

# Lifecycle Manager Administration Guide

vCenter Lifecycle Manager 1.1.0

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# About This Book

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This book, the *Lifecycle Manager Administration Guide*, provides information about managing VMware® vCenter Lifecycle Manager (LCM).

## Intended Audience

This book is intended for administrators who are managing LCM. The information in this guide is written for experienced system administrators who are familiar with virtual machine technology.

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# Understanding LCM

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VMware vCenter Lifecycle Manager (LCM) automates the process of creating virtual machines and removing them from service at the appropriate time.

Using LCM, you can perform the following tasks:

- Handle and process virtual machine requests in a Web user interface.
- Automatically place servers based on their location, organization, environment, service level, or performance levels. When a solution is found for a set of criteria, the machine is automatically deployed.
- Enforce automatic deployment and configuration to reduce errors and speed up provisioning processes.
- Track lifecycle information for requested machines. Tracking helps maintain on-time archiving and deletion of end-of-life servers and avoids server sprawl.

This chapter includes the following topics:

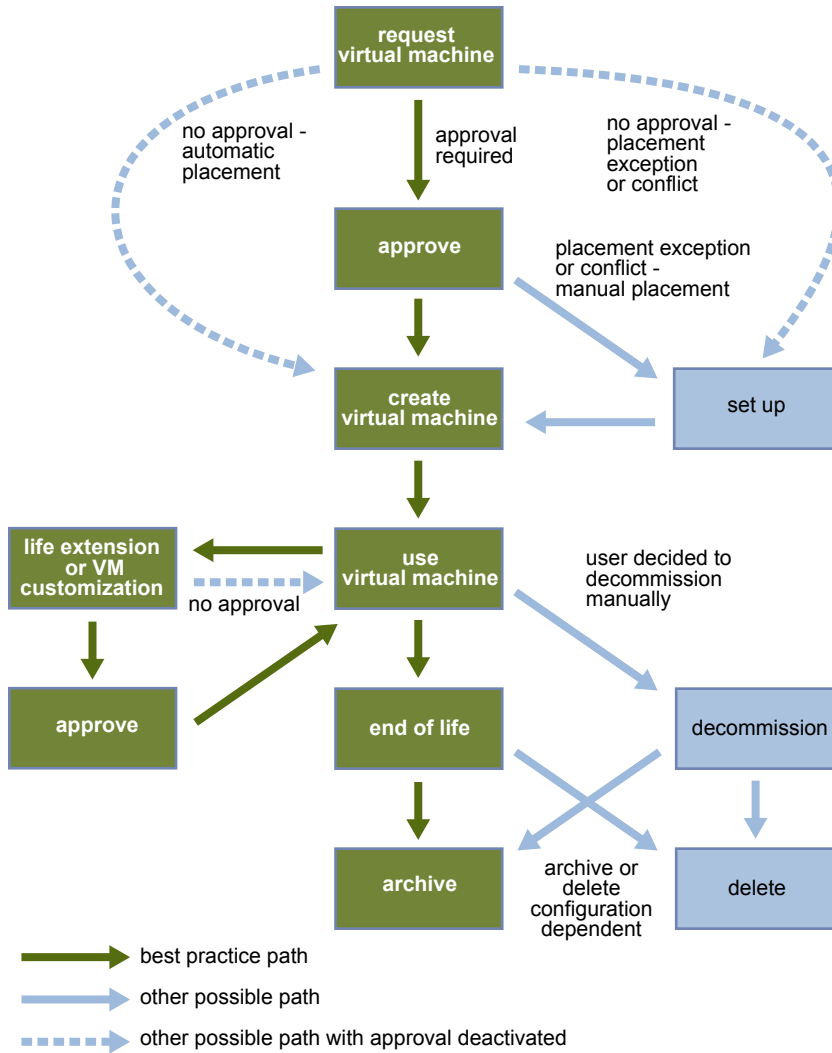
- [“Lifecycle Manager Process,”](#) on page 7
- [“Lifecycle Manager Terminology,”](#) on page 9
- [“Role-Based User Interface,”](#) on page 9
- [“LCM Administrator,”](#) on page 10
- [“Lifecycle Manager Architecture,”](#) on page 10

## Lifecycle Manager Process

LCM automates the process of creating virtual machines and removing them from service at the appropriate time.

[Figure 1-1](#) provides an overview of the process and the tasks completed by each role.

**Figure 1-1.** Stages in the Lifecycle of a Virtual Machine under LCM



The way that LCM handles requests to create virtual machines depends on how the LCM Administrator has configured the approval process. If approval is required, an email notification is sent to the LCM Approver. If approval is not required, and there is no conflict with the request, the virtual machine is created. If there is a conflict, an LCM IT Staff user receives an email notification that a virtual machine is waiting to be created.

After a virtual machine is created, it can be used until the decommissioning date. Five days before the decommissioning date, an email notice is sent to the user who requested the virtual machine if email notifications are enabled. The requester can do one of the following:

- Request to extend the life of the machine.  
If the extension is not approved, the virtual machine is decommissioned and is archived or deleted. The LCM Administrator determines whether decommissioned virtual machines are archived.

- Manually decommission the virtual machine.

The LCM Administrator can choose to delete the virtual machine request. The LCM Administrator is the only role that can remove information about a virtual machine. When a request is deleted, no information about the virtual machine appears in reports, but the virtual machine is not deleted. If a virtual machine request is accidentally deleted, the LCM Administrator can recover the associated virtual machine.

## Lifecycle Manager Terminology

LCM uses specific terminology to describe lifecycle events and attributes.

