Click **Create**.

The initiative is created.

## Viewing Initiatives

Only a service catalog administrator can view initiatives.

To view an initiative:

1. In the Solution Designer landing page, click the **Initiatives** application.
2. In the Initiatives application's landing page, search for an initiative. You can filter the list by:
  - **Initiative Name:** Name of the initiative.
  - **Status:** The current status of the initiative.
  - **Last Updated:** The last updated date of the initiatives.
3. Select an initiative to view or edit it.

The Initiative details page opens. The initiative details page displays the information about the initiatives in different tabs. See "[Updating Initiatives](#)" for information on the different tabs.

## Updating Initiatives

Only a service catalog administrator updates and manages initiatives.

To update an initiative:

1. In the Solution Designer landing page, click the **Initiatives** application.
2. In the **Initiatives** application's landing page, search for an initiative. You can filter the list by **Initiative Name**, **Status**, and **Last Updated**.
3. Select the initiative.

The initiative details page opens.

## Initiative Details

The following information can be viewed or updated in the initiative details page:

- **General Information** tab: View or update the general information of an initiative.
- **Lifecycle** tab: View or manage the lifecycle of an initiative. You transition the initiative from one phase to another phase.

You can discard an initiative only in the **Lifecycle** tab of the **Initiatives** application, when viewing or editing the initiative.

See "[Lifecycle of Initiatives](#)" for more information.

- **Publishing** tab: View the status of the **Publish** operation, download the test and production cartridges when the **Publish** operation succeeds, and view the log when the **Publish** operation fails. You can also download the Design Studio workspace which can be imported in to the Design Studio eclipse environment to implement advanced design and assign policies. See "[Publishing Initiatives](#)" for details on how to publish an initiative to the test workspace and the production workspace.
- **Initiative Items** tab: View the list of initiative items such as domains, service models, technology models, CFSs, RFSS, resources, locations, and data elements. You can filter the initiative items to display only those items with errors or display all the initiative items. Select **All items** to display all the initiative items irrespective of the errors. Select **Items with errors** to display only those items with errors.

In the **Initiative Items** tab, you can perform the following actions:

- Select an initiative item to view or update it.
- View the list of errors for initiative items by clicking **View Errors**. **View Errors** is displayed only when there are errors for that initiative item.
- Click **Delete** to delete an initiative item.
- **Transition History** tab: View the history of the transitions between different phases of an initiative. You can view the comments that were provided while transitioning from one phase to the other. It shows the following information:
  - **State**: The current state of the transition. For example, **Complete testing**, **Approve for testing**, **Start acceptance testing**, **Reopen initiative**, **Reject**, **Complete functional testing**, and so on.
  - **Transition**: The phases, from the start phase to the end phase along with its status.

The following is an example of transition:

```
Functional Testing/Complete to Acceptance Testing/In progress
```

This means that the functional testing phase of the initiative is complete and the acceptance testing is in progress.

- **User Name**: The user who transitioned the initiative.
- **Transition on**: The date and time when the initiative is transitioned.
- **Comments**: The comments that are provided during the transition.

## Lifecycle of Initiatives

Initiatives follow a lifecycle, from definition to release. You must have the service catalog administrator role to use the **Initiatives** application to manage each phase in the initiative lifecycle.



You transition the initiative from one phase to another in the **Lifecycle** tab in the **Initiatives** application. When you transition an initiative from one phase to another, you can enter appropriate comments for each action that you perform. For example, in the *Mobile Service* example, if you want to reject an initiative, you can do so and specify the reason for rejection as *Add few scenarios in functional testing* in the comments field. The functional testing team views the rejection reason in the **comments** column in the **Transition History** tab and adds the corresponding scenarios and repeats the functional testing phase.

[Figure 2-1](#) explains the lifecycle of an initiative.

Figure 2-1 Lifecycle of an Initiative

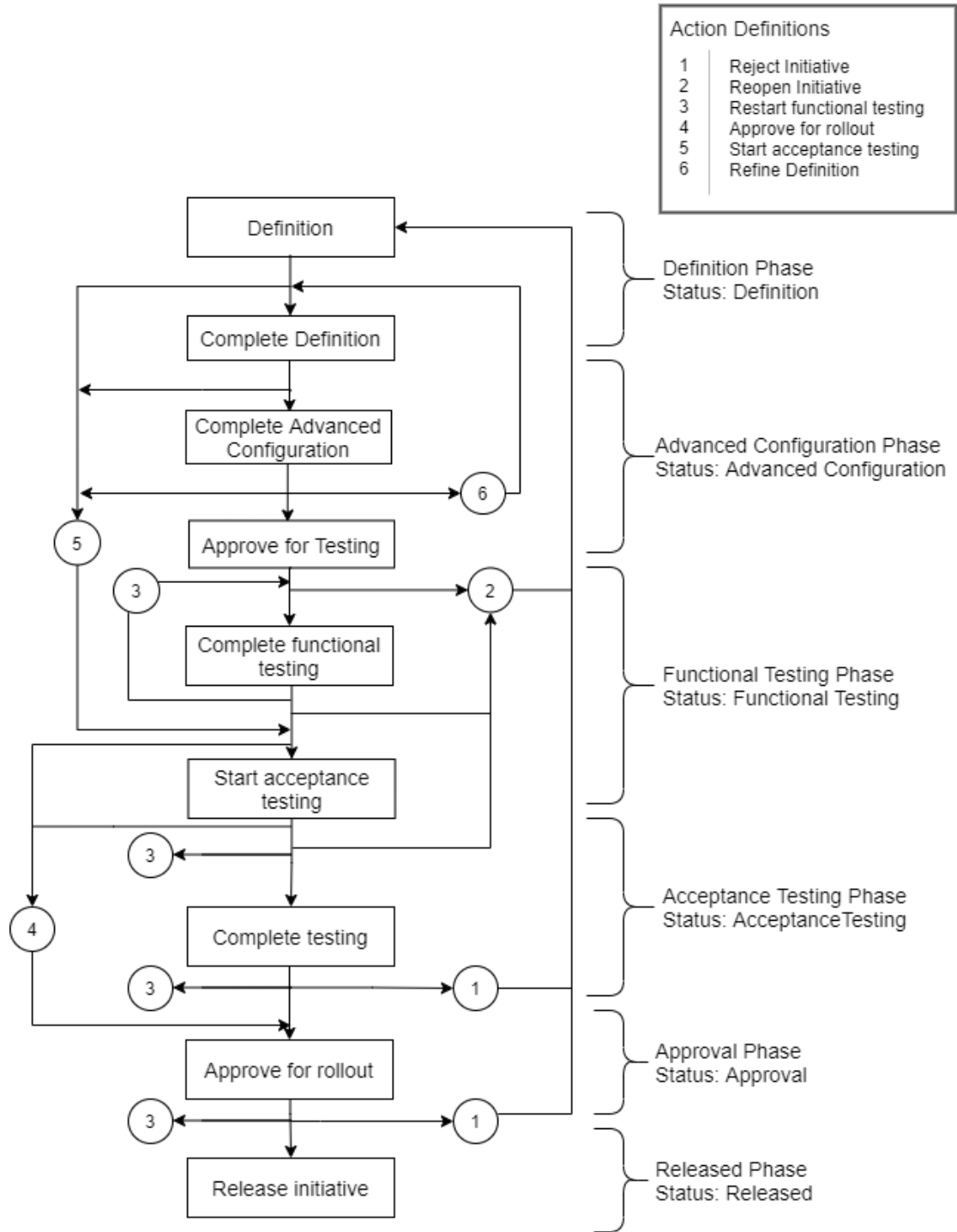


Table 2-1 describes the actions that can be performed in an initiative and their description.

**Table 2-1 Actions in Lifecycle of an Initiative**

Action	Description
Definition	<p>The initial phase when an initiative is created. You define the initiative items such as domains, PSR models, CFSs, RFSs, resources, data elements, and locations.</p> <p>The status of the initiative is <b>Definition</b>.</p>
Complete definition	<p>Completes the definition of an initiative and moves the initiative to advanced configuration.</p> <p>After defining the models and their items, click <b>Complete definition</b> in the <b>Lifecycle</b> tab and confirm to complete the definition.</p> <p>After completing the definition, publish it to a test workspace to generate Design Studio workspace.</p> <p>The status of the initiative is <b>Advanced Configuration</b>.</p>
Complete advanced configuration	<p>Enables UIM developers to write customized code for the defined advanced policies for the initiative. You can publish the initiative to generate Design Studio workspace which the developer can download. You can import the workspace in Design Studio and make the necessary changes.</p> <p>After you click <b>Complete advanced configuration</b>, the initiative moves to approve for testing. You cannot edit the initiative's content or publish it to a test workspace until testing is approved.</p> <p>The status of the initiative is <b>Advanced Configuration</b>.</p>
Approve for testing	<p>Approves the initiative for functional testing.</p> <p>After you click <b>Approve for testing</b> and confirm the approval, the initiative transitions to the <b>Functional Testing</b> phase.</p> <p>You can edit the initiative's content or publish it to a test workspace.</p> <p>The status of the initiative is <b>Functional Testing</b>.</p>
Complete functional testing	<p>Completes the functional testing.</p> <p>After the functional testing is completed, click <b>Complete functional testing</b> in the <b>Lifecycle</b> tab and confirm to complete the functional testing. The initiative moves to the acceptance testing phase.</p> <p>You cannot edit the initiative's content or publish it to a test workspace.</p> <p>The status of the initiative is <b>Functional Testing</b>.</p>
Start acceptance testing	<p>Starts acceptance testing.</p> <p>You can start acceptance testing from the definition phase skipping the functional testing phase. To start the acceptance testing from the definition phase, click <b>Other Actions</b> and select <b>Start acceptance testing</b>.</p> <p>You cannot edit the initiative's content. You can publish the initiative to a test workspace.</p> <p>The status of the initiative is <b>Acceptance Testing</b>.</p>
Complete testing	<p>Completes the acceptance testing. This action completes the acceptance testing phase and transitions it to <b>Approve for rollout</b>.</p> <p>You cannot edit the initiative's content or publish it to a test workspace.</p> <p>The status of the initiative is <b>Acceptance Testing</b>.</p>

**Table 2-1 (Cont.) Actions in Lifecycle of an Initiative**

Action	Description
Approve for rollout	<p>Approves the initiative for releasing it to production.</p> <p>After you complete the functional testing phase or start acceptance testing or complete acceptance testing, you can start an approval process for rolling out the initiative. After the review, the approver approves the initiative for releasing it to production.</p> <p>You cannot edit the initiative's content or publish it to a test workspace.</p> <p>The status of the initiative is <b>Approval</b>.</p>
Release initiative	<p>Releases the initiative to production. The initiative is published to the production workspace automatically. After the publish operation is successful, the initiative transitions to the <b>Released</b> phase. After the initiative is released, you can clone or revise the associated PSR models, the specifications, or the data elements.</p> <p>You cannot edit the initiative's content.</p> <p>The status of the initiative is <b>Released</b>.</p>
Discard initiative	<p>Deletes the initiative.</p> <p>To discard an initiative, click <b>Other Actions</b> and select <b>Discard initiative</b>. This action permanently deletes the initiative and all of its contents including the associated versions of the released items that are created when revising an item.</p>
Reject	<p>Rejects an initiative and moves it to the <b>Definition</b> phase. When you are in the <b>Approve for testing</b> phase or the <b>Approve for rollout</b> phase, you can reject the initiative instead of approving. When you reject an initiative, the initiative transitions to the <b>Definition</b> phase.</p> <p>The status of the initiative is <b>Definition</b>.</p>
Refine Definition	<p>Enables redefining the initiative and moves it to the <b>Definition</b> phase. After you complete the advanced configuration phase, you can redefine the initiative's content by clicking <b>Other Actions</b> and then selecting <b>Refine Definition</b> which transitions the initiative to the <b>Definition</b> phase.</p> <p>The status of the initiative is <b>Definition</b>.</p>
Reopen initiative	<p>Reopens the initiative to the <b>Definition</b> phase.</p> <p>If testing uncovers any issues, you can reopen an initiative which transitions the initiative to the <b>Definition</b> phase. You may need to republish the initiative to your test workspace. To reopen the initiative, click <b>Other Actions</b> and then select <b>Reopen initiative</b>.</p> <p>The status of the initiative is <b>Definition</b>.</p>
Restart functional testing	<p>Restarts the functional testing phase.</p> <p>If you want to repeat functional testing in any of the phases such as functional testing, acceptance testing, and approval, you can transition the initiative to restart functional testing. You can do so by clicking <b>Other Actions</b> and then selecting <b>Restart functional testing</b>.</p> <p>The status of the initiative is <b>Functional Testing</b>.</p>

## About the Definition Phase

In the definition phase, you design the initiative items or the initiative contents such as service model, technology model, domain, customer facing service, resource facing service, resources, and data elements. In this phase, the initiative and its items have the **Definition** status.

You can complete the definition or stay in the definition phase to modify the design. The comments entered while defining the initiative are viewed by the approval team in the **Transition History** tab. A service catalog administrator approves or rejects the initiative for testing.

You can perform the following actions in the **Definition** phase:

- Complete definition
- Start acceptance testing
- Discard initiative

After the definition phase is completed, the initiative progresses to advanced configuration. A developer can code the advanced policies defined in that initiative.

See [Table 2-1](#) for more information on the actions that can be performed in the definition phase.

## About the Advanced Configuration Phase

In the **Advanced Configuration** phase, the initiative and its contents transitions to the **Advanced Configuration** status. A developer can code the advanced policies and also write any custom implementations using extended designer class. See "Extending Solution Designer" in *Developer's Guide* for more information on extending Solution Designer. In the **Advanced Configuration** phase, you can publish the initiative to generate Design Studio workspace. UIM developer can download the workspace and import it in Design Studio. The developer can code the advanced policies and then complete the **Advanced Configuration** phase.

After the **Advanced Configuration** phase is completed, the initiative progresses to approval for testing. An approver reviews the work and can approve or reject the approval request for testing. An approver must be a service catalog administrator.

The approver can perform the following actions when approving the initiative:

- Approve for testing
- Start acceptance testing
- Refine definition
- Reject
- Discard initiative

See [Table 2-1](#) for more information on the actions that can be performed in the Advanced Configuration phase.

## About the Functional Testing Phase

After an approver approves the model definition for testing, the initiative and its contents transition to **Functional Testing**.

In the **Functional Testing** phase, you can publish the model to **Test** workspace. The **Test** workspace publishes the initiative content to the DevOps engine that has all the plug-ins required by Solution Designer to build the requested cartridge. When the publish operation is successful, you need to perform functional testing to ensure the cartridge is deployed in the respective run-time application such as UIM and that the functionality is working as expected. See "[Publishing Initiatives to Generate Design Studio Workspaces](#)" for detailed information on publishing the model to test workspace.

You can perform the following actions in the **Functional Testing** phase:

- Complete functional testing
- Reopen initiative
- Discard initiative

See [Table 2-1](#) for more information on the actions that can be performed in the functional testing phase.

## About the Acceptance Testing Phase

You can perform acceptance testing after you complete functional testing or you can directly perform acceptance testing from the **Definition** phase. To start acceptance testing, click **Start acceptance testing**. The status of the initiative and its contents transition to **Acceptance Testing**. The acceptance testing team can then perform acceptance testing.

You can perform the following actions in the **Acceptance Testing** phase:

- Complete testing
- Approve for rollout
- Restart functional testing
- Reopen initiative
- Discard initiative

See [Table 2-1](#) for details on the actions that can be performed in the **Acceptance Testing** phase.

## About the Approval Phase

When the initiative progresses to the **Approval** phase, an approver reviews the work and the test results. An approver requires the service catalog administrator application role.

The approver can perform the following actions based on the review:

- Approve for rollout
- Restart functional testing
- Reject
- Discard initiative

See [Table 2-1](#) for details on the actions that are performed in the **Approval** phase.

## About the Released Phase

After the initiative is approved, you can release the initiative to production. The contents of the initiative are published to the production workspace. After the publish operation is successful, the initiative and its contents transition to **Released**. See "[Publishing Initiatives to Generate Production Cartridges](#)" for details on publishing the initiative to the production workspace.

After you click **Release initiative** and confirm it in the dialog box, you can't undo a release or reopen a released initiative. The released initiative cannot be reused and the released items cannot be discarded from the application. You can clone or revise the released items as part of a new initiative. Domains, specifications, and data elements from the released initiative are available system-wide.

See [Table 2-1](#) for more information on the actions that can be performed in the released phase.

# 3

## Defining Your PSR Models

Use PSR (Product-Service-Resource) Models in Solution Designer to model end-to-end solutions. A PSR Model includes services, resources, and their relationships.

### Topics in this document

- [About PSR Models](#)
- [About Guided Process](#)
- [Creating PSR Models using Guided Process](#)
- [Importing PSR Models](#)
- [Exporting PSR Models](#)
- [Viewing PSR Models](#)
- [Updating PSR Models](#)
- [Cloning PSR Models](#)
- [Revising PSR Models](#)
- [Deleting PSR Models](#)

## About PSR Models

You create PSR models in Solution Designer to define end-to-end solutions to cater to customer services. The key principle of PSR models is to decouple commercial offers from technical implementation using the customer facing service (CFS) and the resource facing service (RFS) specifications. When new products or services are launched, the underlying PSR model decouples itself from the frequently changing commercial layer. PSR models provide a CFS layer that has technology agnostic reusable specifications and a RFS layer that has technology specific specifications. PSR models have the following types:

- **Service Models:** Service specialists define an end-to-end design of customer services.
- **Technology Models:** Network specialists define an end-to-end design of technology specific RFSs.

## About Service Models

Service models define the relationships between your commercial products, the services that they represent, and the resources that are required to implement the services. A service model contains CFSs, RFSs, resources, locations, their components, and their configurations such as design parameters, characteristics, parameter mapping, design policies, and delivery policies.

Service models describe how the customer services (CFSs) are designed and delivered. Solution Designer provides a guided user interface to the service specialists to holistically define an end-to-end configuration of customer services. The following are the steps involved in defining a service model:

- Select an initiative.



- Select or create a service domain.
- Build a service model that includes CFSs, RFSs, resources, locations and their components.
- Configure attributes for each of the specifications. You can configure the following for the specifications:
  - The service design parameters required to fulfill the customer service.
  - The list of characteristics to support the inventory system requirements.
  - The design parameters mapping to the inventory characteristics to provision the services.
  - The standard and advanced design policies to assign appropriate resources in the inventory system.
  - The delivery policies to ensure the complete delivery of the service.

## About Technology Models

Technology models define how commercial products and technical services are related, and they enable you to associate the products that you sell with the technical services and resources that are required to fulfill orders. A technology model contains RFSs, their components, resources and their location.

Technology models describe how technology specific RFSs are implemented and provisioned in the network. Solution Designer provides a guided user interface to the network specialists to holistically define an end-to-end configuration of network technologies. The following are the steps involved in defining a technology model:

- Select an initiative.
- Select or create a technology domain.
- Build a technology model that includes RFSs, resources, location and their components.
- Configure attributes for each of the specifications. You can configure the following for the specifications:
  - The service design parameters required to fulfill the customer service.
  - The list of characteristics that must be defined in the inventory systems.
  - The design parameters mapping to the inventory characteristics to provision the services.
  - The standard and advanced design policies to assign resources in inventory system.
  - The delivery policies to ensure the complete delivery of the service.

## About Guided Process

You can create service models and technology models in Solution Designer using a guided process. The guided process provides an intuitive, user-friendly interface that offers a streamlined process for specialists to create PSR models. The guided process provides a series of sequential steps by dividing the modeling process.

In the guided process page:

- The process overview panel on the right side lists the steps involved.

- The triangular notch and the steps indicator (for example, 1/4 ) at the top indicate the current active step in the guided process.
- Click the steps indicator at the top to expand or collapse it.
- Click **Save** to save your progress in any step.
- Click **Cancel** to discard any of the changes made.

## Creating PSR Models using Guided Process

In Solution Designer, you can create PSR models that include service models and technology models. See "[About Service Models](#)" and "[About Technology Models](#)" for more details on service models and technology models.

You can create PSR models using the following approaches:

- **Top-down approach:** A service specialist creates an end-to-end service model including CFSs, RFSs, resources, and locations.
- **Bottom-up approach:** A service specialist creates the service model with CFSs and a network specialist creates the technology model with RFSs, resources, and locations. The service specialist uses the existing technology model and completes the service model.

Creating PSR models in guided process involves four steps:

1. **Add general information:** Add the general information such as Model name, Model Id, and so on.
2. **Select domain:** Select service or technology domain based on the type of the PSR model.
3. **Build model:** Build the model graphically in a canvas and create relationships between specifications.
4. **Configure model:** Configure characteristics, design parameters, parameter mappings, design policies, and delivery policies.

## Creating Service Models using Guided Process

To create PSR models in the guided process:

1. Click the **PSR Models** application in the Solution Designer landing page.
2. In the **PSR Models** application, click **Create Service Model**.

The **Create service model** overview page opens that lists the steps involved in creating a service model.

3. Click **Start** to start the guided process and to move to **Add general information** step.  
The **Add general information** page opens.

You can create service models in the guided process by following the four steps:

- [Step 1: Add General Information](#)
- [Step 2: Select Domain](#)
- [Step 3: Build Model](#)
- [Step 4: Configure Model](#)

## Creating Technology Models using Guided Process

To create PSR models in the guided process:

1. Click the **PSR Models** application in the Solution Designer landing page.

In the **PSR Models** application, select **Create Technology Model**.

The **Create technology model** overview page opens and lists the steps involved in creating a technology model.

2. Click **Start** to start the guided process and to move to **Add general information** step.

The **Add general information** page opens.

You can create technology models in the guided process by using the following four steps:

- [Step 1: Add General Information](#)
- [Step 2: Select Domain](#)
- [Step 3: Build Model](#)
- [Step 4: Configure Model](#)

### Step 1: Add General Information

To add general information for service model and technology model:

1. In the **Add general information** page, enter Model name, Model ID, Description, and Initiative. The model ID must follow the naming rules. See "[About Naming Rules](#)" for more information on naming rules.

 **Note:**

You cannot modify the model ID and the initiative after the model is saved for the first time.

2. Click **Continue** to progress to the select domain step.
  - For service model, the **Select service domain** page opens.
  - For technology model, the **Select technology domain** page opens.

### Step 2: Select Domain

To select a domain:

1. Do one of the following:
  - For service model, select an existing service domain or create a new service domain.
  - For technology model, select an existing technology domain or create a new technology domain.

See "[Creating Domains](#)" for more information on how to create a service domain or a technology domain.

 **Note:**

You cannot modify the domain after you add the first entity in the **Build Model** step.

2. Click **Continue** to progress to the **Build model** step.  
The **Build model** page opens.

## Step 3: Build Model

You start building a service model using CFSs and a technology model using RFSs. You can create the following relationships while building the PSR models:

- CFS to location, resource, RFS, or another CFS. This is applicable for service models only.
- RFS to location, resource, or another RFS.
- Resource to location, another resource, or RFS.

### Building a Model

To build a model:

1. In the **Build model** page, click **Create** to build the model for the first time. If you already have any configuration defined, click **Edit** which opens the diagram in the edit mode in full screen.

The **Edit Configuration** page opens.

2. Click + symbol on the canvas to add a specification to the model.
  - For service model: The **Customer Facing Services** dialog opens.
  - For technology model, The **Resource Facing Services** dialog opens.

The specifications ( CFSs, RFSs, resources, and location) dialog lists all the specifications that meet the following criteria:

- Specifications that have the primary domain that match the selected domain.
  - Specifications that have the secondary domains that match the selected domain.
  - Specifications from the released initiatives that match the selected domain.
3. Do one of the following based on the relationships that you want to create between CFSs, RFSs, resources, and locations:
    - **Add CFSs to the model:** This step is applicable only for service models.

In the service model, you can select an existing CFS from the list or create a new CFS. In the service model, when you add a CFS for the first time, you need not add a CFS component. When you add a child CFS to the canvas, you must add a CFS component to relate a CFS.

See "[Creating New CFS in the Model](#)" for creating a new CFS in the **Edit Configuration** page.

- **Add Components to the Model:**  
Click the + symbol on the specification to add a component to the model. To add a child specification to a parent specification, you must create a new component. For example, create a RFS component as a child of the selected CFS. See "[About Components](#)" for more details on components.

