Managing Workflows

This chapter contains the following sections:

Workflow Editing

You can edit many features of an existing workflow. You can:

- Rename a workflow

- Reorder inputs

- Delete inputs

- Rename inputs

- Change an input from optional to mandatory (but not the reverse)

- Edit tasks in the workflow

- Delete tasks from a workflow

You can also:

- Delete any or all versions of a single workflow

- Delete the default version or all versions of multiple workflows at one time

The following sections describe these procedures.

Note To modify a predefined workflow, we recommend that you create a new version of that workflow before making the changes. If you modify a default predefined workflow, you can affect what happens in Cisco UCS Director when you click an action button. Actions that you take in Cisco UCS Director, such as creating or modifying a VM, use the default predefined workflows.

For example, when you click the **Create** button on the **HyperConverged** > **Datastore** page, Cisco UCS Director runs the default Create HyperFlex Datastore workflow and creates a service request for the action.

Renaming Workflows

You can rename any workflow in UCS Director. Exception: you cannot rename a compound task.

Note All versions of the workflow are renamed.

Step 1 Choose **Orchestration**.

Step 2 On the **Orchestration** page, click **Workflows**.

Step 3 Choose the workflow that you want to rename.

Step 4 Click **Edit**.

Step 5 In **Workflow Name** on the **Edit Workflow** screen, enter the new name for the workflow.

Step 6 Click **Next**.

Step 7 On the **Add User Inputs** screen, click **Next**.

Step 8 On the **Add User Outputs** screen, click **Submit**.

Reordering Inputs

After creating a workflow, you can change the order in which workflow user inputs are processed when the workflow is executed.

Step 1 Choose **Orchestration**.

Step 2 On the **Orchestration** page, click **Workflows**.

Step 3 Click **Edit**.

Step 4 On the **Edit Workflow Details** screen, click **Next**.

Step 5 On the **Edit User Inputs** screen, choose an input.

Step 6 Click the **Up Arrow** icon or **Down Arrow** icon to move the input up or down in the input order.

Alternatively, you can drag and drop an input to a different place in the list.

Step 7 Click **Next**.

Step 8   On the **Edit Workflow Outputs** screen, click **Submit**.

Deleting Workflow Inputs

You can delete one or more inputs while editing an existing workflow.

Note   You can also delete inputs in a cloned workflow.

Alternatively, while editing a task, you can navigate to the **Edit Workflow Inputs** screen by clicking **Manage Workflow User Inputs** on the **User Input Mapping** page.

To delete inputs from a workflow, do the following:

Step 1   Choose **Orchestration**.

Step 2   On the **Orchestration** page, click **Workflows**.

Step 3   Choose the workflow you want to edit.

Step 4   Click **Edit**.

Step 5   Click **Next**.

Step 6   In the **Workflow User Inputs** list on the **Edit User Inputs** screen, choose the inputs that you want to delete.

To select multiple inputs from the list, hold down the <Shift> key (for a range of items) or <Ctrl> key (to select individual items).

Step 7   Click **Delete (X)**.

Step 8   On the **Delete Entry** screen, click **Submit**.

What to do next

Click **Next** to move to the **Edit User Outputs** screen, then click **Submit**.

Renaming Workflow Inputs

You can rename inputs while editing an existing workflow.

Alternatively, while editing a task, you can navigate to the **Edit Workflow Inputs** screen by clicking **Manage Workflow User Inputs** on the **User Input Mapping** page.

To rename inputs from an opened workflow, do the following:

Step 1   Choose **Orchestration**.

Step 2   On the **Orchestration** page, click **Workflows**.

Step 3   Choose the workflow you want to edit.

Step 4   Click **Edit**.

Step 5	Click **Next**.
Step 6	In the **Workflow User Inputs** list on the **Edit User Inputs** screen, choose the input that you want to edit.
Step 7	Click **Edit**.
Step 8	On the **Edit Entry** screen, replace the **Input Label**.
Step 9	Click **Submit**.
Step 10	To edit another input, repeat the previous four steps.

What to do next

Click **Next** to move to the **Edit User Outputs** page, then click **Submit**.

Changing Input Optional or Required Status

You can change the optionality (optional or required status) of workflow inputs.

Note You cannot map an optional workflow input to a mandatory task input. Similarly, you cannot change an input from mandatory to optional if it is mapped to a mandatory task input.

