



# **Red Hat CloudForms 4.6**

## **Managing Infrastructure and Inventory**

Viewing and collecting information from your clusters, hosts, virtual machines, and other resources



# Red Hat CloudForms 4.6 Managing Infrastructure and Inventory

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Viewing and collecting information from your clusters, hosts, virtual machines, and other resources

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## Abstract

This guide covers viewing and collecting information from your clusters, hosts, virtual machines, resource pools, datastores, and repositories 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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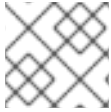


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# CHAPTER 1. CLUSTERS

Clusters provide high availability and load balancing for a group of hosts. The **Clusters** page under **Compute** → **Infrastructure** displays the clusters discovered in your enterprise environment.



## NOTE



Any filter applied will be in effect here.



Use the **Clusters Taskbar** to manage the analysis and tagging of your clusters. These buttons manage multiple clusters at one time. To manage one cluster, click on that cluster in the main area of the screen.

## 1.1. PERFORMING SMARTSTATE ANALYSIS ON CLUSTERS



Analyze a cluster to gather historical data to compare with previous points in time.


1. Navigate to **Compute** → **Infrastructure** → **Clusters**.
2. Check the clusters to analyze.
3. Click  (**Configuration**), and then  (**Perform SmartState Analysis**).
4. Click **OK**.









The SmartState Analysis begins and returns the current data.

## 1.2. COMPARING CLUSTERS

Red Hat CloudForms provides features to compare properties of clusters.

1. Navigate to **Compute** → **Infrastructure** → **Clusters**.
2. Check the clusters to compare.
3. Click  (**Configuration**), and then  (**Compare Selected items**). The comparison displays in a default expanded view and lists a limited set of properties.

|                    | Test Chicag... (base)   | ESX 3X  |
|--------------------|---|---|
|                    |  |  |
| Total Matches      | % Matched:  |  |
| + Ems Cluster (15) | % Matched:  |  |





4. To delete a cluster from the comparison, click  (**Remove this Cluster from the Comparison**).
5. To go to a compressed view, click  (**Compressed View**). To return to an expanded view, click  (**Expanded View**).
6. To change the base cluster that all other clusters compare to, click its label at the top of its column.
7. To go to the cluster summary screen, click its virtual thumbnail or icon.
8. There are three buttons in the taskbar to limit the type of views:
  - Click  (**All attributes**) to see all attributes.
  - Click  (**Attributes with different values**) to see only the attributes that are different across clusters.
  - Click  (**Attributes with the same values**) to see only the attributes that are the same across clusters.
9. To limit the mode of the view, there are two taskbar buttons.
  - Click  (**Details Mode**) to see all details for an attribute.
  - Click  (**Exists Mode**) to only see if an attribute exists compared to the base or not. This only applies to attributes that can have a Boolean property. For example, a user account exists or does not exist, or a piece of hardware that does or does not exist.

This creates a comparison between clusters. Export this data or create a report from your comparison for analysis using external tools.

### 1.2.1. Creating a Cluster Comparison Report

Create a quick report of to compare clusters in CSV, TXT, or PDF formats.

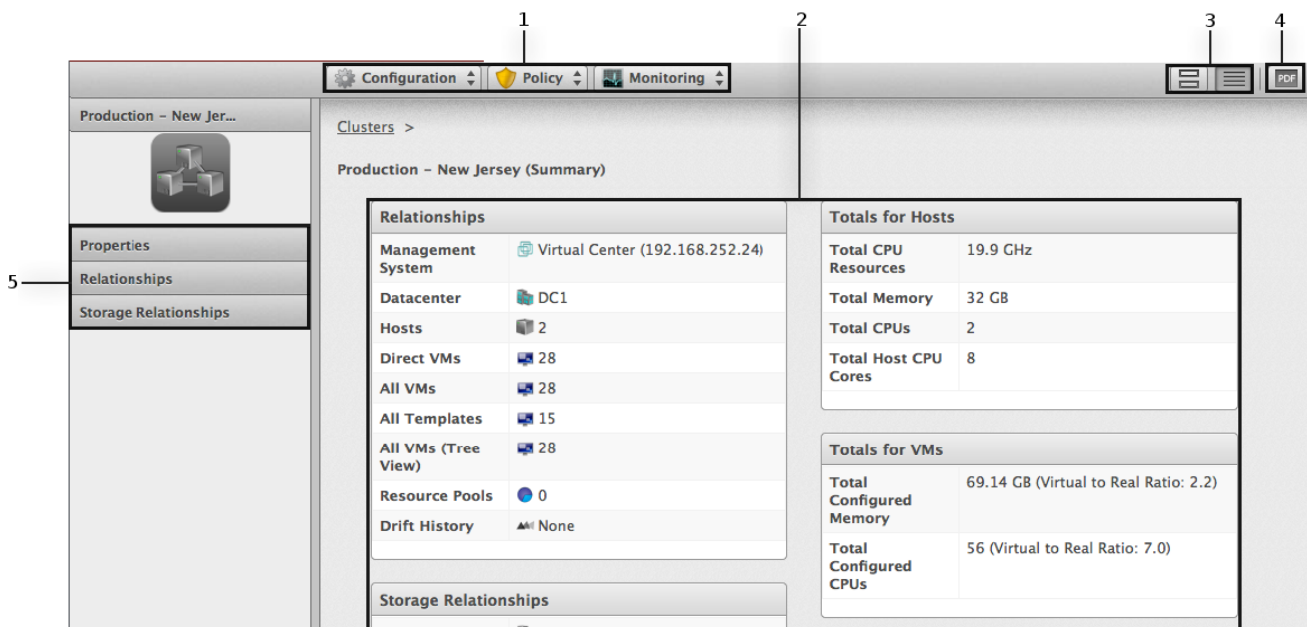
1. Create the comparison to analyze.

2. Click  (**Download**).
3. Click the output button for the type of report.
  - Click  (**Download comparison report in TXT format**) for a text file.
  - Click  (**Download comparison report in CSV format**) for a comma-separated file.
  - Click  (**Download comparison report in PDF format**) for a PDF file.

### 1.3. VIEWING A CLUSTER

You can click on a specific cluster to view its details. The screen provides you with a cluster taskbar, a cluster accordion, and a cluster summary.

#### Cluster Management Screen





1. **Cluster Taskbar:** Choose between **Configuration**, **Policy** and **Monitoring** options for the selected cluster
2. **Cluster Summary:** See cluster summary such as **Relationships**, **Totals for Hosts**, **Totals for VMs**
3. **Cluster Summary Views:** Choose between graphical or text view of the cluster summary
4. **Cluster Summary PDF:** Generates cluster summary in PDF format
5. **Cluster Accordion:** See details about **Properties**, **Relationships**, **Storage Relationships** for the selected cluster



### 1.4. TAGGING CLUSTERS

Use tags to categorize clusters.

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

2. Check the Clusters to tag.

3. Click  (**Policy**), and then  (**Edit Tags**).



| Select a customer tag to assign: Environment * <Select a value to assign>         |               |                   |
|---|---------------|-------------------|
|   | Category      | Assigned Value    |
|  | Cost Center * | Cost Center 001   |
|  | Environment * | Quality Assurance |

\* Only a single value can be assigned from these categories

4. Select a customer tag from the first dropdown, and then a value for the tag.
5. Select more tags or click **Save** to save your changes.

## 1.5. VIEWING CAPACITY AND UTILIZATION CHARTS FOR A CLUSTER

View capacity and utilization for a cluster.

1. Navigate to **Compute** → **Infrastructure** → **Clusters**.
2. Click the cluster to view Capacity and Utilization data.
3. Click  (**Monitoring**), and then  (**Utilization**) or from the accordion menu, click **Properties** → **Capacity & Utilization**.

Options

Interval

Daily

Date

3/12/2013

Show

1 Week

back

Group by

<None>

Time Zone

(GMT+00:00) UTC

\* Daily charts only include days for which all 24 hours of data has been collected.

4. From **Interval**, select to view hourly or daily data points and the dates to view data. Use **Group by** to group the lines by SmartTags. Use **Time Profiles** to select a time range for the data.



The **Capacity & Utilization** charts display





## NOTE

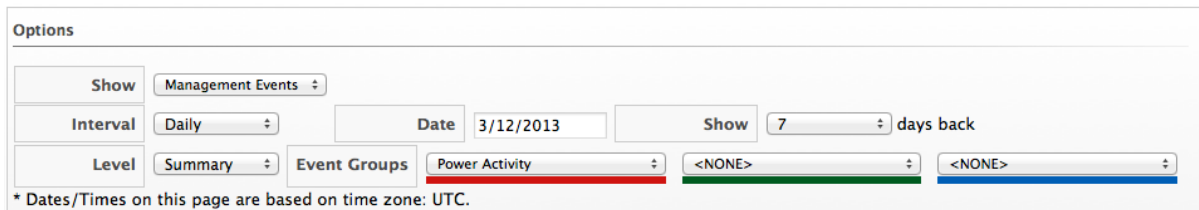
Daily charts only include full days of data. If a day does not include all the 24 data points for a day, the data does not show for that day.

For information about data optimization including utilization trend reports, see [Chapter 6, Data Optimization](#).

## 1.6. VIEWING CLUSTER TIMELINE

Use the cluster timeline to see a graphical depiction of operational and configuration events over time.

1. Navigate to **Compute** → **Infrastructure** → **Clusters**.
2. Click the cluster to view the timeline.
3. Click  (**Monitoring**), and then  (**Timelines**) or from the accordion menu, click **Properties** → **Timelines**.
4. From **Options**, customize the period of time to display, and the types of events to see.



Options

Show Management Events

Interval Daily Date 3/12/2013 Show 7 days back

Level Summary Event Groups Power Activity <NONE> <NONE>

\* Dates/Times on this page are based on time zone: UTC.

- Use the **Interval** dropdown to select hourly or daily data points.
  - Use **Date** to type the date for the timeline to display.
  - If you select to view a daily timeline, use **Show** to set how many days back to go. The maximum history is 31 days.
  - The three **Event Group** dropdowns allow the selection of different groups of events to display. Each has its own color.
  - From the **Level** dropdown, select a **Summary** event if needed, or a **Detail** list of events. For example, the detail level of a Power On event might include the power on request, the starting event, and the actual **Power On** event. If you select **Summary**, the timeline only displays the Power On event.
5. To see more detail on an item in the timeline, click on it. A balloon appears with a clickable link to the resource.

## 1.7. DETECTING DRIFT ON CLUSTERS

Over time, a cluster's configuration might change. Drift is the comparison of a cluster to itself at different points in time. The cluster requires analysis at least twice to collect information. Detecting drift provides users with the following benefits:

- See the difference between the last known state of a cluster and its current state

- Review the configuration changes that happen to a particular cluster between multiple points in time.
- Capture the configuration drifts for a single cluster across a time period.

Detect drift on clusters:


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

2. Click on the cluster to view drift.

3. Click **Relationships** in the cluster accordion.

4. Click **Drift History**.


5. Check the analyses to compare.


6. Click  (**Drift Analysis**) at the top of the screen. The results are displayed.


7. Check the **Comparison** sections on the left to view in your comparison.

8. Click the plus sign next to the section name to expand it.

- An item displayed on red text shows a change from the base analysis. An item displayed in black text shows no change from the base analysis.

- A  (**Changed from previous**) shows there has been a change since the last analysis.


- A  (**Same as previous**) means there has been no change since the last analysis.


- Click  (**Remove from drift**) at the bottom of a column to remove a specific analysis. The drift is then recalculated and the new results display.


9. Click  (**Expanded View**) to see the expanded view. Click  (**Compressed View**) to compress the information.

10. Click the minus sign next to the section name to collapse it.

11. To limit the type of views, there are three buttons in the taskbar.

- Click  (**All attributes**) to see all attributes of the sections selected.

- Click  (**Attributes with different values**) to see only the attributes different across drifts.





- Click  (**Attributes with the same values**) to see only the attributes the same across drifts.

The drift displays for your cluster. Download the data or create a report from the drift for analysis using external tools.





## 1.8. CREATING A DRIFT REPORT FOR CLUSTERS

Use the drift report feature to export information about your cluster's drift.

1. Create a drift of a cluster.
2. Click  (**Download**).
3. Click the output button for the type of report you want.
  - Click  (**Download drift report in TXT format**) for a text file.
  - Click  (**Download drift report in CSV format**) for a comma-separated file.
  - Click  (**Download drift report in PDF format**) for a PDF file.

## 1.9. REMOVING CLUSTERS

If a cluster has been decommissioned or requires troubleshooting, it might require removal from the VMDB.

1. Navigate to **Compute** → **Infrastructure** → **Clusters**.
2. Check the clusters to remove.
3. Click  (**Configuration**), and then  (**Remove Clusters from the VMDB**).
4. Click **OK**.

The clusters are deleted. Any virtual machines or hosts associated with these clusters remain, but are no longer associated with them.

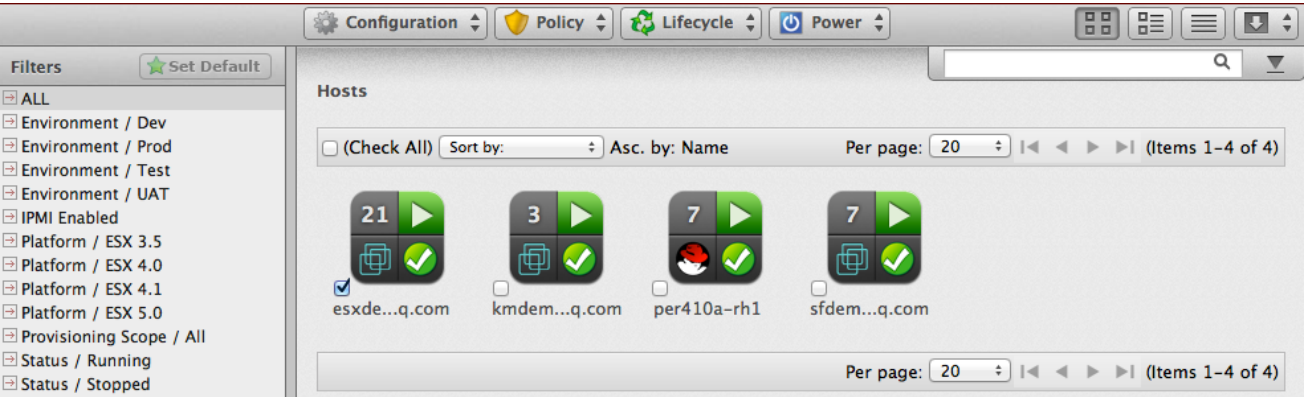
# CHAPTER 2. HOSTS

The **Hosts** page under **Compute** → **Infrastructure** displays the hosts discovered in your enterprise environment.



**NOTE**

Any applied filters will be in effect here.



After adding or sorting your hosts, click on one to examine it more closely and see its virtual machines, SmartProxy settings, and properties.



- 1. Top left quadrant: Number of virtual machines on this host
- 2. Bottom left quadrant: Virtual machine software
- 3. Top right quadrant: Power state of host
- 4. Bottom right quadrant: Authentication status

| Icon | Description  |
|------|--|
|      | Validated: Valid authentication credentials have been added.                   |
|      | Invalid: Authentication credentials are invalid                                |
|      | Unknown: Authentication status is unknown or no credentials have been entered. |

## 2.1. FILTERING HOSTS

The Host Filter accordion is provided to easily navigate through the hosts. Use the ones provided or create your own. In addition, you can set a default filter.

### 2.1.1. Setting a Default Host Filter


Set the default filter for viewing your hosts.

1. From the **Filters** accordion on the left, click on the filter to use.
2. Click **Set Default** at the top of the filters list.

The default filter is set and marked by a green star next to its name.

### 2.1.2. Creating a Host Filter

Create a filter for viewing your hosts.

1. Navigate to **Compute** → **Infrastructure** → **Hosts**.
2. Click  (**Advanced Search**) to open the expression editor.
3. Use the expression editor to choose the appropriate options for your criteria.
4. Click **Save**.
5. Type in a name for the search expression in **Save this search as**.



#### NOTE

This title depends on the type of resource you are searching.

6. Click **Save**.

The filter is saved and displays in the **My Filters** area of the **Filter** accordion.

## 2.2. PERFORMING SMARTSTATE ANALYSIS ON HOSTS



Perform a SmartState analysis on a host to collect additional information about it, such as patches, CPU, and memory.



#### NOTE








- For ESX or ESXi hypervisors, consider the following: ESX hosts utilize a service console for host management and can be accessed using SSH. ESXi hosts lack a service console and therefore SSH cannot be used to obtain information sets for patches, services, Linux packages, user groups, SSH Config, and FS Files.
- **root** or administrator credentials are required to get patch information.

1. Navigate to **Compute** → **Infrastructure** → **Hosts**.
2. Check the hosts to analyze.

3. Click  (**Configuration**), and then  (**Perform SmartState Analysis**).
4. Click **OK**.

## 2.3. COMPARING HOSTS

Red Hat CloudForms allows you to compare hosts and check operating systems, host software and version information, and hardware.

1. Navigate to **Compute** → **Infrastructure** → **Hosts**.
2. Check the hosts to compare.
3. Click  (**Configuration**), and then  (**Compare selected Hosts**). The comparison displays in a default expanded view, which lists a limited set of properties.
4. To remove a host from the comparison, click  (**Remove this Host from the comparison**) at the bottom of the column.
5. To go to a compressed view, click  (**Compressed View**). To return to an expanded view, click  (**Expanded View**).
6. To limit the mode of the view, there are two buttons in the taskbar.
  - Click  (**Details Mode**) to see all details for an attribute.
  - Click  (**Exists Mode**) to limit the view to if an attribute exists compared to the base or not. This only applies to attributes that can have a Boolean property. For example, a user account exists or does not exist, or a piece of hardware that does or does not exist.
7. To change the base host that compare to the other hosts, click its label at the top of its column.
8. To go to the summary screen for a host, click its virtual thumbnail or icon.





### 2.3.1. Host Comparison Sections

| Section         | Description   |
|-----------------|---|
| Host Properties | Use this section to see basic information of the host, such as hostname, product, build number, hardware, and network adapters. |
| Security        | Use this to see users and groups for the host, and firewall rules.  |
| Configuration   | Use this to see the operating system, applications, services, patches, vSwitches, vLANS, and advanced settings.                 |

| Section         | Description               |
|-----------------|---------------------------|
| My Company Tags | Use this to see all tags. |

### 2.3.2. Using the Host Comparison Sections





The following procedure describes how to use the host comparison sections.

1. On the left of a comparison screen, select the categories of properties to display.
2. Click the plus sign next to the sections name to expand it.
3. The following descriptions pertain to the **Expanded View** . Either the value of a property or an icon representing the property displays depending on the properties type.
  - A property displayed in the same color as the base means that the compared host matches the base for that property.
  - A property displayed in a different color from the base means that the compared host does not match the base for that property.
4. If you are in the **Compressed View** , the values of the properties do not display. All items are described by the icons shown below.
  - A  (**checkmark**) means the compared host matches the base for that property. Hover over it and the value of the property displays.
  - A  (**x**) means the compared host does not match the base for that property. Hover over it and the value of the property displays.
5. Click the plus sign next to the section name to collapse it.

This comparison is viewable in multiple ways. Export the data or create a report from your comparison for analysis using external tools.



### 2.3.3. Creating a Host Comparison Report

Create a quick report to compare clusters in CSV, TXT, or PDF formats.

1. Create the comparison to analyze.
2. Click  (**Download**).
3. Click the output button for the type of report.
  - Click  (**Download comparison report in TXT format**) for a text file.
  - Click  (**Download comparison report in CSV format**) for a comma-separated file.
  - Click  (**Download comparison report in PDF format**) for a PDF file.

## 2.4. REFRESHING MULTIPLE HOSTS



Manually refresh a host for its properties and related infrastructure components.

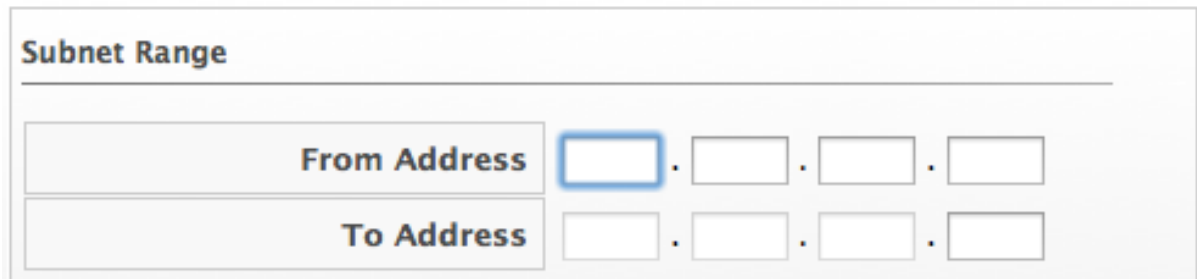
1. Navigate to **Compute** → **Infrastructure** → **Hosts**.
2. Check the hosts to refresh.
3. Click  (**Configuration**), and then  (**Refresh Relationships and Power States**).
4. Click **OK**.

When a host is refreshed and a new virtual machine is discovered on that host, Red Hat CloudForms checks to see if the virtual machine is already registered with another host. If this is the case, the host that the virtual machine is associated with switches to the new host. If the SmartProxy is monitoring a provider, this happens automatically. If not, the next refresh of the host addresses this.

## 2.5. DISCOVERING MULTIPLE HOSTS

If not using a provider, use Red Hat CloudForms's Discovery to find hosts in your environment within a range of IP addresses.

1. Navigate to **Compute** → **Infrastructure** → **Hosts**.
2. Click  (**Configuration**), then click  (**Discover items**).
3. Check the types of hosts to discover: **ESX** or **IPMI**.
4. Type in a range of **IP Addresses**.





5. Click **Start**.

Red Hat CloudForms searches for the supported hosts. When available, the new hosts display. They are named by hostname and IP address. To make them identifiable, edit the basic information for each host.

## 2.6. ADDING A SINGLE HOST

To analyze a host for more detailed information, add it to the VMDB first. If the host has not been found during **Host Discovery** or **Provider Refresh**, and the host's IP address is known, use the **Add a New Host** button.

1. Navigate to **Compute** → **Infrastructure** → **Hosts**.
2. Click  (**Configuration**), then click  (**Add a New item**).

3. Type the **Name**, **Host Name**, and **IP Address** of the host to add. **Name** is how the device is labeled in the console. Select the type of operating system from the **Host Platform** dropdown. If the Host has been found during **Discovery** or **Refresh** and the host's operating system has been identified, the **Host Platform** selector remains disabled. If adding an IPMI server for provisioning, add in the IP address of that host.



### IMPORTANT

The **Host Name** must use a unique fully qualified domain name.

| Basic Information        |                      |
|--------------------------|----------------------|
| <b>Name</b>              | <input type="text"/> |
| <b>Host Name</b>         | <input type="text"/> |
| <b>IP Address</b>        | <input type="text"/> |
| <b>Custom Identifier</b> | <input type="text"/> |
| <b>Host Platform</b>     | <not specified> ▾    |
| <b>IPMI IP Address</b>   | <input type="text"/> |
| <b>MAC Address</b>       | <input type="text"/> |



4. In the **Credentials** box, the **Default** tab provides fields to type a user name with elevated security credentials and the user's password. If using domain credentials, the format for **User ID** is in the format of `[domainname]\[username]`. On ESX hosts, if the **SSH** login is disabled for the **Default** user, type in a user with remote login access on the **Remote Login** tab.

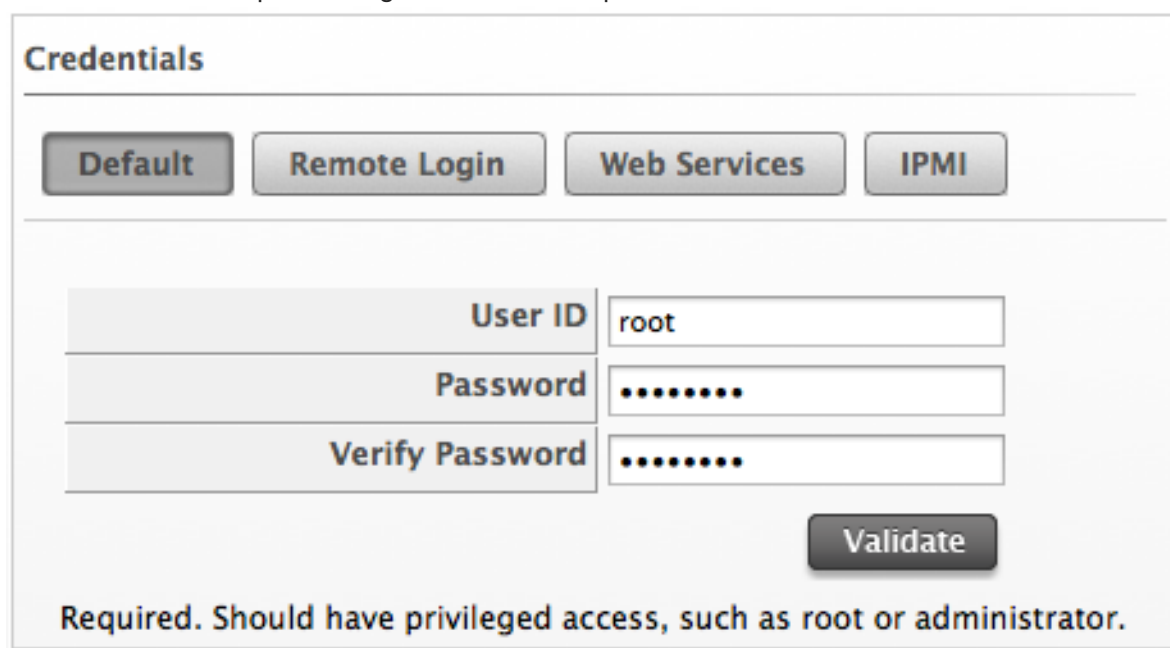
| Credentials   |  |
|---|--|
| <div> <div>Default</div> <div>Remote Login</div> <div>Web Services</div> <div>IPMI</div> </div> |  |
| <b>User ID</b>  | <input type="text" value="root"/>      |
| <b>Password</b>   | <input type="password" value="....."/> |
| <b>Verify Password</b>  | <input type="password" value="....."/> |
| <div>Validate</div>   |  |
| <p><b>Required. Should have privileged access, such as root or administrator.</b></p>           |  |

5. Click **Validate** to check the credentials.
6. Click **Save**.

## 2.7. EDITING HOSTS

If multiple hosts have the same settings or credentials, edit them at the same time.

