Red Hat CloudForms 5.0

Provisioning Virtual Machines and Instances

Provisioning, workload management, and orchestration for Red Hat CloudForms
Abstract

This guide provides instructions for provisioning, service creation, and automation in Red Hat CloudForms. If you have a suggestion for improving this guide or have found an error, please submit a Bugzilla report at http://bugzilla.redhat.com against Red Hat CloudForms Management Engine for the Documentation component. Please provide specific details, such as the section number, guide name, and CloudForms version so we can easily locate the content.
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CHAPTER 1. RED HAT CLOUDFORMS LIFECYCLE

This guide discusses lifecycle activities such as provisioning and retirement that are part of the Red Hat CloudForms Automate component. Red Hat CloudForms Automate enables real-time, bidirectional process integration and adaptive automation for management events and administrative or operational activities.

- Operations Management with service level resource enforcement.
- Resource Management including datastore cleanup, snapshot aging and enforcement, and virtual machine or instance aging and retirement.
- Configuration and Change Management including enforced closed loop change management.
- Lifecycle Management such as provisioning, customization, reconfiguration, approval, CMDB updates, and retirement.

**IMPORTANT**

Provisioning requires the Automation Engine server role enabled. Check your server role settings in the settings menu, **Configuration → Server → Server Control**.

1.1. PROVISIONING

When a virtual machine or cloud instance is provisioned, it goes through multiple phases. First, the request must be made. The request includes ownership information, tags, virtual hardware requirements, the operating system, and any customization of the request. Second, the request must go through an approval phase, either automatic or manual. Finally, the request is executed. This part of provisioning consists of pre-processing and post-processing. Pre-processing acquires IP addresses for the user, creates CMDB instances, and creates the virtual machine or instance based on information in the request. Post-processing activates the CMDB instance and emails the user. The steps for provisioning may be modified at any time using Red Hat CloudForms.
CHAPTER 2. PROVISIONING REQUESTS

The following options are available when making provisioning requests:

- Set an owner (User can do this using LDAP lookup)
- Assign a purpose (tag)
- Select a template or image from which to create a new virtual machine or instance respectively
- Choose placement
- Set hardware requirements
- Specify the vLan
- Customize the guest operating system
- Schedule the provisioning

2.1. REQUIREMENTS FOR PROVISIONING VIRTUAL MACHINES AND INSTANCES

Red Hat CloudForms supports the provisioning of VMware ESX hypervisors. To provision a virtual machine from VMware providers, you must have an appliance with the Automation Engine role enabled.

If you are using a Windows template, the following configuration is required:

- To customize settings that are inside the operating system, Sysprep must be copied to the appropriate directory on your vCenter computer. Usually this location is: C:\Documents and Settings\All Users\Application Data\VMware\VMware VirtualCenter\sysprep. Copy the Sysprep tools to the relevant operating system subdirectory. If you are running a standard Win2008 operating system, this step is unnecessary as Sysprep is included as standard.

- The Windows template must have the latest version of VMware tools for its ESX Server. Check the VMware Site for more information. If you are creating a new password for the Administrator account, the Administrators password must be blank on the template. This is a limitation of Microsoft Sysprep.

See the VMware documentation for a complete list of customization requirements.

2.2. REQUIREMENTS FOR PROVISIONING VIRTUAL MACHINES FROM RED HAT VIRTUALIZATION MANAGER

<table>
<thead>
<tr>
<th>Item</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Hat Virtualization Manager version 4.0 or higher</td>
<td>Red Hat Virtualization Manager properly installed with API in default location <a href="https://server:8443/api">https://server:8443/api</a></td>
</tr>
</tbody>
</table>
2.3. PXE PROVISIONING

PXE is a boot method that allows you to load files from across a network link. Red Hat CloudForms uses it for files required for provisioning virtual machines. PXE can be used for provisioning for either Red Hat Virtualization Manager or VMware.

Procedure Overview

1. Connect to the PXE Server.
2. Create a System Image Type.
3. Associate each PXE image with an image type.
4. Create a customization template.

Requirements for PXE Provisioning

- DHCP server configured with required PXE implementation
PXE implementation for Linux virtual machine provisioning
* NFS or SAMBA read and write access to create and modify files on the PXE server
* Red Hat CloudForms Server uses NFS mount to read and write the response files
* HTTP read access to the NFS share location as virtual machines use this URL to access PXE images and Kickstart or Cloud-Init configuration files
* Operating system installation media available to be streamed from PXE server
* Images configured for desired operating systems
* Kickstart or Cloud-Init templates to configure operating systems with desired packages

**Additional Requirements for Provisioning Linux Virtual Machines**
* Linux distribution kernel and ramdisk available over HTTP
* Linux sources available over HTTP
* Sample PXE menu item that boots this kernel

**Additional Requirements for Provisioning Windows Virtual Machines**
* WinPE ISO built with rhev-agent-tools (for RHEV-M environments) and configured to mount shares for Windows source files and Sysprep files and configured to run customization script
* Windows based WIM file with operating system installed and configured with Sysprep
* Sample Sysprep unattend file to be used with the operating system
* Sample PXE menu item that downloads WinPE ISO, mount in memdisk and boot into WinPE environment

### 2.3.1. Connecting to a PXE Server

The following procedure connects to a PXE server and adds its details to Red Hat CloudForms.

1. Navigate to **Compute → Infrastructure → PXE**.

2. Click ![Configuration](image) (Configuration), then ![Add](image) (Add a New PXE Server).
3. In **Basic Information**, type a **Name** that will be meaningful in your environment.

![Basic Information](image1)

4. For **Depot Type**, select either **Network File System (NFS)** or **Samba**. The fields to enter in the dialog depend on the **Depot Type**.

   - For NFS, type in the **URI**, **Access URL**, **PXE Directory**, **Windows Images Directory**, and **Customization Directory**. When you provision, Red Hat CloudForms writes a text file to the **PXE Directory**. The file is named after the MAC address of the NIC that is assigned to the virtual machine. It contains where to get the kernel and initrd image. This file is removed after a successful provision. The **Windows Images Directory** is where the files are located on your NFS for the provisioning of Windows operating systems. The **Customization Directory** is where your Kickstart and Sysprep files are located.

   - If using a **Depot Type** of **Samba**, you will not need **Access URL**, but you will need a **User ID**, and **Password**, in addition to the items required for NFS.

5. For **PXE Image Menus**, type the **Filename** for the PXE Boot menu.

6. Click **Add**.

7. Select the new PXE server from the tree on the left, and click **(Configuration)**, then **(Refresh)** to see your existing images.

Next, create PXE Image types to associate with the customization templates and to specify if the image type is for a virtual machine, a host, or both.

### 2.3.2. Creating System Image Types for PXE

The following procedure creates a system image type for PXE servers.
1. Navigate to Compute → Infrastructure → PXE.

2. Click the System Image Types accordion.

3. Click (Configuration), then + (Add a new System Image Type).

4. In Basic Information, type in a Name and select a Type.

   - Use Vm if you want this image type to only apply to virtual machines.

5. Click Add.

After creating the System Image Types, assign the types to each image on your PXE servers. To do this, you will select each image on the PXE server and identify its type.

### 2.3.3. Setting the PXE Image Type for a PXE Image

The following procedure sets the image type for a chosen PXE image.

1. Navigate to Compute → Infrastructure → PXE.

2. Click the PXE Servers accordion and select the image that you want to set a type for.

3. Click (Configuration), then (Edit this PXE Image).

4. From the Basic Information area, select the correct type. If this PXE image will be used as the Windows Boot Environment, check Windows Boot Environment. At the time of this writing, only one PXE image can be identified as the Windows Boot Environment. Therefore, checking one as the Windows Boot Environment will remove that from any other PXE image with that check.
2.4. ISO PROVISIONING

Red Hat CloudForms also allows ISO provisioning from Red Hat Virtualization Manager datastores. To use this feature, you will need to do the following before creating a provision request.

1. Add the **ISO Datastore**. The Red Hat Virtualization Manager system must have already been discovered or added into the VMDB. For more information, see Adding a Red Hat Enterprise Virtualization Manager Provider in Managing Providers.

2. Refresh the **ISO Datastore**.

3. Create a **System Image Type**.

4. Set the **ISO Image Type**.

5. Create a customization template.

### 2.4.1. Adding an ISO Datastore

The following procedure adds an ISO Datastore from your Red Hat Virtualization environment.

1. Navigate to **Compute → Infrastructure → PXE**.

2. Click the **ISO Datastores** accordion.

3. Click **(Configuration)**, **(Add a new ISO Datastore)**.

4. Select the Cloud or Infrastructure provider hosting the ISO Datastore.

5. Click **Add**.

The ISO datastore is added to Red Hat CloudForms.

### 2.4.2. Refreshing an ISO Datastore

The following procedure refreshes the chosen ISO datastore and updates Red Hat CloudForms with available ISOs.

1. Navigate to **Compute → Infrastructure → PXE**.
2. Click the ISO Datastores accordion, and select an ISO datastore.

3. Click (Configuration), then click (Refresh Relationships).

2.4.3. Creating System Image Types for ISO

The following procedure creates a system image type for ISO Servers.

1. Navigate to Compute → Infrastructure → PXE.

2. Click the System Image Types accordion.

3. Click (Configuration), then (Add a new System Image Type).

4. In Basic Information, type in a Name and select a Type.

   * Use Vm if you want this image type to only apply to virtual machines.

5. Click Add.

After creating the system image types, assign the types to each image on your ISO servers. To do this, you will select each image on the ISO server and identify its type.

2.4.4. Setting the Image Type for an ISO Image

The following procedure sets the image type for an ISO image.

1. Navigate to Compute → Infrastructure → PXE.

2. Click the ISO Datastores accordion, and select the image that you want to set a type for.

3. Click (Configuration), then (Edit this ISO Image).
4. From the Basic Information area, select the correct Type.

5. Click Save.

2.5. CUSTOMIZATION TEMPLATES FOR VIRTUAL MACHINE AND INSTANCE PROVISIONING

Add a customization template to provide Kickstart, Cloud-Init, or Sysprep files for the initial loading of the operating system.

Cloud-Init Requirements

- When creating a template using Red Hat Virtualization, install the cloud-init package on the source virtual machine. This enables Cloud-Init to source configuration scripts when a virtual machine built on that template boots.

- See Using Cloud-Init to Automate the Configuration of Virtual Machines in the Red Hat Virtualization Administration Guide for more information on using Cloud-Init in a Red Hat Virtualization environment.

- See the Cloud-Init Documentation web site for example scripts.

Kickstart Requirements for ISO Provisioning

- The Kickstart file must be named ks.cfg.

- Set the new virtual machine to power down after provisioning is complete.

- CloudForms must use the virtual machine payload feature of Red Hat Virtualization to create a floppy disk containing the data from the selected customization template.

- Customize the installer to include the data written to the floppy disk payload.

Example 2.1. RHEL ISO with the following modifications:

- RHEL 7.5 and above

- isolinux.cfg – add ks=cdrom to the append line

- ks.cfg – which must minimally include:

```bash
### Pre Install Scripts
%pre
modprobe floppy

# Mount the floppy drive
modprobe floppy
```
# Include ks.cfg file from the floppy (written by CFME based on selected customization template)
```
%include /tmp/floppy/ks.cfg
```

## 2.6. CUSTOMIZATION SCRIPT ADDITIONS FOR VIRTUAL MACHINE AND INSTANCE PROVISIONING

<table>
<thead>
<tr>
<th>Customization Type</th>
<th>Reason to Include</th>
<th>Script entries</th>
</tr>
</thead>
</table>
| Kickstart          | Takes the values from the Customize tab in Provisioning Dialog and substitutes them into the script. | Configure Networking based on values from provisioning dialog `<% if evm[:addr_mode].first == static %> <\%
  network_string = "network --onboot yes --device=eth0 --bootproto=static --noipv6" %\>
  network_string << " -\-
  {ks_key} #{evm[evm_key]}" unless evm[evm_key].blank? %\>
  end %\>
  %\=
  network_string %\> `<% else %> network --device=eth0 --bootproto=dhcp <% end %>` |
| Kickstart          | Encrypts the root password from the Customize tab in the Provisioning Dialog. | `rootpw --iscrypted <%= ManageIQ::Password.md5crypt(evm[:root_password]) %>` |
| Kickstart          | Sends status of the provision back to Red Hat CloudForms Server for display in the Red Hat CloudForms Console. | |
| Sysprep            | Encrypts the root password from the Customize tab in the Provisioning Dialog. The value for the AdministratorPassword line must be inserted to use the password from the Provision Dialog and encrypt it. | `<UserAccounts>`
  `<AdministratorPassword>`<Value>`%= ManageIQ::Password.sysprep_crypt(evm[:root_password]) %>`</Value>
  `<PlainText>false</PlainText>`
  `<AdministratorPassword>`
  `<UserAccounts>` |

## 2.7. ADDING A CUSTOMIZATION TEMPLATE

1. Navigate to Compute → Infrastructure → PXE.
2. Click the **Customization Templates** accordion.

3. Click **(Configuration)**, **(Add a new Customization Template)**.

4. In **Basic Information**, type in a **Name** and **Description**.

5. Select the **Image Type**. This list should include the PXE image types you created.

6. In **Type**, select **Kickstart** or **CloudInit** for Linux based systems, and **Sysprep** for Windows based system.

7. In the **Script** area, either paste the script from another source or type the script directly into the Red Hat CloudForms interface.

