Advanced Service Design
vCloud Automation Center 6.0

This document supports the version of each product listed and supports all subsequent versions until the document is replaced by a new edition. To check for more recent editions of this document, see http://www.vmware.com/support/pubs.
You can find the most up-to-date technical documentation on the VMware Web site at:
http://www.vmware.com/support/
The VMware Web site also provides the latest product updates.
If you have comments about this documentation, submit your feedback to:
docfeedback@vmware.com
## Contents

- **Advanced Service Design** 5  
- **1 Using the Goal Navigator** 7  
- **2 Introduction to vCloud Automation Center and Advanced Service Designer** 9  
  - Overview of VMware vCloud Automation Center 9  
  - Overview of Services 10  
- **3 Introduction to VMware vCenter Orchestrator** 11  
  - VMware vCenter Orchestrator Overview 11  
  - vCenter Orchestrator Plug-Ins Overview 11  
  - vCenter Orchestrator Integration in vCloud Automation Center 13  
- **4 Authoring Services with Advanced Service Designer** 15  
  - Concepts 15  
  - Custom Resources 15  
  - Service Blueprint 16  
  - Resource Action 16  
  - Creating an Advanced Service Overview 16  
  - Create a Custom Resource 17  
  - Create a Service Blueprint 18  
  - Publish a Service Blueprint as a Catalog Item 19  
  - Create a Resource Action 19  
  - Publish a Resource Action 20  
  - Assign an Icon to a Resource Action 21  
  - Create a Service 21  
  - Associate a Catalog Item with a Service 22  
  - Create an Approval Policy for Advanced Service Blueprints and Actions 23  
  - Entitle a Service, Catalog Items, and Actions to a User or a Group of Users 25  
- **5 Extend Operations on IaaS-Provisioned Virtual Machines** 27  
  - Create a Resource Action for Extending Operations on IaaS-Provisioned Virtual Machines 27  
  - Publish a Resource Action 29  
  - Assign an Icon to a Resource Action 29  
- **6 Form Designer** 31  
  - Default New Fields in the Form Designer 31  
  - Predefined Constraints and Values in the Form Designer 33  
  - Working With the Form Designer 36  
    - Designing a Custom Resource Form 37  
    - Designing a Service Blueprint Form 39
7 Advanced Service Designer Examples and Scenarios 47
   Create a Service for Creating and Modifying a User 47
      Create a Test User as a Custom Resource 48
      Create a Service Blueprint for Creating a User 49
      Publish the Create a User Blueprint as a Catalog Item 50
      Create a Resource Action to Change a User Password 50
      Publish the Change a Password Resource Action 51
      Create a Service for Creating a Test User 51
      Associate the Catalog Item with the Create a Test User Service 52
      Entitle the Service and the Resource Action to a Consumer 52
   Create and Publish an Action to Migrate a Virtual Machine 53
      Create a Resource Action to Migrate a vSphere Virtual Machine 53
      Publish the Action for Migrating a vSphere Virtual Machine 54
   Create an Action to Migrate a Virtual Machine With vMotion 54
      Create an Action to Migrate a vSphere Virtual Machine With vMotion 55
      Edit the Resource Action Form 56
      Add a Submitted Action Details Form and Save the Action 57
      Publish the Action for Migrating a Virtual Machine with vMotion 57
   Create and Publish an Action to Take a Snapshot 58
      Create the Action to Take a Snapshot of a vSphere Virtual Machine 58
      Publish the Action for Taking a Snapshot 59

Index 61
Advanced Service Design

*Advanced Service Design* provides information about authoring advanced services in VMware vCloud® Automation Center™.

*Advanced Service Design* contains instructions about creating the major building blocks of an advanced service, such as resource types, service blueprints, and resource actions. Additionally, information about managing catalog items, organizing them into services and publishing the services to service catalogs is provided.

This documentation also contains information about VMware® vCenter™ Orchestrator™ and the vCenter Orchestrator plug-ins.

*Note*  Not all features and capabilities of vCloud Automation Center are available in all editions. For a comparison of feature sets in each edition, see [https://www.vmware.com/products/vcloud-automation-center/](https://www.vmware.com/products/vcloud-automation-center/).

**Intended Audience**

This information is intended for advanced service architects, business group managers, tenant administrators, and approval administrators who are familiar with virtual machine technology, data center management operations, and who also have strong experience with vCloud Automation Center and vCenter Orchestrator.

**VMware Technical Publications Glossary**

VMware Technical Publications provides a glossary of terms that might be unfamiliar to you. For definitions of terms as they are used in VMware technical documentation, go to [http://www.vmware.com/support/pubs](http://www.vmware.com/support/pubs).
Using the Goal Navigator

The goal navigator guides you through high-level goals that you might want to accomplish in vCloud Automation Center.

The goals you can achieve depend on your role. To complete each goal, you must complete a sequence of steps that are presented on separate pages in the vCloud Automation Center console.

The goal navigator can answer the following questions:
- Where do I start?
- What are all the steps I need to complete to achieve a goal?
- What are the prerequisites for completing a particular task?
- Why do I need to do this step and how does this step help me achieve my goal?

The goal navigator is hidden by default. You can expand the goal navigator by clicking the icon on the left side of the screen.

After you select a goal, you navigate between the pages needed to accomplish the goal by clicking each step. The goal navigator does not validate that you completed a step, or force you to complete steps in a particular order. The steps are listed in the recommended sequence. You can return to each goal as many times as needed.

For each step, the goal navigator provides a description of the task you need to perform on the corresponding page. The goal navigator does not provide detailed information such as how to complete the forms on a page. You can hide the page information or move it to a more convenient position on the page. If you hide the page information, you can display it again by clicking the information icon on the goal navigator panel.
Introduction to vCloud Automation Center and Advanced Service Designer

vCloud Automation Center provides an enterprise-wide system for provisioning virtual, cloud, and physical machines. vCloud Automation Center also provides the ability to deploy and provision cloud services across private and public clouds, physical infrastructures, hypervisors and public cloud providers.

vCloud Automation Center allows authorized users to access standardized IT services by using a secure, self-service portal that acts as a service governor by enforcing business and IT policies throughout the lifecycle of the service.

In addition, vCloud Automation Center includes the Advanced Service Designer, which enables service architects to create advanced services and publish them to service catalogs. By using the capabilities of Advanced Service Designer, you can create custom resources to map vCenter Orchestrator object types and define them as items to be provisioned and managed. You can then create blueprints from vCenter Orchestrator workflows and publish the workflows as catalog items, and create services in which to include the catalog items. The vCenter Orchestrator workflows can be either predefined or independently developed by workflow developers. Advanced Service Designer also allows you to define and design the actions and operations that the consumer of the service can perform on the provisioned items.

This chapter includes the following topics:
- “Overview of VMware vCloud Automation Center,” on page 9
- “Overview of Services,” on page 10

Overview of VMware vCloud Automation Center

VMware vCloud Automation Center™ offers out-of-the-box self-service provisioning and lifecycle management of cloud services that comply with easily-configurable and flexible business policies.

vCloud Automation Center provides a secure portal where authorized administrators, developers, or business users can request new IT services, as well as manage specific cloud and IT resources based on their roles and privileges.

vCloud Automation Center also provides the ability to request infrastructure, applications, desktops, and a wide range of IT service through a common service catalog, while still providing one of the quickest deployment times and return on investment in the industry.
Overview of Services

On-demand self-service allows consumers to obtain, configure, and deploy cloud services by using the cloud service catalogs, without requiring the assistance of IT.

vCloud Automation Center makes cloud services available to consumers on demand via the Internet. vCloud Automation Center also provides a secure portal where authorized administrators, developers or business users can request new IT services as well as manage existing computer resources from predefined, user-specific menus.

Service architects can create advanced services by using the capabilities of vCenter Orchestrator and the vCenter Orchestrator workflow engine and publish the vCenter Orchestrator workflows as catalog items and resource actions. Advanced services are custom cloud services which enable you to provide anything as a service. For example, as a service architect, you can create an advanced service, which allows the consumers to request a back up of a database. After completing the request and submitting it, the consumers receive a backup file of the database they specified.
VMware® vCenter™ Orchestrator™ is an automation and management engine that helps you to automate your cloud and integrate the VMware vCloud Suite with the rest of your management systems.

vCenter Orchestrator allows administrators and architects to develop complex automation tasks by using the workflow designer, and then quickly access and run workflows directly from vSphere Web Client or by various triggering mechanisms.

vCenter Orchestrator can access and control external technologies and applications by using vCenter Orchestrator plug-ins.

This chapter includes the following topics:

- “VMware vCenter Orchestrator Overview,” on page 11
- “vCenter Orchestrator Plug-Ins Overview,” on page 11
- “vCenter Orchestrator Integration in vCloud Automation Center,” on page 13

**VMware vCenter Orchestrator Overview**

vCenter Orchestrator is a development- and process-automation platform that provides a library of workflows. You can use the vCenter Orchestrator workflows to create and run automated, configurable processes to manage the VMware® vSphere infrastructure as well as other VMware and third-party technologies.

By default, vCenter Orchestrator exposes every operation in the VMware® vCenter Server™ API, and also allows you to integrate all of these operations into your automated processes. By using vCenter Orchestrator, you can also integrate with other management and administration solutions through its open plug-in architecture.

For information about the latest vCenter Orchestrator releases, see the vCenter Orchestrator documentation landing page [http://vmware.com/support/pubs/orchestrator_pubs.html](http://vmware.com/support/pubs/orchestrator_pubs.html).

**vCenter Orchestrator Plug-Ins Overview**

Plug-ins allow you to use vCenter Orchestrator to access and control external technologies and applications. By exposing an external technology in a vCenter Orchestrator plug-in, you can incorporate objects and functions in workflows that access the objects and functions of the external technology.

The external technologies that you can access by using plug-ins can include virtualization management tools, email systems, databases, directory services, remote control interfaces, and so on.

You can use the standard set of vCenter Orchestrator plug-ins to incorporate external technologies such as the vCenter Server API and email capabilities into workflows. In addition, you can use the vCenter Orchestrator open plug-in architecture to develop plug-ins to access other applications.
Table 3-1. Plug-Ins Included by Default in vCenter Orchestrator Standalone or the vCenter Orchestrator Appliance

<table>
<thead>
<tr>
<th>Plug-In</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>vCenter Server</td>
<td>Provides access to the vCenter Server API so that you can incorporate all of the vCenter Server objects and functions into the management processes that you automate by using vCenter Orchestrator.</td>
</tr>
<tr>
<td>Configuration</td>
<td>Provides workflows for configuring the vCenter Orchestrator authentication, database connection, SSL certificates, and so on.</td>
</tr>
<tr>
<td>vCO Library</td>
<td>Provides workflows that act as basic building blocks for customization and automation of client processes. The workflow library includes templates for lifecycle management, provisioning, disaster recovery, hot backup, and other standard processes. You can copy and edit the templates to modify them according to your needs.</td>
</tr>
<tr>
<td>SQL</td>
<td>Provides the Java Database Connectivity (JDBC) API, which is the industry standard for database-independent connectivity between the Java programming language and a wide range of databases. The databases include SQL databases and other tabular data sources, such as spreadsheets or flat files. The JDBC API provides a call-level API for SQL-based database access from workflows.</td>
</tr>
<tr>
<td>SSH</td>
<td>Provides an implementation of the Secure Shell v2 (SSH-2) protocol. Allows remote command and file transfer sessions with password and public key-based authentication in workflows. Supports keyboard-interactive authentication. Optionally, the SSH plug-in can provide remote file system browsing directly in the vCenter Orchestrator client inventory.</td>
</tr>
<tr>
<td>XML</td>
<td>A complete Document Object Model (DOM) XML parser that you can implement in workflows. Alternatively, you can use the ECMAScript for XML (E4X) implementation in the vCenter Orchestrator JavaScript API.</td>
</tr>
<tr>
<td>Mail</td>
<td>Uses Simple Mail Transfer Protocol (SMTP) to send email from workflows.</td>
</tr>
<tr>
<td>Net</td>
<td>Wraps the Jakarta Apache Commons Net Library. Provides implementations of Telnet, FTP, POP3, and IMAP. The POP3 and IMAP part is used for reading email. In combination with the Mail plug-in, the Net plug-in provides complete email send and receive capabilities in workflows.</td>
</tr>
<tr>
<td>Workflow documentation</td>
<td>Provides workflows that let you generate information in PDF format about a workflow or a workflow category.</td>
</tr>
<tr>
<td>Enumeration</td>
<td>Provides common enumerated types that can be used in workflows by other plug-ins.</td>
</tr>
<tr>
<td>vCO WebOperator</td>
<td>A Web view that lets you to access the workflows in the vCenter Orchestrator library and interact with them across a network by using a Web browser.</td>
</tr>
</tbody>
</table>

The vCenter Orchestrator instance included in the vCloud Automation Center contains the same plug-ins as the ones included in vCenter Orchestrator Standalone or the vCenter Orchestrator Appliance as well as several additional plug-ins.

