Oracle® Communications Service Catalog and Design

Solution Designer User's Guide

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Oracle Communications Service Catalog and Design Solution Designer User's Guide, Release 8.3

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About This Content

This guide describes how to use Oracle Communications Service Catalog and Design - Solution Designer to model your products, services, and resources. Solution Designer is a design tool designed for business users and domain experts from communications service providers.

Audience

This guide is intended for product specialists, fulfillment specialists, 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.

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Conventions

The following text conventions are used in this document.

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

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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 interface, 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 also streamlines the management and maintenance of products, services, and networks by centralizing product, service, resource, and network specifications and configurations. Service Catalog and Design consists of two main components:

- Solution Designer
- Design Studio

Solution Designer

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

Solution Designer offers a journey- and persona-based, design-time user experience. The user interface is designed for improved efficiency and delivers a next-generation user experience. It brings state-of-the-art, consumer-grade usability across devices to sophisticated enterprise scenarios.

Service providers can leverage pre-defined components, specifications, and service templates in the catalog to rapidly assemble and deploy new services. Solution Designer enables product specialists, service specialists, and network specialists to create and manage PSR models, including product fulfillment models, service models, and technology models. You can also create and manage specifications, commercial parameters, data elements, design parameters, characteristics, mapping parameters, design policies, and delivery policies to define an end-to-end service solution. No specific technical expertise is required to use Solution Designer.

A PSR model is an information model structured according to TMF principles, and it:

- Shows the relationship of product specifications to customer-facing service specifications.
- Depicts customer-facing service (CFS) specifications as hierarchical assemblies 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 establishing a common definition at these interfaces, Solution Designer enforces consistency among producers, consumers, and intermediate agents, including upstream order definitions and downstream implementations.

The purpose of the model is to visualize an end-to-end solution, gain a high-level understanding, and assess changes easily. In Solution Designer, the model displays information received from upstream systems, details how it transforms into the configurations needed for network solutions, shows the related mappings between upstream systems and characteristics, and highlights the relevant design, assign, and delivery policies.

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You can also use Solution Designer to maintain and evolve solutions over time. For example, you can quickly modify your solution in response to ongoing customer feedback, technological changes, or market analysis. Solution Designer enables you to manage solutions at all levels of maturity and throughout their lifecycle. As requirements change and your communications services evolve, Solution Designer supports ongoing solution development.

Design Studio

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

Planning a PSR Model

Before designing your PSR model, consider the following questions:

- Which products and related services offered to customers are you modeling?
- What are the orchestration fulfillment systems, fulfillment patterns, and routing rules involved?
- 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 to define entities—data significant to the actual implementation of the service? For example, a Mobile Service needs an MSISDN.

About Solution Designer Applications

Solution Designer includes the following applications, accessible using the menu options on the landing page:

Table 1-1 Solution Designer Applications

Application	Description
Common Elements	Create and edit data elements, converters, and sequence identifiers.
Domains	Create and manage domains to organize specifications in meaningful groups or realize the PSR model.
Fulfillment	Import capabilities cartridges and view fulfillment patterns, functions, and systems.
Infrastructure Specifications	Create and manage infrastructure specifications such as Location, Party, Role, and Inventory Group.
PSR Models	Create and manage PSR models, including service models, technology models, and product fulfillment models. Here, you design your product, service, and network models with their commercial parameters, design parameters, characteristics, design policies, and delivery policies.
Product Specifications	Create and manage product specifications.

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Table 1-1 (Cont.) Solution Designer Applications

Application	Description
Publishing Center	Create initiatives and manage initiative life cycles. Anything you create and work on in Solution Designer is part of an initiative. Manage workspaces, and add lifecycle stages dynamically.
Resource Specifications	Create and manage resource specifications such as Logical Devices, Flow Identifiers, Device Interfaces, and so on.
Service Specifications	Create and manage service specifications such as CFSs and RFSs.

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

> **Note**
>
> After navigating to an application from the landing page and reloading it, the **Close Ask Oracle** button may not appear the first time you return to the landing page using the **Ask Oracle** icon. Click on the desired application again to return to it. After the initial interaction, the **Close Ask Oracle** button displays correctly for subsequent navigation from the landing page.

About Solution Designer User Roles

When you log in to Solution Designer, you use a username and password. Your username is associated with specific roles and privileges, which determine which applications you can access based on your job responsibilities. The user interface is controlled using Role-Based Access Control (RBAC), and users are assigned appropriate roles according to their needs. All role types are independent; for example, a user could have access to Initiative entities in Solution Designer but may not have access to the Initiative application interface.

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

Accessing Solution Designer Application

Solution Designer is a web-based application accessible 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 open the Solution Designer application, log in with your username and password using the following URL:

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

The variables in the example have the following values:

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- *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 menu options for individual applications. Click any of these applications to get started. On the top right corner of the landing page, you will find a User Menu drop-down list with several options. You can use these options to:

- Open the Solution Designer User's Guide using Help.
- View the version information for Service Catalog and Design using About.
- Log out of Solution Designer using Sign Out (this will log you out and return you to the login page).

About Searching

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

To refine your results, type in the box to filter the list. Click any entity to open its detail page. When you return to the search page, your criteria are retained and you can view results based on your earlier filter. When you navigate to any other application or log out of Solution Designer, you can specify a new search criterion.

About Naming Rules

In Solution Designer, entity IDs are automatically generated based on the entity name you enter, and can be modified as needed. To avoid errors when generating cartridges, follow these guidelines for entity IDs:

- You can use uppercase and lowercase letters and numbers.
- The first character must be a letter.
- Underscores are allowed within the ID.
- Do not use hyphens or periods within the ID.

About Cloning Entities

Solution Designer allows you to clone an existing entity and update its details as necessary. Cloning copies the entity along with its configuration, design parameters, characteristics, and general information. Parameter mappings, design policies, and delivery policies are not copied. The cloned entity is named using the original name with "- *Copy*" appended and can be renamed as needed. The copy is created within the same initiative.

For example, if *Mobile CFS* is in **Definition** status within an initiative called *Mobile Service*, cloning *Mobile CFS* creates *Mobile CFS - Copy* under the *Mobile* initiative. You can update the general information, domain, configuration, design parameters, characteristics, parameter mappings, design policies, and delivery policies for the copy

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About Revising Entities

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

Using Product Accessibility Features

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

- Keyboard shortcuts available in your operating system and browser.
- Accessibility tools provided by screen readers and your browser.

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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

Everything you create and manage in the Solution Designer application is part of an initiative, including PSR models, data elements, specifications, and domains. An initiative is a prerequisite for any work performed within the application. Initiatives represent solution development processes and contain capabilities to be delivered within a specific phase of OSS transformation.

Initiatives follow a lifecycle similar to the release management process, allowing you to manage your team's work from initial 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 models, specifications, and reuse domains and data elements. See "Revising Service Specifications" and "Revising PSR Models" for details.

A Service Catalog Administrator manages the lifecycle of initiatives. Initiatives enable various roles to define solutions and publish artifacts to runtime systems during testing cycles and, ultimately, to production. Each initiative proceeds through the following stages, which can be adapted to your business process:

- **Definition**: Design definition is in progress.
- **Advanced Configuration**: You can write 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 cartridges and deploying them to applications such as Oracle Communications Unified Inventory Management (UIM) and Oracle Communications Order and Service Management(OSM).
- **Acceptance Testing**: Acceptance testing is performed by deploying the generated cartridges in UIM and provisioning them.
- **Approval**: The initiative is under review for rollout. After an approver reviews its contents and test results, it can be approved for release.

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- **Released**: The initiative and its contents are released to production.

You may also add user-defined lifecycle stages between predefined stages using the **Lifecycle Designer** tab to suit your business requirements. Each stage can be completed or reverted according to your needs. See "Lifecycle of Initiatives" for more information.

Creating Initiatives

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

To create initiatives:

1. On the Solution Designer landing page, click **Publishing Center**, then the **Initiatives** tab.
2. In the **Initiatives** 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 target release date
   - **Description:** A description of the initiative
4. Click **Create**.

   The initiative is created.

Viewing Initiatives

Only Service Catalog Administrators can view initiatives.

To view initiatives:

1. In the Solution Designer landing page, click **Publishing Center**, then the **Initiatives** tab.
2. On the Initiatives page, search for an initiative. You can filter by:
   - **Origination**: Preloaded initiatives are labeled **Seeded**; initiatives created within Solution Designer are **Native**.
   - **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 and displays information across several tabs. See "Updating Initiatives" for information on the different tabs.

Updating Initiatives

Only Service Catalog Administrators can update and manage initiatives.

To update initiatives:

1. In the Solution Designer landing page, click **Publishing Center** and then the **Initiatives** tab.
2. On the **Initiatives** page and search for an initiative by **Initiative Name**, **Status**, and **Last Updated**.

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3. Select the initiative.

   The initiative details page opens.

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 initiative's lifecycle, transitioning it from one stage to another as needed. Only here can you discard an initiative.
- **Publishing** tab: View the status of publish operations, download test and production cartridges, access publish logs, and download the Design Studio workspace for advanced design and policy implementation. See "Publishing Initiatives" for details on how to publish an initiative to the test workspace and the production workspace.
- **Initiative Items** tab: View items associated with an initiative (domains, models, products, CFSs, RFSs, resources, locations, and data elements). You can filter items to display all or just those with errors, view errors, and delete items. You can filter the initiative items to display only those items with errors by selecting **Items with errors** or display all the initiative items by selecting **All items**.

  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. The initiative item is permanently deleted from Solution Designer.
- **Transition History** tab: View the full transition history between lifecycle stages, including state, transitions, user name, date/time, and comments. 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 stages, from the start stage to the end stage 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 stage 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, progressing from definition to release. You must have the Service Catalog Administrator role to manage each stage of the initiative lifecycle. While predefined stages exist, you can also create user-defined stages to meet your organization's needs. See "Defining a User-Defined Lifecycle Stage" for more information on user-defined lifecycle stage.

Transitions between lifecycle stages are managed via the **Lifecycle** tab. When transitioning, provide appropriate comments detailing your actions. For example, if rejecting an initiative in the *Mobile Service* scenario, you can specify *Add a few scenarios to functional testing* as the

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reason for rejection. The functional testing team can review the comment in the **Transition History** tab, address the feedback, and repeat the functional testing stage as needed.

Figure 2-1 explains the lifecycle of an initiative.

Figure 2-1 Lifecycle of an Initiative

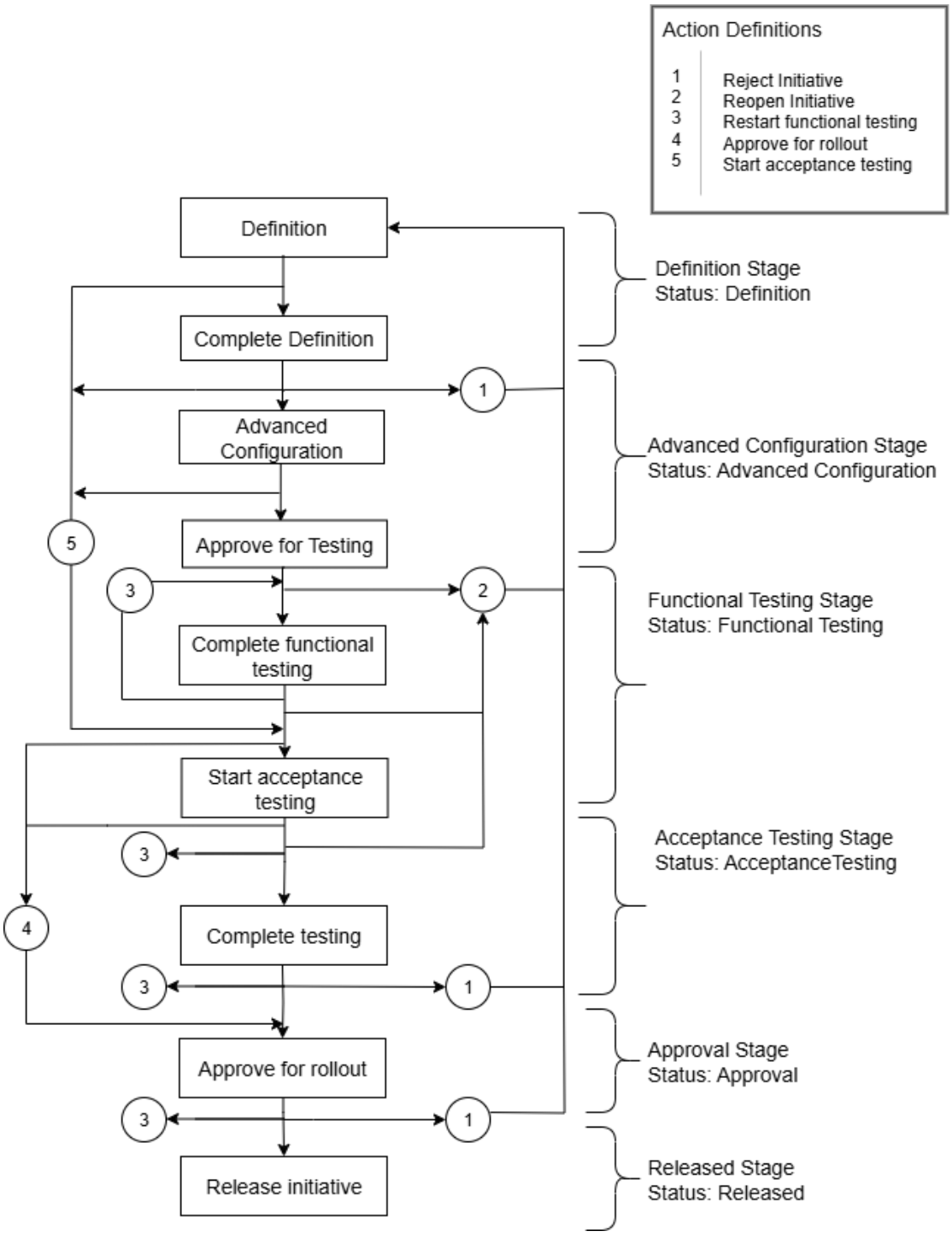

Table 2-1 describes the predefined actions that can be performed on an initiative, their descriptions, beginning stage when action starts, end stage, initiative contents are editable,

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and initiative contents can be published. When you complete a stage but have not started the next one, the initiative's status remains at the current stage, and the stage status stays as **In progress** until the next stage is initiated.