8. Click **Add**.

The default dialogs show all possible parameters for provisioning. To limit the options shown, see Section 2.9.3, “Customizing Provisioning Dialogs”.

### 2.8. PROVISIONING VIRTUAL MACHINES

There are four types of provisioning requests available in Red Hat CloudForms:

1. Provision a new virtual machine from a template
2. Clone a virtual machine
3. Publish a virtual machine to a template
4. Provision a virtual machine using cloud-init via REST API.

#### 2.8.1. Provisioning a Virtual Machine from a Template
You can provision virtual machines through various methods. One method is to provision a virtual machine directly from a template stored on a provider.

**IMPORTANT**

- To provision a virtual machine, you must have the "Automation Engine" role enabled.

- During virtual machine provisioning, the Customize tab is hidden if the template has an unknown operating system (OS) type. To make the Customize tab visible in the user interface, you will need to set the OS type from the provider or perform SmartState analysis on the template to detect the OS type.

To provision a virtual machine from a template:

1. Navigate to **Compute → Infrastructure → Virtual Machines**.

2. Click 🔄 (Lifecycle), and then ➕ (Provision VMs).

3. Select a template from the list.

4. Click Continue.

5. On the Request tab, enter the request information.

   **Provision Virtual Machines**

<table>
<thead>
<tr>
<th>Request</th>
<th>Purpose</th>
<th>Catalog</th>
<th>Environment</th>
<th>Hardware</th>
<th>Network</th>
<th>Customize</th>
<th>Schedule</th>
</tr>
</thead>
</table>

   **Request Information**

   - E-Mail *
   - First Name
   - Last Name
   - Notes

   **Manager**

   - Name

   In **Request Information**, enter your name and email address. The requester will receive status emails about the provisioning request such as auto-approval, quota, provision complete, retirement, request pending approval, and request denied.

   **NOTE**

   Parameters with a * next to the label are required to submit the provisioning request. To change the required parameters, see Section 2.9.3, "Customizing Provisioning Dialogs".

6. Click the **Purpose** tab to select the appropriate tags for the provisioned virtual machines.

7. Click the **Catalog** tab to select the template to provision from. This tab is context sensitive based on provider.
8. For templates on VMware providers:

<table>
<thead>
<tr>
<th>Name</th>
<th>Operating System</th>
<th>Platform</th>
<th>vCPU</th>
<th>Memory</th>
<th>Disk Size</th>
<th>Provider</th>
<th>Snapshots</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D-MIN Template</td>
<td>Microsoft Windows 7 (64-bit)</td>
<td>Windows</td>
<td>1</td>
<td>2 GB</td>
<td>30 GB</td>
<td>VMware</td>
<td>1</td>
</tr>
</tbody>
</table>

- **Provision Type**: Select **VMware** or **PXE**.
  - **Linked Clone**: Select **Linked Clone** to create a linked clone to the virtual machine instead of a full clone. Since a snapshot is required to create a linked clone, this box is only enabled if a snapshot is present. Select the snapshot you want to use for the linked clone.
  - **PXE Server and Image**: If **PXE** is selected, select a PXE **Server** and **Image** to use for provisioning.

- **Count**: Select the number of virtual machines to create in this request.

- **Naming**: Use **VM Name** and **VM Description** to specify a virtual machine name and virtual machine description. When provisioning multiple virtual machines, a number will be appended to the virtual machine name.

9. For templates on Red Hat providers:

- **Name**: Select the Name of a template to use.

- **Provision Type**: Select either **ISO**, **PXE**, or **Native Clone**. You must select **Native Clone** in order to use a Cloud-Init template.

  - **Linked Clone**: If **Native Clone** is selected, select **Linked Clone** to create a linked clone to the virtual machine instead of a full clone. This is equivalent to **Thin Template Provisioning** in Red Hat Virtualization. Since a snapshot is required to create a linked clone, this box is only enabled if a snapshot is present. Select the snapshot to use for the linked clone.

  - **ISO Image**: If **ISO** is selected, select an ISO **Image** to use for provisioning.

  - **PXE Server and Image**: If **PXE** is selected, select a PXE **Server** and **Image** to use for provisioning.

- **Count**: Select the number of virtual machines you want to create in this request.

- **Naming**: Use **VM Name** and **VM Description** to specify a virtual machine name and virtual machine description. When provisioning multiple virtual machines, a number will be appended to the VM Name.

10. Click the **Environment** tab to decide where you want the new virtual machines to reside.
a. If provisioning from a template on VMware, you can either let Red Hat CloudForms decide for you by checking **Choose Automatically**, or select a specific cluster, resource pool, folder, host, and datastore. VMware virtual machines can also be provisioned to a clustered datastore by selecting it under **Datastore**. Additionally, you can assign a storage profile to a VMware virtual machine under **Datastore** to configure the virtual machine to operate using a storage profile from that datastore. Note, read-only datastores are excluded when provisioning a virtual machine.

b. If provisioning from a template on Red Hat, you can either let Red Hat CloudForms decide for you by checking **Choose Automatically**, or select a datacenter, cluster, host and datastore.

11. Click the **Hardware** tab to set hardware options.

   **Hardware**
   
   **Number of Sockets**: 1
   **Cores per Socket**: 1
   **Memory (MB)**: 1024
   **Disk Format**: Thin (Default)

   **VM Limits**
   
   **CPU (MHz)**: -1
   **Memory (MB)**: -1
   
   **VM Reservations**
   
   **CPU (MHz)**: 0
   **Memory (MB)**: 0

   a. In **Hardware**, set the number of sockets, cores per socket, memory in MB, and disk format: thin, pre-allocated/thick or same as the provisioning template (default).

   b. For VMware provisioning, set the **VM Limits** of CPU and memory the virtual machine can use.

   c. For VMware provisioning, set the **VM Reservation** amount of CPU and memory.

12. Click **Network** to set the vLan adapter. Additional networking settings that are internal to the operating system appear on the **Customize** tab.

   **Network Adapter Information**

   **NOTE**

   A VMware virtual machine can be provisioned to a DVPPortgroup by selecting it from the **vLan** list. Prior to provisioning a virtual machine, the DVPPortgroup must be created on a vSphere Distributed Switch (VDS) in VMware vCenter in order for Red Hat CloudForms to list the DVPPortgroup under **vLan**.
13. Click **Customize** to customize the operating system of the new virtual machine. These options vary based on the operating system of the template.

14. For Windows provisioning:

   a. To use a custom specification from the provider, click **Specification**. To select an appropriate template, choose from the list in the custom specification area. The values that are honored by Red Hat CloudForms display.

   ![Customization Options](image)

   **NOTE**

   Any values in the specification that do not show in the Red Hat CloudForms console’s request dialogs are not used by Red Hat CloudForms. For example, for Windows operating systems, if you have any run once values in the specification, they are not used in creating the new virtual machines. Currently, for a Windows operating system, Red Hat CloudForms honors the unattended GUI, identification, workgroup information, user data, windows options, and server license. If more than one network card is specified, only the first is used.

   ![Custom Specification Table](image)

   To modify the specification, select **Override Specification Values**.

   b. Select **Sysprep Answer File**, to upload a Sysprep file or use one that exists for a custom specification on the Provider where the template resides. To upload a file, click **Browse** to find the file, and then upload. To use an answer file in **Customization Specification**, click on the item. The answer file will automatically upload for viewing. You cannot make modifications to it.

15. For Linux provisioning:

   a. Under **Credentials**, enter a **Root Password** for the root user to access the instance.
b. Enter a **IP Address Information** for the instance. Leave as **DHCP** for automatic IP assignment from the provider.

c. Enter any **DNS** information for the instance if necessary.

d. Select **Customize Template** for additional instance configuration. Select from the Kickstart or Cloud-Init customization templates stored on your appliance.

16. Click the **Schedule** tab to select when provisioning begins.

   a. In **Schedule Info**, select when to start provisioning. If you select **Schedule**, you will be prompted to enter a date and time. Select **Stateless** if you do not want the files deleted after the provision completes. A stateless provision does not write to the disk so it requires the PXE files on the next boot.

   b. In **Lifespan**, select to power on the virtual machines after they are created, and to set a retirement date. If you select a retirement period, you will be prompted for when you want a retirement warning.

Provision Virtual Machines

<table>
<thead>
<tr>
<th>Request</th>
<th>Purpose</th>
<th>Catalog</th>
<th>Environment</th>
<th>Hardware</th>
<th>Network</th>
<th>Schedule</th>
</tr>
</thead>
</table>

**Schedule Info**

- **When to Provision**
  - Schedule ☑ Immediately on Approval
  - Stateless

**Lifespan**

- **Power on virtual machines after creation**
  - ✔
- **Time until Retirement**
  - Indefinite

17. Click **Submit**.

The provisioning request is sent for approval. For the provisioning to begin, a user with the administrator, approver, or super administrator account role must approve the request. The administrator and super administrator roles can also edit, delete, and deny the requests. You will be able to see all provisioning requests where you are either the requester or the approver.

After submission, the appliance assigns each provision request a **Request ID**. If an error occurs during the approval or provisioning process, use this ID to locate the request in the appliance logs. The Request ID consists of the region associated with the request followed by the request number. As regions define a range of one trillion database IDs, this number can be several digits long.

**Request ID Format**

Request 99 in region 123 results in Request ID 123000000000099.
2.8.2. Provisioning a Virtual Machine using Cloud-Init via REST API

Cloud-init is a tool for automating the initial setup of virtual machines. In CloudForms, you can use cloud-init via REST API to provision a virtual machine that was created based on a template.

NOTE

To use cloud-init, the template from which the virtual machine is provisioned must have cloud-init package installed, and have the Use Cloud-Init/Sysprep option selected.

For a virtual machine provision request via REST API, ensure the following two fields in the request’s body are set correctly, otherwise cloud-init may not work.

- VLAN
- sysprep_enabled

VLAN

The value of VLAN in the API request can be one of the following options:

<table>
<thead>
<tr>
<th>VLAN value</th>
<th>Note</th>
<th>vNIC profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;empty&gt;</td>
<td>Must be written within the &lt;..&gt;</td>
<td>No vNIC profile</td>
</tr>
<tr>
<td>&lt;Template&gt;</td>
<td>Must be written within the &lt;..&gt;</td>
<td>Use the template’s default vNIC profile</td>
</tr>
<tr>
<td>profile_name (network_name)</td>
<td>Must include a space between profile_name (network_name), otherwise it will fail. For example, ovirtmgmt (ovirtmgmt)</td>
<td>Set the specified vNIC profile.</td>
</tr>
<tr>
<td>vNIC profile ID</td>
<td></td>
<td>Set the specified vNIC profile, such as 3a8dce01-dd59-4a46-8a6f-823acccda79f.</td>
</tr>
</tbody>
</table>

sysprep_enabled

The value of sysprep_enabled in the API request must be in the following format.

NOTE

Sysprep_enabled is written in the order: [value] - [it’s meaning] - [how it appears in the CloudForms user interface virtual machine provision dialog’s Customize tab]

For Windows template:

"fields" - Sysprep Specification
In the CloudForms user interface, when you navigate to the virtual machine provision dialog (Compute → Infrastructure → Virtual Machine), this option located under the Customize tab’s Customize drop-down list is called Sysprep Specification.

"file" - Sysprep answer file

In the CloudForms user interface, when you navigate to the virtual machine provision dialog (Compute → Infrastructure → Virtual Machine), this option located under the Customize tab’s Customize drop-down list is called Sysprep answer file.

For Linux template:

"fields" - Customized template and any Customized parameters will be used

In the CloudForms user interface, when you navigate to the virtual machine provision dialog (Compute → Infrastructure → Virtual Machine), this option located under the Customize tab’s Customize drop-down list is called Specification.