Table 3-2. Additional Plug-Ins Embedded in the Orchestrator Instance Included in vCloud Automation Center

<table>
<thead>
<tr>
<th>Plug-In</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft Active Directory</td>
<td>Allows interaction between vCenter Orchestrator and Microsoft® Active Directory. Provides workflows that automate tasks in the Active Directory infrastructure.</td>
</tr>
<tr>
<td>HTTP-REST</td>
<td>Provides workflows for managing REST hosts and invoking REST operations. You can also generate custom workflows to automate tasks in a REST environment.</td>
</tr>
</tbody>
</table>
Table 3-2. Additional Plug-Ins Embedded in the Orchestrator Instance Included in vCloud Automation Center (Continued)

<table>
<thead>
<tr>
<th>Plug-In</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOAP</td>
<td>Provides workflows for managing SOAP hosts and invoking SOAP operations. You can also generate custom workflows to automate tasks in a SOAP environment.</td>
</tr>
<tr>
<td>PowerShell</td>
<td>Exposes all objects in a connected Microsoft® Windows PowerShell host. You can use the plug-in to call PowerShell scripts and cmdlets from vCenter Orchestrator actions and workflows, and to work with the results. You can also create custom workflows that implement the plug-in API.</td>
</tr>
</tbody>
</table>

The vCenter Orchestrator plug-ins that VMware develops are distributed as .vmoapp files that you can obtain from the VMware Web site at http://www.vmware.com/products/datacenter-virtualization/vcenter-orchestrator/plugins.html. For more information about the vCenter Orchestrator plug-ins that VMware develops and distributes, see the VMware® vCenter™ Orchestrator™ plug-ins documentation landing page.

vCenter Orchestrator Integration in vCloud Automation Center

vCenter Orchestrator is the workflow engine integrated in vCloud Automation Center. The vCenter Orchestrator server distributed with vCloud Automation Center is preconfigured, and therefore when your system administrator deploys the vCloud Automation Center Appliance, the vCenter Orchestrator server is up and running.

Figure 3-1. Create and Request Catalog Items Included in an Advanced Service to Provision a Custom Resource
Service architects can map vCenter Orchestrator objects to custom resources and vCenter Orchestrator workflows to service blueprints in vCloud Automation Center. They can then publish the service blueprints as catalog items and combine the items into an advanced service. Tenant administrators or business group managers can display the service to the catalog of the consumers by creating an entitlement. When the consumers request a catalog item, vCloud Automation Center runs a vCenter Orchestrator workflow and provisions the custom resource.

**Figure 3-2. Create and Request Custom Resource Actions to Modify a Custom Resource**

Service architects can also map vCenter Orchestrator workflows to resource actions to extend the management vCloud Automation Center capabilities. After the consumers provision a custom resource, they can request to run a post-provisioning action. This way, the consumers run a vCenter Orchestrator workflow and modify the provisioned custom resource.

The default vCenter Orchestrator server inventory is shared across all tenants and cannot be used per tenant. For example, if a service architect creates a service blueprint for creating a cluster compute resource, the consumers from different tenants have to browse through the inventory items of all vCenter Server instances although they might belong to a different tenant.

System administrators can install vCenter Orchestrator or deploy the VMware® vCenter™ Orchestrator Appliance™ separately to set up an external vCenter Orchestrator instance and configure vCloud Automation Center to work with that external vCenter Orchestrator instance.

System administrators can also configure vCenter Orchestrator workflow categories per tenant and define which workflows are available to each tenant.

In addition, tenant administrators can also configure an external vCenter Orchestrator instance but only for their own tenants.

For information about configuring an external vCenter Orchestrator instance and vCenter Orchestrator workflow categories, see *Advanced Service Designer Configuration.*
Creating an advanced service involves a number of tasks.

This chapter includes the following topics:

- “Concepts,” on page 15
- “Creating an Advanced Service Overview,” on page 16

**Concepts**

By using Advanced Service Designer you can publish vCenter Orchestrator workflows as catalog items, include them in services, and publish the services in the catalog. You can also extend the vCloud Automation Center capabilities to manage some provisioned items and resources by using custom resource actions.

For example, you can create custom resource actions to extend the post-provisioning actions on vSphere virtual machines provisioned with Infrastructure as a Service (IaaS).

Advanced Service Designer exposes the following objects in vCloud Automation Center:

- Custom resource
- Service blueprint
- Resource action

You can use the objects to create an advanced service in which to include your catalog items, and entitle the service, the catalog items and the resource actions to a user or a group of users within a business group.

**Custom Resources**

To create an advanced service and allow your consumers to provision items, you must first create a custom resource that defines the item to be provisioned.

You create custom resources to define a new type of provisioned item and map it to an existing vCenter Orchestrator object type. vCenter Orchestrator object types are the objects exposed through the APIs of the vCenter Orchestrator plug-ins. The custom resource is the output type of a provisioning workflow and can also be the input type for a resource action workflow.

For example, if you have a running vCenter Server instance, and you also have the vCenter Server plug-in configured to work with vCenter Orchestrator, all of the object types from the vCenter Server API are exposed in vCenter Orchestrator. In addition, the vCenter Server plug-in exposes the vSphere inventory objects in the vCenter Orchestrator inventory. The vSphere inventory objects include data centers, folders, ESXi hosts, virtual machines and appliances, resource pools, and so on. You can perform various operations on these objects. For example, you can create, clone, or destroy virtual machines.
For more information about the vCenter Orchestrator object types exposed through the vCenter Server API, see the *vCenter Server 5.5 Plug-In API Reference for vCenter Orchestrator*.

**Service Blueprint**

A blueprint is a complete specification of a service.

With service blueprints, you can publish predefined and custom vCenter Orchestrator workflows as catalog items. You can also optionally map a workflow output parameter to a custom resource to define the item to be provisioned.

**Resource Action**

You can create custom resource actions that the consumers of an advanced service can perform on a provisioned item.

You can create new post-provisioning operations by publishing vCenter Orchestrator workflows as resource actions. You can use the resource actions to perform post-provisioning operations on either custom resources or on vSphere virtual machines provisioned with IaaS. When you entitle the resource actions, they appear in the **Action** menu of the provisioned items.

**Creating an Advanced Service Overview**

Creating an advanced service and exposing the service to the catalog includes a number of tasks that are performed by different users.

The following is a high-level overview of the sequence of steps required to create and entitle a service to a user or a group of users.

1. A service architect creates a custom resource to define the item to be provisioned. See “Create a Custom Resource,” on page 17.
2. A service architect creates a service blueprint to provision the custom resource and publishes the blueprint as a catalog item. See “Create a Service Blueprint,” on page 18 and “Publish a Service Blueprint as a Catalog Item,” on page 19.
3. A service architect creates and publishes resource actions to define the post-provisioning operations that the consumers of the catalog items can perform on the provisioned items. See “Create a Resource Action,” on page 19 and “Publish a Resource Action,” on page 20.
4. After creating the item to be provisioned, the blueprint and the resource action, a service architect, tenant administrator, or a business group manager creates a service and includes the catalog item in the service. See “Create a Service,” on page 21 and “Associate a Catalog Item with a Service,” on page 22.
5. A tenant administrator or an approval administrator creates an approval policy for advanced service blueprints and actions. See “Create an Approval Policy for Advanced Service Blueprints and Actions,” on page 23.
6. A business group manager or a tenant administrator entitles the service, catalog items, and resource actions to a user or a group of users. The users specified are the consumers of the service who can request the catalog items. See “Entitle a Service, Catalog Items, and Actions to a User or a Group of Users,” on page 25.

This is the most common and straightforward scenario for creating an advanced service, defining the post-provisioning operations, adding catalog items in the service, and entitling the service and the resource actions to a consumer.
Create a Custom Resource

To create an advanced service for provisioning, as a service architect you must first create a custom resource so that you can define the item to be provisioned.

Custom resources map an object type exposed through the API of a vCenter Orchestrator plug-in. If you do not create a custom resource, the service blueprint cannot be used for provisioning.

By creating a custom resource, you map an vCenter Orchestrator object type as a resource. During this process, on the Details Form page, you can specify how the form of the resource looks. See “Designing a Custom Resource Form,” on page 37.

Prerequisites

Log in to the vCloud Automation Center console as a service architect.

Procedure

1. Select Advanced Services > Custom Resources.
2. Click the Add Resource icon (▲).
3. In the Inventory Type text box, type a character to search for the vCenter Orchestrator object type you want to map to this custom resource, and select the vCenter Orchestrator object type.
4. Type a Name and, optionally, a Description.
5. Click Next.
6. On the Details Form page, edit the form of the custom resource.
   
   You can edit the custom resource form by deleting, editing, and rearranging elements. You can also add a new form and form pages and then drag elements to the new form and form page.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add a form page</td>
<td>Click the New Page icon (▲) next to the form page name, fill in the necessary text boxes, and click Submit.</td>
</tr>
<tr>
<td>Add an element to the form page</td>
<td>Drag an element from the New Fields pane on the left to the pane on the right. You can then fill in the necessary text boxes and click Submit. The available elements are specific for the vCenter Orchestrator object type.</td>
</tr>
<tr>
<td>Edit an element</td>
<td>Click the Edit icon (▲) next to the element to edit, make the necessary edits, and click Submit.</td>
</tr>
<tr>
<td>Delete an element</td>
<td>Click the Delete icon (▲) next to the element to delete, and in the confirmation dialog box click Yes. You can also delete the whole form.</td>
</tr>
</tbody>
</table>

7. Click Add.

You created a custom resource and you can see it on the Custom Resources page.

What to do next

Create a service blueprint. See “Create a Service Blueprint,” on page 18.
Create a Service Blueprint

A blueprint is a complete specification for a service. Blueprints are templates that determine the attributes of the item to be provisioned, how the item is provisioned, and so on.

As a service architect you can use service blueprints for provisioning previously created custom resources. If you do not specify an output parameter to be provisioned, when you publish the service blueprint as a catalog item, the blueprint does not provision anything.

By creating a service blueprint, you publish a vCenter Orchestrator workflow as a catalog item. During this process you can edit the default generated forms. See “Designing a Service Blueprint Form,” on page 39.

Prerequisites

Log in to the vCloud Automation Center console as a service architect.

Procedure

1. Select Advanced Services > Service Blueprints.
2. Click the Add Blueprint icon (➕).
3. Navigate through the vCenter Orchestrator workflow library and select a workflow.

You can see the name and description of the selected workflow, and the input and output parameters as they are defined in vCenter Orchestrator.
4. Click Next.
5. Type a name and, optionally, a description on the Details tab.

The Name and Description text boxes are prepopulated with the name and description of the workflow as they are defined in vCenter Orchestrator.
6. Click Next.
7. (Optional) Edit the form of the service blueprint on the Blueprint Form page.

