Red Hat CloudForms 4.0 Monitoring, Alerts, and Reporting

Creating and managing reports, feeds, and widgets in CloudForms Management Engine

CloudForms Team

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Abstract

This guide provides instructions for creating and managing reports, feeds, and widgets in CloudForms Management Engine. It also includes information on accessing usage and timeline data, and chargeback costs. This information supports better information technology decision making and predictions for future virtual machine management.

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CHAPTER 1. CLOUD INTELLIGENCE DASHBOARD

Cloud Intelligence shows your virtual environments events, reports, and configurable alerts. This information supports better information technology decision making and predictions for future virtual machine management.

When you log in to the console, it brings you directly to the Cloud Intelligence Dashboard page by default. The console uses widgets to organize this page, providing you with a default set of commonly used widgets. The configuration items on these widgets are clickable allowing you to drill down directly to a referenced item.

Customize this page to include the charts, reports, and RSS feeds you specifically want to see as soon as you log in to the console. You can add, remove, move, minimize, zoom into, and maximize widgets. Only users with the proper access can create widgets.

1.1. ADDING A WIDGET

You can add widgets to the dashboard to accommodate what information you want to see upon login.

Procedure: To Add a Widget

1. Navigate to **Cloud Intelligence** → **Dashboard**.
2. Click **(Add a Widget)**.
3. Select the widget you want to add from the list. Note that only widgets that are not currently showing on the dashboard will appear in this list.

1.2. RESETTING TO THE DEFAULT SET OF WIDGETS

You can reset to default set of widgets according to your need.

Procedure: To Reset to the Default Set of Widgets

1. Navigate to **Cloud Intelligence** → **Dashboard**.
2. Click **(Reset Dashboard Widgets to the defaults)**.

1.3. REMOVING A WIDGET

You can remove a widget when you no longer need the widget to be displayed in the dashboard.

Procedure: To Remove a Widget

1. Navigate to **Cloud Intelligence** → **Dashboard**.
2. From the widget that you want to remove, click **(Remove from Dashboard)** in the upper right corner of the widget.
3. Click **OK**.

The widget is removed from the dashboard, but it is not deleted. It can be added again if needed.

1.4. ZOOMING IN TO A CHART WIDGET

Procedure: To Zoom in to a Chart Widget

1. Navigate to **Cloud Intelligence** → **Dashboard**.
2. From the chart widget that you want to enlarge, click **(Zoom in on this chart)** in the upper right corner of the widget.

The enlarged chart is opened in its own pop-up window. To close this window, click **(Close)** in the upper right corner.

1.5. OPENING A CHART OR REPORT WIDGET IN ITS OWN WINDOW

Procedure: To Open a Chart or Report Widget in Its Own Window

1. Navigate to **Cloud Intelligence** → **Dashboard**.
2. From the chart or report widget that you want to enlarge, click **(Open the chart and full report in new window)** in the upper right corner of the widget.
3. Click **OK**.

1.6. MINIMIZING OR MAXIMIZING A WIDGET

Procedure: To Minimize or Maximize a Widget

1. Navigate to **Cloud Intelligence** → **Dashboard**.
2. From the chart or report widget that you want to maximize, click **(Minimize)** or **(Maximize)** in the upper right corner of the widget.

1.7. DOWNLOADING A REPORT WIDGET AS A FILE

Procedure: To Download a Report Widget as a File

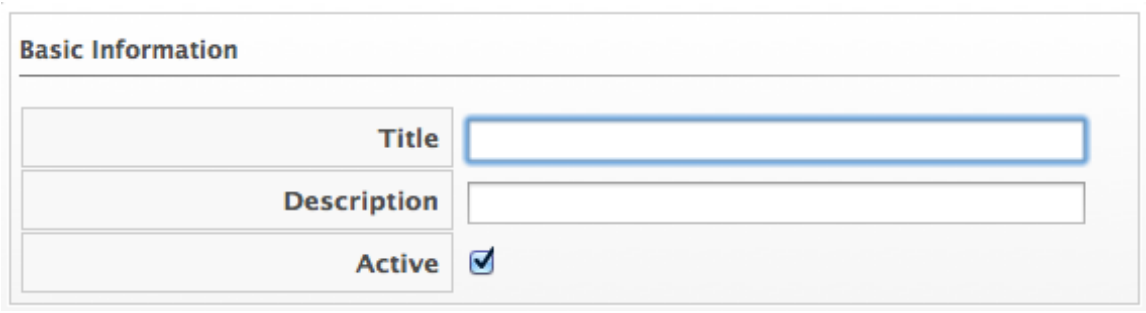
1. Navigate to **Cloud Intelligence** → **Dashboard**.
2. From the chart or report widget that you want to download as a PDF, click **(Download the full report (all rows) as a PDF file)** in the upper right corner of the widget.
3. Click **OK**.

CHAPTER 2. CREATING DASHBOARD WIDGETS

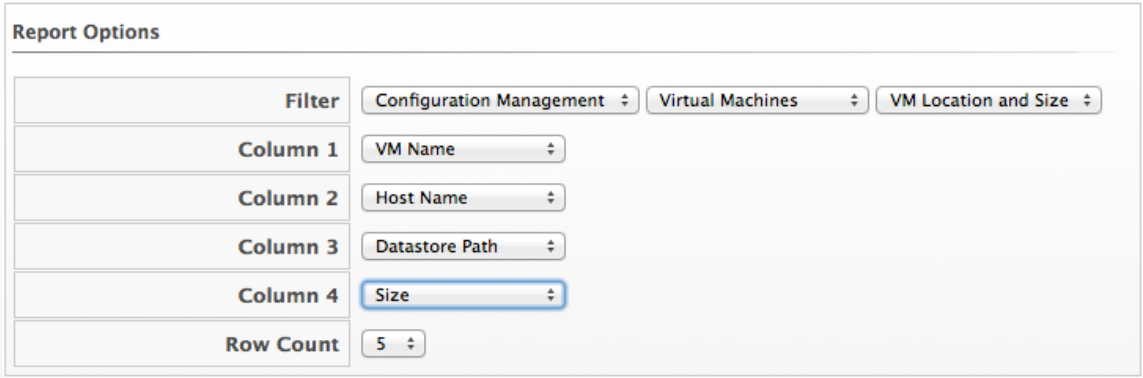
2.1. CREATING A REPORT WIDGET

Procedure: To Create a Report Widget

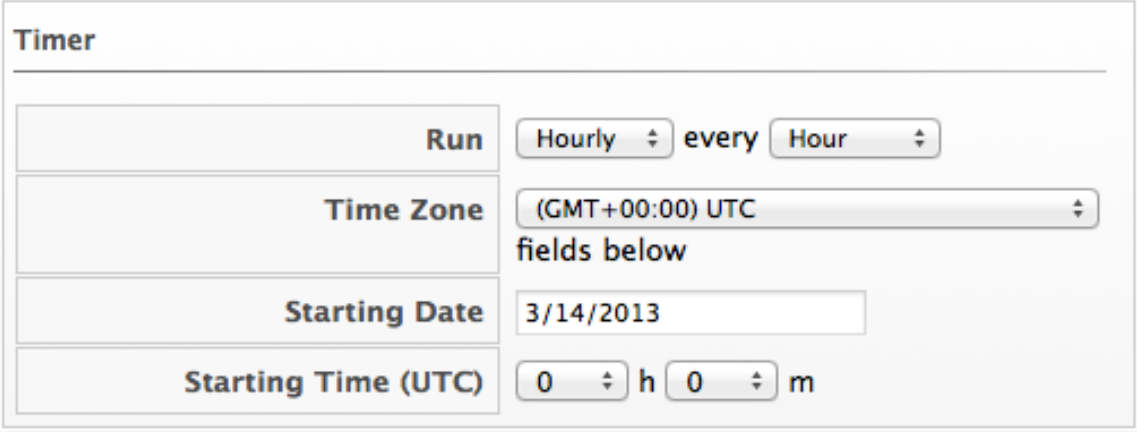
1. Navigate to **Cloud Intelligence → Reports**.
2. Click on the Dashboard Widgets accordion, then choose the Reports folder.
3. Click  **(Configuration)**, then click  **(Add a new Widget)**.
4. Click **Configuration → Add a new Widget**.
5. In the Basic Information area, type in a Title and Description. By default the widget will be active as soon as you create it. To make it inactive, uncheck the Active box.



6. From the Report Options area, select the filters until you are at the report you want for this widget. Select up to four columns from that report. Finally, for Row Count, select the number of rows that you want displayed.



7. In the Timer area, click the Run drop down to specify how often you want the widget data to get updated. The options displayed will depend on which Run option you choose. Select Hourly, Daily, Weekly, or Monthly.

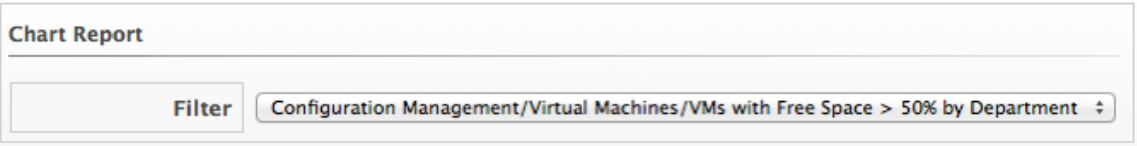


8. Select a Time Zone. Note that if you change the time zone, you will need to reset the starting date and time. Type or select a date to begin the schedule in Starting Date. Select a Starting Time based on a 24 hour clock in the selected time zone.
9. In the Visibility area, select <To All Users>, so that all users can use this widget no matter what user role they are assigned. Select <By Role> to assign this widget to specific user roles. Select <By Group> to assign this widget to specific groups.
10. Click **Add**.

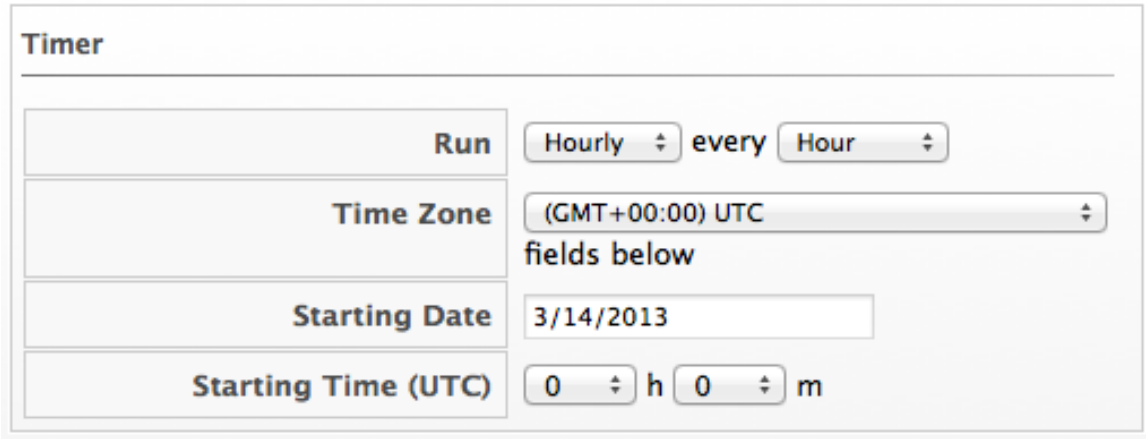
2.2. CREATING A CHART WIDGET

Procedure: To Create a Chart Widget

1. Navigate to **Cloud Intelligence → Reports**.
2. Click the Dashboard Widgets accordion and click the Charts folder.
3. Click  **(Configuration)**, then click  **(Add a new Widget)**.
4. In the Basic Information area, type in a Title and Description. By default the widget will be active as soon as you create it. To make it inactive, uncheck the Active box.
5. From the Chart Report area, select a chart to display in the widget.



6. In the Timer area, click the Run drop down to specify how often you want the widget data to get updated. The options displayed will depend on which Run option you choose. Select Hourly, Daily, Weekly, or Monthly.

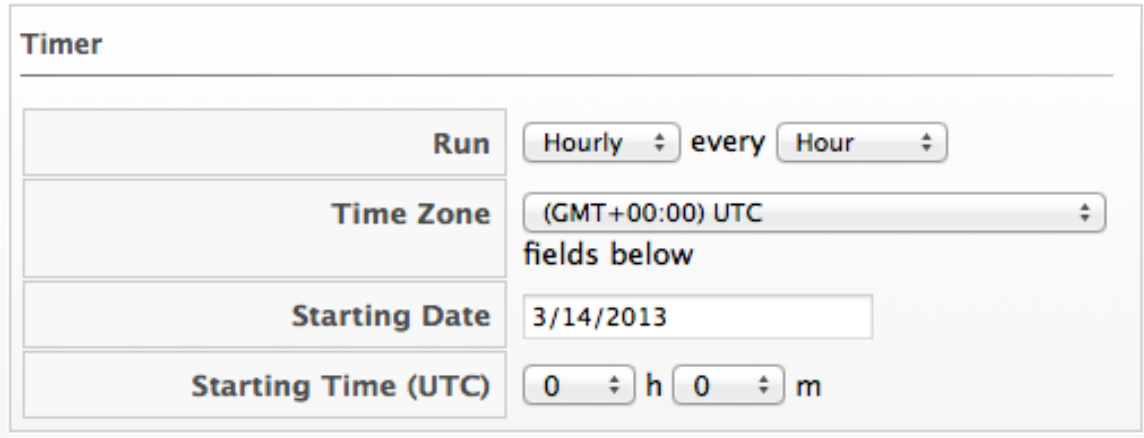


7. Select a Time Zone. Note that if you change the time zone, you will need to reset the starting date and time. Type or select a date to begin the schedule in Starting Date. Select a Starting Time (UTC) based on a 24 hour clock in the selected time zone.
8. In the Visibility area, select <To All Users>, so that all users can use this widget no matter what user role they are assigned. Select <By Role> to assign this widget to specific user roles. Select <By Group> to assign this widget to specific groups.
9. Click **Add**.