NOTE

For cloud-init to work (that is, to have the provisioned virtual machine marked with Use cloud-init and the customized template as well as customized parameters, if any, will be used) "sysprep_enabled" must be set to “fields”. If you do not set it correctly, the customized template will be ignored and the provisioned virtual machine will not be marked with Use cloud-init; although, the template from which the virtual machine is provisioned has it marked.

For both Windows and Linux template

“disabled” - Do not customize

In the CloudForms user interface, when you navigate to the virtual machine provision dialog (Compute → Infrastructure → Virtual Machine), this option located under the Customize tab’s Customize drop-down list is called <None>. The customized template will be ignored, and the provisioned virtual machine will not be marked with Use cloud-init, even though the template from which the virtual machine was provisioned, has it marked. The default value is disabled.

NOTE

For an example of virtual machine provisioning request using cloud-init via REST API, see Provisioning a Virtual Machine Using Cloud-init in the Red Hat CloudForms REST API guide.

2.8.3. Cloning a Virtual Machine

Virtual machines can be cloned in other providers as well.

1. Navigate to Compute → Infrastructure → Virtual Machines, and select the virtual machine you want to clone.

2. Click (Lifecycle), and then (Clone selected item).

3. Enter the requested information in the dialogs. Be sure to check the Catalog tab.

4. Schedule the request on the Schedule tab.

5. Click Submit.
2.8.4. Publishing a Virtual Machine to a Template (VMware Virtual Machines Only)

1. Navigate to **Compute → Infrastructure → Virtual Machines**, and select the virtual machine you want to publish as a template.

2. Click 🔄 (Lifecycle), and then 📝 (Publish selected VM to a Template).

3. Enter the requested information in the dialogs. Be sure to check the **Catalog** tab.

4. Schedule the request on the **Schedule** tab.

5. Click **Submit**.

2.8.5. Renaming a Provisioned Virtual Machine (VMware Virtual Machines Only)

Red Hat CloudForms allows you to rename a VMware virtual machine without having to reprovision it.

To rename a VMware virtual machine:

1. Navigate to **Compute → Infrastructure → Virtual Machines**, and select the VMware virtual machine you want to rename.

2. Click 🛠️ (Configuration), 🖋️ (Rename selected item).

3. In the **Basic Information** screen, provide a new **name**.

4. Click **Save**.

The renamed virtual machine will appear in the inventory view.

2.9. PROVISIONING INSTANCES

Cloud instances follow the same process (Request, Approval, Deployment) as a standard virtual machine from virtualization infrastructure. First, a user makes a request for instances and specifies the image, volume or volume snapshot, tags, availability zone and hardware profile flavor. Second, the request goes through the approval phase. Finally, Red Hat CloudForms executes the request.

2.9.1. Provisioning an EC2 Instance from an Image

1. Navigate to **Compute → Clouds → Instances**.

2. Click 🔄 (Lifecycle), then click 🚀 (Provision Instances).

3. Select an image from the list presented.

4. Click **Continue**.

5. On the **Request** tab, enter information about this provisioning request. In **Request Information**, type in at least a first and last name and an email address. This email is used to send the requester status emails during the provisioning process for items such as auto-approval, quota, provision complete, retirement, request pending approval, and request denied. The other information is optional. If the Red Hat CloudForms Server is configured to use LDAP, you can use the **Look Up** button to populate the other fields based on the email address.
NOTE
Parameters with an * next to the label are required to submit the provisioning request. To change the required parameters, see Section 2.9.3, "Customizing Provisioning Dialogs".

6. Click the **Purpose** tab to select the appropriate tags for the provisioned instance.

7. Click the **Catalog** tab for basic instance options.
   a. To change the image to use as a basis for the instance, select it from the list of images.
   b. Select the **Number of VMs** to provision.
   c. Type a **VM Name** and **VM Description**.

8. Click the **Environment** tab to select the instance’s **Availability Zone**, **Virtual Private Cloud Cloud Subnet**, **Security Groups**, and **Elastic IP Address**. If no specific availability zone is required, select the **Choose Automatically** checkbox.

9. Click the **Properties** tab to set provider options such as hardware flavor and security settings.
   a. Select a flavor from the **Instance Type** list.
   b. Select a **Guest Access Key Pair** for access to the instance.
   c. Select the **CloudWatch** monitoring level. Leave as **Basic** for the default EC2 monitoring.

10. Click the **Customize** tab to set additional instance options.
    a. Under **Credentials**, enter a **Root Password** for the root user access to the instance.
    b. Enter a **IP Address Information** for the instance. Leave as **DHCP** for automatic IP assignment from the provider.
    c. Enter any **DNS** information for the instance if necessary.
    d. Select a **Customize Template** for additional instance configuration. Select from the Cloud-Init scripts stored on your appliance.

11. Click the **Schedule** tab to set the provisioning and retirement date and time.
    a. In **Schedule Info**, choose whether the provisioning begins upon approval, or at a specific time. If you select **Schedule**, you will be prompted to enter a date and time.
    b. In **Lifespan**, select whether to power on the instances after they are created, and whether to set a retirement date. If you select a retirement period, you will be prompted for when to receive a retirement warning.

12. Click **Submit**.

The provisioning request is sent for approval. For the provisioning to begin, a user with the admin, approver, or super admin account role must approve the request. The admin and super admin roles can also edit, delete, and deny the requests. You will be able to see all provisioning requests where you are either the requester or the approver.

After submission, the appliance assigns each provision request a **Request ID**. If an error occurs during the approval or provisioning process, use this ID to locate the request in the appliance logs. The Request
ID consists of the region associated with the request followed by the request number. As regions define a range of one trillion database IDs, this number can be several digits long.

Request ID Format

Request 99 in region 123 results in Request ID 123000000000099.

2.9.2. Provisioning an OpenStack Instance from an Image, Volume or Volume Snapshot

Create a request to provision Red Hat OpenStack Platform cloud instances from images, volumes, and volume snapshots using Red Hat CloudForms. Only bootable volumes not in use will be available.

1. Navigate to Compute → Clouds → Instances.

2. Click (Lifecycle), then click (Provision Instances).

3. Select an OpenStack image, volume or volume snapshot from the list presented. These files must be available on your OpenStack provider.

4. Click Continue.

5. On the Request tab, enter information about this provisioning request. In Request Information, type in at least an email address. This email is used to send the requester status emails during the provisioning process for items such as auto-approval, quota, provision complete, retirement, request pending approval, and request denied. The other information is optional. If the Red Hat CloudForms Server is configured to use LDAP, you can use the Look Up button to populate the other fields based on the email address.

   **NOTE**

   Parameters with a * next to the label are required to submit the provisioning request. To change the required parameters, see Section 2.9.3, “Customizing Provisioning Dialogs”.

6. Click the Purpose tab to select the appropriate tags for the provisioned instance.

7. Click the Catalog tab for basic instance options.

   a. To change the source file to use as a basis for the instance, select it from the list of images, volumes, or volume snapshots.

   b. Select the Number of Instances to provision.

   c. Type a Instance Name and Instance Description.

8. Click the Environment tab to select the instance’s Cloud Tenant, Availability Zones, Cloud Network, Security Groups, and Public IP Address. If no specific Cloud Tenant is required, select the Choose Automatically checkbox.

9. Click the Properties tab to set provider options such as flavors and security settings.

   a. Select a flavor from the Instance Type list.
b. Select a **Guest Access Key Pair** for access to the instance. For more information about key pairs, see Section 2.9.5, “Managing Key Pairs”.

10. Click the **Volumes** tab to provision any volumes with the instance. Volumes are useful for augmenting ephemeral storage of instances with persistent, general-purpose block storage:
   a. Fill in the **Volume Name** and **Size (gigabytes)** fields.
   b. If you want the volume to be deleted once the instance terminates (thereby making it non-persistent), check **Delete on Instance Terminate**
   c. To provision and add multiple volumes to the instance, click **Add Volume**. Doing so will add new fields you can fill in.
      For more information about persistent storage in OpenStack, see the Red Hat OpenStack Platform Storage Guide.

11. Click the **Customize** tab to set additional instance options.
   a. Under **Credentials**, enter a **Root Password** for the root user access to the instance.
   b. Enter a **IP Address Information** for the instance. Leave as **DHCP** for automatic IP assignment from the provider.
   c. Enter any **DNS** information for the instance if necessary.
   d. Select a **Customize Template** for additional instance configuration. Select from the Cloud-Init scripts stored on your appliance.

12. Click the **Schedule** tab to set the provisioning and retirement date and time.
   a. In **Schedule Info**, choose whether the provisioning begins upon approval, or at a specific time. If you select **Schedule**, you will be prompted to enter a date and time.
   b. In **Lifespan**, select whether to power on the instances after they are created, and whether to set a retirement date. If you select a retirement period, you will be prompted for when to receive a retirement warning.

13. Click **Submit**.

The provisioning request is sent for approval. For the provisioning to begin, a user with the admin, approver, or super admin account role must approve the request. The admin and super admin roles can also edit, delete, and deny the requests. You will be able to see all provisioning requests where you are either the requester or the approver.

After submission, the appliance assigns each provision request a **Request ID**. If an error occurs during the approval or provisioning process, use this ID to locate the request in the appliance logs. The Request ID consists of the region associated with the request followed by the request number. As regions define a range of one trillion database IDs, this number can be several digits long.

**Request ID Format**

Request 99 in region 123 results in Request ID 123000000000099.

**2.9.3. Customizing Provisioning Dialogs**
The default set of provisioning dialogs shows all possible options. However, Red Hat CloudForms also provides the ability to customize which tabs and fields are shown. You can decide what fields are required to submit the provisioning request or set default values.

For each type of provisioning, there is a dialog that can be created to adjust what options are presented. While samples are provided containing all possible fields for provisioning, you can remove what fields are shown but cannot add new fields or tabs.

Edit the dialogs to:

1. Hide or show provisioning tabs.

2. Hide or show fields. If you hide an attribute, the default will be used, unless you specify otherwise.

3. Set default values for a field.

4. Specify if a field is required to submit the request.

5. Create custom dialogs for specific users.

2.9.3.1. Adding a Provision Dialog for All Users

1. Login to the Red Hat CloudForms console for the Red Hat CloudForms server where you want to change the dialog.

2. Navigate to Automate → Customization.

3. Click the Provisioning Dialogs accordion.

4. Click the type of dialog you want to create: Host Provision, VM Provision or VM Migrate.

5. Select one of the default dialogs.

6. Click (Configuration), and then (Copy this Dialog).

7. Type a new Name and Description for the dialog.

8. In the Content field,

   • To remove a tab from display, change its display value to ignore. By choosing ignore, you not only hide the tab, but also skip any fields on that tab that were required. To show the tab, change the display value to show.

   • To hide a field, change its :display: value from :edit to :hide. To display fields of most data types, use :edit. To display a button, use :show. To set a default value for a field, add :default: defaultvalue to the list of parameters for the field. Set the :required: parameter to either true or false based on your needs.

   **NOTE**

   If you set :required: to true, the field must have a value for the provision request to be submitted.

9. Click Add.
If you are using Provisioning Profiles, you can specify a specific file that holds the customizations. To do this, you must create an instance mapping to this file in the Red Hat CloudForms Applications/provisioning/profile/VM provisioning by group class. By default, if you are using provisioning profiles and the group does not have a defined instance, the appropriate default dialog file will be used based on the type of provisioning selected.

2.9.3.2. Creating a Custom Provision Dialog

1. Navigate to Automate → Customization.

2. Click on the Provisioning Dialogs accordion.

3. Click on the type of dialog you want to create, Host Provision, VM Provision or VM Migrate.

4. Select one of the default dialogs.

5. Click 🛠 (Configuration), and then 🌰 (Copy this Dialog).

6. Rename the dialog as shown in the examples below.

<table>
<thead>
<tr>
<th>Type of Provision</th>
<th>Dialog Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provision Virtual Machine from a template</td>
<td>miq_provision_dialogs_groupname_template&lt;br&gt;Example: miq_provision_dialogs_EvmGroup-user_self_service_template</td>
</tr>
<tr>
<td>Clone a Virtual Machine</td>
<td>miq_provision_dialogs_groupname_clone_to_vm&lt;br&gt;Example: miq_provision_dialogs_EvmGroup-user_self_service_clone_to_vm</td>
</tr>
<tr>
<td>Publish a Virtual Machine to a template</td>
<td>miq_provision_dialogs_groupname_clone_to_template&lt;br&gt;Example: miq_provision_dialogs_EvmGroup-user_self_service_clone_to_template</td>
</tr>
</tbody>
</table>

7. Make any changes you need.

8. In the Content field,

   - To remove a tab from display, change its display value to ignore. By choosing ignore, you not only hide the tab, but also skip any fields on that tab that were required. To show the tab, change the display value to show.