<b>Commission</b>	The creation of a requested virtual machine. The commission time is submitted during the request process.
<b>Decommission</b>	The requested machine reaches the end of its life. A decommission date is submitted during the request process. The decommissioned machine can be archived or deleted.
<b>Extension</b>	Extending the life of a virtual machine that is to be decommissioned. If approval is required, the request for extension must be approved before the owner of the virtual machine can continue to use it.
<b>Infrastructure</b>	Attributes such as the network, domain, and datastore affect where the requested virtual machine is placed in VMware Infrastructure.
<b>Criteria</b>	Attributes attached to a requested virtual machine that are selected during the request process, such as location, organization, server environment, service level, and performance. The LCM Administrator maps this information to the infrastructure.
<b>Template Profile</b>	The profile that is used when a requested virtual machine is cloned.
<b>Customization Template</b>	The template that determines the resources that the requested virtual machine uses, such as memory reservation, memory limit, CPU shares, and disk shares. Only the LCM IT Staff, LCM Tech Requester, and LCM Administrator can modify the customization template.
<b>Placing</b>	The requested virtual machine is created or moved into the infrastructure, based on the selected criteria and infrastructure.

## Role-Based User Interface

LCM has a role-based interface. Users are presented only the options that are relevant to their specific role. All roles can request a virtual machine.

LCM users can be assigned the following roles:

<b>LCM Administrator</b>	Establishes the criteria used for machine placement and determines how the criteria convert to sizing or placement values. The LCM Administrator configures LCM and establishes the placement of virtual machines.
<b>LCM Requester</b>	Can request to extend the life of a created virtual machine. Requesters can power virtual machines on and off, as well as delegate this control to other users.
<b>LCM Tech Requester</b>	In addition to doing everything that the requester role can do, the LCM Tech Requester can customize the settings for the CPU, memory, and shares of the virtual machine.
<b>LCM Approver</b>	Approves virtual machine deployment and extension requests.
<b>LCM IT Staff</b>	Completes manual placement of approved virtual machines. If a machine cannot be placed based on the provided criteria, a user with the LCM IT Staff role must manually choose the sizing and placement of the new machine.

For more information on the tasks that users can perform, see the *Lifecycle Manager User's Guide*.

## LCM Administrator

The LCM Administrator sets up the LCM environment, and can perform all tasks that other user roles can perform.

The LCM Administrator is responsible for the following tasks.

- Configuring LCM
- Determining the infrastructure, such as the server environment
- Setting up email notifications, the look and feel of the user interface, and style sheets
- Specifying who can access elements such as resource pools or datastores

## Lifecycle Manager Architecture

LCM is powered by VMware vCenter Orchestrator 4.0.1. Orchestrator is a development and process-automation platform that provides a library of extensible workflows for creating and running automated, configurable processes to manage the VMware vCenter infrastructure. You can use Orchestrator to create custom workflows that you can run from LCM.

Orchestrator exposes every operation in the vCenter Server API, allowing users to integrate all these operations into their automated processes. Orchestrator also allows integration with other management and administration solutions through its open plug-in architecture.

### LCM Compatibility with vCenter

LCM works with vCenter 4.0 and vCenter 4.0 Update 1 through an automatic compatibility mode. Only VirtualCenter 2.5 features are available in this mode. LCM is also compatible with VirtualCenter 2.5 Update 4 and VirtualCenter 2.5 Update 5.

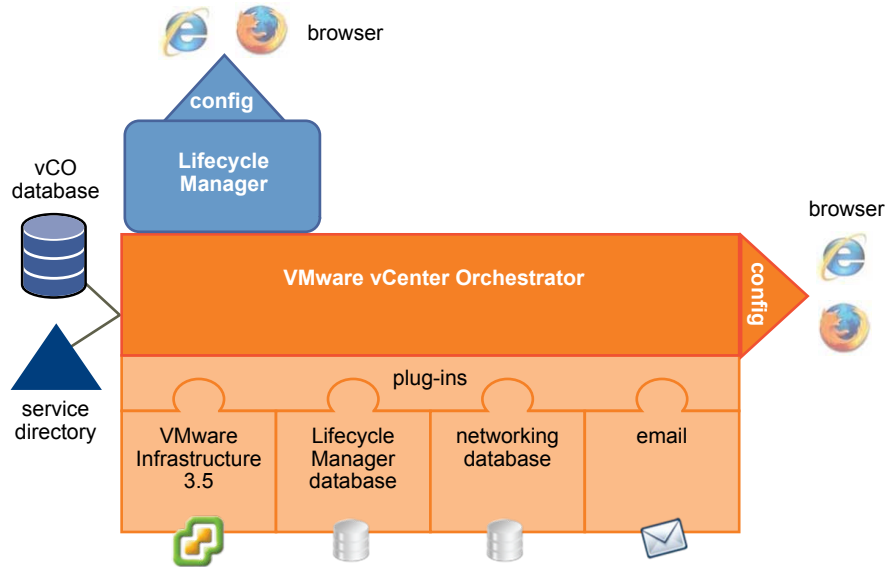
Before you install LCM, make sure that you have vCenter 4.0 or a compatible version of VirtualCenter 2.5 installed.

### Lifecycle Manager Components

You must configure the required components for LCM to function properly.

<b>Service directory</b>	Defines which users can connect to LCM, and also defines their permission levels. Only users who are members of a directory group can log in.
<b>Database</b>	Stores all information that is related to LCM, such as virtual machine names, control groups, view groups, commission and decommission dates, infrastructure elements linked with the virtual machine request (such as template profile, datastore, resource pool, and so on). The information necessary to map criteria and the infrastructure is also stored in the database.
<b>VMware Infrastructure</b>	Responsible for all communication with VMware vCenter. A Web Service API is used to connect to VMware Infrastructure 3.5 or vCenter 4.

The components shown in [Figure 1-2](#) must be configured in the Orchestrator configuration interface.

**Figure 1-2.** Architecture of LCM and Orchestrator

## Orchestrator Plug-Ins

After you install LCM, you must configure the following Orchestrator plug-ins:

- **VMware Infrastructure 3.5**

For adding VMware Infrastructure 3.5 or vCenter 4 instances.

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**NOTE** Because LCM supports vCenter 4.0 only in compatibility mode, you must configure the VMware Infrastructure 3.5 plug-in, and add your vCenter 4.0 server to it. LCM can operate only with the vCenter instances added and configured in the VMware Infrastructure 3.5 plug-in in the Orchestrator configuration interface.

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- **VMware Lifecycle Manager**

For configuring the Lifecycle Manager database.

- **Networking**

For configuring the networking database.