2.3. CREATING AN RSS FEED WIDGET

Procedure: To Create an RSS Feed Widget

1. Navigate to **Cloud Intelligence → Reports**.
2. Click the Dashboard Widgets accordion, and click the RSS Feeds folder.
3. Click **(Configuration)**, then click **(Add a new Widget)**.
4. In the Basic Information area, type in a Title and Description. By default the widget will be active as soon as you create it. To make it inactive, uncheck the Active box.
5. In the RSS Feed Options area, you have the following choices.
   - From Type, select Internal to use feed from CloudForms Management Engine. Then select the RSS feed, from the Internal RSS Feed dropdown.
   - From Type, select External to use a feed outside of CloudForms Management Engine. Then, either select the RSS feed or type your own.
   - From Row Count, select the number of rows you want returned from the RSS feed.
6. Select the Filters until you are at the report you want for this widget. Select up to three columns from that report. Finally, for Row Count, select the number of rows that you want displayed.
7. In the Timer area, click the Run drop down to specify how often you want the widget data to get updated. The options displayed will depend on which Run option you choose. Select Hourly, Daily, Weekly, or Monthly.

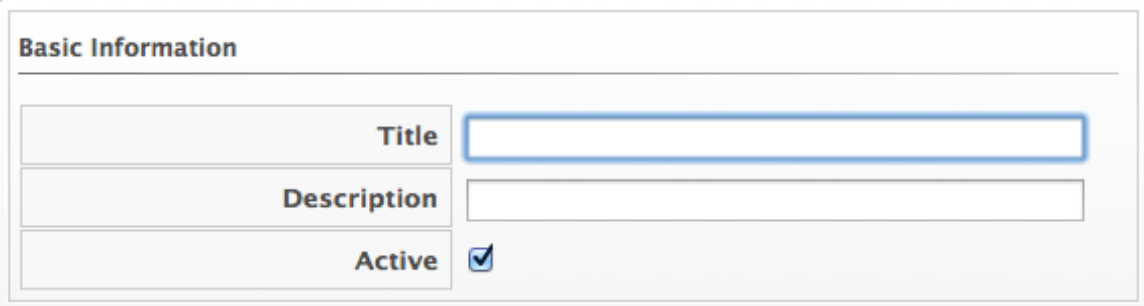


8. Select a Time Zone. Note that if you change the Time Zone, you will need to reset the starting date and time.
9. Type or select a date to begin the schedule in Starting Date.
10. Select a Starting Time (UTC) based on a 24 hour clock in the selected Time Zone.
11. In the Visibility area, select <To All Users>, so that all users can use this widget no matter what user role they are assigned. Select <By Role> to assign this widget to specific user roles. Select <By Group> to assign this widget to specific groups.
12. Click **Add**.

2.4. CREATING A MENU WIDGET

Procedure: To Create a Menu Widget

1. Navigate to **Cloud Intelligence → Reports**.
2. Click the Dashboard Widget accordion and click the Menus folder.
3. Click  **`(Configuration)`**, then click  **`(Add a new Widget)`**.
4. In the Basic Information area, type in a Title and Description. By default the widget will be active as soon as you create it. To make it inactive, uncheck the Active box.



5. In the Menu Shortcut#s area, use the [label]#Add a Shortcut dropdown to select all the places in the console that you want to add to this widget.
6. In the Visibility area, select <To All Users>, so that all users can use this widget no matter what user role they are assigned. Select <By Role> to assign this widget to specific user roles. Select <By Group> to assign this widget to specific groups.

7. Click **Add**.

2.5. EDITING A WIDGET

Procedure: To Edit a Widget

1. Navigate to **Cloud Intelligence** → **Reports**.
2. Click the Dashboard Widgets accordion and select the widget you want to edit.
3. Click  **(Configuration)**, and then  **(Edit this Widget)**.
4. Make the required changes.
5. Click **Save**.

2.6. COPYING A WIDGET

Procedure: To Copy a Widget

1. Navigate to **Cloud Intelligence** → **Reports**.
2. Click the Dashboard Widget accordion, and select the widget you want to copy.
3. Click  **(Configuration)**, and then  **(Copy this Widget)**.
4. Type a unique name for the widget and edit its properties.
5. Click **Save**.

2.7. DELETING A WIDGET

Note

Default widgets cannot be deleted, but they can be copied.

Procedure: To Delete a Widget

1. Navigate to **Cloud Intelligence** → **Reports**.
2. Click the Dashboard Widget accordion and select the widget you want to delete.
3. Click  **(Configuration)**, and then  **(Delete this Widget from the Database)**.
4. Click **OK**.

2.8. IMPORTING A WIDGET

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

Procedure: To Import a Widget

1. Navigate to **Cloud Intelligence** → **Reports**.
2. In the Import/Export accordion, click Widgets.
3. In the Import area, click **`Browse`** to select an import file.
4. Click **`Upload`**.

2.9. EXPORTING A WIDGET

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

Procedure: To Export a Widget

1. Navigate to **Cloud Intelligence** → **Reports**.
2. In the Import/Export accordion, click Widgets.
3. In the Export area, select the widgets that you want to export.
4. Click **`Export`**.

2.10. GENERATING WIDGET CONTENT IMMEDIATELY

Procedure: To Generate Widget Content Immediately

1. Navigate to **Cloud Intelligence** → **Reports**.
2. Click the Dashboard Widgets accordion and select the widget you want to generate.
3. Click  **`(Configuration)`**, and then  **`(Generate Widget Content now)`**.
4. Click **`OK`**.

The content is generated immediately instead of waiting for the next scheduled update. Generation of widget content is shown under the Tasks page of  **`(Settings & Operations)`**.

CHAPTER 3. REPORTS

Click the Reports accordion under **Cloud Intelligence → Reports** to see a list of reports available. These reports have been constructed to help you view the most commonly requested and significant data. From here, you can also create reports if you have appropriate access. CloudForms Management Engine provides a large group of default reports organized into categories. Each category has its own set of subfolders.

- Use Configuration Management to see hardware, application, network, service, user account, operating system, and snapshot information for all of your items.
- Use Migration Readiness to see information specifically related to items required to migrate a virtual machine.
- Use Operations to look at free space on registered and unregistered virtual machines, to see power states for virtual machines, and see which offline virtual machines have snapshots or have never been analyzed. You are also provided with reports specifically related to the operation of CloudForms Management Engine, such as user ids and snapshots taken by CloudForms Management Engine.
- Use VM Sprawl to check on usage information and disk waste.
- Use Relationships to see virtual machine, folder, and cluster relationships.
- Use Events to view operations and configuration management events.
- Use Performance by Asset Type to see a report on the performance of your virtual infrastructure. You must be capturing capacity and utilization data to get this information.
- Use Running Processes to view the information on processes running on a virtual machine. You must have domain credentials entered for the zone to collect the info for these reports, and the virtual machine must have been analyzed at least once.
- Trending shows projections of datastore capacity and host CPU and memory use.
- Provisioning shows provisioning activity based on the approver, datastore, requester, and virtual machine.

For a complete list of Reportable Fields in CloudForms Management Engine, see Appendix B, *Reportable Fields in CloudForms Management Engine*

3.1. RUNNING REPORTS

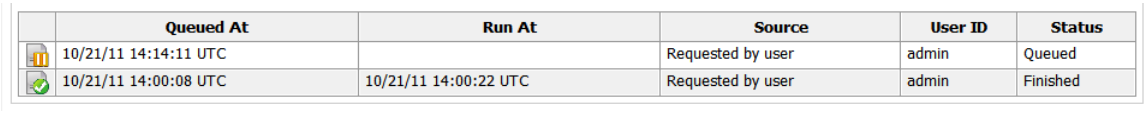
There are two different ways to generate a report: either scheduling the report, or manually by clicking the report generation button on the Reports page. CloudForms Management Engine uses interactive report generation so that reports are placed on a queue. A visual indicator of the reports status is shown. All reports are automatically saved so that they can be downloaded and analyzed later.

3.1.1. Generating a Single Report

Procedure: To Generate a Single Report

1. Navigate to **Cloud Intelligence → Reports**
2. Click the Reports accordion and select the report you want to view.

3. Click (Queue),
4. The report generation is placed on the queue and its status shows in the reports page.



	Queued At	Run At	Source	User ID	Status
	10/21/11 14:14:11 UTC		Requested by user	admin	Queued
	10/21/11 14:00:08 UTC	10/21/11 14:00:22 UTC	Requested by user	admin	Finished

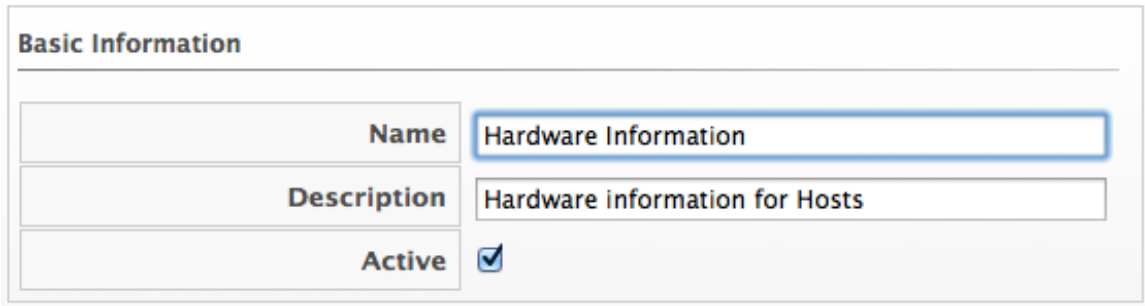
5. Click **(Reload current display)** to update the status.
6. When a report has finished generating, click on its row to view it.

3.1.2. Scheduling a Report

Procedure: To Schedule a Report

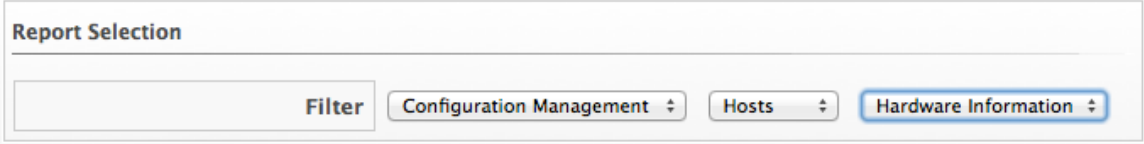
You can view historical data by creating reports on a scheduled basis. In addition, scheduled reports can be emailed directly to users.

1. There are two ways to schedule a report. Select a report from the Reports accordion and click Configuration, Add a New Schedule, or click the Schedules accordion and click Configuration, Add a New Schedule.

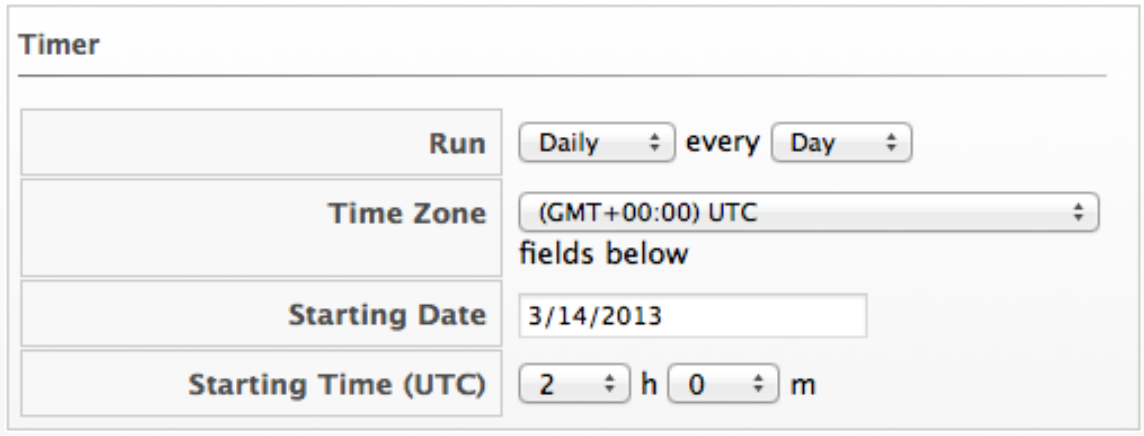


   - In the Basic Information area, type in a Name and Description for the schedule.
   - By default. Active is checked to enable the scan.
   - Check E-Mail after Running to send an email after the report has been generated. The email will be sent to the users email address as show in the Accounts area in Configuration. The email will include a link to the report. See CloudForms Management Engine Settings and Operations Guide to learn how to verify the address, and to validate outgoing email settings.

2. The Report Selection area is pre-populated if you added the schedule directly from the report. If you are adding from the schedule according, use the Filter drop downs to select the report that you want to schedule.

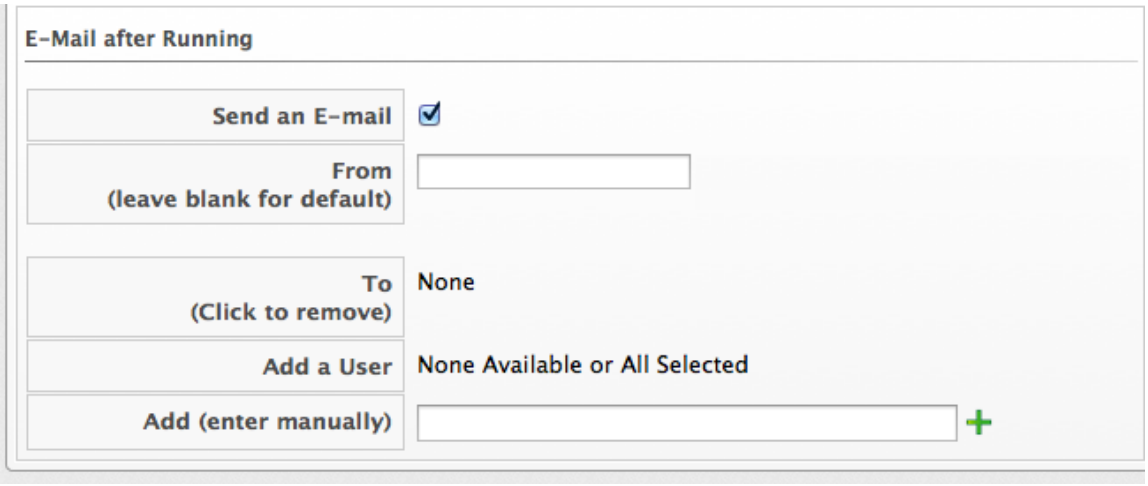


3. In the Timer area, click the Run drop down to specify how often you want the analysis to run. Your options after that will depend on which run option you choose.