   - To hide a field, change its :display: value from :edit: to :hide. To ensure the field does not get turned back on by a workflow model, use :display_override: :hide. To display fields of most data types, use :edit. To display a button, use :show. To set a default value for a field, add :default: defaultvalue to the list of parameters for the field. Set the :required: parameter to either true or false based on your needs.

   **NOTE**
   
   If you set :required: to true, the field must have a value for the provision request to be submitted.
9. Click Add.

Enter the name of the new dialog into the dialog name field in the appropriate Red Hat CloudForms Applications/provisioning/profile instance. This dialog can now be referred to in an instance in the Provisioning Profiles class so that it can be used for groups of users.

2.9.4. Provisioning Profiles

Provisioning profiles can be used to customize the dialogs and the state machine (steps used to provision the machine). Profiles can be created for LDAP or Red Hat CloudForms groups. To use provisioning profiles:

- Create a Provisioning Profile instance for the LDAP or Red Hat CloudForms group. If no instance exists, then default settings will be used.
- If customizing dialogs, create a custom dialog file, and specify the name of that file in the provisioning profile instance. If customizing the states for provisioning, create a state instance and set the name of the state instance in the provisioning profile instance.

The diagram below shows where provisioning profiles are called during the entire provisioning process.

2.9.4.1. Creating a Provisioning Profile Instance
1. Navigate to Automate → Explorer.

2. Using the tree located in the accordion, click DOMAIN → Cloud → VM → Provisioning → Profile.

**NOTE**

DOMAIN must be a user-defined Domain and not the locked ManageIQ Domain. If necessary, you can copy the class from the ManageIQ domain into a custom domain.

This example uses the Cloud Namespace, but can also use the Infrastructure namespace.

3. Click (Configuration), + (Add a New Instance).

4. Make the name of the tag identical to the name of the LDAP or Red Hat CloudForms group you are creating the instance for, replacing spaces in the group name with underscores. For example, change Red Hat CloudForms-test group to Red Hat CloudForms-test_group.

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(vmname)</td>
<td>CloudVM/Provisioning.f5</td>
</tr>
<tr>
<td>(pr_dialog_name)</td>
<td></td>
</tr>
<tr>
<td>(po_dialog_name)</td>
<td></td>
</tr>
<tr>
<td>(vm_dialog_profile)</td>
<td>on_dialog_name_profile</td>
</tr>
<tr>
<td>(dialog_name)</td>
<td>req_provision_dialog</td>
</tr>
<tr>
<td>(vdsq_enabled)</td>
<td>vdsq_enabled=auto</td>
</tr>
<tr>
<td>(vdsq_max_size)</td>
<td>vdsq_max_size=0</td>
</tr>
<tr>
<td>(vdsq_max_free_size)</td>
<td>vdsq_max_size=0</td>
</tr>
</tbody>
</table>

5. In the dialog name field, enter the name of the customized dialog file. This file must reside on the Red Hat CloudForms appliance in the /var/www/miq/vmdb/db/fixtures directory. Red Hat recommends naming the file in the format `miq_provision_dialogs-groupname.rb` and copying this file to all Red Hat CloudForms appliances. For instructions on creating a custom dialog file, see Section 2.9.3, “Customizing Provisioning Dialogs”.

**NOTE**

Be sure that the custom dialog file exists. If it does not, an error will appear when the user clicks on the Provisioning button in the Red Hat CloudForms console.

6. Click Add.

### 2.9.4.2. Setting Provisioning Scope Tags

Some non-default placement methods, for example the redhat_best_placement_with_scope or vmware_best_fit_with_scope methods, may require you to set Provisioning Scope tags for a host and a datastore.

To enable these resources for all groups, set the scope to All. To limit access to a select group, create a tag in the Provisioning Scope category with the exact name of the user group and set this tag on the desired resources. See Tags in General Configuration for information on creating tags.
To set the scope for a datastore:

1. Navigate to **Compute → Infrastructure → Datastores**.
2. Select the datastore to set the provisioning scope for.
3. Click **Policy**, and then **Edit Tags**.
4. From the **Select a customer tag to assign** drop down, select **Provisioning Scope** and then a value for the tag from the next drop down menu.
5. Click **Save**.

### 2.9.5. Managing Key Pairs

Key pairs allow you to manage SSH access between a user and provisioned instance. For more information about key pairs in OpenStack, see **Manage Key Pairs** in the **Instances and Images Guide**.

To manage key pairs, navigate to **Compute → Clouds → Key Pairs**. From there, you can view a list of available key pairs. Click on a key pair to view its details.

To create a new key pair:

1. Navigate to **Compute → Clouds → Key Pairs**.
2. Click **Configuration**, **Add a new Key Pair**.
3. Enter a **Name** for the key pair.
4. If you want to use a public key, copy its contents into the **Public Key (optional)** field.
5. Select which cloud provider on which to create the key pair. The key pair will then be available for use by instances in that provider.
6. Click **Add**.
CHAPTER 3. WORKING WITH REQUESTS

3.1. PROVISIONING REQUEST APPROVAL METHODS

In this chapter, you will learn about the different approval methods. The request can be approved manually in the Red Hat CloudForms console, set for automatic approval by setting options in the Automate Explorer, or by using an external method.

When using an external method, the approval actually takes place on the external system and is sent directly for execution. This chapter discusses how to view and edit requests in the Red Hat CloudForms Console, how to approve a request, and how to set automatic approval parameters.

3.2. WORKING WITH PROVISIONING REQUESTS

After a provisioning request is sent, if you have proper authority, you can copy, edit, delete, approve, or deny a request.

After submission, the appliance assigns each provision request a Request ID. If an error occurs during the approval or provisioning process, use this ID to locate the request in the appliance logs. The Request ID consists of the region associated with the request followed by the request number. As regions define a range of one trillion database IDs, this number can be several digits long.

Request ID Format

Request 99 in region 123 results in Request ID 123000000000099.

3.2.1. Reloading the Status of Provisioning Requests

1. Navigate to Services → Requests.

2. Click (Reload the current display).

3.2.2. Approving a Provisioning Request

After a user creates provisioning request, administrators have the ability to approve the request and allow Red Hat CloudForms to complete virtual machine or instance creation.

1. Navigate to Services → Requests.

2. Click on the request you want to approve.

3. Type in a Reason for the approval.

4. Click (Approve this request).

3.2.3. Denying a Provisioning Request

1. Navigate to Services → Requests.
2. Click on the request you want to deny.

3. Type in a **Reason** for the denial.

4. Click  (Deny this request).

### 3.2.4. Copying a Provisioning Request

1. Navigate to **Services → Requests**.

2. Click on the request you want to copy.

3. Click  (Copy original provision request).

4. Make changes to the request.

5. Click **Submit**.

If the logged in user is not same as the requester or the request has been already approved or denied, you cannot edit or delete the request.

### 3.2.5. Editing a Provisioning Request

1. Navigate to **Services → Requests**.

2. Click on the request you want to edit.

3. Click  (Edit the original provision request).

4. Make changes to the request.

5. Click **Submit**.

### 3.2.6. Deleting a Provisioning Request

1. Navigate to **Services → Requests**.

2. Click on the request you want to delete.

3. Click  (Delete this request).

4. Click **OK** to confirm.

### 3.2.7. Automatically Approving Requests

You can set thresholds for automatic approval of provisioning requests and, therefore, remove the requirement to manually approve the request. You can do this either as a global default or on a per template basis.

#### 3.2.7.1. Enabling Global Defaults for Automatic Approval

To enable a global set of default approval values, edit the defaults instance by navigating to **Automate → Explorer**, then **DOMAIN → Cloud|Infrastructure → VM → Provisioning → StateMachines →**
ProvisionRequestApproval in the accordion menu. The parameters in this instance are used by the methods in that same class. By default, the maximum number of virtual machines or instances that can be automatically approved for provisioning is 1. To skip the check for the maximum number of virtual machines, set this field to 0. Set this field to -1 to force manual approval. At a minimum, you must change this parameter for all others to be validated.

1. Navigate to Automate → Explorer.

2. From the tree in the accordion menu, select DOMAIN → Cloud → VM → Provisioning → StateMachines → ProvisionRequestApproval Class.

   NOTE

   DOMAIN must be a user-defined Domain and not the locked ManageIQ Domain. If necessary, you can copy the class from the ManageIQ domain into a custom domain.

   This example uses the Cloud Namespace but can also use the Infrastructure namespace.

3. Click.Configuration(), then.Edit this instance).

   Fields

   Main Info

   Fields

   Name | Value | On Entry | On Exit | On Error | Collect

   (max_cpus) | | | | | |
   (max_vms) | 1 | | | | |
   (max_memory) | | | | | |
   (max_retirement_days) | | | | | |
   (validateRequest) | validate_request | | | | |

   NOTE

   Do not change any values other than those listed below. Doing so may prevent the automatic approval process from running.

   • Use max_cpus to set the number of CPUs allowed to approve automatically the provisioning request.

   • Use max_vms to set the maximum number of virtual machines or instances that are allowed to be provisioned automatically approve the request. If this is set to blank, no requests will be automatically approved.

   • Use max_memory to set the maximum memory allowed to approve automatically the provisioning request.

   • Use max_retirement_days to set the maximum number of days until the virtual machine or instance is retired to automatically approve this request.
4. Click **Save**.

The thresholds for automatic approval are set. The next time a provision request is created these thresholds will be checked. If the requirements are met, the provisioning request will be approved with no user intervention.

### 3.2.7.2. Template Specific Approval Defaults

Red Hat CloudForms provides tags that can be used to set default automatic approval values on a per template or image basis. These values **supersede** those in the **Automate** model. Use these tags to eliminate the need for manual approval for all provisioning requests. To enable automatic approval, assign the tags directly to templates or images.

<table>
<thead>
<tr>
<th>Category Display Name (Name)</th>
<th>Use (Sample values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto Approve Max CPU (prov_max_cpus)</td>
<td>Sets the maximum number of CPUs that can be automatically approved in a single provisioning request. Sample Values: 1, 2, 3, 4, 5</td>
</tr>
<tr>
<td>Auto Approve Max Memory (prov_max_memory)</td>
<td>Sets the maximum number of memory that can be automatically approved in a single provisioning request. Sample Values: 1, 2, 4, 8 (in GB)</td>
</tr>
<tr>
<td>Auto Approve Max Retirement Days (prov_max_retirement_days)</td>
<td>Sets the maximum number of days until retirement that can be automatically approved in a single provisioning request. Sample Values: 30, 60, 90, 180 (in days)</td>
</tr>
<tr>
<td>Auto Approve Max VM (prov_max_vms)</td>
<td>Sets the maximum number of virtual machines or instances that can be automatically approved in a single provisioning request. Sample Values: 1, 2, 3, 4, 5</td>
</tr>
</tbody>
</table>

### 3.2.7.3. Assigning Tags to a Template for Auto Approval

1. Navigate to **Compute → Infrastructure → Virtual Machines**.

2. Click the **Templates** accordion, and select the templates that you want to tag.

3. Click 🎨 (Policy), and then 🛠️ (Edit Tags).

4. Select a customer tag from the first dropdown, and then a value for the tag.

The thresholds for automatic approval for a specific template are set. The next time a provision request is created for this template these thresholds will be checked. If the requirements are met, the provisioning request will be approved with no user intervention.

### 3.2.7.4. Setting Provisioning Notification Email Addresses

Red Hat CloudForms contains a set of Automate instances for provisioning. These Automate instances also include email fields to set the sender and recipient of provisioning notifications, such as requests. These fields are set to **evadmin@company.com** as a default.
1. Navigate to **Automate → Explorer**.

2. Choose the following Namespace: **DOMAIN → Cloud → VM → Provisioning → Email**.

   ![Image](image.png)

   **NOTE**

   **DOMAIN** must be a user-defined Domain and not the locked ManageIQ Domain. If necessary, you can copy the class from the ManageIQ domain into a custom domain.

   This example uses the **Cloud** Namespace, but can also use the **Infrastructure** namespace.