1. Navigate to **Compute** → **Infrastructure** → **Hosts**.
2. Click  (**Configuration**).
3. Check the Hosts to edit.
4. Click  (**Edit Selected items**).
5. Use **Credentials** to provide login credentials required for this host.



- On the **Default** tab, type a user name with elevated security credentials and the users password. If you are using domain credentials, the format for User ID must be in the format of `[domainname]\[username]`.
- On **ESX** hosts, if **SSH** login is disabled for the **Default** user, type in a user with remote login access on the **Remote Login** tab. If this is not supplied, Default credentials will be used.
- Use **Web Services** to supply credentials for any web service calls made directly to the host system. If this is not supplied, **Default** credentials are used.



### NOTE

Login credentials are required for performing SmartState Analysis on the host's virtual machines and templates.

For each type of credential used, the following information is required:

- Use **User ID** to specify a login ID.
- Use **Password** to specify the password for the User ID.
- Use **Verify Password** to confirm the password.

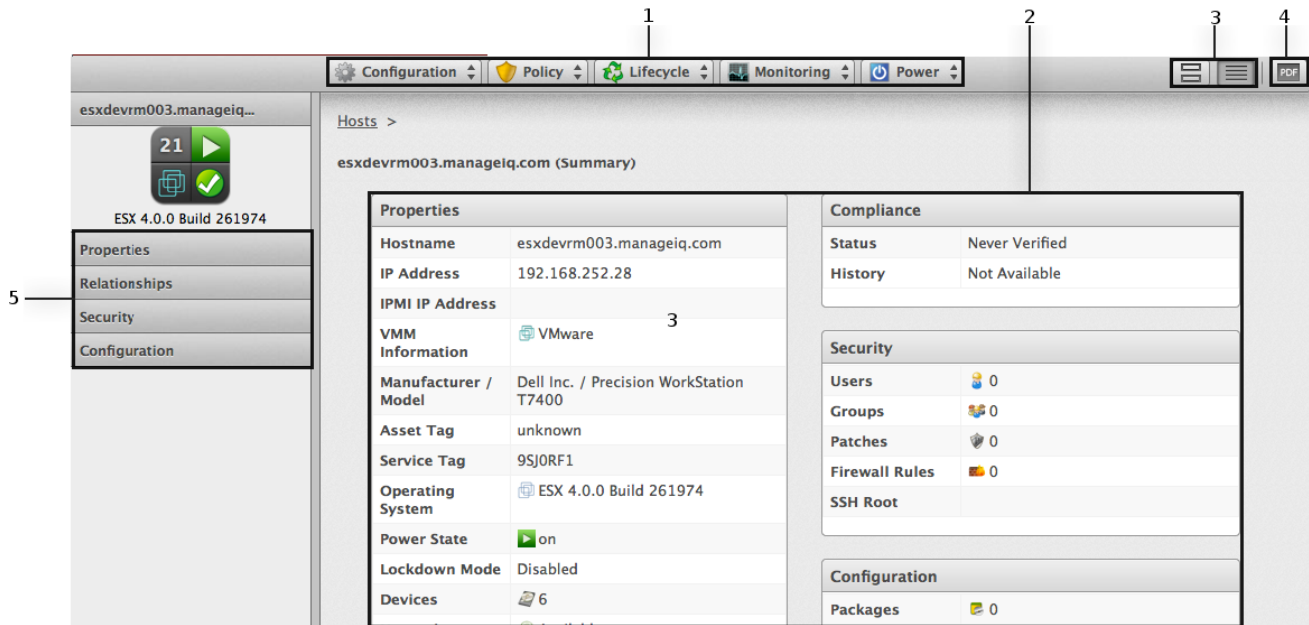


6. Test the credentials by using the Select Host to validate against drop down and click **Validate**.
7. Click **Save**.

## 2.8. VIEWING A HOST

You can click on a specific host to review it. The screen shows a host virtual thumbnail, a host taskbar, a host accordion, and a host summary.

### Host Management Screen





1. **Host Taskbar:** Use the host taskbar to take actions on the selected host
2. **Host Summary:** Use the host summary to see the properties of a host, drill down to a host's information, and view its installed virtual machines
3. **Host Summary Views:** Choose between graphical or text view of the provider summary
4. **Host PDF:** Generates host summary in PDF format
5. **Host Accordion:** See details about **Properties**, **Relationships**, **Security** and **Configuration** for the selected host

## 2.9. TAGGING MULTIPLE HOSTS

To categorize hosts together, apply tags to multiple hosts at the same time.

1. Navigate to **Compute** → **Infrastructure** → **Hosts**.
2. Check the hosts 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.



| Select a customer tag to assign: Environment * <Select a value to assign>         |               |                   |
|---|---------------|-------------------|
|   | Category      | Assigned Value    |
|  | Cost Center * | Cost Center 001   |
|  | Environment * | Quality Assurance |

\* Only a single value can be assigned from these categories

5. Select more tags or click **Save** to save your changes.

## 2.10. REMOVING HOSTS

If a host is decommissioned or requires troubleshooting, it might require removal from the VMDB.

1. Navigate to **Compute** → **Infrastructure** → **Hosts**.
2. Check the hosts to remove.
3. Click  (**Configuration**), and then  (**Remove items from the VMDB**).
4. Click **OK**.



The hosts are removed. The virtual machines remain in the VMDB, but are no longer associated with their respective hosts.

## 2.11. SCALING DOWN COMPUTE HOSTS

Through Red Hat CloudForms, you can perform a *Compute scale down* on a Red Hat OpenStack infrastructure provider. This process involves decreasing its Compute nodes used by an OpenStack infrastructure provider. Doing so involves putting a Compute node into *maintenance mode* and removing it from the provider afterwards. Once a node is in maintenance mode, it can be repurposed (for example, re-provision it as a Controller node), repaired, or decommissioned altogether.

Before scaling down, evacuate or migrate any instances hosted on the node you are removing. For instructions on either procedure, see [Section 13.20, “Migrating a Live Instance”](#) or [Section 13.21, “Evacuating an Instance”](#).

After migrating or evacuating instances from the node, set the node to maintenance mode. To do so:

1. Navigate to **Compute** → **Infrastructure** → **Hosts**.
2. Click the OpenStack compute node to be removed from the provider.
3. Click  (**Configuration**), and then  (**Toggle Maintenance Mode**).





### NOTE

This option can only be used with OpenStack providers with at least two Compute nodes.

Repeat this procedure for every node you want to remove from the cloud provider.

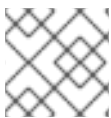
After setting a Compute node to maintenance mode, you can scale down its provider:

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

2. Click the provider to be scaled down.
3. Click  (**Configuration**), and then  (**Scale Down**).
4. From the **Scale Infrastructure Provider Down** section, check the nodes to be removed from the provider. You can only do this for nodes where **Maintenance** is set to **true**.
5. Click **Scale Down**.



## 2.12. REFRESHING RELATIONSHIPS AND POWER STATES FOR A HOST

Refresh the relationships and power states of the items associated with your hosts from the Host Taskbar.



### NOTE

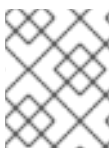
**root** or administrator credentials are required to get patch information.

1. Navigate to **Compute** → **Infrastructure** → **Hosts**.
2. Click on the host to refresh.
3. Click  (**Configuration**), and then  (**Refresh Relationships and Power States**) on the Host Taskbar.

Red Hat CloudForms determines the state (running, stopped, or paused) of all virtual machines registered to the host.



## 2.13. VIEWING CAPACITY AND UTILIZATION CHARTS FOR A HOST

View Capacity & Utilization data for hosts that are part of a cluster.



### NOTE

Your Red Hat CloudForms server requires network visibility to the provider assigned the **Server Role** of **Capacity & Utilization Collector** to enable this feature.

1. Navigate to **Compute** → **Infrastructure** → **Hosts**.
2. Click the Host to view capacity data.
3. Click  (**Monitoring**), and then  (**Utilization**) or from the Host accordion, click **Properties** → **Capacity & Utilization**.
4. From **Interval**, select to view hourly or daily data points and the dates to view data. Use **Group by** to group the lines by SmartTags. Use **Time Profiles** to select a time range for the data.

**Options**

Interval:  Date:  Show:  back

Group by:

Time Zone:

\* Daily charts only include days for which all 24 hours of data has been collected.



The charts are displayed for CPU, memory, disk, network, and running virtual machines.





## NOTE

Daily charts only include full days of data. If a day does not include all the 24 data points for a day, the data does not show for that day.

For information about data optimization including utilization trend reports, see [Chapter 6, Data Optimization](#).

## 2.14. VIEWING THE HOST TIMELINE

View the timeline of events for the virtual machines registered to a host.

1. Navigate to **Compute** → **Infrastructure** → **Hosts**.
2. Click the host to view the timeline.
3. Click  (**Monitoring**), and then  (**Timelines**) or from the host accordion, click **Properties** → **Timelines**.
4. From **Options**, customize the period of time to display and the types of events to see.
  - Use **Show** to select types of events to show on the timeline.
  - Use the **Interval** dropdown to select hourly or daily data points.

- Use **Date** to type the date the timeline displays.
  - If you select to view a daily timeline, use **Show** to set how many days back to go. The maximum history is 31 days. If selecting **Hourly**, select the interval to see.
  - From the **Level** dropdown, select either a **Summary** event or a **Detail** list of events. For example, the detail level of a **Power On** event might include the power on request, the starting event, and the actual **Power On** event. If you select **Summary**, only the Power On event appears in the timeline.
  - The three **Event Group** dropdowns allow selection of different groups of events to display. Each group has its own color.
5. To see more detail on an item in the timeline, click on it. A balloon appears with a clickable link to the resource.







## 2.15. HOST VIRTUAL SUMMARY

Clicking on a specific host shows the Host's Virtual Thumbnail and an **operating system-sensitive** screen of host information, called the Host Summary. Where applicable, click on a subcategory of the Host Summary to see more detail on that section.








A **Refresh** provides some basic information on the Host. To get more detail, enter credentials for the host and perform a SmartState Analysis.

The Summary divides into the following categories.

- **Properties** include information such as base operating system, hostname, IP addresses, devices attached to the system, and storage adapters. Some categories can be clicked on for additional detail. For example, click **Network** to view the network adapters connected to the host.

| Properties             |   |
|------------------------|---|
| Hostname               | per410a-t5.manageiq.com   |
| IP Address             | 192.168.252.4   |
| IPMI IP Address        |   |
| VMM Information        |  VMware                  |
| Manufacturer / Model   | Dell Inc. / PowerEdge R410  |
| Asset Tag              | unknown   |
| Service Tag            | BBR8TK1   |
| Operating System       |  ESXi 4.0.0 Build 504850 |
| Power State            |  on                      |
| Lockdown Mode          | Disabled  |
| Devices                |  6                       |
| Network                |  Available               |
| Storage Adapters       |  5                       |
| Number of CPUs         | 2   |
| Number of CPU Cores    | 8   |
| CPU Cores Per Socket   | 4   |
| Memory                 | 40 GB   |
| Management Engine GUID | a55d2e44-8828-11e2-9abc-005056af00b4  |

- **Relationships** include information on the provider, cluster, datastores, resource pools, and installed virtual machines.

| Relationships     |   |
|-------------------|---|
| Management System |  Virtual Center (192.168.252.14) |
| Cluster           |  None                            |
| Datastores        |  13                              |
| Resource Pools    |  0                               |
| VMs               |  80                              |
| VM Templates      |  7                               |
| Drift History     |  2                               |

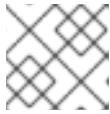
- **Security** shows the number of users, groups, patches installed, and firewall rules on the host. Click on any of these items to see further details.



#### NOTE





Run a SmartState Analysis on the host to retrieve this information.

- **Storage Relationships** shows the relationship the host has to LUNs, volumes, and file shares. The **Storage Inventory Role** must be enabled in the zone for these items to be populated.
- **Configuration** shows the number of packages and services installed. Click on any of these items to see more details.



### NOTE

Run a SmartState Analysis on the host to retrieve this information.

| Configuration     |   |
|-------------------|---|
| Packages          |  364 |
| Services          |  48  |
| Files             |  117 |
| Advanced Settings |  698 |

- **Smart Management** shows all tags assigned to this host.
- **Authentication Status** shows all the types of credentials entered for this host and the whether those credentials are valid.

## 2.16. VIEWING HOST DEVICE INFORMATION

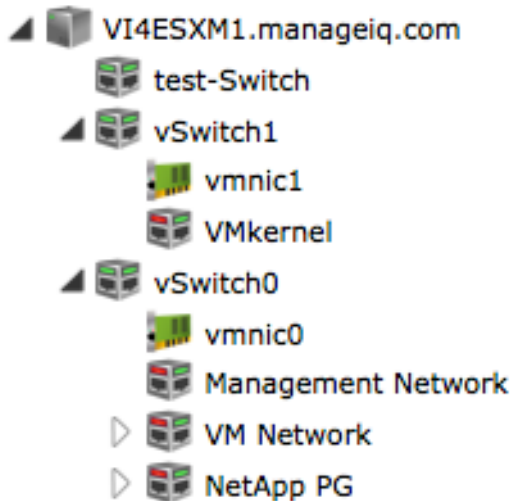
Access information on the hardware devices including processor, CPU type and speed, and memory for each host.

1. Navigate to **Compute** → **Infrastructure** → **Hosts**.
2. Click the host to view the network information.
3. From the host accordion, click **Properties** → **Devices**.

## 2.17. VIEWING HOST NETWORK INFORMATION

Access information on networking including switches, network interfaces, and local area networks for each host.

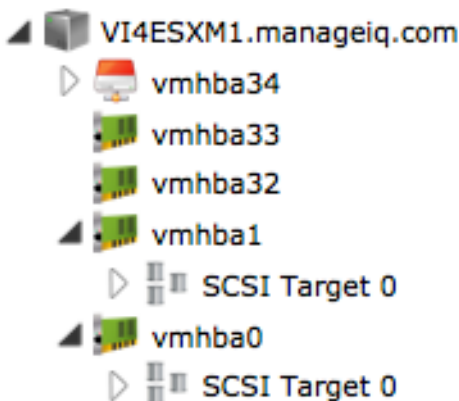
1. Navigate to **Compute** → **Infrastructure** → **Hosts**.
2. Click the host to view the network information.
3. From the host accordion, click **Properties** → **Network**.



## 2.18. VIEWING STORAGE ADAPTERS

Access information on the storage adapters including storage type for each host.

1. Navigate to **Compute** → **Infrastructure** → **Hosts**.
2. Click the host to view the network information.
3. From the host accordion, click **Properties** → **Storage Adapters**.



## 2.19. DETECTING DRIFT ON HOSTS

Over time, the configuration of a host might change. Drift is the comparison of a host to itself at different points in time. The host requires analysis at least twice to collect information. Detecting drift provides you the following benefits:

- See the difference between the last known state of a host and its current state.
- Review the configuration changes that happen to a particular host between multiple points in time.
- Capture the configuration drifts for a single host across a time period.

Detect drift on hosts:

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



2. Click on the host to view drift.
3. Click **Relationships** in the host accordion.
4. Click **Drift History**.
5. Check the analyses to compare.







6. Click **(Drift)** at the top of the screen. The results display.

7. Check the **Comparison** sections on the left to view in your comparison.

8. Click **Apply**.




9. Click the plus sign next to the sections name to expand it.

- An item displayed on red text shows a change from the base analysis. An item displayed in black text shows no change from the base analysis.
- A  **(Changed from previous)** shows a change since the last analysis.
- A  **(Same as previous)** means no change since the last analysis.
- Click  **(Remove from drift)** at the bottom of a column to remove a specific analysis. The drift recalculates and the new results display.

10. Click  **(Expanded View)** to see the expanded view. Click  **(Compressed View)** to compress the information.

11. Click the minus sign next to the sections name to collapse it.

12. To limit the type of views, you have three buttons in the taskbar:





- Click  **(All attributes)** to see all attributes of the sections you selected.
- Click  **(Attributes with different values)** to see only the attributes that are different across the drifts.
- Click  **(Attributes with the same values)** to see only the attributes that are the same across drifts.

The drift comparison displays. Download the data or create a report from your drift for analysis using external tools.

## 2.20. CREATING A DRIFT REPORT FOR HOSTS

Use the drift report feature to export information about your host's drift.

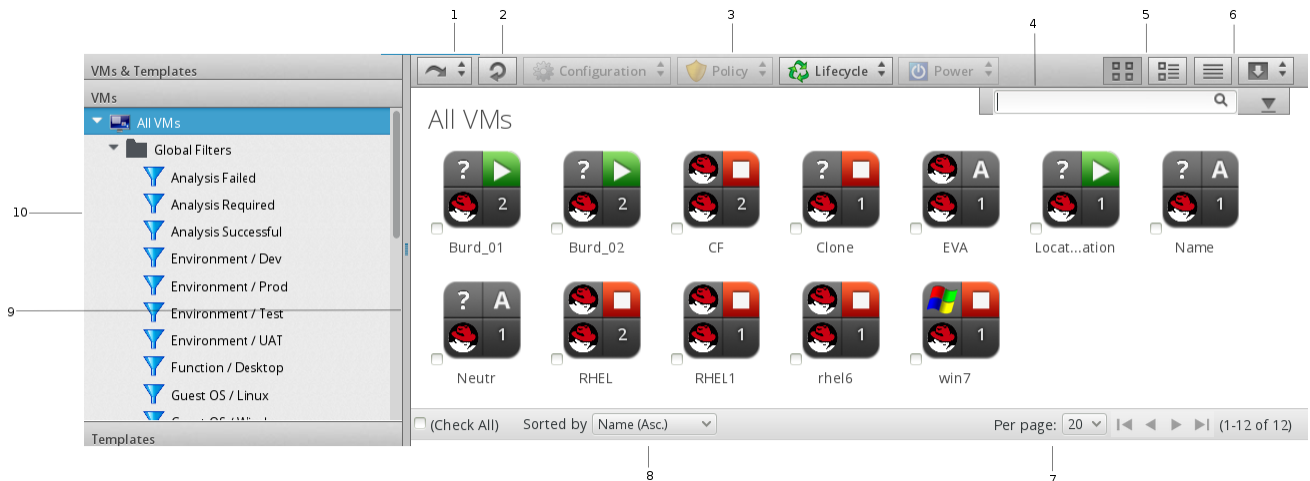
1. Create the comparison to analyze.

2. Click  (**Download**).
3. Click the output button for the type of report you want.
  - Click  (**Download drift report in TXT format**) for a text file.
  - Click  (**Download drift report in CSV format**) for a comma-separated file.
  - Click  (**Download drift report in PDF format**) for a PDF file.

## CHAPTER 3. VIRTUAL MACHINES

The heterogeneous virtual machine container and guest support combined with the ability to analyze information inside the virtual machine - such as disk space, patch level or installed applications - provides in-depth information across the virtual environment. This rich set of information enables Red Hat CloudForms users to improve problem resolution times and effectively manage virtual machines.

The **Virtual Machines** pages display all virtual machines that were discovered by your server. Note that if you have applied a filter to a user, it will be in effect here. The **Virtual Machines** taskbar is a menu driven set of buttons that provide access to functions related to virtual machines.











1. History button
2. Refresh screen button
3. Taskbar
4. Name search bar/Advanced Search button
5. View buttons
6. Download buttons
7. Navigation bar
8. Sort dropdown
9. Main area in Grid View
10. Provider/Filter Navigation

The console uses **Virtual Thumbnails** to describe virtual machines and templates. Each thumbnail contains four quadrants by default. This allows you to glance at a virtual machine for a quick view of its contents.



1. Top left quadrant: Operating system of the Virtual Machine
2. Bottom left quadrant: Virtual Machine Hosts software
3. Top right quadrant: Power state of Virtual Machine or Status icon
4. Bottom right quadrant: Number of Snapshots for this Virtual Machine

| Icon  | Description   |
|---|---|
|    | Template: Virtual Template  |
|    | Retired: 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.  |
|    | Archived: An archived virtual machine has no host or datastore associated with it. Archiving is done to move virtual machines to a low cost storage, either on demand or during retirement, if requested, to avoid incurring extra cost on a virtualized infrastructure due to virtual machine sprawl.  |
|  | Orphaned: An orphaned virtual machine has no host but has a datastore associated with it. Orphaned virtual machines are those that have been removed from their providers but still exist on the storage. An orphaned virtual machine is unable to identify the associated host. A virtual machine also shows as orphaned if it exists on a different host than the host expected by the provider's server.                               |
|  | Disconnected: A disconnected virtual machine is one that has lost connection to either the provider's storage, host, or both. A disconnect is usually a result of network issues on the provider side. For instance, if during virtual machine provisioning the storage is not set up or deleted, the virtual machine will still exist on the provider, but will not run on the host as it has lost connection to its provider's storage. |
|  | On: Virtual Machine is powered on.  |
|  | Off: Virtual Machine is powered off.  |

| Icon  | Description                                    |
|---|--|
|  | Suspended: Virtual Machine has been suspended. |

The **Virtual Machines** page has three accordions organizing your virtual machines and templates in different ways. All of these accordions share a set of common controls:

- Use **VMs and Templates** to view your virtual machines and templates organized by Provider. In addition, you can see archived and orphaned items here.
- Use **VMs** to view, apply filters, and collect information about all of your virtual machines.
- Use **Templates** to view, apply filters, and collect information about all of your templates.

Through the console, you are able to view your virtual machines in multiple ways. For your virtual machines, you can:


- Filter virtual machines
- Change views
- Sort
- Create a report
- Search by MyTags
- Search by collected data

## 3.1. FILTERING VIRTUAL MACHINES AND TEMPLATES

The **Virtual Machine Filter** accordion is provided so that you can easily navigate through groups of virtual machines. You can use the ones provided or create your own through **Advanced Filtering** capabilities.

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Go to the **VMs** or **Templates** accordion.
3. Click on the desired filter from the left pane.

### 3.1.1. Creating a Virtual Machine or Template Filter

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Go to the **VMs** or **Templates** accordion.
3. Click **All VMs** or **All Templates**, then click  (**Advanced Search**) to open the expression editor.
4. Use the expression editor to choose the appropriate options for your criteria. Based on what you choose, different options will show.

- For all of the types of searches, you have the options of creating an alias and requested user input. Select **Use Alias** to create a user friendly name for the search. If you are requested user input for the search, this text will show in the dialog box where the input is requested.
- Click **Field** to create criteria based on field values.

Field

VM : Name

☒ Use Alias VM Name Includes

INCLUDES

<user input> ☒ User will input the value

- Click **Count of** to create criteria based on the count of something, such as the number of snapshots for a virtual machine, or the number of virtual machines on a host.

Count of

VM.Snapshots

☒ Use Alias Snapshots

>=

<user input> ☒ User will input the value

- Click **Tag** to create criteria based on tags assigned to your virtual infrastructure, such as for power states or production tagging.

Tag

VM.My Company Tags : Cost Center

☐ Use Alias

**CONTAINS**

Cost Center 001 ☐ User will input the value

- Click **Registry** to create criteria based on registry values, such as the DCOM status of a Windows system. Note this criteria applies only to Windows operating systems.

Registry

Key: HKLM\SOFTWARE\Mic Value: EnableDCOM = Data: Y

- Click **Find** to seek a particular value, and then check a property.

5. Click (**Commit Expression Element Changes**) to add the expression.
6. Click **Save**.
7. Type in a name for the search expression in **Save this VM** search as. (Note that this title depends on the type of resource you are searching.) To set the filter to show globally, check **Global search**.
8. Click **Save**.

The filter is saved and will show in the **My Filters** area of the **Filter** accordion. If you checked **Global search**, the filter will show under **Global Filters**.

### 3.1.2. Loading a Report Filter or Search Expression






1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the accordion for the items to search either **VMs** or **Templates**.
3. Click (**Advanced Search**) to open the expression editor.
4. Click **Load**.
5. Select either a saved virtual machine search or a virtual machine report filter.



#### NOTE




The set of items to select will depend on the type of resource you are searching.

6. Click **Load** to load the search expression.
7. If you want to edit the expression, click on it and make any edits for the current expression.
  - Click (**Commit expression element changes**) to add the changes.
  - Click (**Undo the previous change**) to remove the change you just made.