See "[Creating Components](#)"

After you add the appropriate component to the canvas, click the **+** symbol on the newly created component to add the child specification.

- **Add RFS to the model:** In the technology model, when you add a RFS for the first time, you need not add a RFS component. When you add a child RFS to the canvas, you must add a RFS component to the related parent specification. After you add the RFS component, click the **+** symbol on the RFS component. In the **Resource Facing Service** dialog, select an existing RFS specification from the list or create a new RFS specification.
  - **Add Resource to the model:** After you add a resource component in the canvas, click the **+** symbol on the resource component. In the **Resources** dialog, select an existing resources specification from the list or create a new resource specification.
  - **Adding Location to the model:** After you add a location component in the canvas, click the **+** symbol on the location component. In the **Locations** dialog, select an existing location specification from the list or create a new location. The **Locations** dialog lists all the locations within the same initiative or the released initiatives.
4. After building the service model or the technology model, click **Continue** to progress to the configure model step.

### Creating New CFS in the Model

To create a new CFS:

1. Click **New customer facing service** in the **Customer Facing Services** dialog.  
The **New customer facing service** dialog opens.
2. Enter name, ID, and description. The ID must be unique and follow the entity naming rules. See "[About Naming Rules](#)" for more information.
3. Click **Create**.  
The CFS is created and added to the canvas. The newly created CFS utilizes the model's initiative and the domain.

### Creating New Components in the Model

To create new components:

1. Click **New component**.  
The **New component** dialog opens.
2. Enter **Name**, **Type**, **Minimum Cardinality**, **Maximum Cardinality**, **Relationship Type**, and **Description**. Select **Relationship type** as **Config hierarchy** for adding a **Other Resource** resource specification. When you add **Other Resource** resource specification, it creates a configuration in the UIM run-time.
3. Click **Create**.  
The component is added as a child of the selected specification. You can add multiple components to a selected specification.

#### Note:

You must create components to add a child specification such as CFS, RFS, resource, and locations based on your business requirements.

### Creating New RFS in the Model

To create new RFSs:

1. Click **New resource facing service** in the **Resource Facing Services** dialog.

The **New resource facing service** dialog opens.

2. Enter name, ID, and description. The ID must be unique and follow entity naming rules. See "[About Naming Rules](#)" for more information.
3. Click **Create**.

The RFS is created and added to the canvas. The newly created RFS utilizes the model's initiative and the model's domain or the primary domain of its parent specification.

### Creating New Resources in the Model

To create new resources:

1. Click **New resource** in the **Resources** dialog.

The **New resource** dialog opens.

2. Enter name, ID, and optional description. The ID must be unique and follow entity naming rules. See "[About Naming Rules](#)" for more information.

Select the type that matches the UIM's resources. For example, Connectivity Specification, Flow Identifier Specification. Select the **Delivery action target** check box to mark the resource to be the delivery action target for the delivery policies. Only those resources that have delivery action target selected are available for delivery policies.

3. Click **Create**.

The resource is created and added to the canvas. The newly created resource utilizes the service model's initiative and the primary domain of the parent specification.

For resource components with **Relationship Type** as **Exclusive**, you must add only the resources with the following resource types:

- Device Interface Specification
- Custom Object Specification
- Custom Network Address Specification
- IPv4Address Resource Extension
- IPv6Address Resource Extension
- Flow Identifier Specification

If you add any other resource type to the logical device component, the **Publish** operation fails with errors. You must reconfigure the service models to add the specified resource types to the logical device components.

### Creating Locations in the Model

To create a new location:

1. Click **New location** in the **Locations** dialog.

The **New location** dialog opens.

2. Enter **Name**, **ID**, **Type**, **Place Type** and optional **Description**. The ID must be unique and follow entity naming rules. See "[About Naming Rules](#)" for more information.

You can select **Site**, **Address**, **Address Range**, and **Location** as the **Place Type**. See "[About Locations](#)" for more information on location specification.

3. Click **Create**.

The location is created and added to the canvas. The newly created location utilizes the service model's initiative.

## Features in the Configuration Canvas

You can perform the following actions in the **Edit Configuration** canvas page:

- When you hover over the entities in the model, Solution Designer highlights the complete relationship hierarchy for that entity.
- To expand all the entities in the model, click **Expand All** on the top left. To collapse all the entities in the model, click **Collapse All** on the top left.
- To collapse the descendants for a selected entity, click the three dots on the entity and click **Collapse**. To expand the immediate children for a selected entity, click the three dots on the entity and click **Expand**. To expand all the descendants for a selected entity, click the three dots on the entity and click **Expand All**.
- To remove an entity from the model, click the entity and click **Remove** in the entity details pop-up. Removing an entity removes it from the canvas but doesn't delete it permanently from Service Specifications and Resource Specifications.
- To delete a component, click the component and click **Delete** in the component details pop-up. Deleting a component deletes the component permanently.
- To delete a relationship between a component and specification, click the three dots on the component and select **Remove link to *child specifications*** where *child specifications* are the specifications that are related to the selected component.
- You can search for any entity in the PSR model including components by clicking **Search** using the sticky tool bar. Clicking **Search** in the sticky tool bar expands the search panel. Type the name of the entity that you want to search in the model. The searched entity is expanded in the model tree and when you click the entity in the search panel, the entity along with its children is shown in the model canvas. When you search for an entity that is referenced by two or more parent entities, the search returns all the instances of that entity. When you search for entities that has the same name, the search returns all the entities that matches the search criteria.
- You can set the display settings for the PSR model canvas. Click **Diagram settings** in the sticky tool bar to expand the diagram settings panel. The panel includes display settings to hide and show **Entity icon** and **Entity type** to fine-tune the diagram. You can choose the orientation to display the model horizontally or vertically. When you have collapsed some of the entities in the canvas and then modify **Diagram settings**, the complete PSR model including all the collapsed entities is displayed.

## Step 4: Configure Model

To configure a model:

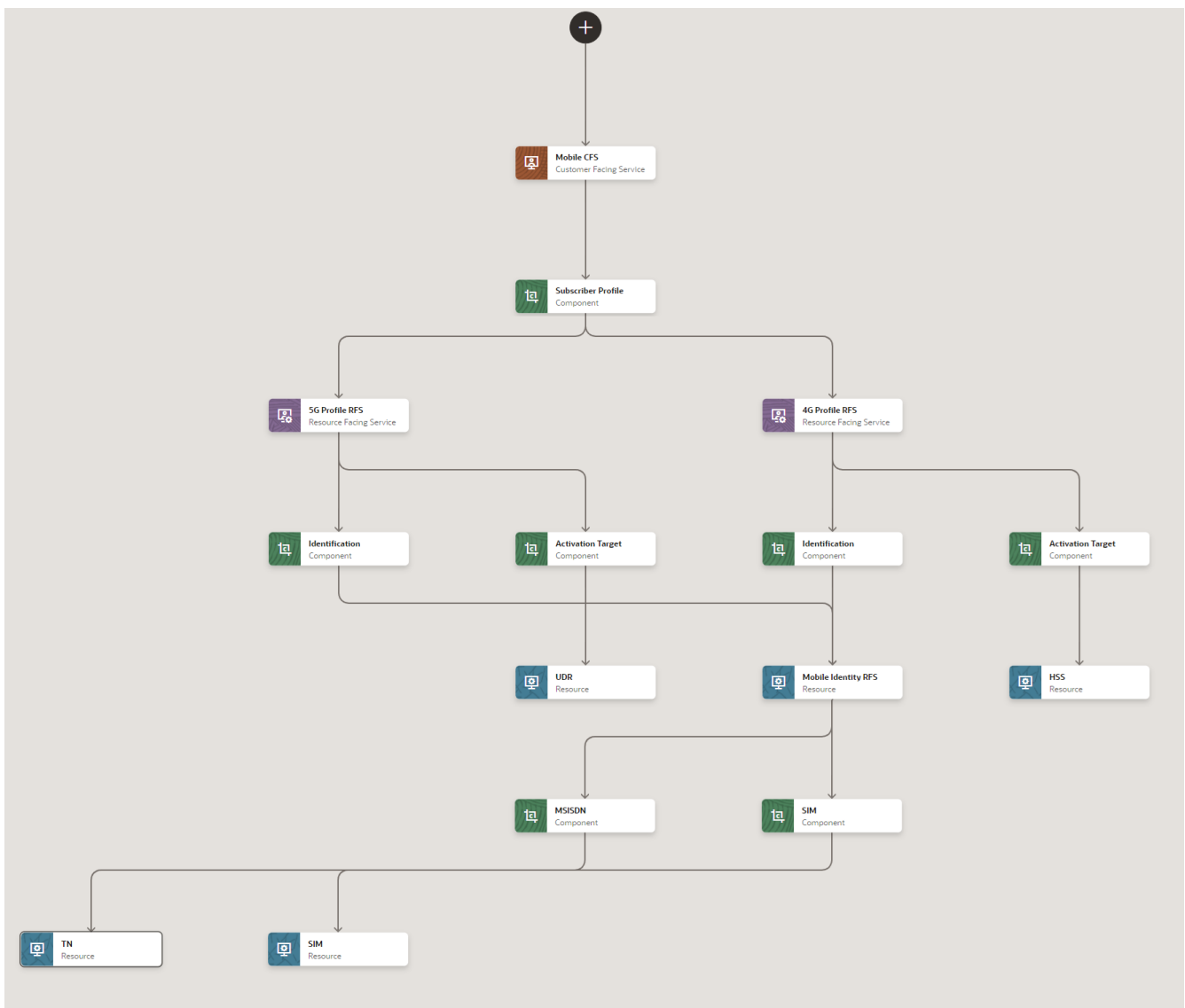
1. In the **Configure model** step, in **Specification Configuration**, you can configure the following:
  - a. Design Parameters: See "[Defining Design Parameters](#)" for details on how to configure design parameters.
  - b. Characteristics: See "[Defining Characteristics](#)" for details on how to configure entity characteristics.

- c. Parameter Mapping: See "[Mapping Design Parameters](#)" for details on how to configure parameter mappings.
  - d. Design Policies: See "[Defining Design Policies](#)" for details on how to configure design policies.
  - e. Delivery Policies: See "[Defining Delivery Policies](#)" for details on how to configure delivery policies.
2. Click **Finish** to complete the model.

## Mobile Service Example of Service Models

The example is to create a service model for new mobile service. [Figure 3-1](#) is a completed service model showing a design for a Mobile Service. The service model shows the component links for the CFSSs, RFSSs, and resources.

**Figure 3-1 Mobil Service Example of a Service Model**





## Releasing a New Mobile Service

To release the *Mobile Service*, follow the steps for top-down approach:

1. Service catalog administrator creates a new initiative, for example, *Mobile*.
2. Service specialist creates the service domain such as *Mobile*. The relative path of the helper class and libraries are added to the service domain.
3. Service specialist creates the *Mobile Service* service model and builds the service model in the diagram [Figure 3-1](#). See "[Creating Service Models using Guided Process](#)" for more information on defining service models.
4. Service specialist creates the design parameters such as *Call waiting*, *Call barring*, *Call Conferencing*, and *Service Address* for the *Mobile CFS*. The *Service Address* design parameter is a feature group which has *State* and *City* data elements.
5. Service specialist creates design policies using standard and advanced policies for the *Mobile CFS*. For example:
  - a. Standard policy: Select the technology 5G or 4G based on the *State* design parameter.
  - b. Advanced policy: Select UDR in the same *State* as the *5G Profile RFS*. See "[Defining Design Policies](#)" for more information on defining design policies.
6. Service specialist creates the delivery policies to activate the *Call waiting*, *Call barring*, and *Call conferencing* services in the activation system such as ASAP.
7. Service specialist completes defining the *Mobile Service* service model by transitioning the initiative to the **Advanced Configuration** status.
8. In the advanced configuration status, publish the initiative to the **Test** workspace. See "[Publishing Initiatives to Generate Design Studio Workspaces](#)" for more information.

The requested Design Studio workspace is generated.
9. You can download the workspace and a developer can write the implementation code in the extended designer class for the advanced policy in Design Studio. See "Extending Solution Designer" in the *Developer's Guide* for details on the extended designer class.

The developer can upload the extended designer class with its helper classes and third party libraries to object store and then update the relative path in Solution Designer automatically using Object Store Utility or manually by placing them in the S3-compatible object store and updating the relative path in Solution Designer. See "Working with Object Store Utility" in the *Developer's Guide* for details on the Object Store Utility.
10. After you complete advanced configuration phase, you can transition the initiative through the lifecycle till acceptance testing. You can publish the initiative to **Test** workspace and the requested cartridges are generated. See "[Publishing Initiatives to Generate Test Cartridges](#)" for more information.
11. You can download and deploy the generated cartridge in the UIM run-time for testing purposes.
12. After the initiative is approved for rollout, service catalog administrator publishes it to the production workspace. The production cartridges are generated that can be deployed in UIM run-time environment. The initiative transitions to **Released** status after the production cartridges are generated. See "[Lifecycle of Initiatives](#)" and "[Publishing Initiatives to Generate Production Cartridges](#)" for more information.

## Upgrading the Mobile Service

After the *Mobile* initiative is released, the product manager decides to add new Closed User Group (CUG) calling product.

The steps for upgrading the *Mobile Service* are as follows:

1. Service catalog administrator creates a new initiative *Mobile Upgrade*.
2. Service specialist revises the *Mobile Service* service model and revises the *Mobile CFS* and *5G Profile RFS*. See "[Revising PSR Models](#)" for more information.
3. Service specialist adds the new CUG parameter to *Mobile CFS* and *5G Profile RFS*.
4. Service specialist creates the design policy to enable the CUG service only for enterprise customers using the standard policy.
5. Service specialist creates the delivery policy to pass the CUG parameter to UDR for *5G Profile RFS*.
6. Service catalog administrator publishes the initiative to the **Test** workspace. The generated cartridges are then deployed in UIM for testing purposes. See "[Publishing Initiatives to Generate Design Studio Workspaces](#)" for more information.
7. After the *Mobile Upgrade* initiative is approved for rollout, service catalog administrator publishes the initiative to the production workspace. The *Mobile Upgrade* initiative transitions to the **Released** status after the *Mobile Upgrade* cartridge is generated. See "[Lifecycle of Initiatives](#)" and "[Publishing Initiatives to Generate Production Cartridges](#)" for more information.

## Importing PSR Models

You can import a service model or a technology model that you created in another environment. You can export the model that you created in your test environment and import it into your production environment. You can also download the sample PSR models from Oracle Software Delivery Cloud and import them into your Solution Designer environment.

As a prerequisite, you must have an initiative that is in **Definition** status.

To import a model:

1. In the Solution Designer landing page, click the **PSR Models** application.
2. In the **PSR Models** application, click **Import**.

The **Import** dialog box opens.

3. You can drag and drop the source file or click the file picker and select a file from your local computer.
4. Select an initiative to which the model should be associated.
5. Click **Import**.
6. Click **Done**.

The imported model is listed in the **PSR Models** page.

## Exporting PSR Models

You can export the released PSR models.

To export a PSR model:

1. In the Solution Designer landing page, click the **PSR Models** application.
2. In the **PSR Models** application, search for the PSR model that you want to export.

The **PSR Models** page opens.

 **Note:**

The PSR model must be in **Released** status to export it.

3. Click the three dots on the PSR model and click **Export**.  
The PSR model is downloaded in the JSON format with the file name same as the PSR model name. You can access the exported model file from the web browser's *Downloads* folder.

## Viewing PSR Models

To view a PSR model:

1. On the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **PSR models** application, search for a service or a technology model. You can filter the list by:
    - Model Name: Name of the model.
    - Domain: The domain of the model. It can be a service domain or a technology domain.
    - Type: The type of the model (Service Models or Technology Models).
    - Status: The current status of the initiative.
    - Initiative: The initiative of the model.
    - Last Updated: The last updated date of the initiatives.
  - In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the initiatives editor page.
3. Select a model to view it.

The model details page opens when the model is in the Functional Testing, Acceptance Testing, Approval, or Released status.

The model details page has two tabs:

- **PSR Model**: Displays the complete service or technology model in the canvas. Click **Explore** to view the PSR model in the **Edit Configuration** page. You can search for an entity in the **Edit Configuration** page.
- **General Information**: Displays the general information of the service or technology model.

The **Edit Service Model** or **Edit Technology Model** page opens based on the model type when the model is in the **Definition** status. The **Build model** page in the guided process opens which lets you view or edit the model. The default view is to show only CFS or RFS, without the descendants. You can expand and collapse all the child entities using **Expand All** and **Collapse All**.

4. Do one of the following:
  - Click **Cancel** in the **Create Service Model** page or the **Create Technology Model** page to return to the **PSR Models** page.
  - Click **Go to PSR Models** to return to the PSR Models page or **Go to Initiatives** to return to the **Initiatives Items** tab in the initiative editor page.

## Updating PSR Models

You can update the general information, the domain, the model, and the configuration that includes design parameters, entity characteristics, parameter mapping, design policies, and delivery policies. You can update a service model or a technology model only if the model is in the **Definition** status.

 **Note:**

- You cannot update the initiative or ID after the model is saved for first time.
- You cannot update the domain after you add the first entity in the **Build Model** step.

To update the PSR Model:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **PSR models** application, search for a service model or technology model that is in the status **Definition**.
  - In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the initiatives editor page.

3. Select a model to update it.

The **Create Service Model** page or **Create Technology Model** page opens. If the PSR model has a domain, the **Build model** page opens. If the PSR model does not have a domain, the **Select domain** page opens.

4. You can update the general information, domain, model relationships, and configuration that includes design parameters, entity characteristics, parameter mapping, design policies, and delivery policies. See "[Configuring Service and Resource Specifications](#)" for more information on configuring the specifications.

 **Note:**

You cannot update a domain after you add the first entity in the **Build model** step.

5. After you finish updating the details in all the steps, click **Finish** in the **Configure model** step.

Clicking **Finish** returns to the **PSR Models** page or the **Initiative Items** tab in the initiatives editor page.

## Cloning PSR Models

You can clone the existing PSR models to create a copy and update the details as necessary. See "[About Cloning Entities](#)" for information on the cloning process.

To clone a PSR model:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **PSR Models** application, search for a model.  
In the PSR models result list page, click **Clone**.
  - In the **PSR Models** application, select a PSR model by searching for it.  
In the PSR model details page, click **Clone**.  
The **Clone Service Model** or **Clone Technology Model** pop-up appears.
  - In the **Initiatives** application, search and select an initiative. Click the model in the **Initiative Items** tab in the initiatives editor page.  
In the respective models page, click **Clone**.  
The **Clone Service Model** or **Clone Technology Model** pop-up appears.
3. Enter the ID and update the name, and description as necessary. You must follow entity naming rules. See "[About Naming Rules](#)" for more information.

 **Note:**

- You can't select a new initiative when you clone a PSR model in the **Definition** and the **Advanced Configuration** status.
- You must select a new initiative that is in **Definition** status when you clone a PSR model in the **Released** status.

4. Click **Continue**.

The respective models page opens with all the details in the guided process pages.

You can update general information, domain, model, and configuration including design parameters, entity characteristics, parameter mapping, design policies, and delivery policies.

## Revising PSR Models

You can revise a PSR model that is in **Released** status. See "[About Revising Entities](#)" for information on revising an entity.

To revise a model:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **PSR Models** application, search for a model.  
The model is listed in the results section in the PSR Models page.
  - In the **PSR Models** application, select a model by searching for it.  
The respective model details page opens.
  - In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the initiatives editor page.
3. Click **Revise**.

The **Revise Service Model** or **Revise Technology Model** dialog box opens.

4. Select a different initiative in **Definition** status and click **Continue**.

The **Create Service Model** or **Create Technology Model** page opens.

5. Update the details of the service model or the technology model in the revised model. You can add new service specifications (CFSs and RFSs) and resource specifications (resources, and locations) to the model.

 **Note:**

If you want to update any specification that includes design parameters, characteristics in the model, you must first revise that specification in the **Service Specifications** or **Resource Specifications** application. See "[Revising Service Specifications](#)" and "[Revising Resource Specifications](#)" for details on revising specifications.

6. After you update the necessary details, click **Finish** in the **Configure Model** step.

The application returns to the **PSR Models** page or the **Initiative Items** tab in the initiative editor page.

## Deleting PSR Models

You can delete PSR models from the **PSR Models** application or from the **Initiative Items** tab in the **Initiatives** application.

To delete a model:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:

- In the **PSR Models** application, search for a service model or a technology model.

The model is listed in the results section in the PSR Models page.

- In the **PSR Models** application, select a PSR model by searching for it.

The respective model details page opens.

- In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the Initiatives details page.

3. Click **Delete**.

A confirmation dialog box appears.

4. Click **Delete** in the confirmation dialog box.

The PSR model is deleted. If you are deleting a revised model, only the current revision is deleted and the model is reverted to the previously released version.

 **Note:**

You can't delete a model after you complete the **Advanced Configuration** phase of the associated initiative.

# 4

## Managing Domains

Use domains in Solution Designer to organize and manage specifications such as Customer Facing Services (CFS), Resource Facing Services (RFS), and resources into meaningful groups.

### Topics in this document

- [About Domains](#)
- [Creating Domains](#)
- [Viewing Domains](#)
- [Updating Domains](#)
- [Deleting Domains](#)

## About Domains

A domain is a logical group or category that represents a specific area or type of service within the telecommunications industry. It is used to organize and classify the specifications, offerings, and capabilities provided by the service provider. Each domain typically represents a distinct aspect of the telecommunications services, such as voice services, data services, network infrastructure, security, customer support, cloud services, Internet of Things (IoT), or any other relevant category specific to your service offerings.

Domains are divided into service domains and technology domains to provide a granular categorization within a specific domain. A technology domain can reference zero or more service domains. Domains are used for filtering when creating service and technology models. For example, if the *Mobile* service domain is selected, then only those entities belong to the same service domain are available for selection when building the PSR model.

A service specialist manages service domains and technology domains. Domains are a required part of entity definitions in Solution Designer. Each entity belongs to a domain:

**Table 4-1 Types of Domain**

Domain Type	Description	Specifications
Service	Manage the specifications related to customer services. Service domains represent different types of services that are offered. Examples include Mobile, Broadband, TV, Voice, Cloud Services, and Internet of Things (IoT).	CFS RFS Resource

**Table 4-1 (Cont.) Types of Domain**

Domain Type	Description	Specifications
Technology	Manage the specifications related to the underlying technologies that are used to implement those customer services. Technology domains represent the different technologies used to deliver the services. Examples include DSL, Fiber, Cable, 5G, LTE, Wi-Fi, and Satellite.	Resource RFS

You can use multiple domains of the appropriate type to help organize your specifications and models. For example, a Mobile Service offering can have a service domain as Mobile and technology domains as 5G, 4G, and so on.

A service domain can be associated with multiple service models and specifications. Similarly a technology domain can be associated with multiple technology models and specifications. The specifications can have one primary domain and multiple secondary domains.

Domains play an important role in realizing a design. After an initiative is released, you can use the domains belonging to that initiative elsewhere in the application.

## Creating Domains

You create domains using the **Domains** application, or in the **Select service domain** step when creating service models, or in the **Select technology domain** step when creating technology models in the guided process.

To create domains:

1. In the Solution Designer landing page, click the **Domains** application.
2. To create domains, do one of the following:
  - In the **Domains** application, click **Create Domain**.
  - In the **PSR Models** application, click **Create Service Domain** in the **Select service domain** step while creating a service model.
  - In the **PSR Models** application, click **Create Technology Domain** in the **Select technology domain** step while creating a technology model.

The **New Domain** drawer appears.

3. Enter the following details:

**Table 4-2 New Domain Fields**

Field Name	Required or Optional	Description
<b>Name</b>	Required	Name of the domain. Name must have more than one character.
<b>ID</b>	Required	Id of the domain.
<b>Type</b>	Required	The type of domain, Service or Technology.