Table 2-1 Actions in Lifecycle of an Initiative

Action	Description	Beginning Stage	End Stage	Allow Changes	Allow Publish
Definition	Initial stage. Define initiative items (domains, models, CFSs, RFSs, resources, data elements, locations). The status of the **Definition** stage is **In Progress**.	Definition	Definition	Yes	No
Complete Definition	After defining the models and their items, click **Complete Definition** in the **Lifecycle** tab and confirm to complete the definition. At this point, the **Definition** stage status is **In Progress** and the initiative is ready to enter the Advanced Configuration stage.	Definition	Definition	No	No
Start advanced configuration	The **Advanced Configuration** stage begins after completing the definition of the initiative. To start the advanced configuration stage, click **Start Advanced Configuration**. This action enables UIM developers to write customized code for the advanced policies specified in the initiative. You can publish the initiative to generate a Design Studio workspace, which developers can download. Import the workspace into Design Studio to make the necessary changes. At this point, the **Definition** stage status is **Succeeded** and the **Advanced Configuration** stage status is **In Progress**.	Definition	Advanced Configuration	Yes	Yes
Complete advanced configuration	After you click **Complete advanced configuration**, the initiative moves to approve for testing. At this point, you cannot edit the initiative's content or publish it to a test workspace until testing is approved. At this point, the **Advanced Configuration** stage status is **In Progress**.	Advanced Configuration	Advanced Configuration	No	No

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

Action	Description	Beginning Stage	End Stage	Allow Changes	Allow Publish
Approve for testing	Approving the initiative for testing moves it to the Functional Testing stage. After you click **Approve for Testing** and confirm the approval, the initiative transitions to the **Functional Testing** stage. At this point, the Advanced Configuration stage status is **Succeeded** and the Functional Testing stage status is **In Progress**.	Advanced Configuration	Functional Testing	No	Yes
Complete functional testing	After the functional testing is complete, click **Complete Functional Testing** in the **Lifecycle** tab and confirm to complete functional testing. You cannot edit the initiative's content or publish it to a test workspace. At this point, the **Functional Testing** stage status is **In Progress** and the initiative is ready to move to the Acceptance Testing stage.	Functional Testing	Functional Testing	No	No
Start acceptance testing	The Acceptance Testing stage begins after functional testing or directly from the Definition stage. To start acceptance testing from the Definition phase—skipping the Functional Testing stage—click **Other Actions** and select **Start Acceptance Testing**. At this point, the Functional Testing stage status is **Succeeded** and the Acceptance Testing stage status is **In Progress**.	Functional Testing	Acceptance Testing	No	Yes
Complete testing	After the acceptance testing is complete, click **Complete Testing** in the **Lifecycle** tab and confirm to complete testing. You cannot edit the initiative's content or publish it to a test workspace. At this point, the **Acceptance Testing** stage status is **In Progress** and the initiative is ready to move to the Approval stage.	Acceptance Testing	Acceptance Testing	No	No

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

Action	Description	Beginning Stage	End Stage	Allow Changes	Allow Publish
Approve for rollout	After completing the Functional Testing stage, starting Acceptance Testing, or completing Acceptance Testing, you can begin the approval process for rolling out the initiative. After the review is complete, the approver approves the initiative for release to production. At this point, the Acceptance Testing stage status is **Succeeded** and the Approval stage status is **In Progress**.	Acceptance Testing	Approval	No	No
Release initiative	Releasing the initiative to production publishes it automatically to the production workspace. After the publish operation is successful, the initiative transitions to the **Released** stage. Once released, you can clone or revise the associated PSR models, specifications, or data elements. At this stage, you cannot edit the initiative's content. The Approval stage status is **Succeeded** and The **Released** stage status is initially **In Progress**. After the publish operation is successful, the **Released** stage status changes to **Succeeded**.	Approval	Released (Publish Successful) Approval (Publish Failure)	No	No
Discard initiative	Deletes the initiative. To delete an initiative, click **Other Actions** and select **Discard initiative**. This action permanently deletes the initiative and all of its contents, including any revised versions of the released items associated with it.	Not applicable.	Not applicable.	Not applicable.	Not applicable.
Reject	Rejecting an initiative moves it to the **Definition** stage. You can reject an initiative during either **Approve for Testing** or **Approve for Rollout**. When you reject an initiative, it transitions back to the **Definition** stage.	Functional Testing or Approval	Definition	No	No

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

Action	Description	Beginning Stage	End Stage	Allow Changes	Allow Publish
Refine Definition	Refining the definition moves it to the **Definition** stage and allows you to update its content after completing the **Advanced Configuration** stage. To do this, click **Other Actions** and select **Refine Definition**. This action transitions the initiative back to the **Definition** stage.	Advanced Configuration	Definition	Yes	No
Reopen initiative	Reopens the Initiative to the **Definition** Stage. If testing uncovers any issues, you can reopen the initiative, which transitions it back to the **Definition** stage. You may need to republish the initiative to your test workspace. To reopen the initiative, click **Other Actions** and then select **Reopen Initiative**.	Functional Testing or Acceptance Testing	Definition	No	No
Restart functional testing	Restarts the Functional Testing Stage. If you need to repeat functional testing during any stage, such as Functional Testing, Acceptance Testing, or Approval; you can restart the **Functional Testing** stage. To do this, click **Other Actions** and then select **Restart functional testing**.	Functional Testing, Acceptance Testing, or Approval	Functional Testing	No	Yes
Restart *Preceeding Stage*	Restarts the preceding stage. For example, if the current stage is Functional Testing and the preceding stage is Advanced Configuration, the action **Restart Advanced Configuration** reopens the initiative and returns it to the Advanced Configuration stage.	*Current Stage*	*Preceding Stage*	Depends on the beginning stage	Depends on the beginning stage

> **Note**
>
> When introducing a new user-defined lifecycle stage, it is added to all initiatives. You can move the initiative between the preceding and following stages as needed. When the preceding stage is completed, the new lifecycle stage is marked as complete.

About the Definition Stage

During the Definition stage, you design the initiative items or contents, such as service models, technology models, domains, customer-facing services, resource-facing services, resources, and data elements. At this stage, the initiative and its items are assigned the **Definition** status

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You can complete the definition or remain in the definition stage to modify the design. Any comments entered while defining the initiative are visible to the approval team in the **Transition History** tab. A Service Catalog Administrator is responsible for approving or rejecting the initiative for testing.

The following actions can be performed in the **Definition** stage:

- Complete definition
- Start acceptance testing
- Discard initiative

After the definition stage is completed, the initiative progresses to advanced configuration. The status of the stage remains in **In Progress** until you start the advanced configuration stage.

See Table 2-1 for more information on the actions that can be performed in the definition stage.

About the Advanced Configuration Stage

After starting the **Advanced Configuration** stage, the initiative and its contents transition to the **Advanced Configuration** status. The Definition stage status moves to **Succeeded**. During this stage, a developer can implement advanced policies and write custom code using the extended designer class. See "Extending Solution Designer" in *Developer's Guide* for more information on extending Solution Designer.

While in the **Advanced Configuration** stage, you can publish the initiative to generate Design Studio workspace. A UIM developer can then download and import this workspace into Design Studio to modify or extend the necessary policies and implementations. After these updates are complete, the developer can mark the completion of the **Advanced Configuration** stage.

After completing the **Advanced Configuration** stage, the initiative progresses to approval for testing. Here, an approver(who must have the Service Catalog Administrator role) reviews the work and can take one of the following actions:

- 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 stage.

About the Functional Testing Stage

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

During the Functional Testing stage, you can publish the model to the **Test** workspace. The Test workspace interacts with the DevOps engine, which includes all the plug-ins required by Solution Designer to build the requested cartridge. Once the publish operation is successful, you should perform functional testing to ensure that the cartridge is properly deployed in the appropriate runtime application, such as UIM, and that it works as expected. See "Publishing Initiatives to Generate Test Cartridges" for detailed information on publishing the model to test workspace.

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

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- 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 stage.

About the Acceptance Testing Stage

You can perform acceptance testing after completing functional testing, or you can initiate acceptance testing directly from the **Definition** stage. To begin acceptance testing, click **Start Acceptance Testing**. The status of the initiative and its contents will then transition to **Acceptance Testing**, allowing the acceptance testing team to proceed with the necessary evaluations.

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

- 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** stage.

About the Approval Stage

When the initiative reaches the **Approval** stage, an approver reviews the work and test results. The approver must have 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** stage.

About the Released Stage

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

After you click **Release Initiative** and confirm in the dialog box, you cannot undo the release or reopen a released initiative. The released initiative cannot be reused, and its released items cannot be discarded from the application. However, 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.

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See Table 2-1 for more information on the actions that can be performed in the released stage.

Defining a User-Defined Lifecycle Stage

You can define new lifecycle stages between any of the predefined stages in the **Lifecycle Designer** tab in the **Publishing Center** application. For example, a Service Catalog Administrator needs to add a new stage of system testing for pre-production environment.

> **Note**
>
> The new lifecycle stage is added to all initiatives, regardless of the initiatives' current stage.

To define new lifecycle stages:

1. In the Solution Designer landing page, click the **Publishing Center** application, and then the **Lifecycle Designer** tab .
2. Click the predefined stage to see the details.
3. Hover over the link between stages and click **+** to add a new lifecycle stage.

   The **Insert New Stage** drawer opens.
4. In the **Insert New Stage** drawer, enter the following details:
   - **Name**: Name of the new stage.
   - **Description**: Description of the new stage
   - **Allow Changes**: Optional, allow making changes to the initiative in this stage.
   - **Allow Publish**: Optional, allow publishing the initiative in this stage.
   - **Entitlement**: The corresponding role from the OIDC provider. Ensure this entitlement matches the OIDC role. See "Roles" in *Solution Designer Installation Guide* for information on the available roles. After you enter the entitlement, you must manually add the newly added entitlement in the OIDC provider. The name of the entitlement in Solution Designer must match the role in the OIDC provider.
5. Click **Save**.

   The new lifecycle stage is inserted between the selected stages. When the preceding stage is completed, the new lifecycle stage is marked as complete.

For user-defined stages, you can:

- Start *stage*: Starts the user-defined stage. The status of the stage is *In Progress*.
- Complete *stage*: Completes the user-defined stage. The status of the stage is *Succeeded*.
- Reopen initiative: Reopens the initiative to the **Definition** phase.
- Discard initiative: Deletes the initiative.

> **Note**
>
> You can only edit or delete user-defined stages and not predefined ones. To delete a user-defined stage, select the three-dot menu on the user-defined stage node and click **Delete**.

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3

Defining Your PSR Models

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

Topics in this document

About PSR Models

PSR models in Solution Designer define end-to-end solutions tailored to customer services. The key principle of PSR models is to decouple commercial offers from technical implementations using customer-facing service (CFS) and resource-facing service (RFS) specifications. When new products or services are introduced, the underlying PSR model isolates itself from frequent commercial changes. PSR models provide a CFS layer with technology-agnostic, reusable specifications, and an RFS layer with technology-specific specifications. There are three main types of PSR models:

- **Service Models**: Created by service specialists, service models define the complete design of customer services.
- **Technology Models**: Created by network specialists, technology models define the design of technology-specific RFSs.
- **Product Fulfillment Models**: Created by product specialists, fulfillment models define an end-to-end design of commercial products.

About Service Models

Service models establish relationships between the services represented by products and the resources necessary for their implementation. A service model typically includes CFSs, RFSs, resources, locations, components, and configuration attributes such as design parameters, characteristics, parameter mappings, 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

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define an end-to-end configuration of customer services. The key steps in defining a service model are:

- 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, including:
  - 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 linked, allowing you to associate sold products with the technical services and resources needed to fulfill orders. A technology model includes RFSs and their components, as well as resources and locations.

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 key steps to define 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 Product Fulfillment Models

Product fulfillment models define relationships between commercial products and their services. The model connects product specifications to customer-facing service specifications, enabling association between products sold and required services. Product fulfillment models include product specifications, CFSs, fulfillment patterns, routing rules, and fulfillment functions.

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Solution Designer guides product specialists in defining the commercial product configuration. The key steps to define a product fulfillment model include:

- Select an initiative.
- Select or create a commercial domain.
- Build a fulfillment model that includes product specifications and its primary and auxiliary services.
- Configure parameters for each of the specifications. You can configure the following for the specifications:
  - The commercial parameters that are required from the commercial product.
  - The design parameters required to fulfill the customer service.
  - The commercial parameters mapping to the design parameters to fulfill the service.
  - The product specification association to the fulfillment pattern.
  - The routing rules to define the fulfillment functions that is implemented by the fulfillment systems and by granularity.

About Guided Process

PSR models can be created in Solution Designer using a guided process, which provides an intuitive, user-friendly interface and a streamlined workflow. The guided process provides a series of sequential steps by dividing the modeling process.

In the guided process page:

- A process overview panel on the right side lists the steps involved.
- The top-of-page indicator shows the current step in the 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

You can create PSR models, including service models, technology models, and fulfillment models, using a top-down or bottom-up approach:

- **Top-down**: A product specialist creates a fulfillment model; a service specialist creates a service model including CFSs, RFSs, resources, and locations.
- **Bottom-up**: A network specialist creates a technology model with RFSs, resources, and locations; a service specialist creates a service model with CFSs and uses the technology model to complete the service model. Product specialists create fulfillment models using existing CFSs.

See "About Service Models", "About Technology Models", "About Product Fulfillment Models" for more details on PSR models.

Creating Service Models using Guided Process

To create service models in the guided process:

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

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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.

The key steps to create service models in the guided process:

1. Adding General Information: Add the general information such as Model name, Model Id, and so on.
2. Selecting Domain: Select service domain.
3. Building Model: Build the model graphically in a canvas and define relationships between CFSs and the specifications.
4. Configuring Model: Configure characteristics, design parameters, parameter mappings, design policies, and delivery policies.

Creating Technology Models using Guided Process

Creating technology models follows the same four-step guided process as service models, with technology domains and RFSs.

To create technology models in the guided process:

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

   In the **PSR Models** application, Click **More Actions** and 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:

1. Adding General Information: Add the general information such as Model name, Model Id, and so on.
2. Selecting Domain: Select the technology domain.
3. Building Model: Build the model graphically in a canvas and create relationships between RFSs and the specifications.
4. Configuring Model: Configure characteristics, design parameters, parameter mappings, design policies, and delivery policies.

Creating Product Fulfillment Models using Guided Process

To create the product fulfillment models in the guided process:

1. Click the **PSR Models** application in the Solution Designer landing page.
2. In the **PSR Models** application, click **More Actions** and then click **Create Product Fulfillment Model**.