- **Mail**

For configuring email notifications.



# Setting Up the Virtual Machine Environment

# 2

Before users can request virtual machines, the LCM Administrator must configure the infrastructure and criteria.

This chapter includes the following topics:

- [“Configuring the Infrastructure for Requested Virtual Machines,”](#) on page 13
- [“Configuring the Criteria for Requested Virtual Machines,”](#) on page 19

## Configuring the Infrastructure for Requested Virtual Machines

The infrastructure defines the resources for requested virtual machines.

To set up the infrastructure for requested virtual machines, you must define the following elements.

<b>Resource Pool</b>	You can use an existing resource pool in vCenter or create a new one.
<b>Datastore</b>	You can choose which datastore to use. The datastore must exist.
<b>Virtual Machine Folder</b>	You can categorize items in vCenter folders, based on different organizations.
<b>Network</b>	You can associate a new network instance with vCenter or your ESX host.
<b>Template Profile</b>	You can create a template profile for virtual machines. An example of a template profile is a virtual machine running Windows XP.
<b>Domain</b>	You can specify the domain or workgroup that the requested virtual machine can join.
<b>Customization Template</b>	You can create a customization template that defines the computer resources available to the virtual machine. LCM uses the template to apply the correct levels of the resources.

If multiple infrastructure elements are mapped to the same criterion, LCM is unable to use any element automatically, and notifies the IT Staff that an element must be selected on the **Placement** view.

## Automatic Placement

When a virtual machine request is approved, the system tries to place the virtual machine automatically.


If automatic placement is successful, the virtual machine is created and the state of the request changes to **Available**. If the automatic placement fails, the state of the request changes to **Waiting for Placement**. During automatic placement, one of the following events might occur.

- If one path is found, the virtual machine is placed.
- If an exception occurs, the automatic placement fails. Information about the exception is displayed. The user is prompted to contact the LCM Administrator.
- If a conflict occurs, for example, if several solutions are found, or if the datastore is full, automatic placement fails. Information about the conflict and solution is displayed. The LCM IT Staff user can enter the new placement if several solutions exist.

## Register a Resource Pool

You can use an existing resource pool for requested virtual machines. LCM automatically maps the request to the resource pool. If you map more than one resource pool to the server environment, the LCM IT Staff user can select which one to use.


### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Infrastructure** view.
- 3 Click the **Resource Pool** icon (.
- 4 Click **Register**.
- 5 Type the name of the resource pool that you want to register.
- 6 Choose whether you want to automatically register all child resource pools and click **Submit**.
- 7 Select the criteria options and click **Submit**.

## Create a Resource Pool

You can create a resource pool for requested virtual machines. LCM automatically maps the request to the resource pool. If you map more than one resource pool to the server environment, the LCM IT Staff user can select which one to use.


### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Infrastructure** view.
- 3 Click the **Resource Pool** icon (.
- 4 Click **Create**.
- 5 Type or select the name of the parent in the new resource pool.
- 6 Type the name of the new resource pool and click **Next**.
- 7 Type or select the CPU allocation information and click **Next**.
- 8 Type or select the memory allocation information and click **Submit**.
- 9 Select the criteria options and click **Submit**.

## Register a Datastore

You must use an existing datastore for the requested virtual machines. LCM cannot create a datastore.


### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Infrastructure** view.
- 3 Click the **Datastore** icon ()
- 4 Click **Register**.
- 5 Select a datastore from the vCenter or ESX host that you want to register and click **Submit**.
- 6 Select the criteria options and click **Submit**.

## Register a Virtual Machine Folder

You can register an existing virtual machine folder.


### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Infrastructure** view.
- 3 Click the **Virtual Machine Folder** icon ()
- 4 Click **Register**.
- 5 Type or search for the name of the virtual machine folder that you want to register.
- 6 Choose whether you want to automatically register all child virtual machine folders and click **Submit**.
- 7 Select the criteria options and click **Submit**.

## Create a Virtual Machine Folder

You can create a new virtual machine folder.


### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Infrastructure** view.
- 3 Click the **Virtual Machine Folder** icon ()
- 4 Click **Create**.
- 5 Type or search for the name of the parent folder.
- 6 Type the name of the new folder and click **Submit**.
- 7 Select the criteria options and click **Submit**.

## Register a Network

LCM automatically maps the request to the network. If you map more than one network to the server environment, the LCM IT Staff user can select which one to use.


### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Infrastructure** view.
- 3 Click the **Network** icon .
- 4 Click **Register**.
- 5 Type or search for a network and click **Next**.
- 6 Type the network domain name and click **Next**.
- 7 On the **IP Configuration** view, under **Network**, type the information and click **Submit**.  
If you select **No** for **Use DHCP**, you must create a range or a subnet for the IP addresses in the network.
- 8 Select the criteria options and click **Submit**.

## Create an IP Address Range

You can create an IP address range for the requested virtual machines.

### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Infrastructure** view.
- 3 Click the **Network** icon .
- 4 Click the name of a network.
- 5 Click **Create Range**.
- 6 Type a description.
- 7 Type the first and final IP addresses in your range.


Each time the virtual machine is provisioned, LCM allocates an IP address from the defined range. You can set up multiple ranges for each network.

- 8 Click **Submit**.

## Create Subnets

You can create subnets that are associated with a network.

### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Infrastructure** view.
- 3 Click the **Network** icon .
- 4 Click the name of a network.
- 5 Click **Create Subnet**.

- 6 Type the information in the text boxes.
- 7 Click **Submit**.

## Create a Template Profile


You can create a template profile. You can select an operating system, and specify the estimated cost for a virtual machine.

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**NOTE** For a list of guest operating systems that support image customization, see the *VMware Infrastructure Compatibility Matrixes*.

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### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Infrastructure** view.
- 3 Click the **Template Profile** icon ()
- 4 Click **Create**.
- 5 Type the information in the text boxes and click **Next**.