3. Select an instance within the chosen class.

4. Click ✏️ (Configuration), then ✏️ (Edit this instance).

5. Type the desired email addresses in the **to_email_address** and **from_email_address** fields.

6. Click **Save**.

   ![Table](table.png)
CHAPTER 4. FULFILLING REQUESTS

4.1. FULFILLING A REQUEST

After a request has been approved, Red Hat CloudForms then goes through the steps required to complete the request. The steps followed for a regular provision from a virtual machine to a virtual machine (not to a template) are found by navigating to Automate → Explorer, then listed under DOMAIN → Cloud|Infrastructure → VM → Provisioning → VMProvision_VM → Provision VM from Template (template). The value for each state shows where the instance resides in the Datastore accordion. The default set of execution steps is shown below. For more information on state machines, see Section 4.2.1.4, “State Machines”.

4.2. DEFAULT EXECUTION STEPS IN STATES INSTANCE

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customize Request</td>
<td>Apply customizations.</td>
</tr>
<tr>
<td>Acquire IP Address</td>
<td>Integrates with IPAM (IP Address Management) to get an IP Address.</td>
</tr>
<tr>
<td>Acquire MAC Address</td>
<td>Integrates with IPAM to get a MAC Address.</td>
</tr>
<tr>
<td>Register DNS</td>
<td>Integrates with IPAM to register with DNS.</td>
</tr>
<tr>
<td>Register CMDB</td>
<td>Integrates with CMDB (Configuration Management Database) to register with the CMDB.</td>
</tr>
<tr>
<td>Register AD</td>
<td>Integrates with IPAM to register with active directory.</td>
</tr>
<tr>
<td>PreProvision</td>
<td>Pre-provisioning steps.</td>
</tr>
<tr>
<td>Provision</td>
<td>Create the virtual machine or instance.</td>
</tr>
<tr>
<td>CheckProvisioned</td>
<td>Check that the new virtual machine or instance is in the VMDB.</td>
</tr>
<tr>
<td>PostProvision</td>
<td>Post-provisioning steps.</td>
</tr>
<tr>
<td>Register DHCP</td>
<td>Integrate with IPAM to register the IP address with DHCP Server.</td>
</tr>
<tr>
<td>Activate CMDB</td>
<td>Integrate with IPAM to activate the virtual machine or instance in the CMDB.</td>
</tr>
<tr>
<td>Email owner</td>
<td>Send email to owner that the virtual machine or instance has been provisioned.</td>
</tr>
</tbody>
</table>

4.2.1. Quotas

Quotas allow you to establish maximum usage thresholds for an user, group, or tenant for provisioned
virtual machines or instances and are integrated into provisioning profiles. These maximums are checked after the approval but before the actual provision request is started. The quota is set for the tenant or group as a whole.

4.2.1.1. Applying User or Group Quotas

1. Log in as a user with administrator or super administrator rights to the Red Hat CloudForms console.

2. Navigate to Automate → Explorer.

3. Copy the ManageIQ → System → CommonMethods → QuotaStateMachine → quota instance to a custom DOMAIN.

4. From the accordion menu, click DOMAIN → System → CommonMethods → QuotaStateMachine → quota.

   **NOTE**
   
   By default, quotas are applied to tenants and do not require any change in Automate → Explorer.

5. Click (Configuration), (Edit this instance).

   Editing Automate instance “quota”

<table>
<thead>
<tr>
<th>Fields</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quota Source Type (quota_source_type)</td>
<td>user or group</td>
</tr>
<tr>
<td>VM Warning Count (vm_warnings)</td>
<td>10</td>
</tr>
<tr>
<td>VM Maximum Count (vm_maxs)</td>
<td>25</td>
</tr>
<tr>
<td>Storage Warning Limit (stor_warning)</td>
<td>1024</td>
</tr>
<tr>
<td>Storage Maximum Limit (stor_maxs)</td>
<td>256</td>
</tr>
<tr>
<td>CPU Warning Count (cpu_warnings)</td>
<td>1</td>
</tr>
<tr>
<td>CPU Maximum Count (cpu_maxs)</td>
<td></td>
</tr>
</tbody>
</table>

   a. Set the value for Quota Source Type to user or group.

   **IMPORTANT**
   
   A user creating a provisioning request must have an email address saved in their profile, or provisioning may fail. See Creating a User in General Configuration for details on configuring users.

   b. Set the values for VM Warning Count, VM Maximum Count, Storage Warning Limit, Storage Maximum Limit, CPU Warning Count, CPU Maximum Count, Memory Warning Limit, or Memory Maximum Limit to be the maximums for a specific user or group.

6. Click Save.

4.2.1.2. Using Tags for Owner and Group Quotas
Red Hat CloudForms provides tags for enforcing quotas for the owners of virtual machines or instances. Ownership of a virtual machine or instance can be set either during the provisioning process or by using the Configuration Set Ownership button. If a virtual machine or instance has an owner, the value is displayed in the Lifecycle section of the virtual machine or instance summary page.

Quota tags can be assigned directly to either a group or owner not to a configuration item. The table below shows the tags for use in quotas.

<table>
<thead>
<tr>
<th>Category Display Name (Name)</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quota Max CPU (quota_max_cpu)</td>
<td>Sets the maximum number of CPUs summed over all virtual machines and instances owned by the group or user. Sample Values: 1, 2, 3, 4, 5, 10, 20, 30, 40, 50</td>
</tr>
<tr>
<td>Quota Max Memory (quota_max_memory)</td>
<td>Sets the maximum memory summed over all virtual machines and instances owned by the group or user. Sample Values: 1024, 2048, 4096, 8192, 10240, 20480, 40960, 81920 (in MB)</td>
</tr>
<tr>
<td>Quota Max Storage (quota_max_storage)</td>
<td>Sets the maximum storage summed over virtual machines and instances owned by the group or user. Sample Values: 10, 100, 1000, 20, 200, 40, 400 (in GB)</td>
</tr>
</tbody>
</table>

### 4.2.1.3. Applying a Tag to a User or User Group

1. Click Configuration.
2. Click the Access Control accordion, and select the user or group that you want to tag.
3. Click Policy, then click Edit Tags.
4. Select the appropriate customer tag to assign, then the value.
5. Click Save.

**NOTE**

When quotas are applied by both automate instance and tagging, the tagged values will have higher precedence.

### 4.2.1.4. State Machines

The automate state machine processes an ordered list of states. It can ensure the successful completion of a step before the next step is run, permit steps to be retried, allow setting a maximum time to retry the state before exiting, and number of retries before exiting the state. Before each state is executed, the On_Entry method is executed and after the state ends the On Exit or On Error method is executed based on how the state ends.

The following components make up a Red Hat CloudForms automate state machine:
<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>On_Entry</td>
<td>Method to run when entering the state. It enables you to execute an automate method to do some pre-processing before the state of the state machine is processed.</td>
</tr>
<tr>
<td>On_Exit</td>
<td>Method to run when exiting the state.</td>
</tr>
<tr>
<td>On_Error</td>
<td>Method to run if an error is encountered when running the state. It enables you to execute an automate method to do some final processing before the state machine finally exits (MIQ_ABORT) due to the error.</td>
</tr>
<tr>
<td>Default Value</td>
<td>Runs after the On_Entry method completes (The actual state being processed).</td>
</tr>
<tr>
<td>Max Retries</td>
<td>Maximum number of times to retry the state before exiting.</td>
</tr>
<tr>
<td>Max Time</td>
<td>Maximum time in seconds to retry the state before exiting.</td>
</tr>
</tbody>
</table>

In the diagram below, you can see how these components combine to create a state machine workflow.

**NOTE**

The retry logic, **On_Entry** and **On_Error** are distinct cases in the program flow.

```py
# Get current provisioning status
task = $evm.root['service_template_provision_task']
task_status = task['status']
```
result = task.status

Then check the result to see how it should proceed:

case result
  when 'error'
    $evm.root['ae_result'] = 'error'
    ....
  when 'retry'
    $evm.root['ae_result'] = 'retry'
    $evm.root['ae_retry_interval'] = '1.minute'
  when 'ok'
    $evm.root['ae_result'] = 'ok'
  end

When the result is "retry", it sets:
$evm.root['ae_result'] = 'retry'
$evm.root['ae_retry_interval'] = '1.minute'

The following image shows a simple state machine pertaining to approving a provision request. This instance can be found in Datastore → ManageIQ → Infrastructure → VM → Provisioning → StateMachines → ProvisioningRequestApproval → Default.

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>On Entry</th>
<th>On Exit</th>
<th>On Error</th>
<th>Collect</th>
<th>Max Retries</th>
<th>Max Time</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>max_vms</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>create</td>
</tr>
<tr>
<td>ValidateRequest</td>
<td>validate_request</td>
<td>pending_request</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>create</td>
</tr>
<tr>
<td>ApproveRequest</td>
<td>approve_request</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>create</td>
</tr>
</tbody>
</table>

1. The attribute max_vms has a value of 1. State machine processing can use the attributes of the state machine instance to make logic decisions. In this case, the validate_request method, which is processed during the On_Entry portion of the ValidateRequest state, evaluates the max_vms attribute. If the number of virtual machines requested is less than the max_vms value, the request can be auto-approved.

2. ValidateRequest is the first state to be executed.

3. ApproveRequest is the next state to be executed.

**NOTE**

Grayed out items reflect values that are set in the class schema. These values can be overwritten on a per instance basis.

### 4.2.1.5. Customizing Provisioning States

The steps followed when provisioning a virtual machine or cloud instance are completed based on instances from the DOMAIN → Cloud|Infrastructure → VM → Provisioning → StateMachines → VMProvision_VM class. Depending on your environment you can remove, change, or add steps to the
provisioning process. For example, if you are not integrating with IPAM or a CMDB, then you can remove those execution steps.

### 4.2.1.6. Editing the Default State Instance

1. Navigate to **Automate → Explorer**.

2. From the accordion menu, click **DOMAIN → Cloud → VM → Provisioning → StateMachines → VMProvision_VM**.

   **NOTE**

   **DOMAIN** must be a user-defined Domain and not the locked ManageIQ Domain. If necessary, you can copy the class from the ManageIQ domain into a custom domain.

   This example uses the **Cloud** Namespace, but can also use the **Infrastructure** namespace.

3. Click **(Configuration)**, then **(Edit this instance)**.

   
   **Main Info**

   | Fully Qualified Name | | | | | |
   |---|---|---|---|---|
   | Name | template | | | |
   | Display Name | Provision VM from Template | | | |

   **Fields**

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>On Entry</th>
<th>On Exit</th>
<th>On Error</th>
<th>Collect</th>
</tr>
</thead>
<tbody>
<tr>
<td>(CustomizesRequest)</td>
<td></td>
<td>update_provision_stat</td>
<td>update_provision_stat</td>
<td>update_provision_stat</td>
<td></td>
</tr>
<tr>
<td>(AcquireIPAddress)</td>
<td></td>
<td>update_provision_stat</td>
<td>update_provision_stat</td>
<td>update_provision_stat</td>
<td></td>
</tr>
<tr>
<td>(AcquireMACAddress)</td>
<td></td>
<td>update_provision_stat</td>
<td>update_provision_stat</td>
<td>update_provision_stat</td>
<td></td>
</tr>
<tr>
<td>(RegisterDNS)</td>
<td></td>
<td>update_provision_stat</td>
<td>update_provision_stat</td>
<td>update_provision_stat</td>
<td></td>
</tr>
<tr>
<td>(RegisterCMDB)</td>
<td></td>
<td>update_provision_stat</td>
<td>update_provision_stat</td>
<td>update_provision_stat</td>
<td></td>
</tr>
<tr>
<td>(RegisterAD)</td>
<td></td>
<td>update_provision_stat</td>
<td>update_provision_stat</td>
<td>update_provision_stat</td>
<td></td>
</tr>
</tbody>
</table>
4. For each step that you want to remove, clear the entries in the Value, On Entry, On Exit, and On Error columns.

5. Click Save.

4.2.1.7. Viewing the Status of a Provisioning Request

After a request has been approved, the various stages of fulfillment are executed. You can see the progress of the provisioning process by viewing its status.

1. Navigate to Services → Requests. The list of requests is shown.

2. Click on a specific request for more information. Once the provisioning begins, if the request was supposed to create more than one virtual machine or instance, a field will appear called Provisioned VMs. Click on the number that appears next to it for information on each of the individual provisions.

4.2.1.8. Viewing a Provisioned Virtual Machine or Instance

When a virtual machine or instance is created as a result of a provisioning request, its summary screen will show when it was provisioned in the Lifecycle area of the respective summary.