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

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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 fulfillment models in the guided process using the following steps:

1. Adding General Information: Add the general information such as model name, model Id, and so on.
2. Selecting Domain: Select commercial domain.
3. Building Model: Build the model graphically in a canvas and create relationships between product specifications and CFSs.
4. Configuring Parameters for Product Fulfillment Model: Configure commercial parameters, design parameters, and parameter mappings.
5. Defining Fulfillment in Product Fulfillment Model: Assign and preview fulfillment pattern flow (functions and systems).
6. Configuring Routing Rules in Product Fulfillment Model: Configure routing rules to associate fulfillment functions that are implemented by the fulfillment systems or granularity.

Steps for PSR Models in the Guided Mode

This section describes the steps required to create PSR models, including service models, technology models, and product fulfillment models.

Adding General Information

To add general information:

1. In the **Add general information** page, enter **Model name**, **Model ID**, **Description**, and **Initiative**. For product fulfillment model, select **Capabilities cartridge**. You can change the capabilities cartridge only after saving the product fulfillment model. 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.
   - For fulfillment model, the **Select commercial domain** page opens.

Selecting 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.

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- For product fulfillment model, select an existing commercial domain or create a new commercial domain.

See "Creating Domains" for more information on how to create a service, technology, or commercial domain.

> **Note**
>
> - For service model and technology models, you cannot modify the domain after you add the first entity in the **Build Model** step.
> - You can select only one domain in the service model and technology model, whereas multiple commercial domains can be selected in the product fulfillment model.

2. Click **Continue** to progress to the **Build model** step.

   The **Build model** page opens.

Building Model

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

- Product specification to CFSs. This is applicable for product fulfillment models only.
- CFS to location, resource, RFS, or another CFS. This is applicable for service models only.
- RFS to location, resource, or another RFS. This is applicable to service and technology models only.
- Resource to location, another resource, or RFS. This is applicable to service and technology models only.

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.
   - For product fulfillment model, click **Associate Product Specification** and the **Products** dialog opens.

   The specifications (Products, 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 Product specifications, CFSs, RFSs, resources, and locations:

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- **Add Product specifications to the model**: This step is applicable only for product fulfillment models.

  In the Product fulfillment mode, select an existing product specification from the list or create a new product specification. You can select primary and auxiliary CFSs for each product specifications. See "Creating New Product Specifications in the Model" for information on how to create product specifications in the Product fulfillment model.

- **Add CFSs to the model**: This step is applicable only for service models and product fulfillment models.

  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.

  Product Fulfillment Model: click **+** in the product specification and click **Associate CFS Specification** to associate an existing CFS specification or create a new CFS specification.

  See "Creating New CFS in the Model" for creating a new CFS in the **Edit Configuration** page.

- **Add Components to the Model:**
  This step is applicable only to service models and technology models. 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 New Components in the Model" for details on creating new 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. See "Creating New RFS in the Model" for information on how to create RFS in the PSR model.

- **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. See "Creating New Resources in the Model" for information on how to create resources in the model.

- **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. See "Creating Locations in the Model" for information on creating locations in the model.

4. After building the model, click **Continue** to progress to the next step.

Creating New Product Specifications in the Model

To create a new Product Specification in the product fulfillment model:

1. Click **New product** in the **Products** dialog.

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The **New product** dialog opens.

2. Enter name, ID, Primary Domain, and description. The ID must be unique and follow the entity naming rules. See "About Naming Rules" for more information.

> **Note**
>
> The commercial domains selected in the **Select Commercial Domain** step are displayed in the **Primary Domain** drop-down list.

3. Click **Create**.

   The product specification is created and added to the canvas. The newly created product specifiation utilizes the model's initiative.

Creating New CFS in the Model

To create a new CFS in the Service model:

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.

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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:

   - Custom Object Specification
   - Custom Network Address Specification
   - Device Interface Specification
   - Flow Identifier Specification
   - IPv4Address Resource Extension
   - IPv6Address Resource Extension
   - Telephone Number 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**.

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

Configuring Model

To configure a service or technology 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.

Configuring Parameters for Product Fulfillment Model

To configure parameters in the product fulfillment model:

1. In the **Configure model** step, in **Specification Configuration**, you can configure the following:
   a. Commercial Parameters: Add commercial parameters to the product specifications. See "Defining Commercial Parameters" for information on how to add commercial parameters.
   b. Design Parameters: Add design parameters to the CFSs. See "Defining Design Parameters" for information on how to add design parameters.
   c. Parameter Mapping: Map the commercial parameters of the product specification to the design parameters of the CFS. See "Mapping Commercial Parameters" for information on how to map the commercial parameters to the design parameters.
2. Click **Continue** to proceed to the **Define fulfillment** step.

Mapping Commercial Parameters in the Model

You map commercial parameters from product specifications to the design parameters of the associated 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 design parameter of boolean type only.

You can map the commercial parameters manually, automatically, or through both the methods. You can map the parameters automatically and also choose to map few of them manually.

To map the parameters:

1. In the **PSR Models** application, in the product fulfillment model, in the **Configure parameters** step, expand **Parameter mapping** and select a CFS specification.

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The **Parameter Mapping** page opens, displaying the CFS with its design parameters and the product specifications with their commercial parameters.

2. Map the parameters manually, automatically, or through both the methods.
   - Click the + sign on the commercial parameter and then drag and drop to the target design parameter to manually map the parameters.
   - Click the three dots in the design parameter and click **Auto select** to automatically map the design parameter to the commercial parameter with the same name and referenced data element type.
   - Click **Automap** to map all the source commercial parameters with the matching destination design parameters at once. Clicking **Automap** maps the parameters with the same name and data elements type of that source entity.

   You can map a source design parameter to multiple destination parameters.
3. After you complete the parameter mapping, click **Save**.

   The parameter mappings are saved and the application returns to the **Specification Configuration** page.

Defining Fulfillment in Product Fulfillment Model

In the **Define Fulfillment** step, map each product specification to an available fulfillment pattern. Each product specification can be linked to only one fulfillment pattern, but multiple product specifications can map to the same fulfillment pattern. To remove the link between a product specification and a fulfillment pattern, click the three dots on the product specification and select **Remove link to *fulfillment pattern***.

To define fulfillment in the product fulfillment model:

1. In the product fulfillment model, select the **Define fulfillment** step in the guided process.
2. Click **Edit** to map the product specification to a fulfillment pattern.

   The **Fulfillment** canvas appears, showing the product specifications associated with the fulfillment model from the **Build Model** step.
3. Hover over the product specification and select the **+** sign.

   The **Fulfillment Patterns** drawer opens, listing all fulfillment patterns available for the selected capabilities cartridge.
4. Select a fulfillment pattern to map to the chosen product specification.
5. Click **Add**.

   The fulfillment pattern is mapped to the product specification and appears in the fulfillment canvas.
6. After you complete the mapping, click **Done**.

   The **Define fulfillment** page appears.
7. Click **Continue** to proceed to the **Configure routing rules** step.

Configuring Routing Rules in Product Fulfillment Model

You can define and manage routing rules to determine the destination and processing path of orders based on specific criteria. Routing rules specify how order items are allocated to each order component during decomposition. OSM evaluates each order item in the source component against the conditions defined in the routing rule. If an order item meets all specified conditions, OSM includes it in the target order component.

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Use routing rules when the orchestration fulfillment pattern associated with the order item is not sufficient to determine if additional order components are needed.

To configure routing rules:

1. On the **Configure Routing Rules** page, click **Add routing rule**.

   The **Rule builder** page opens and displays a template for building a rule for order items.

2. Enter the basic details.

   To enter the basic details:

   a. In the rule builder canvas, click the **Basics** node.

      The **Basics** drawer opens.

   b. Enter the name and objective of the rule. Select **Product Centric** to include commercial parameters from the product specifications when defining conditions in the **Conditions** node.

   c. Click **Add**. The details appear in the rule builder canvas.

3. Select a fulfillment function to which the rule applies at OSM runtime.

   To select a fulfillment function:

   a. Click the **Applies to** node.

      The **Applies to** drawer opens.

   b. Select a fulfillment function from the available list, which is loaded from the selected capabilities cartridge, then click **Add**.

      The selected function is added to the canvas in the **Applies to** node.

4. Add conditions as needed.

   To add conditions to the rule:

   a. Click the **Case 1** node to add a condition.

      The **Case 1** drawer opens.

   b. Choose the **If** clause:

      - **All**: The action is applied only when all the conditions are met.
      - **Any**: The action is applied when any one condition is met.

   c. Select a parameter from the available list. The list includes order item properties from the capabilities cartridge and commercial parameters from the product specifications (if **Product Centric** is selected).

   d. Select an operator from the list. The available operators are Equals, Not equals, Contains, Equals ignore case, Contains ignore case, Not equals ignore case.

   e. Enter a value that the parameter to be validated against.

   f. Click **Add filter** to add more conditions.

      > **Note**
      >
      > Click **Delete** to remove a condition. Click **Copy** to duplicate a condition; a new row with the same details is created.

   g. Click **Add**.

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The conditions are added and the number of conditions is shown in the **Case 1** node in the rule builder canvas.

5. To add more condition cases, click the **+** sign on the rule builder canvas.

   To remove a condition case, click the three dots on the case node and select **Delete case**.

   If the conditions are met, the **True** path is selected, otherwise the false path is selected.

6. Add an action for each case.

   To add an action:

   a. Click the **Action** node.

      The **Action** drawer opens.

   b. Select the routing option:

      - **Route to**: Select this if the order item should be routed to a fulfillment system.
      - **Ignore routing**: Select this to not send a fulfillment request to any fulfillment system.

   c. Choose a fulfillment system in **Which system would you like this item to be routed to?**. The fulfillment systems are listed from the selected capabilities cartridge.

   d. Select the level of granularity in the **How would you like to send this?** field. The available options are derived from the capabilities cartridge. Examples include:

      - CommercialBundleGranularity
      - OrderItemGranularity
      - PackageGranularity
      - ServiceBundleGranularity
      - WholeGranularity or OrderGranularity

   e. Click **Add**.

      The details are added to the **Action** node in the rule builder canvas.

7. When you have finished adding actions for all cases, click **Done**.

   The rule is added to the **Configure Routing Rules** page.

8. **View Errors** appears if there are any errors in the routing rules.

   To edit a routing rule, click the rule name and then click **Edit**.

   To delete a routing rule, click the rule name and then click **Delete**.

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**.

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- 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.

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 CFSs, RFSs, and resources.

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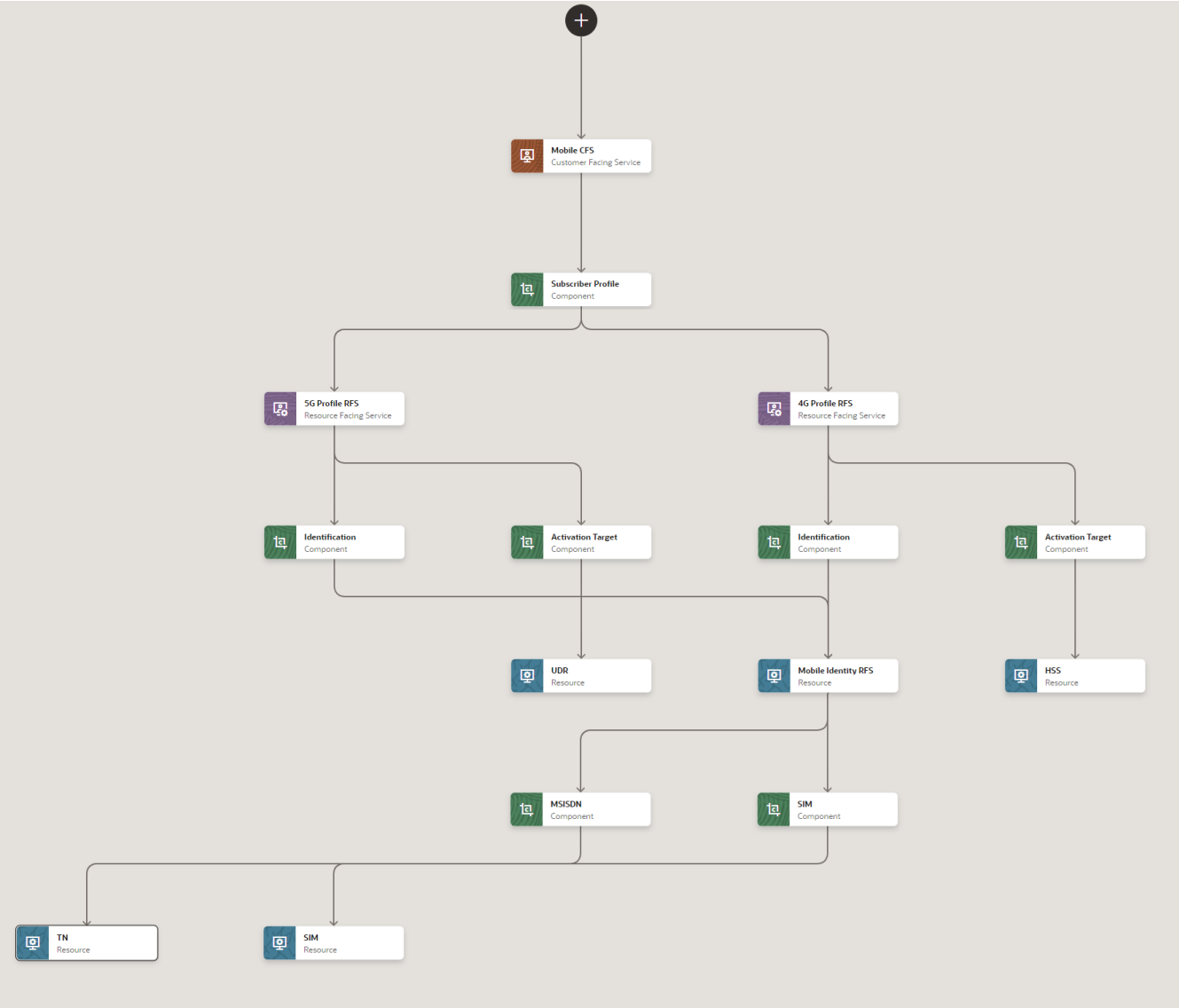
Figure 3-1 Mobil Service Example of a Service Model



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:

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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.