- Click  (**Redo the previous change**) to put the change that you just made back.
  - Click  (**AND with a new expression element**) to create a logical AND with a new expression element.
  - Click  (**OR with a new expression element**) to create a logical OR with a new expression element.
  - Click  (**Wrap this expression element with a NOT**) to create a logical NOT on an expression element or to exclude all the items that match the expression.
  - Click  (**Remove this expression element**) to take out the current expression element.
8. Click **Load**.
  9. Click **Apply**.

## 3.2. CHANGING VIEWS FOR VIRTUAL MACHINES AND TEMPLATES

While you can set the default view for different pages from the settings menu, then **Configuration** → **My Settings** → **Default Views**, the current view can also be controlled from the Virtual Machines pages.

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the accordion for the items to view.
3. Click the appropriate button for the desired view.
  - Click  for **Grid View**.
  - Click  for **Tile View**.
  - Click  for **List View**.

## 3.3. SORTING VIRTUAL MACHINES AND TEMPLATES

Virtual machines and templates can be sorted by Name, Cluster, Host, Datastore, Compliance, Last Analysis Time, Total Snapshots, or Region.





1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the accordion for the items to sort.
3. To sort virtual machines or templates when in grid or tile view:
  - From the **Sort by** dropdown, click the attribute to sort.
4. To sort virtual machines or templates when in list view:
  - Select the **List View**.



- Click on the **Column Name** to sort. For example, click on **Cluster** to sort by the name of the cluster.

### 3.4. CREATING A VIRTUAL MACHINE OR TEMPLATE REPORT

For a listing of virtual machines and templates, you can create a quick report in CSV, TXT, or PDF formats.

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the accordion for the items for report creation.
3. Click  (**Download**).
  - Click  for a **TXT** file.
  - Click  for a **CSV** file.
  - Click  for a **PDF** file.


### 3.5. SEARCHING FOR VIRTUAL MACHINES OR TEMPLATES



To the right of the taskbar on the Virtual Machines page, you can enter names or parts of names for searching. You can search in the following ways:

- Type characters that are included in the name. For example, if you type **sp1**, all Virtual Machines whose names include **sp1** appear, such as **Windows2003sp1** and **Sp1clone**.
- Use **\*** at the end of a term to search for names that begin with specific characters. For example, type **v\*** to find all virtual machines whose names begin with the letter **v**.
- Use **\\*** at the beginning of a term to search for names that end with specific characters. For example, type **\*sp2** to find all virtual machines whose names end with **sp2**.
- Erase all characters from the search box to go back to viewing all virtual machines.

Search for virtual machines or templates:

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the accordion for the items to search.



3. In the **Name Filter** bar in the upper right corner of the window, type your criteria.
4. Click  (**Search by Name within results**) or press **Enter**.
5. Type in other criteria to filter on what is currently displayed.
6. Click  (**Search by Name within results**) or press **Enter**.



## 3.6. ANALYZING VIRTUAL MACHINES AND TEMPLATES

Analyze a virtual machine to collect metadata such as user accounts, applications, software patches, and other internal information. If Red Hat CloudForms is not set up for automatic analysis, perform a manual analysis of a virtual machine. To perform a SmartState analysis, Red Hat CloudForms requires a running SmartProxy with visibility to the virtual machine's storage location. If the virtual machine is associated with a host or provider, ensure the virtual machine is registered with that system to be properly analyzed; the server requires this information since a snapshot might be created.



### NOTE

SmartState Analysis of a virtual machine requires access to its host. To perform a successful analysis, edit the virtual machine's host and enter the host's authentication credentials.

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the accordion for the items to analyze.
3. Check the **Virtual Machines** and **Templates** to analyze.
4. Click  (**Configuration**), then  (**Perform SmartState Analysis**).
5. Click **OK**.

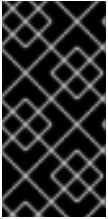
### 3.6.1. Red Hat Enterprise Virtualization Prerequisites

#### 3.6.1.1. SmartState Analysis on Red Hat Enterprise Virtualization Manager 3.1 and Above - Storage Support Notes

Note the following requirements when performing SmartState Analysis on Red Hat Enterprise Virtualization Manager 3.1 and above.

- NFS
  - The Red Hat CloudForms appliance requires a mount to the NFS datastore.
- iSCSI / FCP
  - For Red Hat Enterprise Virtualization 3.1 and 3.2, clusters must use full Red Hat Enterprise Linux hosts and not Red Hat Enterprise Virtualization Hypervisor hosts. You can use either type of host in Red Hat Enterprise Virtualization 3.3 and above.
  - Each Red Hat CloudForms appliance performing SmartState Analysis requires sharable, non-bootable DirectLUN access to each attached iSCSI/FCP storage domain. In order to perform smart analysis, the appliance must mount the data storage as a DirectLUN disk.
  - A Red Hat CloudForms appliance **must** reside in each datacenter with the iSCSI / FCP storage type.
- Other Notes
  - The **Edit Management Engine Relationship** option enables the VM SmartState Analysis job to determine the datacenter where a Red Hat CloudForms appliance is running and thus to identify what storage it has access to in a Red Hat Enterprise Virtualization environment.

- After setting up a Red Hat CloudForms appliance and performing a refresh of the provider, find the Red Hat CloudForms appliance in the **Virtual Machine** accordion list and view its summary screen.
- Click **Configuration** → **Edit Management Engine Relationship**.
- Select the server that relates to this instance of the Red Hat CloudForms appliance.



### IMPORTANT

If you attach a DirectLUN disk after configuring the Red Hat CloudForms database, access the appliance in a terminal and run **pvscan** to detect the DirectLUN disk. Alternatively, in Red Hat CloudForms 5.2.1 and above, you can restart the appliance to detect the disk automatically.

### 3.6.1.2. SmartState Analysis on Red Hat Enterprise Virtualization Manager 3.0 - Storage Support Notes

There are two additional steps required to perform a SmartState Analysis on Red Hat Enterprise Virtualization Manager 3.0 using **iSCSI** or **FCP** storage. NFS storage does not have these requirements.

1. Enable **DirectLUN** support for the host and Red Hat CloudForms appliance that performs the analysis.
  - Enable **DirectLUN** on host.
  - Enable **DirectLUN** on the Red Hat CloudForms appliance. To do this, edit the desired Red Hat Enterprise Virtualization storage and get the **LUNID** value. Then, on the Red Hat CloudForms appliance virtual machine in the Red Hat Enterprise Virtualization user interface, right-click and select **Edit** → **Custom Properties** and enter the following in the **Custom Properties** edit box:

```
directlun=<LUN ID>:readonly
```

If you have multiple storage domains, separate them by a comma, similar to:



```
directlun=<LUN ID 1>:readonly,<LUN ID 2>:readonly,<LUN ID N>:readonly
```



### NOTE

The Red Hat CloudForms appliance must reside in the same data center as the storage you are trying to connect. If you have multiple data centers with **iSCSI** or **FCP** storage, you need a Red Hat CloudForms appliance in each data center to support virtual machine scanning.

2. **Set Server Relationship** - This is required to allow the virtual machine SmartState analysis job to determine which data center a Red Hat CloudForms appliance is running and therefore identify what storage it has access to in a Red Hat Enterprise Virtualization environment.
  - a. After setting up a Red Hat CloudForms appliance and performing a refresh of the Provider, find the Red Hat CloudForms appliance in the **Virtual Machine** accordion list and view its summary screen.

- b. Click  (**Configuration**), and then  (**Edit Server Relationship**).
- c. Select the server that relates to this instance of the Red Hat CloudForms appliance.

### 3.6.2. VMware vSphere Prerequisites

#### 3.6.2.1. Installing VMware VDDK on Red Hat CloudForms

Execution of SmartState Analysis on virtual machines within a VMware environment requires the Virtual Disk Development Kit (VDDK). Red Hat CloudForms supports VDDK 5.5.

1. Download VDDK 5.5 (**VMware-vix-disklib-5.5.0-1284542.x86\_64.tar.gz** at the time of this writing) from the VMware website.



#### NOTE

If you do not already have a login ID to VMware, then you will need to create one. At the time of this writing, the file can be found by navigating to **Downloads** → **All Downloads, Drivers & Tools** → **VMware vSphere** → **Drivers & Tools**. Expand **Automation Tools and SDKs**, and select **vSphere Virtual Disk Development Kit 5.5**. Alternatively, find the file by searching for it using the Search on the VMware site.

2. Download and copy the **VMware-vix-disklib-5.5.0-1284542.x86\_64.tar.gz** file to the **/root** directory of the appliance.
3. Start an **SSH** session into the appliance.
4. Extract and install **VDDK 5.5** using the following commands:

```
# cd /root
# tar -xvf VMware-vix-disklib-5.5.0-1284542.x86_64.tar.gz
# cd vmware-vix-disklib-distrib
# ./vmware-install.pl
```

5. Accept the defaults during the installation.

```
Installing VMware VIX DiskLib API.
You must read and accept the VMware VIX DiskLib API End User License
Agreement to continue.
Press enter to display it.
Do you accept? (yes/no) yes
```

```
Thank you.
What prefix do you want to use to install VMware VIX DiskLib API?
The prefix is the root directory where the other folders such as
man, bin, doc, lib, etc. will be placed.
[/usr]
```

```
[userinput]#(Press Enter)#
```

```
The installation of VMware VIX DiskLib API 5.5.0 build-1284542 for
Linux completed successfully. You can decide to remove this software
```

```
from your system at any time by invoking the following command:
"/usr/bin/vmware-uninstall-vix-disklib.pl".
Enjoy,
--the VMware team
```

6. Run **ldconfig** in order for Red Hat CloudForms to find the newly installed VDDK library.



#### NOTE

Use the following command to verify the VDDK files are listed and accessible to the appliance:

```
# ldconfig -p | grep vix
```

7. Restart the Red Hat CloudForms appliance.

The VDDK is now installed on the Red Hat CloudForms appliance. This enables use of the SmartState Analysis Server Role on the appliance.



## 3.7. COMPARING VIRTUAL MACHINES AND TEMPLATES

The Red Hat CloudForms Server allows you to compare multiple virtual machines. This allows you to see how different virtual machines are from their original template. This helps detect missing patches, unmanaged user accounts, or unauthorized services.

Use the comparison feature to:

- Compare multiple virtual machines from different hosts.
- Compare multiple virtual machines side-by-side.
- Quickly see similarities and differences among multiple virtual machines and a base.
- Narrow the comparison display to categories of properties.
- Print or export in the comparison results to a PDF or CSV file.

Compare virtual machines and templates:

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the accordion for the items to analyze.
3. Check the items to compare.
4. Click  (**Configuration**), and then  (**Compare Selected items**). The comparison displays in a compressed view with a limited set of properties listed.

|                      | Vista (base) | AntiSpam2 | Windows2003... |
|----------------------|--------------|-----------|----------------|
|                      |              |           |                |
| Total Matches        | % Matched:   |           |                |
| + VM Properties (18) | % Matched:   |           |                |
|                      |              |           |                |

5. To delete an item from the comparison, click (**Remove this item from Inventory**) at the bottom of the items column. This option is only available when comparing more than two virtual machines.
6. To view many items on one screen, go to a compressed view by clicking (**Compressed View**). To return to an expanded view, click (**Expanded View**).
7. To limit the mode of the view, there are two buttons in the task bar.
  - Click (**Details Mode**) to see all details for an attribute.
  - Click (**Exists Mode**) to limit the view to if an attribute exists compared to the base or not. This only applies to attributes that can have a boolean property. For example, a user account exists or does not exist, or a piece of hardware that does or does not exist.
8. To change the base virtual machine that all the others are compared to, click its label at the top of its column.
9. To go to the summary screen for a virtual machine, click its **Virtual Thumbnail** or icon.

### 3.7.1. Virtual Machine and Templates Comparison Sections





The following table describes the different sections for comparison information.

| Section    | Description   |
|------------|---|
| Properties | Use this section to see basic information on the file location of the virtual machine, its name, and the virtual machine monitor vendor. Hardware, disk, CD/DVD drives, floppy drive, network adapter, and volume information is also included. |
| Security   | Use this to see users and groups for the virtual machine, including those which may be unauthorized compared to a template.   |

| Section         | Description   |
|-----------------|---|
| Configuration   | Use this to see Guest Applications, Win32 services, Linux Init Processes, Kernel Drivers, File System Drivers, and Patches. |
| My Company Tags | Use this to see all tags.   |

### 3.7.2. Using the Virtual Machine Comparison Sections

Use the comparison sections to view various comparison data and display the data in different ways.

1. On the left of a comparison screen, select what categories of properties to display.
2. Click **Apply**.
3. Click the plus sign next to the sections name to expand it.
4. The following descriptions pertain to the **Expanded View** . Whether you see the value of a property or an icon representing the property depends on the properties type.
  - A property displayed in the same color as the base means that the compared virtual machine matches the base for that property.
  - A property displayed in a different color from the base means that the compared virtual machine does not match the base for that property.
5. If you are in the **Compressed View** , the values of the properties will not be displayed. The icons shown below will describe all items.
  - A  (**checkmark**) means that the compared virtual machine matches the base for that property. If you hover over it, the value of the property will display.
  - A  (**x**) means that the compared virtual machine does not match the base for that property. If you hover over it, the value of the property will display.
6. Click the minus sign next to the sections name to collapse it.

Your comparison can be viewed in multiple ways. Export the data or create a report from your comparison for analysis using external tools.

### 3.7.3. Creating a Virtual Machine Comparison Report






Output the data from a comparison report in TXT, CSV or PDF formats.

1. Create the comparison for the report.
2. Click the output button for the chosen report type.

- Click  (**Download comparison report in TXT format**) for a text file.
- Click  (**Download comparison report in CSV format**) for a CSV file.
- Click  (**Download comparison report in PDF format**) for a PDF file.



### 3.8. CONTROLLING THE POWER STATE OF RED HAT VIRTUALIZATION VIRTUAL MACHINES

Follow this procedure to control the power states of Red Hat Virtualization VMs through the Red Hat CloudForms console.

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click on a VM to change the power state.
3. Click **Power Operations**, then click the button for the desired power operation. Available operations will depend on the current power state of the VM.
  - Click  (**Shutdown Guest**) to shutdown the guest OS on the VM.
  - Click  (**Restart Guest**) to restart the guest OS on the VM.
  - Click  (**Power On**) to power on the VM.
  - Click  (**Power Off**) to power off the VM.
  - Click  (**Suspend**) to suspend the VM.
4. Click **OK**.

### 3.9. REFRESHING VIRTUAL MACHINES AND TEMPLATES

Refresh your virtual machines to get the latest data the provider or host can access. This includes information such as the power state, container, and hardware devices attached to the virtual machine.

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the accordion for the items to analyze.
3. Check the items to refresh.
4. Click  (**Configuration**), and then  (**Refresh Relationships and Power States**) on the **Virtual Machine Taskbar**.

The console returns a refreshed list of the data associated with the selected virtual machines.



### 3.10. EXTRACTING RUNNING PROCESSES FROM VIRTUAL MACHINES AND TEMPLATES

Red Hat CloudForms can collect processes running on Windows virtual machines. To do this, enter domain credentials for the zone where the virtual machine is located.

For more information, see [General Configuration](#).



The virtual machine must be running and must have an IP address in the VMDB, usually obtained from a SmartState Analysis.

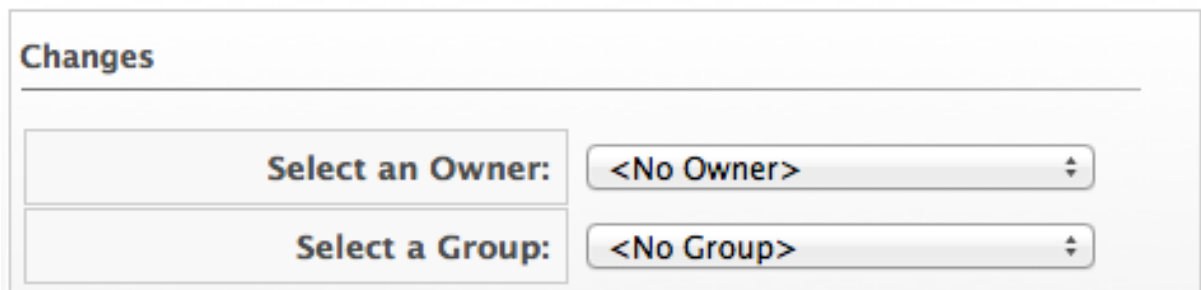
1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Check the Virtual Machines to collect the processes.
3. Click  (**Configuration**), and then  (**Extract Running Processes**) on the Taskbar.
4. Click **OK**.

The server returns the running processes. View the summary of the virtual machine to see the details.

### 3.11. SETTING OWNERSHIP FOR VIRTUAL MACHINES AND TEMPLATES

You can set the owner of a group of virtual machines and templates by either individual user or group. This allows you an additional way to filter and can be used to enforce quotas.

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the accordion for the items to change.
3. Check the items to set ownership.
4. Click  (**Configuration**), and then  (**Set Ownership**) on the **Virtual Machine Taskbar**.
5. From the **Select an Owner** dropdown, select a user, and from the **Select a Group** dropdown, select a group.



**Changes**



Select an Owner: <No Owner>

Select a Group: <No Group>

6. Click **Save**.

### 3.12. REMOVING VIRTUAL MACHINES AND TEMPLATES FROM THE VMDB

If a virtual machine has been decommissioned or you need to perform some troubleshooting, you might need to remove a specific virtual machine from the VMDB. This does not however remove the virtual machine or template from its Datastore or Provider.



1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the accordion for the items to remove.
3. Check the items to remove.
4. Click  (**Configuration**), and then  (**Remove from the VMDB**) button.
5. Click **OK**.

### 3.13. TAGGING VIRTUAL MACHINES AND TEMPLATES

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the accordion for the items to tag.
3. Check the items to tag.
4. Click  (**Policy**), and then  (**Edit Tags**).
5. Select a customer tag from the first dropdown, and then a value for the tag.

**Tag Assignment**

Select a customer tag to assign: Environment \* <Select a value to assign>

|   | Category      | Assigned Value    |
|---|---------------|-------------------|
|  | Cost Center * | Cost Center 001   |
|  | Environment * | Quality Assurance |

\* Only a single value can be assigned from these categories

### 3.14. VIEWING A VMWARE VIRTUAL MACHINE'S STORAGE PROFILE

VMware storage profiles allow you to assign policies to datastores. Storage profiles are used to tag virtual machines to ensure they operate in compliance with settings in the datastore.

Red Hat CloudForms retrieves VMware virtual machine storage profile information in the inventory, and associates the virtual machines and disks with them.













To view a virtual machine's storage profile:

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click a VMware virtual machine to open its summary page.
3. The VMware **Storage Profile** is listed under **Properties**.

You can assign a storage profile when provisioning a VMware virtual machine in Red Hat CloudForms, by using the virtual machine as a template to clone. See [Provisioning Virtual Machines](#) in *Provisioning Virtual Machines and Hosts* for instructions.

### 3.15. VIEWING RUNNING PROCESSES AFTER COLLECTION



1. Click a virtual machine with collected processes.
2. From the **Diagnostics** area, click **Running Processes**.

|   | Name                       | PID   | Memory % | Memory Usage | CPU % | CPU Time |
|---|----------------------------|-------|----------|--------------|-------|----------|
|  | AppleMobileDeviceService.e | 1,360 | 0.54     | 2,883,584    | 0.00  | 0        |
|  | EarthAgent.exe             | 1,412 | 1.36     | 7,278,592    | 0.00  | 409      |
|  | NSClient++.exe             | 1,524 | 1.70     | 9,093,120    | 0.00  | 176      |
|  | SoftwareUpdate.exe         | 2,028 | 3.37     | 18,075,648   | 0.00  | 0        |
|  | SpntSvc.exe                | 1,640 | 1.13     | 6,041,600    | 0.00  | 695      |
|  | StOPP.exe                  | 2,052 | 0.50     | 2,658,304    | 0.00  | 0        |
|  | StWatchDog.exe             | 3,672 | 0.40     | 2,125,824    | 0.00  | 0        |
|  | VMwareService.exe          | 1,664 | 14.34    | 76,918,784   | 0.00  | 108      |
|  | VMwareTray.exe             | 2,368 | 0.14     | 749,568      | 0.00  | 0        |
|  | VMwareUser.exe             | 3,276 | 0.13     | 696,320      | 0.00  | 2        |
|  | csrss.exe                  | 332   | 1.21     | 6,475,776    | 0.00  | 5        |
|  | csrss.exe                  | 3,304 | 1.24     | 6,647,808    | 0.00  | 3        |

The most recent collection of running processes is displayed. Sort this list by clicking on the column headers.

### 3.16. EDITING VIRTUAL MACHINE OR TEMPLATE PROPERTIES



Edit the properties of a virtual machine or template to set parent and child virtual machines. SmartState Analysis also can detect this.

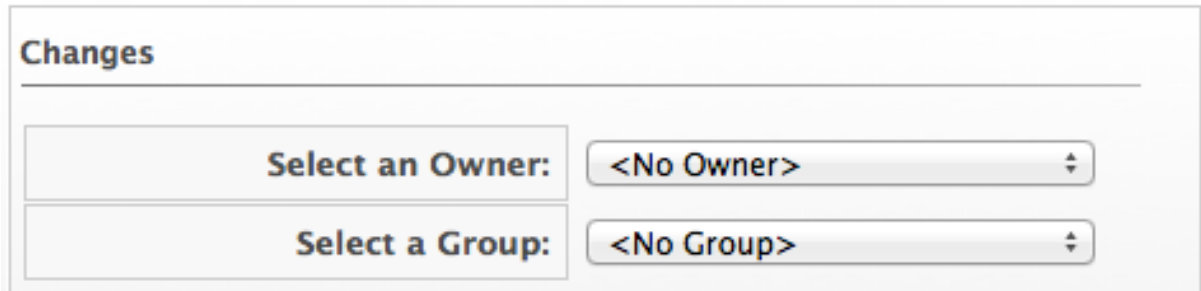
1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the accordion for the items to edit.
3. Click the item to edit properties.
4. Click  (**Configuration**), and then  (**Edit selected item**) on the Taskbar.
5. From the **Parent VM** dropdown, select the parent virtual machine.
6. From **Child VM** selection, select virtual machines that are based on the current virtual machine from the list of **Available VMs**.
7. Click **Save**.

### 3.17. SETTING OWNERSHIP OF A VIRTUAL MACHINE OR TEMPLATE

Set the owner of a virtual machine or template by either individual user or group. This allows you an additional way to filter configuration items.

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the accordion for the items to analyze.



3. Click the item to set ownership.
4. Click  (**Configuration**), and then  (**Set Ownership**) on the taskbar.
5. From the **Select an Owner** dropdown, select a user.



6. From the **Select a Group** dropdown, select a group.
7. Click **Save**.

### 3.18. RIGHT SIZING A VIRTUAL MACHINE

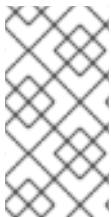
Red Hat CloudForms uses collected statistics to recommend the best size for a virtual machine. Red Hat CloudForms uses the information from the **Normal Operating Range** to calculate the recommendations.

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click a virtual machine for right-sizing.
3. Click  (**Configuration**), and then  (**Right-Size Recommendations**) button.

A new page appears with three levels of Memory and CPU recommendations, Conservative, Moderate, and Aggressive, next to the Normal Operating Range statistics.

### 3.19. VIEWING CAPACITY AND UTILIZATION CHARTS FOR A VIRTUAL MACHINE

You can view capacity and utilization data for virtual machines that are part of a cluster. Note that daily charts only include full days of data. If all 24 data points for a day are not available, daily charts are not displayed. For some capacity and utilization data, Red Hat CloudForms calculates and shows trend lines in the charts which are created using linear regression. The calculation uses the capacity and utilization data collected by Red Hat CloudForms during the interval you specify.





#### NOTE

You must have a server with network visibility to your provider assigned the server role of **Capacity & Utilization Collector** to use this feature.

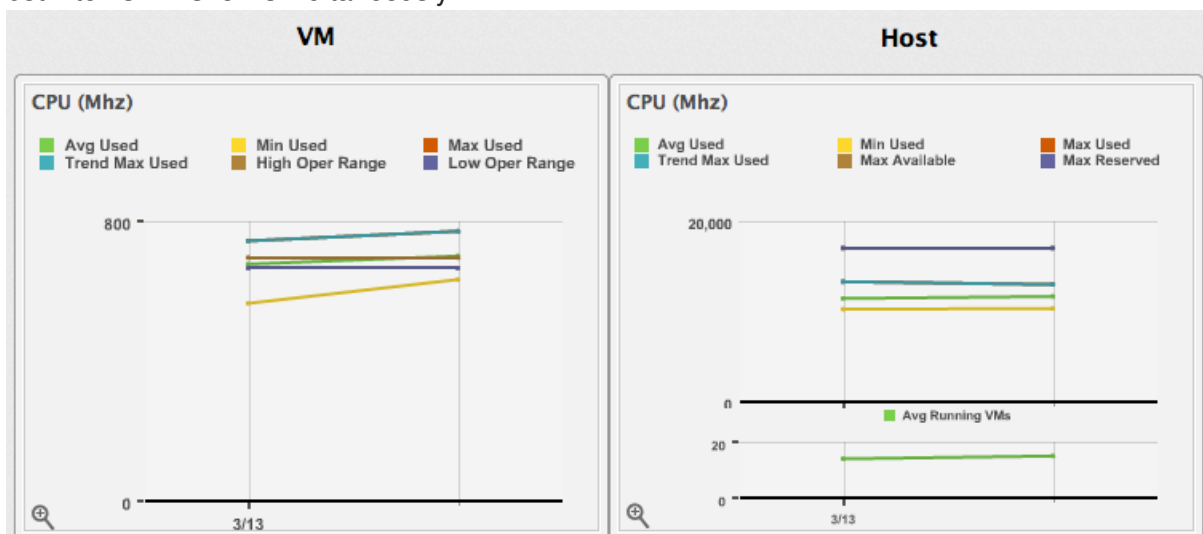
The virtual machine must be powered on to collect the data.