- Click Once to have the analysis run just one time.
- Click Daily to run the analysis on a daily basis. You will be prompted to select how many days you want between each analysis.
- Click Hourly to run the analysis hourly. You will be prompted to select how many hours you want between each analysis.
- Type or select a date to begin the schedule in Starting Date.
- Select a Starting Time based on a 24 hour clock in the CloudForms Management Engine Appliances Time Zone.

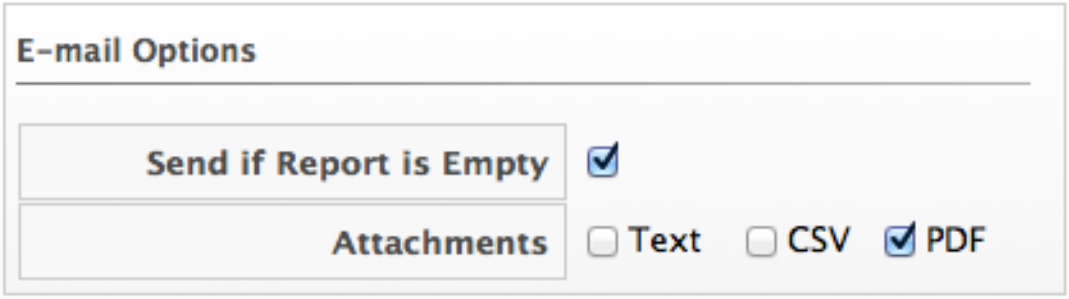
4. To send an email that includes an attachment with the report contents, check Send an E-mail. Parameters required for sending an email are displayed.



- In From (leave blank for default), type in the sending email.
- Use Add a User, to select a specific user. The user must have a valid email address entered under accounts.

- Use Add (enter manually) to type in the address not registered to a User.
- Then, click  **(Add)**.

5. If you are sending an email after the report runs, then you can select further options under Email Options.



- Check Send if Report is Empty if you want an email even if no records exist in the report.
- Next to Attachments, check if you would like the report attached as a Text, CSV, or PDF file.

6. Click **Add**.

Note

You may need to disable, change the report filter, or change the frequency of a schedule. To do this, you will need to edit the schedule.

3.1.3. Modifying a Report Schedule

Procedure: To Modify a Report Schedule

1. Navigate to **Cloud Intelligence** → **Reports**
2. Click the Schedules accordion and select the schedule you want to edit.
3. Click  (Configuration), then click  (Edit this Schedule).
4. Make the required changes.
5. Click **Save**.

3.1.4. Running a Scheduled Report Immediately

Procedure: To Run a Scheduled Report Immediately

1. Navigate to **Cloud Intelligence** → **Reports**.
2. Click the Schedules accordion and select the schedule you want to run.

3. Click  (Configuration), then click  (Queue).

3.2. VIEWING REPORTS

Once you have created a schedule for a report, you can view it at any time after the first scheduled time has occurred.

Procedure: To View a Report

1. Navigate to **Cloud Intelligence → Reports**.
2. Click the Saved Reports accordion or the Reports accordion.
3. Click on the instance of the report you want to view.

3.2.1. Changing Report Views

Some reports can be viewed as charts as well as lists. Note that this will depend on the type of data and on how the report has been created. Where applicable, you will see these additional buttons.

Procedure: To Change the View of a Report

1. Navigate to **Cloud Intelligence → Reports**.
2. Click the report to view. Click one of the following buttons for the view you want.
   - Click  for Graph View.
   - Click  for Hybrid View.
   - Click  for Tabular View.

3.2.2. Report Download Buttons

When you click on one of the supplied reports, you are presented with a group of buttons to download the report in one of three formats or to view the report in a full screen.

Note

Edit and delete buttons are only visible to administrators and super administrators. Edit and delete functions are only available to customer-created reports. The CloudForms Management Engine pre-configured reports cannot be edited or deleted, but they can be copied.

3.2.3. Downloading a Report

Download reports to analyze the data using other tools or to print the report.

Procedure: To Download Reports

1. Navigate to **Cloud Intelligence** → **Reports**.
2. Click the report you want to view.
3. Click on the row for the instance of the report you want to download. If the report needs to be generated, see sect-Running Reports.
4. Click on the report download buttons for the type of export you want.
   - Click TXT **(Download this report in text format)** to download as text.
   - Click CSV **(Download this report in csv format)** to download as a comma separated file.
   - Click PDF **(Download this report in PDF format)** to download as PDF.
   - The report is automatically named with the type of report and date.

3.2.4. Showing a Report in Full Screen

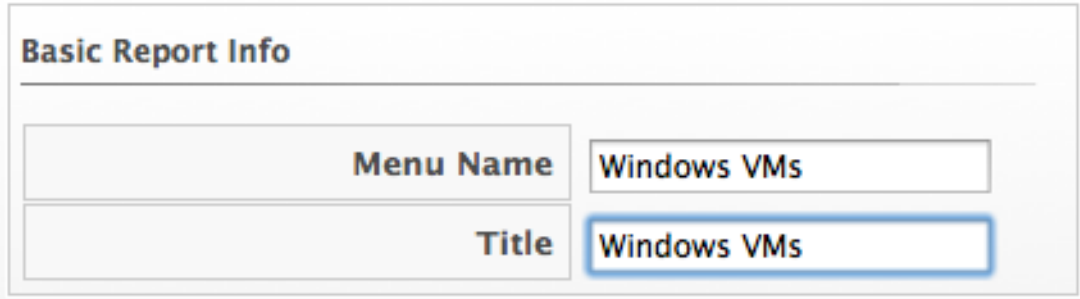
View the report in full screen to zoom into the report screen. From full screen, you can also print the chart that accompanies a report

3.3. ADDING A REPORT

Add reports if the default reports do not include what you need or you want to narrow the scope of a report. For example, you may want a report that shows only Windows virtual machines.

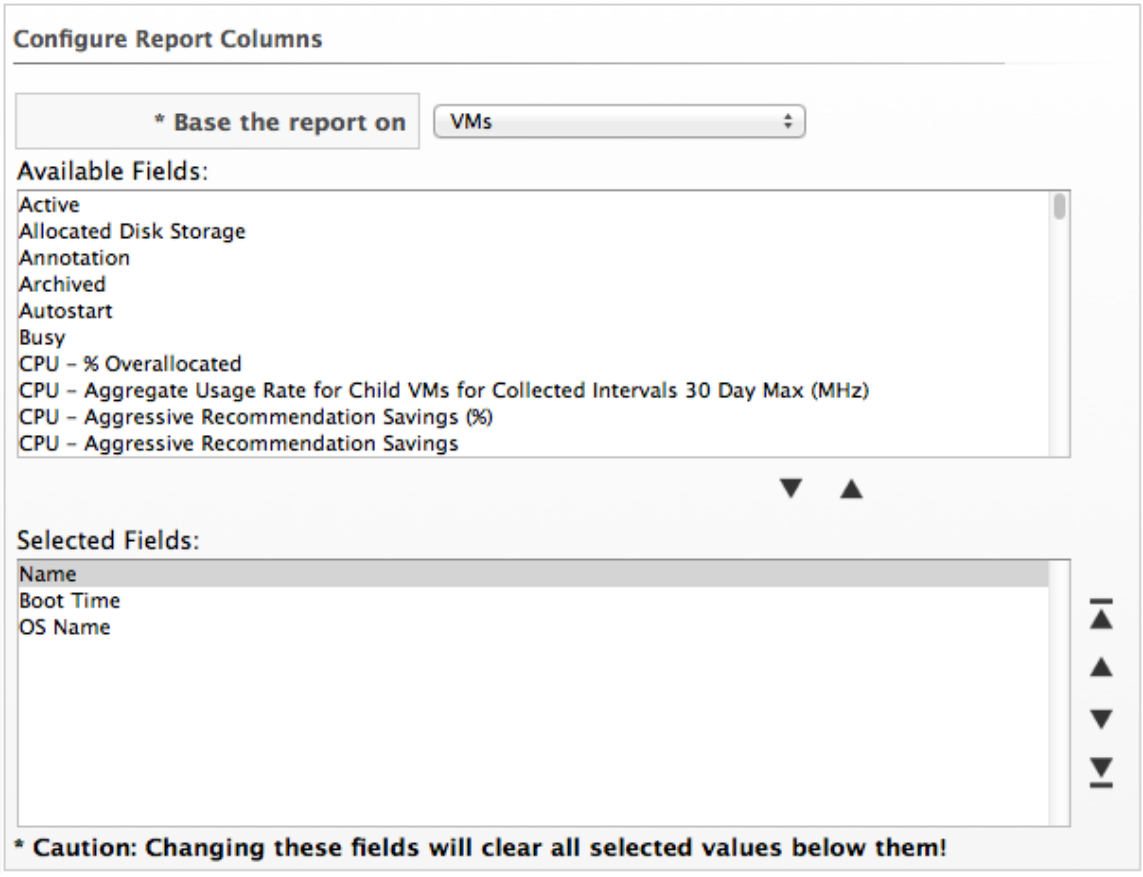
Procedure: To Add a Report

1. Navigate to **Cloud Intelligence** → **Reports**.
2. Click the Reports accordion.
3. Click (Configuration), then click (Add a New Report).
4. In the Columns tab, edit the Basic Report Info area.



   - Type a unique name in Menu Name for how you want the report described in the menu list.
   - Type the Title you want displayed on the report in title.

5. Add fields in the Configure Report Columns area.



- Use the Base the report on table dropdown to choose a table to get fields from.

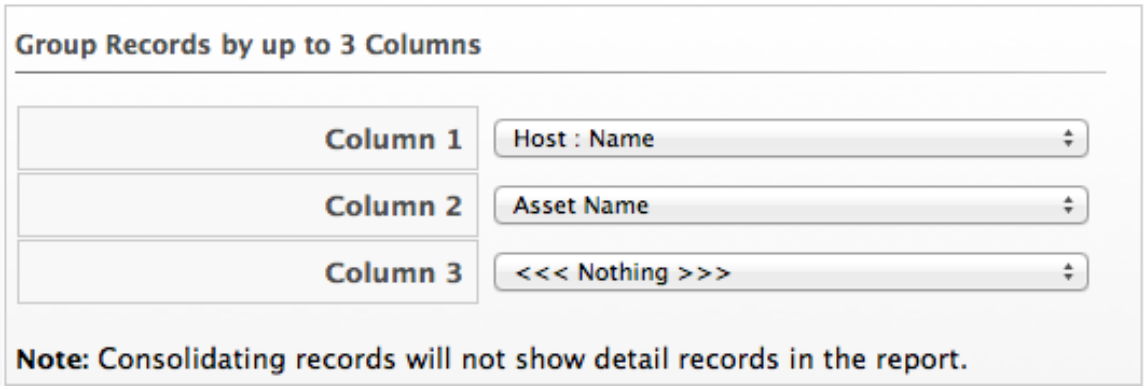
Note

If you change the report base or the interval, all selections below will be reset.

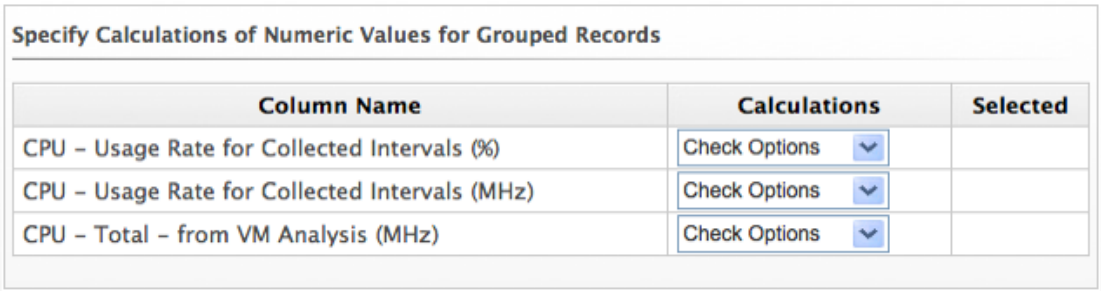
- Select fields that you want in the report from Available Fields, and then click  **(Move selected fields down)**. In addition to the fields, you can also select any tags that you have created and assigned.

- Change the order of the fields in the report by clicking  **(Move selected fields up)** or  **(Move selected fields down)**.

6. Click on the Consolidation tab to consolidate and aggregate data points into maximum, minimum, average, and total. Specifically, this would be useful for analyzing performance data over a specific period of time. Note that if you do this, you will not see individual records, but rather the calculation as a column header.



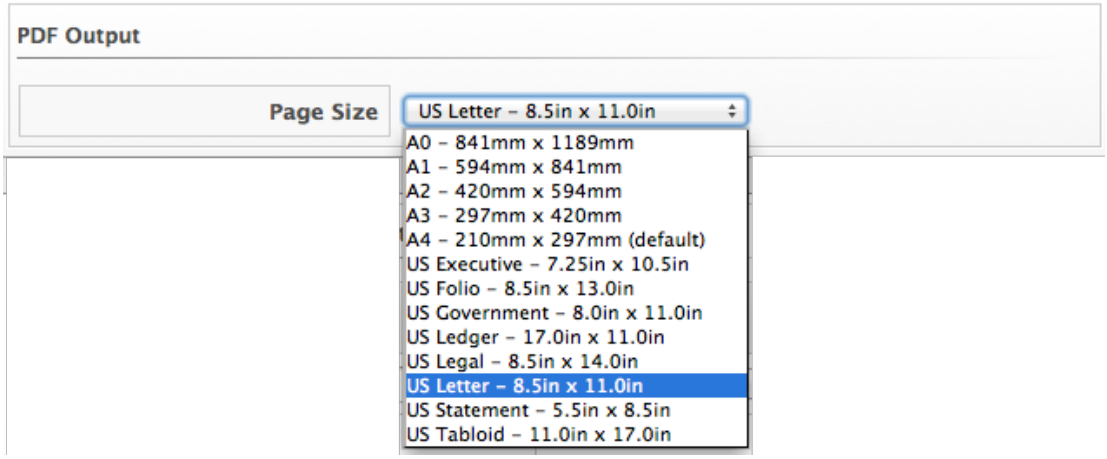
- Select the columns to group by.