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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 service or technology models from other environments or download and import sample PSR models from Oracle Software Delivery Cloud. You can export the model that you created in your test environment and import it into your production 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 **More Actions** and then 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 service and technology models. The model will be downloaded as a JSON file.

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-dot menu 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.

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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, a technology domain, or a commercial domain.
     - Type: The type of the model (Service Models, Technology Models, Fulfillment 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 PSR 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.

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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 **Edit Service Model** page, **Edit Technology Model**, or **Edit Fulfillment 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. See "Configuring Service and Resource Specifications" for more information on configuring the specifications. See "Configuring Product Relationships" for information on how to configure product to CFS relationship.

   > **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 service or technology 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.

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> **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** or **Revise Product Fulfillment Model** dialog box opens.
4. Select a different initiative in **Definition** status and click **Continue**.

   The **Create Service Model** or **Create Technology Model** or **Create Product Fulfillment Model** page opens.
5. Update the details as necessary in the revised model. You can add new product specifications, service specifications (CFSs and RFSs) and resource specifications (resources, and locations) to the model.

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> **Note**
>
> - If you want to update any specification that includes design parameters and 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.
> - You can update the selected capabilities cartridge to a new version when you revise the product fulfillment model. However, you cannot switch to a different capabilities cartridge.

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.

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4

Managing Domains

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

Topics in this document

About Domains

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

Domains are further categorized into commercial domains, service domains, and technology domains for granular classification. A technology or commercial domain can reference zero or more service domains. Domains are used as filters when creating fulfillment, service, and technology models. For example, if the *Mobile* service domain is selected, only entities belonging to that domain are available for selection when building the PSR model.

Product specialists manage commercial domains, while service specialists manage service and technology domains. Domains are required for entity definitions in Solution Designer; each entity belongs to a domain.

Table 4-1 Types of Domain

Domain Type	Description	Specifications
Commercial	Manages specifications related to customer products. Commercial domains represent products offered, such as Broadband and Advanced Data Plan.	Product
Service	Manages specifications related to customer services. Represents types of services offered, such as Mobile, Broadband, TV, Voice, Cloud Services, and IoT.	CFS RFS Resource

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Table 4-1 (Cont.) Types of Domain

Domain Type	Description	Specifications
Technology	Manages specifications for underlying technologies used to implement customer services. Examples: DSL, Fiber, Cable, 5G, LTE, Wi-Fi, Satellite.	Resource RFS

You can use multiple domains to help organize your specifications and models. For example, a mobile service offering can have a service domain of Mobile and technology domains such as 5G and 4G.

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. Each specification can have one primary domain and multiple secondary domains.

Domains play an important role in design realization. After an initiative is released, you can use the associated domains elsewhere in the application.

Creating Domains

You create domains using the **Domains** application, or when selecting the respective domains in the guided process for creating PSR Models.

To create domains:

1. In the Solution Designer landing page, click the application you want to use.
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.
   - In the **PSR Models** application, click **Create Commercial Domain** in the **Select commercial domain** step while creating a product fulfillment model.

   The **New Domain** drawer appears.
3. Enter the following details:

Table 4-2 New Domain Fields

Field Name	Required or Optional	Description
Name	Required	Name of the domain (must be more than one character).
ID	Required	Id of the domain.
Type	Required	The type of domain: Commercial, Service, or Technology.
Description	Optional	Description of the domain.

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Table 4-2 (Cont.) New Domain Fields

Field Name	Required or Optional	Description
Associated Service Domains	Optional	Service domains associated with a technology or commercial domain. Appears only when you select **Technology** or **Commercial** as the type.
Initiative	Required	Initiative to which the domain belongs.
Asset Type in the **Implementation Assets** section	Optional	Type of implementation asset. Values: **Helper class** or **Library**. Available only for service and technology domains.
Description in the **Implementation Assets** section	Optional	Description of the implementation asset. Available only for service and technology domains.
Download Link in the **Implementation Assets** section	Required when **Asset Type** is selected.	The relative path for helper class files or third-party libraries (for example, `/bucket/helperclass.zip`). Files must be uploaded to S3-compatible object storage. This field is available only for service and technology domains. The defined helper class and libraries are loaded from the specified download link 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 **Implementation Assets** values, the fields may appear non-editable. However, you can update the details and click **Submit**.

4. Click **Create.**

   The domain is created.

Viewing Domains

You can view 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: Commercial, Service, or Technology
     - Status: Lifecycle status
     - Initiative
     - Last updated date

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The results are filtered based on your 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 its details.

   The **Domain** drawer appear and shows:

   - **Overview** tab: Details of the domain.
   - **Used by** tab: All items (models, domains, and specifications) associated with the domain. You can filter results by item name.

4. After viewing the details, click 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 for 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 associated service domains.
4. Click **Update**.

> **Note**
>
> - You can't update the domain **Type**.
> - You can update the domain details only in **Definition** and **Advanced Configuration** statuses. You can't update the details after the initiative completes the **Advanced configuration** phase.

Deleting Domains

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

To delete domains:

1. On the Solution Designer landing page, click the application you want to work with.
2. Do one of the following:
   - In the **Domains** application, select a domain.

     The domain drawer opens.

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- 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 only if it is not associated with any entities or domains.

> **Note**
>
> - You can only delete a domain in the **Definition** status and the **Advanced Configuration** status.
> - You can't delete the domain, if the associated initiative is in the **Functional Testing** stage, the **Acceptance Testing** stage, the **Approval** stage, or the **Released** stage, or if the domain is referenced by any entity (such as PSR models, CFSs, or RFSs).

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5

Working with Fulfillment

Use the Fulfillment application to import and view capability cartridges and their contents, including fulfillment functions, fulfillment systems, and fulfillment patterns.

Topics in this document

About Capabilities Cartridges

A capabilities cartridge is an OSM entity that contains OSM configurations. The capabilities cartridge provides all the building blocks such as Fulfillment functions, Fulfillment patterns, Fulfillment modes, and Fulfillment systems that are necessary for OSM. The mapping of data to Fulfillment Function (such as Shipping which is non-Provisioning Fulfillment Funtion) are hardcoded within the capabilities cartridge. For information on Capabilities Cartridge, see "About Dynamic Cartridge Assembly (Cloud Native Only) " in *OSM Concepts* guide.

The end to end journey of Solution Designer and OSM is as follows:

1. The OSM Developer develops and tests the capabilities cartridge in Design Studio.
2. The OSM developer packages artifacts and delivers them to the OSM DevOps Administrator.
3. The OSM DevOps administrator configures the CNTK instance specification, loads the capabilities cartridges into OCA, and tests it. The OSM DevOps administrator delivers the capabilities manifest to the service catalog administrator.
4. The service catalog administrator imports the capabilities manifest in to Solution Designer.
5. A product specialist chooses the capabilities cartridge and defines the product fulfillment model. Fulfillment Specialist defines routing rules and granularity rules.
6. The Service Catalog Admin manages the initiative lifecycle and publishes it to workspace. When the initiative is published, SCD metadata is sent to the OSM participant. OSM Cartridge Assembler (OCA) then assembles and deploys the cartridge to the OSM instance.
7. **OSM Activity** - If the deployment is across the functional testing, acceptance testing, and production environments, the same major version is deployed to the database, although the final digit (representing the publish number) may vary between environments. An example of cartridge naming convention, for instance, employ a format such as '1.0.0.592', in which '1.0.0' signifies the version of the capabilities cartridge and '592' designates the publish ID of the deployed cartridge.
8. After the deployed solution is tested against OSM runtime, publish the initiative to the production workspace.

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9. In production environment, the OSM runtime processes orders using the deployed solution.

Importing Capabilities Cartridges

Import a capabilities cartridge into Solution Designer as sent by the OSM DevOps administration.

To import capabilities cartridges:

1. In the Solution Designer landing page, click the **Fulfillment** application and then click the **Capabilities Cartridges** tab.
2. 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.

> **Note**
>
> The capabilities cartridge must be of JSON format only.

4. Click **Import**.
5. Click **Done**.

   The imported cartridge is listed in the **Capabilities Cartridges** page.

About Fulfillment Patterns

Fulfillment patterns are the entities that include the fulfillment function order components and dependencies required to fulfill a product order. Each order item in an order is mapped to a fulfillment pattern. At run time, OSM uses the fulfillment pattern to determine the necessary fulfillment functions, order components, and dependencies to generate an orchestration plan.

Fulfillment patterns enable you to represent new sets of products by modeling the fulfillment modes, order components, and dependencies required to fulfill order items associated with the corresponding orchestration fulfillment patterns. The fulfillment pattern defines the order components to add the order item to. You use fulfillment patterns that organize order items by the combination of fulfillment mode, product, customer-facing service, resource-facing service, or resource specification. For example, you can define a fulfillment pattern that includes order items for orders that deliver a broadband service. The fulfillment pattern initiates the first level of decomposition in the OSM runtime, by decomposing order items into the function order components identified in the fulfillment pattern. For example, order items are organized into Billing, Shipping, and Provisioning order components. You can map multiple product specifications to one fulfillment pattern. This enables you to introduce new products in existing product specifications without needing to create new fulfillment patterns or fulfillment flows.

Viewing Fulfillment Patterns

You can view the fulfillment patterns in Solution Designer that are developed in Design Studio. The fulfillment patterns are packaged as part of capability cartridges and are imported to Solution Designer.

To view fulfillment patterns:

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1. In the Solution Designer landing page, click the **Fulfillment** application.
2. Click the **Fulfillment Patterns** tab.

   The **Fulfillment Patterns** page lists all the fulfillment patterns that are imported from the capabilities cartridges.
3. Click the fulfillment pattern you want to view.

   The fulfillment patterns details page opens.
4. You see the following tabs:
   - **Configuration**: Displays the relationship between the fulfillment systems and fulfillment functions that are defined in the capabilities cartridge.
   - **Used by**: Lists all the products and the product fulfillment models that uses the selected fulfillment pattern.
5. Click **Go to Fulfillment Patterns** to return to the **Fulfillment Patterns** page.

> **Note**
>
> Search for fulfillment patterns by **name** and by the **Capabilities Cartridge** they belong to.

About Fulfillment Functions

Fulfillment functions are the operations that must be performed to process an order; for example, initiating billing, shipping a modem, or activating a service. Fulfillment functions include operations such as assigning a phone number, activating a service on the network, shipping a phone, and running the bill cycle.

Similar to fulfillment pattern, the fulfillment functions are also packaged in the capabilities cartridge and are imported in Solution Designer.

Viewing Fulfillment Functions

You can view the fulfillment functions in Solution Designer that are developed in Design Studio. The fulfillment functions are packaged as part of capabilities cartridges and are imported to Solution Designer.

To view fulfillment functions:

1. In the Solution Designer landing page, click the **Fulfillment** application.
2. Click the **Fulfillment Functions** tab.

   The **Fulfillment Functions** page lists all the fulfillment functions that are imported from the capabilities cartridges.
3. Click the fulfillment function you want to view.

   The fulfillment function details drawer opens.
4. You see the following tabs:
   - **Overview**: Displays the information such as **Name**, **ID** and **Description** about the fulfillment function.
   - **Used by**: Lists all the products and the fulfillment patterns that use the selected fulfillment function.

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5. Click **Go to Fulfillment Functions** to return to the **Fulfillment Functions** page.

> **Note**
>
> Search for fulfillment functions by **name** and by the **Capabilities Cartridge** they belong to.

About Fulfillment Systems

Fulfillment Systems are the systems that carry out the actions necessary to complete the order; for example, activate services on the network, ship equipment, or run billing. You define the fulfillment systems in Solution Designer and associate the fulfillment system with the fulfillment functions in the product fulfillment model. To process an order, OSM runtime sends commands to fulfillment systems (that are associated in Solution Designer) to carry out their functions and return the status of the fulfillment action.

Viewing Fulfillment Systems

You can view the fulfillment systems in Solution Designer that are developed in Design Studio. The fulfillment systems are packaged as part of capability cartridges and are imported to Solution Designer.

To view fulfillment systems:

1. In the Solution Designer landing page, click the **Fulfillment** application.
2. Click the **Fulfillment Systems** tab.

   The **Fulfillment Systems** page lists all the fulfillment systems and their versions that are imported from the capabilities cartridges.

> **Note**
>
> Search for fulfillment systems by **name** and by the **Capabilities Cartridge** they belong to.

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6

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

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.

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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 6-1 New product Fields

Field Name	Required or Optional	Description
Name	Required	Unique name of a product. In the *Mobile Service* example, *Mobile product* is the product name.
ID	Required	Unique Id of the product.
Initiative	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.
Primary Domain	Required	The primary domain of a product. Only one primary domain can be selected for the product.
Secondary Domains	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.
Start Date	Optional	The starting date of a product.
End Date	Optional	The ending date of a product.
Description	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.

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- **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.

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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

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

Converters can be added for unit of measure or value map conversions. Mapping information is captured in the Product Specification notes and can be referenced in Design Studio for further OTM or XQuery configuration.

There are three mapping options:

- **Manual mapping**: To map the commercial parameters manually, see "Mapping Commercial Parameters Manually"
- **Automatic mapping**: To map commercial parameters automatically, see "Mapping Commercial Parameters Automatically"
- **Combined approach**: Map some parameters automatically and others manually, as needed.

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 manually map commercial parameters:

1. On the Solution Designer landing page, click the application you want to work with.
2. Do one of the following:
   - In the **Product Specifications** application, search and open the specification editor page, click the **Parameter Mapping** tab and then click **Edit**.
   - In the **PSR Models** application, in the product fulfillment model, in the **Configure parameters** step, expand **Parameter mapping** and select a specification.

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3. Map commercial parameters by selecting the source (commercial parameters) and destination (CFS design parameter).You can manually map all the commercial parameters.

   To manually map parameters:

   a. Click **Add mapping** in the **Destination** column.

      The **Select destination** slider appears.

   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.

4. (Optional) Add converters as needed. See "Adding Converters in Parameter Mapping" for details on how to add converters.

5. Click **Save** when done.

   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.

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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 Updated

     The 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.

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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.

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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.

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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.

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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

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 7-1 shows the different types of service specifications and who manages them in Solution Designer:

Table 7-1 Service Specification Types

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

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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.

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- **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 7-2 New CFS Fields

Field Name	Required or Optional	Description
Name	Required	Unique name of the CFS. In the *Mobile Service* example, *Mobile CFS* is the CFS name.