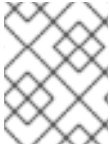
1. From **Compute** → **Infrastructure** → **Virtual Machines**, click the accordion that you want to view capacity data for.
2. Click the item you want to view.

- Click  (**Monitoring**), and then  (**Utilization**).
- From **Interval**, select to view **Daily**, **Hourly**, or **Most Recent Hour** data points. When choosing **Daily**, you can also select the **Date**, and how far back you want to go from that date. When selecting **Hourly**, you can select the date for which you want to view hourly data. If you are using **Time Profiles**, you will be able to select that as an option, also.



- From **Compare to**, select **Parent Host** or **Parent Cluster**. The capacity and utilization charts for both items will show simultaneously.





**NOTE**

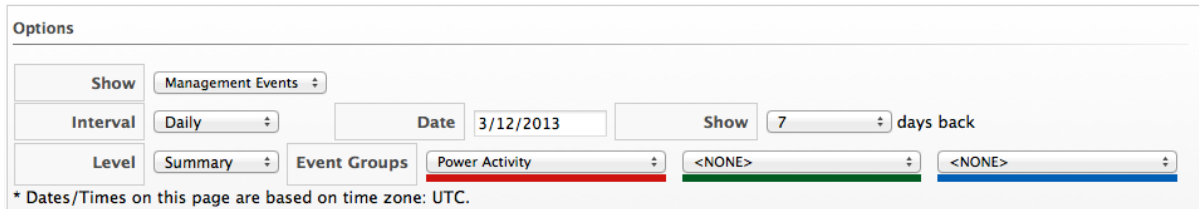
Daily charts only include full days of data. This means Red Hat CloudForms does not show daily data for a day without a complete 24 data point range for a day.

For information about data optimization including utilization trend reports, see [Chapter 6, Data Optimization](#).

## 3.20. VIEWING THE VIRTUAL MACHINE OR TEMPLATE TIMELINE

View the timeline of events for a virtual machine or template if registered to a Host.

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the virtual machine to view the timeline.
3. Click  (**Monitoring**), and then  (**Timelines**) on the taskbar.
4. From **Options**, customize the period of time to display, and the types of events to view.



Options

Show Management Events

Interval Daily Date 3/12/2013 Show 7 days back

Level Summary Event Groups Power Activity <NONE> <NONE>

\* Dates/Times on this page are based on time zone: UTC.

- Use the **Interval** dropdown to select hourly or daily data points.
  - Use **Date** to type the date of the timeline to display.
  - If viewing a daily timeline, use **Show** to set how many days back to go. The maximum history is 31 days.
  - The three **Event Group** dropdowns allow selection of different event groups to display. Each has its own color.
  - From the **Level** dropdown, select either a **Summary** event or a **Detail** list of events. For example, the detail level of a **Power On** event might include the power on request, the starting event, and the actual **Power On** event. If you select **Summary**, you only see the **Power On** event in the timeline.
5. To see more detail on an item in the timeline, click on it. A balloon appears with a clickable link to the resource.





## 3.21. VIRTUAL MACHINE OR TEMPLATE SUMMARY

When you click on a specific virtual machine or template, you will see the **Virtual Thumbnail**, and an operating system-specific screen of the item, called the **Summary**. Where applicable, click on a subcategory of the **Summary** to see more detail on that section.




**NOTE**

When you perform a SmartState Analysis on a virtual machine or template, you get more detailed information in these categories.











- **Properties** include information such as the base operating system, hostname, IP addresses, Virtual Machine vendor, CPU Affinity, devices attached to the system, and snapshots. This includes the ability to analyze multiple partitions, multiple disks, Linux logical volumes, extended partitions, and Windows drives. Some categories can be clicked on for additional detail. For example, click **Container** to view notes associated with a virtual machine.

| Properties             |   |
|------------------------|---|
| Name                   | mgf_build_5011  |
| Hostname               | mgf_5011.localdomain  |
| IP Address             | 192.168.253.11  |
| Container              |  VMware (2 CPUs, 4096 MB)            |
| Parent Host Platform   | ESXi  |
| Platform Tools         | toolsOk   |
| Operating System       |  Red Hat Enterprise Linux 5 (64-bit) |
| CPU Affinity           |   |
| Snapshots              |  1                                   |
| Advanced Settings      |  0                                   |
| Resources              | Available   |
| Management Engine GUID | bdff0558-8828-11e2-9abc-005056af00b4  |

- **Lifecycle** shows the date of discovery and the last analysis. If a retirement date or owner has been set, these display as well.

| Lifecycle       |  |
|-----------------|--|
| Discovered      |  Fri Mar 08 19:45:34 UTC 2013 |
| Last Analyzed   |  Tue Mar 12 15:06:37 UTC 2013 |
| Retirement Date |  Never                        |
| Owner           | Administrator  |
| Group           | EvmGroup-administrator   |

- **Relationships** include information on the parent host, genealogy such as parent and child virtual machines, and drift.

| Relationships     |  |
|-------------------|--|
| Management System |  Virtual Center (192.168.252.14)  |
| Cluster           |  Testing-Production Cluster       |
| Host              |  vi4esxm2.manageiq.com            |
| Resource Pool     |  <input type="text" value="RP3"/> |
| Datastores        |  StarM1-Testing1                  |
| Service           |  None                             |
| Parent VM         |  None                             |
| Genealogy         |  Show parent and child VMs        |
| Drift History     |  1                                |
| Analysis History  |  1                                |

- **Storage Relationships** shows relationships to Filers, LUNs, Volumes and File Shares.
- **VMsafe** shows properties of the VMsafe agent if it is enabled.

#### VMsafe


|               |                 |
|---------------|-----------------|
| Agent Address | 192.168.254.109 |
| Agent Port    | 8888            |
| Fail Open     |                 |
| Immutable VM  |                 |
| Timeout (ms)  | 6000000         |

- **Normal Operating Ranges** shows the values for the normal operating range for this virtual machine. These statistics are used in calculating right sizing recommendations.





| Normal Operating Ranges (over 30 days) |         |           |
|--|---------|-----------|
| CPU                                    | High    | 712.1 MHz |
|  | Average | 706.1 MHz |
|  | Low     | 700.1 MHz |
| CPU Usage                              | High    | 18.35%    |
|  | Average | 18.28%    |
|  | Low     | 18.22%    |
| Memory                                 | High    | 925.76 MB |
|  | Average | 921.99 MB |
|  | Low     | 918.23 MB |
| Memory Usage                           | High    | 23.48%    |
|  | Average | 23.31%    |
|  | Low     | 23.15%    |




- **Power Management** displays the current power state, last boot time, and last power state change. **State Changed On** is the date that the virtual machine last changed its power state. This is a container view of the power state, therefore a restart of the operating system does not cause the container power state to change and will not update this value.

| Power Management |  |
|------------------|--|
| Power State      |  on |
| Last Boot Time   | Fri Jan 11 18:07:54 UTC 2013   |
| State Changed On | Fri Mar 08 19:45:34 UTC 2013   |

- **Security** includes information on users, groups, and security patches. Recall that the items shown on the **Summary** screen change based on the guest operating system.

| Security |  |
|----------|--|
| Users    |  35 |
| Groups   |  47 |

- **Configuration** includes information on applications, services, packages, and init processes. This section changes depending on the base operating system.

| Configuration  |   |
|----------------|---|
| Packages       |  334 |
| Init Processes |  57  |
| Files          |  0   |

- **Datastore Allocation Summary** shows how many and how much disk space has been allocated to this virtual machine as well as disk alignment and thin provisioning information.
- **Datastore Actual Usage Summary** shows how much disk and memory the virtual machine is actually using.

| Datastore Actual Usage Summary         |                            |
|--|----------------------------|
| <b>Disks</b>                           | 42 GB                      |
| <b>Memory</b>                          | 4 GB                       |
| <b>Snapshots</b>                       | 0 Bytes                    |
| <b>Total Datastore Used Space</b>      | 42.03 GB                   |
| <b>Unused/Overcommitted Allocation</b> | (31.99 MB) * Overallocated |

- **Diagnostics** provides a link to viewing running processes and the information from the latest collected event logs.
- **Smart Management** shows all tags assigned to this virtual machine.

## 3.22. VIEWING THE OPERATING SYSTEM PROPERTIES

View details of the operating system from the **Virtual Machine Summary** or the accordion. For Windows systems, see **Account Policies** for the virtual machine.

1. From **Compute** → **Infrastructure** → **Virtual Machines**, click on the item to view its **Summary**.
2. From the **Properties** section, click **Operating System**.

An expanded view of the operating systems properties and **Account Policies** displays. This varies based on the operating system.

## 3.23. VIEWING VIRTUAL MACHINE OR TEMPLATE SNAPSHOT INFORMATION

View the list of snapshots to see a history of their creation and size. Red Hat CloudForms provides the description, size, and creation time of the snapshot as well as a view of the genealogy of the snapshots.



### NOTE

Snapshot size is only available after the successful completion of a **SmartState Analysis**.

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the appropriate accordion containing the item you wish to view the snapshots of.
3. Click on the item to view its **Summary**.
4. From the **Summary**, click Snapshots in the **Properties** area.

5. The list of snapshots show in a tree format and captures their genealogy.

### 3.24. VIEWING USER INFORMATION FOR A VIRTUAL MACHINE OR TEMPLATE

Red Hat CloudForms's **SmartState Analysis** feature returns user information. Drill into the user to get details on the user's account, including group memberships.

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the accordion for the item to view user information.
3. Click on the item to view its **Summary**.
4. From the **Security** section of the **Virtual Machine Summary**, click **Users**.
5. Click the user to view details.

### 3.25. VIEWING GROUP INFORMATION FOR A VIRTUAL MACHINE OR TEMPLATE

Red Hat CloudForms's **SmartState Analysis** feature returns group information. Explore a group to get a list of its users.

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the accordion for the item to view user information.
3. Click on the item to view its **Summary**.
4. From the **Security** section of the **Virtual Machine Summary**, click **Groups**.
5. Click the group to view users.


### 3.26. VIEWING GENEALOGY OF A VIRTUAL MACHINE OR TEMPLATE

Red Hat CloudForms detects the lineage of a virtual machine. View a virtual machine's lineage and compare the virtual machines that are part of its tree. This also allows tagging of virtual machines that share genealogy.



1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the accordion for the item to view genealogy.
3. Click on the item to view its **Summary**.
4. From the **Relationships** area in the **Summary**, click **Genealogy**.



### 3.27. COMPARING GENEALOGY OF A VIRTUAL MACHINE OR TEMPLATE

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the accordion for the item to view genealogy.

3. Click on the item to view its **Summary**.
4. From the **Relationships** area in the **Summary**, click **Genealogy**.
5. Check the items to compare.
6. Click  (**Compare Selected VMs**).

### 3.28. TAGGING VIRTUAL MACHINES OR TEMPLATES WITH A COMMON GENEALOGY

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the accordion for the item to view genealogy.
3. Check the items to tag.
4. Click  (**Policy**), and then  (**Edit Tags**).
5. Select a customer tag from the first dropdown, and then a value for the tag.

| Select a customer tag to assign: Environment *                                      |               |                   |
|---|---------------|-------------------|
| Category  |               | Assigned Value    |
|   | Cost Center * | Cost Center 001   |
|  | Environment * | Quality Assurance |

\* Only a single value can be assigned from these categories











### 3.29. DETECTING DRIFT ON VIRTUAL MACHINES OR TEMPLATES

The configuration of a virtual machine might change over time. **Drift** is the comparison of a virtual machine to itself at different points in time. The virtual machine needs analysis at least twice to collect this information. Detecting drift provides you the following benefits:

- See the difference between the last known state of a machine and its current state.
- Review the configuration changes that happen to a particular virtual machine between multiple points in time.
- Review the host and datastore association changes that happen to a particular virtual machine between multiple points in time.
- Review the classification changes that happen to a virtual machine between two time checks.
- Capture the configuration drifts for a single virtual machine across a time period.





Detect drift on virtual machines or templates:

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click on the item to view its **Summary**.
3. From the **Relationships** area in the **Summary**, click **Drift History**.
4. Check the analyses to compare.

5. Click  (**Select up to 10 timestamps for Drift Analysis**) at the top of the screen. The results display.
6. Check the **Drift** sections on the left to view in your comparison.
7. Click **Apply**.
8. The following descriptions pertain to the **Expanded View** . Whether you see the value of a property or an icon representing the property depends on the properties type.
  - A property displayed in the same color as the base means the compared analysis matches the base for that property.
  - A property displayed in a different color from the base means the compared analysis does not match the base for that property.
9. If you are in the **Compressed View** , the values of the properties are not displayed. All items are described by the icons shown below.
  - A  (**checkmark**) means that the compared analysis matches the base for that property. If you hover over it, the value of the property will display.
  - A  (**triangle**) means the compared analysis does not match the base for that property. If you hover over it, the value of the property displays. Click the minus sign next to the sections name to collapse it.
10. To limit the scope of the view, you have three buttons in the **Resource** button area.
  - Click  (**All attributes**) to see all attributes of the sections you selected.
  - Click  (**Attributes with different values**) to see only the attributes that are different across the drifts.
  - Click  (**Attributes with the same values**) to see only the attributes that are the same across drifts.
11. To limit the mode of the view, there are two buttons in the **Resource** button area.
  - Click  (**Details Mode**) to see all details for an attribute.
  - Click  (**Exists Mode**) to only see if an attribute exists compared to the base or not. This only applies to attributes that can have a Boolean property. For example, a user account exists or does not exist, or a piece of hardware that does or does not exist.

This creates a drift analysis. Download the data or create a report from your drift for analysis using external tools.

### 3.30. CREATING A DRIFT REPORT FOR A VIRTUAL MACHINE OR TEMPLATE

1. Create the comparison to analyze.
2. Click  (**Download**).
3. Click the output button for the type of report you want.
  - Click  (**Download drift report in text format**) for a text file.
  - Click  (**Download drift report in CSV format**) for a csv file.
  - Click  (**Download drift report in PDF format**) for a PDF file.

### 3.31. VIEWING ANALYSIS HISTORY FOR A VIRTUAL MACHINE OR TEMPLATE

Each time a SmartState Analysis is performed on a virtual machine, a record is created of the task. This information is accessed either from the virtual machine accordion or the virtual machine summary. Use this detail to find when the last analysis was completed and if it completed successfully. If the analysis resulted in an error, the error is shown here.

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the accordion for the item to view genealogy.
3. Click on the item to view its **Summary**.
4. From the **Relationships** area in the **Summary**, click **Analysis History**. A history of up to the last 10 analyses is displayed.

| Descending by: Started |            | Per page: 20 |        | (It     |  |
|------------------------|------------|--------------|--------|---------|--|
|                        | Started ▼  | Finished     | Status | Message |  |
| Q                      | 2 Days Ago | 2 Days Ago   | OK     | OK      |  |
| Q                      | 3 Days Ago | 3 Days Ago   | OK     | OK      |  |
| Q                      | 4 Days Ago | 4 Days Ago   | OK     | OK      |  |
| Q                      | 5 Days Ago | 5 Days Ago   | OK     | OK      |  |
| Q                      | 6 Days Ago | 6 Days Ago   | OK     | OK      |  |
| Q                      | 6 Days Ago | 6 Days Ago   | OK     | OK      |  |

5. Click on a specific analysis to see its details.

### 3.32. VIEWING DISK INFORMATION FOR A VIRTUAL MACHINE OR TEMPLATE

Each time a SmartState Analysis is performed on a virtual machine or template, information on the disks associated with the item is collected. This includes free and used space information as well as the type of disk and file system.

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click on the item to view its **Summary**.
3. From **Datastore Allocation Summary**, click **Disks**.

A list of the disks for the item with type, file system, size, and usage information is displayed.

### 3.33. RECONFIGURING VIRTUAL MACHINES

Memory, processors, and disks can be reconfigured on existing VMware and Red Hat Virtualization virtual machines using the **Reconfigure this VM** button.

You can reconfigure multiple components on a virtual machine using one request, or make each reconfiguration separately. Confirm your changes using the **Submit** button.





#### IMPORTANT

The following restrictions apply to adding and removing Red Hat Virtualization virtual machine disks:

- Supported by Red Hat Virtualization 4.0 and above.
- Only a single bootable disk is supported.
- The virtual machine requires at least one existing disk to allow adding additional disks. This is because the destination storage cannot be specified from the Red Hat CloudForms dialog, so the storage associated with the existing disk is reused.

#### 3.33.1. Adding a Disk to a Virtual Machine



A disk can be added to a VMware or Red Hat Virtualization virtual machine with the following steps:

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Select the target virtual machine.
3. Click  (**Configuration**), and then  (**Reconfigure this VM**).
4. Click **Add Disk**.
5. Specify the disk type, mode, size, and dependency options.
6. Click **Submit**.

After the disk has been added, you can view the new disk by navigating to **Compute** → **Infrastructure** → **Virtual Machines**. . Open the target virtual machine, then click **Devices** to view the new disk.

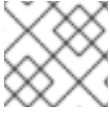
#### 3.33.2. Removing a Virtual Machine Disk

A disk can be removed from a VMware or Red Hat Virtualization virtual machine with the following steps:

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Select the target virtual machine.
3. Click  (**Configuration**), and then  (**Reconfigure this VM**).
4. Click **Delete** next to the disk to remove.

5. Click **Submit**.



### 3.33.3. Resizing a Virtual Machine Disk



#### NOTE

This functionality is available on VMware virtual machines only.



You can extend a VMware virtual machine's disk with the following steps:

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Select the target virtual machine.
3. Click  (**Configuration**), and then  (**Reconfigure this VM**).
4. Click **Resize** next to the disk you want to resize to show resizing options.
5. Specify the desired memory size and units (MB or GB). A disk can only be extended in size.
6. Click **Confirm Resize** to select the values. Alternatively, selecting **Cancel Resize** shows the original values.
7. Click **Submit**.

The disk resizing request is then processed for the virtual machine.

### 3.33.4. Increasing or Decreasing a Virtual Machine's Memory Size

You can increase or decrease a VMware or Red Hat Virtualization virtual machine's memory size with the following steps:

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Select the target virtual machine.
3. Click  (**Configuration**), and then  (**Reconfigure this VM**).
4. Select **Yes** next to **Memory** to show memory options.
5. Specify the desired memory size and units (MB or GB).
6. Click **Submit**.



The memory add request is then processed for the virtual machine.

### 3.33.5. Reconfigure a Virtual Machine's Processors

You can reconfigure a VMware or Red Hat Virtualization virtual machine's processors with the following steps:

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Select the target virtual machine.



- Click  (**Configuration**), and then  (**Reconfigure this VM**).
- Select **Yes** next to **Processors** to show processor options.

### Reconfigure Virtual Machine

#### Options

Memory ☐ No

Processors ☒ Yes

#### Processor Options

Sockets

Cores Per Socket


Total Processors

#### Disks

[Add Disk](#)

| Name                                 | Type | Size |    | Bootable                                | Actions |
|--------------------------------------|------|------|----|---|---------|
| bc62ba21-5a7d-4f41-854b-9812cfb0a063 | thin | 40   | GB | <input checked="" type="checkbox"/> Yes | Delete  |
| d38ca2a4-fa40-4b82-9890-78e832efb69a | thin | 5    | GB | <input type="checkbox"/> No             | Delete  |

#### Affected VMs

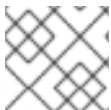
|   | Name      | Processor Sockets | Processor Cores Per Socket | Memory | Host   |
|---|-----------|-------------------|----------------------------|--------|--------|
|  | CFME_5703 | 1                 | 4                          | 8 GB   | Host03 |

[Submit](#) [Cancel](#)

- Specify the number of sockets and the number of cores per socket. The reconfiguration screen will calculate the **Total Processors**.
- Click **Submit**.

The virtual machine's processors are then reconfigured.

### 3.33.6. Adding or Removing Virtual Machine Network Adapters



#### NOTE



This functionality is available on VMware virtual machines only.

You can add or remove network adapters on a VMware virtual machine from the **Reconfigure this VM** button.

#### 3.33.6.1. Adding a Network Adapter to a VMware Virtual Machine

To add a network adapter to a virtual machine:



- Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
- Select the target virtual machine.

3. Click  (**Configuration**), and then  (**Reconfigure this VM**).
4. Click **Add Network** next to the disk you want to resize to show resizing options.
5. Select the type of adapter from the list under **vLan**.
6. Click **Confirm Add**.
7. Click **Submit**.

A request to add the network adapter is then processed for the virtual machine. You can view the details for the new network adapter by navigating to the **Reconfigure this VM** area. When the network adapter is added, a name and MAC address are assigned to the adapter.

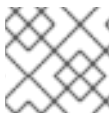
### 3.33.6.2. Removing a Network Adapter from a VMware Virtual Machine

To remove a network adapter from a virtual machine:

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Select the target virtual machine.
3. Click  (**Configuration**), and then  (**Reconfigure this VM**).
4. Click **Delete** next to the network adapter you want to remove.
5. Click **Submit**.

## 3.34. VIEWING EVENT LOGS FOR A VIRTUAL MACHINE OR TEMPLATE

Using an **Analysis Profile**, collect event log information from your virtual machines.



### NOTE

This feature is only available for Windows.

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click the accordion for the item to view event logs.
3. Click on the item to view its **Summary**.
4. From **Diagnostics** click **Event Logs**.

The collected event log entries are displayed. Sort this list by clicking on the column headers.

## 3.35. REMOTE CONSOLES

A console is a graphical window that allows you to view the start up screen, shut down screen, and desktop of a virtual machine, and to interact with that virtual machine in a similar way to a physical machine.

Red Hat CloudForms offers the following support for HTML5-based VNC, SPICE, and WebMKS consoles:

- VNC and SPICE consoles for Red Hat Virtualization Manager with websocket proxy.
- VMware's WebMKS HTML5-based console type.
- VNC consoles for OpenStack using OpenStack-supplied websocket proxy.



## NOTE

- VMware no longer supports the MKS console type. Also, VMRC is no longer a browser plugin but a native desktop application. As a result, the VMware MKS and the VMRC plugin options have been disabled in CloudForms.
- Currently, attempting to connect to the VMware WebMKS console for a virtual machine fails when the server security type is set to **2** for that virtual machine.
- Due to VMware licensing restrictions, Red Hat cannot ship the WebMKS SDK in CloudForms. For information on how to configure WebMKS support in CloudForms, see [Section 3.35.2, “Configuring WebMKS Support in CloudForms”](#).

All of the above make use of the websocket protocol supported by all recent versions of browsers, and can use SSL to encrypt the websocket connection.

## OpenStack

Red Hat CloudForms only makes an API call to get the URL for the console and open that console in a web browser; see [Directly Connect to a VNC Console](#) in the Red Hat OpenStack Platform *Instances and Images Guide* for more details.

## Red Hat Enterprise Virtualization Manager and VMware

By default, the websocket connection runs over HTTPS or HTTP based on how the application was accessed. Under an appliance, you will most likely use HTTPS, and, therefore, the websocket connection will be wss:// (websocket with SSL).

When configuring Red Hat Virtualization Manager for virtual machine console access, set the display type for each virtual machine to **noVNC** or **SPICE HTML5**. Support for the SPICE HTML5 console client is offered as a technology preview. For more information on configuring console options, see [Configuring Console Options](#) in the Red Hat Virtualization *Virtual Machine Management Guide*.

### 3.35.1. Configuring Console Access to VMware ESXi Hosts At A Network Layer

When configuring access to the VNC or HTML5 console, make sure that at a network layer:

- All VNC ports (5900-6000) are opened from the machine on which you access the Red Hat CloudForms Console to the Red Hat CloudForms.
- All VNC ports (5900-6000) are opened from the Red Hat CloudForms to each VMware ESXi host running virtual machines that you want to access.
- The firewall on VMware ESXi hosts is enabled and that the VMware ESXi host firewall ports are opened.

- The VNC service (**gdbserver**) is running and that the **gdbserver** service has an association with ports 5900-6000 usually defined with a `/etc/vmware/firewall/service.xml` firewall rules configuration.  
The **gdbserver** ruleset must be enabled on each ESXi host running virtual machines that will be accessed through the HTML5 console or VNC console on the Red Hat CloudForms. The ruleset can be configured on the host itself, or using the VMware vCenter web user interface.

The following procedures apply to VMware vCenter 5.0 and later.

#### 3.35.1.1. Using SSH to Configure VMware ESXi Hosts to Enable Console Access

Configure the **gdbserver** ruleset on the host using SSH.

1. Access the host:

```
# ssh host@example.com
```

2. Set the **gdbserver** parameter:

```
# esxcli network firewall ruleset set --ruleset-id gdbserver --  
enabled true
```

3. Confirm that the ruleset is active:

```
# esxcli network firewall ruleset list
```

#### 3.35.1.2. Using the VMware vCenter Web Interface to Configure ESXi Hosts to Enable Console Access

Configure the **gdbserver** ruleset on the host using the VMware vCenter web user interface.

1. Select the ESXi host in the VMware vCenter web interface.
2. Click the **Manage** tab.
3. Click the **Settings** sub tab.
4. Click **System** → **Security Profile** from the list on the left.
5. Click **Edit**.
6. Select the **gdbserver** ruleset, and then click **OK**.