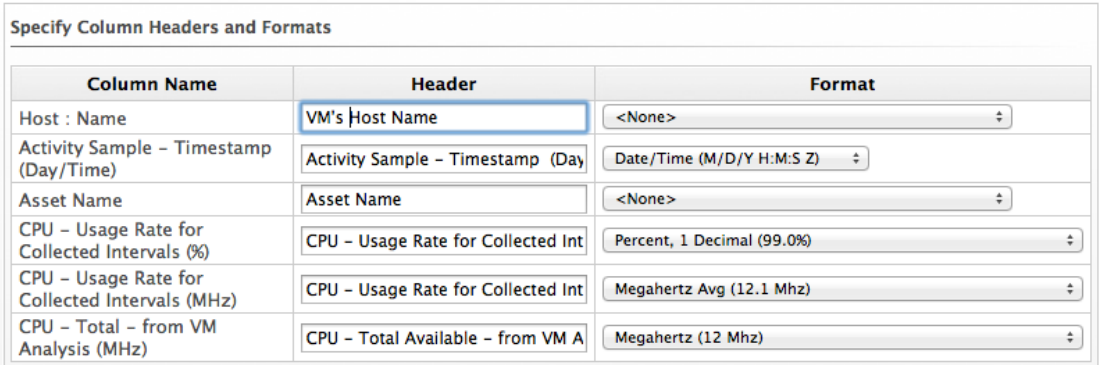
- For each numeric field selected in the report, you can click the dropdown under Calculations. Check the calculations you want to use.

7. Click on the Formatting tab to set the size of paper for a PDF and column header format.

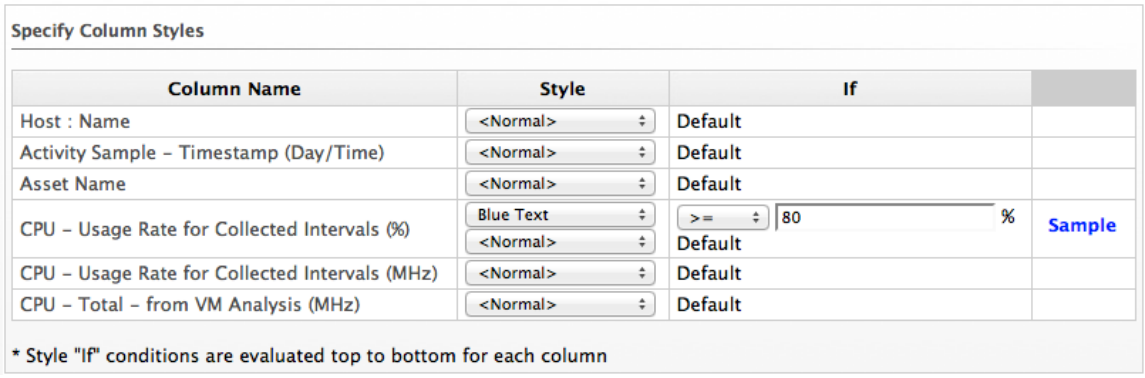
- From the PDF Output area, select the page size from the dropdown.



- From Specify Column Headers and Formats, type the text you want displayed for each field. For each numeric field, you can also set the numeric format.



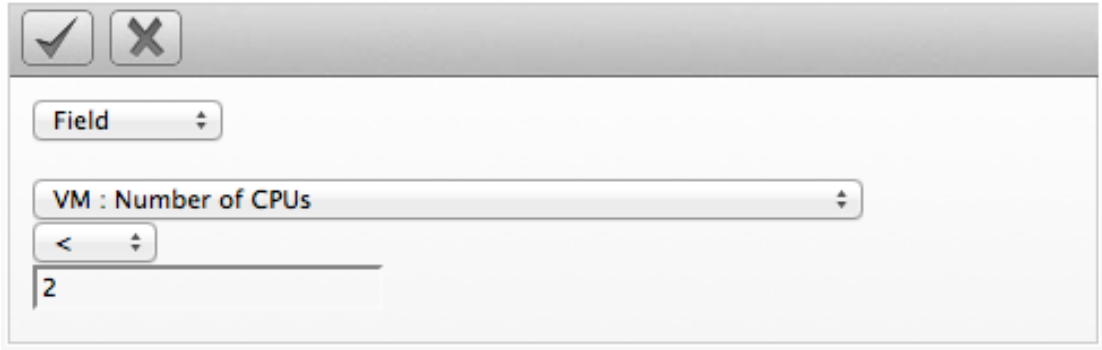
8. Click on the Styling tab to change the color of the text or the background for a row based on a condition.



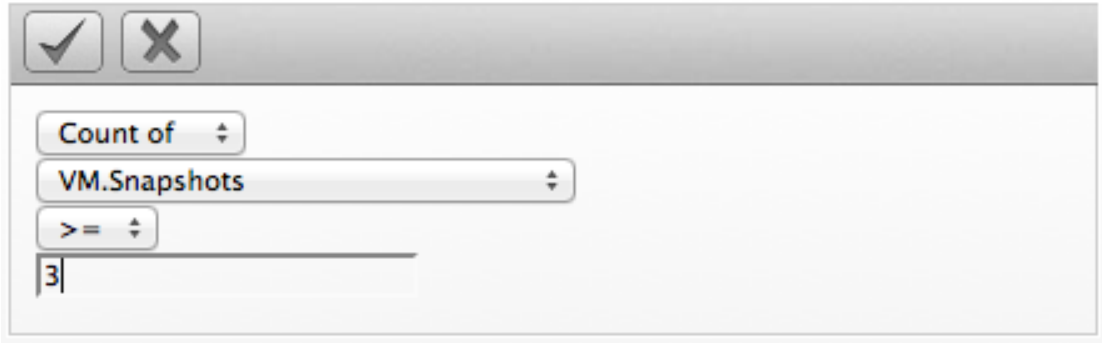
   - Use Style to select the format for the value, you can choose to change the text color or the background.
   - Use If to create a conditional statement for the style.

9. Click on the Filter tab to set filters for the data displayed in the report. There are two types of filters: the first is the Record Filter which is the primary filter of the main tables records, the second is also a Display Filter, which is a secondary filter of rows based on the fields of the child table. Click  in the appropriate area to use the expression editor to choose the appropriate options for your criteria. Based on what you choose, different options will show.

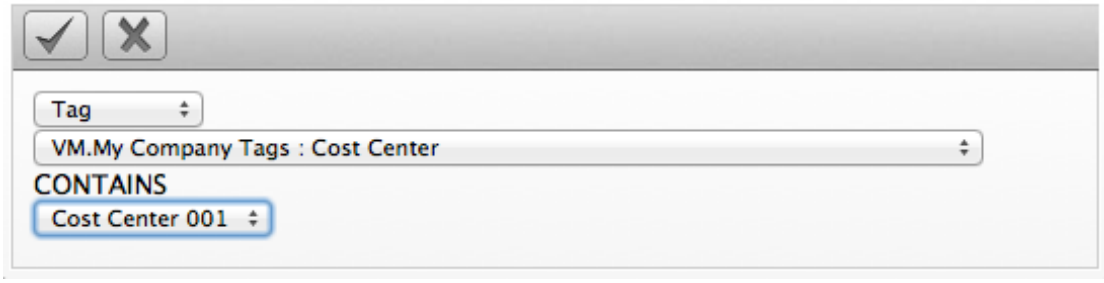
   - Click Field to create criteria based on field values.



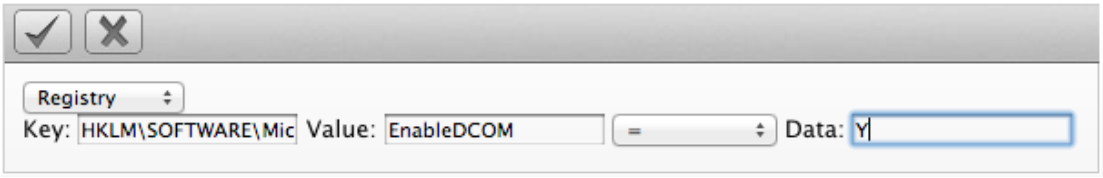
   - Click Count of to create criteria based on the count of something, such as the number of snapshots for a Virtual Machine, or the number of Virtual Machines on a Host.



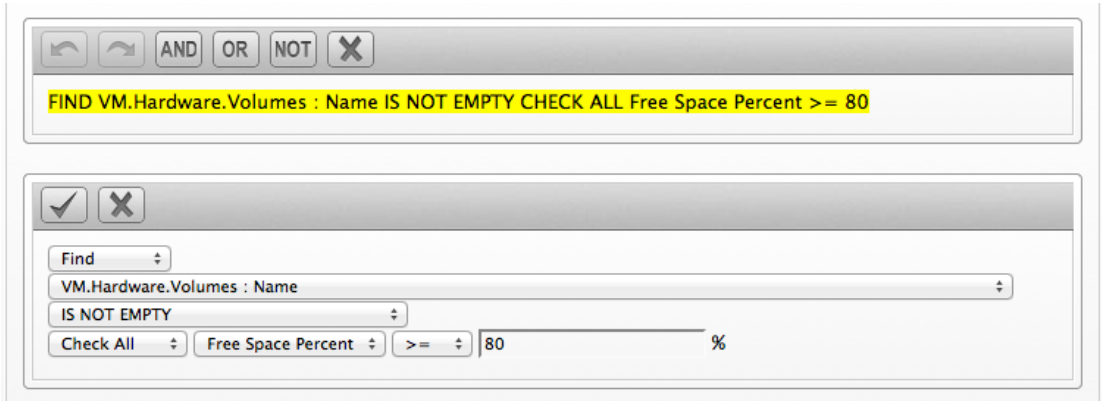
- Click Tag to create criteria based on tags assigned to your resources. For example, you may want to check the power state of a virtual machine or see if it is tagged as production.



- Click Registry to create criteria based on registry values. For example, you may want to check if DCOM is enabled on a Windows System. Note that this applies only to Windows operating systems.



- Click Find to seek a particular value, and then check a property. For example, finding the Admin account and checking that it is enabled.

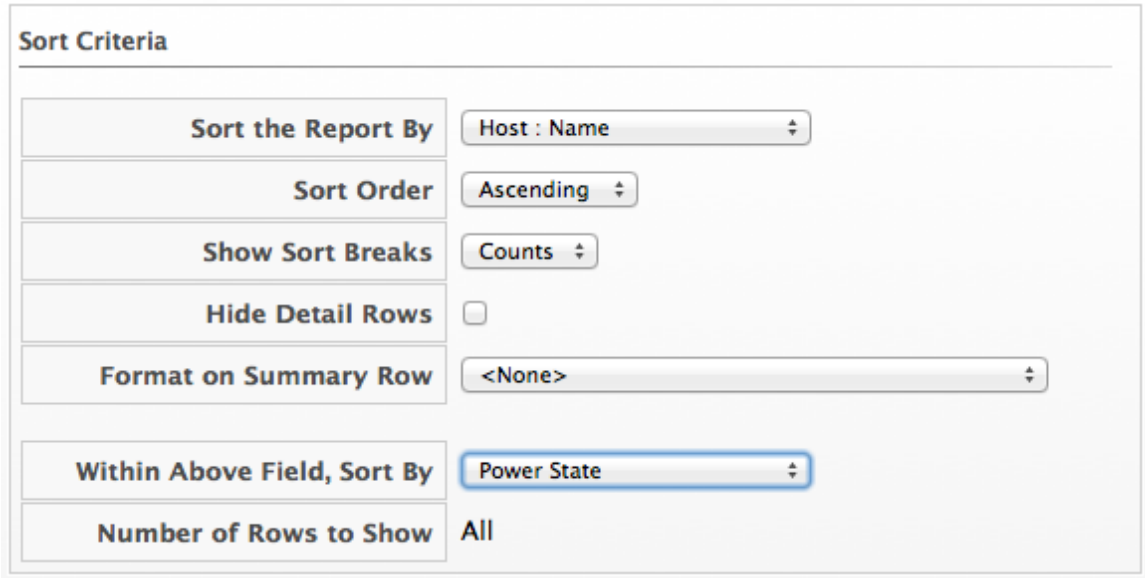


- Click  **(Commit Expression Element Changes)** to add the expression.

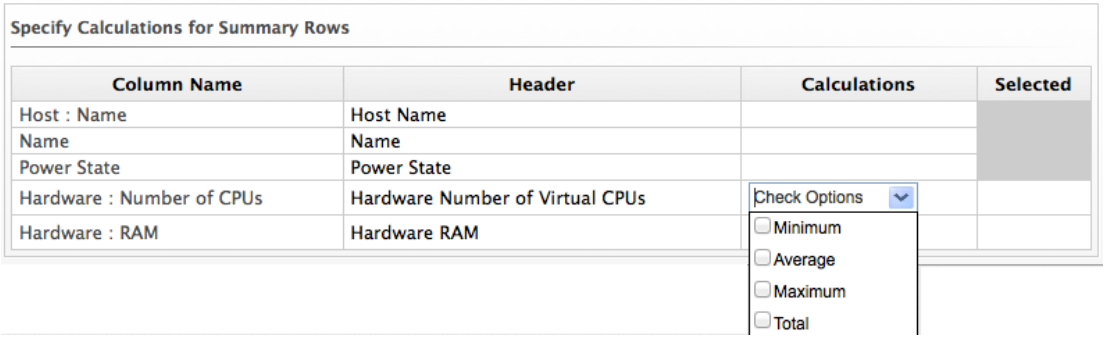
Note

The filters that you apply will show at the bottom of the report so that you know which filters have been applied.

10. Click on the Summary tab to select sort order, sort type, groupings, and group calculations for the report. Summary groups rows of data based on the sort breaks. You can only sort by fields that display in the report.



- Set the primary sort in Sort the Report by.
- Set the next sorts in Within Above Field, Sort By.
- Select the type of sort, ascending or descending, in Sort order.
- In Show Sort breaks, select Yes to show the sort breaks, Counts to show sort breaks with the count, or No for no sort breaks.