Before you begin

Select the workflow you want to edit and choose the **Edit** action.

Step 1	Choose **Orchestration**.
Step 2	On the **Orchestration** page, click **Workflows**.
Step 3	Choose the workflow you want to edit.
Step 4	Click **Edit**.
Step 5	Click **Next**.
Step 6	In the **Workflow User Inputs** list on the **Edit User Inputs** screen, choose the input that you want to edit.
Step 7	Click **Edit**.
Step 8	On the **Edit Entry** screen, check or uncheck **Optional** to make the input optional or required, respectively, at the time of execution.
	Note You cannot make a workflow user input optional if it is mapped to a mandatory task input.
Step 9	Click **Submit**.

What to do next

Click **Next** to move to the **Edit User Outputs** screen, then click **Submit**.

Editing a Task in an Existing Workflow

You can edit a task in an existing workflow. The change is local to the workflow and version containing the edited task. For example, if you edit task A in version 0 of workflow X, the task remains unchanged in workflow Y and in version 1 of workflow X.

Step 1   Choose **Orchestration**.

Step 2   On the **Orchestration** page, click **Workflows**.

Step 3   In the Workflow report, click the workflow you want to edit.

Step 4   Click **Workflow Designer**.

Step 5   In the workflow display, double-click the task that you want to edit.
The **Edit Task** screen appears.

Step 6   On the **Task Information** screen, the following fields are available:

Name	Description
Task Name	You cannot change the name of the task.
Task Category	You cannot change the task category.
Task Type	You cannot change the task type.
Comment	You can change or add to the comment.
Retry Execution	You can check or uncheck **Retry Execution**. If **Retry Execution** is checked, **Retry Count** and **Retry Frequency** controls appear.
Disable Rollback	You can check or uncheck **Disable Rollback**. If **Disable Rollback** is checked, the task is unchecked in the **Rollback Service Request** screen and cannot be rolled back; see Rolling Back a Service Request. If the task does not support rollback, checking **Disable Rollback** has no effect.
Retry Count	The number of times (up to 5) to retry the task on failure.
Retry Frequency	A comma-separated list of integers specifying how many seconds to wait between retries. For example, if you selected a retry count of three, enter `1, 10, 60` to retry after one, 10, and 60 seconds, respectively.

Step 7   Click **Next**.

Step 8   On the **User Input Mappings** screen, you can edit the following fields:

Name	Description
Manage Workflow User Inputs	Click **Manage Workflow User Inputs** to add to or edit the workflow user inputs.

Name	Description
Task Input	Each task input is displayed as a heading on the remainder of this page. The input is labeled **(Mandatory)** if it is required.
Map to User Input	Check **Map to User Input** to populate the task input from a workflow user input at runtime.
User Input	This drop-down list appears if you check **Map to User Input**. Select the workflow user input to map to the task input.

Step 9   Click **Next**.

Step 10   On the **Task Input** screen, you can edit the following fields:

Name	Description
(input label)	Each task input that was not mapped to a user input on the previous page is displayed with an appropriate input control (text field, drop-down list, and so on). Use the input controls to specify the value. Optional inputs can be left blank.

Step 11   On the **User Output Mapping** screen, you can edit the following fields:

Name	Description
Task Output	Each task output is displayed as a heading on this page. The output is labeled **(Mandatory)** if it is required. The output heading labels are assigned automatically and cannot be modified.
Map to User Output	Check **Map to User Output** to populate a workflow user output from the task output at runtime.
User Output	This drop-down list appears if you check **Map to User Output**. Select the workflow user output to map to the task output.

Step 12   Click **Submit**.

Opening Workflow Designer from a Header Search

You can use the search field in the Cisco UCS Director header to find and select a workflow from anywhere in Cisco UCS Director. You can then open the workflow in the **Workflow Designer**.

To find and edit a workflow from the Cisco UCS Director header:

Before you begin

You have previously created a workflow that you want to edit immediately from any page in Cisco UCS Director.

Step 1 In the header bar of Cisco UCS Director, click the **Search** icon.
The **Search Category** drop-down list and **Search** field are displayed.

Step 2 Select **Workflow** from the **Search Category** drop-down list.

Step 3 Begin entering the name of the workflow you want to open.
Once there are three or more letters in the **Search** field, a drop-down list of workflow name matches appears.

