



# **Red Hat CloudForms 4.0**

## **Managing Infrastructure and Inventory**

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



# Red Hat CloudForms 4.0 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 CloudForms Management Engine. 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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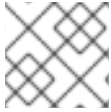
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# CHAPTER 1. CLUSTERS

Clusters provide high availability and load balancing for a group of hosts. The **Clusters** page under **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 **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

CloudForms Management Engine provides features to compare properties of clusters.

1. Navigate to **Infrastructure** → **Clusters**.
2. Check the clusters to compare.
3. Click  (**Configuration**), and then  (**Compare selected Clusters**). 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).

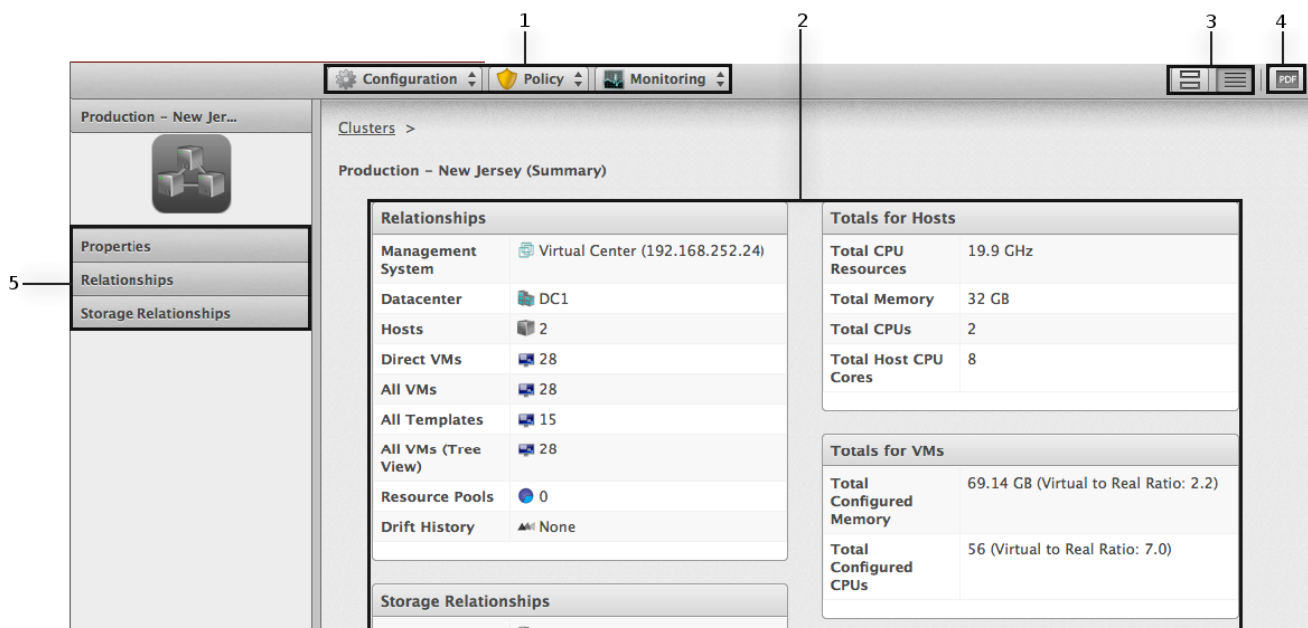
3. Click the output button for the type of report.

- 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.



**Figure 1.1. 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. Before assigning tags, create them using the instructions in the [CloudForms General Configuration guide](#).

1. Navigate to **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.

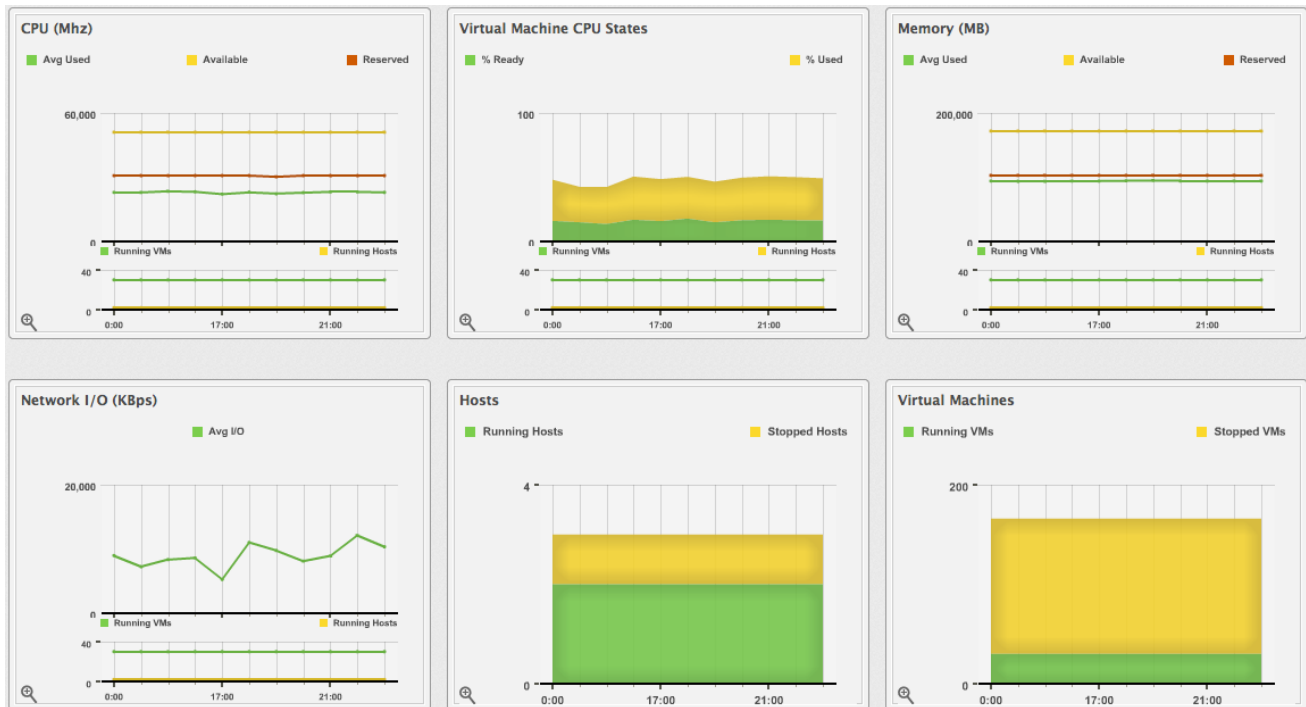
1. Navigate to **Infrastructure** → **Clusters**.
2. Click the cluster to view Capacity and Utilization data.
3. Click  (**Monitoring**), and then  (**Utilization**) or from the accordion menu, click **Properties** → **Capacity & Utilization**.

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.

## 1.6. VIEWING CLUSTER TIMELINE

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

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

**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 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.

1. Navigate to **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.



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

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





3. 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 **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 **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 **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

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

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

## 2.3. COMPARING HOSTS

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





1. Navigate to **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.
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.

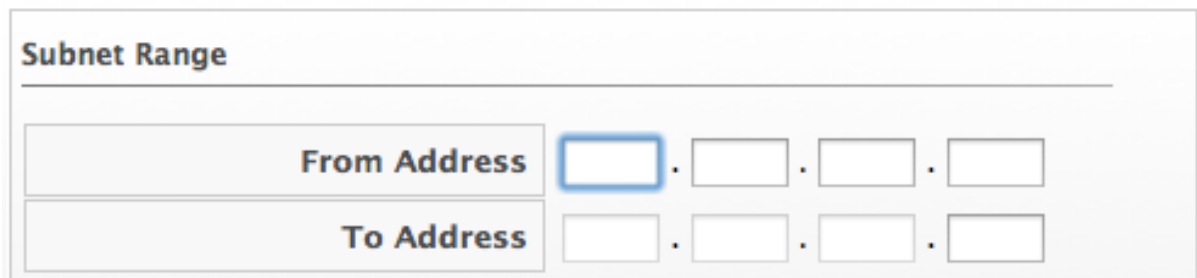
1. Navigate to **Infrastructure** → **Hosts**.
2. Check the hosts to refresh.
3. Click  (**Configuration**), and then  (**Refresh Relationships and Power States**).
4. Click **OK**.