Option	Description
<b>Display name</b>	The name of the template profile.
<b>Description</b>	A description of the template profile.
<b>State</b>	The state of the template profile.
<b>Template to clone</b>	The source template from vCenter or ESX host.
<b>Ongoing monthly cost (currency)</b>	The monthly cost of creating future virtual machines.
<b>Initial setup cost (currency)</b>	The cost associated with setting up each virtual machine that uses this template.
<b>Do customization</b>	Type <b>Yes</b> to clone and customize the template. Type <b>No</b> to clone the template. <b>NOTE</b> Do not customize empty virtual machine templates.

Use the currency entries to charge back through template profiles.

- 6 (Optional) If you are using a Windows template and you have selected to customize the template, click **Next** and enter information about the operating system.


Option	Description
<b>Full Name</b>	Your name.
<b>Organization name</b>	The name of your organization (for example, <b>vmware</b> ).
<b>Local administrator password</b>	If the template that you are registering has a local administrator password set, the password you enter here is ignored. If the template you registered does not have a local administrator password, the one you enter here is applied.
<b>Time zone</b>	The time zone in which the virtual machine is located.
<b>Windows license key</b>	The license key. <b>NOTE</b> If the template uses a volume license key or a license server, you can leave this field blank.
<b>Server licensing mode</b>	Select either <b>perServer</b> or <b>perSeat</b> .
<b>Number of licenses</b>	Minimum number of licenses per server is 5.

- 7 Click **Submit**.
- 8 Select the criteria options and click **Submit**.

## Join a Domain or a Workgroup

You can join a domain or a workgroup.


### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Infrastructure** view.
- 3 Click the **Domain** icon ().
- 4 Click **Create**.
- 5 Choose whether to join a domain.
  - If you selected **Yes**, type the necessary information.
  - If you selected **No**, type a workgroup name.
- 6 If you joined a domain, select a network or an array of networks.  
The networks are defined on the **Network** view.
- 7 Click **Submit**.
- 8 Select the criteria options and click **Submit**.

## Create a Customization Template

A customization template defines the computer resources available to the virtual machine.

### Procedure


- 1 Log in to LCM as an administrator.
- 2 Click the **Infrastructure** view.
- 3 Click the **Customization Template** icon (.
- 4 Click **Create**.
- 5 Type a template name and click **Next**.  
This is the name that the requester sees, so create an easily identifiable name.
- 6 Select the memory information and click **Next**.
- 7 Select the CPU information and click **Next**.
- 8 Select the disk shares and click **Submit**.
- 9 Select the criteria options and click **Submit**.

## Relink Unlinked Elements

You can relink unlinked infrastructure elements automatically or manually. Elements become unlinked if they have been removed from vCenter, or if their ESX host has been removed from vCenter.

### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Infrastructure** view.

- 3 Click the **Unlinked Elements** icon ()
- 4 (Optional) Click **Relink All** to try to relink all unlinked elements automatically.
- 5 Relink an unlinked element manually.
  - a Click an element in the left pane.
  - b Click **Relink** in the right pane.
  - c Under **Action on unlinked element**, select **Relink**.
  - d Select the element and click **Submit**.

## Configuring the Criteria for Requested Virtual Machines

When users request virtual machines, they can specify criteria such as the location, organization, server environment, service level, and performance.

For example, a user can request a virtual machine and Palo Alto as the location, Administrative as the organization, Production as the server environment, select a comprehensive service level, and high performance. As an LCM Administrator, you can modify these criteria if, for example, the needs of the company change or resources change.

You can rename or delete existing elements or reconfigure mapping options. If you reconfigure these options, you are modifying the elements that comprise the criteria for a virtual machine. To create a criterion, at least one criterion of a type must currently exist. You can edit the mapping option for any element.

### Rename Criteria Elements

You can modify the name and the description of criteria elements.

#### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Criteria** view.
- 3 Click an element and click **Edit**.
- 4 Modify the name and description.
- 5 Click **Submit**.

### Reconfigure Mapping Objects

You can modify the mapping options for criteria elements.

#### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Criteria** view.
- 3 Click an element and click **Edit Objects for Mapping**.
- 4 Modify the mapping objects.
- 5 Click **Submit**.

## Delete Elements

You can delete criteria elements.

### Prerequisites

You must delete all tokens associated with a criterion element before you can delete the element.

### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Criteria** view.
- 3 Click an element and click **Delete**.
- 4 Click **Submit**.

## Using LCM

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After you have configured Lifecycle Manager, you can perform administration tasks, such as approving virtual machine requests, importing virtual machines, decommissioning virtual machines, and so on. Some tasks, such as requesting a virtual machine, can be performed by all LCM user roles. Most tasks, however, can only be performed by the LCM Administrator.

This chapter includes the following topics:

- [“Request a Virtual Machine,”](#) on page 21
- [“Display Requested Virtual Machines,”](#) on page 23
- [“Modify Request Options,”](#) on page 25
- [“Check the Power State of a Virtual Machine,”](#) on page 26
- [“Power a Virtual Machine On or Off,”](#) on page 26
- [“Suspend a Virtual Machine,”](#) on page 26
- [“Connecting to a Virtual Machine,”](#) on page 26
- [“Create a Snapshot,”](#) on page 27
- [“Revert to a Snapshot,”](#) on page 28
- [“Generate Reports,”](#) on page 28
- [“Registering Virtual Machines with LCM,”](#) on page 28
- [“Activate Web View Debug Mode,”](#) on page 30
- [“Relink Tokens to Virtual Machines,”](#) on page 30
- [“Check Licensing Status,”](#) on page 31
- [“Export Logs and Application Settings,”](#) on page 31
- [“Troubleshooting LCM,”](#) on page 31

### Request a Virtual Machine

To obtain a virtual machine, you must submit a request. You can request a specific start date or accept the first available date.

By default, virtual machines are decommissioned at midnight. For changing the decommissioning time, see [“Modify the Decommissioning Time,”](#) on page 23.

You can modify virtual machine parameters like CPU, memory, and shares, when you request the virtual machine. The modifications affect only the virtual machine that you are requesting at the time.

## Prerequisites

Review the customization template attributes to verify that you understand the default values. For more information, see [“Customization Template Attributes,”](#) on page 23.