Step 4 Finish entering the workflow name or select the workflow name from the drop-down list.

The workflow opens in the **Workflow Designer**.

What to do next

Modify the workflow just as you would if you had selected the workflow from the **Orchestration** > **Workflow** page. When you are done, Cisco UCS Director returns to the page you were on when you opened the **Workflow Designer**.

Deleting a Workflow

You can delete any or all versions of a workflow.

Step 1 Choose **Orchestration**.

Step 2 On the **Orchestration** page, click **Workflows**.

Step 3 Choose the workflow you want to delete.

Step 4 Click **Delete**.

Step 5 On the **Delete Workflow(s)** screen, choose the versions that you want to delete. To choose all versions for deletion, check the box at the top of the list.

Step 6 Click the **Delete** button.

Deleting Multiple Workflows

You can delete more than one workflow at a time.

Step 1 Choose **Orchestration**.

Step 2 On the **Orchestration** page, click **Workflows**.

Step 3 Choose all the workflow you want to delete.

Note Select multiple items as you would in any other application on your system. For example, in Windows, hold down the **Ctrl** key to choose more items or **Shift** to choose a range of items.

Step 4   Click **Delete All**.

Step 5   On the **Delete Workflow** screen, check **Delete All Versions** if you want to delete all versions of the selected workflows. Otherwise only the default version is deleted.

Step 6   Click **Delete**.

Exporting and Importing Cisco UCS Director Artifacts

You can export and import workflows, custom tasks, script modules, and activities in Cisco UCS Director. This is useful if, for example, you want to:

- Move or copy workflows or other entities to different Cisco UCS Director instances.

- Back up or store entities.

- Use templates to standardize workflows.

Exporting and Importing Artifact Files

Cisco UCS Director artifacts are exported from and imported to Cisco UCS Director in a single package. The you exported or imported file has a `.wfdx` extension and is an XML file containing a serialized representation of the objects. The file contains at least one of the following:

- One or more workflows

- One or more custom tasks

- One or more script modules

- One or more activities

For example, you might import a file that contains only a single custom task; or a file that contains several workflows, a script module, and a few activities; and so on.

Custom inputs are exported when contained in a custom task. The custom inputs become available in Cisco UCS Director when the custom task is imported.

Exporting and Importing Workflows as Templates

You can export and import workflows as templates.

When you export a template, all of the tasks within the workflow are retained. When you create a new workflow using a template, task inputs that have been mapped to workflow inputs cannot be modified. However, you can modify inputs which have not been mapped.

Exporting Workflows, Custom Tasks, Script Modules, and Activities

To export artifacts from Cisco UCS Director, do the following:

Step 1   Click **Export**.

Step 2   On the **Select Workflows** screen, choose the workflows that you want to export.

Note	Custom workflows, tasks, and scripts created in Cisco UCS Director before version 6.6 can fail to import if they contain XML data.

Step 3   Click **Next**.

Step 4   On the **Select Custom Tasks** screen, choose the custom tasks that you want to export.

Note	The exported custom task contains all custom inputs that are used by that custom task.

Step 5   Click **Next**.

Step 6   On the **Export: Select Script Modules** screen, choose the script modules that you want to export.

Step 7   Click **Next**.

Step 8   On the **Export: Select Activities** screen, choose the activities that you want to export.

Step 9   Click **Next**.

Step 10   On the **Export: Confirmation** screen, complete the following fields:

Name	Description
Exported By	Your name or a note on who is responsible for the export.
Comments	Comments about this export.
Exported File Name	The name of the file on your local system. Type only the base filename; the file type extension (`.wfdx`) is appended automatically.

Step 11   Click **Export**.

You are prompted to save the file.

Importing Workflows, Custom Tasks, Script Modules, and Activities

To import artifacts into Cisco UCS Director, do the following:

Step 1   Choose **Orchestration**.

Step 2   On the **Orchestration** page, click **Workflows**.

Step 3   Click **Import**.

Step 4   On the **Import** screen, click **Select a File**.

Step 5   On the **Choose File to Upload** screen, choose the file to be imported. Cisco UCS Director import and export files have a `.wfdx` file extension.

Step 6   Click **Open**.
             When the file is uploaded, the **File Upload** screen displays `File ready for use`.