When a host is refreshed and a new virtual machine is discovered on that host, CloudForms Management Engine 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 CloudForms Management Engine's Discovery to find hosts in your environment within a range of IP addresses.

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



**Subnet Range**



<b>From Address</b>	<input type="text"/>	.	<input type="text"/>	.	<input type="text"/>	.	<input type="text"/>
<b>To Address</b>	<input type="text"/>	.	<input type="text"/>	.	<input type="text"/>	.	<input type="text"/>

5. Click **Start**.

CloudForms Management Engine 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 **Infrastructure** → **Hosts**.
2. Click  (**Configuration**), then click  (**Add a new Host**).
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	
Name	<input type="text"/>
Host Name	<input type="text"/>
IP Address	<input type="text"/>
Custom Identifier	<input type="text"/>
Host Platform	<not specified> ▾
IPMI IP Address	<input type="text"/>
MAC Address	<input type="text"/>



- 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.

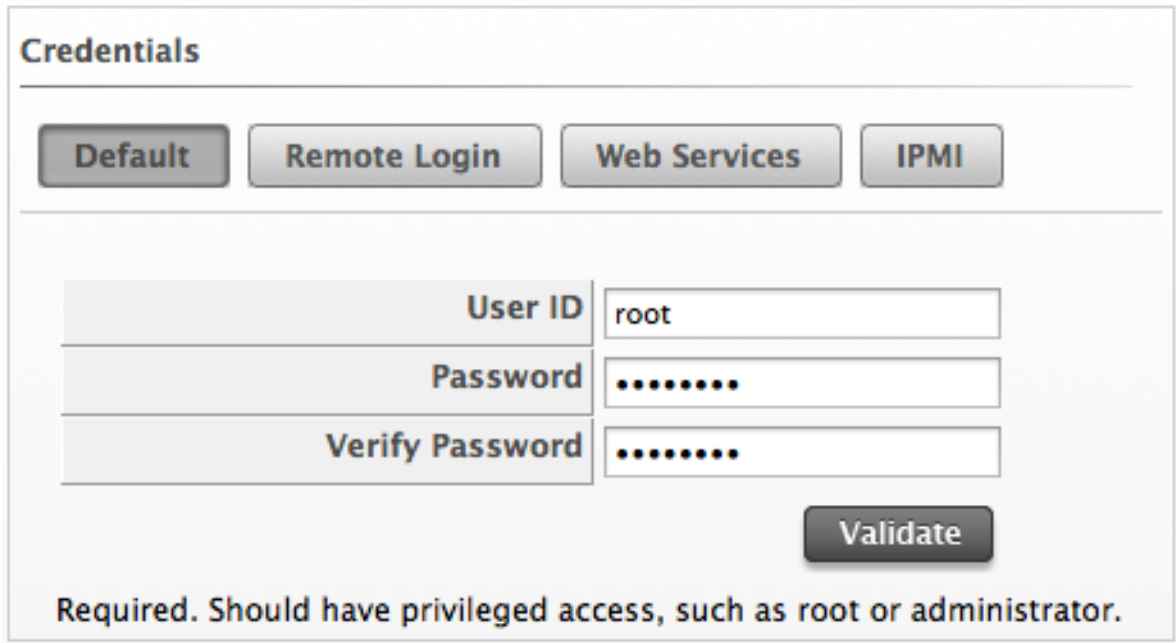
Credentials	
<div> <div>Default</div> <div>Remote Login</div> <div>Web Services</div> <div>IPMI</div> </div>	
User ID	<input type="text" value="root"/>
Password	<input type="password" value="....."/>
Verify Password	<input type="password" value="....."/>
<div>Validate</div>	
<p>Required. Should have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

- Click **Validate** to check the credentials.
- Click **Save**.

## 2.7. EDITING HOSTS

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

1. Navigate to **Infrastructure** → **Hosts**.
2. Click  (**Configuration**).
3. Check the Hosts to edit.
4. Click  (**Edit Selected Hosts**).
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:

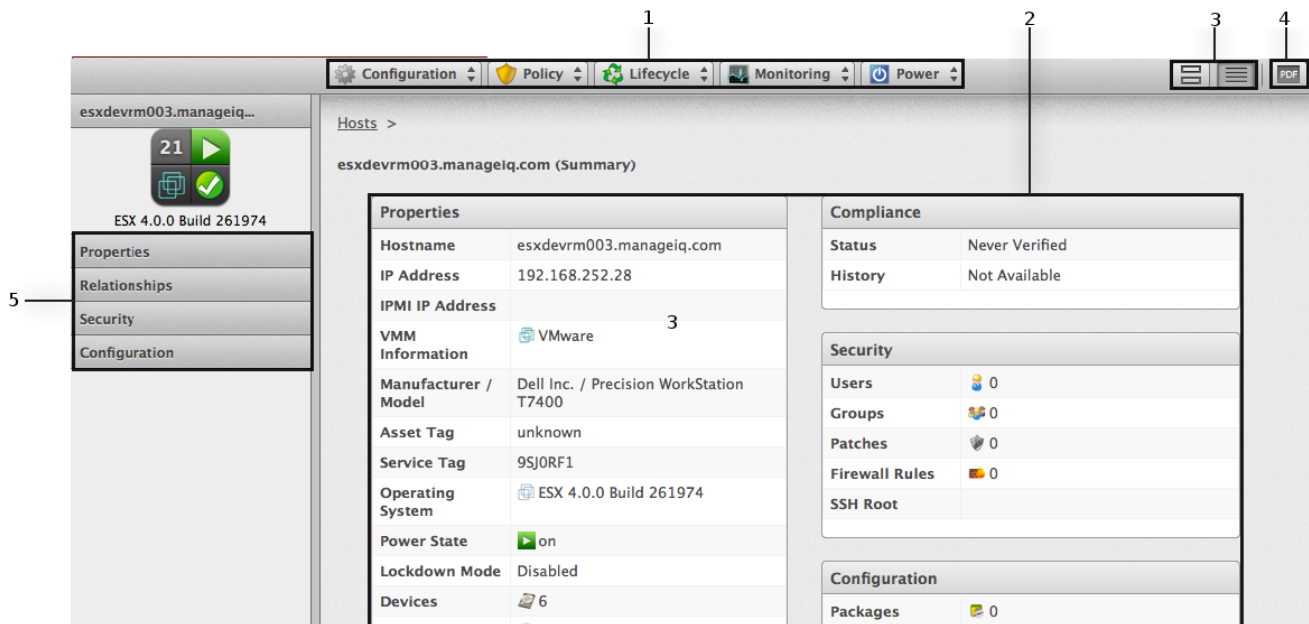
- Use **User ID** to specify a login ID.
  - Use **Password** to specify the password for the User ID.
  - Use **Verify Password** to confirm the password.
6. Test the credentials by using the Select Host to validate against drop down and click **Validate**.

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.



**Figure 2.1. Host Management Screen**





1. **Host Task Bar**: 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 hosts 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. Before assigning tags, create them using the instructions in the [CloudForms General Configuration guide](#).