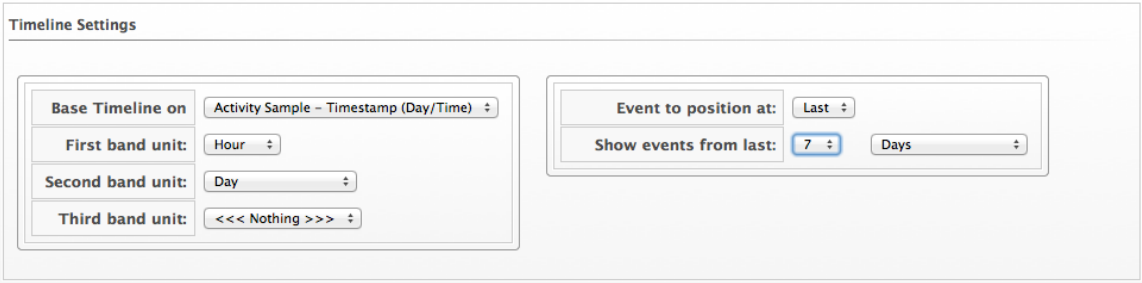


- For any numeric field, you can select to show minimum, average, maximum, and total in the sort break.

11. Click on the Charts tab to create a chart for the report. This is not required.

- Use Choose a chart type to select a type of chart. Note that some charts may not produce the result you are looking for based on the types of fields in the report and its sort order.
- If you only want to see the top values, select the number of top values from Top values to show.
- If you want to see the total number of values that are not categorize and evaluate to other, check Sum 'Other' values.

12. Click on the Timeline tab to select a timeline for the report. You must have a field of time or date format to use this feature.



- Use Base Timeline on to select a column in date or time format for the report.
- Select a unit of time for the first band in First band unit.
- Select a unit of time for the second band in Second band unit.
- Select a unit of time for the third band in Third band unit.
- Select an Event to position at.
- Select the range for the event to position from Show events from last.

Note

If you select a timeline for a report, that timeline will also show on the timelines page of Cloud Intelligence. The filters that you apply will show on a timeline report so that you know which filters have been applied.

13. Click the Previews tab to see a sample of your report.
14. When you have the report that you want, click **Add** to create the new report.

Note

After the new report is created, to make the report accessible from the report menu, you must add it to a report menu.

3.4. COPYING A REPORT

Use this feature to copy a report that is similar to one that you want to create. Then, you only need to make minor edits instead of creating an entirely new report.

1. Navigate to **Cloud Intelligence** → **Reports**.
2. Click the Reports accordion and select the report that you want to copy.
3. Click  (Configuration), then click  (Copy this report).
4. On the Columns tab, edit the Basic Report Info area to include a new Menu Name. Each Menu Name must be unique.
5. Make any other changes you need. See Adding a Report for details on the changes you can make.
6. Click **Add**.

3.5. EDITING A REPORT

If you find that a report is not giving you the data that you need, you can edit it after it has been created. Note that only reports that you have created can be modified. Only administrators and super administrators of CloudForms Management Engine can add, copy, edit, and delete reports.

Procedure: To Edit a Report

1. Navigate to **Cloud Intelligence** → **Report**.
2. Click the Reports accordion and select the report you want to edit.
3. Click  (Configuration),  (Edit this Report).
4. Make any changes you need.
5. Click **Save**.

3.6. DELETING A REPORT

Delete reports when you find that they are no longer useful. Only administrators and super administrators of CloudForms Management Engine can add, copy, edit, and delete reports. Note that only customer created reports can be deleted.

Procedure: To Delete a Report

1. Navigate to **Cloud Intelligence** → **Reports**.

2. Click the Reports accordion and select the report you want to delete.
3. Click  (Configuration),  (Delete this Report from the Database).

Note

The Delete this report from the Database option will only appear on reports you have created. Default reports cannot be deleted.

4. Click **OK**.

3.7. IMPORTING A REPORT

Reports are stored in the VMDB; however, you can share customized reports among VMDBs. To do this use the export and import feature of reports.

Procedure: To Import a Report

1. Navigate to **Cloud Intelligence** → **Reports**.
2. In the Import/Export accordion, click Custom Reports.
3. In the Import area, click **Browse** to select an import file.
4. To overwrite an existing report with the same menu name, select Overwrite existing reports.
5. Click **Upload** to import the report to the Company-Custom folder.

3.8. EXPORTING A REPORT

Reports are stored in the VMDB; however, you can share customized reports among VMDBs. To do this use the export and import feature of reports.

Procedure: To Export a Report

1. Navigate to **Cloud Intelligence** → **Reports**.
2. In the Import/Export accordion, click Custom Reports.
3. In the Export area, select the reports to export.
4. Click **Export**.

3.9. REPORT MENUS

By default, all account roles have the same reports available. If you have the super administrator or administrator role, you can customize the accordions, the folders within them, and the locations of your reports.

Note

When you create your own report, the report is not automatically available. You must add it to a report menu.

The report menu is a hierarchical structure that consists of the following components:

- The Top Level under which the accordions are shown. (Top Level is only displayed when you are in the report menu editor.)
- Accordions that are general categories for the reports. The defaults supplied are Configuration Management, Migration Readiness, Operations, VM Sprawl, Relationships, and Events.
- Folders that are used to further organize reports within an accordion. For example, under the Configuration Management, you would see folders for virtual machines, hosts, and other virtual infrastructure components.
- Reports that are stored directly in the folders.

3.9.1. Managing Report Menu Accordions

Procedure: To Manage Report Menu Accordions

1. Navigate to **Cloud Intelligence** → **Reports**.
2. Click the Edit Report Menus accordion.
3. Click the role whose menus you want to customize.
4. Click on Top Level to organize, add, and delete accordions.
   - Click  **(Move selected Accordion to top)** to move the accordion to the top of the list.
   - Click  **(Move selected Accordion up)** to move the accordion up.
   - Click  **(Move selected Accordion down)** to move the accordion down.
   - Click  **(Move selected Accordion to bottom)** to move the accordion to the bottom of the list.
   - Click  **(Delete selected Accordion and its contents)** to delete an accordion.
   - Click  **(Add folder to selected Accordion)** to add an accordion. Note that if you are creating a new accordion, Top Level must have been selected under Reports. Be sure to select the folder you want to create a subfolder for on the left pane. To name the accordion, double-click on *New Folder*. Click on Top Level in the Reports area.

5. When you are finished adding accordions, click  **(Commit folder management changes)**. To revert, click  **(Discard folder management changes)**.
6. Click **Save**.

The new accordion is added, and you can add folders in which to store reports to it. You can also organize the reports into folder that are meaningful to you.

3.9.2. Managing Report Menu Folders

Procedure: To Manage Report Menu Folders

1. Log in to the console as a user who is assigned either the super administrator or administrator account role.
2. Navigate to **Cloud Intelligence** → **Reports**.
3. Click the Edit Report Menus accordion.
4. Click the role whose menus you want to customize.
5. Click on the accordion name you want to organize or add folders to.
   - Click  **(Move selected folder to top)** to move the folder to the top of the list.
   - Click  **(Move selected folder up)** to move the folder up.
   - Click  **(Move selected folder down)** to move the folder down.
   - Click  **(Move selected folder to bottom)** to move the folder to the bottom of the list.
   - Click  **(Delete selected folder and its contents)** to delete an accordion.
   - Click  **(Add subfolder to selected folder)** to add a folder. When creating a new folder, be sure to select the Accordion that you want the folder to show under. To name the folder, double-click on *New Folder*.
6. When you are finished making changes click  **(Commit folder management changes)**. To revert, click  **(Discard folder management changes)**.
7. Click **Save**.

Note

Only reports that are not already in another folder can be assigned.

3.9.3. Organizing Reports in Report Menus

Procedure: To Organize Reports in Report Menus

1. Log in to the console as a user who is assigned either the Super Administrator or Administrator Account Role.
2. Navigate to **Cloud Intelligence** → **Reports**.
3. Click the Edit Report Menus accordion.
4. Click the role whose menus you want to customize.
5. Expand the Report accordion and menus using the triangles to the left of the item name until you are able to select the subfolder where you want to put reports.
6. Choose one of the following actions.
   - To add a report, select a report from the Available Reports area on the right and click **(Move selected reports left)**.
   - To remove a report from a folder, select the report from the Selected Reports area and click **(Move selected reports right)**.
   - To move a report to the top of the folder, select the report and click **(Move selected reports to top)**.
   - To move a report up one place in the folder, select the report and click **(Move selected reports up)**.
   - To move a report down one place in the folder, select the report and click **(Move selected reports down)**.
   - To move a report to the bottom of the folder, select the report and click **(Move selected reports to bottom)**.
7. When you are finished making changes click **(Commit report management changes)**.
8. Click **Save**.

The changes are made. The next time a user with this Account Role logs in, the new report and menu structure will be displayed.

CHAPTER 4. USAGE

Usage provides a targeted view of CPU, RAM, disk space, disk I/O, and network I/O for tagged virtual machines. This allows you to find which virtual machines are using or overusing resources.

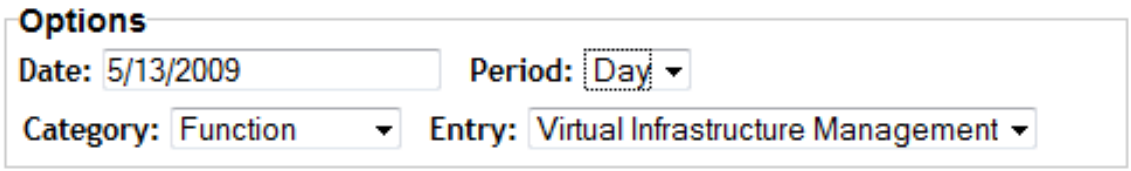
There are two requirements to use this feature:

- You must assign tags to the virtual machines that you want to collect usage data for. See "Tagging Virtual Machines and Templates" in Managing Infrastructure and Inventory.
- Capacity and utilization collection must be enabled. For more information on configuring capacity and utilization charts, see the Deployment Planning Guide.

4.1. ACCESSING USAGE DATA

Procedure: To Access Usage Data

1. Navigate to **Cloud Intelligence** → **Usage**.
2. In the Options area, select a Date. More choices will display.



   - From Period, select either Day or Hour. If you select Hour, you will be prompted for which hour in UTC time.
   - From Category, select the category for the tag.

3. * From Entry, select the tag from within the category that you want usage data for.

CHAPTER 5. CHARGEBACK

The chargeback feature allows you to calculate monetary virtual machine charges based on owner or company tag. To use this feature you must be collecting capacity and utilization data. For information on server control settings and capacity & utilization collection settings, see the Red Hat CloudForms 4.0 Settings and Operations Guide.

5.1. CHARGEBACK RATES

CloudForms Management Engine provides a default set of rates for calculating chargeback costs, but you can create your own set of computing and storage costs by navigating to **Cloud Intelligence → Chargeback** and clicking the Rates accordion.

Chargeback costs are computed using a set formula based on hourly cost per unit and hourly usage.

5.1.1. Memory Used Cost

Calculating the Memory Used Cost in dollars ($) for a day can be expressed in the following ways:

- Memory allocation per hour (in MB) * Hourly Allocation cost per megabyte * Number of Memory Allocation metrics available for the day
- Sum of Memory allocation for the day (in MB) * Hourly Allocation cost per megabyte
- Sum of Memory allocation for the day (in MB) * Daily Allocation cost per megabyte / 24

> **Example 5.1. Memory Used Cost**
>
> In a scenario where 9.29 GB of memory is used in a day with the chargeback rate set at one dollar ($1) per megabyte per day, the Memory Used Cost would be $396.42.

- 9.29 GB = 9514.08 MB
- 9514.08 MB * $1 (per MB per day) = $9514.08
- $9514.08 / 24 = $396.42 Memory Used Cost

5.1.2. CPU Total Cost

The CPU Total Cost is defined as the number of virtual CPUs over the selected interval (hour, day, week, month).

> **Example 5.2. CPU Total Cost**
>
> In a scenario where 16 CPUs are used in a day with the chargeback rate set at one dollar per CPU per day, the CPU Total Cost would be $16.
>
> - 16 CPUs * $1 (per CPU per day) = $16 CPU Total Cost

5.1.3. CPU Used Cost

The CPU Used Cost is defined as the average CPU used in MHz over the selected rate interval (hour, day, week, month).

Example 5.3. CPU Used Cost

In a scenario where 2.5 GHz is used in a day with the chargeback rate set at $0.01 per MHz per day, the CPU Used Cost would be $25.

- 2.5 GHz = 2500 MHz
- 2500 MHz * $0.01 (per MHz per day) = $25 CPU Used Cost

5.1.4. Storage Allocated Cost

The Storage Allocated Cost is defined as the Allocated Disk Storage in Bytes over the selected rate interval (hour, day, week, month).

Example 5.4. Storage Allocated Cost

In a scenario where 500 GB are used in a day with the chargeback rate set at $0.10 per GB per day, the Storage Allocated Cost would be $50.

- 536,870,912,000 bytes = 500 GB
- 500 GB * $0.10 (per GB per day) = $50 Storage Allocated Cost

5.1.5. Storage Total Cost

The Storage Total Cost is defined as the Used Disk Storage in Bytes over the selected rate interval (hour, day, week, month).

Example 5.5. Storage Total Cost

In a scenario where 250 GB are used in a day with the chargeback rate set at $0.10 per GB per day, the Storage Total Cost would be $25.

- 268,435,456,000 bytes = 250 GB
- 250 GB * $0.10 (per GB per day) = $25 Storage Total Cost

5.1.6. Storage Used Cost

The Storage Used Cost is defined as the Used Disk Storage in Bytes over the selected rate interval (hour, day, week, month).

> **Example 5.6. Storage Used Cost**
>
> In a scenario where 250 GB are used in a day with the chargeback rate set at $0.10 per GB per day, the Storage Used Cost would be $25.
>
> - 268,435,456,000 bytes = 250 GB
> - 250 GB * $0.10 (per GB per day) = $25 Storage Used Cost

5.2. CREATING CHARGEBACK RATES

CloudForms Management Engine allows you to create your own set of computing and storage costs.