1. From Services → Workloads, click the virtual machine or instance that you want to view.

<table>
<thead>
<tr>
<th>Discovered</th>
<th>Mon Mar 01 19:52:21 UTC 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last Analyzed</td>
<td>Never</td>
</tr>
<tr>
<td>Retirement Date</td>
<td>Never</td>
</tr>
<tr>
<td>Provisioned On</td>
<td>Mon Mar 01 19:53:03 UTC 2010</td>
</tr>
<tr>
<td>Owner</td>
<td></td>
</tr>
</tbody>
</table>

4.2.1.9. Viewing a Virtual Machine or Instance Summary

From Services → Workloads, click the virtual machine or instance that you want to view.
CHAPTER 5. CATALOGS AND SERVICES

Through the use of catalogs, Red Hat CloudForms provides support for multi-tier service provisioning to deploy layered workloads across hybrid environments. You can create customized dialogs that will give consumers of the services the ability to input just a few parameters and provision the entire service. The following table lists the terminology associated with catalogs that you will use within the CloudForms user interface for service provisioning.

Table 5.1. Terminology

<table>
<thead>
<tr>
<th>Type</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catalog Bundle</td>
<td>A group of templates.</td>
</tr>
<tr>
<td>Catalog Item</td>
<td>A single template.</td>
</tr>
<tr>
<td>Template</td>
<td>A template is a copy of a preconfigured virtual machine, designed to capture the installed software and software configurations, as well as the hardware configuration of the original virtual machine.</td>
</tr>
<tr>
<td>Dialog Tabs</td>
<td>Part of a service dialog.</td>
</tr>
<tr>
<td>Element</td>
<td>An item on a tab in a dialog. It can be a button, check box, drop down list, radio button, tag control, text area box, or a text box.</td>
</tr>
<tr>
<td>Provisioning Dialogs</td>
<td>Dialogs created for host provisioning, virtual machine migration, or virtual machine provisioning. The dialog name must be added to the appropriate provision instance to be processed.</td>
</tr>
<tr>
<td>Service Catalog</td>
<td>A catalog item or catalog bundle that is available for provisioning.</td>
</tr>
<tr>
<td>Service Dialogs</td>
<td>Made up of fully customizable tabs, items, and values for use with service provisioning.</td>
</tr>
</tbody>
</table>

5.1. GENERIC OBJECTS

Generic Objects are object-like entities, defined at runtime, that have unique names and user-defined attributes and relationships. Residing in the Automate Engine datastore, generic objects are designed to manage objects other than those related to private infrastructure, and public or private cloud providers.

Using automate requests, services and catalog items, generic objects can be directly accessed or passed, during any step, as a parameter to a service state machine. As a result, generic objects can be used to quickly add the capability to provision and collect data on resources not supported by Red Hat CloudForms.
NOTE

Outside of the Red Hat CloudForms user interface, Red Hat Marketing may refer to Dynamic Resource Objects when referencing the features and applications of generic objects.

5.1.1. Viewing Generic Objects Classes

View a list of generic objects and click through to see detailed summary information for each object.

1. Navigate to Automate → Generic Objects.
2. Click on a generic object class in the table to view its summary information.

5.1.2. Creating Generic Objects Classes

Model a new resource by creating a generic object class and adding it to your Red Hat CloudForms inventory. Each generic object class can have attributes, associations, and methods. Once created, generic object classes are visible to users of the Self Service user interface at the resource level.

Create a generic object class using the following steps:

1. Navigate to Automation → Automate → Generic Objects.
2. Click (Configuration), then click (Add a New Generic Object Class).
3. Provide a Name and Description for the new object class.
4. In the Attributes field, enter a Name and choose a Type from the drop-down list. Click the button to add attributes.
5. Enter a Name and select a Class for the object class’s Associations. Click the button to create additional associations.
6. Provide a Name for the Methods. Click the button to add methods.
7. Click Add.

5.1.3. Editing Generic Object Classes

Edit existing generic object classes using the following steps:

1. Navigate to Automation → Automate → Generic Objects.
2. Click on a generic object class in the list view.
3. Click (Configuration), then click (Edit this Generic Object Class).
4. Make required changes to the generic object class fields.
5. Click Save.
5.1.4. Removing Generic Objects Classes

Remove generic object classes from your inventory using the following steps:

1. Navigate to Automation → Automate → Generic Objects.
2. Check the generic objects classes from the table to remove.
3. Click (Configuration), then click (Remove selected Generic Object Classes from Inventory).
4. Click OK to confirm.

5.2. SERVICE DIALOGS

When provisioning a service, input will be needed from the requester. Service dialogs are used to take input from the user. This input is connected to a method in the Automate model that defines how the user’s input is translated into the provision request. Before creating a service dialog, be sure to plan what items you need the user to input.

5.2.1. Adding a Service Dialog

IMPORTANT

- When creating a service dialog for use with Ansible playbook catalog items, variable elements must use the prefix param_ when assigning the value. For example, a new variable labeled key1 should have its value set as param_key1.
- Using Ansible playbooks to populate dynamic dialog fields is not recommended due to delay times caused by the overhead of interaction between systems.
- If you add the playbook automate method to a service dialog, only users with admin privileges can run the dialog.

Red Hat CloudForms includes a drag-and-drop service dialog editor to create service dialogs. The editor, with its drag-and-drop feature, provides a visual representation of the components that comprise a service dialog. You can easily design your service dialog utilizing dialog tabs, sections (previously referred to as boxes), and elements.

When users access a service, the majority of options available to them are preset and cannot be altered. The requirements for the service determine the options and fields that need to be present in the dialog for user input. A service dialog exposes some of those options to the user so that even if they are ordering a basic Red Hat Enterprise Linux 7 machine, for example, they can at least choose the amount of memory, virtual CPUs, or other options available to the instance they order. In cases where certain fields must be unique, such as the name of virtual machines in Red Hat Virtualization, users must enter their own unique name for the virtual machine they choose or the operation will fail, so this field must be exposed.

See Creating a Service in CloudForms for Virtual Machine Provisioning for an example about creating a service that utilizes a service dialog for provisioning a Red Hat Virtualization virtual machine.

A service dialog contains three components:

- One or more Tabs.
• Inside the tabs, one or more Sections. Note that in the previous method of creating service dialogs using the CloudForms user interface, Sections were referred to as Boxes.

• Inside the sections, one or more Elements. Elements are controls that accept input. Elements contain methods, like check boxes, drop-down lists or text fields, to fill in the options on the provisioning dialog.

  IMPORTANT

  The names of the elements must correspond to the options used in the provisioning dialog.

1. Navigate to Automation → Automate → Customization.

2. Click the Service Dialogs accordion.

3. Click (Configuration), and then (Add a new Dialog).

4. Enter basic details under General:
   a. Enter the Dialog’s name and Dialog’s description.

5. Add a new tab to the dialog:
   a. Click Create Tab. Then, click the icon on the new tab to edit tab information.
   b. Enter a Label.
   c. Optional: Enter a description for the tab in Description.
   d. Click Save.

6. Add a new section to the tab:
   a. Click Add Section. Then, click the icon on the upper-right to edit section details.
   b. Enter a Label.
c. Optional: Enter a description for the section in **Description**.

d. Click **Save**.

7. Add elements to the section:

a. From the list of elements on the left, click an element you want to add, then drag-and-drop it inside the section. Then, click the **pencil** icon next to the element to edit its field details.

<table>
<thead>
<tr>
<th>Element Types</th>
<th>Additional Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text Area</td>
<td>Provides text area for users to enter text. You can enter the default text in <strong>Default Value</strong>, or leave it as blank.</td>
</tr>
<tr>
<td>Text Box</td>
<td>Text box is similar to a text area with the added option to enable <strong>Protected</strong> so the text is shown as asterisks(*), instead of plain text.</td>
</tr>
<tr>
<td>Check Box</td>
<td>Enable <strong>Default Value</strong> if you want the box checked by default.</td>
</tr>
<tr>
<td>Drop Down</td>
<td>Use drop down to create list entries either manually or using automate methods. Enable <strong>Dynamic</strong> to create lists using automate methods; use <strong>Entry Point</strong> to select an automate instance. Enable <strong>Show Refresh Button</strong> to allow users to refresh list options manually.</td>
</tr>
<tr>
<td>Radio Button</td>
<td>Similar to a drop down but displays options using radio buttons.</td>
</tr>
<tr>
<td>Datepicker</td>
<td>Use this to enable users to pick a date by clicking the calendar icon.</td>
</tr>
<tr>
<td>Timepicker</td>
<td>Use this to enable users to pick a date and time.</td>
</tr>
<tr>
<td>Tag Control</td>
<td>Select a <strong>Category</strong> of tags you want assigned to virtual machines associated with the service dialog. Enable <strong>Single Select</strong> if only one tag can be selected.</td>
</tr>
</tbody>
</table>

b. Enter a **Label**, **Name**, and **Description** for the element.

**IMPORTANT**

Element names must correspond to the options used in the provisioning dialog. **Name** must use only alphanumeric characters and underscores without spaces. It is also used to retrieve the value of this element in the method used with the dialog and must start with `dialog_service_type`.

c. Optional: Add additional information in **Help** to assist the user to complete the fields in the service dialog. This field is useful for explaining unfamiliar terminology or providing configuration tips. This information is presented when you hover over the [!] exclamation mark.
mark in the Service Dialog while ordering a Service Catalog later.

d. Set other options as required.

e. Click Save.

8. Optional: Repeat the above step to add more elements to the existing section, or create and add elements to a new section as required.

9. Optional: Repeat the step to add a new tab to the dialog, and subsequent steps to add sections and elements to it as required.

10. Click Save to create the dialog.

The service dialog is now created, and added to the Service Dialogs accordion.

5.2.2. Creating a Service Dialog from a Container Template

Complete the following procedure to create a Service Dialog from a Container Template.

1. Navigate to Compute → Containers → Container Templates and select the template for provisioning.

2. Click (Configuration), then (Create Service Dialog from Container Template).

3. Enter a name for the dialog in Service Dialog Name.

4. Click Save.

You can use this service dialog when creating a catalog item for container template provisioning; see Section 5.4.8, “Creating an OpenShift Template Catalog Item”.

5.2.3. Importing Service Dialogs

You can share service dialogs between appliances using the export and import features.

1. Navigate to Automation → Automate → Customization.

2. In the Import/Export accordion, click Service Dialog Import/Export.

3. In the Import area, click Browse to select an import file.

4. Click Upload.

5.2.4. Exporting Service Dialogs

You can share service dialogs between appliances using the export and import features.

1. Navigate to Automation → Automate → Customization.

2. In the Import/Export accordion, click Service Dialog Import/Export.

3. In the Export area, select the service dialogs that you want to export.

4. Click Export.
5.3. METHODS

5.3.1. Creating a Method to Associate with the Dialog

You will need to create a method that connects the values in the dialog with the provisioning request. The method should be created in the `DOMAIN/Service/Provisioning/StateMachines/ServiceProvision_Template` class of the Automate model.

**NOTE**

`DOMAIN` must be a user-defined Domain and not the locked ManageIQ Domain. If necessary, you can copy the class from the ManageIQ domain into a custom domain.

A method is provided below that was created for the following scenario:

- You want to provision a three-tiered service that contains catalog items of web, app and DB. Each of these virtual machines (or cloud instances) has been tagged under the Service category with the appropriate value. Then, added as a catalog item and combined into a catalog bundle.

- The Service Dialog captures the selection of small, medium or large application in a dropdown called `service_type`. When referring to a value captured in an element in a dialog, the name of the element should be prefixed with `dialog_`. For example, `service_type` becomes `dialog_service_type` when used in the method.

- The method will set the memory sizes for each of the catalog items based on the `service_type` selection.

```ruby
# Automate Method
#
$evm.log("info", "Automate Method ConfigureChildDialog Started")
#
# Method Code Goes here
#
$evm.log("info", "===========================================")
$evm.log("info", "Listing ROOT Attributes:")
$evm.root.attributes.sort.each { |k, v| $evm.log("info", 	"#{k}: #{v}")}
$evm.log("info", "===========================================")

stp_task = $evm.root["service_template_provision_task"]
$evm.log("info", "===========================================")
$evm.log("info", "Listing task Attributes:")
stp_task.attributes.sort.each { |k, v| $evm.log("info", 	"#{k}: #{v}")}
$evm.log("info", "===========================================")

#############################################################
#### This is how the method would look for dialog variables
#############################################################

dialog_service_type = $evm.root['dialog_service_type']
$evm.log("info", "User selected Dialog option = /#{dialog_service_type}")

stp_miq_request_task = stp_task.miq_request_task
#$evm.log("info", "(parent) miq_request_task: = /#{stp_miq_request_task}"")
```

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This is how you get the catalog items for the catalog bundle

```ruby
stp_miq_request_tasks = stp_task.miq_request_tasks
#$evm.log("info","(children) miq_request_tasks count: = [{#stp_miq_request_tasks.count}]")
```

By going through the children, you can set the dialog variable for each of the children (we based our values on the children's service tags)

```ruby
stp_miq_request_tasks.each do |t|
  $evm.log("info", "Setting dialog for: #{t.description}")
  service = t.source
  service_resource = t.service_resource
  #$evm.log("info", "Child service resource name: #{service_resource.resource_name}")
  #$evm.log("info", "Child service resource description: #{service_resource.resource_description}")

  service_tag_array = service.tags(:app_tier)
  service_tag = service_tag_array.first
  memory_size = nil

  case dialog_service_type
  when "Small"
    case service_tag
      when "app"
        memory_size = 1024
      when "web"
        memory_size = 1024
      when "db"
        memory_size = 4096
      else
        $evm.log("info", "Unknown Dialog type")
    end
  when "Large"
    case service_tag
      when "app"
        memory_size = 4096
      when "web"
        memory_size = 4096
      when "db"
        memory_size = 8192
      else
        $evm.log("info", "Unknown Dialog type")
    end
  else
    $evm.log("info", "Unknown Dialog type - setting Dialog options here")
  end
end
```
5.3.2. Creating a Method in the Service Class

Service methods have been split based on purpose.