By default, the service blueprint form is mapped to the vCenter Orchestrator workflow presentation. You can edit the blueprint form by deleting, editing and rearranging the elements in the form. You can also add a new form and form pages and then drag elements to the new form and form page.

<table>
<thead>
<tr>
<th>Option</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add a form</td>
<td>Click the New Form icon (➕) next to the form name, fill in the necessary text boxes, and click Submit.</td>
</tr>
<tr>
<td>Add a form page</td>
<td>Click the New Page icon (➕) next to the form page name, fill in the necessary text boxes, and click Submit.</td>
</tr>
<tr>
<td>Add an element to the form page</td>
<td>Drag an element from the New Fields pane on the left to the pane on the right. You can then fill in the necessary text boxes and click Submit.</td>
</tr>
<tr>
<td>Edit an element</td>
<td>Click the Edit icon (✍️) next to the element to edit, make the necessary edits, and click Submit.</td>
</tr>
<tr>
<td>Delete an element</td>
<td>Click the Delete icon (❌) next to the element to delete, and in the confirmation dialog box click Yes. You can also delete the whole form.</td>
</tr>
</tbody>
</table>

8. Click Next.
Select an output parameter to be provisioned. The output parameter is the item to be provisioned when the consumers of the advanced service make a request. If you have not created a custom resource, in the drop-down menu you only see No provisioning.

Click Add.

You created a service blueprint and you can see it on the Service blueprints page.

What to do next
Publish the blueprint as a catalog item. See “Publish a Service Blueprint as a Catalog Item,” on page 19.

Publish a Service Blueprint as a Catalog Item

After you create a service blueprint, it is in a draft state and you can edit it, delete it, or publish it as a catalog item.

Prerequisites
Log in to the vCloud Automation Center console as a service architect.

Procedure
1. Select Advanced Services > Service Blueprints.
2. Locate the service blueprint you want to publish.
3. In the Actions column, click the down arrow and click Publish.

The status of the service blueprint changes to Published. If you select Administration > Catalog Management > Catalog Items, you can see that the blueprint is published as a catalog item.

What to do next
You can create a resource action to define the operations that the consumers can perform against the item they provision. See “Create a Resource Action,” on page 19. If you do not want to create a resource action, you can create a service and include the catalog item in it. For more information about creating a service, see “Create a Service,” on page 21.

Create a Resource Action

As a service architect, you can create a resource action to define the operations that consumers can perform on the items they provision by using the advanced service that you create.

By creating a resource action, you publish a vCenter Orchestrator workflow as a post-provisioning operation. During this process, you can edit the default generated forms and specify how the action looks when the consumer requests to perform the operation. See “Designing a Resource Action Form,” on page 43.

Prerequisites
Log in to the vCloud Automation Center console as a service architect.

Procedure
2. Click the New resource action icon (➕).
3 Navigate through the vCenter Orchestrator workflow library and select a workflow.

You can see the name and description of the selected workflow, and the input and output parameters as they are defined in vCenter Orchestrator.

4 Click Next.

5 Select a custom resource that you previously created from the Resource type drop-down menu.

6 Select the input parameter for the resource action from the Input parameter drop-down menu.

7 Click Next.

8 Type a name and, optionally, a description on the Details tab.

The Name and Description text boxes are prepopulated with the name and description of the workflow as they are defined in vCenter Orchestrator.

The name and description that you type appear in the resource action request form. It is important to use a name and description that are meaningful to the consumers.

9 Click Next.

10 (Optional) Edit the form of the resource action on the Form tab.

The form of the resource action maps the vCenter Orchestrator workflow presentation. You can change the form by deleting, editing, and rearranging the elements. You can also add a new form and form pages and drag the necessary elements to the new form and form page.

<table>
<thead>
<tr>
<th>Option</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add a form</td>
<td>Click the New Form icon (CREATE ICON) next to the form name, fill in the necessary text boxes, and click Submit.</td>
</tr>
<tr>
<td>Add a form page</td>
<td>Click the New Page icon (CREATE ICON) next to the form page name, fill in the necessary text boxes, and click Submit.</td>
</tr>
<tr>
<td>Add an element to the form page</td>
<td>Drag an element from the New Fields pane on the left to the pane on the right. You can then fill in the necessary text boxes and click Submit.</td>
</tr>
<tr>
<td>Edit an element</td>
<td>Click the Edit icon (EDIT ICON) next to the element to edit, make the necessary edits, and click Submit.</td>
</tr>
<tr>
<td>Delete an element</td>
<td>Click the Delete icon (DELETE ICON) next to the element to delete, and in the confirmation dialog box click Yes. You can also delete the whole form.</td>
</tr>
</tbody>
</table>

11 Click Add.

You created a resource action and you can see it listed on the Resource Actions page.

What to do next

Publish the resource action. See “Publish a Resource Action,” on page 20.

Publish a Resource Action

To use the newly created resource action as a part of an advanced service, you must publish the resource action.

Prerequisites

Log in to the vCloud Automation Center console as a service architect.
Procedure
1 Select Advanced Services > Resource Actions.
2 Locate the resource action you want to publish.
3 In the Actions column, click the down arrow and click Publish.

The status of the resource action changes to Published.

What to do next
“Assign an Icon to a Resource Action,” on page 21. Business group managers and tenant administrators can then use the action when they create an entitlement.

Assign an Icon to a Resource Action
After you create and publish a resource action, you can edit it and assign an icon to the action.

Prerequisites
Log in to the vCloud Automation Center console as a service architect.

Procedure
1 Select Administration > Catalog Management > Actions.
2 Locate the resource action that you created and click the name of the resource action.
3 Click Browse and select the icon you want to add.
4 Click Open.
5 Click Update.

You assigned an icon to the resource action. Business group managers and tenant administrators can use the resource action in an entitlement.

Create a Service
A service is a representation of a set of related activities. Service architects, tenant administrators, and business group managers can create a new service to add catalog items to the service.

Prerequisites
Log in to the vCloud Automation Center console as a tenant administrator, business group manager, or service architect.

Procedure
1 Select Administration > Catalog Management > Services.
2 Click the Add icon (➕).
3 Type a Name and, optionally, a Description.
4 (Optional) Click the Choose File button to select an icon for the service, and click Open.
   The icon you select appears as a service image to the consumer of the advanced service.
5 (Optional) Select a status of the service from the **Status** drop-down menu.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inactive</td>
<td>The service is in draft state.</td>
</tr>
<tr>
<td>Active</td>
<td>The service can be published in a service catalog.</td>
</tr>
<tr>
<td>Deleted</td>
<td>The service is deleted and cannot be used.</td>
</tr>
</tbody>
</table>

6 (Optional) Select the time settings from the **Hours** drop-down menus.

The time settings specify the availability of internal support services team.

7 (Optional) Type the name of the owner of the service in the **Owner** text box and press Enter.

8 (Optional) Type the name of the person or a group of persons who are in charge of the blueprint in the **Support Team** text box and press Enter.

9 (Optional) Select a day and a time interval to specify any scheduled maintenance from the **Change Window** drop-down menus.

10 Click **Add**.

You created a service and you can see it on the Services page.

**What to do next**

Edit the catalog items you want and include them in the service. See “**Associate a Catalog Item with a Service**,” on page 22.

### Associate a Catalog Item with a Service

Include your catalog items in the service. You can include a catalog item in only one service, but a service can contain many catalog items.

**Prerequisites**

Log in to the vCloud Automation Center console as a **tenant administrator**, **business group manager**, or **service architect**.

**Procedure**

1 Select **Administration > Catalog Management > Catalog Items**.

2 Locate the catalog item you want to associate with a service and click the name of the item.

3 (Optional) Click the **Choose File** button to change the icon of the catalog item.

4 Select the status of the catalog item from the **Status** drop-down menu.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active</td>
<td>The catalog item is active and can be used in the service.</td>
</tr>
<tr>
<td>Inactive</td>
<td>The catalog item is inactive and you cannot use it in the service until you activate it.</td>
</tr>
</tbody>
</table>

5 Select a service with which to associate the catalog item from the **Service** drop-down menu.

6 Click **Update**.

You associated the catalog item with a service.
What to do next

Repeat the steps for all of the catalog items you want to include in the service. Create an entitlement to entitle the service and the catalog items included in it to a user or user groups in a business group. These users are the consumers of your service. See “Entitle a Service, Catalog Items, and Actions to a User or a Group of Users,” on page 25.

Create an Approval Policy for Advanced Service Blueprints and Actions

Tenant administrators and approval administrators can define approval policies and use them in entitlements. You can set up the approval policies with multiple levels for pre- and post-approval events.

For detailed information about approvals and approval levels, see Tenant Administration.

Prerequisites

- Log in to the vCloud Automation Center console as a tenant administrator or approval administrator.
- Verify that a service architect created and published an advanced service blueprint. See “Create a Service Blueprint,” on page 18 and “Publish a Service Blueprint as a Catalog Item,” on page 19.
- Verify that a service architect created and published a custom resource action. See “Create a Resource Action,” on page 19 and “Publish a Resource Action,” on page 20.

Procedure

1. Specify Approval Policy Information on page 23
   When you create an approval policy, first define the approval policy information, such as policy type, name, description, and status.

2. Create an Approval Level on page 24
   When you create an approval policy, you can add levels for both pre- and post-provisioning phases within the provisioning workflow.

You created an approval policy. You can use it when you create an entitlement.

Specify Approval Policy Information

When you create an approval policy, first define the approval policy information, such as policy type, name, description, and status.

Procedure

1. Select Administration > Approval Policies.

2. Click the Add Approval Policy icon (➕)

3. Select a policy type from the Policy Type drop-down menu.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Catalog - Catalog Item Request (Advanced Service Blueprint)</td>
<td>Applies the policy to a catalog item that you created by publishing an advanced service blueprint.</td>
</tr>
<tr>
<td>Service Catalog - Resource Action Request (your_custom_resource_action)</td>
<td>Applies the policy to a resource action that a service architect created by using Advanced Service Designer. The resource action can be any custom resource action, including resource actions for managing IaaS-provisioned vSphere virtual machines.</td>
</tr>
</tbody>
</table>

4. Click OK.

5. Type a Name and, optionally, a Description.
From the **Status** drop-down menu, indicate the state of the policy.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Draft</td>
<td>Approval policy is saved in draft state.</td>
</tr>
<tr>
<td>Active</td>
<td>The approval policy is saved in active state and you can use it in an entitlement.</td>
</tr>
</tbody>
</table>

**What to do next**

Create the pre- and post-approval levels.

**Create an Approval Level**

When you create an approval policy, you can add levels for both pre- and post-provisioning phases within the provisioning workflow.

**Procedure**

1. Click the **Add Levels** icon ( + ) on the **Pre Approval** or **Post Approval** tab.
2. Type a **Name** and, optionally, a **Description**.
3. Select manual approval requirement. .

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always Required</td>
<td>A manual approval is always required to complete the request.</td>
</tr>
<tr>
<td>Required based on conditions</td>
<td>A manual approval is required based on the conditions that you select from the <strong>Clause</strong> drop-down menu.</td>
</tr>
</tbody>
</table>

4. Select the approvers.

<table>
<thead>
<tr>
<th>Option</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Users and Groups</td>
<td>Type the name of a user or group in the <strong>Search</strong> text box and press Enter.</td>
</tr>
<tr>
<td>Determine approvers from the request</td>
<td>Select the approvers from the <strong>Value</strong> drop-down menu.</td>
</tr>
</tbody>
</table>

5. Indicate who must approve the request or action.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anyone can approve</td>
<td>Any one of the approvers can approve the request.</td>
</tr>
<tr>
<td>All must approve</td>
<td>Each of the approvers must approve the request.</td>
</tr>
</tbody>
</table>

6. Click the **Approval Form** tab.

7. Double-click the fields you want to make editable.

   An approver can modify the editable fields when completing an approval for this level and policy.

   Editing fields is only in the pre-provisioning phase. In the post-provisioning phase, the fields are displayed as read-only and cannot be edited.