#### 3.35.1.3. Configuring the VMware ESXi Host Firewall Ports for Console Access


Follow these steps to configure the VMware ESXi host firewall ports for HTML5 or VNC console access to guest virtual machine consoles. The firewall ports must be enabled on each VMware ESXi host running virtual machines that will be accessed through the HTML5 or VNC console on the Red Hat CloudForms.

1. Log in to your vSphere Client and select **Home** → **Inventory** → **Hosts and Clusters**.
2. In the **Hosts/Clusters** tree view, select the VMware ESXi host you want to configure for HTML5 or VNC console access.

3. Select the **Configuration** tab and open the **Software** box.
4. Select **Security Profile**.
5. Navigate to the **Firewall Properties** dialog window by selecting the **Properties** link from the **Firewall** section.
6. In the **Firewall Properties**, scroll down to **GDB Server** and select it.
7. Click **OK**.


### 3.35.2. Configuring WebMKS Support in CloudForms

Complete the following steps to enable WebMKS support in CloudForms.

1. Log in to the CloudForms user interface appliance console as the root user.
2. On the CloudForms user interface appliances, create a folder titled **webmks** in the `/var/www/miq/vmdb/public/` directory.  
 `/var/www/miq/vmdb/public/webmks`
3. Download and extract the contents of [VMware WebMKS SDK](#) into the **webmks** folder.
4. Log in to the CloudForms user interface as an administrative user. If you are already logged in, refresh the settings page in the CloudForms user interface for the changes to take effect.
5. From the settings menu, select **Configuration**.
6. Click on the **Settings** accordion, then click **Zones**.
7. Click the zone where the CloudForms server is located.
8. Click on the server.
9. Under **VMware Console Support**, select **VMware WebMKS** from the **Use** list.
10. Click **Save**.

### 3.35.3. Opening a Console for a Virtual Machine

Open a web-based VNC or SPICE console for a virtual machine.

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Click on the virtual machine that you want to access.
3. Click  (**Access**) and select **VM Console** or **Web Console**.

The virtual machine console opens in a new tab in your browser.

## 3.36. MANAGING VIRTUAL MACHINE SNAPSHOTS



A snapshot is a view of a virtual machine's operating system and applications on any or all available disks at a given point in time. Take a snapshot of a virtual machine before you make a change to it that

may have unintended consequences. You can use a snapshot to return a virtual machine to a previous state.

View virtual machines by infrastructure providers by navigating to **Compute** → **Infrastructure** → **Providers**.


### 3.36.1. Creating a Virtual Machine Snapshot

To create a snapshot of a virtual machine:

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Select the target virtual machine, and open it to view its details.
3. Under **Properties**, click **Snapshots** to show information about the virtual machine's snapshots.
4. Click  (**Create a new snapshot for this VM**).
5. Enter snapshot details in **Description**.
6. (Optional) Select **Snapshot VM memory** for the snapshot to preserve the virtual machine's current runtime state. This option will appear only if the VM **Power State** is  (**On**).
7. Click **Create**.

### 3.36.2. Deleting a Virtual Machine Snapshot

To delete a virtual machine snapshot:

1. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
2. Select the target virtual machine, and open it to view its details.
3. Under **Properties**, click **Snapshots** to show information about the virtual machine's snapshots.
4. Select the snapshot to delete under **Available Snapshots**.
5. Click  and select **Delete Selected Snapshot**.
6. Click **OK**.

### 3.36.3. Reverting a Virtual Machine to a Snapshot

A virtual machine can be reverted to a previous state using a snapshot.



#### IMPORTANT

The virtual machine state must be powered **off** for the **Revert to selected snapshot** option to be available.

To revert a virtual machine to a snapshot:

1. Power the virtual machine off.

2. Navigate to **Compute** → **Infrastructure** → **Virtual Machines**.
3. Select the target virtual machine, and open it to view its details.
4. Under **Properties**, click **Snapshots** to show information about the virtual machine's snapshots.
5. Select the snapshot to revert to under **Available Snapshots**.

6. Click  (**Revert to selected snapshot**).
7. Click **OK**.

### 3.37. CREATING A TEMPLATE BASED ON A VIRTUAL MACHINE

A template is a copy of a virtual machine (VM) that you can use to simplify the subsequent, repeated creation of similar VMs. Templates capture the configuration of software, configuration of hardware, and the software installed on the VM on which the template is based.





#### NOTE

Virtual machines must meet the following criteria to publish as templates:

- The VM must not be blank, archived or orphaned.
- The VM must be associated with a Red Hat Virtualization provider.
- Red Hat Virtualization provider 4.0 or higher, with `use_ovirt_engine_sdk` set to `true` in `/var/www/miq/vmdb/config/settings.yml` on your CloudForms appliance.
- The VM power state is **OFF**.
- Sealing a template is not supported for Windows OS VMs.

To create a template based on an existing VM:

1. Navigate to **Compute** → **Infrastructure** → **Providers**.
2. Click on a Red Hat Virtualization provider.
3. Select a VM.
4. Click  (**Lifecycle**), then click  (**Publish selected VM to a Template**).
5. Under the **Request** tab, provide **Request Information** and identify a **Manager**:
  - a. Enter an **E-Mail** address.
  - b. Provide a **First** and **Last** name in the individual fields.
  - c. Enter a **Manager** name.
6. Assign tags to the new template in the **Purpose** tab.

- a. Click on a tag category and check applicable tags.
7. Use fields in the **Catalog** tab to identify the source VM and provide details for the template:
  - a. Select the source VM from the **Name** field.
  - b. (Optional) Check **Seal Template**.

**NOTE**

Sealing, which uses the **virt-sysprep** command, removes system-specific details from a virtual machine before creating a template based on that VM. This prevents the original VM's details from appearing in subsequent VMs that are created using the same template. It also ensures the functionality of other features, such as predictable vNIC order.

- c. The **Number of VMs** indicates the output will be a single template.
- d. Provide a **Name** and **Description** for the created template.
8. Under the **Environment** tab, specify information for the storage domain in which to create the template's disks.
  - a. Check **Choose Automatically** to allow CloudForms to determine the destination cluster and datastore.  
Or, manually enter cluster and datastore information using the following steps:
    - b. Select the cluster with which to associate the template from the **Cluster** list. By default, this is identical to the cluster of the source VM.
    - c. Choose a **Datastore** for the destination to create the template's disks.
9. Provide provisioning and retirement information for VMs based on the template in the **Schedule** tab.
  - a. Select **Schedule** or **Immediately on Approval** for **Schedule Info** to determine when to provision the VM.
  - b. Set the **Time to Retirement** under **Lifespan** using the drop-down menu.
10. Click **Submit**.





## CHAPTER 4. RESOURCE POOLS

Resource pools are used to allocate CPU and memory across a group of virtual machines.

### 4.1. REMOVING A RESOURCE POOL

If a resource pool is decommissioned or requires troubleshooting, it might require removal from the VMDB.



1. Navigate to **Compute** → **Infrastructure** → **Resource Pools**.
2. Click on the resource pool to remove.
3. Click  (**Configuration**), and then  (**Remove from the VMDB**).
4. Click **OK**.

The resource pool is removed. The virtual machines remain in the VMDB, but are no longer associated with this resource pool.

### 4.2. TAGGING A RESOURCE POOL

Use tags to categorize a resource pool.

1. Navigate to **Compute** → **Infrastructure** → **Resource Pools**.
2. Click the resource pool 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.

| Select a customer tag to assign: Environment * <Select a value to assign>           |               |                   |
|---|---------------|-------------------|
|   | Category      | Assigned Value    |
|  | Cost Center * | Cost Center 001   |
|  | Environment * | Quality Assurance |

\* Only a single value can be assigned from these categories

### 4.3. VIEWING THE RESOURCE POOL SUMMARY

Use the Resource Pool Summary to see the number of discovered virtual machines, the parent host, and the parent cluster. It is the default view when you click on one resource pool.

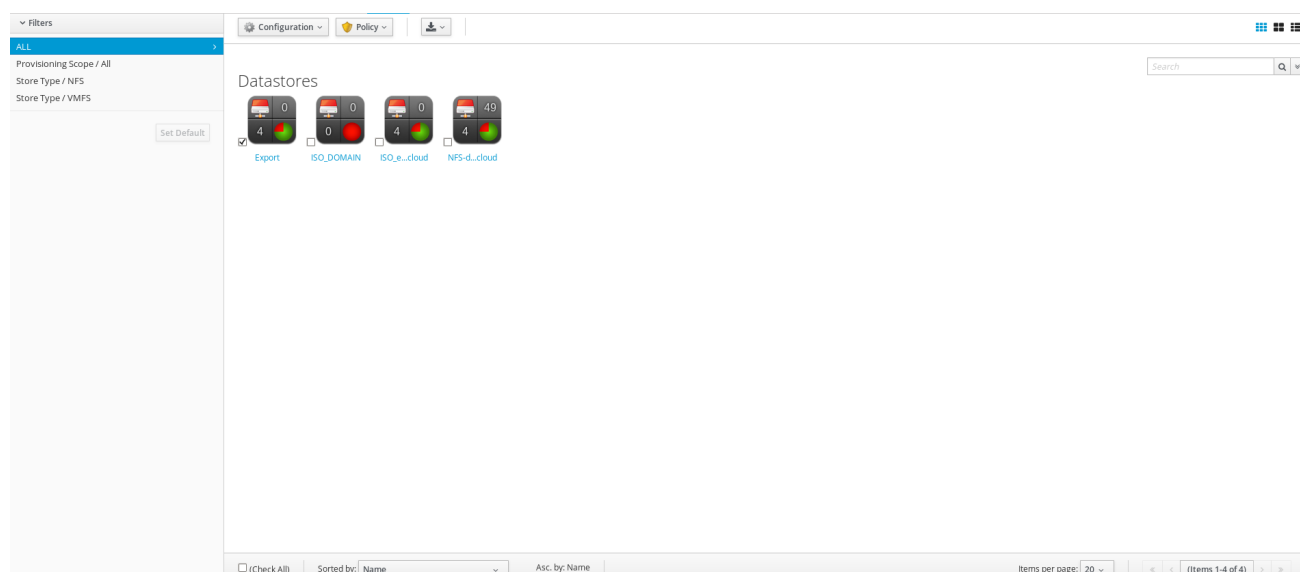
### 4.4. RESOURCE POOLS ACCORDION

Use the **Resource Pools** accordion to access the properties and objects associated with the resource pool.

- Click **Properties** to view the Resource Pools summary screen.
- Click **Relationships** to see the clusters, virtual machines, and hosts related to this resource pool.

## CHAPTER 5. DATASTORES

A storage location is considered a device where digital information resides and is connected to a resource. Red Hat CloudForms detects, analyzes, and collects capacity and utilization data for both VMFS and NFS datastores. Datastores connected to a provider are automatically created on discovery. On creation of a repository, a datastore is automatically created.



After detecting datastores, you might want to examine them more closely to see virtual machines, hosts, and available space.



1. File system type
2. Number of hosts
3. Number of virtual machines
4. Available space



### 5.1. PERFORMING SMARTSTATE ANALYSIS ON DATASTORES

Analyze a datastore to collect information on the types of files on a datastore, and to see the number of managed/registered, managed/unregistered, and unmanaged virtual machines. To perform a SmartState analysis, the datastore is accessible from a running host and valid security credentials are supplied for that host.



#### NOTE

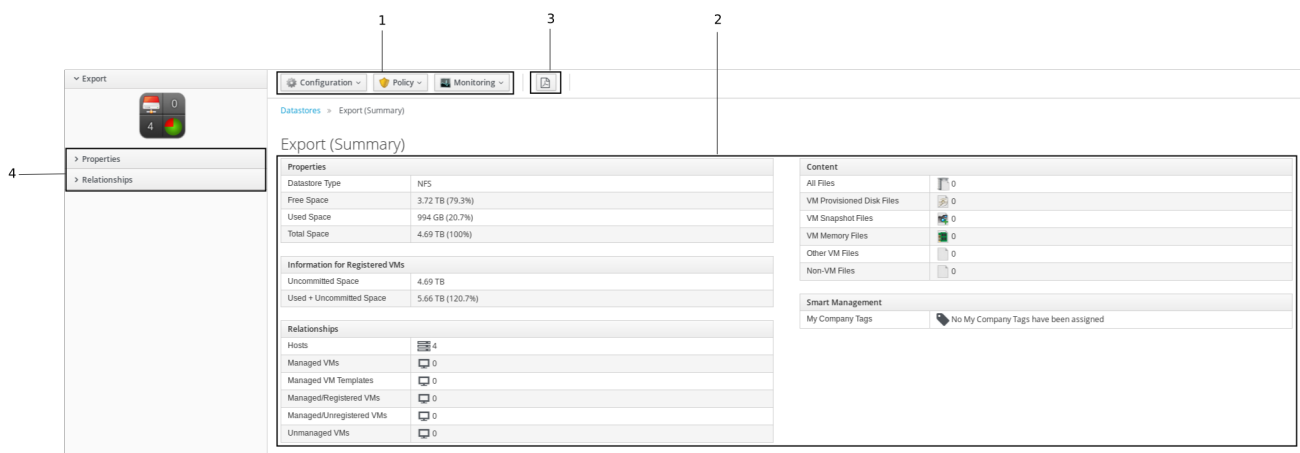
Be aware that executing a SmartState analysis on a datastore from the console takes a while to return data on the content. If capacity and utilization roles are enabled, Red Hat CloudForms performs the analysis automatically on a scheduled basis approximately every 24 hours.

1. Navigate to **Compute** → **Infrastructure** → **Datastores**.
2. Select the datastores to analyze.
3. Click  (**Configuration**), and then  (**Perform SmartState Analysis**).
4. Click **OK**.

## 5.2. VIEWING A DATASTORE

You can click on a specific datastore to view its details. The screen provides you with a datastore taskbar, virtual thumbnail, accordion, and summary.

### Datastore Management Screen



1. **Datastore Taskbar:** Choose between **Configuration**, **Policy** and **Monitoring** options for the selected datastore.
2. **Datastore Summary:** See summary such as datastore properties, storage, VM information.
3. **Datastore PDF:** Generates datastore summary in PDF format.
4. **Datastore Accordion:** See details about **Properties**, **Relationships**, **Storage Relationships** and **Content** for the chosen datastore.





### NOTE



To view **Content** section details, run a SmartState Analysis on the datastore. For information on how to perform SmartState Analysis, see [Performing SmartState Analysis on Datastores](#).

## 5.3. TAGGING A DATASTORE

Use tags to categorize a datastore.

1. Navigate to **Compute** → **Infrastructure** → **Datastores**.
2. Click the datastore to tag.
3. Click  (**Policy**), and then  (**Edit Tags**).

- Select a customer tag from the first list, and then a value for the tag from the second list.

| Select a customer tag to assign: Environment *                                    |               | <Select a value to assign> |
|---|---------------|----------------------------|
|   | Category      | Assigned Value             |
|  | Cost Center * | Cost Center 001            |
|  | Environment * | Quality Assurance          |

\* Only a single value can be assigned from these categories

- Select more tags as required.
- Click **Save**.



## 5.4. VIEWING CAPACITY AND UTILIZATION CHARTS FOR A DATASTORE

You can view capacity and utilization data for a datastore.



### NOTE

Red Hat CloudForms requires network visibility to your provider assigned the server role of Capacity & Utilization Collector to enable this feature.

- Navigate to **Compute** → **Infrastructure** → **Datastores**, then click the Datastore for which to view Capacity and Utilization data.
- Click  (**Monitoring**), and then  (**Utilization**).
- From **Interval**, select to view hourly or daily data points and the dates to view data.
- Use **Show VM Types** to include only managed/registered, managed/unregistered, or unmanaged virtual machines.

- **Managed/Registered VM** - A virtual machine connected to a host and exists in the VMDB. Also, a template connected to a management system and exists in the VMDB.



### NOTE

Templates cannot be connected to a host.

- **Managed/Unregistered VM** - A virtual machine or template that resides on a repository that is no longer connected to a management system or host, but exists in the VMDB. A virtual machine previously considered registered might become unregistered if the virtual machine is removed from management system inventory.
  - **Not Managed** - Files discovered on a datastore that do not have a virtual machine associated with them in the VMDB. These files might be registered to a management system that Red Hat CloudForms does not have configuration information. Possible causes might be the management system has not been discovered or the management system has been discovered but no security credentials are provided.
- Use **Time Profiles** to select a time range for the data.



**NOTE**

Daily charts only include full days of data. If a day does not include all the 24 data points for a day, the data does not show for that day.

For information about data optimization including utilization trend reports, see [Chapter 6, Data Optimization](#).

## 5.5. REMOVING A DATASTORE

If a datastore no longer contains any files associated with the virtual environment, remove it from the VMDB. This button is enabled only if a datastore is completely empty.

1. Navigate to **Compute** → **Infrastructure** → **Datastores**.
2. Click on the Datastore to remove.
3. Click  (**Configuration**), and then  (**Remove Datastore from Inventory**).
4. Click **OK**.

## CHAPTER 6. DATA OPTIMIZATION

Red Hat CloudForms optimization functions allow you to view utilization trends, and identify and project bottlenecks in your environment. In addition, you can predict where you have capacity for additional virtual machines, see [Planning Where to Put a New Virtual Machine](#) in the *Deployment Planning Guide*.



### NOTE

- To access the utilization and bottleneck report features, you will first need to enable data collection in Red Hat CloudForms; see the following sections in the *Deployment Planning Guide*:
  - [Assigning the Capacity and Utilization Server Roles](#)
  - [Capacity and Utilization Data Collected](#)
- For reporting of daily optimization data, incomplete days (days with less than 24 hourly data points from midnight to midnight) that are at the beginning or end of the requested interval are excluded. Days with less than 24 hourly data points would be inaccurate and including them would skew trend lines, therefore, the **Optimize** page requires at least two full days of daily data. All charted values are derived from trend calculations that requires at least two data points.

## 6.1. UTILIZATION TRENDS

Red Hat CloudForms allows you to view the resource utilization of your clusters, providers, and datastores. You can choose from summary, details, or report view.

### 6.1.1. Viewing a Utilization Trend Summary

This procedure shows you how to view a utilization trend summary.

1. Navigate to **Optimize** → **Utilization**.
2. Click **Summary** if it is not already selected.
3. Expand the tree on the left side, until you can see the desired providers, clusters, or datastores.
4. Click on the item.
5. Use the **Options** section in the **Summary** tab to change the characteristics of the data.
  - Use **Trends** to select how far back you want to calculate the trend.
  - Use **Selected Day** for the date you want to see percent utilization for in the chart on the **Summary** tab.
  - Use **Classification** to only see trends for a specific applied tag.
  - Use **Time Profile** to select an existing time profile. If the logged on user does not have any time profiles available, this option will not show.
  - Select a **Time Zone**.

### 6.1.2. Viewing Detail Lines of a Utilization Trend

This procedure shows you how to view detail lines of a utilization trend.

1. Navigate to **Optimize** → **Utilization**.
2. Expand the tree on the left side, until you can see the desired providers, clusters, or datastores.
3. Click on the item.
4. Click **Details** if it is not already selected.
5. From the **Options** area, select how far back you want to view the trends for and any classifications you want to use.

### 6.1.3. Viewing a Report of a Utilization Trend

To find out more about resource utilization, view utilization trend reports.

1. Navigate to **Optimize** → **Utilization**.
2. Expand the tree on the left side, until you can see the desired providers, clusters, or datastores.
3. Click on the item.
4. Click **Report** if it is not already selected.
5. From the **Options** area, select how far back you want to view the trends for and any classifications you want to use.

## 6.2. BOTTLENECKS

Red Hat CloudForms can show where bottlenecks occur in your virtual infrastructure. You can view them either on a timeline or as a report which can be downloaded for further analysis.

### 6.2.1. Prerequisites

- Bottleneck reports use the same mechanism to gather data as capacity and utilization reports. To enable data collection in Red Hat CloudForms, see the following sections:
  - [Assigning the Capacity and Utilization Server Roles](#)
  - [Capacity and Utilization Data Collected](#)
- Additionally, configure your Red Hat CloudForms for collecting capacity and utilization reports for clusters and datastores by following this procedure:
  - a. From the settings menu, select **Configuration**.
  - b. Select **Region** from the **Settings** tab in the left pane of the appliance.
  - c. In the right pane, under the **C & U Collection** tab, check the boxes for **Collect for All Clusters** under **Clusters** and **Collect for All Datastores** under **Datastores**, or check the boxes for the clusters/datastores you desire.

**NOTE**

**Collect for All Clusters** must be checked to be able to collect capacity and utilization data from cloud providers such as Red Hat OpenStack or Amazon EC2.

d. Click **Save**.

- For bottleneck reports to work as expected, the data collection for capacity and utilization reports should also be enabled for the relevant backend provider. See the following documentation to enable data collection for Red Hat Enterprise Virtualization and Red Hat Enterprise Linux OpenStack Platform provider:
  - For Red Hat Enterprise Virtualization: [Data Collection for Red Hat Enterprise Virtualization](#)
  - For Red Hat Enterprise Linux OpenStack Platform: [Data Collection for Red Hat Enterprise Linux OpenStack Platform](#)

**NOTE**

For reporting of daily bottleneck data, incomplete days (days with less than 24 hourly data points from midnight to midnight) that are at the beginning or end of the requested interval are excluded. Days with less than 24 hourly data points would be inaccurate and including them would skew trend lines. Therefore, at least one full day of hourly data from midnight to midnight is necessary for displaying the bottleneck charts under the **Optimize** tab.

## 6.2.2. Viewing the Bottleneck Summary

To find out more about bottleneck capacity or utilization, view a bottleneck summary.

1. Navigate to **Optimize** → **Bottlenecks**.
2. Click **Summary** if it is not already selected.
3. Expand the tree on the left side, until you can see the desired providers, clusters, or datastores.
4. Click on the item.
5. Use the **Options** section to change the characteristics of the data.

The screenshot shows the 'Options' section of the Red Hat CloudForms interface. It contains three input fields: 'Event Groups', 'Show Host Events', and 'Time Zone'. The 'Event Groups' dropdown menu is open, displaying three options: '<ALL>', 'Capacity', and 'Utilization'. The 'Time Zone' dropdown menu shows '(GMT+00:00) UTC'.

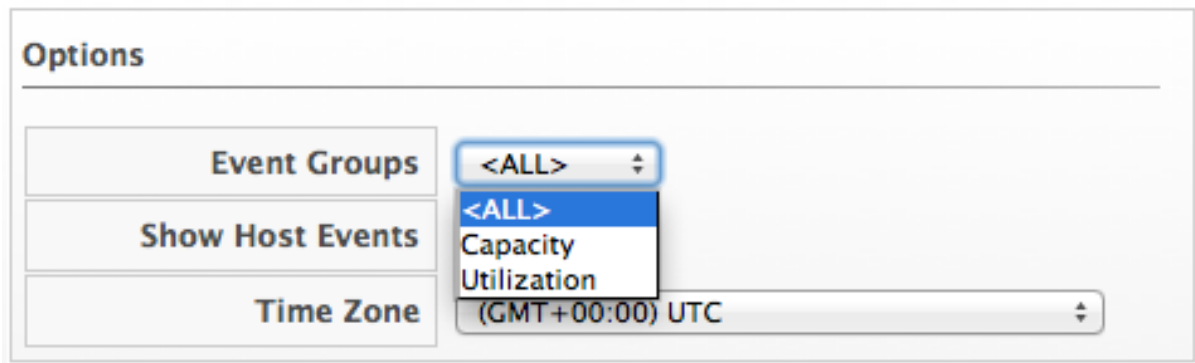
- Use **Event Groups** to select if you want to see bottlenecks based on capacity, utilization or both.
- Select a **Time Zone**.



Data is processed, and a timeline appears. Click on an icon in the timeline to see specific information on the bottleneck.

### 6.2.3. Viewing a Report of the Bottlenecks Trend

1. Navigate to **Optimize** → **Bottlenecks**.
2. Click **Report**.
3. Expand the tree on the left side, until you can see the desired providers, clusters, or datastores.
4. Click on the item.
5. Use the **Options** section to change the characteristics of the data.



The screenshot shows the 'Options' section of the Bottlenecks Report. It contains three main configuration areas:

- Event Groups:** A dropdown menu currently showing '<ALL>'. The dropdown is open, revealing options: '<ALL>', 'Capacity', and 'Utilization'.
- Show Host Events:** A checkbox or toggle switch.
- Time Zone:** A dropdown menu currently showing '(GMT+00:00) UTC'.

- Use **Event Groups** to select if you want to see bottlenecks based on capacity, utilization or both.
  - Select a **Time Zone**.
6. Expand the tree on the left side, until you can see the enterprise, provider, or datastore that you want to see the trend for.

## CHAPTER 7. PXE SERVERS

PXE servers are used by Red Hat CloudForms to bootstrap virtual machines for the purpose of provisioning. They include images for different operating systems that can be customized using customization templates and are used in conjunction with IPMI Servers.

## CHAPTER 8. AVAILABILITY ZONES

An availability zone is a provider-specific method of grouping cloud instances and services. Red Hat CloudForms uses Amazon EC2 regions, OpenStack Nova zones, and Google Compute Engine regions as availability zones.

### 8.1. VIEWING AN AVAILABILITY ZONE

You can click on an availability zone to view its details. The screen provides you with an availability zone accordion and an availability zone summary page.