Procedure: To Create Chargeback Rates

1. Navigate to **Cloud Intelligence** → **Chargeback**.
2. Click the Rates accordion and select either Compute or Storage.
   - Use Compute to set chargeback rates for CPU, disk I/O, memory, network I/O, and fixed items.
3. * Use Storage to set chargeback rates for fixed and storage items.
4. Click  **`(Configuration)`**,  **`(Add a new Chargeback Rate)`** to create a new chargeback rate.
5. Type in a Description for the chargeback rate.
6. For each item that you want to set, type in a rate and select a time option.
7. Click **`Add`**.

5.3. ASSIGNING CHARGEBACK RATES

CloudForms Management Engine allows you to assign chargeback rates by choosing from Compute and Storage.

Procedure: To Assign Chargeback Rates

1. Navigate to **Cloud Intelligence** → **Chargeback**. Click the Assignments accordion, and click either Compute or Storage.
   - Use Compute to assign a compute chargeback rate. You can assign chargeback rates to The Enterprise, Selected Clusters, Selected Infrastructure Providers, or Tagged VMs and Instances.
   - Use Storage to assign a storage chargeback rate.
2. You can assign chargeback rates to The Enterprise, Selected Datastores, or Tagged Datastores
3. From the Basic Info area, use the Assign To list to select a type of assignee to assign the

rate set to. The options displayed vary based on the type you selected.

4. For each item to set, select the chargeback rate to use.
5. Click **Save**.

The rate is assigned. The next time you generate a chargeback report, these values will be used.

Note

Note that when viewing chargeback, there is a rate for a virtual machine for the number of the CPUs. The chargeback for this parameter is calculated based on when the virtual machine is running. If the virtual machine is not running, then it is not charged for CPU allocation.

5.4. CREATING A CHARGEBACK REPORT

CloudForms Management Engine allows you to create chargeback reports to monitor costs you charged.

Procedure: To Create a Chargeback Report

1. Navigate to **Cloud Intelligence** → **Reports**.
2. Click the Reports accordion.
3. Click  **(Configuration)**,  **(Add a new Report)**.
4. On the Columns tab, fill out the Basic Report Info area.
   - Type a unique name in Menu Name for how you want the report described in the menu list.
   - Type the Title to display on the report.
5. Add fields in the Configure Report Columns area.
   - From the Base the report on list, select Chargebacks.
   - Select the fields to include in the report from the Available Fields list, then click  **(Move selected fields down)**. In addition to the fields, you can also select any tags that you have created and assigned.
   - Change the order of the fields in the report by clicking  **(Move selected fields up)** or  **(Move selected fields down)**.
6. Click the Formatting tab to set the size of paper for a PDF and column header format.
   - From the PDF Output area, select the page size from the Page Size list.
   - From Specify Column Headers and Formats, type the text to display for each field. For

each numeric field, you can also set the numeric format.

7. Click the Filter tab to set filters for the data displayed in the report.
   - From Chargeback Filters, select how you want the costs to show, the tag category, the tag, and how you want the items grouped.
   - From Chargeback Interval, select the time interval. You must have a full interval worth of data in order to select an option other than Partial in the Daily Ending With list.
8. Click the Preview tab, and then Load to see what the report will look like.
9. When you are satisfied that you have the report that you want, click **Add** to create the new report.

The new report is created. To make the report accessible from the Report menu, you must add it to a report menu.

CHAPTER 6. TIMELINES

6.1. ACCESSING AND USING A TIMELINE

You can use timelines to view the history record for virtual machines.

Note

Amazon does not provide events, so CloudForms Management Engine does not support timelines for virtual machines hosted by Amazon.

Procedure: To Access and Use a Timeline

1. Navigate to **Cloud Intelligence** → **Timelines**.
2. From the accordion on the left, click a category of Timeline.
   - Select Configuration Management to see when items were brought under management.
   - Select Events to view timelines related to operations and changes in configuration.
3. Drag the relevant time band, such as hour, day, or month to go to the time you want to see. Note that some timelines, such as Events Operations: All Events, use minutes, hours, and days instead going back only 30 days.
4. To see more detail for a resource in the timeline, click on it. A balloon appears with a clickable link to the resource.

6.2. DOWNLOADING A TIMELINE'S DATA

You can download timeline data for further analysis or printing.

Procedure: To Download a Timeline's Data

1. Navigate to **Cloud Intelligence** → **Timelines**, and click the timeline you want to download.
2. Click on the download button for the format you want.
   - Click 

(Download this Timeline data in text format) to download as text.
   - Click 

(Download this Timeline data in csv format) to download as a comma separated file.
   - Click 

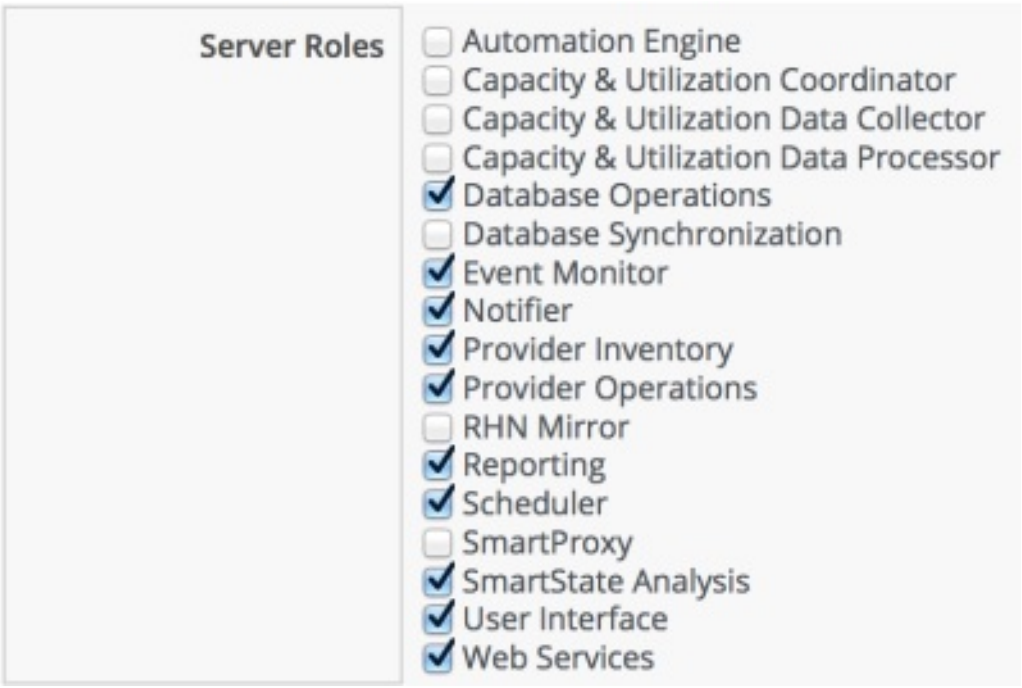
(Download this Timeline data in PDF format) to download as PDF.

CHAPTER 7. ALERTS

7.1. ASSIGNING THE NOTIFIER ROLE

Procedure: To Assign the Notifier Role

1. Navigate to **Configure** → **Configuration**.
2. Click the Settings accordion, and select the CloudForms Management Engine server.
3. From the Server Control tab, select the Notifier role.



4. Click **Save**.

7.2. CREATING AN ALERT

In this section, the basics of creating an Alert are described. Detailed instructions for the specific types of Alerts are given in the sections following.

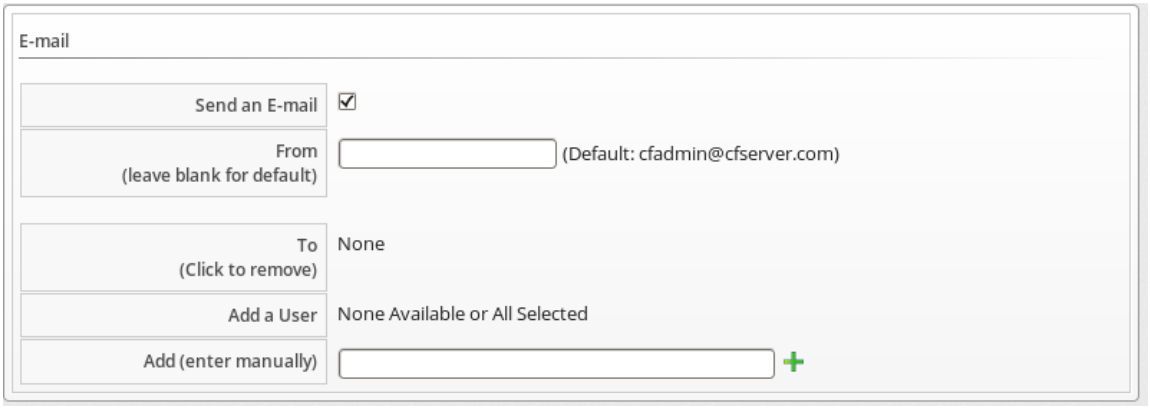
To send emails or SNMP traps from the CloudForms Management Engine server, you must have the **`Notifier`** server role enabled and have set up SMTP email or SNMP traps. For further information, see CloudForms Management Engine Settings and Operations Guide.

Procedure: To Create an Alert

1. Navigate to **Control** → **Explorer**.
2. Click the Alerts accordion, then click (Configuration), (Add a new Alert).
   - Type in a description for the alert.
   - Check Active when you feel that the alert is ready to be enabled.

- From Based On, select the type of infrastructure item to base the alert on.
- The options shown in What to Evaluate change based on what you selected in Based On.
- In Notification Frequency, select how often you want to be notified if the event log threshold is reached.

3. The parameters available are based on the What to Evaluate selection. See the following sections for additional details on each alert type.
4. To send an email, check Send an E-mail. Parameters required for sending an email are displayed.

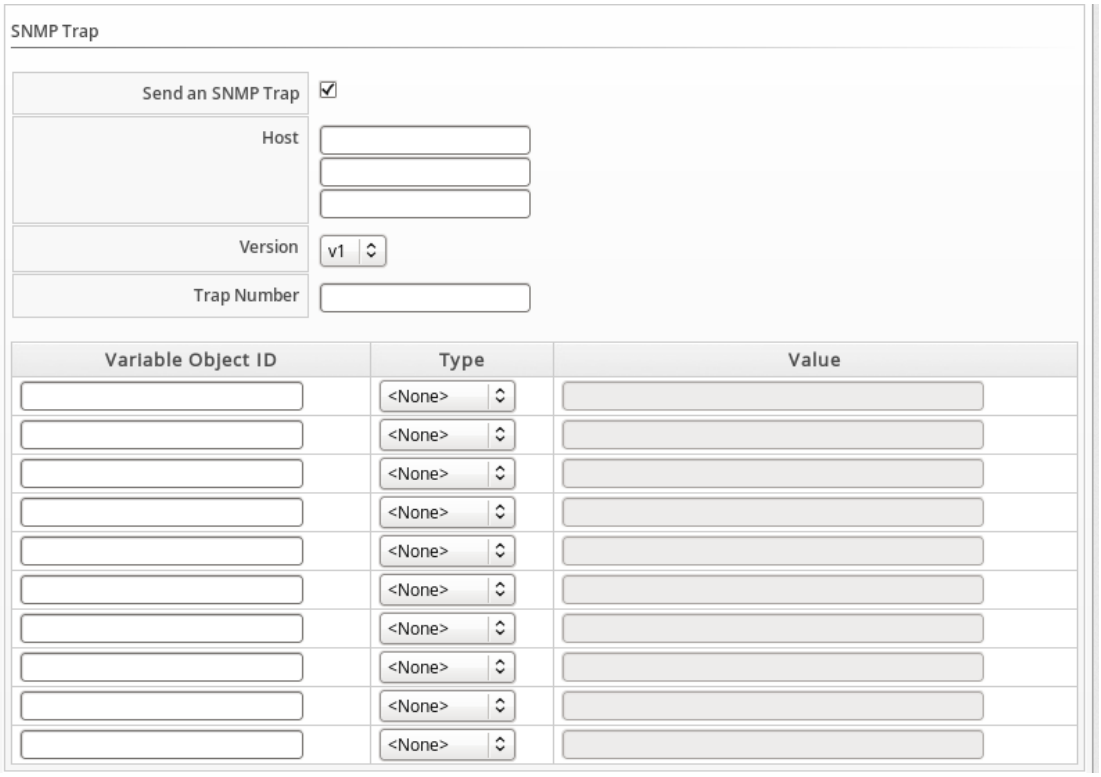


- In From, type in the sending email.
- Use Add a CloudForms Management Engine User to select a user. The CloudForms Management Engine user must have a valid email address entered under accounts.
- Use Add (enter manually) to type in the address not registered to a CloudForms Management Engine user. Then, click (Add).

5. If you check Send an SNMP Trap, type in the IP for the host to send the trap to, select the version of SNMP that you are using, and type in the Trap Object ID. Type in multiple hosts if you need the trap sent to multiple SNMP hosts.
   - If using SNMP V1, you will be prompted for a Trap Number. Type 1, 2, or 3, based on the appropriate suffix number from table below.
   - If using SNMP V2, you will be prompted for a Trap Object ID. Type info, warning, or critical, based on the table below.
   - Trap Object ID and suffix number

Object ID	Suffix Number Added to PEN	PEN with the Suffix Added
info	1	1.3.6.1.4.1.33482.1
warn, warning	2	1.3.6.1.4.1.33482.2

Object ID	Suffix Number Added to PEN	PEN with the Suffix Added
crit, critical, error	3	1.3.6.1.4.1.33482.3



6. To show the alert as an event on the CloudForms Management Engine timeline, check Show on Timeline. It shows as part of the Alarm/Status Change/Errors category.
7. To invoke automation, check Send a Management Event. Type in the name of the event. This item exists in the Process/Event Class.
8. Click **Add**.

7.3. CREATING A HARDWARE RECONFIGURED ALERT

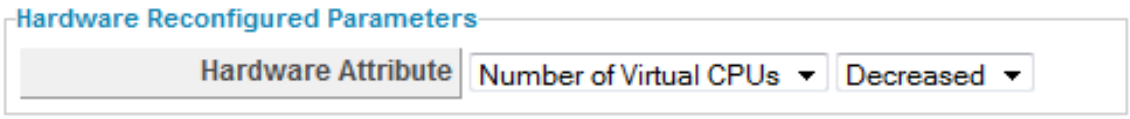
Use a hardware reconfigure alert to detect changes to the amount of memory or the number of CPUs on a virtual machine.