## Procedure

- 1 Log in to LCM and click the **Requests** view.
- 2 Click **Request**.
- 3 (Optional) To specify a commissioning date, select **Yes** for **Set commissioning date?** and select a date.  
If you do not specify a commissioning date, the virtual machine is created at the first available opportunity after approval.
- 4 (Optional) To specify a decommissioning date, select **Yes** for **Set decommissioning date?** and select a date.  
If you do not specify a decommissioning date, the virtual machine remains in service until it is decommissioned manually.
- 5 (Optional) Specify who can control the virtual machine request.  
If you do not specify a user or group, only you have control.
  - a From the **Virtual machine control by** drop-down menu, select **Group** or **User**.
  - b Type the name of the user or group, or search from a list of available group or user names and descriptions.
  - c Type the email address for the user or group if email notifications are enabled.
- 6 (Optional) Specify who can connect to and view the virtual machine when it is running.  
If you do not specify a user or group, only you can view the virtual machine.
  - a From the **Virtual machine view by** drop-down menu, select **Group** or **User**.
  - b Type the name of the user or group, or search from a list of available group or user names and descriptions.
  - c Type the email address for the user or group if email notifications are enabled.
- 7 Click **Next**.
- 8 Select settings for the **Location, Organization, Server Environment, Service Level,** and **Performance** options.
- 9 Type the requester email and click **Next**.
- 10 Select the server type.
- 11 (Optional) To start the virtual machine as soon as it is provisioned, select **Yes** for **Start virtual machine**.
- 12 Select the customization template.
- 13 (Optional) To modify the customization template, select **Yes** for **Would you like to customize the attributes of this template?** and change the attribute values as needed.
- 14 Click **Next**.
- 15 Type comments about the virtual machine, which are viewed in the approval process.
- 16 Click **Submit**.

The virtual machine is deleted on the decommissioning date. You cannot get it back, unless LCM is configured to archive the virtual machines.

## Customization Template Attributes

You can assign custom values for template attributes.

**Table 3-1.** Customization Template Attributes

Attribute	Values
Memory reservation (MB)	Minimum is 0 (default is 256)
Memory limit/size (MB)	Minimum is -1; must be a multiple of 4 (default is 1024); must be greater than the Memory reservation value Selecting -1 maintains the same memory as the vCenter template.
Memory share	<b>low</b> , <b>normal</b> , or <b>high</b> (default is normal)
CPU reservation (MHz)	Minimum is 0 (default is 200)
CPU limit (MHz)	Minimum is -1 (default is 2000); must be greater than the CPU reservation value Selecting -1 maintains the same CPU number as the vCenter template.
CPU count	1, 2, 3, or 4 (default is 1) <b>NOTE</b> You can use 3 CPUs only with vCenter 4.0 or later.
CPU shares	<b>low</b> , <b>normal</b> , or <b>high</b> (default is normal)
Disk shares	<b>low</b> , <b>normal</b> , or <b>high</b> (default is normal)

## Modify the Decommissioning Time

You can change the decommissioning time in the Orchestrator Client.

### Procedure

- 1 Select **Start > Programs > vCenter Orchestrator > vCenter Orchestrator Client**.
- 2 Log in as an administrator.
- 3 Click the **Policies** view.
- 4 Right-click the **Lifecycle Scheduler** policy and select **Stop policy**.
- 5 Right-click the **Lifecycle Scheduler** policy and select **Edit**.
- 6 Click the **Scripting** tab in the right pane.
- 7 Select **Midnight - Delete VMs**.
- 8 On the **General** view underneath, type the new decommissioning time.
- 9 Click **Save and close**.
- 10 Right-click the **Lifecycle Scheduler** policy and select **Start policy**.

The new decommissioning time is now applied.

## Display Requested Virtual Machines

You can display the requested virtual machines according to their status, such as available or rejected.

For information about possible virtual machine request states, see [“Virtual Machine Request Status Icons,”](#) on page 24.

**Procedure**

- 1 Log in to LCM as an administrator.
- 2 Click the **Catalog** view.
- 3 Select a filter from the drop-down menu.













Option	Description
<b>All</b>	Displays all the requested virtual machines requested by users.
<b>Creating</b>	Displays the virtual machines that are being created.
<b>Available VM</b>	Displays the available virtual machines created by users.
<b>Rejected</b>	Displays all the rejected virtual machines that were requested by users.
<b>Decommissioned</b>	Displays all the decommissioned virtual machines that were created by users.
<b>Canceled</b>	Displays all the canceled virtual machines that were created by users.
<b>Errors</b>	Displays all the virtual machines that were created by users with errors.
<b>Waiting For Approval</b>	Displays all the requested virtual machines requested by users that are waiting for approval.
<b>Waiting For Placement</b>	Displays all the requested virtual machines requested by users that are waiting to be correctly placed.
<b>End Of Life</b>	Displays the requested virtual machines that are decommissioned, archived, rejected, or canceled by users.
<b>All Except End Of Life</b>	Displays the requested virtual machines that are not decommissioned, archived, rejected, or canceled by users.

**Virtual Machine Request Status Icons**


















The icon next to a virtual machine request gives you an indication about the state of the request.

[Table 3-2](#) lists the status icons and the corresponding virtual machine request status.

**Table 3-2.** Virtual Machine Request Status Icons

Icon	State
	The virtual machine is powered on.
	The virtual machine is powered off.
	The virtual machine is suspended.
	The virtual machine is available.
	The virtual machine is being archived.
	The virtual machine is archived.
	The virtual machine request is canceled.
	The virtual machine is being deleted.
	The virtual machine request is in an end of life state.
	The virtual machine request has errors.
	The virtual machine request is rejected.
	The virtual machine request is waiting for approval.