1. Navigate to **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

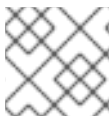
If a host is decommissioned or requires troubleshooting, it might require removal from the VMDB.

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

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

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

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





### NOTE

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

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



2. Click the Host to view capacity data.

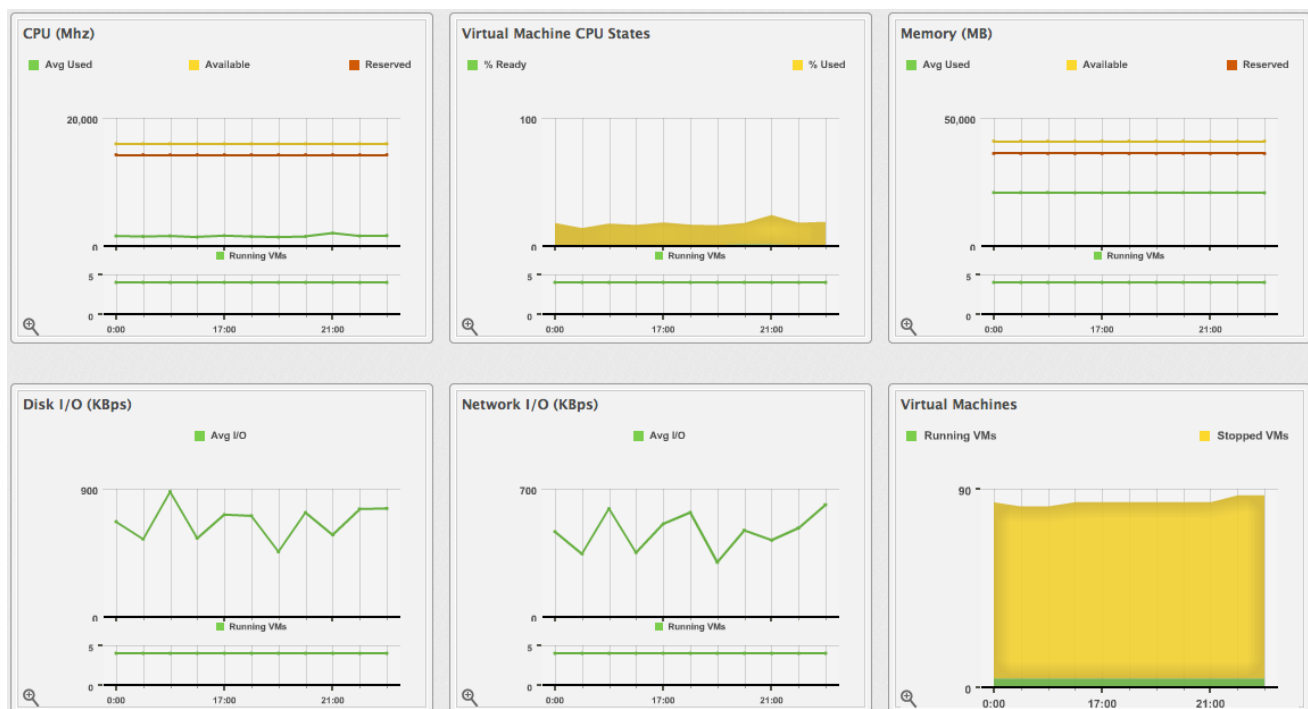
3. Click  (Monitoring), and then  (Utilization) or from the Host accordion, click **Properties** → **Capacity & Utilization**.

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**

<b>Interval</b>	Daily	<b>Date</b>	3/12/2013	<b>Show</b>	1 Week	back
<b>Group by</b>	<None>					
<b>Time Zone</b>	(GMT+00:00) UTC					

\* 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.

## 2.13. VIEWING THE HOST TIMELINE

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

1. Navigate to **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.







## 2.14. 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.

## 2.15. VIEWING HOST DEVICE INFORMATION

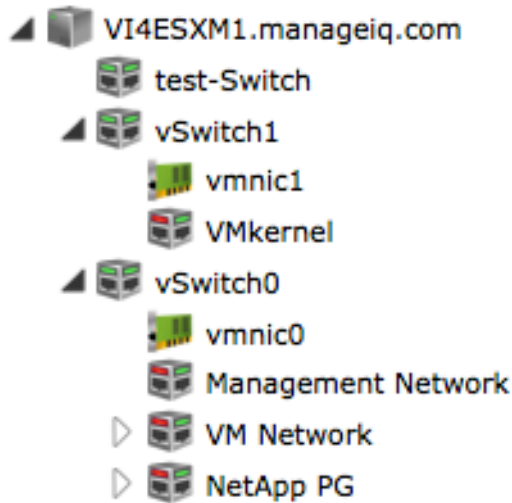
Access information on the hardware devices including processor, CPU type and speed, and memory for each host.

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

## 2.16. VIEWING HOST NETWORK INFORMATION

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

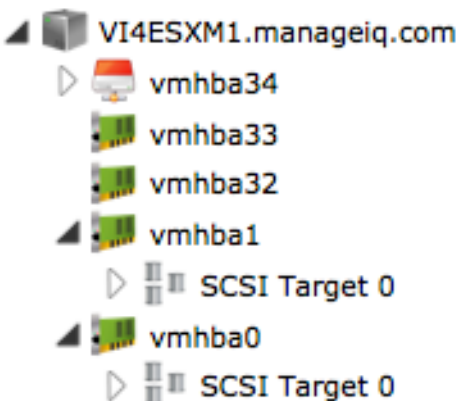
1. Navigate to **Infrastructure** → **Hosts**.
2. Click the host to view the network information.
3. From the Host Accordion, click **Properties** → **Network**.



## 2.17. VIEWING STORAGE ADAPTERS

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

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



## 2.18. 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.

1. Navigate to **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.

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

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

3. 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.

## 2.19. 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**).

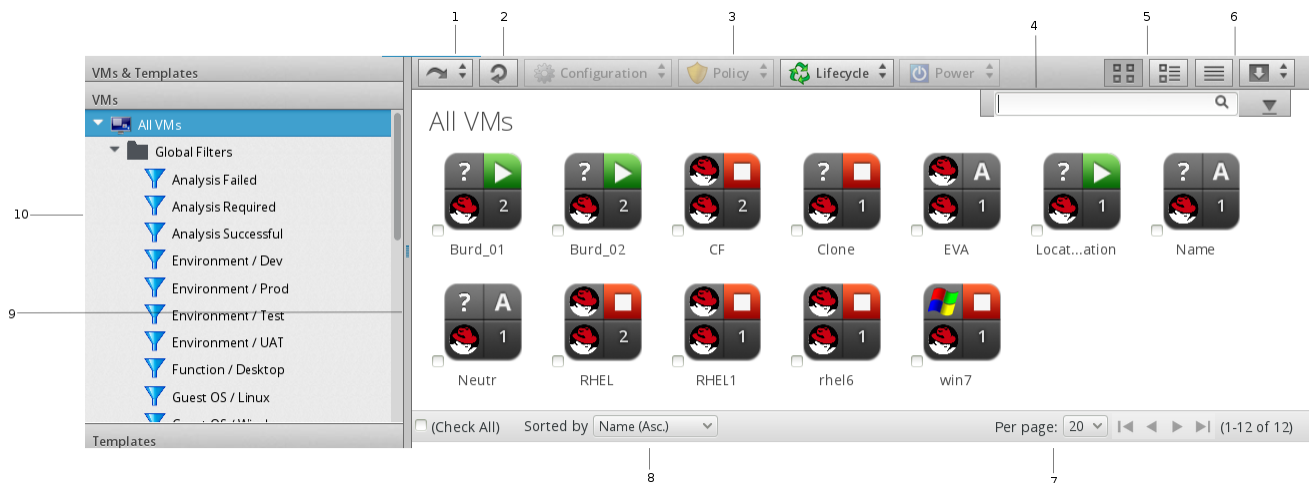
3. Click the output button for the type of report you want.