Table 4-2 (Cont.) New Domain Fields

Field Name	Required or Optional	Description
<b>Description</b>	Optional	The description of domain.
<b>Associated Service Domains</b>	Optional	The service domains that are associated with the technology domain. This field appears only when you select <b>Technology</b> as the <b>Type</b> .
<b>Initiative</b>	Required	The initiative that the domain belongs to.
<b>Asset Type</b> in the <b>Implementation Assets</b> section	Optional	The type of the implementation asset. The values are <b>Helper class</b> and <b>Library</b> .
<b>Description</b> in the <b>Implementation Assets</b> section	Optional	The description of the implementation asset.
<b>Download Link</b> in the <b>Implementation Assets</b> section	Required when <b>Asset Type</b> is selected.	The relative path of the helper class files or the third-party library files. For example, <code>/bucket/helperclass.zip</code> . The helper classes in compressed (zipped) format and the third-party libraries in JAR file format must be placed in S3-compatible object storage and the relative path must be specified.  The defined helper class and libraries are loaded from the specified while building the cartridges.

The domain IDs must follow the naming rules. See "[About Naming Rules](#)" for more information on naming rules.

 **Note:**

When you edit the **Implementation Assets** values, the fields do not appear as editable. However, you can edit the details and click **Submit**.

4. Click **Create**.

The domain is created.

## Viewing Domains

A Service Specialist views the domains from the **Domains** application or from the **Initiative Items** tab in the initiatives editor page in the Initiatives application.

To view domains:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Domains** application, search for a domain using the following criteria:
    - Domain name
    - Type: Service or Technology
    - Status: Lifecycle status
    - Initiatives

- Last Updated date

The domain result is filtered based on the search criteria.

- In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the initiatives editor page.
3. Select a domain to view the details of that domain.  
The **Domain** drawer appears.  
The following details are displayed:
    - **Overview** tab: Shows the details of the domain.
    - **Used by** tab: Shows all the items such as models, domains, and specifications that the domain is associated with. You can filter the results by searching with the item name.
  4. After viewing the details, click anywhere outside the dialog box to return to the Domain list page or the initiatives editor page.

## Updating Domains

You can update the domain details such as **Name**, **Description**, **Implementation assets**, and **Associated service domains**.

To update a domain:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Domains** application, search and select a domain.
  - In the **Initiatives** application, search for an initiative and select a domain from the **Initiative Items** tab in the initiatives editor page.

The domain dialog box opens.

3. Click **Edit** and update the name, description, implementation assets, and the associated service domain.
4. Click **Update**.

### Note:

- You can't update the domain **Type**.
- You can update the domain details only in **Definition** and **Advanced Configuration** status. You can't update the details after you complete the initiative's **Advanced configuration** phase.

## Deleting Domains

You delete a domain from the **Domains** application or from the **Initiatives** application.

To delete a domain:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:

- In the **Domains** application, select a domain.  
The domain drawer opens.
  - In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the initiatives editor page.
3. Click **Delete**.
- The domain is deleted if it is not associated with any entities or domains.

 **Note:**

You can delete a domain only in Definition and Advanced Configuration status. You can't delete the domain, if the associated initiative is in the **Functional Testing** phase, the **Acceptance Testing** phase, the **Approval** phase, or the **Released** phase. You also can't delete a domain if it is referenced by any entity such as PSR models, CFSSs, RFSs and so on.

# 5

## Managing Product Specifications

Use **Product Specifications** in Solution Designer to define your products. Products are used by orchestration processes to map order lines to fulfillment actions and to map order lines to Service specifications.

### Topics in this document

- [About Product Specifications](#)
- [Creating Product Specifications](#)
- [Viewing Product Specifications](#)
- [Updating Product Specifications](#)
- [Cloning Product Specifications](#)
- [Revising Service Specifications](#)
- [Deleting Product Specifications](#)

## About Product Specifications

A product is an entity that your business sells and represents commercial products. A product defines a set of product characteristics, validation rules, and relationships. For example, you might create products for Broadband, Broadband\_Bandwidth, and Email. After you create products in Solution Designer, you can create or review the associated attributes in the Product Specifications.

Products are used by orchestration processes to map order lines to fulfillment actions and to map order lines to Service specifications.

Use the following guidelines when creating products:

- Ensure that your products represent functionality meaningful to a customer.
- Define products to facilitate reuse in multiple bundled offers. Minimize overlap among product definitions to ensure that a simple assembly of product offers can be maintained. Duplication among product definitions can complicate the customer relationship management processes and increase the operating costs.
- Define products so that they do not expose unnecessary details. For example, a Broadband product includes only data elements that represent the properties of the service being ordered, such as upload speed, download speed, service address, customer ID, and so forth. Products do not include data elements that represent technical elements of the service, such as the MAC address or IP address of the home location register (HLR) server.

## Creating Product Specifications

A product specialist can create product specification in Solution Designer and then configure it. A product can have multiple CFSS as its children.

For creating and configuring a product specification, you must have the following in Solution Designer:

- An initiative. See "[Creating Initiatives](#)" for more details.
- Domains. See "[Creating Domains](#)" for more details.
- CFS. To configure a product, you must create CFS within the same initiative so they are available for the product to build the hierarchical relationship between them.

To create a product specification:

1. In the Solution Designer landing page, click the **Product Specifications** application.
2. In the **Product Specifications** application, click **Create Product**.

The **Create Product Specification** page opens.

3. Enter the following fields:

**Table 5-1 New product Fields**

Field Name	Required or Optional	Description
<b>Name</b>	Required	Unique name of a product. In the <i>Mobile Service</i> example, <i>Mobile product</i> is the product name.
<b>ID</b>	Required	Unique Id of the product.
<b>Initiative</b>	Required	The initiative that a product belongs to. This product is available only for the selected initiative until the initiative is released. Specifications from the released initiative are available system-wide.
<b>Primary Domain</b>	Required	The primary domain of a product. Only one primary domain can be selected for the product.
<b>Secondary Domains</b>	Optional	The secondary domains that are associated with a product. Multiple secondary domains can be associated with a product. The domain type for the secondary domains must be same as the selected primary domain.
<b>Start Date</b>	Optional	The starting date of a product.
<b>End Date</b>	Optional	The ending date of a product.
<b>Description</b>	Optional	The description of a product.

4. Click **Create and Continue**.

The **Product Specification** editor page opens.

5. Use the following tabs to define the product:
  - **General Information:** Provides the general information for the product.
  - **Configuration:** Configure the relationship between a product specification and the CFSs. This builds a hierarchy between the products and CFSs. See "[Configuring Product Relationships](#)" for details on how to configure the relationships between specifications.
  - **Commercial Parameters:** Configure the commercial parameters for the product using the existing data elements or create new data elements. Commercial parameters are carried from the upstream order management systems and you define them in the product. See "[Defining Commercial Parameters](#)" for details on how to define commercial parameters.

- **Parameter Mapping:** Configure the mapping of the commercial parameters of a product to the design parameters of the CFS. See "[Mapping Commercial Parameters](#)" for details on parameter mapping.
6. Click **Go to Product Specifications** at the top left to return to the **Product Specifications** page.

## Configuring Product Relationships

You can define the relation between product specifications and CFSs in the **Configuration** tab.

To configure product relationships:

1. In the Solution Designer landing page, click the **Product Specifications** application.
2. In the **Product Specifications** application, select a specification by searching for it. The corresponding specification page opens.

3. Click the **Configuration** tab.

4. Do one of the following:

- Click **Create Configuration** if no configuration exists.
- Click **Edit** if you already have any configuration defined, which opens the diagram in the edit mode in full screen.

The **Edit Configuration** page opens.

5. In the **Edit Configuration** page, click the + symbol to relate the product to an existing CFS that matches the product's domain. You can add multiple CFSs according to the business needs.
6. Mark any one of the relation to be primary. You can also change from a **Primary** relation to an **Auxiliary** relation.

To mark a relation to be primary:

- a. Hover over the relation between product and any one of the CFSs, and click the + sign.
- b. Select **Make Primary**. The primary relation that you selected is displayed with the text **primary**.

You can also change the primary relation to an auxiliary relation and mark any other CFS as primary.

7. Click **Done**.

You can do the following in the **Edit Configuration** page:

- To remove a CFS, click the CFS and click **Remove** in the specification details pop-up. Removing a specification removes it from the canvas but doesn't delete it permanently.
- You can search for any entity including components by clicking **Search**. Type the name of the entity that you want to search in the model. The searched entity is expanded in the model tree and when you click the entity in the left side, the entity along with its children is shown in the model canvas.
- You can set the display settings for the configuration. You can select **Entity icon** and **Entity type** to display the entity icon and the entity type. You can choose the orientation to display the configuration horizontally or vertically.

## Defining Commercial Parameters

To define commercial parameters:

1. In the **Product Specifications** application, search and open the specification page and click the **Commercial Parameters** tab.
2. Click **Create** for adding the first commercial parameter or click **Add Commercial Parameters** to add a new commercial parameter.

The **New commercial parameter** dialog opens.

3. Enter a data element and name. The default value is pre-populated with the default value that you entered in **Data Elements**. You can select an existing element or create a new element to be a commercial parameter. Select **+ Create Data Element** to create a new data element. See "[Creating New Data Elements](#)" for more details.
4. Click **Add**.

The commercial parameter is added to the product specification.

You can search for the associated commercial parameters in the **Commercial Parameters** tab.

## Mapping Commercial Parameters

You map the commercial parameters of the product specification to the design parameters of the related CFS specification. When mapping parameters, the data elements and feature groups must be of the same type. For example, you must map a commercial parameter of boolean type to a characteristic of boolean type only.

When you map the commercial parameters, you can add converters to map the unit of measure conversion and value map conversion.

This mapping information is carried to the notes of the Product Specification in Design Studio. In Design Studio, you can create the appropriate OTM configuration or XQuery based on the mapping defined by the Product Specialist.

You can map the commercial parameters manually, automatically, or through both the methods:

- To map the commercial parameters manually, see "[Mapping Commercial Parameters Manually](#)"
- To map commercial parameters automatically, see "[Mapping Commercial Parameters Automatically](#)"

You can map the parameters automatically and also choose to map few of them manually.

If you have to perform any mappings other than the available mappings, you can map them by writing the custom code in the extended designer class. To write the code for parameter mappings, see "Extending Solution Designer" in *Developer's Guide*.

## Mapping Commercial Parameters Manually

To map commercial parameters manually:

1. In the **Product Specifications** application, search and open the specification editor page and click the **Parameter Mapping** tab.

In the **Parameter Mapping** tab, click **Edit**. The **Parameter Mapping** drawer opens.

2. You can manually map all the commercial parameters. The **Source** column lists all the defined commercial parameters and the **Destination** column lists the mapped design parameters of the related CFSs.

For mapping multiple commercial parameters manually, perform the following steps:

- a. Click **Add mapping** in the text box in the **Destination** column.  
The **Select destination** slider slides.
- b. Do one of the following:
  - Hover over the design parameters and click **Select parameter** which associates the selected design parameter to the commercial parameter and closes the slider.
  - Click **Auto select** to automatically map the commercial parameter to the design parameter of the child CFS based on the name and referenced data element type.

You can map a source design parameter to multiple destination parameters. You must map a feature group source parameter with only a feature group destination parameter with matching multiplicity. You must map all the required characteristics to the source design parameters.

3. (Optional) Add converters for mapping unit of measure or value map. See "[Adding Converters in Parameter Mapping](#)" for details on how to add converters.
4. After you complete the parameter mapping, click **Save**.

The parameter mappings are saved and displayed in the **Parameter Mapping** tab.

## Mapping Commercial Parameters Automatically

To map the commercial parameters automatically:

1. In the Solution Designer landing page, click the **Product Specification** application.
2. In the **Product Specifications** application, search and open the specification editor page and click the **Parameter Mapping** tab.

In the **Parameter Mapping** tab, click **Edit**. The **Parameter Mapping** drawer opens.

3. Click **Automap** to map all the source commercial parameters with the matching destination design parameters at once. Clicking **Automap** maps the commercial parameters and design parameters of the child CFS with the same name and data elements type of that source entity. You can change the automatic mapping and manually map to a different parameter. You can map manually for some parameters and use **Automap** for the rest of the parameters. In such case, clicking **Automap** automatically maps the appropriate parameters and retains the manual mappings that have different names.

You can click **Automap** multiple times as needed. If a new CFS is added later, you can click **Automap** to automatically map the parameters of the newly added specifications.

Click **Reset** to remove all the mappings and clear the data so that you can start the mappings afresh.

4. (Optional) Add converters for mapping unit of measure or value map. See "[Adding Converters in Parameter Mapping](#)" for details on how to add converters.

## Adding Converters in Parameter Mapping

To add converters in Parameter Mapping:

1. In the Solution Designer landing page, click the **Product Specification** application.



2. In the **Product Specifications** application, search and open the specification editor page and click the **Parameter Mapping** tab.  
In the **Parameter Mapping** tab, click **Edit**. The **Parameter Mapping** drawer opens.
3. Map the commercial parameters manually or automatically.
4. Click **Add Converters** to add the converter which maps the unit of measure conversion or the value map conversion.  
The **Add Converter** dialog opens.
5. In the **Converter** drop-down, select an existing converter or create a new converter by clicking **+New Converter**. See "[Creating Converters](#)" for more information on creating converters.
6. If you select a measurement type converter, select **Convert from UOM** and select **Convert to UOM**. For example, select **Convert from UOM** as **KB** and select **Convert to UOM** as **B**.
7. Click **Save**.
8. The **Parameter Mapping** page is displayed and **Add Converter** changes to **Edit Converter**.  
You can click **Edit Converter** and the **Edit Converter** drawer opens. You can remove the converter or change the converter in the **Edit Converter** drawer.

## Viewing Product Specifications

You can view the specifications from the **Product Specifications** application or from the **Initiative Items** tab in the **Initiatives** application.

To view the product specifications:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Product Specifications** application, search for a specification using the following criteria:
    - Specification name
    - Status
    - Initiatives
    - Domain
    - Last UpdatedThe product specification result is filtered based on the search criteria.
  - In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the initiative editor page.
3. Select a product specification to view the details.  
The product specification editor page opens.
4. You can view the product specification details such as configuration, commercial parameters, and general information.
5. Do one of the following:

- Click the **Go to Product Specifications** link on the top left to return to the **Product Specifications** page.
- Click the **Go to previous page** link on the top left to return to the **Initiatives Items** tab in the initiatives editor page.

## Updating Product Specifications

You can update the configuration, commercial parameters, parameter mapping, and general information. You can update the primary domain and the secondary domains if the specification does not have any child specifications associated with it.



### Note:

You can update a product specification only if the associated initiative is in **Definition** and **Advanced Configuration** status.

To update a product specification:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Product Specifications** application, search for a specification and open the specification.
  - In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the initiatives editor page. Select a specification to update the details.

The specifications editor page opens.

3. You can update the specification configuration, commercial parameters, parameter mappings, and general information for the respective specifications.
  - **General Information:** View or update the general information for the selected specification.
  - **Configuration:** View or update the relationship between the specification entities. This builds a hierarchy between the specification entities. See "[Configuring Product Relationships](#)" for details on configuring specifications.
  - **Commercial Parameters:** View or update the commercial parameters for the specifications. See "[Defining Commercial Parameters](#)" for details on defining commercial parameters.
  - **Parameter Mapping:** View or update the parameter mapping. See "[Mapping Commercial Parameters](#)" for details on parameter mapping.
4. Do one of the following:
  - Click the **Go to Product Specifications** link on the top left to return to the **Product Specifications** page.
  - Click the **Go to previous page** link on the top left to return to the **Initiatives Items** tab in the initiatives editor page or the parent specification page from where this specification is opened.

# Cloning Product Specifications

You can clone the existing product specifications to create a copy and update the details as necessary. See "[About Cloning Entities](#)" for information on the cloning process.

To clone a product specification:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Product Specifications** application, search for a specification.  
In the specifications result list page, click **Clone**.  
The **Clone Specification** pop-up appears. *Specification* includes product.
  - In the **Product Specifications** application, search and open the specification.  
The specifications editor page opens. Click the **Clone** in the specifications editor page.  
The **Clone Specification** pop-up appears. *Specification* includes product.
  - In the **Initiatives** application, search and select an initiative. Click the specification in the **Initiative Items** tab in the initiatives editor page.  
In the Specifications editor page, click **Clone**.  
The **Clone Specification** pop-up appears. *Specification* includes product.
3. Update the name, ID, and description as necessary. See "[About Naming Rules](#)" for more information on naming rules for ID.

 **Note:**

- You can't select a new initiative when you clone a specification in **Definition** and **Advanced Configuration** status.
- You must select a new initiative that is in **Definition** status when you clone a specification in **Released** status.

4. Click **Continue**.

The specification editor page opens with all the details.

You can update the configuration, commercial parameters, and general information. You may configure parameter mapping after cloning, as it is not copied when cloning a specification.

# Revising Service Specifications

A product specialist revises a product specification. See "[About Revising Entities](#)" for information on revising an entity.

To revise a product specification:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Product Specifications** application, search a specification.

The specification is listed in the results section.

- In the **Product Specifications** application, search and open a specification.
- In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the initiatives editor page. Select a specification.

The specification editor page opens.

3. Click **Revise**.

The **Revise Specification** dialog box opens. *Specification* includes products.

4. Select an initiative that is in the **Definition** status and click **Continue**.

The corresponding specification editor page opens.

5. The configuration, commercial parameters, parameter mapping, and general information can be modified for the revised specification. See "[Updating Product Specifications](#)" for more information on modifying the specification details.

## Deleting Product Specifications

You delete a product specification from the **Product Specifications** application or from the **Initiative Items** tab in the initiatives editor page in the **Initiatives** application.

To delete a product specification:

1. In the Solution Designer landing page, click the application that you want to work with.

2. Do one of the following:

- In the **Product Specifications** application, search a specification.

The specification is listed in the results section.

- In the **Product Specifications** application, search and open a specification.

The specification editor page opens.

- In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the initiatives editor page. Open a specification.

The specification editor page opens.

3. Click **Delete**.

A confirmation dialog box appears.

4. Click **Delete** in the confirmation dialog box.

The specification is deleted if it is not associated with any other specifications. If you are deleting a revised specification, only the current revision is deleted and the specification is reverted to the previously released version.

### **Note:**

You can't delete a product specification after you complete the **Advanced Configuration** phase of the associated initiative.

# 6

## Managing Service Specifications

Use **Service Specifications** in Solution Designer to define your services. The service specifications include Customer Facing Services (CFS) and Resource Facing Services (RFS).

### Topics in this document:

- [About Service Specifications](#)
- [Creating Service Specifications](#)
- [Viewing Service Specifications](#)
- [Updating Service Specifications](#)
- [Cloning Service Specifications](#)
- [Revising Service Specifications](#)
- [Deleting Service Specifications](#)

## About Service Specifications

A specification is a blueprint that determines the information that you store about a service. The purpose of a specification is to provide a description of the requirements of a service, components of a service, the capability or performance of a service or work to be performed to fulfill a service. In Solution Designer, there are two types of specifications:

- Service Specifications that include CFS and RFS.
- Resource Specifications that include resources and locations.

Service specialists manage the service specifications in Solution Designer. Specifications are the basis for PSR Models you create in Solution Designer to model your network solution. [Table 6-1](#) shows the different types of service specifications and who manages them in Solution Designer:

**Table 6-1 Service Specification Types**

Service Specification	Managed by	Description
Customer facing service (CFS)	Service Specialist	CFS represent services from a customer perspective. See " <a href="#">About Customer Facing Services</a> " for more information.
Resource facing service (RFS)	Network Specialist	RFS represent a technical view of a service. See " <a href="#">About Resource Facing Services</a> " for more information.

## About Customer Facing Services

CFS represents the commercial view of the services that you provide to your customer which means the way that a product is realized and delivered to a customer. In the *Mobile Service* example, *Mobile CFS* is the CFS in the PSR model for the *Mobile Service*. You can use the same CFS to fulfill different but similar product offers. For example, the same *Mobile CFS* can

be used for *Mobile Service* and *Wireless service*. See "[Mobile Service Example of Service Models](#)" for more information.

You define the design parameters for the CFS. Additionally, you associate CFSs with RFSs. For example, you can associate the resource facing services *5G Profile RFS* and *4G Profile RFS* with *Mobile CFS* to fulfill the service.

Use the following set of guidelines when creating CFSs:

- Define CFSs to be customer centric to support multiple products. A CFS can support multiple products if it is not defined for a specific technology.
- Define CFS's design parameters that are important, and hide technology details that are not relevant to a customer.
- Define CFSs to represent domains. For example, the *Mobile CFS* represents the *Mobile* domain and *Wireless* domain.
- Define relationships to other CFSs, RFSs, resources and locations from CFS.

## About Resource Facing Services

An RFS describes how CFSs are configured. For example, you can fulfill a CFS named *Mobile CFS* using multiple modes of delivery, each represented by an RFS, such as 4G or 5G. You determine the RFS that is used to provide the requested services during the service design.

RFSs are technology-specific but not vendor-specific. They have hierarchical structure and have associations with resources or with other, finer-granulated RFSs. In the *Mobile Service* example, the *5G Profile RFS* and *4G Profile RFS* have a child RFS *Mobile Identity RFS* which in turn has an association with the *SIM Card* and *TN* resources to provision the SIM card and telephone number resources from an inventory management systems such Oracle Communications Unified Inventory Management (UIM). See "[Mobile Service Example of Service Models](#)" for more information in *Mobile Service* example.

## About Components

A component represents a specific element needed to complete the entity. You define relationships between the specifications by adding components. When defining a CFSs, RFSs, or resources, you can add one or more components that reference another entity. This sets a relationship between the entities such that they are associated with each other in your system's processes.

### Relationship Types

Each component associated with a specification is defined with a specific relationship type as follows:

- **Exclusive:** At run time, the component can't be shared with other service instances. For example, telephone numbers cannot be used by multiple instances of a mobile service. In *Mobile Service* example, a *Mobile Identity RFS* might have an exclusive component for a telephone number. There's an exclusive relationship between the *Mobile Identity RFS* and the **TelephoneNumber** resource. The Exclusive type defines relationships among CFSs, RFSs, and resources.
- **Shared:** At run time, the component can be shared with other service instances. In *Mobile Service* example, because the UDR can store several subscription data simultaneously (and is not exclusive to any one service), there is a shared relationship between the *5G Profile RFS* and the **UDR** resource. The Shared type defines relationships among CFSs, RFSs, and resources.

- **Reference:** At run time, a target entity references a source entity. For example, in a fixed line service, a **fixed voice CFS** might have a reference component for a service location, which is a physical address.
- **Config hierarchy:** In Oracle Communications Unified Inventory Management (UIM), an intermediate hierarchical structure is referenced at run time. This creates a configuration for the RFS. You can use this for a relationship between an RFS and a resource. The **Config hierarchy** type indicates that a UIM realization of a resource component should result in a hierarchy of configuration items and should not generate a UIM entity.

### Cardinality

Cardinality determines how many instances of the component that can appear at runtime. In the *Mobile Service* example, there can be multiple telephone numbers required for an enterprise, so the cardinality of **TN** component can be a minimum of 1 and a maximum of 10.

## Creating Service Specifications

A service specialist creates and manages the service specifications. You create the service specifications using the **Service Specifications** application or in the **Build Model** step, when creating PSR Models in the guided mode. See ["About Solution Designer Applications"](#) for more information on Solution Designer applications and ["Creating PSR Models using Guided Process"](#) for more information on the guided process.

To create the specifications:

- To create a CFS, see ["Creating Customer Facing Services"](#).
- To create a RFS, see ["Creating Resource Facing Services"](#).

## Creating Customer Facing Services

You must have the service specialist role to create and manage the CFS. A CFS can have CFSs, RFSs, resources, and locations as its children. For creating and configuring a CFS specification, you must have the following in Solution Designer:

- An initiative. See ["Creating Initiatives"](#) for more details.
- Domains. See ["Creating Domains"](#) for more details.
- RFS, resource, another CFS, or locations. To configure a CFS, you must create RFS, resource, another CFS, and locations within the same initiative so they are available for the CFS to build the hierarchical relationship between them.

To create a CFS using the **Service Specifications** application:

1. In the Solution Designer landing page, click the **Service Specifications** application.
2. In the **Service Specifications** application, click **Create Customer Facing Service**.

The **Create Customer Facing Specification** page opens.

3. Enter the following fields:

**Table 6-2 New CFS Fields**

Field Name	Required or Optional	Description
<b>Name</b>	Required	Unique name of the CFS. In the <i>Mobile Service</i> example, <i>Mobile CFS</i> is the CFS name.