**Table 3-2.** Virtual Machine Request Status Icons (Continued)

Icon	State
	The virtual machine is waiting for creation.
	The virtual machine is waiting to be deployed by an LCM IT Staff user.
	The virtual machine is being created.
	The virtual machine is created.
	An error occurred during the virtual machine creation.
	An error occurred during the virtual machine archiving.
	An error occurred during the virtual machine deletion.
	A request to prolong the request time is submitted.
	A request to extend the provisioning time is submitted.
	A request to change an attribute of the virtual machine is submitted.
	A request to change a financial attribute of the virtual machine is submitted.
	A request to change a customization attribute of the virtual machine is submitted.
	A change is applied - the virtual machine is updated with a new configuration.
	The virtual machine is provisioned.
	The virtual machine can operate.
	The virtual machine is unavailable.
	The virtual machine is decommissioned.
	The virtual machine request is finished.

## Modify Request Options

You can change the attributes of a virtual machine request.

### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Catalog** view.
- 3 Select a requested virtual machine in the left pane.
- 4 Select an option from the right pane.

Option	Description
<b>Decommission</b>	Decommission the virtual machine.
<b>Extension</b>	Request an extension for the virtual machine.
<b>Change Request</b>	Modify request resources.
<b>Edit</b>	Modify provisioning and decommissioning dates.

Option	Description
<b>Change State</b>	Move virtual machine requests across different processes in the lifecycle. Used by VMware support to help with troubleshooting. <b>CAUTION</b> Changing a state can move the request to an undesirable state. Virtual machine requests might become unusable.
<b>Change Rights</b>	Change which groups or users can access, control, or view virtual machines.
<b>Delete Request</b>	Delete the request and all associated reports and other elements. This does not delete the virtual machine. To delete the virtual machine, select a virtual machine that is in an available state, and click the <b>Decommission</b> button.

## Check the Power State of a Virtual Machine

You can check whether a virtual machine is powered on or off or suspended.

### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Catalog** view.

The icon to the left of the virtual machine indicates its power state.

- A green triangle indicates that the virtual machine is powered on.
- A red square indicates that the virtual machine is powered off.
- Two parallel yellow bars indicate that the virtual machine is suspended.

## Power a Virtual Machine On or Off

You can power any virtual machine on and off.

### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Catalog** view.
- 3 In the catalog list, click a virtual machine name.
- 4 In the right pane, click **Commands**.
- 5 Click **Power on** or **Shut down**.

## Suspend a Virtual Machine

You can suspend any virtual machine.

### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Catalog** view.
- 3 In the catalog list, click a virtual machine name.
- 4 In the right pane, click **Commands**.
- 5 Click **Suspend**.

## Connecting to a Virtual Machine

You can connect to a virtual machine from your Web browser or using an RDP client application.

## Open a Virtual Machine in a Web Browser

From your Web browser, you can connect to a virtual machine running any guest operating system.

### Prerequisites

To connect via your browser, you must have the VMware WebCenter Remote MKS Plug-in installed in your browser.

### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Catalog** view.
- 3 In the catalog list, click a virtual machine name.
- 4 In the right pane, click **Commands**.
- 5 Click **Open console**.

The virtual machine's desktop appears in a new browser window.

## Use Remote Desktop to Connect to a Virtual Machine

You can open a Windows virtual machine using an RDP client application.

### Prerequisites

The client software must be installed on your computer.

### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Catalog** view.
- 3 In the catalog list, click a virtual machine name.
- 4 In the right pane, click **Commands**.
- 5 Click **Connect**.

Your RDP application opens and the virtual machine's desktop appears in the RDP client.

## Create a Snapshot

A snapshot captures the states of a virtual machine's hard drives. A snapshot does not capture the virtual machine's memory and power state.

### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Catalog** view.
- 3 In the catalog list, click a virtual machine name.
- 4 In the right pane, click **Commands**.
- 5 Click **Snapshot**.

## Revert to a Snapshot

You can use the snapshot to return to the saved state.

### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Catalog** view.
- 3 In the catalog list, click a virtual machine name.
- 4 In the right pane, click **Commands**.
- 5 Click **Revert to snapshot**.

The virtual machine returns to the state it was in when the snapshot was taken.

## Generate Reports

You can generate reports for various LCM events. For example, reports can display approved and rejected requests, decommissioned virtual machines, error events, and so on.

### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Reports** view.
- 3 Select the type of report.
- 4 (Optional) Define the report period.
- 5 Click **Submit**.

The report appears in the right pane. You can save the report as an .xml file.

## Registering Virtual Machines with LCM

You can register existing virtual machines with LCM so that they can be more efficiently managed.

### Register a Virtual Machine Manually

You can register a virtual machine manually.

#### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Administration** view.
- 3 Click **Import Virtual Machine**.
- 4 Type or search for the name of the virtual machine that you want to import.

---

**NOTE** You cannot import virtual machine templates.

---

- 5 Type a comment and click **Next**.
- 6 Specify whether you want to set a decommissioning date.
- 7 (Optional) Specify who can control or view the virtual machine. If you do not specify a user or group, only you have control.
- 8 Click **Next**.

- 9 Specify whether you want to link the virtual machine with criteria.  
If you select **Yes**, select entries for **Location, Organization, Server Environment, Service Level, and Performance**.
- 10 Type the contact email and click **Next**.
- 11 Specify whether you want to use the virtual machine name as the request name.
- 12 Select an existing template profile for the virtual machine.
- 13 Click **Submit**.

## Import Virtual Machines From a Resource Pool

You can import multiple machines from a resource pool.

### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Administration** view.
- 3 Click **Import Virtual Machine from Resource Pool**.
- 4 Select one or more resource pools of the virtual machines that you want to import.
- 5 Type a comment and click **Next**.
- 6 Specify whether you want to set a decommissioning date.
- 7 (Optional) Specify who can control or view the virtual machine. If you do not specify a user or group, only you have control.
- 8 Click **Next**.
- 9 Specify whether you want to link the virtual machines with criteria.  
If you select **Yes**, select entries for **Location, Organization, Server Environment, Service Level, and Performance**. Also, specify whether you want to link the same criteria for all virtual machines or different criteria for each machine. If you want to select one criteria for all virtual machines, you must manually enter the criteria. Otherwise, the workflow prompts you to enter the criteria for each virtual machine that is imported.
- 10 Type the contact email and click **Next**.
- 11 Specify whether you want to use the virtual machine name as the request name.
- 12 Specify whether you want to use the same template profile for all requests.  
If you select **Yes**, select an existing template profile for all virtual machines. Otherwise, the workflow prompts you to enter the template profile for each virtual machine that is imported.
- 13 Click **Submit**.