8. Click **Add**.

9. Click **Add**.

You created an approval policy. You can use the policy and apply it to services, catalog items, and actions when you create an entitlement.
Entitle a Service, Catalog Items, and Actions to a User or a Group of Users

Business group managers and tenant administrators can entitle services, catalog items, and resource actions to groups of users, or to a specific user in a selected business group. They can also assign an approval policy for each service, catalog item, and resource action. The users to whom an object is entitled are the users who can access and request the entitled objects.

Prerequisites

Log in to the vCloud Automation Center console as a tenant administrator or business group manager.

Procedure

1. Select Administration > Catalog Management > Entitlements.
2. Click the Add Entitlement icon.
3. Type a Name and, optionally, a Description.
4. (Optional) Select the date and the time when the entitlement expires in the Expiration Date text boxes. If you do not specify expiry date and time, the entitlement remains active indefinitely.
5. Select the status of the entitlement from the Status drop-down menu.
   
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Draft</td>
<td>Saves the entitlement in draft state.</td>
</tr>
<tr>
<td>Active</td>
<td>The entitlement is active and can be considered when determining access to entities in the service catalog.</td>
</tr>
</tbody>
</table>

   If you select to activate the entitlement, you must select users or groups.
6. Select a business group from the Business Group drop-down menu.
7. Type the name of a user or group in the Users & Groups text box and press Enter.
   You can add more than one user or group from the selected business group to the list. The groups and users must be part of the business you selected in Step 6.
8. Click Next.
9. Type the name of a service in the Entitled Services text box and press Enter.
   You can select more than one service to add to an entitlement or you can add specific individual catalog items instead.
10. (Optional) Type the name of a catalog item in the Entitled Catalog Items text box and press Enter.
    By default, all of the catalog items included in the service are entitled to the users or user groups you selected on the Details tab.
    If you entitle a service, adding catalog items individually allows you to apply different approval policies to the catalog items.
11. (Optional) Type the name of a resource action in the Entitled Actions text box and press Enter.
12. (Optional) Modify the approval policies for a service, catalog item, or action.
   a. Point to the down arrow in the Approval Policy column and select Modify Policy.
   b. Select the policy to apply from the Apply this Policy drop-down menu.
   c. Click OK.
13. Click Add.
You created an entitlement and you can see it on the Entitlements page. If you set the status of the entitlement to **Active**, the users and user groups that you specified can access the catalog items in the service.

When consumers of the service log in to their vCloud Automation Center consoles, they see the service on the **Catalog** tab, and they can request the catalog items included in the service.
Extend Operations on IaaS-Provisioned Virtual Machines

By using Advanced Service Designer, you can publish vCenter Orchestrator workflows as resource actions for managing vSphere and vCloud Director vApp virtual machines provisioned with IaaS.

Procedure

1. **Create a Resource Action for Extending Operations on IaaS-Provisioned Virtual Machines** on page 27

   You can extend the operations that the consumers of the catalog items can perform on vSphere and vCloud Director vApp virtual machines by creating custom resource actions and associating them with IaaS-provisioned vSphere and vApp machines.

2. **Publish a Resource Action** on page 29

   To use the newly created resource action as a part of an advanced service, you must publish the resource action.

3. **Assign an Icon to a Resource Action** on page 29

   After you create and publish a resource action, you can edit it and assign an icon to the action.

You created and published a resource action for managing IaaS-provisioned vSphere or vCloud Director vApp virtual machines. You can navigate to Administration > Catalog Management > Actions and see the resource action.

What to do next

Business group managers and tenant administrators can use the resource action when they create entitlements for provisioning vSphere and vCloud Director vApp virtual machines with IaaS. This way, consumers of the IaaS catalog item can perform additional operations on the machines they provision.

Create a Resource Action for Extending Operations on IaaS-Provisioned Virtual Machines

You can extend the operations that the consumers of the catalog items can perform on vSphere and vCloud Director vApp virtual machines by creating custom resource actions and associating them with IaaS-provisioned vSphere and vApp machines.

By creating a resource action, you publish a vCenter Orchestrator workflow as a post-provisioning operation. During this process, you can edit the workflow presentation and specify how the action looks when the consumer requests to perform the operation. See “Designing a Resource Action Form,” on page 43.

Prerequisites

Log in to the vCloud Automation Center console as a service architect.
**Procedure**

1. Select **Advanced Services > Resource Actions**.

2. Click the **New resource action** icon (▼).

3. Navigate through the vCenter Orchestrator workflow library and select a workflow.
   
   You must select a workflow that enables you to perform an action on a virtual machine.

4. Click **Next**.

5. Select **IaaS VC VirtualMachine** from the **Resource type** drop-down menu.

6. Select **vm** from the **Input parameter** drop-down menu.

7. Click **Next**.

8. Type a name and, optionally, a description on the **Details** tab.
   
   The **Name** and **Description** text boxes are prepopulated with the name and description of the workflow as they are defined in vCenter Orchestrator.

   The name and description that you type appear in the resource action request form. It is important to use a name and description that are meaningful to the consumers.

9. Click **Next**.

10. (Optional) Edit the form of the resource action on the **Form** tab.

    The form of the resource action maps the vCenter Orchestrator workflow presentation. You can change the form by deleting, editing, and rearranging the elements. You can also add a new form and form pages and drag the necessary elements to the new form and form page.

    | Option                              | Action                                                                 |
    |-------------------------------------|------------------------------------------------------------------------|
    | Ad a form                           | Click the **New Form** icon (▼) next to the form name, fill in the necessary text boxes, and click **Submit**. |
    | Add a form page                     | Click the **New Page** icon (▼) next to the form page name, fill in the necessary text boxes, and click **Submit**. |
    | Add an element to the form page     | Drag an element from the New Fields pane on the left to the pane on the right. You can then fill in the necessary text boxes and click **Submit**. |
    | Edit an element                     | Click the **Edit** icon (✎) next to the element to edit, make the necessary edits, and click **Submit**. |
    | Delete an element                   | Click the **Delete** icon (❌) next to the element to delete, and in the confirmation dialog box click **Yes**. You can also delete the whole form. |

11. Click **Add**.

You created a resource action for managing a virtual machine provisioned with IaaS and you can see it listed on the Resource Actions page.

**What to do next**

Publish the resource action.
Publish a Resource Action

To use the newly created resource action as a part of an advanced service, you must publish the resource action.

**Prerequisites**

Log in to the vCloud Automation Center console as a service architect.

**Procedure**

2. Locate the resource action you want to publish.
3. In the Actions column, click the down arrow and click Publish.

The status of the resource action changes to Published.

**What to do next**

“Assign an Icon to a Resource Action,” on page 21. Business group managers and tenant administrators can then use the action when they create an entitlement.

Assign an Icon to a Resource Action

After you create and publish a resource action, you can edit it and assign an icon to the action.

**Prerequisites**

Log in to the vCloud Automation Center console as a service architect.

**Procedure**

1. Select Administration > Catalog Management > Actions.
2. Locate the resource action that you created and click the name of the resource action.
3. Click Browse and select the icon you want to add.
4. Click Open.
5. Click Update.

You assigned an icon to the resource action. Business group managers and tenant administrators can use the resource action in an entitlement.
The Advanced Service Designer includes a dynamic form designer that you can use to design custom forms for blueprints, resources, and actions.

You can create interactive forms that a user can complete, for example to submit a catalog request. You can also create read-only forms that define what information displays on the details view for a catalog item or a provisioned resource.

As you create new objects in the Advanced Service Designer, forms are generated for common use cases.

### Table 6-1. Advanced Service Designer Object Types and Associated Forms

<table>
<thead>
<tr>
<th>Object Type</th>
<th>Default Form</th>
<th>Additional Forms</th>
</tr>
</thead>
</table>
| Service blueprint | Request submission form based on the presentation of the selected workflow. | Catalog item details (read-only)  
|                 |                                                       | Submitted request details (read-only)                 |
| Custom resource | Resource details form based on the attributes of the vCenter Orchestrator plug-in inventory type. | (None)                                                 |
| Custom action   | Action submission form based on the presentation of the selected workflow. | Submitted action details (read-only)                  |

You can modify the default forms and design new forms by using a drag-and-drop interface to place fields on the form. You can place constraints on the values of certain fields, specify default values, or provide instructional text for the end user who is completing the form.

This chapter includes the following topics:

- “Default New Fields in the Form Designer,” on page 31
- “Predefined Constraints and Values in the Form Designer,” on page 33
- “Working With the Form Designer,” on page 36

### Default New Fields in the Form Designer

When you edit the default generated forms of a resource action or a service blueprint, you can add various predefined new fields to the form. This way, you can extend the workflow presentation and functionality.

If an input parameter is defined in the vCenter Orchestrator workflow, in vCloud Automation Center it appears on the default generated form. If you do not want to use the default generated fields in the form, you can delete them and drag and drop new fields from the palette. If you want to replace a field, the ID that you enter for the new field must be the same as the ID of the field you are replacing. This way, the new field is mapped to the workflow input parameter.
You can add new fields, other than the ones that were generated based on the vCenter Orchestrator workflow inputs, so that you can extend the workflow presentation and functionality in the following cases:

- When you want to extend the default generated form by adding constraints to the existing fields

  For example, you can create a new drop-down menu and name it **dd**. You can also create predefined options of Gold, Silver, Bronze, and Custom. If there is a predefined field, such as CPU, you can add the following constraints to this field:

  - If dd equals Gold, then CPU is 2000 MHz
  - If dd equals Silver, then CPU is 1000 MHz
  - If dd equals Bronze then CPU is 500 MHz
  - If dd equals Custom, the CPU field is editable, and the consumer can specify a custom value

- When you want to extend the default generated form by adding new fields that are handled in the vCenter Orchestrator workflow as global parameters

  For instance, the workflow provides an integration with a third-party system and the workflow developer defined input parameters to be handled in the general case, but has also provided a way for passing custom fields. For example, in a scripting box, all global parameters that start with **my3rdparty** are handled. Then, if the service architect wants to pass specific values for consumers to provide, the service architect can add a new field named **my3rdparty_CPU**.

### Table 6-2. New Fields in the Resource Action or Service Blueprint Form

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text field</td>
<td>Single-line text box</td>
</tr>
<tr>
<td>Text area</td>
<td>Multi-line text box</td>
</tr>
<tr>
<td>Password field</td>
<td>Field in which consumers type a password</td>
</tr>
<tr>
<td>Integer field</td>
<td>Text box in which consumers type an integer</td>
</tr>
<tr>
<td></td>
<td>You can make this field a slider with a minimum and maximum value, as well as an increment.</td>
</tr>
<tr>
<td>Decimal field</td>
<td>Text box in which consumers type a decimal</td>
</tr>
<tr>
<td></td>
<td>You can make this field a slider with a minimum and maximum value, as well as an increment.</td>
</tr>
<tr>
<td>Date &amp; time</td>
<td>Text boxes in which consumers specify a date (by selecting a date from a calendar menu) and can also select the time (by using up and down arrows)</td>
</tr>
<tr>
<td>Check box</td>
<td>Check box</td>
</tr>
<tr>
<td>Yes/No</td>
<td>Drop-down menu for selecting Yes or No</td>
</tr>
<tr>
<td>Drop-down</td>
<td>Drop-down menu</td>
</tr>
<tr>
<td>List</td>
<td>List</td>
</tr>
<tr>
<td>Check box list</td>
<td>Check box list</td>
</tr>
<tr>
<td>Radio button group</td>
<td>Group of radio buttons</td>
</tr>
<tr>
<td>Search</td>
<td>Search text box that auto completes the query and where consumers select an object</td>
</tr>
<tr>
<td>Tree</td>
<td>Tree that consumers use to browse and select available objects</td>
</tr>
</tbody>
</table>
## Predefined Constraints and Values in the Form Designer

When you edit an element of the blueprint or resource action form, you can apply various constraints and values to the element.