- You can choose between graphical or text view of the datastore summary.
- Use the availability zone accordion to view the **Properties** of the zone and its **Relationships** to other cloud resources.
- Use the availability zone summary to see details on **Relationships (Cloud Provider, Instances)** and **Smart Management (Company Tags)**.

### 8.2. VIEWING AVAILABILITY ZONE RELATIONSHIPS

Use the availability zone accordion's **Relationship** section to see items related to an availability zone.

1. Navigate to **Compute** → **Clouds** → **Availability Zones**.
2. Click the availability zone to view the configuration.
3. From the availability zone accordion, click **Relationships**.
4. Click the type of resource relationship to view as a list.

## CHAPTER 9. TENANTS

A Tenant is an OpenStack term for an organizational unit or project. OpenStack uses tenants for the following reasons:

- Assigning users to a project
- Defining quotas for a project
- Applying access and security rules for a project
- Managing resources and instances for a project

This helps administrators and users organize their OpenStack environment and define limits for different groups of people. For example, one project might require higher quotas and another project might require restricted access to certain ports. OpenStack allows you to define these limits and apply them to a project.

Red Hat CloudForms can abstract information from tenants including quotas and relationships to other OpenStack objects.

To see multiple tenants in Red Hat CloudForms, the user authenticating to your OpenStack environment from Red Hat CloudForms must be configured to have visibility into these tenants.

### 9.1. TENANT MAPPING

When adding an OpenStack cloud or infrastructure provider, you can enable *tenant mapping* in CloudForms to map any existing tenants from that provider. This means CloudForms will create new cloud tenants to match each existing OpenStack tenant; each new cloud tenant and its corresponding OpenStack tenant will have identical resources assignments, with the exception of quotas. Tenant quotas are not synchronized between CloudForms and OpenStack, and are available for reporting purposes only. You can manage quotas in CloudForms but this will not affect the quotas created in OpenStack.

During a provider refresh, CloudForms will also check for any changes to the tenant list in OpenStack. CloudForms will create new cloud tenants to match any new tenants, and delete any cloud tenants whose corresponding OpenStack tenants no longer exist. CloudForms will also replicate any changes to OpenStack tenants to their corresponding cloud tenants.

### 9.2. VIEWING A TENANT

Click on a specific tenant to view its details. The screen provides you with a tenant accordion and a tenant summary.

- Use tenant summary Views to change how you are looking at the **Summary**.
- Use the tenant accordion to view the **Properties** of the tenant and its **Relationships**.
- Use the tenant summary to see details on **Relationships** (**Cloud Provider**, **Security Groups**, **Instances**, and **Images**), **Quotas** (including all OpenStack **Compute**, **Network**, and **Volume** quotas) and **Smart Management** (**Company Tags**).

### 9.3. VIEWING TENANT RELATIONSHIPS

Use the tenant accordion's **Relationship** section to see items related to the tenant.

1. Navigate to **Compute** → **Clouds** → **Tenants**.
2. Click a tenant to view the configuration.
3. From the tenant accordion, click **Relationships**.
4. Click the type of **Resource** to see the flavor's relationships.

## CHAPTER 10. VOLUMES

A volume is a block storage device that you can attach to or detach from an instance to manage the storage available to that instance. Volumes are managed through storage managers, which are added automatically to Red Hat CloudForms when the corresponding provider is added.



### 10.1. AMAZON ELASTIC BLOCK STORE MANAGER VOLUMES

This section outlines the actions that you can perform on Amazon Elastic Block Store manager volumes.

#### 10.1.1. Creating Volumes

You can create and attach volumes to your storage manager.

To create a volume:

1. Navigate to **Storage** → **Block Storage** → **Volumes**.
2. Click  (**Configuration**), then click  (**Add a new Cloud Volume**).
3. Select the Amazon Elastic Block Store manager from the **Storage Manager** list.
4. Select an availability zone from the **Availability Zone** list.
5. Enter a **Volume Name**.
6. Select the type of the volume from the **Cloud Volume Type** list.



#### NOTE

See [Amazon EBS Volume Types](#) for more information on volume types.



7. Enter the size of the volume in gigabytes (GB).
8. Select whether the volume should be encrypted using the **Encryption** toggle.
9. Click **Add**.

The volume appears in the list of volumes after it has been provisioned.

#### 10.1.2. Creating a Snapshot of a Volume

You can create a snapshot of a volume to preserve the state of the volume at a specific point in time. The snapshot can be used to create a duplicate of the volume.

To create a snapshot of a volume:



1. Navigate to **Storage** → **Block Storage** → **Volumes**.
2. Click the volume to snapshot to open the volume's summary page.
3. Click  (**Configuration**), then click  (**Create a Snapshot of this Cloud Volume**).

4. Enter a name for the snapshot in **Snapshot Name**.
5. Click **Save**.

Click **Cloud Volume Snapshots** on the summary page of a volume to view the snapshots for that volume.



### 10.1.3. Attaching a Volume to an Instance

To attach a volume to an instance:

1. Navigate to **Storage** → **Block Storage** → **Volumes**.
2. Select the volume to attach.
3. Click  (**Configuration**), then click  (**Attach selected Cloud Volume to an Instance**) to open the **Attach Cloud Volume** screen.
4. Select an instance from the list.
5. Optionally, enter a **Device Mountpoint**.
6. Click **Attach**.

### 10.1.4. Detaching a Volume from an Instance



To detach a volume from an instance:

1. Navigate to **Storage** → **Block Storage** → **Volumes**.
2. Select the volume to detach.
3. Click  (**Configuration**), then click  (**Detach selected Cloud Volume from an Instance**) to open the **Detach Cloud Volume** screen.
4. Select an instance from the list.
5. Click **Detach**.

### 10.1.5. Editing a Volume

You can edit several properties of existing volumes.

To edit a volume:

1. Navigate to **Storage** → **Block Storage** → **Volumes**.
2. Select the volume to edit to open its summary page.
3. Click  (**Configuration**), then click  (**Edit this Cloud Volume**).
4. Enter a new **Volume Name**.
5. Select a new volume type from the **Cloud Volume Type** list.

**NOTE**

See [Amazon EBS Volume Types](#) for more information on each of the volume types.

6. Enter a new size in gigabytes.
7. Click **Save**.

### 10.1.6. Deleting a Volume

To delete a volume from a storage manager:

1. Navigate to **Storage** → **Block Storage** → **Volumes**.
2. Select the volume to delete.
3. Click  (**Configuration**), then click  (**Delete selected Cloud Volumes**).

## 10.2. OPENSTACK BLOCK STORAGE MANAGER VOLUMES

This section outlines the actions that you can perform on OpenStack Block Storage manager volumes.



### 10.2.1. Creating Volumes

You can create and attach volumes to your storage manager.

To create a volume:

**IMPORTANT**

After creating a volume, only the volume name can be edited.

1. Navigate to **Storage** → **Block Storage** → **Volumes**.
2. Click  (**Configuration**), then click  (**Add a new Cloud Volume**).
3. Select the OpenStack Block Storage manager from the **Storage Manager** list.
4. Enter a **Volume Name**.
5. Enter the size of the volume in gigabytes (GB).
6. Under **Placement**, select the cloud tenant to attach it to.
7. Click **Add**.

The volume appears in the list of volumes after it has been provisioned.

### 10.2.2. Creating a Backup of a Volume

You can create a backup of a volume to protect against data loss, and restore it in the future.







## IMPORTANT

For OpenStack Block Storage managers, the **openstack-cinder-backup** service must be enabled on the OpenStack Block Storage manager to create a volume backup.

To create a backup of a volume:

1. Navigate to **Storage** → **Block Storage** → **Volumes**.
2. Click the volume you want to back up to open the volume's summary page.
3. Click  (**Configuration**), then click  (**Create a Backup of this Cloud Volume**).
4. Enter a name for the backup in **Backup Name**.
5. (Optional) Select **Incremental?** to take an incremental backup of the volume instead of a full backup.



## NOTE

You can take an incremental backup of a volume if you have at least one existing full backup of the volume. An incremental volume saves resources by capturing only changes made to the volume since its last backup. See [Create an Incremental Volume Backup](#) in the *Storage Guide* for more information.

6. (Optional) Select **Force?** to allow backup of a volume attached to an instance.

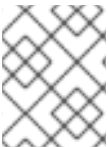


## NOTE

Selecting the **Force** option will back up the volume whether its status is *available* or *in-use*. Backing up an *in-use* volume ensures data is crash-consistent.

7. Click **Save**.

View a volume's backups by clicking **Cloud Volume Backups** on the volume's summary page.





## NOTE

See [Back Up and Restore a Volume](#) in the *Storage Guide* for more information about backups.

### 10.2.3. Restoring a Volume from a Backup


In case of data loss, you can restore a volume from a backup with the following steps:

1. Navigate to **Storage** → **Block Storage** → **Volumes**.
2. Click the volume whose backup you want to restore. This will open the volume's summary page.
3. Click  (**Configuration**), then click  (**Restore from a Backup of this Cloud Volume**).
4. Select the volume to restore from in the **Cloud Volume Backup** list.

5. Click **Save**.



### 10.2.4. Restoring a Cloud Volume from a Backup

In case of data loss, you can restore from a cloud volume backup with the following steps:

1. Navigate to **Storage** → **Block Storage** → **Volume Backups**.
2. Select a **Cloud Volume Backup** to restore.
3. Click  (**Configuration**), then click  (**Restore backup to Cloud Volume**).
4. Select the **Volume** to restore from the backup.
5. Click **Save**.

### 10.2.5. Deleting a Cloud Volume Backup



Delete unnecessary cloud volume backups through the following steps:

1. Navigate to **Storage** → **Block Storage** → **Volume Backups**.
2. Select the **Cloud Volume Backups** to delete.
3. Click  (**Configuration**), then click  (**Delete selected Backups**).
4. Click **OK** to confirm your choice.

### 10.2.6. Creating a Snapshot of a Volume

You can create a snapshot of a volume to preserve the state of the volume at a specific point in time. The snapshot can be used to create a duplicate of the volume.

To create a snapshot of a volume:

1. Navigate to **Storage** → **Block Storage** → **Volumes**.
2. Click the volume to snapshot to open the volume's summary page.
3. Click  (**Configuration**), then click  (**Create a Snapshot of this Cloud Volume**).
4. Enter a name for the snapshot in **Snapshot Name**.
5. Click **Save**.

Click **Cloud Volume Snapshots** on the summary page of a volume to view the snapshots for that volume.





#### NOTE

See [Create, Use, or Delete Volume Snapshots](#) in the *Storage Guide* for more information about snapshots.



### 10.2.7. Attaching a Volume to an Instance

To attach a volume to an instance:

1. Navigate to **Storage** → **Block Storage** → **Volumes**.
2. Select the volume to attach.
3. Click  (**Configuration**), then click  (**Attach selected Cloud Volume to an Instance**) to open the **Attach Cloud Volume** screen.
4. Select an instance from the list.
5. Optionally, enter a **Device Mountpoint**.
6. Click **Attach**.

### 10.2.8. Detaching a Volume from an Instance



To detach a volume from an instance:

1. Navigate to **Storage** → **Block Storage** → **Volumes**.
2. Select the volume to detach.
3. Click  (**Configuration**), then click  (**Detach selected Cloud Volume from an Instance**) to open the **Detach Cloud Volume** screen.
4. Select an instance from the list.
5. Click **Detach**.

### 10.2.9. Editing a Volume

Only the volume name can be edited on an existing volume.

To edit a volume's name:

1. Navigate to **Storage** → **Block Storage** → **Volumes**.
2. Select the volume to edit to open its summary page.
3. Click  (**Configuration**), then click  (**Edit this Cloud Volume**).
4. Enter the new **Volume Name**.
5. Click **Save**.

### 10.2.10. Deleting a Volume

To delete a volume from a storage manager:

1. Navigate to **Storage** → **Block Storage** → **Volumes**.

2. Select the volume to delete.

3. Click  (**Configuration**), then click  (**Delete selected Cloud Volumes**).

## CHAPTER 11. FLAVORS

Flavors indicate the resource profiles available for instances. Each flavor contains a value set for CPUs, CPU cores and memory. Flavors allow you to pre-configure resource settings, which you can then apply during instance provisioning. You can also change the flavor of a provisioned instance; see [Section 13.19, “Resizing an Instance”](#) for instructions.

Red Hat CloudForms provides the ability to view individual flavor information and instances currently using the flavor.

### 11.1. VIEWING A FLAVOR

You can click on a specific flavor to view its details. The screen provides you with a flavor accordion and a flavor summary.

- Use flavor summary views to change how you are looking at the summary.
- Use the flavor accordion to view the **Properties** of the flavor and its **Relationships**.
- Use the flavor summary to see details on **Properties (CPUs, CPU Cores, Memory)**, **Relationships (Cloud Provider, Instances)**, and **Smart Management (Company Tags)**.

### 11.2. VIEWING FLAVOR RELATIONSHIPS

Use the **Relationship** section in the flavor accordion to see items related to the flavor.

1. Navigate to **Compute** → **Clouds** → **Flavors**.
2. Click a flavor to view the configuration.
3. From the flavor accordion, click **Relationships**.
4. Click the type of resource to see the flavor’s relationships.

## CHAPTER 12. CLOUD NETWORKS

Red Hat CloudForms enables configuration and administration for the software-defined networking component of Red Hat OpenStack Platform. The virtual network infrastructure enables connectivity between instances and the physical external network.

This section describes common cloud network administration tasks, such as adding and removing subnets and routers to suit your Red Hat OpenStack Platform providers.

### 12.1. CREATING AND ADMINISTERING CLOUD NETWORKS

Create a network to provide instances a place to communicate internally and receive IP addresses using Dynamic Host Configuration Protocol (DHCP). A network can also be integrated with external networks in your Red Hat OpenStack Platform deployment or elsewhere, such as the physical network.




#### NOTE

- Keystone API v3 is required to create cloud tenants on Red Hat OpenStack Platform cloud providers. For more information, see [OpenStack Identity \(keystone\)](#) in the Red Hat OpenStack Platform *Architecture Guide*.
- For further details on cloud network objects and administration, see the [Networking Guide](#) in the Red Hat OpenStack Platform documentation..


#### 12.1.1. Adding a Cloud Network

Add a new cloud network following the steps in this procedure:

1. Navigate to **Networks** → **Networks**.
2. Click  (**Configuration**) and click **Add a new Cloud Network**.
3. In the **Network Providers** area, select a **Network Manager** from the drop-down menu.
4. Under **Placement**, select a **Cloud Tenant**.
5. In the **Network Provider Information** section, choose a **Provider Network Type**.
  - If **Local** is selected, provide a **Physical Network** name.
  - If **GRE** is selected, provide a **Physical Network** name and **Segmentation ID**.
6. In the **Network Information** area:
  - a. Provide a descriptive **Network Name** based on the role the network will perform.
  - b. Enable an **External Router**
  - c. Set the **Administrative State** to control whether the network is immediately available.
  - d. Establish **Shared** status of the network.
7. Click **Add**.


#### 12.1.2. Editing Cloud Network Details

To edit network information details of a cloud network:

1. Navigate to **Networks** → **Networks**.
2. Select a network from the list view.
3. Click  (**Configuration**), then  (**Edit selected Cloud Network**).
4. Edit **Network Information** fields.
5. Click **Save**.

### 12.1.3. Deleting a Cloud Network

To delete a cloud network:

1. Navigate to **Networks** → **Networks**.
2. Select a cloud network from the list view.
3. Click  (**Configuration**), then click **Delete selected Cloud Networks**.

## 12.2. CREATING AND ADMINISTERING SUBNETS


Red Hat CloudForms enables creation and administration of subnets for your cloud networks. Create subnets in pre-existing networks as means to grant network connectivity to instances. Subnets are the means by which instances are granted network connectivity. Each instance is assigned to a subnet as part of the instance creation process.

Consider proper placement of instances to best accommodate their connectivity requirements:

- Tenant networks in OpenStack Networking can host multiple subnets.
- Subnets are isolated from one another.
- Host distinctly different systems on different subnets within the same network.
- Instances on one subnet that wish to communicate with another subnet must have traffic directed by a router.
- Place systems requiring a high volume of traffic amongst themselves in the same subnet, avoiding routing and subsequent latency and load issues.

### 12.2.1. Adding a Subnet

Add a subnet to an existing cloud network following the procedure below.

1. Navigate to **Networks** → **Subnets**.
2. Click  (**Configuration**), then click **Add a new Cloud Subnet**.
3. Select a **Network Manager**.
4. Under **Placement**, select a **Cloud Tenant**.

5. Provide the following **Cloud Subnet** details:
  - a. A descriptive **Subnet Name**.
  - b. The **Gateway** IP address of the router interface for the default gateway.
  - c. **Enable DHCP** services for the subnet. DHCP allows automated distribution of IP settings to instances.
  - d. Select the **IP Version**. The IP address range in the Network Address field must match whichever version you select.
  - e. Input the **Subnet CIDR** address in CIDR format, which contains the IP address range and subnet mask in one value.





#### NOTE

Determine the address by calculating the number of bits masked in the subnet mask and append that value to the IP address range. For example, the subnet mask 255.255.255.0 has 24 masked bits. To use this mask with the IPv4 address range 192.168.122.0, specify the address 192.168.122.0/24.

### 12.2.2. Editing a Cloud Subnet

To edit the details of a cloud subnet:

1. Navigate to **Networks** → **Subnets**.
2. Click on a subnet from the list view.
3. Click  (**Configuration**), then  (**Edit this Cloud Subnet**).
4. Edit **Cloud Subnet details** fields.
5. Click **Save**.

## 12.3. CONFIGURING NETWORK ROUTERS


Red Hat CloudForms enables configuration for Red Hat OpenStack Platform provider cloud network routing services using an SDN-based virtual router.

- Routers are a requirement for your instances to communicate with external subnets, including those out in the physical network.
- Routers and subnets connect using interfaces, with each subnet requiring its own interface to the router.
- A router's default gateway defines the next hop for any traffic received by the router.
- A router's network is typically configured to route traffic to the external physical network using a virtual bridge.

### 12.3.1. Adding a Network Router





Add a network router to an existing cloud network by following the procedure below.

1. Navigate to **Networks** → **Network Routers**.
2. Click  (**Configuration**) and click **Add a new Router**.
3. In the **Network Provider** area, select a **Network Manager**.
4. Provide a **Router Name**.
5. Under **External Gateway**:
  - a. If **Yes** is selected, provide the following:
    - i. Choose to **Enable Source NAT**. In Source Network Address Translation (SNAT), the NAT router modifies the IP address of the sender in IP packets. SNAT is commonly used to enable hosts with private addresses to communicate with servers on the public Internet.
    - ii. Select a **Network**.
    - iii. Select a **Subnet**.
6. Select a **Cloud Tenant**.
7. Click **Add**.

### 12.3.2. Editing Network Router Details



To edit the details of a network router:

1. Navigate to **Networks** → **Network Routers**.
2. Select a network router from the list view.
3. Click  (**Configuration**), then  (**Edit selected Router**).
4. Edit required fields.
5. Click **Save**.

### 12.3.3. Adding an Interface to a Network Router

Interfaces allow you to interconnect routers with subnets. As a result, the router can direct any traffic that instances send to destinations outside of their intermediate subnet.

To add an interface to a network router:



1. Navigate to **Networks** → **Network Routers**.
2. Select a network router from the list view.
3. Click  (**Configuration**), then  (**Add Interface to this Router**).
4. Select a **Subnet** from the list.

5. Click **Add**.

### 12.3.4. Removing a Network Router Interface


You can remove an interface to a subnet if you no longer require the router to direct its traffic.

To remove an interface:

1. Navigate to **Networks** → **Network Routers**.
2. Select a network router in the list view.
3. Click  (**Configuration**), then  (**Remove Interface from this Router**).
4. Confirm your choice.

### 12.3.5. Deleting a Network Router

To delete a network router:

1. Navigate to **Networks** → **Network Routers**.
2. Select a network router from the list view.
3. Click  (**Configuration**), then click **Delete selected Routers**.

## 12.4. CREATING FLOATING IPS

Floating IP addresses allow you to direct ingress network traffic to your cloud network instances. Define a pool of validly routable external IP addresses, which can then be dynamically assigned to an instance. All incoming traffic destined for that floating IP is routed to the instance to which it has been assigned.




### NOTE

Red Hat OpenStack Networking allocates floating IP addresses to all projects (tenants) from the same IP ranges/CIDRs. As a result, every subnet of floating IPs is consumable by any and all projects. Manage this behavior using quotas for specific projects.

### 12.4.1. Adding Floating IPs.

Floating IP addresses allow you to direct ingress network traffic to your instances.



Add floating IP addresses to an existing cloud network by following the procedure below.

1. Navigate to **Networks** → **Floating IPs**.
2. Click  (**Configuration**) and click Add a new Floating IP.
3. Select a **Network Manager**.
4. Choose an **External Network**
5. Under **Association Information** provide the following:

- a. (Optional) An **Associated Port** for the floating IP.
- b. (Optional) The **Floating IP Address**.
6. Select a **Cloud Tenant**.
7. Click **Add**.


### 12.4.2. Managing Port Association of a Floating IP

To manage the port associations of a floating IP:

1. Navigate to **Networks** → **Floating IPs**.
2. Click on a floating IP from the list view.
3. Click  (**Configuration**), then  (**Manage the port association of this Floating IP**).
4. To associate a port, add a new **Port id**
5. To disassociate a port, delete the **Port id** field information.
6. Click **Save**.

### 12.4.3. Deleting a Floating IP

To delete a floating IP

1. Navigate to **Networks** → **Floating IPs**.
2. Click on a floating IP from the list view to view its summary page.
3. Click  (**Configuration**), then click **Delete this Floating IP**.

## 12.5. SECURITY GROUPS

You can group instances using security groups to restrict port or IP address accessibility. Security groups can be created and assigned to instances using Red Hat CloudForms instance provisioning.



Cloud providers that currently support this function include: Amazon EC2, OpenStack, and Red Hat Enterprise Virtualization.

### 12.5.1. Editing Security Group Details

Editing security group information allows users to make changes to existing security group details and firewall rules, in addition to adding new firewall rules.

To edit details of a security group:

1. Navigate to **Networks** → **Security Groups**.
2. Click on a security group to view the summary page.

3. Click  (**Configuration**), then  (**Edit this Security Group**).
4. Under **Security Group Information**, edit the **Security Group Name** and the **Security Group Description**.
5. Edit existing **Firewall Rules** or add new firewall rules by clicking **Add a Firewall Rule**.
6. Click **Save**.

### 12.5.2. Viewing Security Groups

This procedure describes how to view security groups.

1. Navigate to **Networks** → **Security Groups**.
2. Click the desired security groups for viewing the details.
  - In **Properties**, you can view the basic information of the security group.
  - In **Relationships**, you can view the cloud provider and the instances associated with the security group.
  - In **Firewall Rules**, you can view a list of ports and IP ranges that are accessible.





#### NOTE

This box is not available if you have not set any rules for your security group.


### 12.5.3. Tagging Security Groups

Apply tags to security groups to categorize them.

1. Navigate to **Networks** → **Security Groups**.
2. Select the security group to tag.
3. Click  (**Policy**), and then  (**Edit Tags**).
4. Select a customer tag to assign from the dropdown menu.
5. Select a value to assign.
6. Click **Save**.

### 12.5.4. Deleting a Security Group

To delete a security group:

1. Navigate to **Networks** → **Security Groups**.
2. Click on a security group in the list view to view its summary page.
3. Click on  (**Configuration**), then click **Delete this Security Group**.

## CHAPTER 13. INSTANCES AND IMAGES

**Images** are the static templates containing the software configuration from which you provision a running **Instance** - a virtual machine, with which you can interact - on your cloud provider.

The **Instance** and **Images** containers, combined with the ability to analyze information inside each instance or image, provides in-depth information across the cloud environment. This rich set of information enables Red Hat CloudForms users to improve problem resolution times and effectively manage instances and images in their cloud environment.

The **Instances** and **Images** pages display all instances and images the server discovered from your cloud providers. The taskbar on each page is a menu driven set of buttons that provide access to functions related to instances and images.

10

1 2 3 4 5

6 Search

9 All Images by Provider

|  | Name  | Provider | Type  | Compliant | Allocated Size | Architecture | Virtualization Type | Root Device Type | Last Analysis Time | CFME Region |
|--|---|----------|-------|-----------|----------------|--------------|---------------------|------------------|--------------------|-------------|
|  | Atomic-7.2_HVM_GA-20151112-x86_64-1-Access2-GP2 |          | Image |           | 0 Bytes        | 64 bit       | hvm                 | ebs              |                    | Region 1    |
|  | cirros  | OSP      | Image |           | 12.7 MB        |              |                     | qcow2            |                    | Region 1    |
|  | hvmTest   |          | Image |           | 0 Bytes        | 32 bit       | hvm                 | ebs              |                    | Region 1    |
|  | RHEL-5.10_GA-i386-7-Access2                     |          | Image |           | 0 Bytes        | 32 bit       | paravirtual         | ebs              |                    | Region 1    |
|  | RHEL-5.10_GA-i386-8-Access2                     |          | Image |           | 0 Bytes        | 32 bit       | paravirtual         | ebs              |                    | Region 1    |
|  | RHEL-5.10_GA-i386-8-Access2-GP2                 |          | Image |           | 0 Bytes        | 32 bit       | paravirtual         | ebs              |                    | Region 1    |
|  | RHEL-5.10_GA-x86_64-7-Access2                   |          | Image |           | 0 Bytes        | 64 bit       | paravirtual         | ebs              |                    | Region 1    |
|  | RHEL-5.10_GA-x86_64-8-Access2                   |          | Image |           | 0 Bytes        | 64 bit       | paravirtual         | ebs              |                    | Region 1    |
|  | RHEL-5.10_GA-x86_64-8-Access2-GP2               |          | Image |           | 0 Bytes        | 64 bit       | paravirtual         | ebs              |                    | Region 1    |
|  | RHEL-5.11_Beta-i386-3-                          |          | Image |           | 0 Bytes        | 32 bit       | paravirtual         | ebs              |                    | Region      |









7 Name 8 20 items 1-20 of 132

1. History button
2. Refresh screen button
3. Taskbar
4. Download buttons
5. View buttons
6. Name search bar/Advanced Search button
7. Sort dropdown
8. Navigation bar
9. Main area in List View
10. Cloud/Filter Navigation

Console uses Virtual Thumbnails to describe instances and images. Each thumbnail contains four quadrants by default. This allows you to glance at an instance or image for a quick view of its contents.