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Table 7-2 (Cont.) New CFS Fields

Field Name	Required or Optional	Description
ID	Required	Unique Id of the CFS.
Initiative	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.
Primary Domain	Required	The primary service domain. Only one primary domain can be selected for the CFS.
Secondary Domains	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.
Start Date	Optional	The starting date of the CFS.
End Date	Optional	The ending date of the CFS.
Description	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 RFSs, resources, other CFSs, and locations. This builds a hierarchy between the CFSs, 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 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.

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- **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 7-3 New RFS Fields

Field Name	Required or Optional	Description
Name	Required	Unique name of an RFS. In the *Mobile Service* example, *4G Profile RFS*, *5G Profile RFS*, and *Mobile Identity RFS* are the RFS names. See "Mobile Service Example of Service Models" for more details.
ID	Required	Unique Id of an RFS.
Initiative	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.
Primary Domain	Required	The primary service domain or the technology domain. Only one primary domain can be selected for the RFS.
Secondary Domains	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.
Start Date	Optional	The starting date of an RFS.
End Date	Optional	The ending date of an RFS.

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Table 7-3 (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. lick **Go to Service Specifications** on the top left to return to the **Service Specifications** page.

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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

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- 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.

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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 the 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.

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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.

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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.

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8

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

Resource specifications are entities required for service provisioning. Network specialists manage these specifications in Solution Designer, and they form the foundation for PSR Models used to represent network solutions.

Resources are objects in the network or inventory that can be consumed, referenced, or shared when provisioning a Resource Facing Service (RFS). Resources may be physical (a port) or logical (bandwidth). For example, resources such as IP addresses, VoIP phones, and DSLAM ports could be specified. In the *Mobile Service* example, resources like *TN*, *SIM Card*, and *UDR* are necessary to fulfill the service, and the *Mobile Identity RFS* utilizes *SIM Card* and *TN* resources.

Resources can be associated with other resources and may be realized in external systems such as supply chain or activation platforms.

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

- **Business Interaction Specification**: Define arrangements or transactions (for example, service orders, projects). These provide the context for tracking inventory transactions. Any additions, changes, or deletions to items in the inventory made under the context of a business interaction are included in its transactions. The transactions associated with a business interaction become effective when the business interaction is completed, and they are canceled when the business interaction is canceled. They also enable transaction cancellations and changes. Business interactions can include child business interactions.
- **Connectivity Specification**: Represent the connectivity in your network. You can create the connectivity specification in Solution Designer, however, the built-in support for various technologies is not supported. If you create a Connectivity specification, it is realized as a PacketNetworkConnectivity entity by default at runtime. If you want to create a different entity type, you must use the extended designer class.

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

- **Custom Network Address Specification**: Define network addresses not modeled by default. For example, default models are telephone numbers and logical device accounts.
- **Custom Object Specification**: Define entities that do not fit into pre-defined categories, allowing you to extend the inventory without changing the underlying schema. All standard specification features—such as characteristics, relationships, and policies—are available for custom objects.
- **Device Interface Specification**: Describe device access points for a 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**: Model flow identifiers like VLAN IDs, VPI/VCI, DLCI, VPLS, and more for isolating network traffic in virtual networks. In UIM, you use flow identifiers to represent these various types of network addresses.
- **Flow Interface Specification**: Model flow interfaces used with flow identifiers to trace service paths through device interfaces. There are four termination types defined by Flow Interface specifications:
  - **Access**: Indicates that the purpose of an interface is to terminate connectivity that provides access to a service provider network, such as Ethernet UNI connectivity.
  - **Internetwork**: Indicates that the purpose of an interface is to terminate connectivity that interconnects two service provider networks, such as Ethernet E-NNI connectivity.
  - **Trunk**: Indicates that the purpose of an interface is to terminate connectivity that connects equipment and devices in the same network, such as Ethernet I-NNI connectivity.
  - **Unknown**: Indicates that the purpose of the interface is unknown. Used to support scenarios not covered by the Access, Internetwork, and Trunk termination types.
- **Logical Device Account Specification**: Model special network address types hosted by or managed by a logical devices. 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**: Model logical devices, representing 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**: Represent media (audio, video) over cable, satellite, radio, or streaming IP. You can create the media stream specification, however, the built-in properties are not supported.
- **Network Specification**: Define networks as collections of related entities (equipment, logical devices, sub-networks). You can create network specification, however, the built-in network properties are not supported.
- **Network Address Domain Specification**: Define the context for unique network addresses used with flow identifiers and IP subnets. For example, you can use network address domain to define private routing domains for IP addresses. You can use network address domains with Flow identifiers and IP subnets.
- **Other Resource**: You use **Other Resource** specification to define configurations. A configuration is a hierarchically organized collection of facts (configuration items) in the

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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.

- **Party Specification**: Model people or organizations in your inventory. Party specifications answer the business question of who is involved in your inventory.
- **Pipe Specification**: Define trails, connections, or hierarchical relationships for pipes or layered connectivity. You can create Pipe specification, however, built in properties are not supported.
- **Telephone Number Specification**: Define and manage types of telephone numbers in your inventory. A Telephone Number specification is a blueprint for the various kinds of telephone numbers you might use.

About IP Address Resource Specifications

IP Address Resource Extensions model networks, subnets, and IP addresses for IPv4 and IPv6 management. The following are preloaded in Solution Designer:

- IPv4Address
- IPv4Network
- IPV4Subnet
- IPV6Address
- IPV6Network
- IPV6Subnet

You can only revise the preloaded IP Address resource specifications to add supplemental characteristics. You cannot create or clone new IP Address resource specifications.

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, deviceIdentifier, 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

Network specialists create and manage resource specifications. Use the **Resource Specifications** application or the **Build Model** step in the guided PSR Model creation process.

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You can relate a resource to a location, another resource, or RFSs. 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.

Prerequisites:

- 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 resources:

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

   The **Create resource specification** dialog opens.
3. Select the type of resource specification that you want to create. See "About Resource Specifications" for more information on the types of resources supported.
4. Enter the following fields. Note that fields such as rate code, vendor, technology, stacking level, and more, may apply only to specific resource types. Table 8-1 describes the fields in creating resources.

Table 8-1 New Resource Fields

Field Name	Required or Optional	Description	Applies to
Name	Required	Unique resource name. In the *Mobile Service* example, *TN*, *SIM Card*, and *UDR* are the resources.	All
ID	Required	Unique resource identifier.	All
Initiative	Required	The initiative this 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.	All
Primary Domain	Required	Primary domain. Only one primary domain can be selected for a resource.	All
Secondary Domains	Optional	Secondary domains(must match the primary domain's type). Multiple secondary domains are allowed.	All
Description	Optional	Description of a resource.	All
Rate Code	Required	The rate code of a device interface. Rate code values are system-provided. See "About Rate Codes" in *Design Studio Modeling Inventory* for information on rate codes.	Device Interfaces
Vendor	Optional	Vendor for a logical device.	Logical Devices
Model Number	Optional	Model number for a logical device.	Logical Devices

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Table 8-1 (Cont.) New Resource Fields

Field Name	Required or Optional	Description	Applies to
Part Number	Optional	Part number for a logical device.	Logical Devices
Technology	Required	The technology that a specification operates under or supports. The supported values are: **Flow Identifier specification**: ATM, Ethernet, Frame Relay, and MPLS. **Flow Interface specification**: ATM, Ethernet, Frame Relay, MPLS and DSL.	Flow Identifier Flow Interface
Minimum value	Required	The minimum value that specified the lower boundary of ranges for the flow identifier. UIM users can create ranges of flow identifiers. If you enter a **Minimum value**, you must also enter a **Maximum value**. The default value is 0.	Flow Identifier
Maximum value	Required	The maximum value that specified the upper boundary of ranges for the flow identifier. UIM users can create ranges of flow identifiers. If you enter a **Maximum value**, you must also enter a **Minimum value**. The default value is 0.	Flow Identifier
Stacking level	Required	Enter a stacking level for flow identifiers based on this specification. The stacking level is used in UIM to implement Q-in-Q stacking. Flow identifiers with lower stacking level values can be stacked within flow identifiers with higher values. Q-in-Q stacking enables VLAN IDs to be encapsulated (stacked) within each other to allow customer traffic with the same VLAN ID to travel safely through the same service provider network. Stacking levels are oriented from the customer site looking into the service provider network. A CEVLANID is level 0 and an SP-VLAIND is level 1. Stacking levels are used in packet technologies other than Ethernet. For example, stacking levels support VPIs (virtual path identifiers) and VCIs (virtual channel identifiers) for ATM and DLCIs (data link connection identifiers) for Frame Relay. The default value is 0.	Flow Identifier

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Table 8-1 (Cont.) New Resource Fields

Field Name	Required or Optional	Description	Applies to
Provider Managed	Optional	Select if this specification represents a Provider Managed flow identifier. In UIM, provider-managed flow identifiers are grouped into network address domains and resource pools from which they can be assigned. For example, an SP-VLANID is a provider managed flow identifier. Unmanaged flow identifiers are not managed by service providers. They are typically received on an order and referenced with a service location on the service. For example, a CE-VLANID is unmanaged by the service provider. The identifier value must be unique across all flow identifiers associated with the same network address domain.	Flow Identifier
Allow untagged	Optional	This check box ix enabled only when you select **Ethernet** as **Technology**. Select to indicate that the specification can be used to create untagged flow identifiers. Untagged flow identifiers allow untagged frames to pass through an interface. If this check box is selected, you can create both tagged and untagged flow identifiers. If the check box is not selected, you can create only tagged flow identifiers. Untagged flow identifiers must be named Untagged and cannot have an identifier. Otherwise, the identifier is required.	Flow Identifier
Delivery Action Target	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 "Defining Delivery Policies" for more information on how to define delivery policies.	Connectivity Specification Custom Network Address Specification Device Interfaces Logical Devices Media Stream Network Party Pipe Telephone Number Specification Custom Object Logical Device Account

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Table 8-1 (Cont.) New Resource Fields

Field Name	Required or Optional	Description	Applies to
Assign to Multiple Entities	Optional	Indicates that 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 Custom Network Address Specification, Device Interfaces, Logical Devices, Custom Object, and Logical Device Account.	Custom Network Address Specification Device Interfaces Logical Devices Custom Object Logical Device Account
Network Address Type	Required	Determines the entity types to which the network address domain applies. The valid values are IP Subnet and Flow Identifier. The default value is IP Subnet.	Network Address Domain
Allow Multiple Assignments	Optional	Indicates if the instances of the specification can assign entities whose specifications allow them to be assigned to multiple instances at the same time.	Logical Devices Logical Device Account
Termination type	Optional	Select the termination type: • Access • Trunk • Internetwork • Unknown The **Termination Type** and **Termination Packet Rider** values are interrelated. If you select the Termination Packet Rider check box, **Termination Type** becomes disabled.	Flow Interface
Termination packet rider	Optional	Indicates if the specification is rider or bearer. This field is disabled when **Termination Type** is selected.	Flow Interface
Start Date	Optional	Start date of a resource.	All except Other Resource
End Date	Optional	End date of a resource.	All except Other Resource

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Table 8-1 (Cont.) New Resource Fields

Field Name	Required or Optional	Description	Applies to
ID Generation	Optional	Method for resource ID generation. Select **Manually** or **ID specification** to specify the method in which the resource ID must be generated at the run time environment. This field is not available for Network Address Domain and Other specifications.	Flow Interface Specification Media Stream Specification Network Specification Party Specification Pipe Specification Business Interaction Custom Object Specification Connectivity Specification Device Interface Specification
ID Specification	Optional	Select the Identifier specification that must be used to generate resource IDs at runtime. This field is active only when you choose **ID Specifications** as the **ID Generation** method.	Flow Interface Specification Media Stream Specification Network Specification Party Specification Pipe Specification Business Interaction Custom Object Specification Connectivity Specification Device Interface Specification

> **Note**
>
> Resource IDs must be unique and follow naming rules. See "About Naming Rules" for more information on naming rules.

5. Click **Create and Continue**.

   The **Resource** editor page opens.

6. Use the appropriate tabs to further define resource details (tab availability varies by resource type):

   - **General Information**: Displays the general information of the specification. You can add advanced policy implementation assets to a specification. See "Adding Advanced

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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:
  - Flow Interface
  - Logical Device Account
  - Logical Device
  - 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 Business Interaction, Custom Network Address, Custom Object, Flow Identifier, Device Interface, Logical Device, Logical Device Account, Party, and Telephone Number Specifications. 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.

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> **Note**
>
> You cannot create new IP Address Resource Specifications, as these are preloaded. You may revise preloaded specifications if needed. See "Revising Resource Specifications" for information on how to revise resource specifications.

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. On the Solution Designer landing page, select the desired application.
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. Review 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. Click **Go to Resource Specifications** to return to the main page, or **Go to previous page** to return to the **Initiative Items** tab.

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

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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.

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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

Network specialists can revise resource specifications in **Released** status. See "About Revising Entities" for information on revising an entity.

To revise a resource specification:

1. On the Solution Designer landing page, select the desired application.
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 appears. *Specification* includes resources and locations.
4. Select an initiative in **Definition** status and click **Continue**.

   The corresponding specification editor page opens.
5. Update the required details such as configuration, design parameters, entity characteristics, parameter mapping, design policies, delivery policies, and general information. See "Updating Resource Specifications" for more information on modifying the specification details.

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> **Note**
>
> You can only revise preloaded IP Address Resource specifications; you cannot create or clone new ones.

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.

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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

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 **Property 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

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

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

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. **Property Location** is pre-loaded in Solution Designer. 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 **Property Location**, revise the preloaded Property Location Extension specification. See "Revising Infrastructure Specifications" for information on revising locations.

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

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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

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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 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 9-2 Create Inventory Group Fields

Field Name	Required or Optional	Description
Name	Required	Unique name of the Inventory Group.
ID	Required	Unique Id of the Inventory Group.
Initiative	Required	The initiative that the Inventory Group belongs to.
Inventory Group Type	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 **Group Entities** are added by default.

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Table 9-2 (Cont.) Create Inventory Group Fields

Field Name	Required or Optional	Description
Group Entities	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 **Inventory Group Type** selected and you can select multiple entities along with the default entities. The selected entities are retained when you modify **Inventory Group Type**. You can deselect them manually.
Start Date	Optional	The starting date of the Inventory Group specification.
End Date	Optional	The ending date of the Inventory Group specification.
Description	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. You can have the hard attributes that are added by default. See "About Hard Attributes" for details on hard attributes. You can also add user defined characteristics based on your business needs.
   - **Related Specifications**: Relate a specification to the selected Inventory Group specifications. The **Related Specifications** tab is available only for Inventory Groups specification and Place specifications. See "Relating Specifications" for details on defining related specifications.
   - **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:

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Table 9-3 Create Inventory Group Fields

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

5. Click **Create and Continue**.

   The **Involvement Specification** editor page opens.