Table 6-2 (Cont.) New CFS Fields

Field Name	Required or Optional	Description
<b>ID</b>	Required	Unique Id of the CFS.
<b>Initiative</b>	Required	The initiative that the CFS belongs to. This CFS is available only for the selected initiative until the initiative is released. Specifications from the released initiative are available system-wide.
<b>Primary Domain</b>	Required	The primary service domain. Only one primary domain can be selected for the CFS.
<b>Secondary Domains</b>	Optional	The secondary service domains that are associated with a CFS. Multiple secondary domains can be associated with a CFS. The secondary domains must have the same domain type as of the selected primary domain.
<b>Start Date</b>	Optional	The starting date of the CFS.
<b>End Date</b>	Optional	The ending date of the CFS.
<b>Description</b>	Optional	The description of CFS.

 **Note:**

The CFS must have unique ID and follow the naming rules. See "[About Naming Rules](#)" for more information on naming rules.

4. Click **Create and Continue**.

The **Customer Facing Service** editor page opens.

5. You use the following tabs to define the CFS:

- **General Information:** Provides the general information for the CFS. You can add advanced policy implementation assets to a specification. See "[Adding Advanced Policy Implementation Assets](#)" for information on how to add advanced policy implementation assets.
- **Configuration:** Configure the relationship between a CFS specification and the other specifications such as RFSSs, resources, other CFSs, and locations. This builds a hierarchy between the CFSs, RFSSs, resources, and locations. See "[Configuring Relationships between Specifications](#)" for details on how to configure the relationships between specifications.
- **Design Parameters:** Configure the design parameters for the CFS using the existing data elements or create new data elements. Design parameters are carried from the upstream order management systems and you define them in the CFS. See "[Defining Design Parameters](#)" for details on how to define design parameters.
- **Characteristics:** Configure the characteristics for the CFS using the existing data elements or create new data elements. Data elements are added as characteristics to realize them in UIM run-time environment. See "[Defining Characteristics](#)" for details on how to define entity characteristics.
- **Parameter Mapping:** Configure the mapping of the design parameters to characteristics of the specification and also the mapping between the design parameters of the specification and the design parameters of its child specifications. See "[Mapping Design Parameters](#)" for details on parameter mapping.



- **Design Policies:** Define the design policies to provision the services in UIM. UIM provisions the service based on the defined design policies. See "[Defining Design Policies](#)" for details on defining design policies.
  - **Used by:** Lists all the PSR Models and product specifications that use the CFS.
6. Click **Go to Service Specifications** at the top left to return to the **Service Specifications** page.

## Creating Resource Facing Services

Service specialists or network specialists create and manage RFSs. You can relate an RFS to locations, resources, or another RFS.

For creating and configuring an RFS, you must have the following in Solution Designer:

- An initiative. See "[Creating Initiatives](#)" for more details.
- Domains. See "[Creating Domains](#)" for more details.
- Resource, Locations, or another RFS. To configure an RFS, you must create the resources, locations, and another RFSs within the same initiative so they are available for the RFS to build the hierarchical relationship between them.

To create an RFS using the **Service Specifications** application:

1. In the Solution Designer landing page, click the **Service Specifications** application.
2. In the **Service Specifications** application, select **Create Resource Facing Service**.

The **Create Resource Facing Specification** page opens.

3. Enter the following fields:

**Table 6-3 New RFS Fields**

Field Name	Required or Optional	Description
<b>Name</b>	Required	Unique name of an RFS. In the <i>Mobile Service</i> example, <i>4G Profile RFS</i> , <i>5G Profile RFS</i> , and <i>Mobile Identity RFS</i> are the RFS names. See " <a href="#">Mobile Service Example of Service Models</a> " for more details.
<b>ID</b>	Required	Unique Id of an RFS.
<b>Initiative</b>	Required	The initiative that the RFS belongs to. This RFS is available only for the selected initiative across the application until the initiative is released. Service Specifications from the released initiative are available system-wide.
<b>Primary Domain</b>	Required	The primary service domain or the technology domain. Only one primary domain can be selected for the RFS.
<b>Secondary Domains</b>	Optional	The secondary domains that are associated with the RFS. Multiple secondary domains can be associated with the RFS. The secondary domains must have the same domain type as that of the selected primary domain.
<b>Start Date</b>	Optional	The starting date of an RFS.
<b>End Date</b>	Optional	The ending date of an RFS.

Table 6-3 (Cont.) New RFS Fields

Field Name	Required or Optional	Description
Description	Optional	The description of the RFS.

 **Note:**

The RFS must have unique ID and must follow the naming rules. See "[About Naming Rules](#)" for more information on naming rules.

4. Click **Create and Continue**.

The **Resource Facing Service** editor page opens.

5. You use the following tabs to define the RFS:

- **General Information:** Provides the general information for the RFS. You can add advanced policy implementation assets to a specification. See "[Adding Advanced Policy Implementation Assets](#)" for information on how to add advanced policy implementation assets.
- **Configuration:** Configure the relationship between the RFS and the other entities such as RFSs, resources, and locations. This builds a hierarchy between the RFSs, resources, and locations. See "[Configuring Relationships between Specifications](#)" for details on how to configure the relationships between specifications.
- **Design Parameters:** Configure the design parameters for the RFS using the existing data elements or create new data elements. Design parameters are carried from the upstream order management systems and you define them in the RFS. See "[Defining Design Parameters](#)" for details on how to define design parameters.
- **Characteristics:** Configure the characteristics for the RFS using the existing data elements or create new data elements. Data elements are added as characteristics to realize them in UIM run-time environment. See "[Defining Characteristics](#)" for details on how to define entity characteristics.
- **Parameter Mapping:** Configure the mapping of the design parameters to characteristics of the specification and also the mapping between the design parameters of the specification and the design parameters of its child specifications. See "[Mapping Design Parameters](#)" for details on parameter mapping.
- **Design Policies:** Configure the design policies to provision the services in UIM. UIM provisions the service based on the defined design policies. See "[Defining Design Policies](#)" for details on defining design policies.
- **Delivery Policies:** Configure the delivery policies which are requests to downstream delivery systems such as activation, supply chain management, and so on, to make changes in the network. See "[Defining Delivery Policies](#)" for details on defining delivery policies.
- **Used by:** Lists all the entities such as PSR models, specifications and so on that use the RFS.

6. Click **Go to Service Specifications** on the top left to return to the **Service Specifications** page.

## Adding Advanced Policy Implementation Assets

You can add the **Advanced policy implementation assets** by clicking **Add** in the **General Information** tab of a specification.

### **Note:**

You must add an advanced policy implementation asset information when you define advanced policies for that specification. You can add only one advanced policy implementation assets for multiple advanced policies for that specification.

To add advanced policy implementation assets:

1. In the specification editor page, click the **General Information** tab.
2. Click **Add** in the **Advanced policy implementation assets** section.  
The **Advanced policy implementation assets** page opens.
3. Enter **Link**. This is the relative path of the S3-compatible object store. For example,

```
/bucket/restOfPath.java
```

The object store is the location where the advanced policy implementation class is placed. When you publish an initiative that has a PSR model, the DevOps engine generates the Design Studio workspace and requested cartridges. You can download the Design Studio workspace and import it into Design Studio Eclipse environment. The Design Studio workspace contains a base class and an implementation class named extended designer class. The extended designer class contains the implementation for the advanced policy. After you complete your customized implementation, you must place it in the object store. Then, this relative path is entered in **Link**.

4. Enter **Relates to**. Select the advanced policies for which the implementation code is written.
5. Click **Add**.

The implementation assets details are added to the **General Information** tab. After you add the implementation asset details, the status of the advanced policy moves from **In Progress** to **Ready**. You can add only one advanced policy implementation assets information. You can update or delete the advanced policy implementation assets information.

## Viewing Service Specifications

You can view the specifications from the **Service Specifications** application or from the **Initiative Items** tab in the **Initiatives** application.

To view the service specifications:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Service Specifications** application, search for a specification using the following criteria:
    - Specification name

- Status
- Initiatives
- Domain
- Type
- Last Updated

The service specification result is filtered based on the search criteria.

 **Note:**

In the service specifications results page, click **View Errors** to view the validation errors if any.

- In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the initiative editor page.
3. Select a service specification to view the details.  
The service specification editor page opens.
  4. You can view the service specification details such as configuration, design parameters, characteristics, design policies, delivery policies, used by, and general information for the respective specifications in different tabs.
  5. Do one of the following:
    - Click the **Go to Service Specifications** link on the top left to return to the **Service Specifications** page.
    - Click the **Go to previous page** link on the top left to return to the **Initiatives Items** tab in the initiatives editor page.

## Updating Service Specifications

You can update the configuration, design parameters, characteristics, parameter mapping, design policies, delivery policies and general information. You can update the primary domain and the secondary domains if the specification does not have any components or any child specifications associated with it.

 **Note:**

You can update a service specification only if the associated initiative is in **Definition** and **Advanced Configuration** status.

To update a specification:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Service Specifications** application, search for a specification and open the specification.
  - In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the initiatives editor page. Select a specification to update the details.

The specifications editor page opens.

3. You can update the specification configuration, design parameters, characteristics, parameter mappings, design policies, delivery policies, and general information for the respective specifications.
  - **General Information:** View or update the general information for the selected specification. You can add **Advanced policy implementation assets** by clicking **Add** in the **General Information** tab. See "[Adding Advanced Policy Implementation Assets](#)" for information on how to add advanced policy implementation assets.
  - **Configuration:** View or update the relationship between the specification entities. This builds a hierarchy between the specification entities. See "[Configuring Relationships between Specifications](#)" for details on configuring specifications.
  - **Design Parameters:** View or update the design parameters for the specifications. See "[Defining Design Parameters](#)" for details on defining design parameters.
  - **Entity Characteristics:** View or update the characteristics for the specifications. See "[Defining Characteristics](#)" for details on defining entity characteristics.
  - **Parameter Mapping:** View or update the parameter mapping. See "[Mapping Design Parameters](#)" for details on parameter mapping.
  - **Design Policies:** View or update the design policies to provision the services. See "[Defining Design Policies](#)" for details on defining design policies.
  - **Delivery Policies:** View or update the delivery policies. Delivery policies are available for RFSs and Resource specifications only. See "[Defining Delivery Policies](#)" for details on defining delivery policies.
  - **Used by:** Lists all the PSR Models and specifications that use the selected specification. Click the entity name to view the general information of the entity.
4. Do one of the following:
  - Click the **Go to Service Specifications** link on the top left to return to the **Service Specifications** page.
  - Click the **Go to previous page** link on the top left to return to the **Initiatives Items** tab in the initiatives editor page or the parent specification page from where this specification is opened.

## Cloning Service Specifications

You can clone the existing service specifications to create a copy and update the details as necessary. See "[About Cloning Entities](#)" for information on the cloning process.

To clone a specification:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Service Specifications** application, search for a specification.  
In the specifications result list page, click **Clone**.  
The **Clone Specification** pop-up appears. *Specification* includes CFS and RFS.
  - In the **Service Specifications** application, search and open the specification.  
The specifications editor page opens. Click the **Clone** in the specifications editor page.  
The **Clone Specification** pop-up appears. *Specification* includes CFS and RFS.

- In the **Initiatives** application, search and select an initiative. Click the specification in the **Initiative Items** tab in the initiatives editor page.

In the Specifications editor page, click **Clone**.

The **Clone Specification** pop-up appears. *Specification* includes CFS and RFS.

3. Update the name, ID, and description as necessary. See "[About Naming Rules](#)" for more information on naming rules for ID.

 **Note:**

- You can't select a new initiative when you clone a specification in **Definition** and **Advanced Configuration** status.
- You must select a new initiative that is in **Definition** status when you clone a specification in **Released** status.

4. Click **Continue**.

The specification editor page opens with all the details.

You can update the configuration, design parameters, characteristics, and general information. You may configure parameter mapping, design policies, and delivery policies after cloning, as those are not copied when cloning a specification.

## Revising Service Specifications

A service specialist revises a CFS whereas a network specialist revises a RFS. See "[About Revising Entities](#)" for information on revising an entity. In the *Mobile Service* example, you are revising the *Mobile CFS* in the **Released** status to add a new design parameter *Closed User Group (CUG)*. When revising, select a different initiative in **Definition** status, *Mobile Upgrade*. The original specification is associated with *Mobile* initiative and the revised specification is associated with *Mobile Upgrade* initiative. See "[Mobile Service Example of Service Models](#)" for more information on the Mobile Service example.

To revise a service specification:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Service Specifications** application, search a specification.  
The specification is listed in the results section.
  - In the **Service Specifications** application, search and open a specification.
  - In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the initiatives editor page. Select a specification.  
The specification editor page opens.
3. Click **Revise**.  
The **Revise Specification** dialog box opens. *Specification* includes CFSs and RFSs.
4. Select an initiative that is in the **Definition** status and click **Continue**.  
The corresponding specification editor page opens.

5. The configuration, design parameters, characteristics, parameter mapping, design policies, delivery policies, and general information can be modified for the revised specification. See "[Updating Service Specifications](#)" for more information on modifying specification details.

## Deleting Service Specifications

You delete a service specification from the **Service Specifications** application or from the **Initiative Items** tab in the initiatives editor page in the **Initiatives** application.

To delete a specification:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Service Specifications** application, search a specification.  
The specification is listed in the results section.
  - In the **Service Specifications** application, search and open a specification.  
The specification editor page opens.
  - In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the initiatives editor page. Open a specification.  
The specification editor page opens.
3. Click **Delete**.  
A confirmation dialog box appears.
4. Click **Delete** in the confirmation dialog box.  
The specification is deleted if it is not associated with any other specifications or PSR models. If you are deleting a revised specification, only the current revision is deleted and the specification is reverted to the previously released version.



### Note:

You can't delete a service specification after you complete the **Advanced Configuration** phase of the associated initiative.

# 7

## Managing Resource Specifications

Use **Resource Specifications** in Solution Designer to define your resources. The resources include logical devices, connectivity, custom network address, custom object, device interfaces, flow identifiers, flow interfaces, IPv4Address resource extension, network, telephone number, and so on.

### Topics in this document

- [About Resource Specifications](#)
- [Creating Resource Specifications](#)
- [Viewing Resource Specifications](#)
- [Updating Resource Specifications](#)
- [Cloning Resource Specifications](#)
- [Revising Resource Specifications](#)
- [Deleting Resource Specifications](#)

## About Resource Specifications

Resource specifications are entities that are required to provision a service. Network specialists manage the resource specifications in Solution Designer. Resource specifications are the basis for PSR Models you create in Solution Designer to model your network solution.

Resources are entities that are required to provision a service. A resource is a specific object in the network and in the inventory that can be consumed, referenced, or shared by a service when provisioning an RFS. Resources can be physical, such as a port, or logical, such as bandwidth. Examples of resources include IP addresses, VoIP phones, and DSLAM ports. In the *Mobile Service* example, the *TN*, *SIM Card*, and *UDR* are the resources required to fulfill the service.

In the *Mobile Service* example, the *Mobile Identity RFS* utilizes the *SIM Card* resource and *TN* resource to fulfill the service.

Resources have associations with other resources. Additionally, you can define resources that you intend to realize in external systems such as supply chain management, activation and so on.

You can define the following types of resources in Solution Designer:

- **Connectivity Specification:** You use the Connectivity specification to represent the connectivity in your network. Connectivity entities provide built-in support for a variety of technologies and can be customized to suit your business needs. You can create Connectivity specifications for three types of Connectivity entities:
  - Multiplexed Connectivity entities support technologies such as E-Carrier, T-Carrier, JCarrier, SDH, and SONET, and WDM.
  - Packet Connectivity entities support technologies such as Ethernet, Frame Relay, ATM, and MPLS.



- Service Connectivity entities represent the connectivities that delivers services to end customers. Service connectivity consumes other types of connectivity and resources, but cannot be consumed itself.
- **Custom Network Address Specification:** A network address is a name, label, or number identifying a location in storage or a device in a system or network. You use a Custom Network Address specification to define a network address that is not modeled by default in UIM. The network addresses that are modeled by default in the UIM framework are telephone numbers and logical device accounts.
- **Custom Object Specification:** You use Custom Object specifications to define entities that do not fit into one of the predefined categories in UIM. Custom Object specifications enable you extend the inventory model without having to create a custom schema or redeploy UIM. All of the standard features of specifications, such as characteristics, relationships, and policies are available for custom objects.
- **Device Interface Specification:** You use Device Interface specification to define the access points into the device. Logical devices often provide device interfaces. These device interfaces may be for connectivity, power, timing, or any other means of interaction with the device.
- **Flow Identifier Specification:** You use the Flow Identifier specification to model flow identifiers. The various packet connectivity technologies have a variety of ways of identifying network traffic to make it visible to only the appropriate devices. By isolating network traffic in this way, the same physical or infrastructure network can support multiple virtual networks. For example, the Ethernet technology uses VLAN IDs (or tags) for this purpose. Similarly, ATM uses VPI and VCI; Frame Relay uses DLCI; and MPLS uses VPLS IDs. In UIM, you use flow identifiers to represent these various types of network addresses.
- **Flow Interface Specification:** You use Flow Interface specification to model flow interfaces. Flow interfaces are used with flow identifiers (such as VLAN IDs) to trace the path of services through the device interfaces and connectivities in multipoint and point-to-point service arrangements.
- **IPv4Address Resource Extension:** You use IPv4 Address Resource Extension specifications to model content for IPv4 address management for IPv4 networks, subnets, and IP addresses.
- **IPv6Address Resource Extension:** You use IPv6 Address Resource Extension specifications to model content for IPv6 address management for IPv6 networks, subnets, and IP addresses.
- **Logical Device Account Specification:** You use the Logical Device Account Specification to model special types of network addresses that are hosted or managed by a logical device. For a service provider, a logical device account could be a management account, such as a login name, for configuring a logical device. You use Logical Device Account specifications to define these accounts in your inventory. The information captured in a Logical Device Account specification depends on the account that you are modeling.
- **Logical Device Specification:** You use the Logical Device Specification to model logical devices. A logical device represents a functional view of a set of resources. The logical device itself is not physical, but it can be supported by one or more physical resources that support it and act together logically to perform one or more functions.
- **Media Stream Specification:** You use Media Stream specification to model content such as audio or video media delivered over cable, satellite, radio, or streaming IP. Media Stream specifications represent provisional or subscription video services such as tiered services and a la carte packages.

- **Network Specification:** You use a Network specification to define a network as a whole. In UIM, a network represents a collection of other related entities, such as equipment, logical devices, and other networks.
- **Other Resource:** You use Other Resource specification to define configurations. A configuration is a hierarchically organized collection of facts (configuration items) in the form of characteristics, resource allocations, and entity references. Configurations can be versioned such that a collective set of facts can be organized, managed and referenced as a unit (version) with its own life cycle. In the PSR model, you add a component for other resource, select **Resource component** as **Type** and **Config hierarchy** as **Relationship type**. You add the child resource specification that has **Other Resource** as its type. Any component or resource that you add as a child of the **Other Resource** specification, is created as a configuration item in UIM run-time environment. Configuration items define the content of the configuration. See "Configurations" in *UIM Concepts* for more information on configuration and configuration items.
- **Pipe Specification:** Use the Pipe Specification to define trails and connections, to model layered connectivity, and to model hierarchical relationships of pipes.
- **Telephone Number Specification:** You use Telephone Number specification to define the types of telephone numbers that your inventory includes and how they are managed in the business process. A Telephone Number specification is a blueprint for the various kinds of telephone numbers you might use.
- **Party Specification:** You use Part and Role specifications to define the people and organizations in your inventory. You create Party specifications to model the people or organizations that interact with your inventory. Party specifications answer the business question of who is involved in your inventory.

## About Hard Attributes

Hard attributes are the data elements that are added by default as characteristics in the resource specifications. The hard attributes are added based on the resource type. For example, the hard attributes for logical device specification are id, name, description, deviceId, and networkLocationEntityCode. Hard attributes are available as **Data Elements** and are associated with the initiative **UIM Configuration**. Based on the resource type, some of the hard attributes are required and some of them are optional. In general, id and name are the hard attributes added for all the resource types. You cannot edit, clone, revise, or delete the hard attributes.

The hard attributes are displayed with **Type** as **Hard Attribute** in **Resource Specifications**. At run time, all these hard attributes are available for all the instances of the specification as required or optional based on the resource type.

## Creating Resource Specifications

A network specialist creates and manages the resource specifications. You create the resource specifications using the **Resource Specifications** application or in the **Build Model** step, when creating PSR Models in the guided mode. See "[About Solution Designer Applications](#)" for more information on Solution Designer applications and "[Creating PSR Models using Guided Process](#)" for more information on the guided process.

Network specialists create and manage the resources. You can relate a resource to a location, another resource, or RFSs.

For creating and configuring a resource specification, you must have the following in Solution Designer:

- An initiative. See "[Creating Initiatives](#)" for more details.
- Domains. See "[Creating Domains](#)" for more details.
- Resources or Locations. To configure a resource, you must create the child resources, or have locations within the same initiative so they are available for the resource to build the hierarchical relationship between them.

To create a resource using the **Resource Specifications** application:

1. In the Solution Designer landing page, click the **Resource Specifications** application.
2. In the **Resource Specifications** application, click **Create Resource** from the **Actions** drop-down list.

The **Create resource specification** dialog opens.

3. Select the type of resource specification that you would like to create. See "[About Resource Specifications](#)" for more information on the types of resources supported.
4. Enter the following fields. [Table 7-1](#) describes the fields in creating resources.

**Table 7-1 New Resource Fields**

Field Name	Required or Optional	Description
<b>Name</b>	Required	Unique name of a resource. In the <i>Mobile Service</i> example, <i>TN</i> , <i>SIM Card</i> , and <i>UDR</i> are the resources.
<b>ID</b>	Required	Unique Id of a resource.
<b>Initiative</b>	Required	The initiative that the resource belongs to. This resource is available only for the selected initiative across the application until the initiative is released. Specifications from the released initiative are available system-wide.
<b>Primary Domain</b>	Required	The primary service domain or the technology domain. Only one primary domain can be selected for a resource.
<b>Secondary Domains</b>	Optional	The secondary domains that are associated with the resource. Multiple secondary domains can be associated with the resource. The secondary domains must have the same domain type as that of the selected primary domain.
<b>Rate Code</b>	Required	The rate code of a device interface. Rate code values are system-provided. See "About Rate Codes" in <i>Design Studio Modeling Inventory</i> for information on rate codes. Available only for <b>Device Interfaces</b> specification.
<b>Vendor</b>	Optional	The vendor name of a logical device. Available only for <b>Logical Devices</b> specification.
<b>Model Number</b>	Optional	The model number of a logical device. Available only for <b>Logical Devices</b> specification.
<b>Part Number</b>	Optional	The part number of a logical device. Available only for <b>Logical Devices</b> specification.

Table 7-1 (Cont.) New Resource Fields

Field Name	Required or Optional	Description
<b>Delivery Action Target</b>	Optional	Select the check box to mark a resource to be the delivery action target for the delivery policies. Only those resources that have delivery action target selected are available for the delivery policies. See " <a href="#">Defining Delivery Policies</a> " for more information on how to define delivery policies.
<b>Assign to Multiple Entities</b>	Optional	Select the check box if the instances of the specification can be assigned to more than one instance of a parent related entity at the same time.  Available only for <b>Device Interfaces, Logical Devices, Custom Object, and Logical Device Account</b> .
<b>Allow Multiple Assignments</b>	Optional	Select the check box if instances of this specification can assign entities whose specifications have <b>Assign to Multiple Entities</b> selected.  Available only for <b>Logical Devices and Logical Device Account</b> .
<b>Start Date</b>	Optional	The starting date of a resource. Not available for <b>Other Resource</b> specification
<b>End Date</b>	Optional	The ending date of a resource. Not available for <b>Other Resource</b> specification
<b>Description</b>	Optional	The description of a resource.

 **Note:**

The resource must have a unique ID and follow the naming rules. See "[About Naming Rules](#)" for more information on naming rules.

5. Click **Create and Continue**.

The **Resource** editor page opens.