1. Top left quadrant: Operating system of the Instance
2. Bottom left quadrant: Instance Cloud Provider
3. Top right quadrant: Power state of Instance or Status icon
4. Bottom right quadrant: Number of Snapshots for this Instance

| Icon  | Description  |
|---|--|
|    | Template: Cloud Image  |
|    | Retired: Instance has been retired   |
|   | Archived: Instance has no provider or availability zone associated with it.              |
|  | Orphaned: Instance has no availability zone but does have a provider associated with it. |
|  | Disconnected: Instance is disconnected.  |
|  | On: Instance is powered on.  |
|  | Off: Instance is powered off.  |
|  | Suspended: Instance has been suspended.  |

The **Instances** page has four accordions organizing your instances and images in different ways. All of these accordions share a set of common controls:

- Use **Instances by Provider** and **Images by Provider** to view your instances and images organized by provider. In addition, you can see archived and orphaned items here.
- Use the **Instances** to view, apply filters, and collect information about all of your instances.
- Use **Images** to view, apply filters, and collect information about all of your images.

Through the console, you can view your instances and images in multiple ways:

- Filter instances
- Change views
- Sort
- Create a report
- Search by Tags
- Search by collected data


## 13.1. FILTERING INSTANCES AND IMAGES

The **Instance Filter** accordion is provided so that you can easily navigate through groups of instances. You can use the ones provided or create your own through **Advanced Filtering** capabilities.

### 13.1.1. Using an Instance or Image Filter

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click on the **Instances** or **Images** accordion.
3. Click on the desired filter from the left pane.

### 13.1.2. Creating an Instance or Image Filter

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Go to the **Instances** or **Images** accordion.
3. Click **All Instances** or **All Images**, then click  (**Advanced Search**) to open the expression editor.
4. Use the expression editor to choose the appropriate options for your criteria. Based on what you choose, different options will show.
  - For all of the types of searches, you have the options of creating an alias and requested user input. Select **Use Alias** to create a user friendly name for the search. If you are requested user input for the search, this text will show in the dialog box where the input is requested.
  - Click **Field** to create criteria based on field values.

- Click **Count of** to create criteria based on the count of something, such as the number of snapshots for an instance, or the number of instances on a host.

- Click **Tag** to create criteria based on tags assigned to your virtual infrastructure, such as for power states or production tagging.

- Click **Find** to seek a particular value, and then check a property.

5. Click  (**Commit Expression Element Changes**) to add the expression.

6. Click **Save**.


7. Type in a name for the search expression in **Save this Instance search as**. To set the filter to show globally, check **Global Search**.



- Click **Save**.

The filter is saved and shows in the **My Filters** area of the **Filter** accordion. If you checked **Global Search**, the filter shows there.





### 13.1.3. Loading a Report Filter or Search Expression

- Navigate to **Compute** → **Clouds** → **Instances**.
- Click the accordion for the items to search (either **Instances** or **Images**).
- Click  (**Advanced Search**) to open the expression editor.
- Click **Load**.
- Select either a saved instance search or an instance report filter.



#### NOTE


The set of items to select will depend on the type of resource you are searching.

- Click **Load** to load the search expression.
- If you want to edit the expression, click on it and make any edits for the current expression.
  - Click  (**Commit expression element changes**) to add the changes.
  - Click  (**Undo the previous change**) to remove the change you just made.
  - Click  (**Redo the previous change**) to put the change that you just made back.
  - Click **AND** (**AND with a new expression element**) to create a logical **AND** with a new expression element.
  - Click **OR** (**OR with a new expression element**) to create a logical **OR** with a new expression element.
  - Click **NOT** (**Wrap this expression element with a NOT**) to create a logical NOT on an expression element or to exclude all the items that match the expression.
  - Click  (**Remove this expression element**) to take out the current expression element.
- Click **Load**.
- Click **Apply**.

## 13.2. CHANGING VIEWS FOR INSTANCES AND IMAGES

While you can set the default view for different pages from the settings menu, then **Configuration** → **My Settings** → **Default Views**, the current view can also be controlled from the Instances pages.

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click the accordion for the items to view.
3. Click the appropriate button for the desired view.

- Click  for **Grid View**.
- Click  for **Tile View**.
- Click  for **List View**.





### 13.3. SORTING INSTANCES AND IMAGES

Virtual machines and images can be sorted by Name, Availability Zone, Flavor, Cloud Provider, Compliant, Last Analysis Time, and Region.

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click the accordion for the desired items to sort.
3. To sort instances or images when in grid or tile view:
  - From the **Sort by dropdown**, click the attribute to sort.
4. To sort instances or images when in list view:
  - Select the **List View**.
  - Click on the **Column Name** to sort. For example, click on **Availability Zone** to sort by the name of the availability zone.

### 13.4. CREATING AN INSTANCE OR IMAGE REPORT

For a listing of instances and images, you can create a quick report in CSV, TXT, or PDF formats.

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click the accordion for the desired items for report creation.
3. Click  (**Download**).
  - Click  for a **TXT** file.
  - Click  for a **CSV** file.
  - Click  for a **PDF** file.

### 13.5. SEARCHING FOR INSTANCES OR IMAGES

To the right of the taskbar on the **Instances** page, you can enter names or parts of names for searching. You can search in the following ways.

- Type characters that are **included** in the name. For example, if you type **sp1**, all Instances whose names include **sp1** appear, such as **Windows2003** and **Sp1clone**.
- Use **\*** at the end of a term to search for names that begin with specific characters. For example, type **v\*** to find all instances whose names begin with the letter **v**.
- Use **\*** at the beginning of a term to search for names that end with specific characters. For example, type **\*\sp2** to find all instances whose names end with **sp2**.
- Erase all characters from the search box to go back to viewing all instances.

Search for instances and images:

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click the accordion for the desired items to search.



3. In the **Name Filter** bar in the upper right corner of the window, type your criteria.



4. Click  (**Search by Name within results**) or press **Enter**.

5. Type in other criteria to filter on what is currently displayed.

6. Click  (**Search by Name within results**) or press **Enter**.

## 13.6. ANALYZING INSTANCES AND IMAGES WITH SMARTSTATE ANALYSIS

Analyze an instance to collect metadata such as user accounts, applications, software patches, and other internal information. If Red Hat CloudForms is not set up for automatic analysis, perform a manual analysis of an instance. To perform a SmartState Analysis, Red Hat CloudForms requires a running SmartProxy with visibility to the instance's storage location so that a snapshot can be created.

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click the accordion for the items to analyze.
3. Check the instances and images to analyze.
4. Click  (**Configuration**), and then  (**Perform SmartState Analysis**) on the taskbar.
5. Click **OK**.



## RESTRICTIONS ON DISPLAYING FILES COLLECTED

### Non-Displayable File Types

- File size bigger than 20k characters
- File with missing name
- Non MIME .conf file, with non ascii characters
- Non MIME .conf file, without content
- MIME .exe binary file

### Displayable File Types

- MIME .txt non binary file
- Non MIME .conf ascii file



## IMPORTANT

SmartState Analysis for instances runs as a process independent from providers. For example, a successful SmartState Analysis of a host does not mean SmartState Analysis for instances will be successful. Ensure to enter credentials for the provider that contains the instance for the SmartState Analysis to work.



## 13.7. COMPARING INSTANCES AND IMAGES






You can compare multiple instances in Red Hat CloudForms server. This allows you to see how different instances are from their original image. This helps detect missing patches, unmanaged user accounts, or unauthorized services.

Use the comparison feature to:

- Compare multiple instances from different hosts
- Compare multiple instances side-by-side
- Quickly see similarities and differences among multiple instances and a base
- Narrow the comparison display to categories of properties
- Print or export in the comparison results to a PDF or CSV file





Compare instances and images:

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click the accordion for the items to analyze.
3. Click the checkboxes for the items to compare.
4. Click  (**Configuration**), and then  (**Compare Selected items**). The comparison displays in a compressed view with a limited set of properties listed.

5. To delete an item from the comparison, click  (**Remove this VM from the comparison**) at the bottom of the items column.
6. To view many items on one screen, go to a compressed view by clicking  (**Compressed View**). To return to an expanded view, click  (**Expanded View**).
7. To limit the mode of the view, there are two buttons in the task bar.
  - Click  (**Details Mode**) to see all details for an attribute.
  - Click  (**Exists Mode**) to limit the view to if an attribute exists compared to the base or not. This only applies to attributes that can have a boolean property. For example, a user account exists or does not exist, or a piece of hardware that does or does not exist.
8. To change the base instance that all the others are compared to, click its label at the top of its column.
9. To go to the summary screen for an instance, click its **Virtual Thumbnail** or icon.



### 13.7.1. Creating an Instance Comparison Report

Output a the data from a comparison report in TXT, CSV or PDF formats.

1. Create the comparison for the report.
2. Click  (**Download**).
  - Click  for a **TXT** file.
  - Click  for a **CSV** file.
  - Click  for a **PDF** file.



## 13.8. REFRESHING INSTANCES AND IMAGES

Refresh your instances to get the latest data the provider can access. This includes information such as the power state, container, and hardware devices attached to the instance.

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click the accordion for the desired items to analyze.
3. Click the checkboxes for the items to refresh.
4. Click  (**Configuration**), and then  (**Refresh Relationships and Power States**) on the **Instance Taskbar**.



## 13.9. EXTRACTING RUNNING PROCESSES FROM INSTANCES AND IMAGES

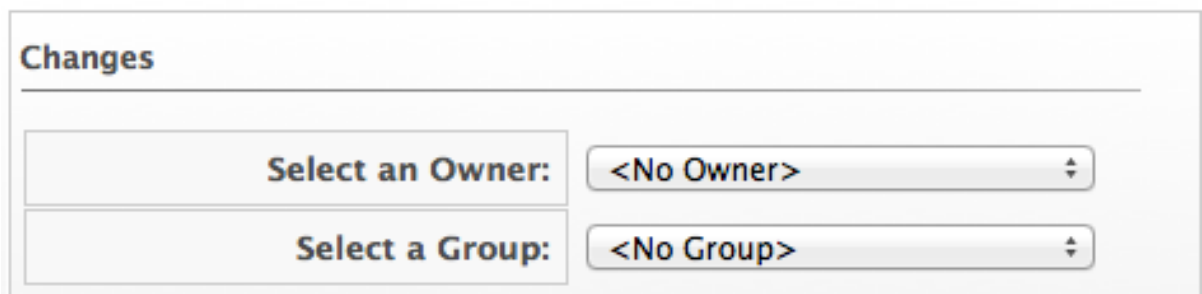
Red Hat CloudForms can collect processes running on Windows instances. To do this, enter domain credentials for the zone where the instance is located. The instance must be running and must have an IP address in the VMDB, usually obtained from a SmartState Analysis.

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click the checkboxes for the instances to collect processes.
3. Click  (**Configuration**), and then  (**Extract Running Processes**) on the taskbar.
4. Click **OK**.

## 13.10. SETTING OWNERSHIP FOR INSTANCES AND IMAGES

You can set the owner of a group of instances and images by either individual user or group. This allows you an additional way to filter and can be used to enforce quotas.

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click the accordion for the items to change.
3. Click the checkboxes for the items to set ownership.
4. Click  (**Configuration**), and then  (**Set Ownership**) on the **Instance Taskbar**.
5. From the **Select an Owner** dropdown, select a user.



**Changes**


|                  |            |
|------------------|------------|
| Select an Owner: | <No Owner> |
| Select a Group:  | <No Group> |

6. From the **Select a Group** dropdown, select a group
7. Click **Save**.



## 13.11. REMOVING INSTANCES AND IMAGES FROM THE VMDB

If an instance has been decommissioned or you need to perform some troubleshooting, you might need to remove a specific instance from the VMDB. This does not however remove the instance or image from its provider.

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click the accordion for the items to remove.
3. Click the checkboxes for the items to remove.



- Click  (**Configuration**), and then  (**Remove from the VMDB**) button.
- Click **OK**.

## 13.12. TAGGING INSTANCES AND IMAGES

- Navigate to **Compute** → **Clouds** → **Instances**.
- Click the accordion for the items to tag.
- Click the checkboxes for the items to tag.
- Click  (**Policy**), and then  (**Edit Tags**).
- Select a customer tag from the first dropdown, and then a value for the tag.

**Tag Assignment**

Select a customer tag to assign: Environment \* <Select a value to assign>

|   | Category      | Assigned Value    |
|---|---------------|-------------------|
|  | Cost Center * | Cost Center 001   |
|  | Environment * | Quality Assurance |

\* Only a single value can be assigned from these categories

- Click **Save**.

## 13.13. REVIEWING AN INSTANCE OR IMAGE

After viewing your list of instances and images, click on a specific item to review a **Summary** screen of it. The **Summary** screen provides you with a **Virtual Thumbnail** and a **Taskbar**.

- Use the **Taskbar** to perform actions on the selected item.
- Use **Summary Views** to change the view type of the summary screen.
- Use **Virtual Thumbnails** for a quick glance at the item.
- Use the **Summary** screen to see a quick summary of the attributes of the item.

## 13.14. VIEWING RUNNING PROCESSES AFTER COLLECTION

- Click an instance with collected processes.
- From the **Diagnostics** area, click **Running Processes**.



The most recent collection of running processes is displayed. Sort this list by clicking on the column headers.

## 13.15. MANAGING SECURITY GROUPS FOR CLOUD INSTANCES



Manage security groups associated with cloud provider instances using Red Hat CloudForms.

To add a security group to an instance:

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



2. Click on **Instances by Provider**, and select an instance.
3. Click  (**Configuration**), then click  (**Add a Security Group**).
4. Select a **Security Group** from the drop-down menu to add to the instance.
5. Click **Save**.

To remove a security group from an instance:

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click on **Instances by Provider**, and select an instance.
3. Click  (**Configuration**), then click  (**Remove a Security Group**).
4. Select a **Security Group** from the drop-down menu to remove from the instance.
5. Click **Save**.


## 13.16. EDITING INSTANCE OR IMAGE PROPERTIES

Edit the properties of an instance or image to set parent and child instances. SmartState Analysis also can detect this.






1. From **Compute** → **Clouds** → **Instances**.
2. Click the accordion for the items to edit.
3. Click the item to edit properties.
4. Click  (**Configuration**), and then  (**Edit this Instance or Edit this Image**) on the Taskbar.
5. From the **Parent Instance** dropdown, select the parent instance.
6. From **Child Instance** selection, select instances that are based on the current instance from the list of **Available Instances**.
7. Click **Save**.

## 13.17. CONTROLLING THE POWER STATE OF AN INSTANCE

Follow this procedure to control the power states of an instance through the Red Hat CloudForms console.

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click the instance to change the power state.
3. Click **Power Operations**, then click the button for the desired power operation.
  - Click  (**Start**) to start the selected instances.



- Click  (**Terminate**) to terminate the selected instances.
- Click  (**Suspend**) to suspend the selected instances.
- Click  (**Reset**) to reset the selected instances.
- Click  (**Stop Guest**) to stop the guest operating system.
- Click  (**Restart Guest**) to restart the guest operating system.

4. Click **OK**.





#### NOTE

Google Compute Engine instances are limited to the following power options: **Start**, **Stop**, and **Terminate**.

## 13.18. RIGHT SIZING AN INSTANCE

Red Hat CloudForms uses collected statistics to recommend the best size for an instance. Red Hat CloudForms uses the information from the **Normal Operating Range** to calculate the recommendations.

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click an instance for right-sizing.
3. Click  (**Configuration**), and then  (**Right-Size Recommendations**) button.

A new page appears with three levels of Memory and CPU recommendations, Conservative, Moderate, and Aggressive, next to the Normal Operating Range statistics.

## 13.19. RESIZING AN INSTANCE

Red Hat CloudForms allows you to resize an existing, active instance by changing its flavor. This is only possible if your OpenStack deployment has:

- At least two Compute nodes, or with resizing to the same host enabled
- Enough capacity to support the needs of the new flavor





#### NOTE

Keep in mind that the instance will undergo a controlled shutdown when you change its flavor.

For more information about the requirements and underlying OpenStack process involved, see [Resize an Instance](#) in the Red Hat OpenStack Platform *Instances and Images Guide*.

To resize an instance through Red Hat CloudForms:

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



2. Click the instance whose flavor you want to change.
3. Click  (**Configuration**), and then  (**Reconfigure this Instance**).
4. In the **Reconfigure Instance** section, select the new flavor you want from the **Choose Flavor** dropdown.
5. Click **Submit**. Doing so will initiate the flavor change, and it might take several minutes before Red Hat CloudForms verifies whether the change was successful.


See [Chapter 11, Flavors](#) and [Manage Flavors](#) in the Red Hat OpenStack Platform *Instances and Images Guide* for more information.

## 13.20. MIGRATING A LIVE INSTANCE

*Live migration* involves moving a live instance between Compute nodes. Live migration is useful for avoiding instance downtime during cloud maintenance or load management. See [How to Migrate a Live Instance](#) in the Red Hat OpenStack Platform *Migrating Instances* guide for details on the underlying OpenStack process.

To migrate a live instance:



1. Navigate to **Compute** → **Clouds** → **Instances**.
2. On the right pane, click the instance to be migrated. Use the **Instances by Provider** accordion to filter instances by provider and/or availability zone.
3. Click  (**Lifecycle**), then  (**Migrate selected Instance**).
4. On the **Migrate Instance** section, select your preferred migration options:
  - **Auto-select Host?**: let the OpenStack provider automatically choose a destination Compute node. If you prefer to choose a specific node, uncheck this option and choose from the **Destination Host** dropdown.
  - **Block Migration**: check this option to perform a *block-based* migration. With this migration, the entire virtual machine image is moved from the source node to the destination node. If your OpenStack provider uses *shared storage*, leave this option unchecked. See [Prerequisites](#) in the Red Hat OpenStack Platform *Migrating Instances* guide for related information.
  - **Disk Over Commit**: check this option to prevent the OpenStack provider from verifying first whether the destination host has available disk space to host the instance.
5. Click **Submit**.


Once the migration initiates, the instance list will reload with a message indicating that the selected instance is being migrated. Upon completion, the instance list will reload and the evacuated instance will be displayed as  (**On**).

## 13.21. EVACUATING AN INSTANCE

If a Compute node is shut down, you can *evacuate* instances hosted on it. This is only useful if the instances use shared storage or block storage volumes. See [Evacuate Instances](#) in the Red Hat OpenStack Platform *Instances and Images Guide* for details on the underlying OpenStack process.

To evacuate an instance:

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. On the right pane, click the instance to be evacuated. Use the **Instances by Provider** accordion to filter instances by provider and/or availability zone.
3. Click  (**Lifecycle**), then  (**Evacuate selected Instance**).
4. On the **Evacuate Host** section, select your preferred evacuation options:
  - **Auto-select Host?**: let the OpenStack provider automatically choose a destination Compute node. If you prefer to choose a specific node, uncheck this option and choose from the **Destination Host** dropdown.
  - **On Shared Storage**: leave this checked to indicate that all instance files are on shared storage.
5. Click **Submit**.

Once the evacuation initiates, the instance list will reload with a message indicating that the selected instance is being evacuated. Upon completion, the instance list will reload and the evacuated instance will be displayed as  (**On**).



## 13.22. VIEWING CAPACITY AND UTILIZATION CHARTS FOR AN INSTANCE

View capacity and utilization data for instances that are part of a cluster.



### NOTE

You must have a server with network visibility to your provider assigned the server role of **Capacity & Utilization Collector** to use this feature. For more information, see [General Configuration](#).

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click the accordion to view capacity data.
3. Click the item to view.
4. Click  (**Monitoring**), and then  (**Utilization**) on the taskbar.
5. Select to view hourly, most recent hour, or daily data points for the dates to view data.

**Options**

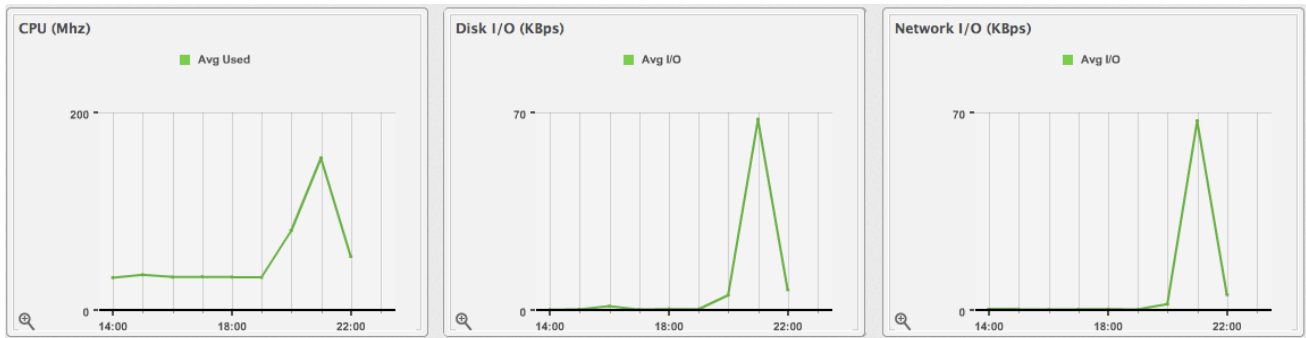
Interval:  Date:  Show:  back

Time Zone:

Compare To:

\* Daily charts only include days for which all 24 hours of data has been collected.

## 6. Select a **Time Profile**.



### NOTE

Daily charts only include full days of data. This means Red Hat CloudForms does not show daily data for a day without a complete 24 data point range for a day.

For information about data optimization including utilization trend reports, see [Chapter 6, Data Optimization](#).

## 13.23. VIEWING THE INSTANCE OR IMAGE TIMELINE

View the timeline of events for an instance or image if registered to a host.

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click the instance to view the timeline.
3. Click (**Monitoring**), and then (**Timelines**) on the taskbar.
4. From **Options**, customize the period of time to display, and the types of events to view.

**Options**

Show:  Interval:  Date:  Show:  days back

Level:  Event Groups:

\* Dates/Times on this page are based on time zone: UTC.

- Use the **Interval** dropdown to select hourly or daily data points.
- Use **Date** to type the date of the timeline to display.
- If viewing a daily timeline, use **Show** to set how many days back to go. The maximum history is 31 days.

- The three **Event Group** dropdowns allow selection of different event groups to display. Each has its own color.
  - From the **Level** dropdown, select either a **Summary** event or a **Detail** list of events. For example, the detail level of a **Power On** event might include the power on request, the starting event, and the actual **Power On** event. If you select **Summary**, you only see the **Power On** event in the timeline.
5. To see more detail on an item in the timeline, click on it. A balloon appears with a clickable link to the resource.

## 13.24. VIEWING THE INSTANCE OR IMAGE SUMMARY

When you click on a specific instance or image, you will see the **Virtual Thumbnail**, and an operating system-specific summary screen of the item. Where applicable, click on a subcategory of the summary to see more detail on that section.

The summary page contains the following categories:

- **Properties** include information such as the base operating system, hostname, IP addresses, instance vendor, cloud resources, and snapshots. This includes the ability to analyze multiple partitions, multiple disks, Linux logical volumes, extended partitions, and Windows drives. Some categories can be clicked on for additional detail. For example, click **Container** to view notes associated with an instance.
- **Lifecycle** shows the date of discovery and the last analysis. If a retirement date or owner has been set, these display as well.
- **Relationships** include information on the instance's cloud provider, genealogy such as parent and child instances, and drift.
- **VMsafe** shows properties of the VMsafe agent if it is enabled.
- **Compliance** shows the status of system compliance checks and history of past checks.
- **Power Management** displays the current power state, last boot time, and last power state change. **State Changed On** is the date that the instance last changed its power state. This is a container view of the power state, therefore a restart of the operating system does not cause the container power state to change and does not update this value.
- **Security** includes information on users and groups.
- **Configuration** includes information on applications, services, packages, init processes, and files. This section changes depending on the base operating system.
- **Diagnostics** provides a link to viewing running processes and the information from the latest collected event logs.
- **Smart Management** shows all tags assigned to this instance.

Performing a SmartState Analysis on an instance or image provides more detailed information in these categories.

## 13.25. VIEWING USER INFORMATION FOR AN INSTANCE OR IMAGE

Red Hat CloudForms's **SmartState Analysis** feature returns user information. Explore the user to get details on the user's account, including group memberships.

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click on the instance or image to open its summary page.
3. From the **Security** section of the summary page, click **Users**.
4. Click the user to view details.

## 13.26. VIEWING GROUP INFORMATION FOR AN INSTANCE OR IMAGE

Red Hat CloudForms's **SmartState Analysis** feature returns group information. Explore the group to get a list of its users.