1. Navigate to Automation → Automate → Explorer.

2. Service Class is located at DOMAIN → Service → Provisioning → StateMachines → Methods and Domain → Service → Retirement → StateMachines → Methods.

   **NOTE**

   DOMAIN must be a user-defined Domain and not the locked ManageIQ Domain. If necessary, you can copy the class from the ManageIQ domain into a custom domain.

3. Click the Methods tab.

4. Click (Configuration), then (Add a New Method).

5. Enter a Name and Display Name.

6. In the Data field, enter the method contents.

7. Click Validate and wait for your data entry to be successfully validated.
8. Click Add.

![Main Info](image)

![Data](image)

![Input Parameters](image)

5.3.3. Creating an Instance in the Service Class

1. Navigate to Automation → Automate → Explorer.

2. Service Class is located at DOMAIN → Service → Provisioning → StateMachines → Methods and Domain → Service → Retirement → StateMachines → Methods.

   **NOTE**

   DOMAIN must be a user-defined Domain and not the locked ManageIQ Domain. If necessary, you can copy the class from the ManageIQ domain into a custom domain.

3. Click the Instances tab.

4. Click ![Configuration](image), then ![Add a new Instance](image).

5. Enter a Name and Display Name.

6. In the Fields area, enter the method's name in Value.

7. Click Add.

The instance is created so that it can be called from the ServiceProvision class.
NOTE

After the method has been created, it must be mapped to an instance in the DOMAIN/Service/Service/Provisioning/StateMachines class. The name of the instance must be specified as the Entry Point. This method must be called before the provision job begins.

5.3.4. Associating a Method with an Automate Instance

Service methods have been split based on purpose.

1. Navigate to Automation → Automate → Explorer.

2. From the accordion menu, click the required service method.

3. Service Class is located at DOMAIN → Service → Provisioning → StateMachines → Methods and Domain → Service → Retirement → StateMachines → Methods.

NOTE

DOMAIN must be a user-defined Domain and not the locked ManageIQ Domain. If necessary, you can copy the class from the ManageIQ domain into a custom domain.

4. Either create a new instance or select the clone_to_service instance.

5. Click ⚙️ (Configuration), then ✏️ (Edit Selected Instance).

6. In the configurechilddialog value, put the path to the method.

7. Click Save or Add if you are adding this to a new instance.

5.4. CATALOGS
Catalogs are used to create groups of virtual machines or instances for provisioning. For example, a complete package of a database server, desktop with specialized software already on it, and a firewall. You will need to complete the following steps to create and provision a service catalog.

1. Create **Catalog Items** for each virtual machine or instance that will be part of the service.

2. Create a **Service** dialog. For example, create a dropdown with three options small, medium, and large.

3. Create a method for the Service Dialog. This method defines what each of the options means to each of the individual virtual machines or cloud instances for the service. This method is called from a service provisioning instance in the Automate model.

4. Create an instance in the **DOMAIN/Service/Provisioning/StateMachines/ServiceProvision_Template** class that calls the method.

   NOTE
   DOMAIN must be a user-defined Domain and not the locked ManageIQ Domain. If necessary, you can copy the class from the ManageIQ domain into a custom domain.

5. Associate method with Automate instance.

6. Create a **Catalog Bundle**, adding each of the catalog items to it. Select the **Service Dialog** you created. Use the instance created in the **DOMAIN/Service/Provisioning/StateMachines/ServiceProvision_Template** class as the **Entry Point**. Check **Display in Catalog** box.

7. Provision a service.

5.4.1. Creating a Catalog Bundle

1. Navigate to **Services → Catalogs**.

2. Click the **Catalog Items** accordion.

3. Click **.Configuration**, and then **Add a New Catalog Bundle**.

4. In **Basic Info**, enter a name and description:

   ![Basic Info](image)

5. Click **Display in Catalog**.

6. Select the appropriate dialog name.

7. Select the path to the appropriate **ServiceProvision** instance.

8. Click on the **Resources** tab, then select the catalog items you want added to the bundle from the **Add a Resource** dropdown.
9. Click Add.

A catalog bundle is created and visible in the Service Catalog accordion.

**NOTE**

You should also create and specify an Entry Point in the
DOMAIN/Service/Provisioning/StateMachines/Methods/CatalogBundle class for each catalog item that is part of a bundle. If you do not, then the pre and post provision processing will occur for each item in the bundle in addition to processing for the Catalog Bundle. To set the entry point, go into each Catalog Item and check Display in Catalog. Then, you will see the Entry Point field.

### 5.4.2. Creating a Catalog Item

Create a catalog item for each virtual machine or cloud instance that will be part of the service.

1. Navigate to Services → Catalogs.

2. Click the Catalog Items accordion.

3. Click + (Configuration), and then + (Add a New Catalog Item).

4. Select the Catalog Item Type you are adding. This list only shows items related to providers available or options activated in the appliance (for example, Ansible Playbook is available as a Catalog Item Type option if the Embedded Ansible server role is enabled on the appliance).

5. In the Basic Info subtab:
   a. Type a Name/Description.
   b. Check Display in Catalog to edit Catalog, Dialog, and Entry Point(NS/Cls/Inst) options.
      i. Provisioning Entry Point (Domain/NS/Cls/Inst) requires you to select an Automate instance to run upon provisioning.
      ii. Retirement Entry Point (Domain/NS/Cls/Inst) requires you to select an Automate instance to run upon retirement.
NOTE

The entry point must be a State Machine since the Provisioning Entry Point list is filtered to only show State Machine class instances. No other entry points will be available from the Provisioning Entry Point field.

NOTE

You can only choose from the catalogs and dialogs you have already created. If you haven’t done so, leave the values blank and edit later.

6. In the Details subtab, write a Long Description for the catalog item.

7. In the Request Info subtab, select provisioning options that apply to the provider chosen. For more information, refer to ] and xref:provisioning-instances[.

8. Click Add.

5.4.3. Creating a Generic Catalog Item

Create generic catalog items for services non-specific to virtualization or cloud environments. This catalog item type can serve a wide array of needs, from creating a vLAN across a network to accessing virtual machine IP addresses and adding them to a load balancer pool.

1. Navigate to Services → Catalogs.

2. Click the Catalog Items accordion.

3. Click (Configuration), and then (Add a New Catalog Item).

4. Select Generic from the Catalog Item Type list.

5. In the Basic Info subtab:
   
a. Type a Name/Description.

b. Check Display in Catalog to display the item in the catalog. A Dialog will be required if you select Display in Catalog.

c. Choose a Catalog to which to add the new item.

d. Select a Dialog from the available options.

e. Choose a Subtype from the list menu.

f. Add Entry Point(NS/Cls/Inst) options.

   i. Provisioning Entry Point (Domain/NS/Cls/Inst) requires you to select an Automate instance to run upon provisioning.

   ii. Retirement Entry Point (Domain/NS/Cls/Inst) requires you to select an Automate instance to run upon retirement.
6. In the Details subtab, write a Long Description for the catalog item.

7. Click Add.

5.4.4. Creating an Ansible Playbook Service Catalog Item

Create a catalog item that uses an Ansible Playbook to back it.

NOTE

- Before creating an Ansible service, at least one repository, one playbook, and one credential must exist in the Red Hat CloudForms inventory. Check your inventory and add the appropriate resources before creating an Ansible service. For more information, see Automation Management Providers in Managing Providers.

- Debugging verbosity is available for Ansible playbook catalog items. Selecting a higher verbosity value provides more detailed output as the playbook executes. 0 (Normal) is the default value. 1 (Verbose) will yield return data while a value of 3 (Debug) provides connection attempt and task invocation details. Higher levels, such as 4 (Connection) can be useful for debugging SSH connections. Use 5 (WinRM Debug) when debugging WinRM connections.

- Using Ansible playbooks to populate dynamic dialog fields is not recommended due to delay times caused by the overhead of interaction between systems.

- Only users with administrator privileges can run a service dialog based on a playbook.

1. Navigate to Services → Catalogs.

2. In the Catalog Items accordion, click on the All Catalog Items.

3. Click (Configuration), then (Add a New Catalog Item).

4. Select Ansible Playbook from the Catalog Item Type drop-down list.

5. Type a Name and Description for the new service catalog item.

6. Click Display in Catalog.

7. Select the appropriate Catalog from the drop-down list.

8. In the Provisioning tab, set parameters for your catalog item to use by configuring a Playbook to back your service item:

   a. Choose a Repository from the drop-down list.

   b. Select the Ansible Playbook to use.
c. Assign the appropriate **Machine Credentials** from the drop-down list.

d. Add **Cloud** or **Network Credentials** from the drop-down lists.

e. Choose the **Host** against which to run the service item.

f. Set the **Max TTL** in minutes. The Time To Live (TTL) field allows you to set the maximum execution time for the playbook to run.

g. Use the **Escalate Privilege** toggle switch to enable user privilege escalation if called for in credentials during the playbook run.

h. Choose a **Verbosity** value to set the debug level for playbook execution.

i. Add key value pairs for **Variables** and their corresponding **Default Values**.

j. In the **Dialog** options, choose an existing dialog from the **Use Existing** drop-down list or select **Create New** to add a new dialog.

9. In the **Retirement** tab, set parameters for your catalog item to use by selecting values for the following:

a. Choose a **Repository** from the drop-down list.

b. Select the **Ansible Playbook** to use.

c. Assign the appropriate **Machine Credentials** from the drop-down list.

d. Add **Cloud** or **Network Credentials** from the drop-down lists.

e. Choose the **Host** against which to run the service item.

f. Set the **Max TTL** in minutes. The Time To Live (TTL) field allows you to set the maximum execution time for the playbook to run.

g. Use the **Escalate Privilege** toggle switch to enable user privilege escalation if called for in credentials during the playbook run.

h. Choose a **Verbosity** value to set the debug level for playbook execution.

i. Add key value pairs for **Variables** and their corresponding **Default Values**.

j. In the **Dialog** options, choose an existing dialog from the **Use Existing** drop-down list or select **Create New** to add a new dialog.

10. Click **Add**.

### 5.4.5. Creating an Ansible Tower Service Catalog Item

Create a service catalog item from an Ansible Tower template you can use to execute an Ansible Tower playbook in Red Hat CloudForms.

**IMPORTANT**

You must first create the job or workflow template in Ansible Tower. The job or workflow templates are automatically discovered by Red Hat CloudForms when refreshing your Ansible Tower provider’s inventory.
First, create a catalog:

1. Navigate to Services → Catalogs.

2. Click (Configuration), then (Add a New Catalog).

3. Enter a Name and Description for the catalog.

4. Click Add.

Then, create an Ansible Tower service catalog item:

1. Navigate to Automation → Ansible Tower → Explorer, then click on the Templates accordion menu.

2. Click Ansible Tower Templates and select an Ansible Tower job or workflow template.

3. Click (Configuration), then (Create Service Dialog from this Template).

4. Enter a Service Dialog Name (for example, ansible_tower_job) and click Save.

5. Navigate to Services → Catalogs. Click Catalog Items.

6. Click (Configuration), then (Add a New Catalog Item) to create a new catalog item with the following details, at minimum:
   - For Catalog Item type, select Ansible Tower.
   - Enter a Name for the service catalog item.
   - Select Display in Catalog.
   - In Catalog, select the catalog you created previously.
   - In Dialog, select the service dialog you created previously (in this example, ansible_tower_job). To ask the user to enter extra information when running the task, Service Dialog must be selected. A dialog is required if Display in Catalog is chosen.
   - In Provider, select your Ansible Tower provider. This brings up the Ansible Tower Template option and configures the Provisioning Entry Point State Machine automatically.
   - Add configuration information for Reconfigure Entry Point and Retirement Entry Point as applicable.
   - Select your desired Ansible Tower Template from the list. Generally, this is the Ansible Tower job or workflow template previously used to create the service dialog.