6. You can use the following tabs that are displayed based on the resource type to define the resources:

- **General Information:** Displays the general information of the specification. You can add advanced policy implementation assets to a specification. See "[Adding Advanced Policy Implementation Assets](#)" for information on how to add advanced policy implementation assets.
- **Configuration:** Configure the relationship between a resource and the other entities such as resources and locations. This builds a hierarchy between resources and locations. The **Configuration** tab is displayed only for the following resource types:
  - Logical Device Account
  - Logical Device
  - Flow Interface
  - Network

- Other Resource

See "[Configuring Relationships between Specifications](#)" for details on how to configure the relationships between specifications.

- **Design Parameters:** Configure the design parameters for the resource using the existing data elements or create new data elements. Design parameters are carried from the upstream order management systems and you define them in the resource. See "[Defining Design Parameters](#)" for details on how to define design parameters.
- **Characteristics:** Configure the characteristics for the resource using the existing data elements or create new data elements. Data elements are added as characteristics to realize them in UIM run-time environment. See "[Defining Characteristics](#)" for details on how to define entity characteristics.
- **Parameter Mapping:** Configure the parameter mapping of the design parameters to the characteristics of the specification and also to the design parameters of its child specification. See "[Mapping Design Parameters](#)" for details on parameter mapping.
- **Design Policies:** Configure the design policies to provision the services in UIM. UIM provisions the service based on the defined design policies. See "[Defining Design Policies](#)" for details on defining design policies.
- **Delivery Policies:** Configure the delivery policies which are requests to downstream delivery systems such as activation, supply chain management, and so on, to make changes in the network. See "[Defining Delivery Policies](#)" for details on defining delivery policies.
- **Related Specifications:** Relate a specification to the selected resource specifications. The **Related Specifications** tab is available only for Device Interface, Logical Device Account, Logical Device, and Custom Object. See "[Relating Specifications](#)" for details on defining related specifications.
- **Used by:** Lists all the PSR Models and specifications that use the specification.

 **Note:**

Resources of type **Other Resource** do not support Design Parameters, Characteristics, Parameter Mapping, Design Policies, and Delivery Policies.

7. Click **Go to Resource Specifications** on the top left to return to the **Resource Specifications** page.

## Viewing Resource Specifications

You can view the resource specifications from the **Resource Specifications** application or from the **Initiative Items** tab in the **Initiatives** application.

To view the resource specifications:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Resource Specifications** application, search for a specification using the following criteria:
    - Specification name
    - Status

- Initiative
- Domain
- Type
- Resource Type
- Last Updated

The resources specification result is filtered based on the search criteria.

 **Note:**

In the resource specifications results page, click **View Errors** to view the validation errors if any.

- In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the initiative editor page.
3. Select a resource specification to view the details.  
The resource specification editor page opens.
  4. You can view the resource specification details such as configuration, design parameters, characteristics, design policies, delivery policies, used by, and general information for the respective specifications in different tabs.
  5. Do one of the following:
    - Click the **Go to Resources Specifications** link on the top left to return to the **Resource Specifications** page.
    - Click the **Go to previous page** link on the top left to return to the **Initiatives Items** tab in the initiatives editor page.

## Updating Resource Specifications

You can update the configuration, design parameters, characteristics, parameter mapping, design policies, delivery policies and general information. You can update the primary domain and the secondary domains if the specification does not have any components or any child specifications associated with it.

 **Note:**

You can update a resource specification only if the associated initiative is in **Definition** and **Advanced Configuration** status.

To update a resource specification:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Resource Specifications** application, search for a resource specification and open the resource specification.
  - In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the initiatives editor page. Select a specification to update the details.

The specifications editor page opens.

3. You can update the specification configurations, design parameters, characteristics, parameter mappings, design policies, delivery policies, and general information for the respective specifications. See "[Configuring Service and Resource Specifications](#)" for more information on updating the resource specifications.
4. Do one of the following:
  - Click the **Go to Resource Specifications** link on the top left to return to the **Resource Specifications** page.
  - Click the **Go to previous page** link on the top left to return to the **Initiatives Items** tab in the initiatives editor page or the parent specification page from where this specification is opened.

## Cloning Resource Specifications

You can clone the existing resource specifications to create a copy and update the details as necessary. See "[About Cloning Entities](#)" for information on the cloning process.

To clone a resource specification:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Resource Specifications** application, search for a specification.  
In the specifications result list page, click **Clone**.  
The **Clone Specification** pop-up appears. *Specification* includes resource and location.
  - In the **Resource Specifications** application, search and open the specification.  
The specifications editor page opens. Click the **Clone** in the specifications editor page.  
The **Clone Specification** pop-up appears. *Specification* includes resource and location.
  - In the **Initiatives** application, search and select an initiative. Click the specification in the **Initiative Items** tab in the initiatives editor page.  
In the specifications editor page, click **Clone**.  
The **Clone Specification** pop-up appears. *Specification* includes resource and location.
3. Update the name, ID, and description as necessary. See "[About Naming Rules](#)" for more information on naming rules for ID.

### Note:

- You can't select a new initiative when you clone a specification in the **Definition** and the **Advanced Configuration** status.
- You must select a new initiative that is in **Definition** status when you clone a specification in **Released** status.

4. Click **Continue**.



The specification editor page opens with all the details.

You can update the configuration, design parameters, entity characteristics, and general information. You may configure parameter mapping, design policies, and delivery policies after cloning, as those are not copied when cloning a specification.

## Revising Resource Specifications

A network specialist revises a resource or location specification in the **Released** status. See "[About Revising Entities](#)" for information on revising an entity.

To revise a resource specification:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Resource Specifications** application, search a specification.  
The specification is listed in the results section.
  - In the **Resource Specifications** application, search and open a specification.
  - In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the initiatives editor page. Select a specification.  
The specification editor page opens.
3. Click **Revise**.  
The **Revise Specification** dialog box opens. *Specification* includes resources and locations.
4. Select an initiative that is in the **Definition** status and click **Continue**.  
The corresponding specification editor page opens.
5. The configuration, design parameters, entity characteristics, parameter mapping, design policies, delivery policies, and general information can be modified for the revised specification. See "[Updating Resource Specifications](#)" for more information on modifying the specification details.

## Deleting Resource Specifications

You can delete a specification from the **Specifications** application or from the **Initiative Items** tab in the initiatives editor page in the **Initiatives** application.

To delete a resource specification:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Resource Specifications** application, search for a specification.  
The specification is listed in the results section.
  - In the **Resource Specifications** application, search for and open a specification.  
The specification editor page opens.
  - In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the initiatives editor page. Open a specification.  
The specification editor page opens.



3. Click **Delete**.

A confirmation dialog box appears.

4. Click **Delete** in the confirmation dialog box.

The specification is deleted if it is not associated with any other specifications or PSR models. If you are deleting a revised specification, only the current revision is deleted and the specification reverts to the previously released version.

 **Note:**

You can't delete a resource specification after you complete the **Advanced Configuration** phase of the associated initiative.

# 8

## Configuring Service and Resource Specifications

Learn how to configure the details of specifications using the tabs in the Service Specifications and Resource Specifications page. You can configure relationship between the entities, define the design parameters that come from the upstream order management system, define the characteristics that match the inventory management system, map the design parameters to the entity characteristics to fulfill the order, define the design policies to assign appropriate resources from the inventory system, and define the delivery policies to send the appropriate details to the delivery systems.

### Topics in this document

- [Configuring Relationships between Specifications](#)
- [Defining Design Parameters](#)
- [Defining Characteristics](#)
- [Mapping Design Parameters](#)
- [Defining Design Policies](#)
- [Defining Delivery Policies](#)
- [Relating Specifications](#)

## Configuring Relationships between Specifications

You can define the relationships between specifications in the **Configuration** tab in the Specifications page.

You can configure the following relationships between specifications:

- CFS to location, resource, RFS, or another CFS
- RFS to location, resource, or another RFS
- Resource to location, another resource, or an RFS

You define relationships between specifications by adding components to the specification in the **Configuration** tab. A component represents a specific entity that is needed to complete the specification. Each specification requires at least one component to relate the other specifications. For example, a CFS requires at least one component to relate to RFS, resource, or location specification.

To configure the relationships between specifications:

1. In the Solution Designer landing page, click the **Service Specifications** or **Resource Specifications** application.
2. In the **Service Specifications** or **Resource Specifications** application, select a specification by searching for it.

The corresponding specification page opens.

3. Click the **Configuration** tab.
4. Do one of the following:
  - Click **Create Configuration** if no configuration exists.
  - Click **Edit** if you already have any configuration defined, which opens the diagram in the edit mode in full screen.

The **Edit Configuration** page opens.

5. In the **Edit Configuration** page, click the + symbol to add a component to the configuration. You can create a new component only; you cannot search for any existing components.

To create new components:

- a. Click **New component** to create a new component.  
The **New component** dialog opens. You can create a new component that relates to the selected specification. For example, if the selected specification is *Mobile CFS*, you can create a *Subscriber Profile RFS* component and then relate the *4G Profile RFS* and *5G Profile RFS* to the component. For each specification that you relate, you must create a corresponding component.
- b. Enter the following details:

**Table 8-1 New Component Fields**

Name	Required or Optional	Description
<b>Name</b>	Required	Name of the component.
<b>Type</b>	Required	Type of the component such as resource facing service component, resource component, location component.
<b>Minimum Cardinality</b>	Required	The minimum number of instances of the component that can appear at runtime.
<b>Maximum Cardinality</b>	Required	The maximum number of instances of the component that can appear at runtime.
<b>Relationship Type</b>	Required	The relationship type of the component. When you create a component for <b>Other Resource</b> specification, select <b>Config hierarchy</b> as the <b>Relationship type</b> . See " <a href="#">Relationship Types</a> " for the details on relationship types.
<b>Description</b>	Optional	The description of the component.

- c. Click **Create**.

The component is created and added to the **Edit Configuration** page.

The component is added as a child of the selected specification in the configuration.

To update the component, click the component and update the details. Whenever you update the component details, you can save the changes in the components page and click **Done** in the **Edit Configuration** page.

See "[About Components](#)" for more information on components.

6. After you add a component, click the + symbol on the component and select an existing specification that matches the type of the component. When you add a resource specification of type **Other Resource** to a component that has Relationship type as **Config hierarchy**, a configuration is created in the UIM run-time. Any component and the

resource specification that are added as a child of the **Other Resource** specification, are created as configuration items in UIM run-time.

7. Click **Done**.

 **Note:**

When you select or create a resource for a component whose parent is logical device resource, and the relationship type as **Exclusive**, only the following resources types are available in the **Resources** dialog:

- Device Interface Specification
- Custom Object Specification
- Custom Network Address Specification
- IPv4Address Resource Extension
- IPv6Address Resource Extension
- Flow Identifier Specification

You can perform several actions in the **Edit Configuration** canvas. See "[Features in the Configuration Canvas](#)" for the details on the features available in the **Edit Configuration** canvas.

## Defining Design Parameters

You define the design parameters to pass the information from the upstream order management systems to the specifications in Solution Designer. A design parameter identifies the data elements or features that apply to CFSs, RFSs, or resources. Data elements define the data that is necessary to fulfill your service. Feature group is a group of data elements that you want to use together. In the *Mobile Service* example, in *Mobile CFS*, the design parameter *Service Address* can be created as a feature group which has *city* and *state* as its data elements.

You also define the design action mapping for the design parameter. Design action mappings identify which of the design parameters on the specification are exposed in the signatures of operations acting on the entity. For example, the set of design parameters identified as inputs on the Add action will be part of the request to create an instance of the entity.

## Design Action Mapping

A design action mapping is an operation that can be invoked on a specification in the context of a service configuration. You can define design actions for CFSs, RFSs, and resources. Action codes represent the specific types of actions permitted for each mapping. For example, an action can include a number of action codes to represent create, disconnect, and remove. Design Action Mapping includes a group of action codes, each of which can be performed against the associated specification. For example, a design parameter can affect change to a customer facing service because it includes the action codes Add, Move, and Delete.

You can select one or more of the following action codes for the design parameter:

- Add
- Change

- Disconnect
- Move
- Resume
- Suspend

You can specify whether a design parameter is required or optional to a specification. For each design action operation, you can select whether the design parameter will be provided as input, output, or both.

The values for each action code are:

- Optional In/Out
- Optional In
- Optional Out
- Required In/Out
- Required In
- Required Out

A set of design parameters is identified as required or optional for a specific action code. For example, in the *Mobile Service* example, if you are creating a new service order, the *MSISDN* design parameter is a required input parameter and also a required output parameter. The value of the *MSISDN* design parameter is required from the upstream order management system and that value must be passed to the downstream inventory management system to provision the service accordingly. In this case, define the design action mapping with action code as **Add** and the **Value** as **Required In/Out**.

After you define the design action mapping in Solution Designer, you can override the existing implementation with your custom implementation using the extended designer class. To write the implementation code for design action mapping, see "Extending Solution Designer" in *Developer's Guide*.

## Defining Design Parameters

To define design parameters:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In **Service Specifications** or **Resource Specifications** application, search and open the specification page and click the **Design Parameters** tab.
  - In the **PSR Models** application, in the **Configure Model** step, expand **Design Parameters** and select a specification.

The corresponding specification drawer opens that lists the defined design parameters.

3. Click the + icon to add a new design parameter to the selected specification.

The **New design parameter** drawer opens.

4. Enter a data element, name, and default value. The default value is pre-populated with the default value that you entered in **Data Elements**. You can select an existing element or create a new element to be a design parameter. Select **+ Create Data Element** to create a new data element. See "[Creating New Data Elements](#)" for more details.

5. Select **Persist** to automatically create a corresponding characteristic and also a parameter mapping between them. **Persist** is available only for the newly created design parameter.
6. (Optional) Enter the **Multiplicity** details. Multiplicity section appears only when you add a data element of type **Feature Group** as design parameter. See "[About Multiplicity](#)" for more information on multiplicity.
7. Add **Design Action Mapping** by selecting value for the action codes Add, Change, Disconnect, Suspend, Resume, and Move according to your business requirements.
8. Click **Add**.  
The design parameter is added.

You can search for the associated design parameters in the **Design Parameters** tab. You can see the consolidated view of the design parameters to design action mapping. You can see all the design parameters along with its design action mapping where you can change to the mappings with the view of data in full context of the other parameters.

## Editing Design Parameters

To edit a design parameter:

1. In the **Design Parameters** tab, search for design parameters by typing the name in **Search**.

2. Click the design parameter name in the **Design Parameters** tab.

The **Edit design parameter** dialog opens.

3. Edit the data element, name, default value and design action mapping.

4. Click **Save**.

The modified design parameter is displayed in the **Design Parameters** tab in the **Specifications** application or in the Design parameters page while configuring the model in the **PSR models** application.

To edit the design action mapping, click **Edit** in the **Design Parameters** tab and change the values. Then click **Submit**.

## Deleting Design Parameters

To delete a design parameter, click **Delete** in **Design Parameters**. On confirmation, the design parameter is deleted. Deleting a design parameter removes the data element from the specification. The data element remains in the **Data Elements** application so you can reuse that data element in another specification within the same initiative. To delete a data element from the application, you must navigate to the **Data Elements** application and delete them. See "[Deleting Data Elements](#)" for more information.

## Defining Characteristics

Characteristics are specific types of data with particular properties that you can use in a service in Solution Designer. For example, a characteristic can be an ID, a feature, or a telephone number. Few characteristics are added by default based on the resource type and those are called as hard attributes. You can define data elements or feature groups that are entity characteristics within the CFSS, RFSs, resources, and locations.

To define characteristics:

1. In the Solution Designer landing page, click the application that you want to work with.

2. Do one of the following:
  - In **Service Specifications** or **Resource Specifications** applications, search and open the specification page and click the **Characteristics** tab.

The **Characteristics** tab page listing the existing characteristics and the hard attributes opens.

- In the **PSR Models** application, in the **Configure Model** step, expand **Characteristics** and select a specification.

The corresponding specification drawer that lists the existing characteristics and the hard attributes opens.

 **Note:**

You can search for the characteristics that are already defined for the selected specification using name.

3. Enter the details of the characteristics as follows:
  - Select an existing data element or create new data element and select it to be the characteristic. You can also select or create a new feature group as an characteristic. You can create data elements or feature groups within the **Characteristics** tab. See "[Creating New Data Elements](#)" for more details.
  - Enter the name of the characteristic.
  - Enter a default value for the characteristic. The default value is pre-populated with the default value that you entered in **Data Elements**.
  - Select **Required** if the characteristic must be mapped with the design parameters in the **Parameter Mapping** tab. This field is not available for the data elements of type **Feature Group**.
  - Select **Changeable** if the characteristic changes frequently or if you need to track the life cycle of an characteristic. In the *Mobile Service* example, customers often upgrade services for monthly quota. You can select **Changeable** for the *Monthly Quota* characteristic and track the characteristic's history for auditing purposes. When realizing CFSs and RFSs in the UIM run-time application, Solution Designer saves the changeable characteristics to the Service Configuration specifications.
  - (Optional) Enter the **Multiplicity** details. **Multiplicity** section appears only when you add a data element of type **Feature Group** as characteristic. See "[About Multiplicity](#)" for more information on multiplicity.
4. Click **Submit**.

The characteristic is added to the specification.

## Editing Characteristics

To edit entity characteristics:

1. In the **Characteristics** tab of Service Specification or Resource Specification, click **Edit**.

The characteristic is editable and you can change the details.
2. Click **Save**.

The modified entity characteristic is displayed in the **Characteristics** tab in the **Service Specifications** application, in the **Resource Specifications** application, or in the Characteristics section while configuring the model in the **PSR models** application.

## Deleting Characteristics

To delete a characteristic, click **Delete** next to the characteristics in the **Characteristics** tab. On confirmation, the characteristic is deleted from the specification. Deleting a characteristic removes the data element from the specification. The data element remains in the **Data Elements** application so you can reuse that data element in another specification within the same initiative. To delete a data element from the application, you must navigate to the **Data Elements** application and delete them. See "[Deleting Data Elements](#)" for more information.

## Mapping Design Parameters

You map the design parameters of a specification to the specification's characteristics and the design parameters of its child specification. When mapping parameters, the data elements and feature groups must be of the same type. For example, you must map a design parameter of boolean type to a characteristic of boolean type only. When you map design parameters to its characteristics in Solution Designer, at runtime, the value for the mapped parameter is passed from the order management system to the inventory management system to provision the services.

You can map the design parameters manually or automatically or both:

- To map the parameters manually, see "[Mapping Design Parameters Manually](#)"
- To map parameters automatically, see "[Mapping Parameters Automatically](#)"

You can map parameters automatically and also choose to map few of them manually.

If you have to perform any mappings other than the available mappings, you can map them by writing the custom code in the extended designer class. To write the code for parameter mappings, see "Extending Solution Designer" in *Developer's Guide*.

## Mapping Design Parameters Manually

To map design parameters manually:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Service Specifications** application or **Resource Specifications** application, search and open the specification editor page and click the **Parameter Mapping** tab. In the **Parameter Mapping** tab, click **Edit**. The **Parameter Mapping** drawer opens.
  - In the **PSR Models** application, in the **Configure Model** step, expand **Parameter Mapping** and select a specification. The **Parameter Mapping** drawer opens.
3. You can manually map all the design parameters. The **Source** column lists all the defined design parameters and the **Destination** column lists the mapped characteristics or the mapped design parameters of child entities.

For mapping multiple design parameters manually, perform the following steps:

- a. Click **Add mapping** in the text box in the **Destination** column.

The **Select destination** slider slides.



- b. Do one of the following:
  - Hover over the design parameters and click **Select parameter** which associates the selected parameter to the source design parameter and closes the slider.
  - Click **Auto select** to automatically map the specification design parameter to its own characteristics and to any child entity design parameters based on the name and referenced data element type.

You can map a source design parameter to multiple destination parameters. You must map a feature group source parameter with only a feature group destination parameter with matching multiplicity. You must map all the required characteristics to the source design parameters.

4. After you complete the parameter mapping, click **Save**.

The parameter mappings are saved and displayed in the **Parameter Mapping** tab.

## Mapping Parameters Automatically

To map the design parameters automatically:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Service Specifications** application or **Resource Specifications** application, search and open the specification editor page and click the **Parameter Mapping** tab.  
In the **Parameter Mapping** tab, click **Edit**. The **Parameter Mapping** drawer opens.
  - In the **PSR Models** application, in the **Configure Model** step, expand **Parameter Mapping** and select a specification.  
The **Parameter Mapping** drawer opens.
3. Click **Automap** to map all the source design parameters with the matching destination parameters at once.

Clicking **Automap** maps the design parameters and characteristics with the same name and data elements type of that source entity. It also maps the design parameters of the child specifications with the same design parameter name and data elements type. You can change the automatic mapping and manually map to a different parameter. You can map manually for some parameters and use **Automap** for the rest of the parameters. In such case, clicking **Automap** automatically maps the appropriate parameters and retains the manual mappings that have different names.

You can click **Automap** multiple times as needed. If a new RFS or resource is added later, you can click **Automap** to automatically map the parameters of the newly added specifications.

Click **Reset** to remove all the mappings and clear the data so that you can start the mappings afresh.

## Defining Design Policies

You define the design policies to provision the service in UIM. It allows you to define the design and assign conditions, so at runtime, if the condition is met, then the defined logic is run to assign appropriate resources in UIM to fulfill the service. These are simple policies that have if-then conditions. You can manage the following types of design policies in Solution Designer:

- **Standard Policies:** Define the standard policies within Solution Designer for designing and assigning service specifications based on the design parameters. You can create simple

standard policies for CFSs, RFSs and resources. In the *Mobile Service* example, if the State is *ON*; then select the *5G Profile RFS* else select the *4G Profile RFS*.

You can create the following three types of standard policies:

- **Standard Policies for Specification Selection:** Define the standard policies within Solution Designer for designing and assigning service and resource specifications based on the design parameters. The specification selection policy is applicable only for resource and service specifications.
  - **Standard Policies for Resource Selection:** Define the standard policies within Solution Designer for designing and assigning resource based on the characteristics. As an example, based on Service Address, reserve and assign the phone numbers from the range in the inventory. The resource selection policy is applicable only for resource specifications.
  - **Standard Policies for Naming:** Define the standard policies within Solution Designer for naming policies, when a resource specification instance is created in the run-time application. You can define a naming policy based on the design parameter, ID, string, or combination of them. The naming policy is applicable only for resource specifications.
- .
- **Advanced Policies:** Define advanced policies in Solution Designer. A developer implements the advanced policies in Design Studio environment using the extended designer class. Solution Designer builds the solution with standard policies and advanced policies. In the *Mobile Service* example, select UDR in the same *State* as the *5G Profile RFS* is an advanced policy.

 **Note:**

When you define a design policy with feature group parameter in condition and that feature group having multiplicity more than one, only the first instance is considered to satisfy the condition.

## Defining Standard Policies

You can create standard policies for Service specifications which are specifications selection policies by default.

To define standard policies:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In **Service Specifications** applications, search and open the specification editor page and click the **Design Policies** tab.  
The **Design Policies** tab page opens.
  - In the **PSR Models** application, in the **Configure Model** step, expand **Design Policies** and select a service specification.  
The **Design Policies** drawer opens.
3. In **Design Policies** tab, click the **Add** drop-down and select **Standard policy**.  
The **New standard policy** page opens.

4. Enter the name, description, component, and default value. The **Component** drop-down lists only those components that are related to the selected specification. The **then** part of the condition is displayed based on the component that you select. If you select an RFS component in the **Component** drop-down, the **Then** clause is displayed with RFS. The **Default Value** drop-down lists the specifications that are related to the component that was selected in the **Component** drop-down.
5. To add conditions, in the **Conditions** section, do the following:
  - a. Drag and drop the design parameters from the **Parameters** panel on the right. The **Parameters** panel displays the design parameters for that specification.
  - b. Select the operator from the available operators. The available operators are Contains, Equals, Not equals, Equal ignore case, Contains ignore case, and Not equal ignore case.
  - c. Select or enter a value in the **Select Value** field that must be validated with the actual value. Select a value if you have to defined valid values for the parameters or enter a value if you do not have valid values defined for design parameters.

When you add multiple conditions within a group, all the specified conditions must be met to run the corresponding **Then** clause.
6. In the **Then** drop-down, select the option **Create** or **Select**. **Create** option creates the selected specification at runtime. **Select** option selects the specification based on the selected advanced policy or resource selection standard policy in the **Select policy** drop-down at runtime.