6. 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 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 **Place Specification** in the **Create Infrastructure Specification** pop-up.

   The **Create Place Specification** page opens.

3. Enter the following fields:

Table 9-4 New Place Fields

Field Name	Required or Optional	Description
Name	Required	Unique name of the place entity.
ID	Required	Unique Id of the place entity.
Initiative	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.
Type	Required	The types of place specification. • **Site** defines a place that does not have a single, precise location. • **Address** defines ways to locate places based on textual information. • **Address Range** define a place using groups of related addresses. • **Location** defines a place based on geographic references.

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Table 9-4 (Cont.) New Place Fields

Field Name	Required or Optional	Description
Assign to Multiple Entities	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.
Allow Multiple Assignments	Optional	Select the check box if instances of this specification can assign entities whose specifications have **Assign to Multiple Entities** selected.
Start Date	Optional	The starting date of the place.
End Date	Optional	The ending date of the place.
ID Generation	Optional	Select **Manually** or **ID specification** to specify the method in which the resource ID must be generated at the run time environment. This field is not available for Network Address Domain and Other specifications.
ID Specification	Optional	Select the Identifier specification that must be used to generate resource IDs at runtime. This field is active only when you choose **ID Specifications** as the **ID Generation** method.
Description	Optional	The description of a place.

> **Note**
>
> The location must have a unique name and ID.

4. Click **Create and Continue**.

   The **Place** editor page opens.

5. You use the following tabs to define characteristics on locations:

   - **General Information**: Displays the general information of the location.
   - **Configuration**: Configure the relationship between the place specification and the resource entities. This tab is available only for **Site** type place specification. This builds a hierarchy between site and resources. See "Configuring Relationships between Specifications" for details on how to configure the relationships between specifications.
   - **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.
   - **Related Specifications**: Relate a specification to the selected place specifications. The **Related Specifications** tab is available only for Inventory Groups specification and Place specifications. See "Relating Specifications" for details on defining related specifications.
   - **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.

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Creating Role Specifications

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

To create Role 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 **Role Specification** in the **Create Infrastructure Specification** pop-up.

   The **Create Role Specification** page opens.
4. Enter the following fields:

Table 9-5 Create Role Fields

Field Name	Required or Optional	Description
Name	Required	Unique name of the Role Specification.
ID	Required	Unique Id of the Role Specification.
Initiative	Required	The initiative that the Role Specification belongs to.
Role Type	Optional	The type of the Role Specification. The available role types are **Technology**, **Function**, **Topology**, or **Target**. See "About Role Specifications" for the supported role types.
Applicable Entities	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 **Applicable Entities**, the role specification is available only to those selected entities at UIM run-time.
Start Date	Optional	The starting date of the Role Specification.
End Date	Optional	The ending date of the Role Specification.
Description	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:

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- 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.

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- **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.

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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.

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

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10

Managing Common Elements

Use **Common Elements** application to define the common elements such as data elements, converters, and sequence identifiers which can be used in the entity specifications.

Topics in this document

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 **Data Elements** or within CFSs, RFSs, and resources specifications.

Topics in this section

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:

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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 **Numeric** 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 **Feature Group** type is selected, the **Data Elements** 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
Text Field	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 **Numeric**, **Text**, **Time**, **Date and Time**, and **Hex Binary** data types.

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Table 10-2 (Cont.) Control Types

Control Types	Description
Dropdown	Displays a list of values. You can define the possible values for the list by selecting the data values such as **Enumerations**, **Entity based**, and **Query based**. This control type is available only for **Numeric**, **Text**, **Time**, and **Hex Binary** data types.
URL	Displays a URL. This control type is available only for **Text** data type.
Calendar	Enables users to enter or select date and time. This control type is available only for **Date and Time** 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 **Data Elements** in the **Common Elements** 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 **Common Elements** application, click the **Data Elements** tab in the bottom left and then click**Create Data Element**.

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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.

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6. Do one of the following:
   - Click **Create** if you are creating a feature group from **Data Elements**.
   - 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 **Common Elements** 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 **Common Elements** 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 **Common Elements** 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.

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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.

> **Note**
>
> The special characters such as ampersand character (&) and the left angle bracket (<) must not appear in their literal form. They must be escaped using either numeric character references or the strings such as **&** and **<** respectively.

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.

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Table 10-3 Inventory Settings Fields

Field Name	Use	Data Type	Control Type
Control Type	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 About Control Types for more information on control types.	Text Numeric Time Date and Time Hex Binary	Not applicable
Read-Only	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
Mask during display mode	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
Mask during edit mode	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
Minimum Value	Enter a minimum value from which the field values are valid in the UIM run-time environment.	Numeric	Text Field
Maximum Value	Enter a maximum value to which the field values are valid in the UIM run-time environment.	Numeric	Text Field
Case	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
Enable Search (text)	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 *UIM Developer's Guide* for more information on customizing the user interface of pop-up window.	Text	Text Field

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Table 10-3 (Cont.) Inventory Settings Fields

Field Name	Use	Data Type	Control Type
Sensitive	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 **Sensitive**, **Mask during display mode** and **Mask during edit mode** are disabled.	Text Time Numeric Hex Binary	Text Field
External	If **External** is set, the URL is opened in a new tab of the browser that UIM is open. If **External** is not set, the URL is opened within the UIM application page.	Text	URL
From Range	Select a date from which the field values are valid.	Date Date and Time	Calendar
To Range	Select a date to which the field values are valid.	Date Date and Time	Calendar
Data Values	You can dynamically populate the drop-down list by selecting any one of the data values: • **Enumerations**: Enables you to populate the drop-down list with a group of values that do not change. • **Entity based**: Enables you to populate the drop-down list with the names of all entities created from the selected specification. • **Query based**: Enables you to populate the drop-down list with the results of a query that you define. To specify the syntax of the query, select from the **Data values** list, select **JPQL**, **SQL** or **USERS**. – Select **JPQL** to use JPQL syntax. – Select **SQL** to use SQL syntax. – Select **USERS** to specify a query that populates the drop-down list with all UIM users.	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.

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- **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 **Common Elements** application.
- **Initiative Items** tab in **Initiatives** in the **Publishing Center**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** tab in the **Common Elements** application, search for a data element using the following criteria:
     – Data Elements name
     – Type

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  - Initiatives
  - Last Updated date

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

- In the **Initiatives** tab in the **Publishing Center** 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 **Common Elements** application, in the **Data Elements** tab, search for a data element.

     The data elements result is filtered based on the search criteria.
   - In the **Publishing Center** application, in the **Initiatives** tab, 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 **Common Elements** application, in the **Data Elements** tab, search for a data element and click to open it.

     The data element drawer opens.

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- In the **Publishing Center** application, in the **Initiatives** tab, 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** tab in the **Common 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 **Data Elements**.

To delete a data element in **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 **Common Elements** application, in the **Data Elements** tab, search for a data element.

     The data elements results section is filtered based on the search criteria.

   - In the **Common Elements** application, in the **Data Elements** tab, search for a data element and click to open it.

     The data element drawer opens.

   - In the **Publishing Center** application, in the **Initiatives** tab, 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.

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> **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 **Common Elements** application, you can use those conversion values while mapping the parameters in the product specification.

Topics in this section

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:

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- In the **Common Elements** 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 **Common Elements** application and click **Converters**.
2. Search for a converter using the following criteria:
   - Converter name
   - Type
   - Initiatives
   - Last Updated

   The 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.

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To update a converter:

1. In the **Common Elements** 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 **Common Elements** 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.

Managing Sequence Identifiers

You can manage the sequence of an ID for an entity and identity generation.

Topics in this section:

- About Sequence Identifiers
- Creating Sequence Identifiers
- Viewing Sequence Identifiers

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- Updating Sequence Identifiers
- Deleting Sequence Identifiers

About Sequence Identifiers

You can customize the identification generation using **Identity** specifications. You can use **Sequence** specifications to customize the sequence of an ID for an entity, by defining the maximum, minimum and increment values for the sequence. Additionally, you can define and use **Sequence** specifications independent of **Identity** specifications. You can create sequence specifications to define sequences used in custom logic (in rulesets and extension points in UIM) that you write to generate numeric identifiers.

You use Solution Designer to create entities so that when instances are created in UIM, the entity IDs are generated automatically. By default, the ID is a numeric sequence number. You can also customize the ID generation by defining an Identification specification and associating it to CFS, RFS and resource specifications. The Identity specifications enable you to define alphanumeric prefixes and suffixes, which are added to numeric sequence values to form ID values for entities. An Identification specification must be associated with a Sequence specification. The Sequence specification defines the minimum, maximum, and increment values that UIM uses to generate the numeric sequence value segment of the entity ID. You can associate an Identification specification to one or multiple specifications to define how UIM creates entity IDs when you create an entity using those specifications.

Creating Sequence Identifiers

Use **Identity** to define how ID values are created for an entity when the ID is generated automatically.

You use **Sequence** specifications with **Identity** specifications to customize the sequence of an ID for an entity, by defining the maximum, minimum and increment values for the sequence. Additionally, you can define and use Sequence specifications independent of Identification specifications. You can create sequence specifications to define sequences used in custom logic (in rulesets and extension points) that you write to generate numeric identifiers. For example, you can create sequence specifications for serial numbers or connection IDs. See *UIM Developer's Guide* for more information.

Creating Sequence

To create sequence specifications:

1. In the Solution Designer landing page, click the **Common Elements** application.
2. Click the **Sequence Identifiers** tab and then click **Create Sequence Identifier**.

   The Create Sequence Identifier page opens.
3. Select **Sequence Specification** as the specification type.

   The **Create Sequence Specification** page opens.
4. Enter the information in Basic information and Additional information section.

   lists the fields while creating sequence specifications.

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Table 10-4 Sequence Specification Fields

Field Name	Required or Optional	Description
Name	Required	Name of the sequence specification
ID	Required	Name of the sequence specification
Initiative	Required	Initiative of the sequence specification
Minimum value	Required	Specify a minimum value for the sequence.
Maximum value	Required	Specify a maximum value for the sequence. Retain the default value 0 to define the sequence value with no explicit limit.
Increment value	Required	Specify an increment value for the sequence.
Start Date	Optional	Start date for the sequence specifications.
End Date	Optional	End date for the sequence specifications.
Description	Optional	Description for the sequence specification.

5. Click **Create and Continue**.

   The Sequence Specification details page opens.

You can associate the sequence specification to the Identification specification in the Identification Specification page.

You see the following tabs:

- **General Information**: Displays the general information of the sequence specification.
- **Used by**: Lists all the specifications that are related to the sequence specification.

Creating Identity

To create identification specifications:

1. In the Solution Designer landing page, click the **Common Elements** application.
2. Click the **Sequence Identifiers** tab and then click **Create Sequence Identifier**.

   The Create Sequence Identifier page opens.
3. Select **Identity** as the specification type.

   The **Create Identity** page opens.
4. Enter the information in Basic information and Additional information section.

   lists the fields while creating sequence specifications.

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Table 10-5 Identity Specification Fields

Field Name	Required or Optional	Description
Name	Required	Name of the identity specification
ID	Required	Name of the identity specification
Initiative	Required	Initiative of the identity specification
Prefix	Optional	Specify an alphanumeric sequence of characters to append to the beginning of the numeric sequence of the ID value.
Suffix	Optional	Specify an alphanumeric sequence of characters to append to the end of the numeric sequence of the ID value.
Sequence specification	Required	Select an existing Sequence specification.
Start Date	Optional	Start date for the identity specifications.
End Date	Optional	End date for the identity specifications.
Description	Optional	Description for the identity specification.

5. Click **Create and Continue**.

   The identity details page opens.

You see the following tabs:

- **General Information**: Displays the general information of identity.
- **Used by**: Lists all the specifications that are related to identity.

Viewing Sequence Identifiers

To view sequence identifier specifications:

1. In the Solution Designer landing page, click the **Common Elements** application and click **Sequence Identifiers**.
2. Search for a sequence identifier using the following criteria:
   - Sequence identifier name
   - Type
   - Status
   - Initiative
   - Last Updated

   The sequence identifiers result is filtered based on the search criteria.
3. Click a sequence identifier's name to view the details.

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A sequence identifier details page appears.

4. After viewing the details, click **Go to Sequence Identifiers**.

Updating Sequence Identifiers

You update the sequence identifier details such as name, description, minimum value, maximum value, and incremental value.

To update the sequence identifiers:

1. In the **Common Elements** application, in the **Sequence Identifier** tab, search for a Sequence Identifier.

   The sequence identifier result is filtered based on the search criteria.

2. Click the sequence identifier that you want to view.

   You see the following tabs:

   - **General Information**: Displays the general information of the sequence identifier specification.
   - **Used by**: Lists all the specifications that are related to the sequence identifier specification.

3. Click **Edit** in the General Information page.
4. In the sequence identifier details drawer and update the necessary information.
5. Click **Save**.

> **Note**
>
> You can't update the sequence identifier's details, if the associated initiative has completed the **Advanced Configuration** phase.

Deleting Sequence Identifiers

You delete a Sequence Identifiers in the Sequence Identifiers' results page or in the details page. You can't delete a Sequence Identifier that is being used in a released initiative or that is referenced by a specification.

To delete a Sequence Identifier:

1. In the Solution Designer landing page, click the **Common Elements** application and then click **Sequence Identifiers**.

   The Sequence Identifiers results section is displayed.

2. Click **Delete** on the Sequence Identifier to be deleted.

   The delete confirmation dialog box opens.

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

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

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Note

You can't delete a sequence identifier:

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

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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

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.

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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 11-1 New Component Fields

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

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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

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- 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. On the Solution Designer landing page, click the desired application.
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, for service model and technology model, in the **Configure Model** step, expand **Design Parameters** and select a specification.
   - In the **PSR Models** application, for product fulfillment model, in the **Configure parameters** step, expand **Design Parameters** and select a specification.

   The specification drawer opens with a list of defined design parameters
3. Click **Add design parameter**.

   The **New design parameter** drawer opens.
4. Enter a data element, name, and default value. The default value is populated from the **Data Elements**. You may select an existing data element or create a new one by selecting **+ Create Data Element**. See "Creating New Data Elements" for more details.