Procedure: To Create a Hardware Reconfigure Alert

1. Navigate to **Control** → **Explorer**.
2. Click the Alerts accordion, then click (Configuration), (Add a new Alert).
3. In the Info area:
   - Type in a description for the alert.
   - From Based On, select VM and Instance.

- From What to Evaluate, select Hardware Reconfigured.
- In Notification Frequency, select how often you want to be notified if hardware reconfiguration is detected.

4. From Hardware Attribute, select Number of CPUs. From the next dropdown, select Decreased.



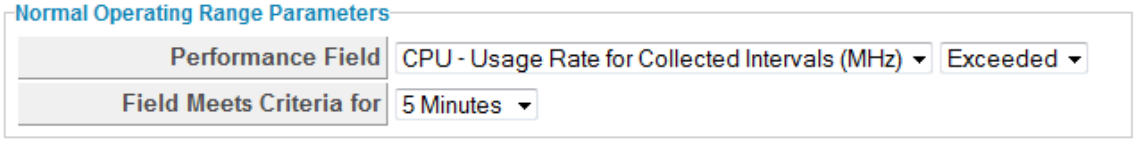
5. After setting the parameters, select what you want the alert to do. You can send an email, create an SNMP Trap, let the alert show on the timeline, or send a management event to start an automation process.
6. Click **Add**.

7.4. CREATING A NORMAL OPERATING RANGE ALERT

Normal operating range alerts enables you to be notified when the normal operating range is exceeded, or falls below for a period of time from 1 minute to 2 hours. Capacity and utilization must be enabled for normal operating ranges to be calculated. See CloudForms Management Engine Settings and Operations Guide for instructions.

Procedure: To Create a Normal Operating Range Alert

1. Navigate to **Control** → **Explorer**.
2. Click the Alerts accordion, then click  (Configuration),  (Add a new Alert).
3. In the Info area:
   - Type in a Description for the alert.
   - From Based On, select VM and Instance.
   - For What to Evaluate, select Normal Operating Range.
   - In Notification Frequency, select how often you want to be notified if the performance threshold is reached.
4. Set the threshold in the Normal Operating Range Parameters area.



   - From Performance Field, select the field to check and whether you want to be notified if the field is exceeded or fell below.
   - In Field Meets Criteria for, select the amount of time that the threshold requires to be met to trigger the alert.

5. After setting the parameters, you then select what you want the alert to do. You can send an email, create an SNMP Trap, let the alert show on the timeline, or send a management event to start an automation process. See To create an Alert.

6. Click **Add**.

7.5. CREATING A REAL TIME PERFORMANCE ALERT

Real Time Performance alerts enables you to be notified immediately when a performance threshold has been met for a virtual machine, host, or cluster. Capacity and Utilization must be enabled for performance thresholds to be detected. See CloudForms Management Engine Settings and Operations Guide for instructions.

Procedure: To Create a Real Time Performance Alert

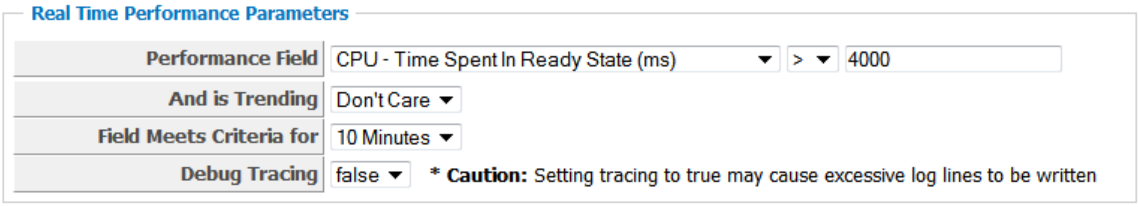
1. Navigate to **Control** → **Explorer**.

2. Click the Alert accordion, then click  (Configuration),  (Add a new Alert).

3. In the Info area:

   - Type in a Description for the alert.
   - From Based On, select VM and Instance.
   - For What to Evaluate, select Real Time Performance.
   - In Notification Frequency, select how often you want to be notified if the performance threshold is reached.

4. Set the threshold in the Real Time Performance Parameters area.



   - From Performance Field, select the field to check and any other parameters required for that field.
   - In And is Trending, select Don't Care if it does not matter how the performance metric is trending. Otherwise, choose from the possible trending options.
   - In Field Meets Criteria for, select the amount of time that the threshold requires to be met to trigger the alert.
   - Set Debug Tracing to true only when directed to do so by Red Hat Support. This provides an extremely detailed level of logging and can result in many more log lines being written.

5. After setting the parameters, you then select what you want the alert to do. You can send an email, create an SNMP Trap, let the alert show on the timeline, or send a management event to start an automation process.

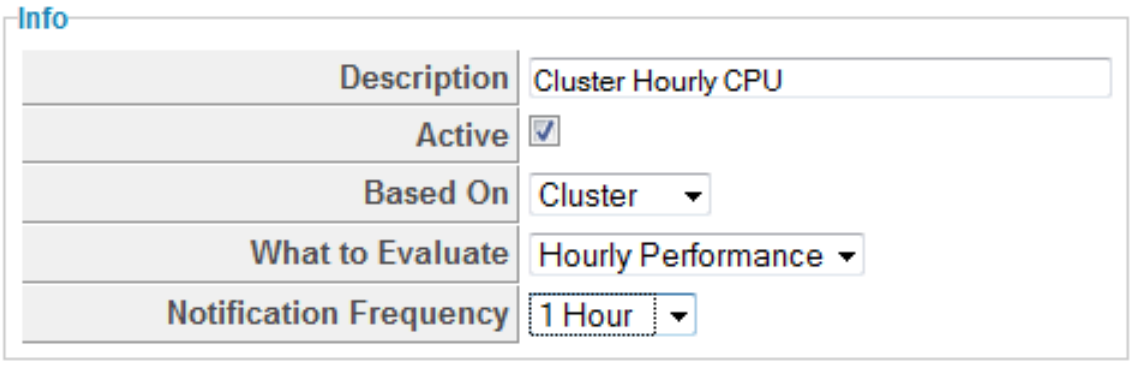
6. Click **Add**.

7.6. CREATING AN HOURLY PERFORMANCE ALERT

Hourly performance alerts enable you to be notified immediately when an hourly performance threshold has been met for a cluster. Capacity and Utilization must be enabled for performance thresholds to be detected. See CloudForms Management Engine Settings and Operations Guide for instructions.

Procedure: To Create an Hourly Performance Alert

1. Navigate to **Control** → **Explorer**.
2. Click the Alerts accordion.
3. Click (Configuration), (Add a new Alert).
4. In the Info area:



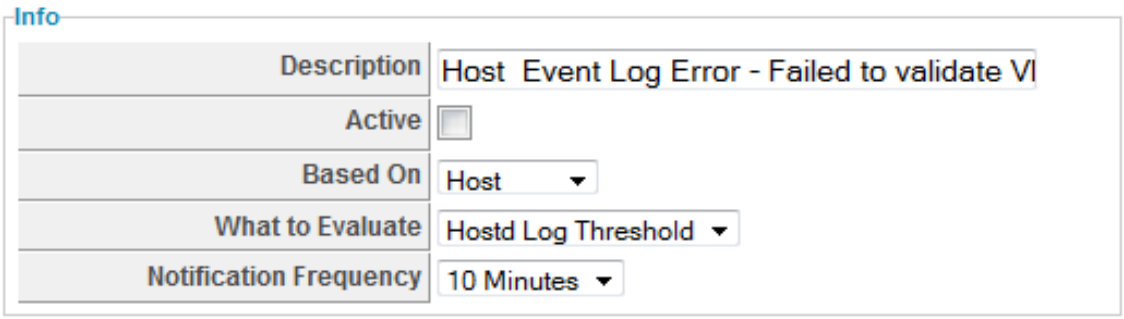
   - Type in a Description for the alert.
   - From Based On, select Cluster.
   - For What to Evaluate, select Hourly Performance.
   - In Notification Frequency, select how often you want to be notified if threshold is met.
5. In the Hourly Performance Parameters area select performance field and the criteria. You can also select options from the And is Trending dropdown box and whether the Debug Tracing is true or false.
6. After setting the parameters, you then select what you want the alert to do. You can send an email, create an SNMP Trap, let the alert show on the timeline, or send a management event to start an automation process.
7. Click **Add**.

7.7. CREATING A HOSTD LOG THRESHOLD ALERT

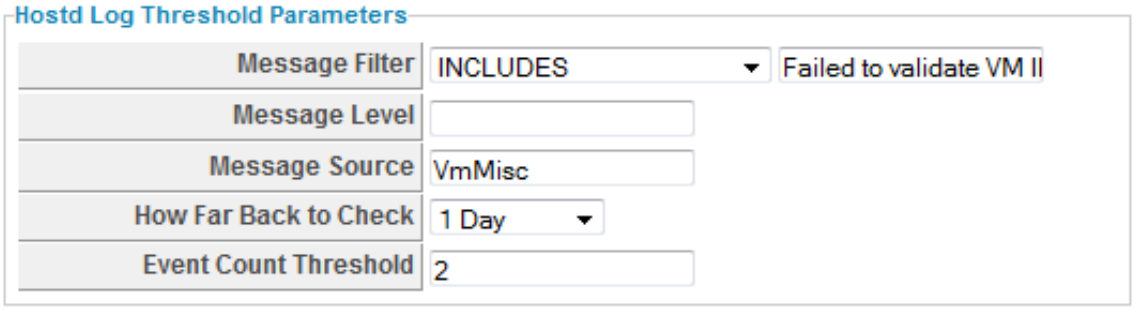
Use hostd log threshold when you want to send a notification when certain items are found in the event logs for a host. A default analysis profile with event log items is required for this feature. In this example, we will check the Hosts log for a failure to validate a virtual machine's IP address.

Procedure: To Create a Hostd Log Threshold Alert

1. Navigate to **Control** → **Explorer**.
2. Click the Alert accordion.
3. Click (Configuration), (Add a new Alert).
4. In the Info area:



   - Type in a Description for the alert.
   - From Based On, select Host.
   - For What to Evaluate, select Hostd Log Threshold.
   - In Notification Frequency, select how often you want to be notified if the log item is detected.
5. In the Hostd Log Threshold Parameters area, select the parameters for the event log message. You can set a threshold for a filter, level, or message source.



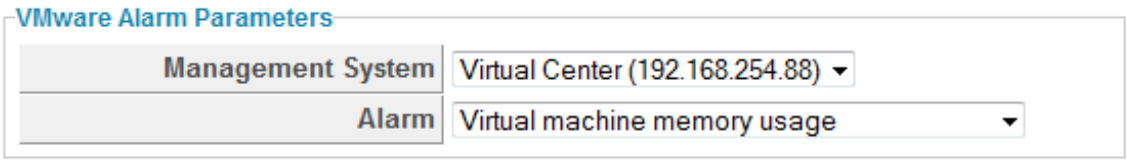
   - Use Message Filter to look for specific text in a message. Use Message Level to filter based on message level. CloudForms Management Engine reports on the specified level and above. Use Message Source to filter log messages based on its source.
   - Set How Far Back to Check in days you want to look for this message.
   - If you only want an alert triggered when the log message has occurred a certain number of times, type the number in Event Count Threshold.
6. After setting the parameters, select what you want the alert to do. You can send an email, create an SNMP Trap, let the alert show on the timeline, or send a management event to start an automation process.
7. Click **Add**.

7.8. CREATING A VMWARE ALARM ALERT

CloudForms Management Engine can use VMware alarms as a trigger for an alert. This type of alert can be created for a cluster, host, or virtual machine.

Procedure: To Create a VMware Alarm Alert

1. Navigate to **Control** → **Explorer**.
2. Click the Alerts accordion, then click (Configuration), (Add a new Alert).
3. In the Info area:
   - Type in a description for the alert.
   - From Based On, select Cluster, Host, or VM.
   - For What to Evaluate, select VMware Alarm.
   - In Notification Frequency, select how often you want to be notified if the log item is detected.
4. In the VMware Alarm Parameters area select the provider and alarm.



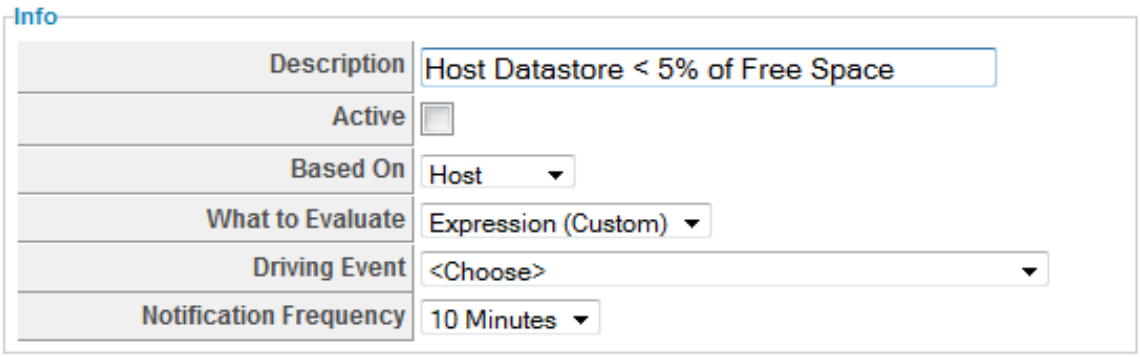
5. After setting the parameters, you then select what you want the alert to do. You can send an email, create an SNMP Trap, let the alert show on the timeline, or send a management event to start an automation process.
6. Click **Add**.

7.9. CREATING AN EXPRESSION ALERT

Expression alerts enables you to create a notification based on any possible criteria for clusters, datastores, hosts, and virtual machines. In the example below, we look for a host whose datastore has less than 5% free space.