 **Note:**

- When you select the option **Select** in the **Then** drop-down, that standard policy must have a corresponding advanced policy or a resource selection standard policy to select the entity.
- When you define a standard policy for creating a resource, Solution Designer creates the resource automatically only for Logical Device specification and Logical Device Account specification.

7. Click **Add New Group** to add more conditions and enter the conditions accordingly. When you add multiple groups, the group that meets all the specified conditions first is considered and the corresponding **Then** is invoked.
8. Click **Save**.

The standard policy is listed in the **Design Policies** page.

## Defining Specification Selection Policies

To define specification selection standard policies for resources:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In **Resource Specifications** applications, search and open the specification editor page and click the **Design Policies** tab.

The **Design Policies** tab page opens.

- In the **PSR Models** application, in the **Configure Model** step, expand **Design Policies** and select a resource specification.  
The **Design Policies** drawer opens.
- 3. In **Design Policies** tab, click the + drop-down and select **Standard policy**.  
The **New standard policy** page opens.
- 4. Select **Specification selection** as the **Standard policy type**. The **Standard policy type** is available only when you create a standard policy for resource specification.
- 5. Add conditions for the specification selection policy. See "[Defining Standard Policies](#)" to add conditions for the specification selection policy.
- 6. Click **Save**.  
The standard policy is listed in the **Design Policies** page.

## Defining Resource Selection Policies

To define resource selection standard policies for resources:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In **Resource Specifications** applications, search and open the specification editor page and click the **Design Policies** tab.  
The **Design Policies** tab page opens.
  - In the **PSR Models** application, in the **Configure Model** step, expand **Design Policies** and select a resource specification.  
The **Design Policies** drawer opens.
3. In **Design Policies** tab, click the + drop-down and select **Standard policy**.  
The **New standard policy** page opens.
4. If you are creating a standard policy for a resource specification, select **Resource selection** as the **Standard policy type**. The **Standard policy type** is available only when you create a standard policy for resource specification.
5. Enter the name, and description.
6. In the **Settings** section, select **All** or **Any** in the **If** clause. Select **All** if all the conditions must be met to select a resource. Select **Any** if any of the conditions can be met to select a resource.

To add conditions:

- a. Drag and drop the characteristics from the **Characteristics** panel on the right. The **Characteristics** panel displays all the hard attributes and the user defined characteristics for that specification.
- b. Select the operator from the available operators. The available operators are Contains, Equals, Not equals, Equal ignore case, Contains ignore case, and Not equal ignore case.
- c. Select or enter a value based on characteristic type. The value that you enter is validated with the actual value. Select a value if you have to defined valid values for the characteristics or enter a value if you do not have valid values defined for design parameters.

When you add more than one condition, at run time, the first available resource is selected based on the resource type and the conditions that are met. For example, if the design policy is created for logical device resource and the conditions are entered as id **Equals** *VMS* and name **Contains** *Voice*, in UIM, the first available logical device with id as *VMS* and name that contains *Voice* is selected.

7. Click **Save**.  
The standard policy is listed in the **Design Policies** page.

 **Note:**

You must associate the resource selection policy to any of its parents' specification's standard policy to select an appropriate resource.

## Defining Naming Policies

You can create a naming policy only for resource specifications.

To define a naming policy for resource:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In **Resource Specifications** applications, search and open a resource specification and click the **Design Policies** tab.  
The **Design Policies** tab page opens.
  - In the **PSR Models** application, in the **Configure Model** step, expand **Design Policies** and select a resource specification.  
The **Design Policies** drawer opens.
3. In **Design Policies** tab, click the + drop-down and select **Standard policy**.  
The **New standard policy** page opens.
4. Select **Naming** as the **Standard policy type**.  
Enter the name and description.
5. In the **Settings** section, select **Type** as Design Parameter, ID, or String. When you select Design Parameter, select **Value** from the design parameters defined for that specification. You can specify to use the automatically generate IDs using **ID** type or specify a constant text that must be added to the name using **String** type.
6. Click **Submit** to add the settings to the naming policy.  
The naming policy can have multiple settings and any new settings that you add are appended to the naming preview. Naming preview section displays the preview of the naming policy. For example, the naming preview displays *<ID>naming policy string<DE-DownloadSpeed1>* which means that there are three settings added to the naming policy and they are ID, string, and design parameter.
7. Click **Save**.  
The standard policy for naming is listed in the **Design Policies** page.

 **Note:**

You can have only one naming policy for a resource. If you add a new naming policy, you may choose to overwrite the existing policy.

## Defining Advanced Policies

To define an advanced policy:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In **Service Specifications** or **Resource Specifications** application, search and open the specification editor page and click the **Design Policies** tab.  
The Design Policies tab page opens.
  - In the **PSR Models** application, in the **Configure Model** step, expand **Design Policies** and select a specification.  
The **Design Policies** drawer opens.
3. In **Design Policies** tab, click the + drop-down and select **Advanced policy**.  
The **New advanced policy** page opens.
4. Enter the name, description, component, and default value. The **Component** drop-down lists only those components that are related to the selected specification. The **Default Value** drop-down lists the specifications that are related to the component that was selected in the **Component** drop-down.
5. Enter the notes regarding the policy that you are defining in the **Notes** tab. For example, in *Mobile Service* example, you can enter the notes as Select UDR in the same state as RFS.
6. Click **Save**.  
The advanced policy is listed in the **Design Policies** page with the status **In Progress**. After you add the advanced policy implementation assets in the **General Information** tab, the advanced policy status moves to **Ready**.

### Advanced Policy Setup Process

Perform the following steps to set up an advanced policy:

1. Add an advanced policy with notes in the **Notes** tab regarding the policy. These notes that you enter are added as comments in the generated extended designer Java class, when you publish the initiative.
2. Publish the initiative that is in **Advanced Configuration** status to generate Design Studio workspace. See "[Publishing Initiatives to Generate Design Studio Workspaces](#)" for more information on how to publish an initiative to the generate Design Studio Workspaces.  
When the publish operation is successful, the requested Design Studio workspace is generated. The Design Studio workspace can be downloaded and imported in to Design Studio Eclipse environment. The Design Studio project contains base class and an extended designer class. You can write the code for the advanced policies in the extended designer class.
3. Download the Design Studio workspace from the **Publish** operation that is in the **Simulated Success** status.

4. Import the Design Studio workspace into Design Studio Eclipse environment. See "Importing Projects" in *Design Studio Modeling Basics Guide* for more information on importing the workspace into Design Studio.
5. Write the implementation code in the extended designer class in Design Studio Eclipse environment for the advanced policy using the comments and compile them. See "Extending Solution Designer" in *Developer's Guide* on how to define advanced policy implementation.
6. Use Object Store Utility for updating the designer classes, helper classes, and third-party libraries information in Solution Designer. See "Working with Object Store Utility" in *Developer's Guide* for information on how to work with Object Store Utility.
7. Transition the initiative to the **Functional Testing** phase.
8. Republish the initiative to **Test** workspace for and the DevOps engine builds the test cartridge including the implementation code in the location specified in **Link** in the **Advanced policy implementation assets** section. See "[Adding Advanced Policy Implementation Assets](#)" for adding advanced policy implementation asset details.

## Editing Design Policies

To edit a design policy:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Open the specification in the **Service Specifications, Resource Specifications** application, or in the **Configure Model** step in the **PSR Models** application.
3. In the **Design Policies** tab or the **Design Policies** drawer, click the design policy to be edited.

You can edit the details of the policy.

4. Click **Save**.

The modified policy is displayed in the **Design Policies** tab in the specifications editor page or in the design policies while configuring the model in the PSR models application.

## Deleting Design Policies

To delete a design policy, click the delete icon for the policy in the **Design Policies** tab. On confirmation, the design policy is deleted from the specification.

## Defining Delivery Policies

You define the delivery policies in Solution Designer. Delivery policies are a set of delivery actions that communicate to a delivery system. For example, an activation system performs delivery actions to configure a network; a shipping system performs delivery actions to pick, pack, and ship physical goods; and a workforce management system performs delivery actions to dispatch work to a field technician.

When you define a resource, you can specify that it is a delivery action target. Only those resources which are defined as delivery action targets can be delivery targets in delivery policies. You define a delivery policy for an RFS or a resource that includes a set of delivery parameters, to indicate the parameters that are involved along with the type of delivery action. With multiple delivery policies, you can have delivery actions destined for different types of delivery systems defined against a single specification.

Available delivery types and the corresponding action codes are:



**Table 8-2 Delivery Types and Action Codes**

Delivery Types	Action Codes
Activation	Activate Alter Deactivate
NFV Orchestration	Instantiate Terminate
Supply Chain Management	Ship Recover
Test	Initiate
Workforce Management	Install Reconfigure Uninstall
All Applications	Not applicable
Partner Gateway	Order Revise Cancel

During service order fulfillment, a design and assign process defined by the design policies produces a service configuration that defines the delivery actions that must be run to fulfill the requested service.

A delivery action represents a unit of work that is performed to realize a resource in a network. A delivery action also defines delivery parameters that describe the work to be done, and these delivery parameters also map to properties of a resource assigned to or referenced by the service configuration. You define the delivery action in Solution Designer by mapping the delivery parameter to the delivery action code and its value. For each delivery action operation, you can select the **Value** field as required or optional, inputs, outputs, or both.

To define delivery policies:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Service Specifications** or **Resource Specifications** application, search for an RFS or a resource and open the specification editor page and click the **Delivery Policies** tab.  
The **Delivery Policies** page opens.
  - In the **PSR Models** application, in the **Configure Model** step, expand **Delivery Policies** and select a specification.  
The **Delivery Policies** drawer opens.
3. Click the + icon to add a new delivery policy.  
A **New delivery policy** drawer opens.
4. Enter a name, a delivery type, a delivery target, and a description. Only those resource specifications which have **Delivery Action Target** set are displayed in the **Delivery Target** drop-down. When defining a delivery policy for an RFS, only those resource specifications that are related as a child to the selected RFS with **Delivery Action Target** set are displayed in the **Delivery Target** drop-down.



5. Add delivery parameters.

To add delivery parameters:

- a. Click the + icon in the **Delivery Parameters** section.

A **New delivery parameter** drawer appears.

- b. Enter a name and default value. The default value is pre-populated with the default value that you entered in **Data Elements**. Select an existing data element or create a new data element. See "[Creating New Data Elements](#)" for more details.

- c. (Optional) Enter the **Multiplicity** details. Multiplicity section appears only when you add a data element of type **Feature Group** as delivery parameter.

- Select a number in **Minimum** in the **Multiplicity** section if you need as many instances in the delivery system such as Activation, Workforce Management and so on. **Minimum** indicates the minimum number of times the delivery parameter can appear in the delivery system. Selecting the value 1 means that this delivery parameter must appear once in the delivery system.
- Select a number greater than **Minimum** in **Maximum** in the **Multiplicity** section. **Maximum** indicates the maximum number of times the delivery parameter can appear in the delivery system. Selecting a value means that this delivery parameter can appear that many times in the delivery system.
- Select **Unbounded** if there is no specific limit and this delivery parameter can appear any number of times in the delivery system. If you want to have at least one occurrence of the delivery parameter, select the value 1 in the **Minimum** field and select **Unbounded** (no explicit limit). If there is no required minimum number of occurrences, select the value 0 in the **Minimum** field and select **Unbounded**.

To make a delivery parameter as required, set **Minimum** value to 1 and **Maximum** value to 1. To make a delivery parameter as optional, set **Minimum** value to 0 and **Maximum** value to 1.

- d. In the **Characteristic mapping** section, select the source characteristic which lists the characteristics from the specification where the delivery policy is being added and any target specifications. This maps the characteristics to the selected delivery parameter. You can also map feature group to the destination characteristic that has exactly matching multiplicity. You can map the feature group itself or the individual elements in it.

- e. In the **Delivery action mapping** section, select **Value** for the listed action codes. The action codes are listed based on the chosen **Delivery Type**.

- f. Click **Save**.

The added delivery parameter is listed in the delivery parameters section in the **New delivery policy** drawer.

6. Click **Save**.

The delivery policy is added and listed in the **Delivery Policies** tab in the **Service Specifications** application, **Resource Specifications** application, or in the **Delivery Policies** drawer in the **PSR Models** application. The Delivery Policies provides the consolidated view where you can see all delivery parameters along with its Action Codes mappings. You can make changes to the mappings by seeing the data in full context of other parameters.

After you define the delivery action mapping in the **Delivery Parameter** in Solution Designer, you can override the existing implementation with your custom implementation using the extended class. To write the implementation code for delivery action mapping, see "Extending Solution Designer" in *Developer's Guide*.

## Editing Delivery Policies

To edit a delivery policy:

1. Open the specification in the **Service Specifications** application, the **Resource Specifications** application, or in the **Configure Model** step in the **PSR Models** application.
2. Click the delivery policy to be edited.

You can edit the details.

 **Note:**

You cannot edit the delivery type if the delivery parameters have been defined.

3. Click **Save**.

The modified policy is displayed in **Delivery Policies** in the **Service Specifications** application, the **Resource Specifications** application, or while configuring model in the **PSR Models** application.

## Deleting Delivery Policies

To delete a delivery policy, click Delete. On confirmation, the delivery policy is deleted.

## Relating Specifications

You can relate a specification to another specification or change relationship properties by using **Related Specifications** tab. The **Related Specifications** tab is divided into subtabs where you can define relationships to different entity types. Only the entity types listed in the subtab have meaningful relationships by default in UIM. The **Others** subtab enables you to relate other specifications, but these relationships require rulesets to trigger behaviors and actions in UIM.

The **Related Specifications** tab is available only for the Resource specifications of type Logical Device, Logical Device Account, Custom Object, and Device Interface. The following subtabs are available in the **Related Specifications** tab:

- **Device Interfaces** subtab: Lists specifications of device interfaces that can be provided by logical devices or can be sub-device interfaces of device interfaces based on this specification.
- **Logical Devices** subtab: Lists specifications of logical devices that can be children of the selected specification based on this specification.
- **Logical Device Accounts** subtab: Lists specifications of logical device accounts that can be associated with the selected specification based on this specification.
- **Roles** subtab: Lists roles to which the selected specification based on the base specification can be assigned.
- **Inventory Groups** subtab: Lists the specifications of inventory groups to which services based on the base specification can belong.
- **Others** subtab: Lists specifications of entities that have a customized relationship with entities based on the base specification.

Table 8-3 lists the available subtabs for the specifications that has related specifications tab displayed.

**Table 8-3 Related Specifications Subtabs**

Specifications	Available Subtabs
Logical Devices	Device Interfaces Logical Devices Logical Device Accounts Roles Inventory Groups Others
Device Interfaces	Device Interfaces Logical Devices Roles Others
Logical Device Accounts	Device Interfaces Inventory Groups Others
Custom Objects	Roles Inventory Groups Others

To relate specifications:

1. In the Solution Designer landing page, click the application that you want to work with.
2. In the **Resource Specifications** application, search for a resource and open the specification editor page and click the **Related Specifications** tab.

The **Related Specifications** page opens.

 **Note:**

The Related Specifications tab is available only for Logical Devices, Logical Devices Account, Device Interfaces, and Custom Objects.

3. In the available subtabs, select a subtab and click **Add**.  
The selected specification drawer opens.
4. Select the existing specification or create a new specification.  
To create a new specification:
  - a. Click **Create** in the Specifications drawer.  
The **Create Specification** drawer opens.
  - b. Enter the appropriate values based on the specification type.  
See "[Creating Infrastructure Specifications](#)" to create new Inventory Groups and Roles. See "[Creating Resource Specifications](#)" for creating Device Interfaces, Logical Devices, Logical Device Accounts, and Others specifications.
  - c. Click **Save and Add**.

The selected specification is added to the respective subtab.

# 9

## Managing Infrastructure Specifications

Use **Infrastructure Specifications** in Solution Designer to define your locations, inventory groups, involvement, and role.

### Topics in this Document

- [About Infrastructure Specifications](#)
- [Creating Infrastructure Specifications](#)
- [Viewing Infrastructure Specifications](#)
- [Updating Infrastructure Specifications](#)
- [Cloning Infrastructure Specifications](#)
- [Revising Infrastructure Specifications](#)

## About Infrastructure Specifications

You use **Infrastructure Specifications** application to define the locations, Inventory Groups, Involvements and Roles:

- **Locations:** A physical location for services and resources, such as an office, residence, or city. See "[About Locations](#)" for more information.
- **Inventory Groups:** You can organize and correlate entities in the inventory using Inventory Groups. See "[About Inventory Group Specifications](#)" for more information.
- **Involvement Specification:** You can define associations between entities for relationships that are not currently supported in UIM. See "[About Involvement Specifications](#)" for more information.
- **Roles:** You can define the functions played by entities in an inventory. See "[About Role Specifications](#)" for more information.

## About Locations

Locations define geographic references that are relevant to services or resources. Locations can be specific places, such as a residence or a business, or more general places, such as a city.

In Solution Designer, two location specification types are supported:

- **Place Specifications:** You use **Place specifications** to define entities that represent places that can be located on maps.
- **Property Location:** You use **Property Location** specification for geographic locations involved in connectivity scenarios. Unlike Place entities, Property Location entities are all based on a single specification.

In Solution Designer, two locations **Customer Site** and **Service Location** are pre-loaded and can be used in the PSR models. **Customer Site** location is a **Place Specifications** with the place type as **Address**. For example, in a Fixed line service, a Customer Premise Equipment (CPE) that is, a telephone instrument must be installed at that customer location. Use

**Customer Site** in the PSR model to represent the customer location where the CPE must be installed.

**Service Location** is a type of **Property Location**. For example, in a Carrier Ethernet service, the service is delivered to one or more service locations by a service provider. Use **Service Location** in the PSR model to represent the location where the service originates or is delivered.

## About Place Specifications

You use **Place specifications** to define geographic entities that can be located on a map, such as a state, city, street, postal address, campus, or building. Place entities answer the business question of where other inventory entities (such as subscribers, services, equipment, service terminations, and so on) are located.

[Table 9-1](#) shows the four different types of Place specification that describe different geographical entities.

**Table 9-1 Types of Place Specification**

Place Type	Description
Site	Defines a loosely defined place such as a campus, cell site, or VPN site. Unlike a location, a site is not necessarily bound to specific geographic coordinates.
Address	Defines a place using the standard address format to meet your business requirements and national postal standards.
Address Range	Defines a group of addresses as a range, such as an address defined with a low street number and high street number.
Location	Defines a place based on geographic references. It can be a very specific place, such as a residence, or more general places, such as a city or province.  You can geocode a location to identify its placement on the face of the earth and to enable geographic visualizations of your network or business. Using geographic coordinates also makes it possible to calculate distances between locations.

## About Property Location Specifications

Property Location entities define where resources are located and where connectivity is terminated. Property Location entities are optimized for defining the locations of devices and services in your network. Property Location entities are all based on a single specification. **Service Location** is pre-loaded in Solution Designer and is a type of Property Location. You can supplement the default data elements of Property Location entities by adding **Characteristics**. The added characteristics apply to all the instances of the entity in the run-time environment. To add more characteristics to **Service Location**, revise the service location. See "[Revising Resource Specifications](#)" for information on revising locations. You can clone the service location to create a copy of the service location.

## About Inventory Group Specifications

You use Inventory Group specifications to organize and correlate entities in the inventory. You can define inventory groups to organize entities based on certain criteria such as geographic area, serving area, billing area, IP address pool, and so forth. For example, an inventory group containing locations and telephone numbers enables you to specify the telephone numbers

that can be selected from a specific serving area. You create Inventory Group specifications in the same manner as you create other types of specifications. See [Creating Inventory Group Specifications](#) for creating Inventory Group specifications.

## About Involvement Specifications

Involvement specifications enable you to define associations between entities for relationships that are not currently supported in UIM. The Involvement specifications that you create enable you to capture characteristics on the relationship and to specify the roles played by the entities participating in the involvement.

## About Role Specifications

You create **Role** specifications to define the functions played by entities in an inventory. For example, an instance of a **Party** specification called Individual could have the role of subscriber or employee.

An entity can play multiple roles simultaneously and its roles can change over time. When a role specification is created, you must select one or more role-enabled entity types to which the role applies. When an instance of the selected entity type is created in UIM, the role may be optionally applied to the entity. For example the role of MPLS can be applied to a Logical Device and a Pipe, indicating that they both support MPLS technology.

An entity's role might be relevant to its involvements with other entities. Not all entity types can be assigned roles. In UIM, role-enabled entities have Role areas on their Summary pages.

When you create a Role specification, you can optionally select a role type. The following are the role types:

- **Technology:** This role defines the technology that an entity operates under or supports.
- **Function:** This role defines the function that an entity plays.
- **Topology:** This role defines the role the topology plays in the network topology, such as hub or spoke
- **Target:** This role identifies the entity as a target for activation systems. A network target is a resource on which services or other resources must be activated. For example, in a *Mobile Service* example, a voice mail service must be activated on a voice mail server. In this scenario, the voice mail server is the target for the voice mail account.

In Solution Designer, you can create Role specifications with the **Target** role type. In UIM, Role entities that were created using the specifications with **Target** role type can be associated to logical devices and parties to identify them as network targets.

When you assign a **Target** role to a Logical Device or Party entity, it becomes a target for other entities associated with it in various ways. Logical devices are network targets for:

- Logical device accounts associated with them
- Logical devices in their hierarchies (unless those logical devices are themselves network targets)
- Device interfaces in their hierarchies
- Any entities with which they have custom involvements based on the Manages (Oracle Provided) base specification

Parties can be network targets for:

- Any entities associated with them

- Any entities with which they have custom involvements based on the Manages (Oracle Provided) base specification

## Creating Infrastructure Specifications

You can create the following Infrastructure Specifications:

- Location Specification: See "[Creating Locations](#)" for information on creating location specification.
- Inventory Group Specification: See "[Creating Inventory Group Specifications](#)" for information on creating location specification.
- Involvement Specification: See "[Creating Involvement Specifications](#)" for information on creating location specification.
- Role Specification: See "[Creating Role Specifications](#)" for information on creating location specification.



### Note:

Two locations **Customer Site** and **Service Location** are pre-loaded in Solution Designer.

## Creating Locations

You can create the location in Solution Designer. Two locations **Customer Site** and **Service Location** are pre-loaded in Solution Designer and can be used in PSR Models.

To create locations using the **Infrastructure Specifications** application, do the following:

1. Click **Create Infrastructure Specification** in the **Infrastructure Specification** application.
2. Click **Location Specification** in the **Create Infrastructure Specification** pop-up.  
The **Create Location Specification** page opens.
3. Enter the following fields:

**Table 9-2 New location Fields**

Field Name	Required or Optional	Description
<b>Name</b>	Required	Unique name of the location.
<b>ID</b>	Required	Unique Id of the location.
<b>Initiative</b>	Required	The initiative that the location belongs to. This location is available only for the selected initiative across the application until the initiative is released.
<b>Type</b>	Required	The type of the location and defaulted to <b>Place Specification</b> and can't be modified.



**Table 9-2 (Cont.) New location Fields**

Field Name	Required or Optional	Description
<b>Place Type</b>	Required	The types of place specification. <ul style="list-style-type: none"> <li>• <b>Site</b> defines a place that does not have a single, precise location.</li> <li>• <b>Address</b> defines ways to locate places based on textual information.</li> <li>• <b>Address Range</b> define a place using groups of related addresses.</li> <li>• <b>Location</b> defines a place based on geographic references.</li> </ul>
<b>Start Date</b>	Optional	The starting date of the location.
<b>End Date</b>	Optional	The ending date of the location.
<b>Description</b>	Optional	The description of a location.

 **Note:**

The location must have a unique name and ID.

4. Click **Create and Continue**.  
The **Location** editor page opens.
5. You use the following tabs to define characteristics on locations:
  - **General Information:** Displays the general information of the location.
  - **Characteristics:** Defines the characteristics for the locations along with the hard attributes that are added by default. You can use the existing data elements or create a new data element. Data elements are added as characteristics to realize them in UIM. See "[Defining Characteristics](#)" on how to define entity characteristics.
  - **Used by:** Lists all the PSR Models and specifications that use the location.
6. Click **Go to Infrastructure Specifications** at the top left, to return to the **Infrastructure Specifications** page.