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5. Select **Persist** to automatically create a corresponding characteristic and a parameter mapping. *Persist* is only available for newly created design parameters.
6. (Optional) Enter **Multiplicity** details. This section appears only when you add a feature group as a design parameter. See "About Multiplicity" for more information on multiplicity.
7. Add **Design Action Mapping** by selecting appropriate values for the action codes (Add, Change, Disconnect, Suspend, Resume, and Move) according to your business requirements.
8. Click **Add** to save the design parameter.

   The design parameter is added.

You can search for associated design parameters in the **Design Parameters** tab. A consolidated view of design parameters and their design action mappings is available, allowing you to update mappings in the context of 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 represent specific data properties you can associate with a service or resource in Solution Designer. For example, a characteristic can be an ID, a feature, or a telephone number. Some characteristics are added by default based on the resource type and these are referred to as hard attributes. You can define data elements or feature groups as entity characteristics for CFSs, RFSs, resources, and locations.

To define characteristics:

1. On the Solution Designer landing page, click the desired application.
2. Do one of the following:

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- In **Service Specifications** or **Resource Specifications** applications, search and open the specification page and click the **Characteristics** tab.

  The **Characteristics** page opens that lists the existing characteristics and the hard attributes.

- 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 the list of defined characteristics for the selected specification by name.

3. Enter the details of the characteristic:
   - Select an existing data element, or create a new one. Optionally, select or create a new feature group as a 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, if needed. The default is pre-populated from the associated data element.
   - Select **Required** if the characteristic must be mapped to a design parameter in the **Parameter Mapping** tab. This option is not available for feature group characteristics.
   - Select **Changeable** if the characteristic changes frequently or if you need to track its lifecycle. For example, in the *Mobile Service* scenario, you may mark *Monthly Quota* as changeable so you can audit changes over time. For CFSs and RFSs realized in UIM, Solution Designer records changeable characteristics in the Service Configuration specification.
   - (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. (Optional) Enter **Derived value**. You can derive the value of a characteristic from the specification's design parameters and the custom text. The actual values are set in the UIM runtime environment.

> **Note**
>
> The **Derived value** field is available only for characteristics of type **Numeric** or **Text**.

To add a derived value for a Text characteristic:

a. Click anywhere in the **Derived value** text box.

b. Do one of the following:
   - Select **Add design parameter** to use a parameter's value. In the **Add Design Parameter** task dialog, select the design parameter from the drop-down list which displays all the **Numeric** and **Text** design parameters.

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- Select **Add Text (String)** to add custom text.

You may combine design parameters and text; for example, merge the *Line1* and *Line2* design parameters to create an *Address* characteristic.

To add a derived value for a Numeric data type characteristic:

a. Click anywhere in the **Derived value** text box.

b. Do one of the following:

- Select **Add design parameter** to use a value from the specification's numeric design parameters. In the **Add Design Parameter** task dialog, select the design parameter from the drop-down list which displays all the **Numeric** design parameters.
- Select **Add Operator**to derive a value mathematically. The supported operations include addition, subtraction, multiplication, and division. This option is available only for **Numeric** data type characteristic.
- Select **Add Value** to enter the static numeric value.

You can mix static values and parameter values in arithmetic expressions.

5. Click **Submit**.

The characteristic is added to the specification.

> **Note**
>
> At runtime, characteristic values follow this precedence:
>
> - The derived value (if present) takes the highest priority and overrides parameter mapping or any default value.
> - If a value is set using parameter mapping, it takes precedence over the default value.

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.

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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.

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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

Design policies define how a service or resource is provisioned in UIM. They allow you to specify logic and assignment conditions, so that at runtime, if a condition is met, the defined logic is run to assign the appropriate resources in UIM to fulfill the service. These policies typically use simple if-then rules. In Solution Designer, you can manage two types of design policies:

- Standard Policies
- Advanced Policies

> **Note**
>
> When you define a design policy with a feature group parameter in the condition, and the feature group has a multiplicity greater than one, only the first instance is considered for condition validation.

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Defining Standard Policies

Standard policies define the design and assign of service specifications and resource specifications. You can configure and assign service specifications based on design parameters, and configure and assign resource specifications based on design parameters, characteristics, and inventory groups. For example, in the *Mobile Service* scenario, if the State is *ON*, select the *5G Profile RFS*; otherwise, select the *4G Profile RFS*.

You can create the following types of standard policies:

- **Standard Policies for Service Specifications**: Assign service specifications based on design parameters. These are the default design policies for service specifications. The specification selection policy is applicable only for resource and service specifications. The design policies created for service specifications are Specification Selection policies by default.
- **Standard Policies for Resource Specifications**:
  - **Specification Selection Policies**: Assign resources based on design parameters.
  - **Resource Selection Policies**: Assign resources based on their characteristics or inventory group. The resource selection policy is applicable only for resource specifications.
    - **Characteristics based**: Assign resources by characteristic values. For example, select a phone number from inventory range based on Service Address.
    - **Inventory group based**: Assign resources based on inventory group characteristics. Only Inventory Groups with the same initiative and in Released status are available.
  - **Naming Policies**: Define naming logic for resource specification instances created at runtime. Naming can be based on a design parameter, ID, string, or a combination. The naming policy is applicable only for resource specifications.
  - **IP Creation Policies**: Define the creation of IP Subnets and IP Addresses, based on characteristics of the IP specification. This applies only to IPv4Subnet and IPv6Subnet specifications. The IP Creation policy is applicable only for IPv4Subnet and IPv6Subnet specifications.

Defining Standard Policies for Service Specifications

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

To define standard policies:

1. On the Solution Designer landing page, click the desired application.
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** 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**.

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The **New standard policy** page opens.

4. Enter the policy name and description.
5. Select a component in the **Component** drop-down. The **Component** drop-down lists only those components that are related to the selected service specification.
6. Select a default value in the **Default Value** drop-down that lists the specifications related to the chosen component.
7. Add conditions in the **Conditions** section:
   a. Drag and drop the design parameters from the **Parameters** panel. The **Parameters** panel displays the design parameters for the selected 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 define valid values for the parameters or enter a value if you do not have valid values defined for design parameters.

      Multiple conditions within a group require all conditions to be met for the corresponding **Then** action to run.
8. In the **Then** drop-down, choose **Create** or **Select**:
   - **Create:** Creates the chosen specification at runtime.
   - **Select:** Uses an advanced policy or resource selection policy from the **Select policy** drop-down.

   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.

   > **Note**
   >
   > If you use **Select**, an appropriate advanced or resource selection policy must exist for the entity.

9. (Optional) Click **Add New Group** to define additional condition groups. The first group whose conditions are met will trigger its **Then** clause.
10. Click **Add**.

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

Defining Standard Policies for Resource Specifications

You can define the specification selection policies, resource selection policies, and naming policies for the resource specifications.

> **Note**
>
> When you create a standard policy for a Logical Device or Logical Device Account resource specification, Solution Designer can create the resource automatically.

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Defining Resource Selection Policies

You can define the specification selection standard policies, resource policies based on its characteristics and the inventory groups. The resource selection policy is applicable only for resource specifications.

For specification selection standard policies, see "Defining Specification Selection Policies".

For characteristics based resource selection policies, see "Defining Characteristics Based Resource Selection Policies".

For Inventory group based resource selection policies, see "Defining Inventory Group Based Resource Selection Policies".

Defining Specification Selection Policies

To define specification selection standard policies for resources:

1. On the Solution Designer landing page, click the desired application.
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** 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 **Add**.

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

Defining Characteristics Based Resource Selection Policies

To define Characteristics Based Resource Selection Policies for resources:

1. On the Solution Designer landing page, click the desired application.
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** 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**.

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The **New standard policy** page opens.

4. If you are creating a standard policy for a resource specification, select **Resource selection** as **Standard policy type**. The **Standard policy type** is available only when you create a standard policy for the resource specifications.
5. Select **Characteristics based** as **Selection rule**.
6. Enter the name and description.
7. 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 define 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.
8. Click **Add**.

   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 Inventory Group Based 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** 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**.

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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. Select **Inventory group based** as **Selection rule**.
6. Select **Inventory group**. The Inventory group drop-down list displays all groups with the same initiative as the selected specifications and those currently in the **Released** status.
7. Enter the name and description.
8. 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 the selected Inventory group.

   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 define 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.
9. Click **Add**.
   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** 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.

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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 **Add**.
   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 IP Creation Policies

The IP Creation policies creates the IP Subnets and IP addresses. This policy is available only for IPv4Subnet Resource Extension and IPv6Subnet Resource Extension specifications.

To define IP Creation Policies for resources:

1. In the Solution Designer landing page, click the **Resource Specifications** application
2. Search the preloaded **IPv4Subnet** or **IPv6Subnet** specification editor page.
3. Revise the **IPv4Subnet** or **IPv6Subnet** specification. See "Revising Resource Specifications" for information on revising IPv4Subnet and IPv6Subnet specifications.
4. Click the **Design Policies** tab.
5. click the + drop-down and select **Standard policy**.

   The **New standard policy** page opens.

6. Select **IP creation** as the **Standard policy type**.
7. Enter the name and description.
8. In the **Conditions** section, select **All** or **Any** in the **If** clause. Select **All** if all the conditions must be met to create the IP resources. Select **Any** if any of the conditions can be met to create the IP resources.

   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.

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b. Select the operator from the available operators. The available operators are based on the characteristics type. The operators include 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 define valid values for the characteristics or enter a value if you do not have valid values defined for design parameters.

9. In the **Then create** drop-down, select the **Entity**. Select **IPv4Subnet** or **IPv4Addresses** if the selected specification is IPv4Subnet Resource Extension specification. Select **IPv6Subnet** or **IPv6Addresses** if the selected specification is IPv4Subnet Resource Extension specification.

   - If you have selected **IPv4Subnet** or **IPv6Subnet** in the **Entity** drop-down list, enter **Quantity** and **Prefix length**. Quantity defines the number of subnets that must be created at runtime and Prefix length identifies the Classless Inter-Domain Routing (CIDR) in which the subnets must be created.
   - If you have selected **IPv4Address** or **IPv6Address**, enter **Start address** and optionally **End address**. If you enter an end address, the IP addresses between the start address and the end address are created contiguously.

10. 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.

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

> **Note**
>
> You must associate the IP creation policy to any of its parents' specification's standard policy to select an appropriate IP resource.

Defining Advanced Policies

Advanced policies in Solution Designer provide the flexibility to implement complex provisioning logic that extends beyond standard if-then scenarios.

While you define the advanced policy's structure in Solution Designer, a developer implements the logic in Design Studio using the extended designer class. Solution Designer combines both standard and advanced policies to build a complete solution.

For example, in the *Mobile Service* scenario, you may require an advanced policy such as: *Select the UDR in the same state as the 5G Profile RFS*.

To define an advanced policy:

1. On 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 page opens.
   - In the **PSR Models** application, in the **Configure Model** step, expand **Design Policies** and select a specification.

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The **Design Policies** drawer opens.

3. In **Design Policies** tab, click **Add** and select **Advanced policy**.

   The **New advanced policy** page opens.

4. Enter the policy name, description, component, and default value. The **Component** drop-down lists only those components related to the selected specification. The **Default Value** drop-down lists the specifications related to the selected component.

5. Enter clarifying notes regarding the policy 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.**

Procedure for Setting up an Advanced Policy

Perform the following steps to set up an advanced policy:

1. Add the advanced policy in Solution Designer, and include explanatory notes in the **Notes** tab. These notes will be inserted as comments within 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 Workspace.

   After a successful publish, the requested Design Studio workspace is generated.

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. In the Design Studio project, you will find a base class and an extended designer class. Write the advanced policy implementation in the extended designer class using the notes as reference comments. Compile your code as needed. See "Extending Solution Designer" in *Developer's Guide* on how to define advanced policy implementation.

6. Use Object Store Utility to update 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 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.

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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 11-2 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

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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

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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 he **Service Specifications** application, the **Resource Specifications** application, or while configuring model in the **PSR Models** application.

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Deleting Delivery Policies

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

Relating Specifications

You can relate one specification to another or modify relationship properties using the **Related Specifications** tab. This tab is divided into subtabs, each representing a different entity type. By default, only the entity types listed in each subtab have meaningful relationships in UIM. The **Others** subtab allows you to relate specifications to additional entity types, but these relationships require rulesets to trigger behaviors and actions in UIM. To relate entities from different domains, you must designate those domains as either the primary or secondary domain for the selected entity's domain.

The **Related Specifications** tab is available only for the Resource specifications of type Business Interaction, Custom Network Address, Custom Object, Flow Identifier, Device Interface, Logical Device, Logical Device Account, Party, and Telephone Number Specifications. The **Related Specifications** tab contains the following subtabs:

- **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.
- **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. In **Others** subtab, you can relate the following specifications to the base specification:
  - Business Interaction
  - Connectivity Specification
  - Custom Network Address Specification
  - Custom Object Specification
  - Customer Facing Services
  - Device Interface Specification
  - Flow Identifier Specification
  - Flow Interface Specification
  - Inventory Group Specification
  - Involvement Specification
  - Logical Device Specification
  - Logical Device Account Specification
  - Media Stream Specification

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- Network Specification
- Network Address Domain Specification
- Other Resource
- Party Specification
- Pipe Specification
- Place Specification
- Resource Facing Services
- Role Specification
- Telephone Number Specification

Table 11-3 lists the available subtabs for the specifications that has related specifications tab displayed.