- 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 CloudForms Management Engine 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, CloudForms Management Engine 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.

Icon	Description
	Off: Virtual Machine is powered off.
	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 the 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

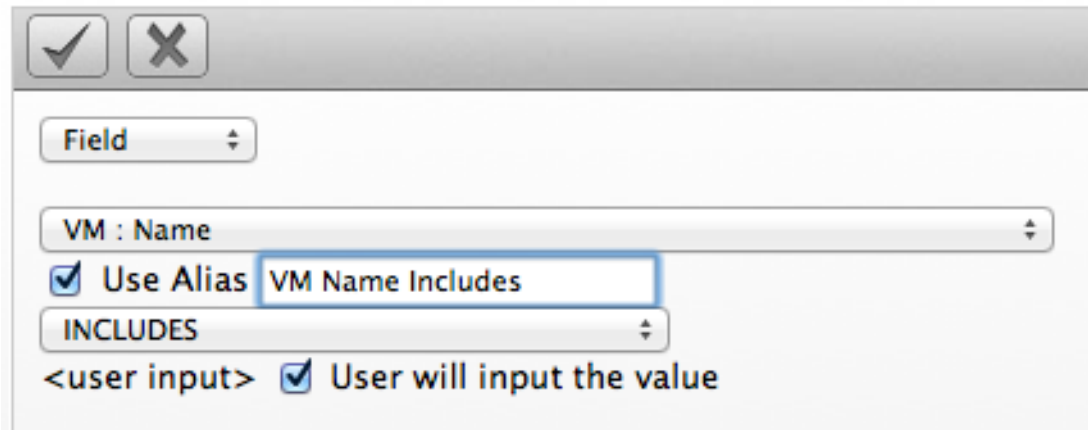
The Virtual Machine Filter accordion is provided so that you can easily navigate through groups of virtual machines. You can use the ones provided or create your own through Advanced Filtering capabilities.

1. Navigate to **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 **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

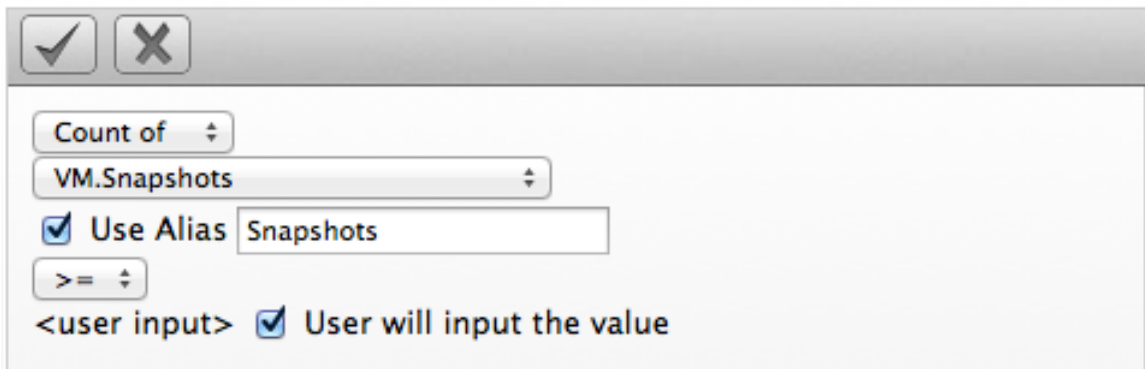
VM : Name

☒ 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

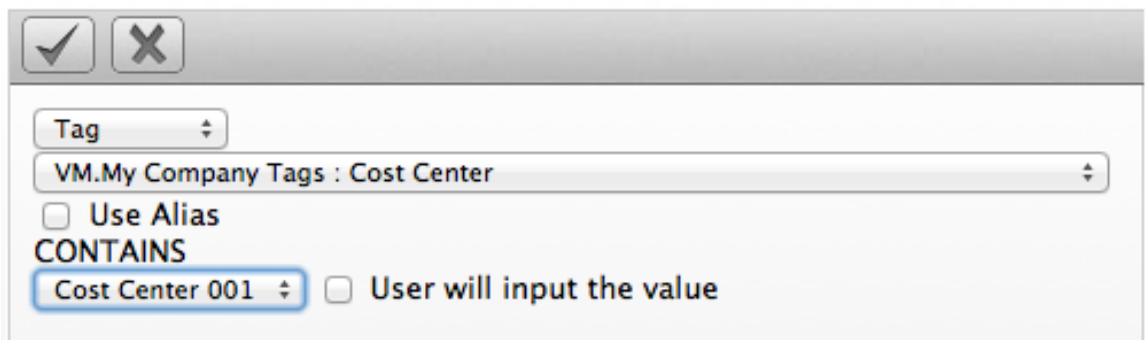
VM.Snapshots

☒ 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.

Find

Virtual Machine.Advanced Settings : Description

☐ Use Alias

= Text

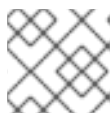
Check All <Choose>

- Click (**Commit Expression Element Changes**) to add the expression.
- Click **Save**.
- 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 Filter**.
- Click **Save**.

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

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

- Navigate to **Infrastructure** → **Virtual Machines**.
- Click the accordion for the items to search either **VMs** or **Templates**.
- Click (**Advanced Search**) to open the expression editor.
- Click **Load**.
- 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.








Choose a saved VM filter: <Choose>

-- OR --

Choose a VM report filter: <Choose>

- 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 in **Configure** → **My Settings** → **Default Views**, the current view can also be controlled from the Virtual Machines pages.

1. Navigate to **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 **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 **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.

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

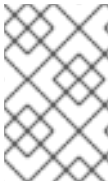


3. In the **Name Filter** bar in the upper right corner of the window, type your criteria.

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 CloudForms Management Engine is not set up for automatic analysis, perform a manual analysis of a virtual machine. To perform a SmartState analysis, CloudForms Management Engine 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 **Infrastructure** → **Virtual Machines**.
2. Click the accordion for the items to analyze.
3. Check the Virtual Machines and Templates to analyze.
4. Click  (**Configuration**), and then  (**Perform SmartState Analysis**) on the taskbar.
5. Click **OK**.

### 3.6.1. Red Hat Enterprise Virtualization Prerequisites

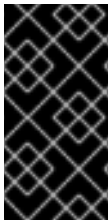
#### 3.6.1.1. SmartState Analysis on Red Hat Enterprise Virtualization Manager 3.1 and Above - Storage Support Notes

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

- **NFS**
  - The CloudForms Management Engine 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 CloudForms Management Engine 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 CloudForms Management Engine Appliance **must** reside in each datacenter with the iSCSI / FCP storage type.
- Other Notes
  - The **Set Server Relationship** option enables the VM SmartState Analysis job to determine the datacenter where a CloudForms Management Engine Appliance is running and thus to identify what storage it has access to in a Red Hat Enterprise Virtualization environment.
    - After setting up a CloudForms Management Engine Appliance and performing a refresh of the provider, find the CloudForms Management Engine Appliance in the Virtual Machine accordion list and view its summary screen.
    - Click **Configuration** → **Edit Server Relationship**.
    - Select the server that relates to this instance of the CloudForms Management Engine Appliance.