## Creating Inventory Group Specifications

You create Inventory Group specifications to organize and correlate entities in the inventory.

To create Inventory Group specifications:

1. In the Solution Designer landing page, click the **Infrastructure Specification** application.
2. Click **Create Infrastructure Specification** in the **Infrastructure Specification** application.
3. Click **Inventory Group Specification** in the **Create Infrastructure Specification** pop-up.  
The **Create Inventory Group Specification** page opens.
4. Enter the following fields:

**Table 9-3 Create Inventory Group Fields**

Field Name	Required or Optional	Description
<b>Name</b>	Required	Unique name of the Inventory Group.
<b>ID</b>	Required	Unique Id of the Inventory Group.
<b>Initiative</b>	Required	The initiative that the Inventory Group belongs to.
<b>Inventory Group Type</b>	Optional	The type of the Inventory Group. The values are Flow Identifier Resource Pool and IP Address Resource Pool. If you select any value, the corresponding <b>Group Entities</b> are added by default.
<b>Group Entities</b>	Required	Select the specifications that belong to the Inventory Group. Only the selected specifications are available for that Inventory Group instance at UIM run-time. The group entities are populated based on the <b>Inventory Group Type</b> selected and you can select multiple entities along with the default entities. The selected entities are retained when you modify <b>Inventory Group Type</b> . You can deselect them manually.
<b>Start Date</b>	Optional	The starting date of the Inventory Group specification.
<b>End Date</b>	Optional	The ending date of the Inventory Group specification.
<b>Description</b>	Optional	The description of Inventory Group specification.

5. Click **Create and Continue**.

The **Inventory Group** editor page opens.

6. You use the following tabs to define characteristics for Inventory Groups:
  - **General Information**: Displays the general information of the Inventory Group.
  - **Characteristics**: Defines the characteristics for the Inventory Group with the hard attributes that are added by default. See "[About Hard Attributes](#)" for details on hard attributes.
  - **Used by**: Lists all the specifications that are related to the Inventory Group.

## Creating Involvement Specifications

Use Involvement Specification to define associations between entities for relationships that are not currently supported in UIM.

To create Involvement Specifications:

1. In the Solution Designer landing page, click the **Infrastructure Specification** application.
2. Click **Create Infrastructure Specification** in the **Infrastructure Specification** application.
3. Click **Involvement Specification** in the **Create Infrastructure Specification** pop-up.

The **Create Involvement Specification** page opens.

4. Enter the following fields:

**Table 9-4 Create Inventory Group Fields**

Field Name	Required or Optional	Description
<b>Name</b>	Required	Unique name of an Involvement Specification.
<b>ID</b>	Required	Unique Id of an Involvement Specification.
<b>Initiative</b>	Required	The initiative that an Involvement Specification belongs to.
<b>Start Date</b>	Optional	The starting date of an Involvement Specification.
<b>End Date</b>	Optional	The ending date of an Involvement Specification.
<b>Description</b>	Optional	The description of an Involvement Specification.

- Click **Create and Continue**.

The **Involvement Specification** editor page opens.

- You see the following tabs:
  - General Information:** Displays the general information of the Involvement Specification.
  - Used by:** Lists all the specifications that are related to the Involvement Specification.

## Creating Role Specifications

Use Role Specification to define associations between entities for relationships that are not currently supported in UIM.

To create Role Specifications:

- In the Solution Designer landing page, click the **Infrastructure Specification** application.
- Click **Create Infrastructure Specification** in the **Infrastructure Specification** application.
- Click **Role Specification** in the **Create Infrastructure Specification** pop-up.  
The **Create Role Specification** page opens.
- Enter the following fields:

**Table 9-5 Create Role Fields**

Field Name	Required or Optional	Description
<b>Name</b>	Required	Unique name of the Role Specification.
<b>ID</b>	Required	Unique Id of the Role Specification.
<b>Initiative</b>	Required	The initiative that the Role Specification belongs to.
<b>Role Type</b>	Optional	The type of the Role Specification. The available role types are <b>Technology</b> , <b>Function</b> , <b>Topology</b> , or <b>Target</b> . See " <a href="#">About Role Specifications</a> " for the supported role types.

Table 9-5 (Cont.) Create Role Fields

Field Name	Required or Optional	Description
<b>Applicable Entities</b>	Optional	The entities that the role specification is applicable to. The role specification is available to all the entities by default in UIM run-time. If you select specific entities in <b>Applicable Entities</b> , the role specification is available only to those selected entities at UIM run-time.
<b>Start Date</b>	Optional	The starting date of the Role Specification.
<b>End Date</b>	Optional	The ending date of the Role Specification.
<b>Description</b>	Optional	The description of Role Specification.

5. Click **Create and Continue**.  
The **Role Specification** editor page opens.
6. You see the following tabs:
  - **General Information**: Displays the general information of the Role Specification.
  - **Used by**: Lists all the specifications that are related to the Role Specification.

## Viewing Infrastructure Specifications

You can view the specifications from the **Infrastructure Specifications** application or from the **Initiative Items** tab in the **Initiatives** application.

To view the Infrastructure specifications:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Infrastructure Specifications** application, search for a specification using the following criteria:
    - Specification name
    - Status
    - Initiatives
    - Type
    - Last Updated

The Infrastructure specification result is filtered based on the search criteria.
  - In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the initiative editor page.
3. Select an Infrastructure specification to view the details.  
The Infrastructure specification editor page opens.
4. You can view the Infrastructure specification details such as General Information, Characteristics, and Used by for the respective specifications in different tabs.
5. Do one of the following:
  - Click the **Go to Infrastructure Specifications** link on the top left to return to the **Infrastructure Specifications** page.

- Click the **Go to previous page** link on the top left to return to the **Initiatives Items** tab in the initiatives editor page.

## Updating Infrastructure Specifications

You can update the general information for Infrastructure Specifications.



### Note:

You can update a Infrastructure specification only if the associated initiative is in **Definition** and **Advanced Configuration** status.

To update a specification:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Infrastructure Specifications** application, search for a specification and open the specification.
  - In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the initiatives editor page. Select a specification to update the details.

The specifications editor page opens.

3. You can update the general information for the respective specifications.
  - **General Information:** View or update the general information for the selected specification.
  - **Characteristics:** View or update the characteristics for the specifications. See "[Defining Characteristics](#)" for details on defining entity characteristics.
  - **Used by:** Lists all the PSR Models and specifications that use the selected specification. Click the entity name to the view the general information of the entity.
4. Do one of the following:
  - Click the **Go to Infrastructure Specifications** link on the top left to return to the **Infrastructure Specifications** page.
  - Click the **Go to previous page** link on the top left to return to the **Initiatives Items** tab in the initiatives editor page or the parent specification page from where this specification is opened.

## Cloning Infrastructure Specifications

You can clone the existing Infrastructure specifications to create a copy and update the details as necessary. See "[About Cloning Entities](#)" for information on the cloning process.

To clone an Infrastructure specification:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Infrastructure Specifications** application, search for a specification. In the specifications result list page, click **Clone**.

The **Clone Specification** pop-up appears. *Specification* includes Location, Involvement, Role, and Inventory Group.

- In the **Infrastructure Specifications** application, search and open the specification. The specifications editor page opens. Click the **Clone** in the specifications editor page.

The **Clone Specification** pop-up appears. *Specification* includes Location, Involvement, Role, and Inventory Group.

- In the **Initiatives** application, search and select an initiative. Click the specification in the **Initiative Items** tab in the initiatives editor page.

In the specifications editor page, click **Clone**.

The **Clone Specification** pop-up appears. *Specification* includes location, Involvement, Role, and Inventory Group.

3. Update the name, ID, and description as necessary. See "[About Naming Rules](#)" for more information on naming rules for ID.

 **Note:**

- You can't select a new initiative when you clone a specification in the **Definition** and the **Advanced Configuration** status.
- You must select a new initiative that is in **Definition** status when you clone a specification in **Released** status.

4. Click **Continue**.

The specification editor page opens with all the details.

You can update the configuration and general information.

## Revising Infrastructure Specifications

You can revise an infrastructure specification in the **Released** status. See "[About Revising Entities](#)" for information on revising an entity.

To revise an infrastructure specification:

1. In the Solution Designer landing page, click the application that you want to work with.

2. Do one of the following:

- In the **Infrastructure Specifications** application, search a specification.

The specification is listed in the results section.

- In the **Infrastructure Specifications** application, search and open a specification.

- In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the initiatives editor page. Select a specification.

The specification editor page opens.

3. Click **Revise**.

The **Revise Specification** dialog box opens. *Specification* includes Location, Inventory Group, Role, Involvement specifications.

4. Select an initiative that is in the **Definition** status and click **Continue**.

The corresponding specification editor page opens.

5. The configuration and general information can be modified for the revised specification.

## Deleting Infrastructure Specifications

You can delete a specification from the **Specifications** application or from the **Initiative Items** tab in the initiatives editor page in the **Initiatives** application.

To delete an Infrastructure specification:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Infrastructure Specifications** application, search for a specification.  
The specification is listed in the results section.
  - In the **Infrastructure Specifications** application, search for and open a specification.  
The specification editor page opens.
  - In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the initiatives editor page. Open a specification.  
The specification editor page opens.

3. Click **Delete**.

A confirmation dialog box appears.

4. Click **Delete** in the confirmation dialog box.

The specification is deleted if it is not associated with any other specifications or PSR models. If you are deleting a revised specification, only the current revision is deleted and the specification reverts to the previously released version.



### Note:

You can't delete an Infrastructure specification after you complete the **Advanced Configuration** phase of the associated initiative.

# 10

## Working with Data Elements and Converters

Use **Administration** application to define data elements and converters which can be used in the entity specifications.

### Topics in this document

- [Managing Data Elements](#)
- [Managing Converters](#)

## Managing Data Elements

Data elements are specific types of data that you can use in a service in Solution Designer. Feature groups are sets of data elements that you want to use together. The data elements can be defined in the **Data Elements** application or within CFSSs, RFSSs, and resources specifications.

### Topics in this section

- [About Data Elements and Feature Groups](#)
- [Creating New Data Elements](#)
- [Viewing Data Elements](#)
- [Updating Data Elements](#)
- [Revising Data Elements](#)
- [Deleting Data Elements](#)

## About Data Elements and Feature Groups

A data element defines the attributes and properties of services and resources. It is a type of data with particular properties. A data element can be, for example, an ID, a feature, a download speed, or a telephone number.

Data elements are used to:

- Provide metadata that enriches the understanding of the services and resources. This metadata can include information like the data type, units of measurement, allowed values, and more.
- Manage the configuration of services and resources with an accurate representation of how services are configured, which resources are allocated, and what settings are applied.
- Describe the details of the network assets and resources, such as the physical location, capacity, manufacturer, and maintenance history.
- Provide the building blocks for describing the specific details of services, resources, and operations.

Data elements can have the following data element types:



**Table 10-1 Data Element Types**

Data Element Types	Description
Boolean	Contains true and false values.
Date	Enables you to enter or select date values.
Time	Enables you to enter or select time values.
Date and Time	Enables you to enter or select date and time values.
Numeric	Enables you to enter integers. When <b>Numeric</b> type is selected, you can specify the decimal places that the integer must have.
Text	Enables you to enter alphanumeric text.
Feature Group	Enables you to create a feature group data element. Feature groups are sets of data elements that you want to use together.  When <b>Feature Group</b> type is selected, the <b>Data Elements</b> section is displayed. You can select the existing data elements that you want to combine into the feature group and also if it is required.
Hex Binary	Enables you to enter hex binary data.  You must enter the minimum values and maximum values as an even number between 0 and 2048.

You can combine data elements into feature groups. You can select existing data elements or create a new data element to combine them into feature group. You can have feature group within a feature group. You can use the same feature group in multiple specifications.

## About Control Types

You can define the manner in which run-time application users work with data elements by specifying a control type. The control type is available for elements defined with the following data types:

- Time
- Date and Time
- Numeric
- Text
- Hex Binary

Control types have specific options that define or limit the information stored for the data element:

**Table 10-2 Control Types**

Control Types	Description
<b>Text Field</b>	Enables users to enter characters. The properties you specify for the text field data element determine what users can enter in the field.  This control type is available only for <b>Numeric</b> , <b>Text</b> , <b>Time</b> , <b>Date and Time</b> , and <b>Hex Binary</b> data types.

Table 10-2 (Cont.) Control Types

Control Types	Description
<b>Dropdown</b>	Displays a list of values. You can define the possible values for the list by selecting the data values such as <b>Enumerations</b> , <b>Entity based</b> , and <b>Query based</b> . This control type is available only for <b>Numeric</b> , <b>Text</b> , <b>Time</b> , and <b>Hex Binary</b> data types.
<b>URL</b>	Displays a URL. This control type is available only for <b>Text</b> data type.
<b>Calendar</b>	Enables users to enter or select date and time. This control type is available only for <b>Date and Time</b> data type.

## About Multiplicity

Multiplicity defines the number of instances that the feature group data element can appear in UIM run-time. You use the multiplicity fields to define the data element cardinality. Multiplicity section appears only when you add a data element of type **Feature Group** as design parameter, Characteristics, data elements, and delivery parameter. You have the following fields in **Multiplicity** section:

- **Minimum:** Select a number if you need as many instances in the run-time. **Minimum** indicates the minimum number of times the data element can appear in the run-time. Selecting the value 1 means that this data element must appear once in this specification instance that is created in run-time.
- **Maximum:** Select a number greater than **Minimum** in **Maximum**. **Maximum** indicates the maximum number of times the data element can appear in a specification instance in the run-time. Selecting a value means that this data element can appear that many times in this specification instance that is created in the run-time.
- **Unbounded:** Select **Unbounded** if there is no specific limit and this data element can appear any number of times in the specification instance. If you want to have at least one occurrence of the data element, select the value 1 in the **Minimum** field and select **Unbounded** (no explicit limit). If there is no required minimum number of occurrences, select the value 0 in the **Minimum** field and select **Unbounded**.

To make a data element as required in UIM run-time, set **Minimum** value to 1 and **Maximum** value to 1. To make a data element as optional in UIM run-time, set **Minimum** value to 0 and **Maximum** value to 1.

## Creating Feature Groups

You can also create feature groups when creating the specifications and creating the PSR Models. The features that you create in the specifications or in the PSR models are added to the **Data Elements** in the **Administration** application.

To create feature groups in Specifications and the PSR Models:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Administration** application, click **Data Elements** in the bottom left. Click **Create Data Element**.

The **Create Data Element** page opens.

- In the **Service Specifications** or **Resource Specifications** application, in the Specifications details page, in the **Design Parameters** tab, create a new or open an existing design parameter and click **+ Create Data Element** in the **Data Element** field.

The **New data element** drawer opens.

- In the **Service Specifications** or **Resource Specifications** application, in the Specifications details page, in the **Entity Characteristics** tab, create a new or open an existing characteristic and click **+ Create Data Element** in the **Data Element** field.

The **New data element** drawer opens.

- In the **Service Specifications** or **Resource Specifications** application, in the Specifications details page, in the **Delivery Policies** tab, in the **New Delivery Policy** drawer, create a new or open a delivery parameter and click **+ Create Data Element** in the **Data Element** field.

The **New data element** drawer opens.

- In the **PSR Models** application, in the **Configure model** step, in the Specification Configuration, expand the Design Parameters, select the specification and create a new or open an existing design parameter and click **+ Create Data Element** in the **Data Element** field.

The **New data element** drawer opens.

- In the **PSR Models** application, in the **Configure model** step, in the Specification Configuration, expand the Entity characteristics, select the specification, click **+ Create Data Element** in the **Data Element** field.

The **New data element** drawer opens.

- In the **PSR Models** application, in the **Configure model** step, in the Specification Configuration, expand the **Delivery Policies**, select the specification and create a new delivery parameter and click **+ Create Data Element** in the **Data Element** field.

The **New data element** drawer opens.

3. Enter a name, ID, initiative, and a description.
4. Select the **Data type** as **Feature Group**.
5. Enter the details in the **Data Elements** section.
  - a. Click **Name** to select the data elements to combine them into feature group. **Name** displays all the data elements that are available for the selected initiative and also the released data elements.
  - b. (Optional) Select **Required?**. If you select required, the data element in the feature group is required at runtime.
  - c. (Optional) Enter **Multiplicity** details. Multiplicity is displayed when you add feature group data element. See "[About Multiplicity](#)" for more information on multiplicity.

 **Note:**

When you edit the multiplicity values, the fields do not appear as editable. However, you can edit the details and click **Submit**.

- d. Click **Submit**. The data element is added to the **Data elements** list for the feature group.

- e. Repeat the steps **a** to **d** to add more data elements to the feature group.
6. Do one of the following:
    - Click **Create** if you are creating a feature group from the **Data Elements** application.
    - Click **Add** if you are creating a feature group from the **Service Specifications** application, the **Resource Specifications** application or the **PSR Models** application.

The feature group is added to the data elements, the design parameters, the entity characteristics, or the delivery parameters.

## Creating New Data Elements

You create data elements in the following ways:

- In the **Administration** application, you can create the data elements and feature groups. Define data elements and features here if you want to reuse the data elements elsewhere in the application as design parameters, delivery parameters, and entity characteristics within the same initiative. The data elements and features from the released initiative are available system-wide.
- When defining design parameters, delivery parameters, and characteristics in the **Service Specifications** application, **Resource Specifications** application, or in **PSR Models** application, you can add a previously defined data element or feature group or create new ones. The data elements and feature groups that you create as design parameters, delivery parameters, and characteristics then show up in **Data Elements** in the **Administration** application.

The existing data elements are available only to those specifications with the same initiative until they are released. Data elements from the released initiative are available system-wide.

To create data elements:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Administration** application, click **Data Elements** in the bottom left and then click **Create Data Element**.  
The **Create Data Element** page opens.
  - In the **Service Specifications** or **Resource Specifications** application, in the Specifications details page, in the **Design Parameters** tab, create a new or open an existing design parameter and click **+ Create Data Element** in the **Data Element** field.  
The **New data element** drawer opens.
  - In the **Service Specifications** or **Resource Specifications** application, in the Specifications details page, in the **Entity Characteristics** tab, create a new or open an existing characteristic and click **+ Create Data Element** in the **Data Element** field.  
The **New data element** drawer opens.
  - In the **Service Specifications** or **Resource Specifications** application, in the Specifications details page, in the **Delivery Policies** tab, in the **New Delivery Policy** drawer, create a new or open a delivery parameter and click **+ Create Data Element** in the **Data Element** field.  
The **New data element** drawer opens.
  - In the **PSR Models** application, in the **Configure model** step, in the Specification Configuration, expand the Design Parameters, select the specification and create a

new or open an existing design parameter and click **+ Create Data Element** in the **Data Element** field.

The **New data element** drawer opens.

- In the **PSR Models** application, in the **Configure model** step, in the Specification Configuration, expand the Entity characteristics, select the specification, click **+ Create Data Element** in the **Data Element** field.

The **New data element** drawer opens.

- In the **PSR Models** application, in the **Configure model** step, in the Specification Configuration, expand the **Delivery Policies**, select the specification and create a new delivery parameter and click **+ Create Data Element** in the **Data Element** field.

The **New data element** drawer opens.

The **Create Data Element** page opens.

3. In the **Basic information** section, enter the following information:
  - Name
  - ID
  - Data Type
  - Initiative
  - Default Value
  - Description
  - Decimal Places (Available only for **Numeric** data type)
  - Minimum Characters (Available only for **Text** and **Hex Binary** data types)
  - Maximum Characters (Available only for **Text** and **Hex Binary** data types)
4. Enter the information in **Enumerations** section which is available only for the **Text**, **Numeric**, and **Hex Binary** data types.
  - a. Enter **Name** and **Value**.
  - b. Click **Submit**.

Enumeration is added to the list and repeat the steps to add more enumerations.
  - c. (Optional) Select a **Default** value from the enumerations list.
5. Enter the information in **Inventory settings** section.

You can configure the presentation of data elements in the run-time applications in the **Inventory settings** section. [Table 10-3](#) describes the fields that you can define in the **Inventory Settings** section and its availability based on the data type and control type.

Table 10-3 Inventory Settings Fields

Field Name	Use	Data Type	Control Type
<b>Control Type</b>	Specify the manner in which run-time application users interact with the corresponding data element. The value that you select in this field determines the subsequent options that appear. The available control types are Text Field, Dropdown, URL, and Calendar. See <a href="#">About Control Types</a> for more information on control types.	Text Numeric Time Date and Time Hex Binary	Not applicable
<b>Read-Only</b>	Select to make the data element a read-only field in the run-time environment.	Text Boolean Date Time Date and Time Numeric Hex Binary	Text Field Calendar
<b>Mask during display mode</b>	Enter a mask to control how text in read-only fields is formatted and displayed in a run-time environment. You use Java regular expressions to define display masks.	Text Time Date and Time Numeric Hex Binary	Text Field
<b>Mask during edit mode</b>	Enter a mask to control how text in editable fields is formatted and displayed in a run-time environment. You use Java regular expressions to define masks.	Date and Time Hex Binary Numeric Text Time	Text Field
<b>Minimum Value</b>	Enter a minimum value from which the field values are valid in the UIM run-time environment.	Numeric	Text Field
<b>Maximum Value</b>	Enter a maximum value to which the field values are valid in the UIM run-time environment.	Numeric	Text Field
<b>Case</b>	Select the display format for the text when the element appears in the run-time environment. You can format the text using all uppercase, all lowercase, or mixed case.	Hex Binary Text	Text Field
<b>Enable Search (text)</b>	Select to provide a browse option in the run-time environment, which opens a pop-up window. You can customize the pop-up window as per the requirement. See <i>UIM Developer's Guide</i> for more information on customizing the user interface of pop-up window.	Text	Text Field

Table 10-3 (Cont.) Inventory Settings Fields

Field Name	Use	Data Type	Control Type
<b>Sensitive</b>	Select to protect the contents of a text or time data element that contains sensitive information. For example, select this option for fields that are used as password fields. If you select <b>Sensitive, Mask during display mode</b> and <b>Mask during edit mode</b> are disabled.	Text Time Numeric Hex Binary	Text Field
<b>External</b>	If <b>External</b> is set, the URL is opened in a new tab of the browser that UIM is open. If <b>External</b> is not set, the URL is opened within the UIM application page.	Text	URL
<b>From Range</b>	Select a date from which the field values are valid.	Date Date and Time	Calendar
<b>To Range</b>	Select a date to which the field values are valid.	Date Date and Time	Calendar
<b>Data Values</b>	<p>You can dynamically populate the drop-down list by selecting any one of the data values:</p> <ul style="list-style-type: none"> <li>• <b>Enumerations:</b> Enables you to populate the drop-down list with a group of values that do not change.</li> <li>• <b>Entity based:</b> Enables you to populate the drop-down list with the names of all entities created from the selected specification.</li> <li>• <b>Query based:</b> Enables you to populate the drop-down list with the results of a query that you define.</li> </ul> <p>To specify the syntax of the query, select from the <b>Data values</b> list, select <b>JPQL</b>, <b>SQL</b> or <b>USERS</b>.</p> <ul style="list-style-type: none"> <li>– Select <b>JPQL</b> to use JPQL syntax.</li> <li>– Select <b>SQL</b> to use SQL syntax.</li> <li>– Select <b>USERS</b> to specify a query that populates the drop-down list with all UIM users.</li> </ul>	Text Numeric Time Hex Binary	Dropdown

6. (Optional) Populate the drop-down list dynamically using enumerations, entity based, and query based.
  - **Populate the drop-down list with Enumerations:**
    - a. Select the **Data Type** as Text, Numeric, Time, or Hex Binary.
    - b. Select the **Control Type** as **Dropdown**.
    - c. Select the **Data values** as **Enumerations**. This uses the enumerations values specified in the **Enumerations** section.