### Constraints

The constraints that you can apply vary depending on the type of element you are editing or adding to the form.

#### Table 6-3. Constraints in the forms designer

<table>
<thead>
<tr>
<th>Constraint</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required</td>
<td>Indicates whether the element is required. The options are:</td>
</tr>
<tr>
<td></td>
<td><strong>Constant</strong> Sets the element you are editing to required or optional.</td>
</tr>
<tr>
<td></td>
<td><strong>Field</strong> Binds the element to another element from the form. For example, you can set the element to be required only when another element, such as a check box, from the form is selected.</td>
</tr>
<tr>
<td></td>
<td><strong>Conditional</strong> Applies a condition. By using conditions you can create various clauses and expressions and apply them to the state or constraints of the element.</td>
</tr>
<tr>
<td>Read only</td>
<td>Indicates whether the field is read-only. The options are:</td>
</tr>
<tr>
<td></td>
<td><strong>Constant</strong> Sets the element you are editing to read-only or editable state.</td>
</tr>
<tr>
<td></td>
<td><strong>Field</strong> Binds the element to another element from the representation. For example, you can set the element to be read-only when another element, such as a check box, from the form is selected.</td>
</tr>
<tr>
<td></td>
<td><strong>Conditional</strong> Applies a condition. By using conditions you can create various clauses and expressions and apply them to the state or constraints of the element.</td>
</tr>
<tr>
<td>Value</td>
<td>Allows you to set a value for the element.</td>
</tr>
<tr>
<td></td>
<td><strong>Constant</strong> Sets the element you are editing to a constant value that you specify.</td>
</tr>
<tr>
<td></td>
<td><strong>Field</strong> Binds the value of the element to a parameter of another element from the form.</td>
</tr>
<tr>
<td></td>
<td><strong>Conditional</strong> Applies a condition. By using conditions you can create various clauses and expressions and apply them to the state or constraints of the element.</td>
</tr>
<tr>
<td>Constraint</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Visible</td>
<td>Indicates whether the consumer can see the element.</td>
</tr>
<tr>
<td></td>
<td><strong>Constant</strong> Sets the element you are editing to visible or hidden.</td>
</tr>
<tr>
<td></td>
<td><strong>Field</strong> Binds the element to another element from the form. For example, you can set the element to be visible only when another element, such as a check box, from the form is selected.</td>
</tr>
<tr>
<td></td>
<td><strong>Conditional</strong> Applies a condition. By using conditions you can create various clauses and expressions and apply them to the state or constraints of the element.</td>
</tr>
<tr>
<td>Minimum length</td>
<td>Allows you to set a minimum number of characters of the string input element.</td>
</tr>
<tr>
<td></td>
<td><strong>Constant</strong> Sets the minimum number of characters of the string input element you are editing to a constant value that you specify.</td>
</tr>
<tr>
<td></td>
<td><strong>Field</strong> Binds the minimum number of characters of the string input element to another element from the form.</td>
</tr>
<tr>
<td></td>
<td><strong>Conditional</strong> Applies a condition. By using conditions you can create various clauses and expressions and apply them to the state or constraints of the element.</td>
</tr>
<tr>
<td>Maximum length</td>
<td>Allows you to set a maximum allowed number of characters of the string input element.</td>
</tr>
<tr>
<td></td>
<td><strong>Constant</strong> Sets the maximum allowed number of characters of the string input element you are editing to a constant value that you specify.</td>
</tr>
<tr>
<td></td>
<td><strong>Field</strong> Binds the maximum allowed number of characters of the string input element to another element from the form.</td>
</tr>
<tr>
<td></td>
<td><strong>Conditional</strong> Applies a condition. By using conditions you can create various clauses and expressions and apply them to the state or constraints of the element.</td>
</tr>
<tr>
<td>Minimum value</td>
<td>Allows you to set a minimum value of the number input element.</td>
</tr>
<tr>
<td></td>
<td><strong>Constant</strong> Sets the minimum value of the number input element you are editing to a constant value that you specify.</td>
</tr>
<tr>
<td></td>
<td><strong>Field</strong> Binds the minimum value of the number input element to another element from the form.</td>
</tr>
<tr>
<td></td>
<td><strong>Conditional</strong> Applies a condition. By using conditions you can create various clauses and expressions and apply them to the state or constraints of the element.</td>
</tr>
</tbody>
</table>
### Table 6-3. Constraints in the forms designer (Continued)

<table>
<thead>
<tr>
<th>Constraint</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum value</td>
<td>Allows you to set a maximum value of the number input element.</td>
</tr>
<tr>
<td>Constant</td>
<td>Sets the maximum value of the number input element you are editing to a constant value that you specify.</td>
</tr>
<tr>
<td>Field</td>
<td>Binds the maximum value of the number input element to another element from the form.</td>
</tr>
<tr>
<td>Conditional</td>
<td>Applies a condition. By using conditions you can create various clauses and expressions and apply them to the state or constraints of the element.</td>
</tr>
<tr>
<td>Increment</td>
<td>Allows you to set an increment for an element such as a Decimal or Integer field. For example, when you want an Integer field to be rendered as a Slider, this will be the value of the step.</td>
</tr>
<tr>
<td>Minimum count</td>
<td>Allows you to set a minimum count of items of the element that can be selected.</td>
</tr>
<tr>
<td>Constant</td>
<td>Sets the minimum count of items of the element that can be selected to a constant value that you specify.</td>
</tr>
<tr>
<td>Field</td>
<td>Binds the minimum count of items of the element that can be selected to another element from the form.</td>
</tr>
<tr>
<td>Conditional</td>
<td>Applies a condition. By using conditions you can create various clauses and expressions and apply them to the state or constraints of the element.</td>
</tr>
<tr>
<td>For example, when you add or edit a Check box list you can set the minimum number of check boxes that the consumer should select to proceed.</td>
<td></td>
</tr>
<tr>
<td>Maximum count</td>
<td>Allows you to set a maximum count of items of the element that can be selected.</td>
</tr>
<tr>
<td>Constant</td>
<td>Sets the maximum count of items of the element that can be selected to a constant value that you specify.</td>
</tr>
<tr>
<td>Field</td>
<td>Binds the maximum count of items of the element that can be selected to another element from the form.</td>
</tr>
<tr>
<td>Conditional</td>
<td>Applies a condition. By using conditions you can create various clauses and expressions and apply them to an element.</td>
</tr>
<tr>
<td>For example, when you add or edit a Check box list you can set the maximum number of check boxes that the consumer should select to proceed.</td>
<td></td>
</tr>
</tbody>
</table>

## Values

You can apply values to some of the elements and define what the consumers see for some of the fields. After the consumers make their selections, the selections are passed to the workflow engine. For example, when you add or edit a Check box list, you can specify predefined values to the check boxes in the list.
Working With the Form Designer

When you create advanced service blueprints, custom resource actions, and custom resources, you can edit the forms of the blueprints, actions, and resources by using the form designer. You can edit the representation and define what the consumers of the item or action see when they request the catalog item or run the post-provisioning operation.

By default, any service blueprint, resource action, or custom resource form is generated based on the workflow presentation in vCenter Orchestrator.

![Form Designer Screenshot]

The steps in the vCenter Orchestrator presentation are represented as form pages and the vCenter Orchestrator presentation groups are represented as separate sections. The input types of the selected workflow are displayed as various fields in the form. For example, the vCenter Orchestrator type string is represented by a text box. A complex type such as VC:VirtualMachine is represented by a search box or a tree, so that the consumers can type an alphanumeric value to search for a virtual machine or browse to select a virtual machine.
You can edit how an object is represented in the form designer. For example, you can edit the default VC:VirtualMachine representation and make it a tree instead of a search box. You can also add new fields such as check boxes, drop-down menus, and so on, and apply various constraints. If the new fields you add are not valid and correctly mapped to the vCenter Orchestrator workflow inputs, when the consumer runs the workflow, vCenter Orchestrator skips the unmapped fields.

Designing a Custom Resource Form

When you create a custom resource to map to an Orchestrator object type, you can edit the default generated form of the resource by modifying or deleting certain fields. You can also create a new page and move some of the properties to it, but you cannot add new properties to the form.

The fields on the Details Form page are properties of the custom resource. You can perform basic edit operations, such as deleting and rearranging the form page. You cannot add anything different from a property specific for the selected resource.

You can delete the properties that you consider unnecessary for the consumer. You can rearrange the form by using drag-and-drop. You can create a new form page and delete some of the elements on the original page and insert them into the new form page. This way, the consumer sees two tabs with reorganized elements for the custom resource.

- **Edit a Custom Resource Element** on page 38
  You can edit some of the characteristics of an element on the custom resource Details Form page. Each element on the page represents a property of the custom resource. You cannot change the type of a property and the default values, but you can edit the name, size, and the description.

- **Add a New Custom Resource Form Page** on page 38
  You can add a new page to the form of the custom resource to rearrange the available elements and to edit the form of the custom resource.

- **Insert a Section Header in a Custom Resource Form** on page 39
  You can insert a section header to split the form into sections.

- **Insert a Text Element in a Custom Resource Form** on page 39
  You can insert a text box to add some descriptive text to the form.
**Edit a Custom Resource Element**

You can edit some of the characteristics of an element on the custom resource Details Form page. Each element on the page represents a property of the custom resource. You cannot change the type of a property and the default values, but you can edit the name, size, and the description.

**Prerequisites**

- Log in to the vCloud Automation Center console as a **tenant administrator** or **service architect**.
- “Create a Custom Resource,” on page 17.

**Procedure**

1. Select **Advanced Services > Custom Resources**.
2. Click the custom resource you want to edit.
3. Click the **Details Form** tab.
4. Locate the element you want to edit.
5. Click the **Edit** icon (-pencil).
6. Type a new name of the field in the **Label** text box to change the label.
7. Edit the description in the **Description** text box.
8. Select an option from the **Size** drop-down menu to change the size of the element.
9. Select an option from the **Label size** drop-down menu to change the size of the label.
10. Click **Submit**.
11. Click **Update**.

**Add a New Custom Resource Form Page**

You can add a new page to the form of the custom resource to rearrange the available elements and to edit the form of the custom resource.

**Prerequisites**

- Log in to the vCloud Automation Center console as a **tenant administrator** or **service architect**.
- “Create a Custom Resource,” on page 17.

**Procedure**

1. Select **Advanced Services > Custom Resources**.
2. Click the custom resource you want to edit.
3. Click the **Details Form** tab.
4. Click the **New Page** icon (+) next to the form page name.
5. Type a name for the page in the **Heading** text box.
6. Click **Submit**.
7. Click **Update**.

You can see the new form page on the Details Form page. You can delete some of the elements from the original form page and insert them in the new form page.
**Insert a Section Header in a Custom Resource Form**

You can insert a section header to split the form into sections.

**Prerequisites**
- Log in to the vCloud Automation Center console as a tenant administrator or service architect.
- “Create a Custom Resource,” on page 17.

**Procedure**
1. Select Advanced Services > Custom Resources.
2. Click the custom resource you want to edit.
3. Click the Details Form tab.
4. Drag the Section header element from the New Fields pane to the Form page pane.
5. Type a name of the section.
6. Click outside of the element to save the changes.
7. Click Update.

**Insert a Text Element in a Custom Resource Form**

You can insert a text box to add some descriptive text to the form.

**Prerequisites**
- Log in to the vCloud Automation Center console as a tenant administrator or service architect.
- “Create a Custom Resource,” on page 17.

**Procedure**
1. Select Advanced Services > Custom Resources.
2. Click the custom resource you want to edit.
3. Click the Details Form tab.
4. Drag the Text element from the New Fields pane to the Form page pane.
5. Type the text you want to add.
6. Click outside of the element to save the changes.
7. Click Update.

**Designing a Service Blueprint Form**

When you create a service blueprint, you can edit the form of the blueprint by adding new fields to the form, modifying the existing fields, deleting, or rearranging fields. You can also create new forms and form pages, and drag and drop new fields to them.