Step 7   Click **Next**.
             The **Import** screen displays a list of Cisco UCS Director objects contained in the uploaded file.

Step 8   (Optional) Specify how objects are handled if they duplicate names already in the workflow folder. On the **Import** screen, complete the following fields:

Name	Description
Workflows	Choose from the following options to specify how identically named workflows are handled: • **Replace**—Replace the existing workflow with the imported workflow. • **Keep Both**—Import the workflow as a new version. • **Skip**—Do not import the workflow.
Custom Tasks	Choose from the following options to specify how identically named custom tasks are handled: • **Replace** • **Keep Both** • **Skip**
Script Modules	Choose from the following options to specify how identically named script modules are handled: • **Replace** • **Keep Both** • **Skip**
Activities	Choose from the following options to specify how identically named activities are handled: • **Replace** • **Keep Both** • **Skip**
Import Workflows to Folder	Check **Import Workflows to Folder** to import the workflows. If you do not check **Import Workflows to Folder** and if no existing version of a workflow exists, that workflow is not imported.
Select Folder	Choose a folder into which to import the workflows. If you chose **[New Folder..]** in the drop-down list, the **New Folder** field appears.
New Folder	Enter the name of the new folder to create as your import folder.

Step 9 Click **Import**.

Workflow Templates

A workflow template is like an outline of a workflow. It contains placeholders for all the tasks in the workflow, but is not executable.

A workflow template is useful when you want to import a workflow to a different Cisco UCS Director instance, especially if the workflow is large or contains custom tasks.

A workflow template contains the following elements:

- Task names. Only the names are exported; the tasks themselves must exist in the Cisco UCS Director environment in order to execute.

- Workflow structure (connections between tasks).

- Input names.

A workflow template does not contain these elements:

- Custom tasks. Since only task names are exported in a template, you must import custom tasks in the new Cisco UCS Director environment in order for them to execute.

- Admin input values. Since the elements referred to by input values are unlikely to exist in the new Cisco UCS Director environment, input values must be redefined.

- Custom workflow input values. As with admin input values, workflow input values must be redefined.

Exporting Workflows as Templates

You can export a workflow as a template. To export a workflow as a template:

Step 1   Choose **Orchestration**.

Step 2   On the **Orchestration** page, click **Workflows**.

Step 3   Choose the workflow you want to export.

Step 4   Click **Export As Template**.

Step 5   On the **Export as Template** screeen, complete the following fields:

Name	Description
Template Name	The name for the template.
Description	A description of the template.

Step 6   Click **Submit**.
You are prompted to save the template to your system.

> **Note**   The template is saved under a system-generated filename. The template name you assign is for display in Cisco UCS Director only.

Importing a Workflow Template

To import a workflow template:

Step 1   Choose **Orchestration**.

Step 2   On the **Orchestration** page, click **Workflows**.

Step 3   Click **Import**.

Step 4   On the **Import** screen, click **Upload**.

Step 5   On the **File Upload** screen, click **Click and select a file from your computer**.

Step 6   Select the template file. Cisco UCS Director template files have a `.wft` file extension.
When the file is uploaded, the **File Upload** dialog displays `File ready for use`.

Step 7   Dismiss the **File Upload** dialog.

Step 8   On the **Import Template** screen, click **Submit**.

The template appears on the **Workflow Templates** page.

Creating a Workflow from a Template

Step 1   Choose **Orchestration**.

Step 2   On the **Orchestration** page, click **Workflow Templates**.

Step 3   Choose a template.

Step 4   Click **Create Workflow**.

Step 5   On the **Overview** screen, complete the following fields:

Name	Description
Name	The name of the workflow to be created.
Description	An optional description for the workflow.

Step 6   Click **Next**.

Step 7   Click through the remaining screens of the **Create Workflow from Template** wizard. You can change any editable task-specific inputs that appear.

Step 8   Click **Submit**.

The workflow is created in the **Template Workflows** folder on the **Workflows** page.

What to do next

Open the workflow in the **Workflow Designer** and configure it to work in its new environment.

Predefined Templates

Cisco UCS Director installs with the following predefined templates. The templates are available, along with any user-imported templates, on the **Policies** > **Orchestration** > **Workflow Templates** screen.