## Import Virtual Machines From a Virtual Machine Folder

You can import multiple machines from a virtual machine folder.

### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Administration** view.
- 3 Click **Import Virtual Machines from VM folder**.
- 4 Select one or more virtual machine folders that you want to import.

- 5 Type a comment and click **Next**.
- 6 Specify whether you want to set a decommissioning date.
- 7 (Optional) Specify who can control or view the virtual machine. If you do not specify a user or group, only you have control.
- 8 Click **Next**.
- 9 Specify whether you want to link the virtual machines with criteria.  
If you select **Yes**, select entries for **Location, Organization, Server Environment, Service Level, and Performance**. Also, specify whether you want to link the same criteria for all virtual machines or different criteria for each machine. If you want to select one criteria for all virtual machines, you must manually enter the criteria. Otherwise, the workflow prompts you to enter the criteria for each virtual machine that is imported.
- 10 Type the contact email and click **Next**.
- 11 Specify whether you want to use the virtual machine name as the request name.
- 12 Specify whether you want to use the same template profile for all requests.  
If you select **Yes**, select an existing template profile for all virtual machines. Otherwise, the workflow prompts you to enter the template profile for each virtual machine that is imported.
- 13 Click **Submit**.

## Activate Web View Debug Mode

You can switch the Web view debug mode on or off.

### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Administration** view.
- 3 Click **Activate webview debug mode**.
- 4 Select **Yes**.
- 5 Click **Submit**.

## Relink Tokens to Virtual Machines

If a provisioning request is available with a virtual machine but the virtual machine is unregistered in vCenter, the token loses its link to the virtual machine. The workflow can only connect to the virtual machine after it is registered again. You can try to relink the tokens.

### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Administration** view.
- 3 Click **Relink Requests That Lost the Link With its Virtual Machine**.
- 4 Confirm that you want to proceed.
- 5 Click **Submit**.

## Check Licensing Status

You can review the licensing status of LCM to check the number of used CPUs.

### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Administration** view.
- 3 Click **Licensing status**.
- 4 Select whether you want to proceed.
- 5 Click **Submit**.

## Export Logs and Application Settings

You can export logs and application settings for analysis purposes.

### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Administration** view.
- 3 Click the **Export** icon (📄).
- 4 Click **Export Logs and Application Settings**.

A log file that you can download is automatically generated.

## Troubleshooting LCM

If you encounter problems, you can try certain procedures to troubleshoot the situation.

### Cache Plug-In Errors

Cache plug-in errors might cause an LCM operation, such as an auto placement check, to fail.

#### Problem

A task fails, and an error message containing the following text appears:

(ReferenceError: 'CacheManager' is not defined.)

#### Cause

The Cache plug-in is missing or not enabled.

#### Solution

- 1 Log in to the Orchestrator configuration interface.  
`http://orchestrator_server:8282`
- 2 On the **Plug-ins** tab, check whether the Cache 1.1.0 plug-in is missing or is not enabled.
  - If the plug-in is not enabled, select the check box to enable it and click **Apply changes**.
  - If the plug-in is missing, re-install LCM.

## Networking Plug-In Errors

Networking plug-in errors might cause an LCM operation, such as registering a network, to fail.

### Problem

A task from the **Network** view in the **Infrastructure** tab fails.

### Cause

The Networking plug-in is missing or not enabled.

### Solution

- 1 Log in to the Orchestrator configuration interface.  
`http://orchestrator_server:8282`
- 2 On the **Plug-ins** tab, check whether the Networking 1.1.0 plug-in is missing or is not enabled.
  - If the plug-in is not enabled, select the check box to enable it and click **Apply changes**.
  - If the plug-in is missing, re-install LCM.

# Customizing LCM

---

LCM is highly customizable. You can change the look of the UI, or create custom workflows to modify the functionality of LCM.

This chapter includes the following topics:

- [“Customizing the User Interface,”](#) on page 33
- [“Callback Workflows,”](#) on page 36


## Customizing the User Interface

You can customize certain elements of the user interface. For example, you can add buttons to link to a particular workflow, or you can add your company logo.

### Create a Custom Style Sheet

You can create a new custom style sheet. With custom style sheets, you can change the look and feel of the UI.


#### Procedure


- 1 Log in to LCM as an administrator.
- 2 Click the **Configuration** view.
- 3 Click the **Custom Element** icon ()
- 4 Click **New**.
- 5 From the **Location** drop-down menu, select **Custom style sheet** and click **Next**.
- 6 Upload a custom style sheet to modify or create a new custom style sheet.
- 7 Click **Submit**.
- 8 Click **Reset Cache** to apply the changes.

### Modify a Custom Style Sheet

After you have created a custom style sheet, you can modify it.

#### Procedure



- 1 Log in to LCM as an administrator.
- 2 Click the **Configuration** view.
- 3 Click the **Custom Element** icon ()

- 4 Click the **Custom style sheet** () that you want to modify to display its contents.
  - To modify the content of the custom style sheet, click **Edit**.
  - To upload a different style sheet, click **Upload**.
  - To download the existing style sheet, click **Download**.
  - To remove the existing style sheet, click **Remove**.
- 5 Click **Submit**.
- 6 Click **Reset Cache** to apply the changes.

## Modify an RDP Template

You can modify the RDP template that is used to connect to a virtual machine. This changes the RDP settings when the LCM UI starts an RDP session from the **Catalog** view. For example, you can modify the screen and audio settings for RDP sessions.



### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Configuration** view.
- 3 Click the **Custom Element** icon ()
- 4 Click **Rdp template** ()
  - To modify the content of the RDP template, click **Edit**.
  - To upload a different RDP template, click **Upload**.
  - To download the existing RDP template, click **Download**.
  - To revert to the default RDP template, click **Reinitialize**.
- 5 Click **Submit**.
- 6 Click **Reset Cache** to apply the changes.

## Change the Application Logo

You can replace the application logo with your own to make the interface look more like your corporate intranet.



### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Configuration** view.
- 3 Click the **Custom Element** icon ()
- 4 Click **Application logo** ()
  - To upload a new logo, click **Upload**.
  - To download the existing logo, click **Download**.
  - To revert to the default logo, click **Reinitialize**.
- 5 Click **Reset Cache** to apply the changes.

## Change a Navigation Element

You can add a link to the navigation bar in the LCM UI. This link can point to a custom URL.

### Procedure


- 1 Log in to LCM as an administrator.
- 2 Click the **Configuration** view.
- 3 Click the **Custom Element** icon .
- 4 Click **Navigation Items** .
  - Click **Edit** to modify the label of the link and the URL.
  - Click **Reinitialize** to remove the link from the navigation bar.
- 5 Click **Submit**.
- 6 Click **Reset Cache** to apply the changes.

## Add a Custom Element

You can add custom elements such as additional buttons that are linked to workflows. You can use standard workflows or use custom workflows created in the Orchestrator Client.

For information about developing workflows, see the *vCenter Orchestrator Developer's Guide*.

### Procedure

- 1 Log in to LCM as an administrator.
- 2 Click the **Configuration** view.
- 3 Click the **Custom Element** icon .
- 4 Click **New**.
- 5 From the **Location** drop-down menu, select a custom element and click **Next**.
- 6 Type the information needed to point to the custom elements that you want to add.
- 7 Click **Submit**.
- 8 Click **Reset Cache** to apply the changes.

## Allow All Users Access to Custom Workflows

By default LCM Requester and LCM Tech Requester users do not have access to custom workflows. You can allow users with these roles to access workflows stored in custom categories.

Members of the LCM Requester and LCM Tech Requester groups have permissions to run workflows only from the Applications\Lifecycle manager\User workflow category. If you're adding a custom element pointing to a custom workflow, you can use the Applications\Lifecycle manager\User\Custom workflow category for storing the workflows.

If you want members of the LCM Requester and LCM Tech Requester groups to have permissions to run workflows from other categories, you must perform the following steps to give them permissions.

### Procedure

- 1 Select **Start > Programs > vCenter Orchestrator > vCenter Orchestrator Client**.
- 2 Log in as an administrator.

- 3 Click the **Web views** view.
- 4 Right-click **vCenter Lifecycle Manager** and select **Unpublish**.
- 5 Right-click **vCenter Lifecycle Manager** and select **Edit**.
- 6 On the **Attributes** tab, select the **userAllowedWorkflowPaths** attribute.
- 7 Click the entry in the **Value** column and add the category where the workflows are stored.
- 8 Click **Save and close**.
- 9 Right-click **vCenter Lifecycle Manager** and select **Publish**.

## Callback Workflows

You can use callback workflows to modify or expand the functionality of LCM.

---

**NOTE** You must not modify standard LCM workflows.

---

### Callback Workflow Operation

Every request that you make in the LCM interface runs a workflow or series of workflows in the underlying Orchestrator server. LCM requests are passed to the workflows as workflow input parameters.

The workflows that perform LCM operations include references to empty callback workflows. The callback workflows run as part of the standard LCM workflow, but they do not do anything unless you adapt them.

Callback workflows take input parameters from the LCM workflows that call them. If you have not modified a callback workflow, the input parameters pass through the callback workflow without any processing. However, you can adapt the callback workflow so that it performs additional processing on the input parameters that it receives, thus customizing the way in which LCM handles the request.

For information about how to modify workflows, see the *vCenter Orchestrator Developer's Guide*.

### Callback Workflows that Add a Custom Operation to the LCM Request

Many LCM workflows take an input parameter named `token`. The `token` input parameter represents the LCM request that starts the workflow in the Orchestrator server. For example, the `token` input parameter contains the details of a provisioning request for a new virtual machine, including the memory, performance, and operating system requirements. The workflow can then create a virtual machine according to those requirements.

Most callback workflows contain only a start element and an end element. These callback workflows take the `token` input parameter and do not define any output parameter. They allow you to add new functions to the LCM request, by taking the provisioning information from the request and using it to perform additional operations that the standard LCM workflow does not provide.

### Callback Workflows that Customize the Result of an LCM Request

Certain callback workflows contain a start element, an end element, and a scripted task element named `in = out`.

Callback workflows that contain an `in = out` element take an input parameter `cloneProperties` and return an output parameter `outCloneProperties`.

Callback workflows that contain an `in = out` element perform the following tasks:

- Clone the properties of the LCM workflow that calls the callback workflow.
- Optionally perform processing on the cloned properties in the callback workflow to modify them.
- Pass the modified properties as the `outCloneProperties` output parameter to the next element in the LCM workflow, thus changing the result of the request.

The `in = out` element contains the following scripting code:

```
cloneProperties= outCloneProperties;
```

If you do not modify the callback workflow, the value of the `outCloneProperties` output parameter it returns is identical to the `cloneProperties` input parameter it received. However, you can modify the callback workflow so that it results in a `outCloneProperties` output parameter with a value different from the initial `cloneProperties` value.

By modifying the properties of the LCM workflow that calls the callback workflow, the callback workflow changes the result of the LCM request.

## Callback Workflow Categories

LCM installs five default callback workflow categories.

[Table 4-1](#) lists the default callback workflow categories and the type of workflows that they contain.

**Table 4-1.** Default Callback Workflow Categories

Category	Content
Create	Virtual machine creation events
Decommission	Virtual machine decommissioning events
End date range	Virtual machine request extension events
Provision	Virtual machine provisioning events
Shaping change	Virtual machine customization change events

## Find Related Workflows

You can search for standard workflows that use callback workflows as a part of their execution procedure.

### Procedure

- 1 Select **Start > Programs > vCenter Orchestrator > vCenter Orchestrator Client**.
- 2 Log in as an administrator.
- 3 Click the **Workflows** view.
- 4 Expand the hierarchical tree to **Applications > Lifecycle manager > Callback**.
- 5 Expand a workflow category.
- 6 Right-click a callback workflow and select **References > Find Elements that Use this Element**.



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