### IMPORTANT

If you attach a DirectLUN disk after configuring the CloudForms Management Engine database, access the Appliance in a terminal and run `pvscan` to detect the DirectLUN disk. Alternatively, in CloudForms Management Engine 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 CloudForms Management Engine Appliance that performs the analysis.
  - Enable **DirectLUN** on host.
  - Enable **DirectLUN** on the CloudForms Management Engine Appliance. To do this, edit the desired Red Hat Enterprise Virtualization storage and get the **LUNID** value. Then, on the CloudForms Management Engine 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 CloudForms Management Engine 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 CloudForms Management Engine 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 CloudForms Management Engine Appliance is running and therefore identify what storage it has access to in a Red Hat Enterprise Virtualization environment.
  - a. After setting up a CloudForms Management Engine Appliance and performing a refresh of the Provider, find the CloudForms Management Engine 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 CloudForms Management Engine Appliance.

## 3.6.2. VMware vSphere Prerequisites

### 3.6.2.1. Installing VMware VDDK on CloudForms Management Engine

Execution of SmartState Analysis on virtual machines within a VMware environment requires the Virtual Disk Development Kit (VDDK). CloudForms Management Engine 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 CloudForms Management Engine 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 CloudForms Management Engine Appliance.

The VDDK is now installed on the CloudForms Management Engine Appliance. This enables use of the SmartState Analysis Server Role on the appliance.

## 3.7. COMPARING VIRTUAL MACHINES AND TEMPLATES

The CloudForms Management Engine 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.


1. Navigate to **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**). 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 from the comparison**) 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.

1. To change the base virtual machine that all the others are compared to, click its label at the top of its column.

2. 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.
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. 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 **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.

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



CloudForms Management Engine 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 the [CloudForms General Configuration guide](#). The virtual machine must be running and must have an IP address in the VMDB, usually obtained from a SmartState Analysis.

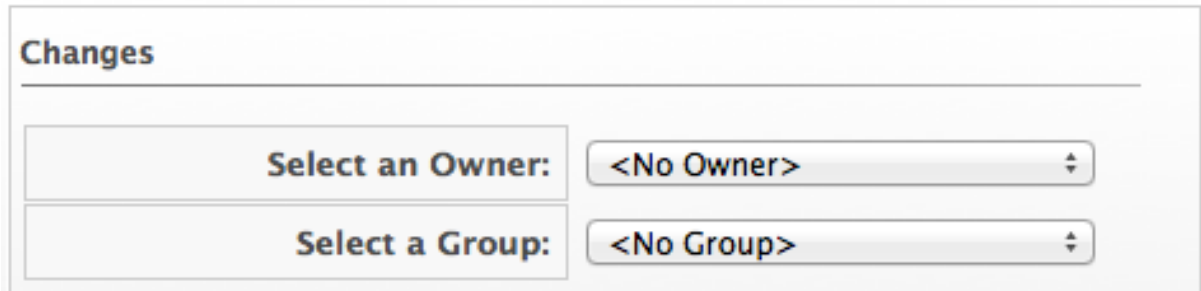
1. Navigate to **Infrastructure** → **Virtual Machines**.
2. Check the Virtual Machines to collect the processes.
3. Click  (Configuration), and then  (Extract Running Processes) on the Taskbar.
4. Click **OK**.

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

## 3.10. 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 **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**.

### 3.11. 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 **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**.

### 3.12. TAGGING VIRTUAL MACHINES AND TEMPLATES

1. Navigate to **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

### 3.13. 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.



### 3.14. EDITING VIRTUAL MACHINE OR TEMPLATE PROPERTIES

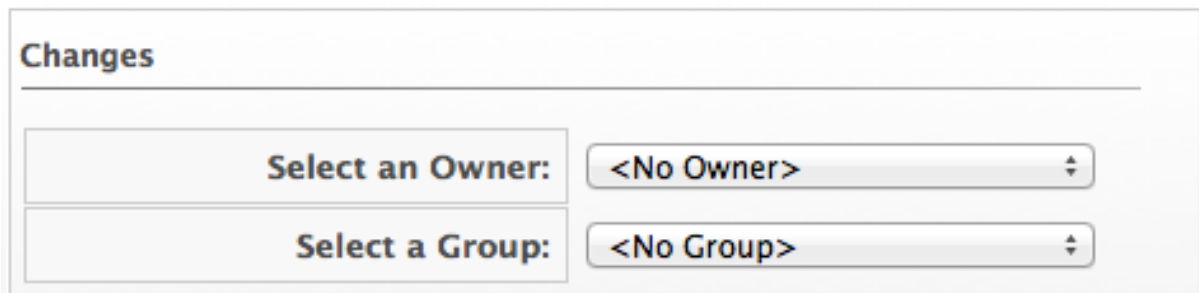
Edit the properties of a virtual machine or template to set parent and child virtual machines. SmartState Analysis also can detect this.

1. Navigate to **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 this VM or Edit this Template**) 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**.

### 3.15. 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 **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**.

### 3.16. RIGHT SIZING A VIRTUAL MACHINE

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

1. Navigate to **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.

### 3.17. 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, CloudForms Management Engine calculates and shows trend lines in the charts which are created using linear regression. The calculation uses the capacity and utilization data collected by CloudForms Management Engine during the interval you specify.