Name	Purpose	Description
Customer Onboarding	Customer onboarding in a secure multitenancy setting	The workflow does the following: • Creates a virtual data center (VDC) • Generates a VLAN from the selected VLAN policy • Creates a VLAN on the selected Cisco Nexus 5000 Series switches • Creates a port profile on selected Nexus 1000v Series switches • Creates a VLAN interface • Creates flexible volume • Creates and establishes a vFiler on the controller • Mounts the storage as a data store on a selected host node
Deploy ESXi Host	Deployment of a new blade as an ESXi Host on a VMware (vCenter) account	The workflow does the following: • Creates a service profile • Associates the service profile to a selected server • Configures SAN zones on a Cisco Nexus 5000 Series switch • Establishes a PXE boot • Monitors PXE booting and registers the host with a selected VMware (vCenter) account
Deploy ESXi Host with ONTAP	Deployment of a new blade as an ESXi Host on a VMware (vCenter) account.	Workflow does the following: • Creates a service profile • Associates the service profile to a selected server • Configures SAN zones on a Cisco Nexus 5000 Series switch • Establishes a PXE boot • Monitors PXE booting and registers the host with a selected VMware (vCenter) account
Deploy ESXi Host of Local Storage (without a Cisco Nexus 1000v Series switch)	Deployment of a new blade as an ESXi local storage host (without using a Cisco Nexus 1000v Series switch) on a VMware (vCenter) account	The workflow does the following: • Creates a service profile • Associates the service profile to a selected server • Configures SAN Zones on a Cisco Nexus 5000 Series switch • Establishes a PXE boot • Monitors PXE booting and registers the host with a selected VMware (vCenter) account

Name	Purpose	Description
Attach VLAN to Storage Controller	Attaching a NetApp storage controller's Ethernet ports to a new VLAN	The workflow does the following: • Generates a VLAN from the selected VLAN policy • Creates a VLAN on the selected devices • Creates a VLAN interface • Creates a vFiler on the controller

Workflow Version History

Cisco UCS Director provides a set of features for managing versions of a workflow. See Workflow Versioning.

The following sections discuss how to manage workflow versions.

Creating a New Version of a Workflow

You can create a new version of a workflow. You can then modify the new version without changing the old version.

Before you begin

You have an existing workflow that you want to modify.

Step 1   Choose **Orchestration**.

Step 2   On the **Orchestration** page, click **Workflows**.

Step 3   Choose the workflow to duplicate.

Step 4   Click **Create New Version**.

Step 5   On the **Create New Version** screen, complete the following fields:

Name	Description
Version Label	The label for the version. The default label for a new workflow is zero, so consider labeling new versions numerically starting from one.
Description	A description for the version.

Step 6   Click **Submit**.
The new version opens in the **Workflow Designer**.

Step 7   In **Workflow Designer**, complete your changes for the workflow.

Step 8   Click **Close**.

If the **Manage Versions** settings specify **Set latest version as default**, the new version becomes the default version. The **Workflows** report displays the new version of the workflow under the **Version** column.

If the **Manage Version** settings specify **Set selected version as default**, the new version is created but the default version does not change. See

Choosing the Default Version of a Workflow

Step 1   Choose **Orchestration**.

Step 2   On the **Orchestration** page, click **Workflows**.

Step 3   From the **More Actions** drop-down list, choose **Manage Versions**.

Step 4   On the **Manage Versions** screen, complete the following fields:

Name	Description
Show latest version	Check **Show latest version** to set the default version of a workflow to be the last version that was created. The default version of a workflow is displayed in the **Workflows** page. If you create a new version of a workflow, the new version becomes the default. For example, if the latest version of a workflow is X.0, the **Version Label** column in the Workflows page displays X.0. If you then create a version X.1, the **Version Label** column displays X.1.
Set default version	Check **Set default version** to set the default version of a workflow to be the version that you select. The default version of a workflow is displayed in the **Workflows** page. If you create a new version of a workflow, your selected version remains the default. For example, if the latest version of a workflow is X.0, the **Version Label** column in the Workflows page displays X.0. If you then create a version X.1, the **Version Label** column remains X.0.
Version	If you chose **Set default version**, check one version from the list to be the default version.

Step 5   Click **Submit**.

Managing Versions of a Compound Task

When you update a compound task, the new version of the compound task replaces the old one in all workflows that use the compound task.