7. Click Add. The catalog item you created will appear in the All Service Catalog Items list.

5.4.6. Creating an Amazon Service Catalog Item

Use the following procedure to create an Amazon catalog item. Once created, the catalog item and service dialog combine with all of the options in the provisioning dialog. Users can then order Red Hat Enterprise Linux instances from the Service Catalog in the CloudForms Service user interface.
1. Navigate to Services → Catalogs, then click on the Catalog Items accordion.

2. Click (Configuration), then (Add a New Catalog Item).

3. Select Amazon from the Catalog Item Type list.

4. Enter the basic details in the Basic Info tab:
   a. Enter a Name and Description for the new service catalog item.
   b. Select Display in Catalog.
   c. Select the appropriate catalog from the Catalog list.
   d. Select the appropriate service dialog from the Dialog list.

5. Click the Request Info tab to enter request details:
   a. On the Catalog tab, select your Amazon AWS image name from the Name list, and the number of instances from the Count list. The VM Name will be overwritten during the provisioning process, but you can enter it as changeme for now.
   b. On the Properties tab, select T2 Micro from the Instance Type list, and Basic or Advanced for CloudWatch. If you plan to access the instance, select a Guest Access Key Pair, too.
   c. On the Customize tab, set the Root Password under Credentials, then select the Basic root pass template as a script for cloud-init under Customize Template.

6. Click Add.

5.4.7. Creating an Azure Service Catalog Item

Use the following procedure to create an Azure catalog item.

1. Navigate to Services → Catalogs, then click on the Catalog Items accordion.

2. Click (Configuration), then (Add a New Catalog Item).

3. Select Azure from the Catalog Item Type list.

4. Enter the basic details in the Basic Info tab:
   a. Enter a Name and Description for the new service catalog item.
   b. Select Display in Catalog.
   c. Select the appropriate catalog from the Catalog list.
   d. Select the appropriate service dialog from the Dialog list.

5. Click the Request Info tab to enter request details:
   a. On the Catalog tab, select your Azure image name from the Name list, and the number of instances from the Count list. The VM Name will be overwritten during the provisioning process, but you can enter it as changeme for now.
b. Select appropriate **Environment** settings that are known to work for your Azure environment.

c. On the **Customize** tab, set the **Username** and **Password** under **Credentials**, then select the appropriate script under **Customize Template**.

6. Click **Add**.

### 5.4.8. Creating an OpenShift Template Catalog Item

**NOTE**

Before adding a new catalog item for container template provisioning, create a service dialog from a container template. See **Section 5.2.2, “Creating a Service Dialog from a Container Template”** for details.

Complete the following procedure to create an OpenShift Template catalog item.

1. Navigate to **Services → Catalogs**, then click on the **Catalog Items** accordion.

2. Click **Configuration**, then **Add a New Catalog Item**.

3. Select **OpenShift Template** from the **Catalog Item Type** list.

4. Enter a **Name** and **Description** for the new service catalog item. Select **Display in Catalog**.

5. Select the appropriate catalog from the **Catalog** list.

6. From the **Dialog list**, select the service dialog you have created from a container template.

7. Select your provider from the **Provider** list.

8. Set the **Provisioning Entry Point**.

9. Click **Add**.

### 5.4.9. Creating an Orchestration Catalog Item

Use the following procedure to create an Orchestration catalog item.

1. Navigate to **Services → Catalogs** and select **Catalog Items** in the accordion menu.

2. Click **Configuration**, then **Add a New Catalog Item**. The **Adding a new Service Catalog Item** window is displayed.

3. Select **Orchestration** from the **Catalog Item Type** list.

4. Enter the basic details in the **Basic Info**:

   a. Enter a **Name** and **Description** for the new service catalog item.

   b. Select **Display in Catalog** box.

   c. Select the appropriate catalog from the **Catalog** list.
d. Select the appropriate dialog from the **Dialog** list.

e. Select the **Orchestration Template** from the list.

5. Click **Add**.

### 5.4.10. Provisioning a Service

1. Navigate to **Services → Catalogs**.

2. Click the **Service Catalogs** accordion, and select the service to provision.

3. Click **Order**.

The parameters are passed to the children based on the method tied to the choices made in the dialog.

### 5.5. ORCHESTRATION STACKS

Cloud orchestration is a service that allows you to create, update, and manage cloud resources and their software components as a single unit and then deploy them in an automated, repeatable way through a template. Templates use a human-readable syntax and can be defined in text files, thereby allowing users to check them into version control. Templates allow you to easily deploy and reconfigure infrastructure for applications within your cloud. A user can author the stack templates, or can upload them from other sources.

Red Hat CloudForms supports adding Amazon CloudFormation, OpenStack Heat, Microsoft Azure, VNF, and VMware vApp template type, and provides the ability to:

- Inventory stacks and elements of each type into the CloudForms VMDB.
- Model the relationships of instances to their stacks, inclusive of the user interface. For example, selecting an instance within a region that is within a stack, the user interface shows this on the standard instance view.
- Model the stack and its elements in the user interface.

**NOTE**

When importing a template into CloudForms, the selected elements are converted according to their type. For example, lists convert to list boxes, and single items convert to text boxes.

See [Service Provisioning in CloudForms Using an Orchestration Template](#) for an example about creating a service in CloudForms for provisioning virtual machine instances using an AWS CloudFormation orchestration template.

### 5.5.1. Creating an Orchestration Template

Complete the following procedure to add an orchestration template.

1. Navigate to **Services → Catalogs** and select **Orchestration Templates** in the accordion menu.

2. Click **Configuration**, then click **Create a new Orchestration Template**
3. Enter a **Name** and **Description** for your template.

4. Select the template type from the **Template Type** list. The default is Amazon CloudFormation.

5. Select **Draft** to create a draft template.

6. Add your template in the area below for the selected **Template Type**.

7. Click **Add**.

### 5.5.2. Editing Orchestration Templates

Complete the following procedure to edit orchestration templates.

1. Navigate to **Services → Catalogs** and select **Orchestration Templates** in the accordion menu.

2. Select the orchestration template you want to edit from the **All Orchestration Templates** list.

3. Click **Configuration**, then click **Edit this Orchestration Template**

4. Edit the template as needed.

   **NOTE**

   You can only edit the name and description of a read-only template as there can be stacks associated with the template.

5. Click **Save**.

### 5.5.3. Copying Orchestration Templates

Complete the following procedure to copy an orchestration template to create a new template.

1. Navigate to **Services → Catalogs** and select **Orchestration Templates** in the accordion menu.

2. Click **Configuration**, then click **Copy this Orchestration Template**

3. Change the **Description** and the actual content of the template as required. CloudForms automatically prefixes **Copy of** to the old template **Name**.

   **NOTE**

   To create a copy of an orchestration template into a new template, the old and new template content must differ.

4. Click **Add**.

### 5.5.4. Deleting Orchestration Templates

Complete the following procedure to delete orchestration templates.

1. Navigate to **Services → Catalogs** and select **Orchestration Templates** in the accordion menu.
2. Select the orchestration template you want to delete from the All Orchestration Templates list.

3. Click **Configuration**, then click **Remove this Orchestration Template from Inventory**.

4. Click **OK**.

**NOTE**

Read-only templates cannot be deleted.
CHAPTER 6. RETIREMENT

6.1. RETIRING VIRTUAL MACHINES

6.1.1. Retiring Virtual Machines and Instances

When a virtual machine or instance is no longer required, it can be retired. Once a virtual machine or instance reaches its retirement date, it is immediately shut down and not allowed to restart. If an attempt to restart is made, Red Hat CloudForms will shut down the virtual machine or instance.

There are three built-in policies involved with retirement:

- If the virtual machine or instance reaches its retirement date, it will be stopped even if it is running.
- If a retired virtual machine or instance is requested to start through Red Hat CloudForms, the virtual machine or instance will not be allowed to start.
- If a provider starts a retired virtual machine or instance outside of Red Hat CloudForms, the virtual machine or instance will be stopped.

Red Hat CloudForms provides a number of ways to retire a virtual machine or instance:

- By using the allocated buttons in the Red Hat CloudForms console.
- When creating a provision request, a retirement date can be set up.

6.1.2. Using the Console to Retire a Virtual Machine

Through the Red Hat CloudForms console, you can retire a virtual machine on a specific date or immediately.

6.1.3. Retiring a Virtual Machine Immediately

1. Navigate to **Compute → Infrastructure → Virtual Machines**.
2. Select the virtual machine or instance that you want to retire.
3. Click 🔄 (Lifecycle), then 🗑️ (Retire this VM/Instance).

The virtual machine or instance is immediately stopped, and will be shut down if an attempt is made to restart it.

6.1.4. Setting a Retirement Date and Time for a Virtual Machine or Instance

You can schedule virtual machine retirement by specifying a date and time, or by selecting a relative time a number of months, weeks, days or hours ahead of the present time.

1. Navigate to **Compute → Infrastructure → Virtual Machines**.
2. Select the virtual machine or instance that you want to set a retirement date for.
3. Click 🔄 (Lifecycle), then 🗓️ (Set Retirement Dates).
4. From **Enter Retirement Date** as select **Specific Date and Time** or **Time Delay from Now** to schedule retirement.
   
   a. To choose a **Specific Date and Time**, click the **Retirement Date and Time** field to open the calendar.
      
      i. Select a retirement date using the calendar control.
      
      ii. Click 🕒 then select a retirement time (in UTC) using the arrows.
   
   b. To retire the virtual machine using a relative time, select **Time Delay from Now**.
      
      i. From **Time Delay**, specify a retirement time any number of months, weeks, days, or hours in the future using the arrows.
   
5. Select a **Retirement Warning** if desired.

6. Click **Save**.

The scheduled retirement date and time display in the virtual machine summary screen.

6.1.5. Removing a Retirement Date for a Virtual Machine or Instance

1. Navigate to **Compute → Infrastructure → Virtual Machines**.

2. Select the virtual machine or instance that you want to remove the retirement date from.

3. Click 🔄 (Lifecycle), then click 🕒 (Set Retirement Date).

4. Click ✗ to remove the retirement date.

6.2. SETTING RETIREMENT IN A PROVISION REQUEST

If you are using Red Hat CloudForms to provision, you can set when you want retirement in the provision request. To see how to create a request, see *Chapter 2, Provisioning Requests*. A warning email will be sent to the owner before the retirement.

6.2.1. Scheduling Retirement in a Provision Request

When provisioning a cloud instance or virtual machine, a multi-tabbed screen appears where you can set up your provision requests.

1. Click the **Schedule** tab to set when to provision your request and the lifespan of the virtual machine or instance.

2. In **Lifespan**, you can choose to power on the virtual machines or instances after creation and set the **Time until Retirement**. If you select the time until retirement, you will select **Retirement Warning** accordingly.

3. Click **Submit**.
6.3. EXTENDING RETIREMENT DATES

Red Hat CloudForms Automate includes a method to extend the retirement of a virtual machine or instance by 14 days. This section describes how to create a button that invokes this method and how to edit the method to change the number of days.

6.3.1. Creating a Custom Button to Extend Retirement

1. Navigate to Automate → Customization.

2. Click the Buttons accordion.

3. From the Object Types tree, select VM and Instance.

4. Navigate to the button group to which you want to add this button. (If you do not have a button group, add one and then create the button.)

5. Click (Configuration), then (Add a new Button).

6. Type in a button text and button hover text, and select the image you want to use.

7. In Object Details, select Request from the /System/Process/ dropdown. By default, the message is create. Do not change it.

8. In Request, type vm_retire_extend.

9. Click Add.

6.3.2. Changing the Number of Days to Extend Retirement

1. Navigate to Automate → Explorer.

2. Click DOMAIN → Cloud → VM → Retirement → Email → vm_retire_extend.
NOTE

DOMAIN must be a user-defined Domain and not the locked ManageIQ Domain. If necessary, you can copy the class from the ManageIQ domain into a custom domain.

This example uses the Cloud Namespace, but you can also use the Infrastructure namespace.

3. Click (Configuration), then (Edit this Instance).

4. In the Value field, change the `vm_retire_extend_days` attribute to the new value.

5. Click Save.