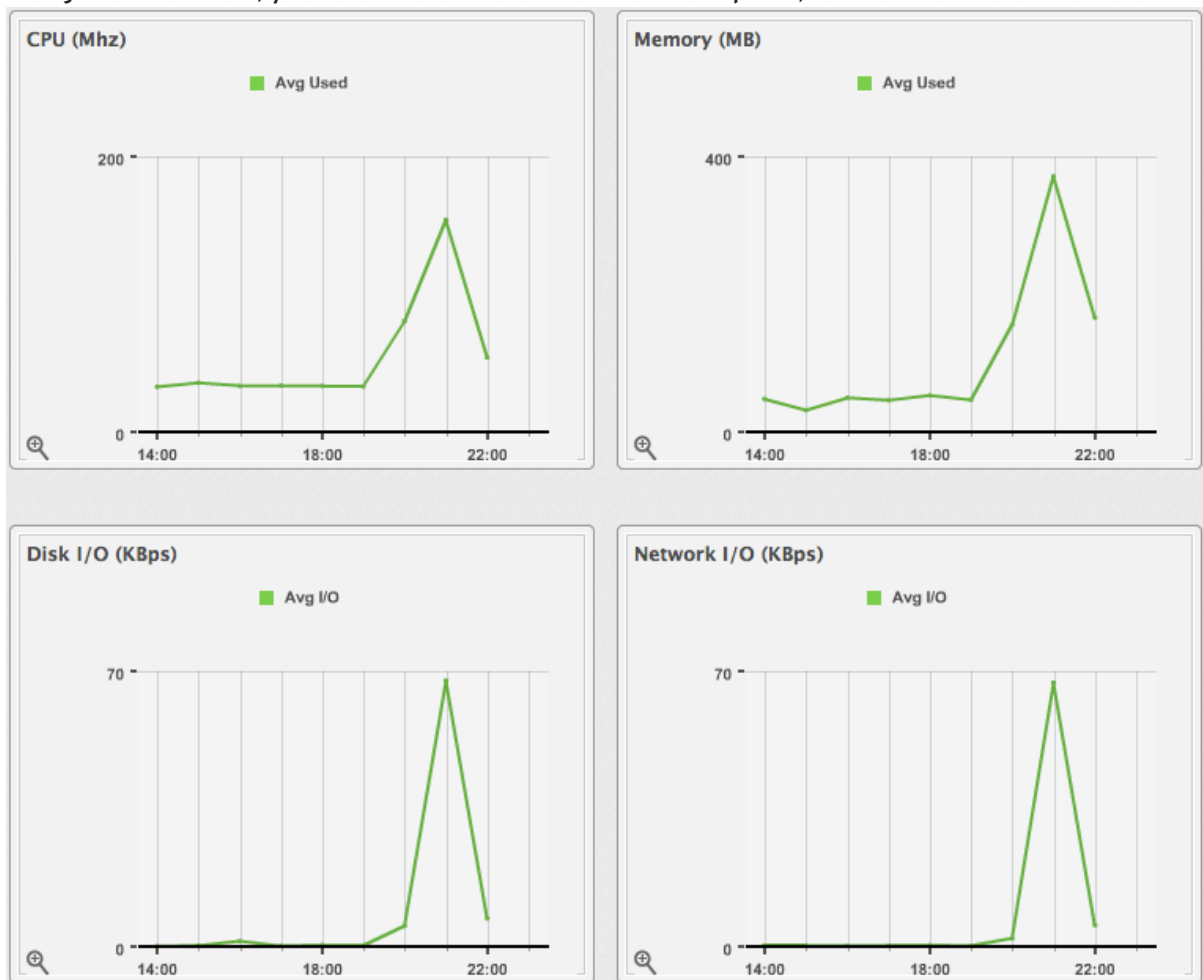


## NOTE

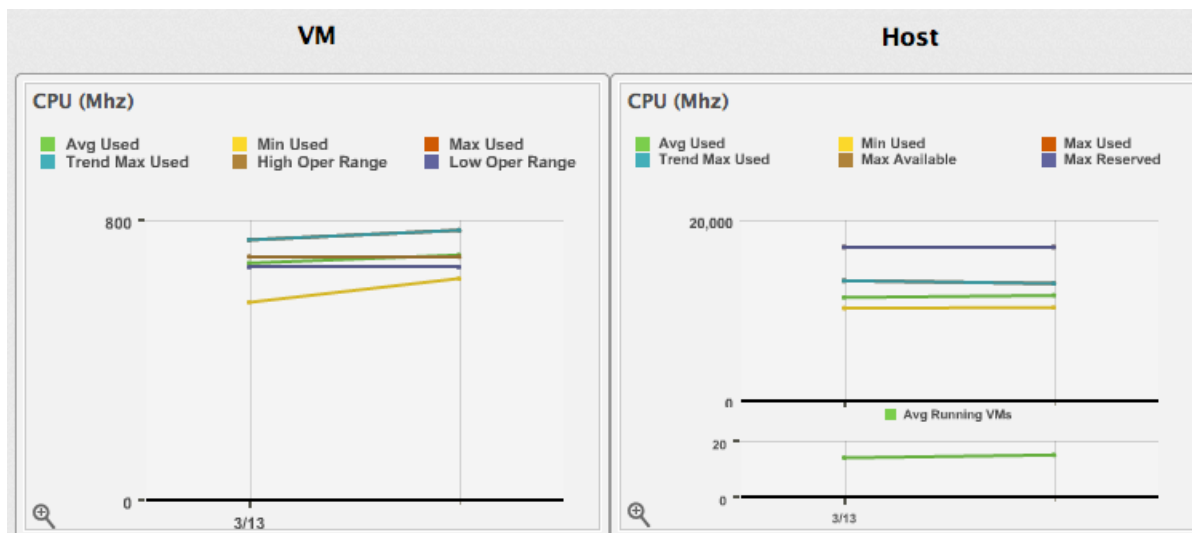
You must have a server with network visibility to your provider assigned the server role of **Capacity & Utilization Collector** to use this feature.

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

1. From **Infrastructure** → **Virtual Machines**, click the accordion that you want to view capacity data for.
2. Click the item you want to view.
3. Click  (**Monitoring**), and then  (**Utilization**).
4. 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.



5. 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 CloudForms Management Engine does not show daily data for a day without a complete 24 data point range for a day.

## 3.18. 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 **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.

The screenshot shows the 'Options' panel for viewing the timeline. It includes the following controls:

- Show:** Management Events (dropdown)
- Interval:** Daily (dropdown)
- Date:** 3/12/2013 (text input)
- Show:** 7 (dropdown) days back
- Level:** Summary (dropdown)
- Event Groups:** Power Activity (dropdown), <NONE> (dropdown), <NONE> (dropdown)

\* 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.

- To see more detail on an item in the timeline, click on it. A balloon appears with a clickable link to the resource.

### 3.19. 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 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.

## 3.20. 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 **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.

## 3.21. VIEWING VIRTUAL MACHINE OR TEMPLATE SNAPSHOT INFORMATION

View the list of snapshots to see a history of their creation and size. CloudForms Management Engine 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 **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.

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

CloudForms Management Engine'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 **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.

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

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

1. Navigate to **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.


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

CloudForms Management Engine 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 **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**.



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

1. Navigate to **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**).
7. For more information on the **Compare** feature, see [Comparing virtual machines and templates](#).

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

1. Navigate to **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 *		<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

## 3.27. 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.
  1. Navigate to **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.



1. 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.

1. 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.

1. 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.

### 3.28. 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.

### 3.29. 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 **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.

### 3.30. 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 **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.

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

Using an **Analysis Profile**, collect event log information from your virtual machines. See section [Setting a Default Analysis Profile](#) in the CloudForms General Configuration guide.



#### NOTE

This feature is only available for Windows.

1. Navigate to **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.

### 3.32. VNC AND SPICE 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.

Before opening a console for a virtual machine, you must first configure console access at a network layer, and then configure the browser plug-in and certificate for the virtual machine console.

CloudForms Management Engine offers the following support for HTML5-based VNC and SPICE consoles:

- VNC and SPICE consoles for Red Hat Enterprise Virtualization Manager with websocket proxy
- VNC consoles for VMWare with websocket proxy
- VNC consoles for OpenStack using OpenStack-supplied websocket proxy

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

CloudForms Management Engine 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 Enterprise Linux OpenStack Platform 7 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 the [Configuring Console Options](#) section in the *Red Hat Enterprise Virtualization Virtual Machine Management Guide*.

### 3.32.1. 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 CloudForms Management Engine Console to the CloudForms Management Engine.
- All VNC ports (5900-6000) are opened from the CloudForms Management Engine 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 CloudForms Management Engine. 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.

#### 3.32.1.1. 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
```

#### 3.32.1.2. 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**.

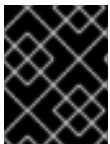
### 3.32.1.3. Configuring the VMware ESXi Host Firewall Ports for Console Access

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 CloudForms Management Engine.

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**.

### 3.32.2. Configuring the Certificate for a Virtual Machine Console

Use SSL to control the encryption of data between your browser and proxy processes running on the virtual machine. This procedure assumes that you have generated or purchased a certificate that is accepted by your browser, and that the certificate has been signed. For more information about generating and replacing SSL certificates in CloudForms Management Engine, see [Replacing SSL Certificates in CloudForms Management Engine](#) and [Generating SSL Certificates for Your Appliance and Database](#).



#### IMPORTANT

Red Hat recommends not to use the default self-signed certificate supplied with the Appliance, as the CloudForms Management Engine may not perform reliably.

1. Navigate to **Configure** → **Configuration**.
2. Click on the **Settings** accordion, then click **Zones**.
3. Click the zone where the CloudForms Management Engine server is located.
4. Click on the server.
5. Click the **Advanced** tab.

- Under the **server** configuration parameter, add the following lines:

```
websocket:
:encrypt: true
:cert: certs/certificate.cer
:key : certs/key.cer.key
```

Replace **certificate.cer** with the name of the certificate file and **key.cer.key** with the name of the key file.

All paths are relative to the **/var/www/miq/vmdb/** directory. In other words, the **/cert** directory referenced above is found in the **/vmdb** directory.

The value for **encrypt** defaults to **true** for SSL connections and to **false** for non-SSL encryption, however it can be overridden here. For example, you can access the application using HTTP and yet use **wss://** for the websocket proxy.

- Click **Save**.

### 3.32.3. Configuring the Browser Plug-in for a Virtual Machine Console

This section only applies to using the VMware MKS or VMware VMRC browser plug-ins for accessing a virtual machine console. It does not apply to access through the HTML5 console.

To use a browser plug-in for accessing a virtual machine console, you must have installed VNC on the machine on which you access the CloudForms Management Engine Console and installed either the VMware MKS plug-in or the VMware VMRC plug-in in your browser.

- Navigate to **Configure** → **Configuration**.
- Click on the **Settings** accordion, then click **Zones**.
- Click the zone where the CloudForms Management Engine server is located.
- Click on the server.
- Click the **Advanced** tab.
- Under the **server** configuration parameter, add the following line:

```
remote_console_type: console
```

Replace **console** with the browser plug-in that you have set up. Valid values are **mks** and **vmrc**.

- Click **Save**.

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

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

- Navigate to **Infrastructure** → **Virtual Machines**.
- Click on the virtual machine that you want to access.

3. Click  (**Open a web-based VNC or SPICE console for this VM** ).



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

## 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 **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. Before assigning tags, create them using the instructions in the [CloudForms General Configuration guide](#).

1. Navigate to **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: <span>Environment *</span> <span>&lt;Select a value to assign&gt;</span>		
	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 of 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. PXE SERVERS

PXE servers are used by CloudForms Management Engine 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. See the [CloudForms General Configuration guide](#) for more information.

## CHAPTER 6. AVAILABILITY ZONES

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

### 6.1. 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)**.

### 6.2. VIEWING AVAILABILITY ZONE RELATIONSHIPS

Use the Availability Zone Accordion's **Relationship** section to see items related to an availability zone.

1. Navigate to **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 7. 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.

CloudForms Management Engine can abstract information from tenants including quotas and relationships to other OpenStack objects.

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

### 7.1. 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)**.

### 7.2. VIEWING TENANT RELATIONSHIPS

Use the Tenant Accordion's **Relationship** section to see items related to the Tenant.

1. Navigate to **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 8. FLAVORS

Flavors indicate the resource profiles available for instances. Each Flavor contains a value set for CPUs, CPU Cores and memory. CloudForms Management Engine provides the ability to view individual flavor information and instances currently using the flavor.

### 8.1. 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)**.

### 8.2. VIEWING FLAVOR RELATIONSHIPS

Use the Flavor Accordion's **Relationship** section to see items related to the Flavor.

1. Navigate to **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 9. SECURITY GROUPS

You can group instances using security groups to restrict port or IP address accessibility. Security groups are to be created from the cloud provider side and can be assigned to instances using CloudForms Management Engine instance provisioning.

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

### 9.1. VIEWING SECURITY GROUPS

This procedure describes how to view security groups.

1. Navigate to **Clouds** → **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.

### 9.2. TAGGING SECURITY GROUPS

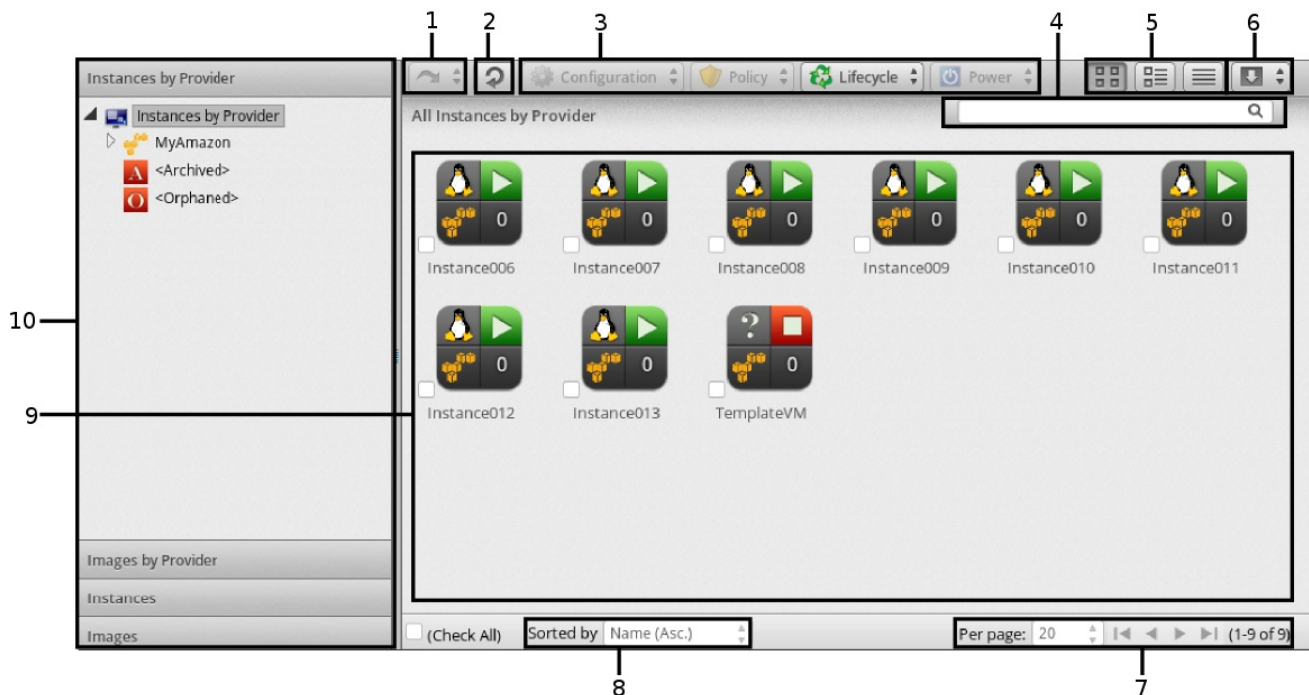
Apply tags to security groups to categorize them. Before assigning tags, create them using instructions in the [CloudForms General Configuration guide](#).

1. Navigate to **Clouds** → **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**.

## CHAPTER 10. INSTANCES

The **Instance** container combined with the ability to analyze information inside each instance provides in-depth information across the cloud environment. This rich set of information enables CloudForms Management Engine users to improve problem resolution times and effectively manage instances in their cloud environment.

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











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. 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 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 in multiple ways:

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


## 10.1. 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.

### 10.1.1. Using an Instance or Image Filter

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

### 10.1.2. Creating an Instance or Image Filter

1. Navigate to **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.



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 an instance, or the number of instances 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 **Find** to seek a particular value, and then check a property.

Find

Virtual Machine.Advanced Settings : Description

☐ Use Alias

=

Text

Check All <Choose>

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


6. Click **Save**.

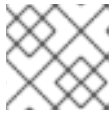
7. Type in a name for the search expression in **Save this Instance search as** . To set the filter to show globally, check **Global Search**.

## 8. 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.





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

1. Navigate to **Clouds** → **Instances**.
2. Click the accordion for the items to search (either **Instances** or **Images**).
3. Click  (**Advanced Search**) to open the expression editor.
4. Click **Load**.
5. 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.

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** (**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.
8. Click **Load**.
9. Click **Apply**.

## 10.2. CHANGING VIEWS FOR INSTANCES AND IMAGES

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