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click the accordion for the item to view user information.
3. Click on the item to view its **Summary**.
4. From the **Security** section of the **Instance Summary**, click **Groups**.
5. Click the group to view users.

## 13.27. VIEWING GENEALOGY OF AN INSTANCE OR IMAGE

Red Hat CloudForms detects the lineage of an instance. View an instance's lineage and compare the instances that are part of its tree. This also allows tagging of instances that share genealogy.










1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click the accordion for the item to view genealogy.
3. Click on the item to view its **Summary**.
4. From the **Relationships** area in the **Summary**, click **Genealogy**.


## 13.28. DETECTING DRIFT ON INSTANCES OR IMAGES

The configuration of an instance might change over time. **Drift** is the comparison of an instance to itself at different points in time. The instance needs to be analyzed at least twice to collect this information. Detecting drift provides you the following benefits:

- See the difference between the last known state of a machine and its current state.
- Review the configuration changes that happen to a particular instance between multiple points in time.
- Review the association changes that happen to a particular instance between multiple points in time.
- Review the classification changes that happen to an instance between two time checks.
- Capture the configuration drifts for a single instance across a time period.





Detect drift on instances or images:

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click the accordion for the item to view drift.
3. Click on the item to view its **Summary**.
4. From the **Relationships** area in the **Summary**, click **Drift History**.
5. Click the checkboxes for the analyses to compare.
6. Click  (**Select up to 10 timestamps for Drift Analysis**) at the top of the screen. The results display.
7. Check the **Drift** sections on the left to view in your comparison.
8. Click **Apply**.
9. The following descriptions pertain to the **Expanded View** . Whether you see the value of a property or an icon representing the property depends on the properties type.
  - A property displayed in the same color as the base means the compared analysis matches the base for that property.
  - A property displayed in a different color from the base means the compared analysis does not match the base for that property.
10. If you are in the **Compressed View** , the values of the properties are not displayed. All items are described by the icons shown below.
  - A  (**checkmark**) means that the compared analysis matches the base for that property. If you hover over it, the value of the property will display.
  - A  (**triangle**) means the compared analysis does not match the base for that property. If you hover over it, the value of the property displays. Click the minus sign next to the sections name to collapse it.
11. To limit the scope of the view, you have three buttons in the **Resource** button area.
  - Click  (**All attributes**) to see all attributes of the sections you selected.
  - Click  (**Attributes with different values**) to see only the attributes that are different across the drifts.
  - Click  (**Attributes with the same values**) to see only the attributes that are the same across drifts.
12. To limit the mode of the view, there are two buttons in the **Resource** button area.
  - Click  (**Details Mode**) to see all details for an attribute.

- Click  (**Exists Mode**) to only see if an attribute exists compared to the base or not. This only applies to attributes that can have a Boolean property. For example, a user account exists or does not exist, or a piece of hardware that does or does not exist.

This creates a drift analysis. Download the data or create a report from your drift for analysis using external tools.

## 13.29. CREATING A DRIFT REPORT FOR AN INSTANCE OR IMAGE

1. Create the comparison to analyze.
2. Click  (**Download**).
3. Click the output button for the type of report you want.
  - Click  (**Download drift report in text format**) for a text file.
  - Click  (**Download drift report in CSV format**) for a csv file.
  - Click  (**Download drift report in PDF format**) for a PDF file.

## 13.30. VIEWING ANALYSIS HISTORY FOR AN INSTANCE OR IMAGE

Each time a SmartState Analysis is performed on an instance, a record is created of the task. This information is accessed either from the instance accordion or the instance summary. Use this detail to find when the last analysis was completed and if it completed successfully. If the analysis resulted in an error, the error is shown here.

1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click the accordion for the desired item to view analysis history.
3. Click on the item to view its summary.
4. From the **Relationships** area in the summary, click **Analysis History**. A history of up to the last 10 analyses is displayed.

| Descending by: Started |            | Per page: 20 |        |         |  | (It |
|------------------------|------------|--------------|--------|---------|--|-----|
|                        | Started ▼  | Finished     | Status | Message |  |     |
| Q                      | 2 Days Ago | 2 Days Ago   | OK     | OK      |  |     |
| Q                      | 3 Days Ago | 3 Days Ago   | OK     | OK      |  |     |
| Q                      | 4 Days Ago | 4 Days Ago   | OK     | OK      |  |     |
| Q                      | 5 Days Ago | 5 Days Ago   | OK     | OK      |  |     |
| Q                      | 6 Days Ago | 6 Days Ago   | OK     | OK      |  |     |
| Q                      | 6 Days Ago | 6 Days Ago   | OK     | OK      |  |     |

5. Click on a specific analysis to see its details.

## 13.31. VIEWING EVENT LOGS FOR AN INSTANCE OR IMAGE

Using an **Analysis Profile**, collect event log information from your instances.



See the [Setting a Default Analysis Profile](#) section in the CloudForms General Configuration guide.

**NOTE**

This feature is only available for Windows.



1. Navigate to **Compute** → **Clouds** → **Instances**.
2. Click the accordion for the item to view event logs.
3. Click on the item to view its **Summary**.
4. From **Diagnostics** click **Event Logs**.

The collected event log entries are displayed. Sort this list by clicking on the column headers.

## CHAPTER 14. ORCHESTRATION STACKS

Navigate to **Compute** → **Clouds** → **Stacks** to see a list of orchestration stacks along with information such as *Name*, *Provider*, *Type*, *Status*, *Instances*, *Security Groups*, and *Cloud Networks*. Click on a stack to see more information about it, including properties, retirement date, and relationships with the cloud provider and instances. You can click on instances to see details of all instances the stack relates to.



### 14.1. TAGGING ORCHESTRATION STACKS

Apply tags to orchestration stacks to categorize them together at the same time. . Navigate to **Compute** → **Clouds** → **Stacks**. . Select the orchestration stacks to tag. . Click  (**Policy**), and then  (**Edit Tags**). . **Select a customer tag to assign** from the first list. . Select a value to assign from the second list. . Click **Save**.

### 14.2. RETIRING ORCHESTRATION STACKS

You can either retire orchestration stacks on a set date, or retire them immediately.

To set a retirement date:



1. Navigate to **Compute** → **Clouds** → **Stacks**.
2. Select the orchestration stacks to retire on a set date.
3. Click  (**Lifecycle**), and then  (**Set Retirement Dates**).
4. On the **Retire Orchestration Stacks** page, set **Retirement Date**.
5. Select **Retirement Warning** from the list. The default is *None*.
6. Click **Save**.



#### NOTE



Saving a blank date will remove all retirement dates.

To retire selected stacks immediately:

1. Navigate to **Compute** → **Clouds** → **Stacks**.
2. Select the orchestration stacks to retire now.
3. Click  (**Lifecycle**), and then  (**Retire selected Orchestration Stacks**). A pop-up window appears to confirm the action.
4. Click **OK**.

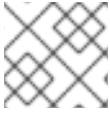
### 14.3. REMOVING ORCHESTRATION STACKS

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

2. Select the orchestration stacks to remove from the VMDB. A warning pop-up window appears to confirm the action.
3. Click  (**Configuration**), and then  (**Remove Stacks from the VMDB**).
4. Click **OK**.

## CHAPTER 15. KEY PAIRS



This tab lists key pairs and fingerprints for all cloud providers. Click on a key pair to see a summary and its relationship with instances. On this screen, click on instances to see details of all instances the key pair relates to. You can use the key pairs added during provisioning instances.





### NOTE

Adding a new key pair is currently only supported for OpenStack.

### 15.1. ADDING A NEW KEY PAIR

1. Navigate to **Compute** → **Clouds** → **Key Pairs**.
2. Click  (**Configuration**), then click  (**Add a new Key Pair**).
3. In **Basic Information**, enter a **Name** and the **Public Key (optional)** generated using **ssh-keygen** command.
4. Select your OpenStack provider from the **Provider** list.
5. Click **Add**.

### 15.2. REMOVING A KEY PAIR



1. Navigate to **Compute** → **Clouds** → **Key Pairs**.
2. Select the key pair you want to remove from the key pairs list. Or, click on the key pair to see the instances it relates to.
3. Click  (**Configuration**), then click  (**Remove selected Key Pairs from Inventory**). A warning appears to confirm the action.
4. Click **OK**.

## CHAPTER 16. OBJECT STORES

Navigate to **Storage** → **Object Stores** to see a list of all cloud object stores along with information including *Key*, *Size (bytes)*, *Object Count*, *Cloud Tenant*, and *Cloud Provider*. Click on an object store to see its properties and relationships with the cloud provider, tenant, and object store on the summary page.

### 16.1. TAGGING OBJECT STORES

Apply tags to object stores to categorize them together at the same time.

1. Navigate to **Storage** → **Object Stores**.
2. Select the object stores to tag.
3. Click  (**Policy**), and then  (**Edit Tags**).
4. **Select a customer tag to assign** from the first list.
5. Select a value to assign from the second list.
6. Click **Save**.

## CHAPTER 17. VMWARE NETWORKING SWITCHES



After adding a VMware provider, Red Hat CloudForms automatically discovers all vSphere distributed switches (vDS) on that provider and collects the information in the Red Hat CloudForms inventory.

Navigate to **Compute** → **Infrastructure** → **Networking** to see a list of all VMware switches, along with information including *Name*, *Ports*, and *UUID*. Switches and port groups are listed by provider, then cluster on the sidebar.

Click on a switch to view its summary page, which displays relationships with hosts, and any tags.


### 17.1. TAGGING VMWARE NETWORKING SWITCHES

Use tags to categorize vSphere distributed switches.

1. Navigate to **Compute** → **Infrastructure** → **Networking**.
2. Select the switches to tag.
3. Click  (**Policy**), and then  (**Edit Tags**).

Edit Tags

Tag Assignment (Tags common to all selected items)

| Select a customer tag to assign:  |               | Cost Center * | >               | <Select a value to assign> | > |
|---|---------------|---------------|-----------------|----------------------------|---|
| Category  |               |               | Assigned Value  |                            |   |
|  | Cost Center * |               | Cost Center 001 |                            |   |

\* Only a single value can be assigned from these categories

2 Switches Being Tagged



dvs-nsx



dvs-prod







4. Select a customer tag from the first dropdown, and then a value for the tag.
5. Select more tags or click **Save** to apply the tags.

## CHAPTER 18. CONTAINER ENTITIES

This chapter provides information on managing resources on your containers providers.

### 18.1. THE CONTAINERS OVERVIEW PAGE

The containers overview page shows information on all containers providers and entities known to CloudForms. The **Overview** page provides links to other summary pages which contain further information on the containers providers and entities. The **Overview** page also provides metrics for **Aggregated Node Utilization**, **Network Utilization Trend**, **New Image Usage Trend**, **Node Utilization**, and **Pod Creation and Deletion Trends**.

|                |            |                  |                 |                |
|----------------|------------|------------------|-----------------|----------------|
| 1<br>Providers | 1<br>Nodes | 21<br>Containers | 2<br>Registries | 12<br>Projects |
| 1              | 22<br>Pods | 15<br>Services   | 10<br>Images    | 11<br>Routes   |

#### Working with the Containers Overview Page

1. Navigate to **Compute** → **Containers** → **Overview**.
2. Click the desired containers entity, or provider, if applicable, for viewing the summary with further information.



#### NOTE

To reliably associate pods and images, CloudForms requires information from the **docker-pullable** field, added in OpenShift 3.3.1.2. This can affect the results of the **Chargeback by Image** report for older OpenShift providers, and potentially cause image inspection (done as part of Smart State Analysis) to fail due to associating a container to the wrong image. Consequently, CloudForms may not report accurate information about pods and images in OpenShift providers before version 3.3.1.2.

### 18.2. VIEWING A CONTAINER ENTITY SUMMARY

Container entity (object) summaries are found at **Compute** → **Containers** → **Entity**, where you can view information about container entities and their components.

#### Viewing a Containers Provider Summary

Navigate to **Compute** → **Containers** → **Providers** to view information on different aspects of a containers provider. The summary includes:

- The status of the provider and its components.
- The relationships between different entities of the containers provider. These relationships are summarized in the **Relationships** box on the right-hand side of the summary page.

## RED HAT® CLOUDFORMS MANAGEMENT ENGINE



| Relationships    |   |
|------------------|---|
| Projects         | 6 |
| Routes           | 3 |
| Services         | 6 |
| Replicators      | 4 |
| Pods             | 8 |
| Containers       | 5 |
| Nodes            | 2 |
| Image Registries | 1 |
| Images           | 5 |

| Overview |  |
|----------|--|
| Topology |  |

| Smart Management |                                       |
|------------------|---------------------------------------|
| Managed by Zone  | default                               |
| My Company Tags  | No My Company Tags have been assigned |

- Additional information on aggregated capacity of all CPU cores of all nodes, and aggregated capacity of all memory of all nodes.

### Viewing a Container Nodes Summary

Navigate to **Compute** → **Containers** → **Container Nodes** to view information on different aspects of a container node. The summary includes:

- The number of entities on a node.
- A node's capacity and utilization.
- The version of the underlying operating system and software.

To view the timeline of events for a node from a container nodes summary page, click



(**Monitoring**), and then (**Timelines**).

### Viewing a Containers Summary

Navigate to **Compute** → **Containers** → **Containers** to view information on different aspects of a container. The summary includes:



- The relationships of the container to a related node, pod, or image.
- The node the container runs on.
- The container ID.
- Properties of the container image, such as name, tag, etc.

### Viewing a Container Images Summary

Navigate to **Compute** → **Containers** → **Container Images** to view information on different aspects of a container image. The summary includes:

- The containers currently using the images.
- The image registry the image is from.

### Viewing an Image Registries Summary

Navigate to **Compute** → **Containers** → **Image Registries** to view information on different aspects of an image registry. The summary includes:

- Which images are from the registry.
- The number of images that come from that registry.
- Which containers use images from that registry.
- The host and port of the registry.

### Viewing a Pods Summary

Navigate to **Compute** → **Containers** → **Pods** to view information on different aspects of a pod. The summary includes:

- The containers that are part of the pod.
- The services that reference the pod.
- The node the pod runs on.
- If the pod controlled by a replicator.
- The IP address of the pod.

### Viewing a Replicators Summary

Navigate to **Compute** → **Containers** → **Replicators** to view information on different aspects of a replicator. The summary includes:

- The number of requested pods.
- The number of current pods.
- The labels and selector for the replicator.

### Viewing a Container Services Summary

Navigate to **Compute** → **Containers** → **Container Services** to view information on different aspects of a container service. The summary includes:

- The pods that the container service provide traffic to.
- The port configurations for the container service.
- The labels and selector for the container service.

### Viewing a Volumes Summary

Navigate to **Compute** → **Containers** → **Volumes** to view information on the persistent volumes of a container provider. The summary includes:

- The pods the volume is connected to.
- The volume's connection parameters.
- The volume's storage capacity.
- The volume's iSCSI target details (if applicable).

### Viewing a Container Builds Summary

Navigate to **Compute** → **Containers** → **Container Builds** to view different aspects of a container build. The summary includes:

- The build configuration the container build is based on.
- Which build instances have been created.
- Which phase in the build process the instance has completed.
- Which pod a build instance reside in.

### Viewing a Container Templates Summary

Navigate to **Compute** → **Containers** → **Container Templates** to view different aspects of a container template. The summary includes:

- The project the template is associated with.
- The objects the template contains.
- The parameters that can be used with the template's objects.
- The template's version number.

## 18.3. USING THE TOPOLOGY WIDGET

The **Topology** widget is an interactive topology graph, showing the status and relationships between the different entities of the containers providers and projects to which Red Hat CloudForms has access.


- The topology graph includes pods, containers, services, nodes, virtual machines, hosts, routes, and replicators within the overall containers provider environment.
- Each entity in the graph displays a color indication of its status.
- Hovering over any individual graph element will display a summary of details for the individual element.
- Double-click the entities in the graph to navigate to their summary pages.
- It is possible to drag elements to reposition the graph.
- Click the legend at the top of the graph to show or hide entities.
- Click **Display Names** on the right-hand side of the page to show or hide entity names.

### 18.3.1. Viewing the Topology for Container Providers

1. Navigate to **Compute** → **Containers** → **Providers**.
2. Click the desired containers provider for viewing the provider summary.
3. On the provider summary page, click **Topology** in the **Overview** box on the right side of the page.

### 18.3.2. Viewing the Topology for Container Provider Projects

The project topology page displays the project as the center node, surrounded by its related entities.

1. Navigate to **Compute** → **Containers** → **Projects**.
2. Click on a project.
3. On the project summary page, click  (**Topology View**) on the top right side of the page.

### 18.3.3. Limiting the Number of Containers Shown in the Topology View



1. Navigate to the settings menu, then **My Settings**, and click on the **Visual** tab.
2. Select the number of container items from the drop-down under **Topology Default Items in View**.
3. Click **Save**.

## 18.4. ANALYZING CONTAINER IMAGES WITH SMARTSTATE ANALYSIS

Perform a SmartState Analysis of a container image to inspect the packages included in an image.

### Running a SmartState Analysis

1. Navigate to **Compute** → **Containers** → **Container Images**.
2. Check the container image to analyze. You can check multiple images.

3. Click  (**Configuration**), and then  (**Perform SmartState Analysis**).

The container image is scanned. The process will copy over any required files for the image. After reloading the image page, all new or updated packages are listed.

To monitor the status of container image SmartState Analysis tasks, navigate to the settings menu, then **Tasks**. The status of each task is displayed including time started, time ended, what part of the task is currently running, and any errors encountered.



#### NOTE

See [Scanning Container Images in CloudForms with OpenSCAP](#) for details on scanning container images using OpenSCAP policies.

## 18.5. CONFIGURING AUTOMATIC TAGGING FOR CONTAINER ENTITIES

Container object labels in OpenShift can be used to automatically create tags and tag categories in Red Hat CloudForms. This is done by mapping Red Hat CloudForms tags to existing OpenShift or Kubernetes labels.

Labels from OpenShift can be mapped to Red Hat CloudForms tags for the following container entities:

- Projects
- Nodes
- Routes
- Replicators
- Container services
- Pods
- Container builds



#### NOTE

Tags automatically created from OpenShift labels are completely managed by the Red Hat CloudForms system and cannot be manually assigned or unassigned. Deleting a mapping rule from Red Hat CloudForms immediately deletes the resulting tags.

You can view a container entity's OpenShift labels on the entity's details page under **Labels**.

The following example shows how to configure tagging for a node, but the same steps can be used for mapping labels to tags on other container entities.

To configure automatic tagging on container entities using labels:

1. Note the *key* of the OpenShift label you want to map to a Red Hat CloudForms tag. OpenShift labels consist of two parts: a *key* and a *value*.
  - a. Navigate to **Compute** → **Containers** → **Nodes**.

- b. Select a node to open its summary page.
- c. Under **Labels**, note the label(s) to map to Red Hat CloudForms tag(s). Any OpenShift labels will list the *key* in the left column of the **Labels** table, and the *value* in the right column of the **Labels** table.

This node has six labels (key/value pairs) that were created in OpenShift and collected in the Red Hat CloudForms inventory:









[Nodes](#) » ocp-node-1.example.com (Summary)

ocp-node-1.example.com (Summary)


| Properties                    |   |
|-------------------------------|---|
| Name                          | ocp-node-1.example.com                            |
| Creation timestamp            | Thu, 10 Nov 2016 20:39:13 +0000                   |
| Resource version              | 3698277   |
| Number of CPU Cores           | 2   |
| Memory                        | 8 GB  |
| Max Pods Capacity             | 110   |
| System BIOS UUID              | A66267E2-3A55-4D22-B74D-5B32D258ED21              |
| Machine ID                    | 02f1ddb1415c4feba9880b2b8c4c5925                  |
| Infrastructure Machine ID     | openstack:///a66267e2-3a55-4d22-b74d-5b32d258ed21 |
| Runtime version               | docker://1.10.3                                   |
| Kubelet version               | v1.3.0+52492b4                                    |
| Proxy version                 | v1.3.0+52492b4                                    |
| Operating System Distribution | Employee SKU                                      |
| Kernel version                | 3.10.0-514.el7.x86_64                             |

| Labels                                   |                        |
|--|------------------------|
| beta.kubernetes.io/arch                  | amd64                  |
| beta.kubernetes.io/os                    | linux                  |
| failure-domain.beta.kubernetes.io/region | regionOne              |
| kubernetes.io/hostname                   | ocp-node-1.example.com |
| region                                   | primary                |
| zone                                     | east                   |

| Compliance |                |
|------------|----------------|
| Status     | Never Verified |
| History    | Not Available  |

| Relationships       |  |
|---------------------|--|
| Containers Provider |  ocp-master.example.com |
| Routes              |  0                      |
| Container Services  |  0                      |
| Replicators         |  0                      |
| Pods                |  0                      |
| Containers          |  0                      |
| Underlying Instance |  ocp-node-1.example.com |
| Container Images    |  0                      |

| Conditions     |        |                         |                            |
|----------------|--------|-------------------------|----------------------------|
| Name           | Status | Last Transition Time    | Reason                     |
| OutOfDisk      | False  | 2016-12-17 16:24:30 UTC | KubeletHasSufficientDisk   |
| MemoryPressure | False  | 2016-11-10 20:39:23 UTC | KubeletHasSufficientMemory |
| Ready          | True   | 2016-12-17 16:24:30 UTC | KubeletReady               |

| Smart Management |  |
|------------------|--|
| Tags             |  No Tags have been assigned |



## NOTE

To create an OpenShift label, see [Developer CLI Operations](#) in the OpenShift Container Platform *CLI Reference* guide. A new label added in OpenShift will only show up in Red Hat CloudForms after the next OpenShift provider refresh.

2. Navigate to **Configuration** and select the region.
3. Click the **Map Tags** tab.
4. Click **Add** to create a new mapping rule.
  - a. Select a container entity to tag from the **Entity** list, or select **<All>** to tag all entities.
  - b. Specify the *key* from the OpenShift label you noted earlier in the **Label** field.
  - c. Specify a Red Hat CloudForms tag category in **Category** to map the label to. If the tag category does not exist yet in Red Hat CloudForms, it will be created automatically.

Adding a new Mapping

Details

C & U Collection

Categories

Tags

Import Tags

Import Variables

Map Tags

Red Hat Updates

Replication

Choose a container entity and label

Entity

Node

Label

zone

Choose a tag category to map to

Category

category1

d. Click **Add**. The mapping will show in the table on the **Map Tags** tab.

5. Refresh the provider to complete the mapping:

a. Navigate to **Compute** → **Containers** → **Providers**.

b. Select the provider to refresh.

c. Click  (**Configuration**), and then  (**Refresh Items and Relationships**).

The label will display on the entity's summary page under **Smart Management** under **Company Tags** as **<Category> : <value>**.









Containers Providers > ocp-master.example.com (All Container Nodes) > ocp-node-1.example.com (Summary)

ocp-node-1.example.com (Summary)


| Properties                    |  |
|-------------------------------|--|
| Name                          | ocp-node-1.example.com                             |
| Creation timestamp            | Thu, 10 Nov 2016 20:39:13 +0000                    |
| Resource version              | 3699480  |
| Number of CPU Cores           | 2  |
| Memory                        | 8 GB   |
| Max Pods Capacity             | 110  |
| System BIOS UUID              | A66267E2-3A55-4D22-B74D-5B32D258ED21               |
| Machine ID                    | 02f1ddb1415c4feba9880b2b8c4c5925                   |
| Infrastructure Machine ID     | openstack:///aa66267e2-3a55-4d22-b74d-5b32d258ed21 |
| Runtime version               | docker://1.10.3                                    |
| Kubelet version               | v1.3.0+52492b4                                     |
| Proxy version                 | v1.3.0+52492b4                                     |
| Operating System Distribution | Employee SKU                                       |
| Kernel version                | 3.10.0-514.el7.x86_64                              |

| Labels                                   |                        |
|--|------------------------|
| beta.kubernetes.io/arch                  | amd64                  |
| beta.kubernetes.io/os                    | linux                  |
| failure-domain.beta.kubernetes.io/region | regionOne              |
| kubernetes.io/hostname                   | ocp-node-1.example.com |
| region                                   | primary                |
| zone                                     | east                   |

| Compliance |                |
|------------|----------------|
| Status     | Never Verified |
| History    | Not Available  |

| Relationships       |  |
|---------------------|--|
| Containers Provider |  ocp-master.example.com |
| Routes              |  0                      |
| Container Services  |  0                      |
| Replicators         |  0                      |
| Pods                |  0                      |
| Containers          |  0                      |
| Underlying Instance |  ocp-node-1.example.com |
| Container Images    |  0                      |

| Conditions     |        |                         |                            |
|----------------|--------|-------------------------|----------------------------|
| Name           | Status | Last Transition Time    | Reason                     |
| OutOfDisk      | False  | 2016-12-17 16:24:30 UTC | KubeletHasSufficientDisk   |
| MemoryPressure | False  | 2016-11-10 20:39:23 UTC | KubeletHasSufficientMemory |
| Ready          | True   | 2016-12-17 16:24:30 UTC | KubeletReady               |

| Smart Management |   |
|------------------|---|
| Tags             |  category1: east |

Any container entity with the OpenShift **zone** label will be tagged automatically as **category1** in Red Hat CloudForms. If the *value* for **zone** is **south**, for example, the entity will be tagged as **category1 : south**.

You can use these tags to create reports. See [Monitoring, Alerts, and Reporting](#) for details on creating reports.