- Add a New Service Blueprint Form on page 40
  When you edit the default generated form of a workflow that you want to publish as a service blueprint, you can add a new service blueprint form.

- Edit a Service Blueprint Element on page 40
  You can edit some of the characteristics of an element on the Blueprint Form page of a service blueprint. You can change the type of an element, its default values, and apply various constraints and values.
Add a New Element on page 41
When you edit the default generated form of a service blueprint, you can add a predefined new element to the form. For example, if you do not want to use a default generated field, you can delete it and replace it with a new one.

Insert a Section Header in a Service Blueprint Form on page 42
You can insert a section header to split the form into sections.

Add a Text Element to a Service Blueprint Form on page 43
You can insert a text box to add some descriptive text to the form.

Add a New Service Blueprint Form
When you edit the default generated form of a workflow that you want to publish as a service blueprint, you can add a new service blueprint form.

By adding a new service blueprint form, you define the look and feel of the catalog item details and submitted request details pages. If you do not add a catalog item details and submitted request details forms, the consumer sees what is defined in the request form.

Prerequisites
- Log in to the vCloud Automation Center console as a tenant administrator or service architect.
- “Create a Service Blueprint,” on page 18.

Procedure
1. Select Advanced Services > Service Blueprints.
2. Click the service blueprint you want to edit.
3. Click the Blueprint Form tab.
4. Click the New Form icon (➕).
5. Type a Name and, optionally, a Description.
6. Select the screen type from the Screen type menu.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catalog item details</td>
<td>A catalog item details page that consumers see when they click a catalog item.</td>
</tr>
<tr>
<td>Request form</td>
<td>The default service blueprint form. The consumers see the request form when they request the catalog item.</td>
</tr>
<tr>
<td>Submitted request details</td>
<td>A request details page that consumers see after they request the item and want to view the request details on the Request tab.</td>
</tr>
</tbody>
</table>
7. Click Submit.

What to do next
Add the fields you want by dragging them from the New fields pane to the Form page pane.

Edit a Service Blueprint Element
You can edit some of the characteristics of an element on the Blueprint Form page of a service blueprint. You can change the type of an element, its default values, and apply various constraints and values.

Prerequisites
- Log in to the vCloud Automation Center console as a tenant administrator or service architect.
“Create a Service Blueprint,” on page 18.

Procedure

1. Select Advanced Services > Service Blueprints.
2. Click the service blueprint you want to edit.
3. Click the Blueprint Form tab.
4. Locate the element you want to edit.
5. Click the Edit icon (>Edit).
6. Type a new name of the field in the Label text box to change the label.
7. Edit the description in the Description text box.
8. Select an option from the Type drop-down menu to change the display type of the element.
   The options vary depending on the type of element you edit.
9. Select an option from the Size drop-down menu to change the size of the element.
10. Select an option from the Label size drop-down menu to change the size of the label.
11. Edit the default value of the element.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>Sets the default value of the element you are editing to a constant value that you specify.</td>
</tr>
<tr>
<td>Field</td>
<td>Binds the default value of the element to a parameter of another element from the representation.</td>
</tr>
<tr>
<td>Conditional</td>
<td>Applies a condition. By using conditions you can create various clauses and expressions and apply them to an element.</td>
</tr>
</tbody>
</table>

12. Apply constraints to the element on the Constraints tab.
13. Add predefined values for the element on the Values tab.
   You can add multiple values by repeating this step.
   a. Type a value in the Value text box.
   b. Type the name of the predefined value in the Label text box.
   c. Click the Add icon (>Add).
   You can only add values for fields such as Drop-down, Check box list, List, Slider, or Radio button group.
14. Click Submit.
15. Click Update.

Add a New Element

When you edit the default generated form of a service blueprint, you can add a predefined new element to the form. For example, if you do not want to use a default generated field, you can delete it and replace it with a new one.

Prerequisites

- Log in to the vCloud Automation Center console as a tenant administrator or service architect.
- “Create a Service Blueprint,” on page 18.
Procedure
1. Select **Advanced Services > Service Blueprints**.
2. Click the service blueprint you want to edit.
3. Click the **Blueprint Form** tab.
4. Drag an element from the New Fields pane and drop it to the Form page pane.
5. Type an ID in the **ID** text box.
   - The ID must be the ID of a workflow input parameter.
6. Type a label in the **Label** text box.
   - This defines the label of the field and how the consumer sees it.
7. (Optional) Select a type of the field from the **Type** drop-down menu.
   - You can leave the default type.
8. Type the name of a vCenter Orchestrator object in the **Entity type** text box and press Enter.
   - This step is required when the new field is **List**, **Check box list**, **Radio button group**, **Search** or **Tree**.
9. (Optional) Select the **Multiple values** check box to specify whether the consumer are able to select more than one object.
   - This option is available for fields such as **Search** and **Tree**.
10. Click **Submit**.
11. Click **Update**.

**What to do next**
You can edit the element to change the default settings and apply various constraints or values.

**Insert a Section Header in a Service Blueprint Form**
You can insert a section header to split the form into sections.

**Prerequisites**
- Log in to the vCloud Automation Center console as a **tenant administrator** or **service architect**.
- “Create a Service Blueprint,” on page 18.

**Procedure**
1. Select **Advanced Services > Service Blueprints**.
2. Click the service blueprint you want to edit.
3. Click the **Blueprint Form** tab.
4. Drag the **Section header** element from the New Fields pane to the Form page pane.
5. Type a name of the section.
6. Click outside of the element to save the changes.
7. Click **Update**.
Add a Text Element to a Service Blueprint Form

You can insert a text box to add some descriptive text to the form.

Prerequisites

- Log in to the vCloud Automation Center console as a tenant administrator or service architect.
- “Create a Service Blueprint,” on page 18.

Procedure

1. Select Advanced Services > Service Blueprints.
2. Click the service blueprint you want to edit.
3. Click the Blueprint Form tab.
4. Drag the Text element from the New Fields pane to the Form page pane.
5. Type the text you want to add.
6. Click outside of the element to save the changes.
7. Click Update.

Designing a Resource Action Form

When you create a resource action, you can edit the form of the action by adding new fields to the form, modifying the existing fields, deleting, or rearranging fields. You can also create new forms and form pages, and drag and drop new fields to them.

Add a New Resource Action Form

When you edit the default generated form of a workflow you want to publish as a resource action, you can add a new resource action form.

By adding a new resource action form, you define how the submitted action details page looks. If you do not add a submitted action details form, the consumer sees what is defined in the action form.

Prerequisites

- Log in to the vCloud Automation Center console as a tenant administrator or service architect.
- “Create a Resource Action,” on page 19.

Procedure

2. Click the resource action you want to edit.
3. Click the Form tab.
4. Click the New Form icon ().
5. Type a Name and, optionally, a Description.
6   Select the screen type from the **Screen type** menu.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Action form</strong></td>
<td>The default resource action form that consumers see when they decide to run the post-provisioning action.</td>
</tr>
<tr>
<td><strong>Submitted action details</strong></td>
<td>A request details page that consumers see when they request the action and decide to view the request details on the <strong>Request</strong> tab.</td>
</tr>
</tbody>
</table>

7   Click **Submit**.

**What to do next**

Add the fields you want by dragging them from the New fields pane to the Form page pane.

**Add a New Element to a Resource Action Form**

When you edit the default generated form of a resource action, you can add a predefined new element to the form. For example, if you do not want to use a default generated field, you can delete it and replace it with a new one.

**Prerequisites**

- Log in to the vCloud Automation Center console as a tenant administrator or service architect.
- “Create a Resource Action,” on page 19.

**Procedure**

1   Select **Advanced Services > Resource Actions**.

2   Click the resource action you want to edit.

3   Click the **Form** tab.

4   Drag an element from the New Fields pane and drop it to the Form page pane.

5   Type an ID in the **ID** text box.

   The ID must be the ID of a workflow input parameter.

6   Type a label in the **Label** text box.

   This defines the label of the field and how the consumer sees it.

7   (Optional) Select a type of the field from the **Type** drop-down menu.

   You can leave the default type.

8   Type the name of a vCenter Orchestrator object in the **Entity type** text box and press Enter.

   This step is required when the new field is **List**, **Check box list**, **Radio button group**, **Search** or **Tree**.

9   (Optional) Select the **Multiple values** check box to specify whether the consumer are able to select more than one object.

   This option is available for fields such as **Search** and **Tree**.

10  Click **Submit**.

11  Click **Update**.

**What to do next**

You can edit the element to change the default settings and apply various constraints or values.
Edit a Resource Action Element

You can edit some of the characteristics of an element on the resource action Form page. You can change the type of an element, its default values, and apply various constraints and values.

Prerequisites

- Log in to the vCloud Automation Center console as a tenant administrator or service architect.
- “Create a Resource Action,” on page 19.

Procedure

2. Click the resource action you want to edit.
3. Click the Form tab.
4. Locate the element you want to edit.
5. Click the Edit icon (✏).
6. Type a new name of the field in the Label text box to change the label.
7. Edit the description in the Description text box.
8. Select an option from the Type drop-down menu to change the display type of the element.
   The options vary depending on the type of element you edit.
9. Select an option from the Size drop-down menu to change the size of the element.
10. Select an option from the Label size drop-down menu to change the size of the label.
11. Edit the default value of the element.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>Sets the default value of the element you are editing to a constant value that you specify.</td>
</tr>
<tr>
<td>Field</td>
<td>Binds the default value of the element to a parameter of another element from the representation.</td>
</tr>
<tr>
<td>Conditional</td>
<td>Applies a condition. By using conditions you can create various clauses and expressions and apply them to an element.</td>
</tr>
</tbody>
</table>

12. Apply constraints to the element on the Constraints tab.
13. Add predefined values for the element on the Values tab.
   You can add multiple values by repeating this step.
   a. Type a value in the Value text box.
   b. Type the name of the predefined value in the Label text box.
   c. Click the Add icon (➕).
   You can only add values for fields such as Drop-down, Check box list, List, Slider, or Radio button group.
14. Click Submit.
15. Click Update.
Insert a Section Header in a Resource Action Form

You can insert a section header to split the form into sections.

Prerequisites
- Log in to the vCloud Automation Center console as a tenant administrator or service architect.
- “Create a Resource Action,” on page 19.

Procedure
2. Click the resource action you want to edit.
3. Click the Form tab.
4. Drag the Section header element from the New Fields pane to the Form page pane.
5. Type a name of the section.
6. Click outside of the element to save the changes.
7. Click Update.

Add a Text Element to a Resource Action Form

You can insert a text box to add some descriptive text to the form.

Prerequisites
- Log in to the vCloud Automation Center console as a tenant administrator or service architect.
- “Create a Resource Action,” on page 19.

Procedure
2. Click the resource action you want to edit.
3. Click the Form tab.
4. Drag the Text element from the New Fields pane to the Form page pane.
5. Type the text you want to add.
6. Click outside of the element to save the changes.
7. Click Update.
Advanced Service Designer
Examples and Scenarios

7

The examples and scenarios identify tasks in vCloud Automation Center and suggest ways to accomplish them.

For instance, if you want to create an advanced service for creating a user and changing the password of the user, see “Create a Service for Creating and Modifying a User,” on page 47. This section guides the service architect through all of the tasks that result in the publishing of a Create a user catalog item and associating a Change the user password resource action with it.

You can also create various resource actions, so that the consumers of the catalog items can manage some of the items that they provision. For example, if you want to create a resource action for migrating a virtual machine, see “Create and Publish an Action to Migrate a Virtual Machine,” on page 53. This section guides you through the tasks that result in publishing a resource action for migrating a vSphere virtual machine.

You can also create a resource action for migrating a vSphere virtual machine with vMotion and edit the default generated form of the resource action to define the look and feel of the request and submitted forms. For information, see “Create an Action to Migrate a Virtual Machine With vMotion,” on page 54.