1. Navigate to **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**.

### 10.3. 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 **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.

### 10.4. 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 **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.

## 10.5. 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.

1. Navigate to **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**.

## 10.6. 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 CloudForms Management Engine is not set up for automatic analysis, perform a manual analysis of an instance. To perform a SmartState Analysis, CloudForms Management Engine requires a running SmartProxy with visibility to the instance's storage location requires a running SmartProxy with visibility to the instance's storage location so that a snapshot can be created.

1. Navigate to **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.

## 10.7. COMPARING INSTANCES AND IMAGES

You can compare multiple instances in CloudForms Management Engine 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



1. Navigate to **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.
  1. To change the base instance that all the others are compared to, click its label at the top of its column.
  2. To go to the summary screen for an instance, click its **Virtual Thumbnail** or icon.

### 10.7.1. 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.

## 10.8. 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 **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.

## 10.9. EXTRACTING RUNNING PROCESSES FROM INSTANCES AND IMAGES



CloudForms Management Engine can collect processes running on Windows instances. To do this,

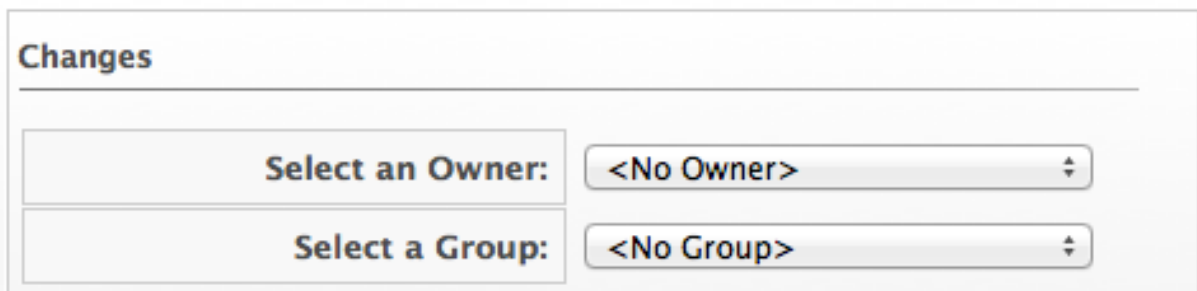
enter domain credentials for the zone where the instance is located. For more information, see the [CloudForms General Configuration guide](#). The instance must be running and must have an IP address in the VMDB, usually obtained from a SmartState Analysis.

1. Navigate to **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**.

## 10.10. 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 **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**.



## 10.11. 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 **Clouds → Instances**.
2. Click the accordion for the items to remove.
3. Click the checkboxes for the items to remove.
4. Click  (**Configuration**), and then  (**Remove from the VMDB**) button.



5. Click **OK**.

## 10.12. TAGGING INSTANCES AND IMAGES

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

6. Click **Save**.

## 10.13. 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.

## 10.14. VIEWING RUNNING PROCESSES AFTER COLLECTION

1. Click an instance with collected processes.
2. 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.

## 10.15. 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 **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**.



## 10.16. CONTROLLING THE POWER STATE OF AN INSTANCE

Follow this procedure to control the power states of an instance through the CloudForms Management Engine console.

1. Navigate to **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**.

## 10.17. RIGHT SIZING AN INSTANCE

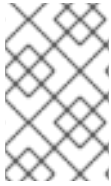
CloudForms Management Engine uses collected statistics to recommend the best size for an instance. CloudForms Management Engine uses the information from the **Normal Operating Range** to calculate the recommendations.

1. Navigate to **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.



## 10.18. 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 the [CloudForms General Configuration guide](#).

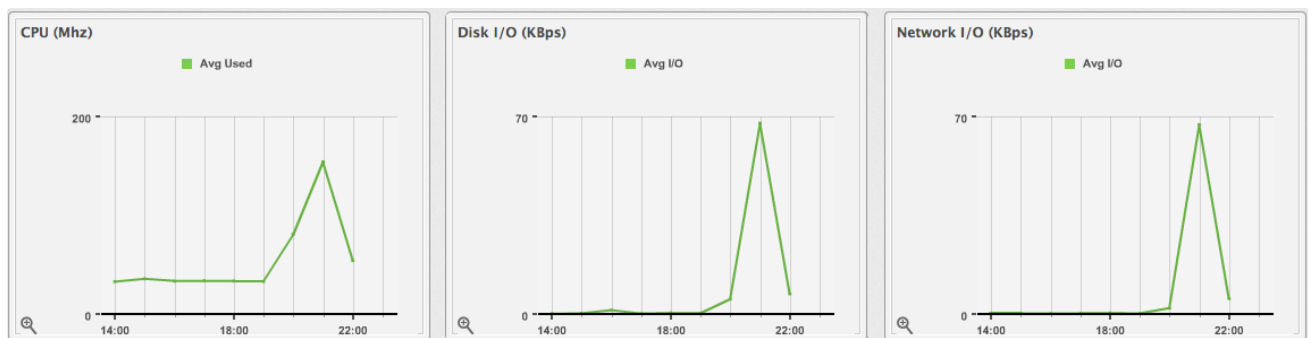
1. Navigate to **Clouds → Instances**.
2. Click the accordion to view capacity data.
3. Click the item to view.
4. Click  (**Monitoring**), and then  (**Utilization**) on the taskbar.
5. Select to view hourly, most recent hour, or daily data points for the dates to view data.

**Options**

Interval	Daily	Date	3/12/2013	Show	1 Week	back
Time Zone	(GMT+00:00) UTC					
Compare To	<Nothing>					

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

6. Select a Time Profile.





### NOTE

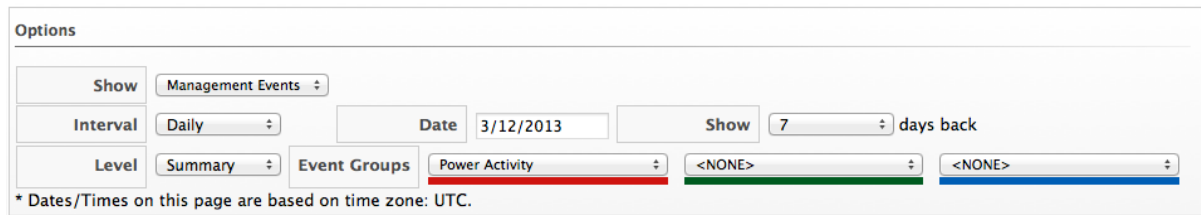
Daily charts only include full days of data. This means CloudForms Management Engine does not show daily data for a day without a complete 24 data point range for a day.

## 10.19. VIEWING THE INSTANCE OR IMAGE TIMELINE

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

1. Navigate to **Clouds → Instances**.
2. Click the instance to view the timeline.

- Click  (**Monitoring**), and then  (**Timelines**) on the taskbar.
- 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.
- To see more detail on an item in the timeline, click on it. A balloon appears with a clickable link to the resource.

## 10.20. 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.

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

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

1. Navigate to **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 **Users**.
5. Click the user to view details.

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

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

1. Navigate to **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.

## 10.23. VIEWING GENEALOGY OF AN INSTANCE OR IMAGE

CloudForms Management Engine 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 **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**.

## 10.24. 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.


1. Navigate to **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.



1. 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.

1. 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.

1. 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.

## 10.25. 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.

## 10.26. 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 **Clouds** → **Instances**.
2. Click the accordion for the desired item to view analysis history.
3. Click on the item to view its **Summary**.

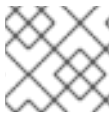
- From the **Relationships** area in the **Summary**, click **Analysis History**. A history of up to the last 10 analyses is displayed.

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

- Click on a specific analysis to see its details.

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

Using an **Analysis Profile**, collect event log information from your instances. See section [Setting a Default Analysis Profile](#) in the CloudForms General Configuration guide.



### NOTE

This feature is only available for Windows.

- Navigate to **Clouds** → **Instances**.
- Click the accordion for the item to view event logs.
- Click on the item to view its **Summary**.
- From **Diagnostics** click **Event Logs**.

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