Table 11-3 Related Specifications Subtabs

Specifications	Available Subtabs
Business Interaction	For Business Interaction, there are no subtabs but you can relate any of the following specifications: Business Interaction Connectivity Specification Custom Network Address Specification Custom Object Specification Customer Facing Services Device Interface Specification Flow Identifier Specification Flow Interface Specification Inventory Group Specification Involvement Specification Logical Device Specification Logical Device Account Specification Media Stream Specification Network Specification Network Address Domain Specification Other Resource Party Specification Pipe Specification Place Specification Resource Facing Services Role Specification Telephone Number Specification
Custom Network Address	Inventory Groups Others
Custom Objects	Roles Inventory Groups Others

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Table 11-3 (Cont.) Related Specifications Subtabs

Specifications	Available Subtabs
Device Interfaces	Device Interfaces Logical Devices Roles Others
Inventory Groups	Inventory Groups Others
Flow Identifier	For Flow Identifier, there are no subtabs but you can relate any of the following specifications: Business Interaction Connectivity Specification Custom Network Address Specification Custom Object Specification Customer Facing Services Device Interface Specification Flow Identifier Specification Flow Interface Specification Inventory Group Specification Involvement Specification Logical Device Specification Logical Device Account Specification Media Stream Specification Network Specification Network Address Domain Specification Other Resource Party Specification Pipe Specification Place Specification Resource Facing Services Role Specification Telephone Number Specification
Logical Devices	Device Interfaces Logical Devices Logical Device Accounts Roles Inventory Groups Others
Logical Device Accounts	Device Interfaces Inventory Groups Others
Party	Roles Inventory Groups Others

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Table 11-3 (Cont.) Related Specifications Subtabs

Specifications	Available Subtabs
Place Specifications	Roles Inventory Groups Others
Telephone Number Specifications	Inventory Groups Others

To relate specifications:

1. In the Solution Designer landing page, click the application that you want to work with.
2. Do one of the following:
   a. 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 Business Interaction, Custom Network Address, Custom Object, Flow Identifier, Device Interface, Logical Device, Logical Device Account, Party, and Telephone Number Specifications.

   b. In the **Infrastructure Specifications** application, search for a Inventory Groups or Place Specifications and open the specification editor page and click the **Related Specifications** tab.
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 resource specifications.

   c. Click **Save and Add**.

   The selected specification is added to the respective subtab.

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12

Publishing Initiatives

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

Topics in this document

About Workspaces

A workspace is a secure, logical environment that allows you to collaboratively manage, configure, and deploy publishing initiatives. Workspaces provide structured separation between different projects, stages (such as Test and Production), or teams, enabling controlled access, versioning, and workflow management. Each workspace operates independently, ensuring that changes or activities within one do not impact others, and supporting best practices for security, compliance, and quality assurance.

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 cartridges and those cartridges are then deployed into the application's run-time instances. A cartridge is a collection of PSR models which includes fulfillment patterns, fulfillment functions, service specifications, resource 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 application 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 the 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 application's run-time instance.

Viewing Workspaces

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

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To view the workspace:

1. In the Solution Designer landing page, click the **Publishing Center** application.
2. Click **Workspaces** tab and then click the **Test** or **Production** workspace.
3. The workspace details page opens.
4. 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. This status is applicable only for UIM participant.
     - **SIMULATED_FAILED**: The simulated publish is unsuccessful and a log is generated to show the errors that caused the failure. This status is applicable only for UIM participant
     - **STAGED**: The Publish operation to the **Production** workspace is in progress.
   - The **Participants** tab lists the participants that are defined for the selected workspace. The predefined participants are:
     - UIM Participant
     - OSM Participant are also called OSM Cartridge Assembler (OCA)

     You can't delete the predefined participants and you cannot define any new participants.
5. 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.

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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 **Publishing Center** application, click the **Workspaces** tab.
3. In the **Workspaces** page, click **Manage Connections**.

   A **Connections** page opens which lists the available connections.
4. Click **New Connection**.

   A **New Connection** page opens.
5. Enter the following details:

Table 12-1 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, *Connection*.
Authentication	Required	Provide authentication details to authenticate the participant. Enter the **ID**, **Secret**, and **Token Endpoint URL**.
Participant	Required	Add the participant details. Select the Participant ID, Workspace, Scope, and End point URL as follows: **For UIM participant:** Partcipant ID: `UIM` Workspace: `Test` or `Production` Scope: `/lcm` Endpoint URL: `http://uim-participant:8080` **For OSM participant:** Partcipant ID: `OSM` Workspace: `Test` or `Production` Scope: `/lcm` Endpoint URL: `http://participandsd` You must add the same participant twice- once to the **Test** workspace and once to the **Production** workspace.

6. Click **Create**.

   The connection is created and is listed in the **Connections** page.
7. Navigate to the *Connection* Initiative and transition the initiative to the **Acceptance Testing** phase.
8. 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.

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9. 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 for all the 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 **Publishing Center** application and then click the **Workspaces** tab.
2. In the **Workspaces** page, 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 user role to delete a connection.

To delete a connection:

1. In the Solution Designer landing page, click the **Publishing Center** application and then click the **Workspaces** tab.
2. In the **Workspaces** page, 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 Participants

In Solution Designer, a participant is a microservice that interacts with the respective DevOps engine to process publish requests and generate the corresponding cartridges.

There are two predefined participants:

- UIM Participant
- OSM Participant (also known as the OSM Cartridge Assembler)

You can publish initiatives to a workspace that is configured for a specific participant. The cartridges are generated based on the type of the PSR model that is published. If a workspace

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is configured for multiple participants, the priority setting determines the order in which the initiative is published.

For example, if the Test workspace is configured for both the OSM Participant (priority 1) and the UIM Participant (priority 2), the initiative is published to the OSM Participant first, followed by the UIM Participant. If the publish process fails for the OSM Participant, the process stops and is not sent to the UIM Participant.

About UIM Participant

UIM Participant is a microservice that interacts with the DevOps engine to generate UIM cartridges when an initiative is published to a workspace. A **workspace** is an interface that enables Solution Designer to interact with the DevOps engine, which includes all necessary plug-ins required by Solution Designer to build the requested UIM cartridge. After generation, you can deploy the cartridge into UIM.

A UIM cartridge is a collection of PSR models, which include specifications, characteristics, design parameters, parameter mappings, design policies, and delivery policies defined in Solution Designer. The artifacts are compiled into a deployable JAR file.

Cartridge Generation Process

1. **Build the service or technology model in PSR models:** See "Creating PSR Models using Guided Process" for information on how to create service models and technology models.
2. **Transition the initiative to the Advanced Configuration stage.**
3. **Publish the initiative to the Test workspace:** The workspace interacts with the UIM Participant, a microservice that participates in the publish operation. The UIM Participant, in turn, communicates with the DevOps engine to generate the required Design Studio workspaces and cartridges.
4. **Monitor cartridge generation:** After the cartridge is generated, the DevOps engine informs the UIM Participant, which then updates the workspace regarding the request status. The locations of the generated cartridge artifacts and the Design Studio workspace (which can be imported into Design Studio) are displayed in the **Publishing** tab of the corresponding initiative.
5. **Download and import the Design Studio workspace:** Import the workspace into the Design Studio Eclipse environment to:
   - Code the design and assign logic for advanced policies,
   - Define parameter mappings,
   - Configure logic for design and delivery action mappings.

   The generated workspace contains both a base class and an extended designer class:
   - The **base class** is Java code generated by the DevOps engine to implement specification behavior and must not be modified.
   - The **extended designer class** allows you to add custom code at provided extension points. You can:
     - Code and assign policies based on your business requirements,
     - Debug existing design and assign policies for errors, including compilation errors.

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

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6. **Upload custom code:** After completing the custom code in Design Studio, upload the updates to Solution Designer either manually or by running the Object Store Utility. See "Working with Object Store Utility" in *Developer's Guide* for more information on Object Store Utility.
7. **Publish and deploy cartridges**: Publish the initiative to the **Test** workspace, which triggers the DevOps engine to build the requested cartridge for deployment to a runtime environment. Download the cartridge artifacts and deploy them in UIM. See "Deploying Cartridges" in *UIM Cartridge Guide* for more information on deploying cartridges in UIM.
8. **Release the initiative**: After the initiative is transitioned to the release stage, publish it to the **Production** workspace. The DevOps engine then builds the production cartridge for deployment to the production UIM runtime environment.

Publishing Initiatives to UIM Participant

You must have the Service Catalog Administrator role to publish initiatives. After you finish defining the service models or technology models and their contents, transition the initiative from the **Definition** stage to the **Advanced Configuration** stage.

You can then publish the initiative to the UIM participant to create the test and production cartridges, which can be deployed to the UIM runtime.

The processes for generating production cartridges are as follows:

- Publishing Initiatives to Generate Design Studio Workspaces
- Publishing Initiatives to Generate Test Cartridges
- Publishing Initiatives to Generate Production Cartridges

Publishing Initiatives to Generate Design Studio Workspaces

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

> **Note**
>
> Simulated publish is applicable only to UIM participant.

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

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

   The initiative details page opens.
3. Ensure that the initiative is in **Advanced Configuration** stage. The initiative must have completed the definition stage and not be approved for testing yet.
4. Click **Publish**.

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5. Select a workspace from the available list and click **Publish**. You publish the initiative to generate only Design Studio workspaces when the definition is completed and before you complete advanced configuration.
6. Click **Publishing** tab.

   A new row for the publish operation is added and the **Publish Status** is in **In Progress**.
7. 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.
8. 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 **UIM Error 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.
9. 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 **Publishing Center** application and then click the **Initiatives** tab.
2. In the **Initiatives** page, search for the initiative and click to open it.

   The initiative details page opens.
3. Click **Publish**.
4. Select a workspace and click **Publish**. You publish the initiative to generate a UIM Cartridge which can be deployed in the UIM test environment to perform functional testing.

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> **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.

5. 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**.

6. 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.

7. 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 **UIM Error 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 **Publishing Center** application and then click the **Initiatives** tab.
2. In the **Initiatives** page, 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 the **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.

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5. You must wait until you receive a pop-up message *Publish successful* or *Publish failed*. If the publish operation succeeds, 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 UIM.
   - If the Publish Status is **Failed**, click **UIM Error 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**.

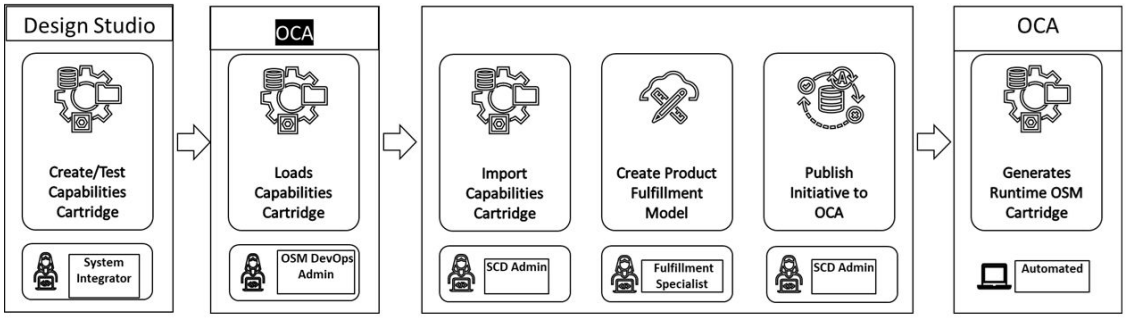
     After you resolve the errors, you can republish the initiative until the publish operation is successful.

About OSM Participant or OSM Cartridge Assembler

The OSM participant (also called as OSM Cartridge Assembler (OCA)) is a microservice to seamlessly unify TMF cartridges created in Design Studio with content modeled in Solution Designer, enabling dynamic assembly and streamlined deployment of cartridges to OSM. The OCA microservice is the component responsible for merging the content between OSM and Solution Designer; and deploying the resulting cartridge to OSM.

Figure 12-1 describes the work flow between Solution Designer and OCA.

Figure 12-1 Solution Designer to OCA Workflow



OCA Cartridge Generation Process:

1. **Create the Capabilities Cartridge:** Begin the process by creating a capabilities cartridge in Design Studio that includes fulfillment patterns, fulfillment functions, and fulfillment systems required by Solution Designer. See "Packaging and Deploying a Capabilities Cartridge " in *Design Studio Modeling OSM Orchestration* for information on how to generate the capabilities cartridge in Design Studio.
2. **Load Cartridge into OCA:** After creation and testing, import the cartridge into OCA by the OSM DevOps admin. See "Installing OSM Cartridge Assembler (OCA) for Integration with Solution Designer" in *OSM Cloud Native Deployment Guide* for information on how to load the capabilities cartridge in OCA.

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3. **Generate and Import Manifest:** OCA produces a manifest (a JSON file) describing the cartridge contents. The SCD admin then imports this manifest into Solution Designer, which provides access to fulfillment entities, fulfillment patterns, fulfillment functions, fulfillment systems, order item properties, and granularities. See "Importing Capabilities Cartridges" on how to import capabilities cartridge into Solution Designer.
4. **Create Product Fulfillment Model:** The fulfillment specialist creates the product fulfillment model in Solution Designer. This involves adding product specifications, mapping them to CFSs, providing parameter mapping, defining target fulfillment patterns, and setting routing rules for order decomposition. See "Creating Product Fulfillment Models using Guided Process"
5. **Publish Model Back to OCA:** After completing the model, the SCD admin publishes it back to OCA. See"Publishing Initiatives to OSM Participant" for information on how to publish the model to OCA.
6. **Generate and Deploy OSM COM Cartridge:** OCA uses the model and capabilities cartridge to generate an OSM Central Order Management (COM) cartridge, which is deployed to the OSM runtime automatically.
7. **Accept OSM COM Orders:** The OSM runtime can then process OSM COM orders.

Publishing Initiatives to OSM Participant

You must have the service catalog administrator role to publish the initiatives. After you complete defining the Product fulfillment models and their contents, you transition the initiative from the **Definition** stage to the **Functional Testing** stage.

To publish or republish an initiative to the Test workspace:

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

   The initiative details page opens.
3. Click **Publish**.
4. Select a workspace and click **Publish**.

> **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.

5. 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**.
6. You must wait until you receive a pop-up message *Publish successful* or *Publish failed*. If the publish operation succeeds, 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.
7. You can do one of the following based on the **Publish Status**:
   - If the Publish Status is **Success**, the OSM cartridge is generated with the same name as the capabilities cartridge with version appended with the publish operation ID. OCA

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then deploys the OSM cartridge to the OSM runtime. See "Viewing Deployed Cartridges and Setting Default Versions" in *Order Management Web Client User's Guide* to view the deployed cartridges in the OSM Order Management Web client.

- If the Publish Status is **Failed**, click **OSM Error 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 you complete the functional testing and acceptance testing, transition the initiative stages accordingly. After the initiative is in **Approved for rollout** stage, click **Release Initiative**.

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

9. Click the **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.

10. You must wait until you receive a pop-up message *Publish successful* or *Publish failed*. If the publish operation succeeds, 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.

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

    - If the Publish Status is **Success**, the OSM cartridge is generated with the same name as the capabilities cartridge with version appended with the publish operation ID. OCA then deploys the OSM cartridge to the production instance of the OSM runtime. See "Viewing Deployed Cartridges and Setting Default Versions" in *Order Management Web Client User's Guide* to view the deployed cartridges in the OSM Order Management Web client.
    - If the Publish Status is **Failed**, click **OSM Error 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.

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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.

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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.

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