For an example scenario about creating a resource action for taking a snapshot of a vSphere virtual machine, see “Create and Publish an Action to Take a Snapshot,” on page 58.

This chapter includes the following topics:

- “Create a Service for Creating and Modifying a User,” on page 47
- “Create and Publish an Action to Migrate a Virtual Machine,” on page 53
- “Create an Action to Migrate a Virtual Machine With vMotion,” on page 54
- “Create and Publish an Action to Take a Snapshot,” on page 58

Create a Service for Creating and Modifying a User

By using Advanced Service Designer, you can create and publish a catalog item for provisioning a user in a group. You can also associate a new post-provisioning operation to the provisioned user, for example, an operation allowing the consumers to change the user password.

In this scenario, as a service architect, you create a new custom resource, a service blueprint, and publish a catalog item for creating a user. You create service and include the catalog item in the service. You also create a resource action for changing the password of the user. In addition, you edit the workflow presentation of the catalog item by using the form designer and change the way the consumers see the request form.

As a business group manager or a tenant administrator, you entitle the newly created service, catalog item, and resource action to a consumer.
Prerequisites
Verify that the Active Directory plug-in is properly configured and you have the rights to create users in Active Directory.

Procedure
1. **Create a Test User as a Custom Resource** on page 48
   You can create a custom resource and map it to the vCenter Orchestrator object type \texttt{AD:User}.

2. **Create a Service Blueprint for Creating a User** on page 49
   After you created the custom resource, you can create the service blueprint to publish the Create a user in a group workflow as a catalog item.

3. **Publish the Create a User Blueprint as a Catalog Item** on page 50
   After you create the Create a test user service blueprint, you can publish it as a catalog item.

4. **Create a Resource Action to Change a User Password** on page 50
   You can create a resource action to allow the consumers of the service to change the password of the user after they provision the user.

5. **Publish the Change a Password Resource Action** on page 51
   To use the Change the password of the Test User resource action as a post-provisioning operation, you must publish it.

6. **Create a Service for Creating a Test User** on page 51
   Create a service to display in the service catalog and allow consumers to easily locate the catalog items related to creating the test user.

7. **Associate the Catalog Item with the Create a Test User Service** on page 52
   Include the Create a test user catalog item in the Create a Test User service.

8. **Entitle the Service and the Resource Action to a Consumer** on page 52
   Business group managers and tenant administrators can entitle the service and the resource action to a user or a group of users so that they can see the service in their catalog and request the Create a test user catalog item included in the service. In addition, after the consumers provision the item, they can request to change the user password.

When consumers of the service log in to their vCloud Automation Center consoles, they see the service you created, Create a test user, on the Catalog tab, and they can request the catalog item you created and included in the service, Create a user in a group. After they create the user, they can also change the user password.

**Create a Test User as a Custom Resource**
You can create a custom resource and map it to the vCenter Orchestrator object type \texttt{AD:User}.

**Prerequisites**
Log in to the vCloud Automation Center console as a service architect.

**Procedure**
1. Select Advanced Services > Custom Resources.

2. Click the Add Resource icon ( ).

3. Type \texttt{AD:User} in the Inventory Type text box and press Enter.
4 Type a name for the resource.
   For example, Test User.
5 Type a description for the resource.
   For example,
   This is a test custom resource that I will use for my catalog item to create a user in a group.
6 Click Next.
7 Leave the form as is.
8 Click Add.

You created a Test User custom resource and you can see it on the Custom Resources page.

What to do next
Create a service blueprint.

Create a Service Blueprint for Creating a User
After you created the custom resource, you can create the service blueprint to publish the Create a user in a group workflow as a catalog item.

Prerequisites
Log in to the vCloud Automation Center console as a service architect.

Procedure
1 Select Advanced Services > Service Blueprints.
2 Click the Add Blueprint icon ( ).
3 Navigate to Orchestrator > Library > Microsoft > Active Directory > User in the vCenter Orchestrator workflow library, and select the Create a user in a group workflow.
4 Click Next.
5 Change the name of the blueprint to Create a test user, and leave the description as is.
6 Click Next.
7 Edit the blueprint form.
   a Click the Edit icon ( ) next to the groupContainer text box, and change the name of the label to Group container.
   b Click Submit to save the changes.
   c Click the Edit icon ( ) next to the accountName text box, and change the label to Account name.
   d Click Submit to save the changes.
   e Click the Edit icon ( ) next to the domainName text box, and change the name of the label to Domain name.
   f Click the Constraints tab.
   g Select Constant from the Value drop-down menu and type Test domain.
      You set the domain name to a constant value.
Click **Constant** in the **Visible** drop-down menu and select **No**.
You made the domain name invisible for the consumer of the catalog item.

Click **Submit** to save the changes.

Click the **Edit** icon (EDIT) next to the **displayName** text box, and change the label to **Display name**.

Click **Submit** to save the changes.

Click **Next**.

Select **newUser [Test User]** as an output parameter to be provisioned.

Click **Add**.

You created a blueprint for creating a test user and you can see it on the Service blueprints page.

**What to do next**

Publish the Create a test user blueprint to make it an active catalog item.

**Publish the Create a User Blueprint as a Catalog Item**

After you create the Create a test user service blueprint, you can publish it as a catalog item.

**Prerequisites**

Log in to the vCloud Automation Center console as a service architect.

**Procedure**

1 Select **Advanced Services > Service Blueprints**.
2 Locate the Create a test user blueprint.
3 In the Actions column, click the down arrow and click **Publish**.

The status of the Create a test user blueprint changes to Published. You can navigate to **Administration > Catalog Management > Catalog Items** and see that the Create a test user blueprint is published as a catalog item.

**Create a Resource Action to Change a User Password**

You can create a resource action to allow the consumers of the service to change the password of the user after they provision the user.

**Prerequisites**

Log in to the vCloud Automation Center console as a service architect.

**Procedure**

1 Select **Advanced Services > Resource Actions**.
2 Click the **New resource action** icon (NEW).
3 Navigate to **Orchestrator > Library > Microsoft > Active Directory > User** in the vCenter Orchestrator workflow library, and select the **Change a user password** workflow.
4 Click **Next**.
5 Select **Test User** from the **Resource type** drop-down menu.
   This is the custom resource you created previously.
6  Select user from the Input parameter drop-down menu.

7  Click Next.

8  Change the name of the resource action to Change the password of the Test User, and leave the description as it appears on the Details tab.

9  Click Next.

10 (Optional) Leave the form as is.

11  Click Add.

You created a resource action for changing the password of a user and you can see it listed on the Resource Actions page.

What to do next
Publish the Change the password of the Test User resource action.

Publish the Change a Password Resource Action
To use the Change the password of the Test User resource action as a post-provisioning operation, you must publish it.

Prerequisites
Log in to the vCloud Automation Center console as a service architect.

Procedure
1  Select Advanced Services > Resource Actions.

2  Locate the Change the password of the Test User action.

3  In the Actions column, click the down arrow and click Publish.

The status of the Change the password of the Test User resource action changes to Published.

What to do next
Assign an icon to the resource action. You can then use the action when you create an entitlement. For more information about assigning an icon to a resource action, see “Assign an Icon to a Resource Action,” on page 21.

Create a Service for Creating a Test User
Create a service to display in the service catalog and allow consumers to easily locate the catalog items related to creating the test user.

Prerequisites
Log in to the vCloud Automation Center console as a service architect.

Procedure
1  Select Administration > Catalog Management > Services.

2  Click the Add icon (＋).

3  Type Create a Test User as a name of the service.

4  Select Active from the Status drop-down menu.

5  Leave the other fields blank.
6 Click Add.

You created the service called Create a Test User, and you can see it on the Services page.

**What to do next**

Edit the Create a test user catalog item to include it in the service.

### Associate the Catalog Item with the Create a Test User Service

Include the Create a test user catalog item in the Create a Test User service.

**Prerequisites**

Log in to the vCloud Automation Center console as a service architect.

**Procedure**

1. Select Administration > Catalog Management > Catalog Items.
2. Locate the Create a test user catalog item, and click the catalog item name.
3. (Optional) Click the Choose File button to change the icon of the catalog item.
4. Select the Create a Test User service from the Service drop-down menu.
5. Click Update.

You associated the Create a test user catalog item with the Create a Test User service.

**What to do next**

Business group managers and tenant administrators can entitle the service and the resource action to a user or a group of users.

### Entitle the Service and the Resource Action to a Consumer

Business group managers and tenant administrators can entitle the service and the resource action to a user or a group of users so that they can see the service in their catalog and request the Create a test user catalog item included in the service. In addition, after the consumers provision the item, they can request to change the user password.

**Prerequisites**

Log in to the vCloud Automation Center console as a tenant administrator or business group manager.

**Procedure**

1. Select Administration > Catalog Management > Entitlements.
2. Click the Add Entitlement icon (➕).
3. Type Create a user in the Name text box.
4. Leave the Description and Expiration Date fields empty.
5. Select Active from the Status drop-down menu.
6. Select your business group from the Business Group drop-down menu.
7. Type a user name in the Users & Groups text box and press Enter.

The person you select can see the service and the catalog items included in the service in the catalog.

8. Click Next.
9 Type **Create a Test User** in the **Entitled Services** text box and press Enter.

10 Type **Change the password of the Test User** in the **Entitled Resource Actions** text box and press Enter.

11 Click **Add**.

You created an active entitlement and exposed the service to the catalog of the consumers.

When consumers of the service log in to their vCloud Automation Center consoles, they see the service you created, Create a test user, on the **Catalog** tab, and they can request the catalog item you created and included in the service, Create a user in a group. After they create the user, they can also change the user password.

---

**Create and Publish an Action to Migrate a Virtual Machine**

By using Advanced Service Designer, you can create and publish a resource action to extend the operations that consumers can perform on IaaS-provisioned vSphere virtual machines.

In this scenario, you create a resource action for quick migration of a vSphere virtual machine.

**Prerequisites**

Log in to the vCloud Automation Center console as a **service architect**.

**Procedure**

1. **Create a Resource Action to Migrate a vSphere Virtual Machine** on page 53

   You can create a custom resource action to allow the consumers to migrate vSphere virtual machines after they provision the vSphere virtual machines with IaaS.

2. **Publish the Action for Migrating a vSphere Virtual Machine** on page 54

   To use the Quick migration of virtual machine resource action as a post-provisioning operation, you must publish it.

You created and published a vCenter Orchestrator workflow as a resource action. You can navigate to **Administration > Catalog Management > Actions** and see the Quick migration of virtual machine resource action in the list of actions. You can assign an icon to the resource action. See “**Assign an Icon to a Resource Action,**” on page 21.

**What to do next**

Business group managers and tenant administrators can include the Quick migration of virtual machine resource action in an entitlement. For more information about how to create and publish IaaS blueprints for virtual platforms, see **IaaS Configuration for Virtual Platforms**.

---

**Create a Resource Action to Migrate a vSphere Virtual Machine**

You can create a custom resource action to allow the consumers to migrate vSphere virtual machines after they provision the vSphere virtual machines with IaaS.

**Procedure**

1. Select **Advanced Services > Resource Actions**.

2. Click the **New resource action** icon (➕).

3. Navigate to **Orchestrator > Library > vCenter > Virtual Machine management > Move and migrate** in the vCenter Orchestrator workflow library and select the **Quick migration of virtual machine** workflow.

4. Click **Next**.
5 Select IaaS VC VirtualMachine from the Resource type drop-down menu.

6 Select vm from the Input parameter drop-down menu.

7 Click Next.

8 Leave the name of the resource action and the description as they appear on the Details tab.

9 Click Next.

10 Leave the form as is.

11 Click Add.

You created a resource action for migrating a virtual machine and you can see it listed on the Resource Actions page.

What to do next
Publish the resource action.

Publish the Action for Migrating a vSphere Virtual Machine

To use the Quick migration of virtual machine resource action as a post-provisioning operation, you must publish it.

Procedure
1 Select Advanced Services > Resource Actions.