- **Populate the drop-down list with Entity Based Specifications:**
    - a. Select the **Data Type** as Text, Numeric, Time, or Hex Binary.
    - b. Select the **Control Type** as **Dropdown**.
    - c. Select the **Data values** as **Entity based**.
    - d. Select **Source entity**. The **Source entity** displays all the resource specifications and the location specifications for the initiative that you selected in the **Basic information** section along with all the released resource specifications and location specifications.
    - e. (Optional) Select **Parameters** from the list. The **Parameters** lists the data elements that are associated with the selected initiative along with all the released data elements.
    - f. (Optional) To enter an additional SQL filter, enter the filter in **Enter query here for additional filter**.
  - **Populate the drop-down list with Query Based Results:**

To populate the drop-down with query based:

    - a. Select the **Data Type** as Text, Numeric, Time, or Hex Binary.
    - b. Select the **Control Type** as **Dropdown**.
    - c. Select the **Data values** as **Query based**.
    - d. Select **Query type** as JPQL, SQL, or USERS. The **USERS** populate the drop-down list with the results of pre-defined query that returns all authorized UIM users.
    - e. (Optional) Select **Parameters** from the list. The **Parameters** lists the data elements that are associated with the selected initiative along with all the released data elements.
    - f. (Optional) Enter a query in **Enter query here for additional filter** to use in a filtered data query using the selected **Query Type**. No query is required if you selected **USERS**.
7. Click **Create**.
- The data element is created and the newly created data element is listed in the **Data Elements** page.

## Viewing Data Elements

You view the data elements from the following applications:

- **Data Elements** tab in the **Administration** application.
- **Initiative Items** tab in the **Initiatives** application.

To view data elements:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Data Elements** application, search for a data element using the following criteria:
    - Data Elements name
    - Type



- Initiatives
- Last Updated date

The data elements result is filtered based on the search criteria.

- In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the Initiatives editor page.
3. Click a data element name to view the details.  
A data element drawer appears with the details of the data element.
  4. After viewing the details, click anywhere outside the dialog box to return to the data elements details page or the initiatives editor page.

## Updating Data Elements

You update the data element details such as Name, Description, Inventory Settings, Enumerations, and Data Elements if the selected data element is a feature group.

To update a data element:

1. Do one of the following:
  - In the **Administration** application, in the **Data Elements** tab, search for a data element.  
The data elements result is filtered based on the search criteria.
  - In the **Initiatives** application, search for an initiative and click the **Initiative Items** tab in the Initiatives editor page.
2. Click the data element that you want to view.
3. Click **Edit** in the data elements drawer and update the name, description, inventory settings, enumerations, and the data elements in case of feature group.
4. Click **Save**.



### Note:

You can't update the data element **Type** and **Initiative**.

You can't update the data element's details, if the associated initiative has completed the **Advanced Configuration** phase.

## Revising Data Elements

You can revise a data element in the **Released** status. See "[About Revising Entities](#)" for information on revising an entity.

To revise a data element:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Administration** application, in the **Data Elements** tab, search for a data element and click to open it.  
The data element drawer opens.

- In the **Initiatives** application, search for an initiative, click the data element that you want to revise in the **Initiative Items** tab in the initiatives editor page.  
The data element drawer opens.
3. Click **Revise**.  
The **Revise Characteristic** drawer opens.
  4. Select a different initiative in the **Definition** status and click **Continue**.  
The data element drawer opens with the newly selected initiative.
  5. Do one of the following:
    - Click **Edit** to modify the name, description, inventory settings, enumerations, and data elements and then click **Save**. The revised version is saved with the updated details.
    - Click **Delete** to delete the current revised version. After confirmation, the revised version of the data element is deleted.

## Deleting Data Elements

You delete a data element in the data element's results page or in the details page. Deleting a data element or feature group in the **Data Elements** application deletes it from the system. You can't delete a data element or feature group that is being used in a released initiative or that is referenced by a specification. For example, if a data element is defined as a design parameter of a specification, you can't delete that data element from the **Data Elements** application.

To delete a data element in the **Data Elements** application:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Data Elements** application, search for a data element.  
The data elements results section is filtered based on the search criteria.
  - In the **Data Elements** application, search for a data element and click to open it.  
The data element drawer opens.
  - In the **Initiatives** application, search for an initiative, open the initiative details page, in the **Initiative Items** tab, click the data element that you want to delete.  
The data element drawer opens.
3. Click **Delete**.  
The delete confirmation dialog box opens.
4. Click **Delete** in the confirmation dialog box.  
After confirmation, the data element is deleted if it is not associated with any specifications.

### Note:

You can't delete a data element:

- If the data element is associated with any specification.
- If the associated initiative has completed the **Advanced Configuration** phase.

## Managing Converters

Converters are a specific type of data conversion that determine how the data values are transferred from the product specification to the CFS.

After you create a converter in the **Administration** application, you can use those conversion values while mapping the parameters in the product specification.

### Topics in this section

- [About Converters](#)
- [Creating Converters](#)
- [Viewing Converters](#)
- [Updating Converters](#)
- [Deleting Converters](#)

## About Converters

Converters are used to define the conversion that can be used when transforming commercial parameters to the design parameters between the product specifications and CFSs. There are two types of converters:

- **Measurement:** Defines the unit of measure conversions that enable you to perform conversions between numeric values having different units of measure. The base units of measure must be defined in the converter with a base value of 1 for this type of conversion to work. The rest of the units of measure must be converted to the base unit of measure.
- **ValueMap:** Defines the list of value mappings where an input value is mapped to an output value.

The existing converters are available only to those specifications with the same initiative until they are released. Converters from the released initiative are available system-wide.

## Creating Converters

You can create converters of measurement type and value map type.

In the measurement type converter, you can transform different units of measure to the base unit of measure. In the ValueMap type converter, for each incoming value that you wish to transform, you can enter an outgoing value.

To create converters:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
  - In the **Administration** application, click the **Converters** tab. Click **Create Converter**. The **Create Converter** page opens.
  - In the **Product Specifications** application, in the Specifications details page, in the **Parameter Mapping** tab, click **Add Converter** and click **+ Create Converter** in the **Converter** field. The **New converter** drawer opens.

3. Enter a unique **Name**, **ID**, and **Description**.
4. Select **Type** as **Measurement** or **ValueMap**.  
The **Settings** section is displayed according to the selected type.
5. Do one of the following:
  - For **Measurement** type, enter **Unit of Measure** and **Value**. Click **Submit**.  
You must create a **Unit of Measure** as a base unit of measure with the Value 1. The value for all the other UOMs must be converted to the same base unit.  
  
For example, create the base **Unit of Measure** as 1 byte, **Value** must be 1. If the **Unit of Measure** is 1 KB, **Value** must be 1024 as 1 KB is equal to 1024 bytes. If the **Unit of Measure** is 1 MB, **Value** must be 1,048,576 as 1 MB is equal 1,048,576 (1024 x 1024) bytes.
  - For **ValueMap** type, enter **Input** and **Output**. Click **Submit**.  
The incoming value is then mapped to the outgoing value.
6. Click **Create**.  
The converter is created and is displayed in the Converters landing page.

## Viewing Converters

To view converters:

1. In the Solution Designer landing page, click the **Administration** application and click **Converters**.
2. Search for a converter using the following criteria:
  - Converter name
  - Type
  - Initiatives
  - Last Updated dateThe converters result is filtered based on the search criteria.
3. Click a converter name to view the details.  
A converter dialog appears with the details of the converter.
4. After viewing the details, click anywhere outside the dialog to return to the converter details page.

## Updating Converters

You update the converter details such as Name, Description, and Settings.

To update a converter:

1. In the **Administration** application, in the **Converters** tab, search for a converter.  
The converters result is filtered based on the search criteria.
2. Click the converter that you want to view.
3. Click **Edit** in the converters drawer and update the name, description, and settings.
4. Click **Save**.



**Note:**

You can't update the converter's details, if the associated initiative has completed the **Advanced Configuration** phase.

## Deleting Converters

You delete a converter in the converters' results page or in the details page. You can't delete a converter that is being used in a released initiative or that is referenced by a product specification.

To delete a converter:

1. In the Solution Designer landing page, click the **Administration** application and then click **Converters**.

The converters results section is displayed.

2. Click **Delete** on the converter to be deleted.

The delete confirmation dialog box opens.

3. Click **Delete** in the confirmation dialog box.

After confirmation, the converter is deleted if it is not associated with any specifications.



**Note:**

You can't delete a converter:

- If the converter is associated with any specification.
- If the associated initiative has completed the **Advanced Configuration** phase.

# 11

## Publishing Initiatives

Use workspaces to publish your initiatives for testing the design and launching the initiatives to production.

### Topics in this document

- [About Workspaces](#)
- [Viewing Workspaces](#)
- [Managing Connections](#)
- [Publishing Initiatives to Generate Design Studio Workspaces](#)
- [Publishing Initiatives to Generate Test Cartridges](#)
- [Publishing Initiatives to Generate Production Cartridges](#)
- [Errors and Troubleshooting Issues](#)

## About Workspaces

Workspace is an interface that enables Solution Designer to interact with the DevOps engine and generates the requested cartridge. The DevOps engine has all the plug-ins required by Solution Designer to build the requested cartridge. You can then deploy the cartridge into UIM. A cartridge is a collection of PSR models which includes specifications, characteristics, design parameters, parameter mappings, design policies, and delivery policies that are defined in Solution Designer. The artifacts are compiled into a deployable JAR file.

Workspaces are created during the Solution Designer installation. You can't create, modify, or update the workspaces in Solution Designer. The following workspaces are available in Solution Designer:

- **Non-production or Test workspace:** A workspace where initiatives are published to the test instance and the test cartridges are generated. These cartridges are deployed in the UIM run-time instances and you can do the functional testing. Based on the functional testing results, you can modify the initiative contents and then perform acceptance testing. The modified initiatives are published again to the test workspace until the initiative content is finalized and passes acceptance testing.
- **Production workspace:** A workspace where the initiatives are published and the production cartridges are generated. After the initiative is released to the production workspace, the DevOps engine generates a production cartridge which in turn is deployed to the UIM run-time instance.

### Cartridge Generation Process

You publish an initiative to a test or production workspace. The workspace interacts with UIM Participant. UIM Participant is a micro-service that participates in the workspace operation **Publish**. The UIM participant in turn interacts with the DevOps engine to generate the requested Design Studio workspaces and cartridges. After generating the cartridge, the DevOps engine informs the UIM participant and the UIM participant informs the workspace about the status of the request. The location of the generated cartridge artifacts and the location of the Design Studio workspace that can be imported in Design Studio are displayed in

the **Publishing** tab of the corresponding initiative. You can download these cartridge artifacts and deploy them in UIM. See "Deploying Cartridges" in *UIM Cartridge Guide* for more information on deploying cartridges in UIM.

You can download the Design Studio workspace and import it into the Design Studio Eclipse environment to code the design and assign logic for advanced policies, define parameters mapping, define logic for design action mapping, define logic for delivery action mapping, and build solution cartridges for OSM and ASAP.

The generated Design Studio workspace contains a base class and an extended designer class. The base class is the Java code that the DevOps engine generated to implement the behavior of the specifications and must not be modified. The extended designer class is the Java code which lets you write your custom code for the extension points that are provided in the class. You can do the following in the extended designer class:

- Coding the design and assign policies according to your business requirements using advanced policies
- Debugging the existing design and assign policies for any errors including compilation errors

See "Extending Solution Designer" in *Developer's Guide* for more information on extended designer class.

After you complete the custom code in Design Studio, upload the information to Solution Designer manually or by running Object Store Utility. See "Working with Object Store Utility" in *Developer's Guide* for more information on Object Store Utility. Publish the initiative to the **Test** workspace and the DevOps engine builds the requested cartridge that you can deploy to a run-time environment.

You can download the cartridge workspace and import it into the Design Studio Eclipse environment to build solution cartridges for OSM and ASAP. You can do the following in Design Studio:

- Modeling ASAP with the ASDLs and CSDLs generated in the cartridge for the activation system
- Modeling OSM with the Action Parameter Bindings generated in the cartridge

You can build and package the cartridge in Design Studio and then deploy it to a run-time environment.

## Viewing Workspaces

You must have the service catalog admin role to view the workspaces and manage the connection for the workspaces.

To view the workspace:

1. In the Solution Designer landing page, click the **Workspaces** application.
2. In the **Workspaces** application, click the **Test** or **Production** workspace.  
The workspace details page opens.
3. The following tabs are displayed:
  - The **Operations** tab lists all the initiatives that are published for the selected workspace. The status of each publish operation is displayed in the **Operations** tab. The different statuses are:

- **COMPLETE:** The publish operation to the **Test** workspace or **Production** workspace is successful and the test cartridges are generated successfully.
  - **FAILED:** The publish operation to the **Test** workspace is unsuccessful and a log is generated to show the errors that caused the failure.
  - **SIMULATED\_COMPLETE:** In the **Advanced Configuration** phase of the initiative, you can publish the initiative to the **Test** workspace to generate Design Studio workspace. This process is called as simulated publish which allows you to download the Design Studio workspace and import it in Design Studio to code the advanced policies. The publish operation to the **Test** workspace is successful and the Design Studio workspace is generated successfully.
  - **SIMULATED\_FAILED:** The simulated publish is unsuccessful and a log is generated to show the errors that caused the failure.
  - **STAGED:** The Publish operation to the **Production** workspace is in progress.
  - The **Participants** tab lists the participants that are defined for the selected workspace. UIM Participant is the only participant listed. You can't delete the UIM Participant and you cannot define any new participants.
4. Click **Go to Workspaces** to return to the **Workspaces** page.

## Managing Connections

You must have **Service Catalog Admin** user role to manage the connections. Connections specify the details of the applications to which the workspaces connect to perform an action.

You can perform the following tasks in the **Connections** page:

- [Creating New Connections](#)
- [Updating Connections](#)
- [Deleting Connections](#)

## Creating New Connections

You must have the service catalog admin user role to create new connections. After you install Solution Designer, you must manually create a connection for the workspaces to publish the initiative content.

To create a new connection:

1. Create an initiative exclusively for creating the connections without any initiative items in it. For example, create an initiative with the name *Connection*. See "[Creating Initiatives](#)" for more details on how to create an initiative.
2. In the **Workspaces** application, click **Manage Connections**.  
A **Connections** page opens which lists the available connections.
3. Click **New Connection**.  
A **New Connection** page opens.
4. Enter the following details:



**Table 11-1** New Connection details

Field Name	Required or optional	Description
Name	Required	Name of the connection.
Initiative	Required	Select the initiative that was created exclusively for connections. For example, <i>Connection</i> .
Authentication	Required	Provide authentication details to authenticate the UIM Participant. Enter the <b>ID</b> , <b>Secret</b> , and <b>Token Endpoint URL</b> for the UIM Participant.
Participant	Required	Add the Participant details. Select the participant ID (UIM), workspace ( <i>Test</i> or <i>Production</i> ), Scope ( <i>/lcm</i> ) and the end point URL for the UIM participant ( <code>http://uim-participant:8080</code> ). You must add two UIM participants one each for the <b>Test</b> and <b>Production</b> workspaces.

5. Click **Create**.

The connection is created and is listed in the **Connections** page.

6. Navigate to the *Connection* Initiative and transition the initiative to the **Acceptance Testing** phase.
7. Publish the initiative to the **Test** workspace. You must wait until the publishing status changes to **Completed**. See "[Publishing Initiatives to Generate Design Studio Workspaces](#)" for more information on publishing initiatives to the Test workspace.
8. Publish the initiative to the **Production** workspace. Wait until the initiative's status transitions to **Released**. This makes the connection available for the **Publish** operation of other initiatives. See "[Publishing Initiatives to Generate Production Cartridges](#)" for more information on publishing initiatives to the Production workspace.

## Updating Connections

You must have **Service Catalog Admin** user role to update the connection details. You may want to update an existing connection to add or update the participant details or to update the authentication details.

To update a connection:

1. In the Solution Designer landing page, click the **Workspaces** application.
2. In the **Workspaces** application, click **Manage Connections**.  
The **Connections** page opens.
3. Search and select the connection that you want to update.  
The connection details page opens.
4. Update the name, the authentication details, and the participant details.
5. Click **Save**.  
The updated connection details are saved.

## Deleting Connections

You must have service catalog admin use role to delete a connection.

To delete a connection:

1. In the Solution Designer landing page, click the **Workspaces** application.
2. In the **Workspaces** application, click **Manage Connections**.

The **Connections** page opens.

3. Search for an existing connection and click **Delete**.

A confirmation dialog box appears.

4. Click **Delete** in the confirmation dialog box.

The connection is deleted.

## Publishing Initiatives to Generate Design Studio Workspaces

You must have the service catalog administrator role to publish the initiatives. After you complete defining the PSR models and their contents, you transition the initiative from the **Definition** phase to the **Advanced Configuration** phase. In the advanced configuration phase, you can publish the initiative to the **Test** workspace to generate a Design Studio workspace. This process of publishing the initiatives in **Advanced Configuration** phase is called simulated publish. See "[Lifecycle of Initiatives](#)" for more details on various statuses of initiatives.

To publish or republish an initiative to generate Design Studio workspace:

1. In the Solution Designer landing page, click the **Initiatives** application.
2. In the **Initiatives** application, search for the initiative and click to open it.

The initiative details page opens.

3. Ensure that the initiative is in **Advanced Configuration** phase. The initiative must have completed the definition phase and not be approved for testing yet.
4. Click **Publish**. You can publish the initiative to generate only Design Studio workspaces when the definition is completed and before you complete advanced configuration.
5. Click **Publishing** tab.

A new row for the publish operation is added and the **Publish Status** is in **In Progress**.

6. You must wait until you receive a pop-up message *Publish successful to workspace Test*. The status changes from **In Progress** to **Simulated Success**. If the publish operation fails, the **Publish Status** changes to **Simulated Failed**. You can republish the initiative after fixing the error messages that are listed in the log.

7. You can do one of the following based on the **Publish Status**:

- If the Publish Status is **Simulated Success**, click **Download Design Studio Workspace** link to download the workspace that you can import to Design Studio eclipse environment.

To implement custom code for various extension points, you can download the Design Studio workspace which contains the Design Studio projects and import them to Design Studio Eclipse workspace. The Design Studio workspace contains base class and an extended designer class. You can code the custom implementation in the extended designer class. See "Extending Solution Designer" in *Developer's Guide*.

- If the Publish Status is **Simulated Failed**, click **View Log** link to view the list of errors that caused the failure. The **Task Details** drawer opens which lists the error code, reason and the description of the error. You can download the details as a CSV file by clicking **Download as CSV**.  
After you resolve the errors, you can republish the initiative until the publish operation is successful.
8. After the simulated publish is successful, see [Publishing Initiatives to Generate Test Cartridges](#) to generate test cartridges that can be deployed in the run-time test environments.

## Publishing Initiatives to Generate Test Cartridges

You must have the service catalog administrator role to publish initiatives. After you complete the implementation in the advanced configuration phase, you transition the initiative from the **Advanced Configuration** phase to the **Functional Testing** phase. After the approver approves the initiative to start functional testing, you can publish the initiative to the **Test** workspace to generate a test cartridge. See "[Lifecycle of Initiatives](#)" for more details on various statuses of initiatives.

To publish or republish an initiative to the Test workspace:

1. In the Solution Designer landing page, click the **Initiatives** application.
2. In the **Initiatives** application, search for the initiative and click to open it.

The initiative details page opens.

3. Click **Publish**. You can publish the initiative to generate a UIM Cartridge which can be deployed in the UIM test environment to perform functional testing.

### Note:

You will see **Publish** only when the initiative is approved for functional testing, in acceptance testing phase, and before the initiative is approved for rollout. See "[Lifecycle of Initiatives](#)" for more details on various phases of initiatives.

4. Click **Publishing** tab.  
The **Publishing** details page opens. You see a row with the name **Test** which indicates the **Test** workspace with the **Publish Status** as **In Progress**.
5. You must wait until you receive a pop-up message *Publish successful to workspace Test*. The status changes from **In Progress** to **Success**. If the publish operation fails, the **Publish Status** changes to **Failed**. You can republish the initiative after fixing the error messages that is listed in the log.
6. You can do one of the following based on the **Publish Status**:
  - If the Publish Status is **Success**, click **UIM Cartridge** to download the cartridge that can be deployed into the run-time test environment. You can also click **Download Design Studio Workspace** link to download the workspace that you can import to Design Studio eclipse environment. In Design Studio, you can build solution cartridges for OSM and ASAP.
  - If the Publish Status is **Failed**, click **View Log** link to view the list of errors that caused the failure. The **Task Details** drawer opens which lists the error code, reason and the description of the error. You can download the details as a CSV file by clicking **Download as CSV**.

After you resolve the errors, you can republish the initiative until the publish operation is successful.

## Publishing Initiatives to Generate Production Cartridges

You must have **Service Catalog Admin** user role to publish initiatives to the **Production** workspace to generate the production cartridges.

To publish or republish an initiative to generate production cartridges:

1. In the Solution Designer landing page, click the **Initiatives** application.
2. In the **Initiatives** application, search for the initiative and click to open it.

The initiative details page opens.

3. In the **Lifecycle** tab, click **Release Initiative**.

The initiative's content is automatically published to the **Production** workspace.

4. Click **Publishing** tab.

The **Publishing** details page opens. You see a row with the name **Production** which indicates the **Production** workspace with the **Publish Status** as **In Progress**.

After the requested cartridge is generated successfully in the **Production** workspace, the initiative's status transitions to **Released**.

If there is an error in the **Publish** operation, the initiative's status remains in **Approval** status. **Release Initiative** is enabled to republish the initiative to the **Production** workspace.

5. You must wait until you receive a pop-up message *Publish successful to workspace Test*. The status changes from **In Progress** to **Success**. If the publish operation fails, the **Publish Status** changes to **Failed**. You can republish the initiative after fixing the error messages that are listed in the log.
6. You can do one of the following based on the **Publish Status**:
  - If the Publish Status is **Success**, click **UIM Cartridge** to download the cartridge that can be deployed in run-time production environment. You can also click **Download Design Studio Workspace** link to download the workspace that you can import to Design Studio eclipse environment. You can download the Design Studio workspace and import it into the Design Studio Eclipse environment to build solution cartridges for OSM and ASAP.
  - If the Publish Status is **Failed**, click **View Log** link to view the list of errors that caused the failure. The **Task Details** drawer opens which lists the error code, reason and the description of the error. You can download the details as a CSV file by clicking **Download as CSV**.

After you resolve the errors, you can republish the initiative until the publish operation is successful.

## Errors and Troubleshooting Issues

This section describes the error messages you may encounter while publishing the initiative and how to troubleshoot issues.

## Error Messages in Publish Operation

### **Error: Unable to connect to URL**

**Cause:** Some of the required values are missing.

**Action:** You must manually fix all the validation errors displayed in the Solution Designer User Interface for the items associated with the published initiative. You can view the errors by clicking **View Errors** in PSR Models, Service Specifications, and Resource Specifications results page. You can view the errors in the **Initiative Items** tab in the initiative details page.

### **Error: Build workspace failed in *Specification\_DesignJ***

**Cause:** Compilation issues in the DesignJ classes or the extended designer class.

**Action:** You must download the generated Design Studio Workspace and import it into Design Studio eclipse environment to fix all the compilation errors.

### **Error: We couldn't Publish to Workspace Test**

**Cause:** The following can be the cause of the error:

- Broken communication between services.
- Out of memory.
- Lack of permissions.

**Action:** Contact your system administrator.

## Troubleshooting Issues

### **Configuration Issues**

The publish operation of an initiative may fail if the participants are not configured properly. To verify if the connections are set up correctly, see "[Creating New Connections](#)".

The configuration issues may occur in one of the following:

- Incorrect participant information for the connections in the workspace.
- Incorrect UIM participant deployment configuration.

After you correct the configuration issues, the publish operation mostly succeeds.

### **Validation Errors**

After you fix the configuration issues, the publish operation may fail due to validation errors.

When there are validation errors for the specifications or the PSR Models, error markers appear during transitioning the initiative. You can view the validation errors in the **Initiatives Items** tab in the initiatives editor page and in the specifications results page in the **Specifications** application and fix those errors. After fixing all the validation errors, republish the initiative to the test workspace.

### **Other Errors**

After you fix all the validation errors and have a proper configuration of the UIM participant, the publish operation may fail due to downstream UIM participant issues. You can check the reason for the failure by clicking **View Logs** in the **Publishing** tab in the initiative details page. You can view the reason, fix the issue, and republish the initiative.

If the failure reason is unclear from the **Workspaces** application, you can contact your system administrator to view the logs for the UIM participant, headless design studio, or workspace manager for the detailed failure reason. You can fix those issues and republish the initiative.