However, it is possible for some versions of a workflow to be compound tasks while other versions of the same workflow are not. Normally, the behavior of a workflow is defined by the workflow's default version, but this is sometimes not the case with compound tasks.

If the default version of a workflow is not a compound task, then when the workflow is called as a compound task the system uses the most recent version of the workflow that is defined as a compound task. This can be confusing. The following example illustrates this behavior.

Before you begin

1. Create a compound task called *CT*. Note that in the Workflow tab, the Version Label for *CT* is shown as 0. We will refer to this version of *CT* as *CTv0*.

2. Include the compound task in a workflow called *WF*.

3. Validate the workflow *WF*. Validation should pass.

Step 1 Save *CTv0* as a normal (non-compound-task) workflow:

a) Choose **Orchestration**.
b) On the **Orchestration** page, click **Workflows**.
c) Choose the compound task workflow *CTv0*.
d) Click **Edit Workflow**.
e) Uncheck **Save as Compound Task**.
f) Click through to the **Edit User Outputs** screen and click **Submit**.

Step 2 In the **Workflow Designer**, validate *WF*.

a) On the **Orchestration** page, click **Workflows**.
b) Choose the workflow *WF*.
c) Click **Workflow Designer**.
d) On the **Workflow Designer** page, click **Validate Workflow**.

Validation fails with the message `The task "Compound add user" does not exist anymore.`

Step 3 Create a new version of *CT* (*CTv1*).

a) On the **Orchestration** page, click **Workflows**.
b) Choose the workflow *CTv0*.
c) Click **Create New Version**.
d) On the **Create New Version** screen, enter the required fields:

• Version Label - Something recognizable, for example **v1**.

• Description - Any description.

e) Click **Submit**.
f) When the **Workflow Designer** comes up, click **Close**.
g) Click **Edit**.
h) Verify that for *CTv1*, **Save as Compound Task** is unchecked.
i) Close the **Edit Workflow** page.

Step 4 Validate *WF* again, as in Step 2.
Validation fails with the message `The task "Compound add user" does not exist anymore.`

Step 5 Make *CTv1* a compound task.

a) On the **Orchestration** page, click **Workflows**.
b) Choose the workflow *CT*.
c) Click **Edit Workflow**.
d) Check **Save as Compound Task**.
e) Click through to the **Edit User Outputs** page and click **Submit**.

Step 6 Validate *WF* again.
Validation is successful.

Step 7 Change the default version of *CT* back to *CTv0*.

a) On the **Orchestration** page, click **Workflows**.
b) Choose the workflow *CT*.

c) Click **Manage Versions**.

d) On the **Manage Versions** screen, uncheck **Set Latest Version as Default**.

e) Check **Set Selected Version as Default**.

f) In the table, check *CTv0*.

g) Click **Submit**.

In the **Workflows** tab, **Version Label** is now *0*, indicating that *CTv0* is the default version of *CT*.

Step 8   Validate *WF* again.
Validation is successful. Note that *WF* is using *CTv1* as the compound task, even though *CTv0* is the default. Be aware that this can cause confusion if you have more than one version of a workflow that is used as a compound task.

Cloning a Workflow

You can clone a workflow. The cloned workflow is identical to the original workflow. You can edit the new workflow immediately. You might do this, for example, to create a workflow that is similar to the original workflow but which has different inputs. The new workflow has a new, separate version history.

Step 1   Choose **Orchestration**.

Step 2   On the **Orchestration** page, click **Workflows**.

Step 3   Select the workflow you want to clone.

Step 4   Click **Clone**.
The **Clone Workflow** screen comes up.

Step 5   Edit the workflow details, inputs, and outputs. See Creating a Workflow. You must enter a new name for the workflow.

Step 6   Click **Next** to proceed to the **Workflow User Inputs** screen.

Step 7   Edit the workflow user inputs.

Saving a Picture of a Workflow

You can create a graphics image of a workflow. To capture an image, do the following:

Step 1   Choose **Orchestration**.

Step 2   On the **Orchestration** page, click **Workflows**.

Step 3   Choose a workflow.

Step 4   Click **Workflow Designer**.

Step 5   From the **Workflow Designer Action Menu** click the **Export as Image** icon.
The entire workflow is converted to a .png file and displayed in a new browser window.

Step 6   You can save the image using your browser.