2 Locate the Quick migration of virtual machine resource action.

3 In the Actions column, click the down arrow and click Publish.

You created and published a vCenter Orchestrator workflow as a resource action. You can navigate to Administration > Catalog Management > Actions and see the Quick migration of virtual machine resource action in the list of actions. You can assign an icon to the resource action. See “Assign an Icon to a Resource Action,” on page 21.

What to do next
Business group managers and tenant administrators can include the Quick migration of virtual machine resource action in an entitlement. For more information about how to create and publish IaaS blueprints for virtual platforms, see IaaS Configuration for Virtual Platforms.

Create an Action to Migrate a Virtual Machine With vMotion

By using Advanced Service Designer, you can create and publish a resource action to migrate an IaaS-provisioned virtual machine with vMotion.

In this scenario, you create a resource action to migrate a vSphere virtual machine with vMotion. In addition, you edit the workflow presentation by using the form designer and change the way the consumers see the action when they request it.

Prerequisites
Log in to the vCloud Automation Center console as a service architect.

Procedure
1 Create an Action to Migrate a vSphere Virtual Machine With vMotion on page 55

You can create a custom resource action to allow the consumers of the service to migrate a vSphere virtual machine with vMotion after they provision the machine with IaaS.
2 **Edit the Resource Action Form** on page 56
   
   The form of the resource action maps the vCenter Orchestrator workflow presentation. You can edit
   the form and define what the consumers of the resource action see when they decide to run the post-
   provisioning operation.

3 **Add a Submitted Action Details Form and Save the Action** on page 57
   
   You can add a new form to the Migrate a virtual machine with vMotion resource action to define what
   the consumers see after they request to run the post-provisioning operation.

4 **Publish the Action for Migrating a Virtual Machine with vMotion** on page 57
   
   To use the Migrate a virtual machine with vMotion resource action as a post-provisioning operation,
   you must publish it.

You created and published a vCenter Orchestrator workflow as a resource action. You can navigate to
Administration > Catalog Management > Actions and see the Migrate virtual machine with vMotion
resource action in the list of actions. You can assign an icon to the resource action. See “Assign an Icon to a

You also edited the presentation of the workflow and defined the look and feel of the action.

**What to do next**

Business group managers and tenant administrators can include the Migrate a virtual machine with
vMotion resource action in an entitlement. For more information about how to create and publish IaaS
blueprints for virtual platforms, see *IaaS Configuration for Virtual Platforms*.

**Create an Action to Migrate a vSphere Virtual Machine With vMotion**

You can create a custom resource action to allow the consumers of the service to migrate a vSphere virtual
machine with vMotion after they provision the machine with IaaS.

**Procedure**

1 Select **Advanced Services > Resource Actions**.

2 Click the **New resource action** icon (➕).

3 Navigate to **Orchestrator > Library > vCenter > Virtual Machine management > Move and migrate** in
   the vCenter Orchestrator workflow library and select the **Migrate virtual machine with vMotion**
   workflow.

4 Click **Next**.

5 Select **IaaS VC VirtualMachine** from the **Resource type** drop-down menu.

6 Select **vm** from the **Input parameter** drop-down menu.

7 Click **Next**.

8 Leave the name of the resource action and the description as they appear on the **Details** tab.

9 Click **Next**.

**What to do next**

Edit the resource action form.
Edit the Resource Action Form

The form of the resource action maps the vCenter Orchestrator workflow presentation. You can edit the form and define what the consumers of the resource action see when they decide to run the post-provisioning operation.

Procedure

1. Delete the pool element by clicking the Delete icon (x).

2. Edit the host element.
   a. Click the Edit icon (EDIT) next to the host field.
   b. Type Target host in the Label text box.
   c. Select Search from the Type drop-down menu.
   d. Click the Constraints tab.
   e. Select Constant from the Required drop-down menu and select Yes.

   You made the host field always required.
   f. Click Submit.

3. Edit the priority element.
   a. Click the Edit icon (EDIT) next to the priority field.
   b. Type Priority of the task in the Label text box.
   c. Select Radio button group from the Type drop-down menu.
   d. Click Submit.

   When the consumers request the resource action, they see a radio button group with three radio buttons: lowPriority, defaultPriority, and highPriority.

4. Edit the state element.
   a. Click the Edit icon (EDIT) next to the state field.
   b. Type Virtual machine state in the Label text box.
   c. Select Drop-down from the Type drop-down menu.
   d. Click Submit.

   When the consumers request the resource action, they see a drop-down menu with three options: poweredOff, poweredOn, and suspended.

You edited workflow presentation of the Migrate a virtual machine with vMotion workflow.

What to do next

Add a new form and save the resource action.
Add a Submitted Action Details Form and Save the Action

You can add a new form to the Migrate a virtual machine with vMotion resource action to define what the consumers see after they request to run the post-provisioning operation.

**Procedure**

1. Click the New Form icon () next to the Form drop-down menu.
2. Type Submitted action in the Name text box.
3. Leave the Description field blank.
4. Select Submitted action details from the Screen type menu.
5. Click Submit.
6. Click the Edit icon () next to the Form page drop-down menu.
7. Type Details in the Heading text box.
8. Click Submit.
9. Drag the Text element from the Form pane and drop it to the Form page.
10. Type You submitted a request to migrate your machine with vMotion. Wait until the process completes successfully.
11. Click outside of the text box to save the changes.
12. Click Submit.
13. Click Add.

You created a resource action to migrate a virtual machine with vMotion and you can see it listed on the Resource Actions page.

**What to do next**

Publish the resource action to make it active.

Publish the Action for Migrating a Virtual Machine with vMotion

To use the Migrate a virtual machine with vMotion resource action as a post-provisioning operation, you must publish it.

**Procedure**

2. Locate the Migrate a virtual machine with vMotion action.
3. In the Actions column, click the down arrow and click Publish.
4. In the Actions column, click the down arrow and click Publish.

You created and published a vCenter Orchestrator workflow as a resource action. You can navigate to Administration > Catalog Management > Actions and see the Migrate virtual machine with vMotion resource action in the list of actions. You can assign an icon to the resource action. See “Assign an Icon to a Resource Action,” on page 21.

You also edited the presentation of the workflow and defined the look and feel of the action.
What to do next

Business group managers and tenant administrators can include the Migrate a virtual machine with vMotion resource action in an entitlement. For more information about how to create and publish IaaS blueprints for virtual platforms, see IaaS Configuration for Virtual Platforms.

Create and Publish an Action to Take a Snapshot

By using Advanced Service Designer, you can create and publish a resource action to take a snapshot of a vSphere virtual machine provisioned with IaaS.

In this scenario, you create a resource action to take a snapshot of a vSphere virtual machine provisioned with IaaS. In addition, you edit the workflow presentation by using the form designer and change the way the consumers see the action when they request it.

Prerequisites

Log in to the vCloud Automation Center console as a service architect.

Procedure

1. Create the Action to Take a Snapshot of a vSphere Virtual Machine on page 58
   You can create a custom resource action to allow the consumers to take a snapshot of a vSphere virtual machine after they provision the machine with IaaS.

2. Publish the Action for Taking a Snapshot on page 59
   To use the Create a snapshot resource action as a post-provisioning operation, you must publish it.

You created and published a vCenter Orchestrator workflow as a resource action. You can navigate to Administration > Catalog Management > Actions and see the Create a snapshot resource action in the list of actions. You can assign an icon to the resource action. See “Assign an Icon to a Resource Action,” on page 21.

What to do next

Business group managers and tenant administrators can include the Create a snapshot resource action in an entitlement. For more information about how to create and publish IaaS blueprints for virtual platforms, see IaaS Configuration for Virtual Platforms.

Create the Action to Take a Snapshot of a vSphere Virtual Machine

You can create a custom resource action to allow the consumers to take a snapshot of a vSphere virtual machine after they provision the machine with IaaS.

Procedure

2. Click the New resource action icon (➕).
3. Navigate to Orchestrator > Library > vCenter > Virtual Machine management > Snapshot in the vCenter Orchestrator workflow library and select the Create a snapshot workflow.
4. Click Next.
5. Select IaaS VC VirtualMachine from the Resource type drop-down menu.
6. Select vm from the Input parameter drop-down menu.
7. Click Next.
8. Leave the name of the resource action and the description as they appear on the Details tab.
9 Click Next.
10 Leave the form as is.
11 Click Add.

You created a resource action for taking a snapshot of a virtual machine and you can see it listed on the Resource Actions page.

**What to do next**

Publish the resource action.

### Publish the Action for Taking a Snapshot

To use the Create a snapshot resource action as a post-provisioning operation, you must publish it.

**Procedure**

1 Select Advanced Services > Resource Actions.
2 Locate the Create a snapshot action.
3 In the Actions column, click the down arrow and click **Publish**.

You created and published a vCenter Orchestrator workflow as a resource action. You can navigate to Administration > Catalog Management > Actions and see the Create a snapshot resource action in the list of actions. You can assign an icon to the resource action. See “Assign an Icon to a Resource Action,” on page 21.

**What to do next**

Business group managers and tenant administrators can include the Create a snapshot resource action in an entitlement. For more information about how to create and publish IaaS blueprints for virtual platforms, see *IaaS Configuration for Virtual Platforms*.
Index

A
Active Directory plug-in overview 11
adding a new form
resource actions 43
service blueprints 40
adding a new form page 38
advanced service, creating 16
Advanced Service Designer, form designer 31
approval policies
creating 23
overview 23
post-approval level 24
pre-approval level 24
approval policy, general settings 23

C
catalog items
associating with a service 22
including in a service 22
including in an example service 52
publishing 19
constraints, form designer 33
custom resources
creating 17
editing the form 37
overview 15
custom resource elements, editing 38

D
dynamic forms, Advanced Service Designer 31

E
editing a form, examples 56
embedded Orchestrator instance 13
entitling
example resource action 52
example service to a user 52
resource action 25
service to a user 25
example
associating catalog items with a service 52
changing user password 50
creating services 51
creating user in a group 49
creating a custom resource 48
entitling service to a customer 52
migrating virtual machine 53, 55
publishing a resource action 51, 54, 57, 59
resource action for migrating virtual machine 53
resource action for migrating virtual machine with vMotion 54
resource action for taking a snapshot 58
service for creating and modifying a user 47
take a snapshot of a virtual machine 58
example resource action, editing the form 56

F
form designer
constraints to apply 33
new fields 31
overview 36
forms designer, editing custom resources 37

G
goal navigator, using 7

H
HTTP-REST plug-in overview 11

M
mapping a resource to Orchestrator 15

O
Orchestrator
integration 13
overview 11
Orchestrator object types 15
Orchestrator plug-ins, overview 11
overview of
approval policies 23
custom resources 15
form designer 36
Orchestrator 11
Orchestrator plug-ins 11
services 10
vCloud Automation Center 9

P
post-approval levels, creating 24
PowerShell plug-in overview 11
pre-approval levels, creating 24
publishing
example resource actions 51, 54, 57, 59
example service blueprint 50
resource actions 20, 29
service blueprints 19

R
resource actions
  adding a new field 41, 44
  adding a new form 43
  adding an example form 57
  assigning an icon 21, 29
  changing user password 50
  creating 19, 27
  editing fields 45
  editing the form 43
  example 50
  extending operations on IaaS 27
  migrating virtual machine 53, 55
  new fields 31
  overview 16
  publishing 20, 29
  saving an example action 57
  take a snapshot 58

S
section headers, adding 39, 42, 46
service, including catalog items 22
service blueprints
  adding a new form 40
  adding a new field 41, 44
  creating 18
  creating user in a group 49
  editing fields 40
  editing the form 39
  new fields 31
  overview 16
  publishing 19
services
  creating 21
  including an example catalog item 52
  overview 10
SOAP plug-in overview 11
submitted action details form, adding 57

T
text boxes, adding 39, 43, 46

V
values, form designer 33
vCloud Automation Center, overview 9
virtual machines, extending operations 27