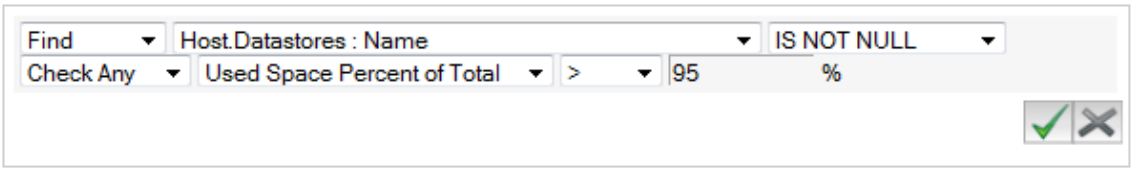
Procedure: To Create an Expression Alert

1. Navigate to **Control** → **Explorer**.
2. Click on the Alerts accordion, then click (Configuration), (Add a new Alert).
3. In the Info area:



- Type in a description for the alert.
- From Based On, select Host.
- For What to Evaluate, select Expression (Custom).
- In Notification Frequency, select how often you want to be notified if the expression is evaluated to true.

4. Use the expression editor to create your expression. This is the same expression editor used to create Conditions. For details on how to use the expression editor, see Creating a Condition in the Control Guide.



5. Click  (Commit expression element changes) to accept the expression.
6. After setting the parameters, you then select what you want the alert to do. You can send an email, create an SNMP Trap, let the alert show on the timeline, or send a management event to start an automation process.
7. Click **Add**.

7.10. CREATE AN OPERATIONAL ALERT

Procedure: To Create an Operational Alert

1. Navigate to **Control** → **Explorer**.
2. Click on the Alerts accordion, then click  (Configuration),  (Add a new Alert).
3. In the Info area:
   - Type in a description for the alert.
   - Check Active when you feel that the alert is ready to be enabled.
   - From Based On, select Server.
   - Select the appropriate driving event.

- In Notification Frequency, select how often you want to be notified if the event log threshold is reached.

4. After setting the parameters, select what you want the alert to do. You can send an email, create an SNMP Trap, let the alert show on the timeline, or send a management event to start an automation process.

5. Click **Add**.

7.11. OPERATIONAL ALERT TYPES

Table 7.1. Operational Alerts

Driving Event	Explanation (Thresholds, Description)	Proposed Action if Alert is Raised
EVM Server Start	Alert is raised when an EVM Server starts.	
EVM Server Stop	Alert is raised when an EVM Server stops.	
EVM Server Not Responding	Alert is raised when one EVM server detects that another EVM Server has not responded in (2 minutes).	This is a sign of a problem that should be investigated. Check logs.
EVM Server Exceeded Memory Limit	Alert is raised when an EVM server has exceeded its system memory limit and begins killing workers. Default is 80%. Threshold configured in Advanced Settings. server: :worker_monitor: :kill_algorithm: :name: :used_swap_percent_gt_value :value: 80	This may be caused by the following issues: The server is running with too few resources. The server is enabled with too many roles or number of workers. The server picked up all the roles because another server has failed. A runaway process has taken up most of the memory.

Driving Event	Explanation (Thresholds, Description)	Proposed Action if Alert is Raised
EVM Server is Master	When one EVM Server takes over as a master server.	Typically, this should only occur when first starting a set of servers, perhaps following expected outages. If a server picks up as master in other situations, the old master had an issue that needs to be researched (such as server not responding in time).
EVM Server High System Disk Usage	The EVM Servers system disk is 80% full. This check is run as part of a system schedule. Threshold configured in Advanced Settings. server: events: :disk_usage_gt_percent: 80	Something is filling the disk such as temp files used by the operating system such as, yum updates and normal /tmp files, or EVM temp files in /var/lib/data/miqtemp/.
EVM Server High App Disk Usage	The EVM Servers app disk is 80% full. This check is run as part of a system schedule. Threshold configured in Advanced Settings. server: events: :disk_usage_gt_percent: 80	Possibly EVM temp files are being left around.
EVM Server High Log Disk Usage	The EVM Servers log disk is 80% full. This check is run as part of a system schedule. Threshold configured in Advanced Settings. server: events: :disk_usage_gt_percent: 80	Logs are getting too big or are not being log rotated properly every day. Check most recent logs.

Driving Event	Explanation (Thresholds, Description)	Proposed Action if Alert is Raised
EVM Server High DB Disk Usage	The EVM Servers db disk is 80% full. This check is run as part of a system schedule. Applies if using PostgreSQL as the VDMB. Threshold configured in Advanced Settings. server: events: :disk_usage_gt_percent: 80	Database or database logging is getting too large. May need FULL vacuuming of PostgreSQL database.
EVM Worker Started	Alert is raised when a worker is about to start.	
EVM Worker Stopped	Alert is raised when a worker is requested to stop.	
EVM Worker Killed	Alert is raised when a non-responsive worker does not restart on its own and is killed.	
EVM Worker Not Responding	Alert is raised when a worker has not responded for 2 minutes (:heartbeat_timeout) or has not started within 10 minutes (:starting_timeout).	
EVM Worker Exceeded Memory Limit	Alert is raised when a worker exceeds the memory threshold. The default is 150 MB, but some workers have their own value in the :memory_threshold section for that specific worker.	

Driving Event	Explanation (Thresholds, Description)	Proposed Action if Alert is Raised
EVM Worker Exceeded Uptime Limit	Alert is raised when a worker has been running longer than the :restart_interval. (Most workers are set to never restart using the 0.hours setting.) The EMS Refresh SmartProxy workers are set to restart every 2 hours.	
EVM Worker Exit File	Alert is raised when the scheduler worker exits due to a pending large ntp time change.	

7.12. EDITING AN ALERT

After creating an alert, you can edit the threshold, expression, or the notification type.

Procedure: To Edit an Alert

1. Navigate to **Control** → **Explorer**
2. Click on the Alerts accordion, then click on the alert that you need to edit.
3. Click  (Configuration),  (Edit this Alert).
4. Make the required changes.
5. Click **Save**.

7.13. COPYING AN ALERT

You can copy an existing alert to create a new alert that is similar to the existing one, then change the values associated with it.

Procedure: To Copy an Alert

1. Navigate to **Control** → **Explorer**.
2. Click on the Alert accordion, then click on the alert that you want to copy.
3. Click  (Configuration),  (Copy this Alert). Click **OK** to confirm.
4. Make the required changes.
5. Click **Add**.

7.14. DELETING AN ALERT

When an alert is no longer needed, you can remove it from your VMDB

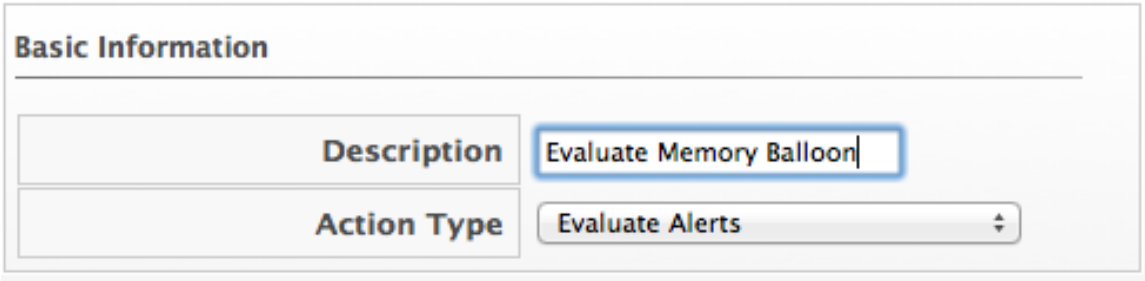
Procedure: To Delete an Alert

1. Navigate to **Control** → **Explorer**.
2. Click on the Alerts accordion, then click on the alert that you want to delete.
3. Click (Configuration), (Delete this Alert).
4. Click **OK** to confirm.

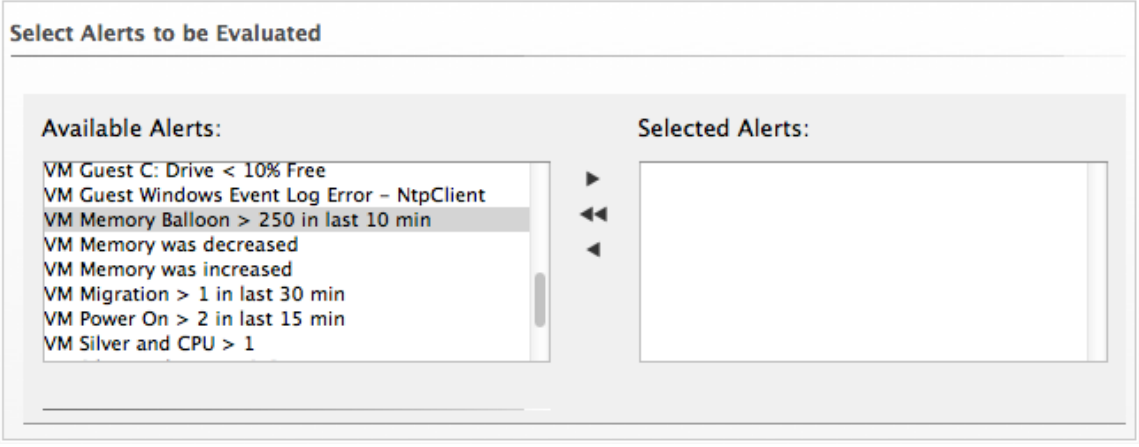
7.15. EVALUATING AN ALERT

Procedure: To Evaluate an Alert

1. Navigate to **Control** → **Explorer**.
2. Click the Actions accordion, then click (Configuration), (Add a new Action).
3. Type in a Description for the action.



4. Select Evaluate Alerts from Action Type.
5. Select the alerts to be evaluated and click (Move selected Alerts into this Action). Use the **Ctrl** key to select multiple alerts.



6. Click **Add**.

CHAPTER 8. ALERT PROFILES

8.1. CREATING ALERT PROFILES

Alert profiles enable you to create groups of standard alerts. An alert profile can have as many alerts assigned as you need, and can be assigned to clusters, datastores, hosts, and virtual machines.

Procedure: To Create an Alert Profile

1. Navigate to **Control** → **Explorer**.
2. Click on the Alert Profiles accordion, then click on the type of profile that you want to create.
3. Click  (Configuration),  (Add a new Profile).
4. In the Basic Information box, type in a unique Description for the alert profile.
5. Select the desired alerts from the Available Datastore Alerts area. Use the **Ctrl** key to select multiple alerts.
6. Click  to add the Alerts.
7. Type in any additional description in the Notes area.
8. Click **Add**.

8.2. EDITING AN ALERT PROFILE

You can edit an alert profile as your enterprise's need change.

Procedure: To Edit an Alert Profile

1. Navigate to **Control** → **Explorer**.
2. Click on the Alert Profiles accordion, then click the alert profile you want to edit.
3. Click  (Configuration),  (Edit this Alert Profile).
4. Make the required changes.
5. Click **Save**.

8.3. DELETING AN ALERT PROFILE

Remove alert profiles that you no longer need. This does not remove the alerts associated with the alert profile.

Procedure: To Delete an Alert Profile

1. Navigate to **Control** → **Explorer**.

2. Click on the Alert Profiles accordion, then click the alert profile you want to remove.
3. Click  (Configuration),  (Delete this Alert Profile).
4. Click **OK** to confirm.

8.4. ASSIGNING AN ALERT PROFILE

After an alert profile is created and verified, you can assign it directly to a resource.

Procedure: To Assign an Alert Profile

1. Navigate to **Control** → **Explorer**.
2. Click on the Alert Profiles accordion, then click on the alert profile that you want to assign.
3. Click  (Configuration),  (Edit Assignments for this Alert Profile).
4. The options presented change based on if the alert is for a cluster, datastore, CloudForms Management Engine server, host, or virtual machine and instance. You can assign to the enterprise, to specific hosts, cluster, resource pools, and providers, or based on assign tags. For a CloudForms Management Engine server alert profile, you can only assign to CloudForms Management Engine servers in the current Region.
5. Click **Save**.

CHAPTER 9. IMPORTING AND EXPORTING

9.1. IMPORTING AND EXPORTING POLICIES, POLICY PROFILES, AND ALERTS

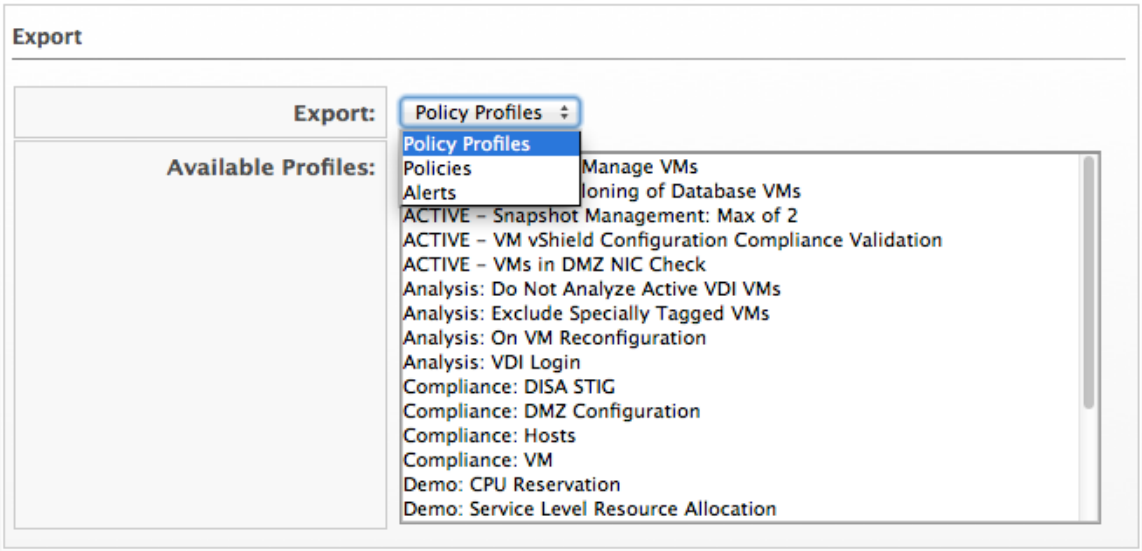
If you have multiple VMDBs, you can export policies, policy profiles, or alerts from one to another. You can export and import for use with other CloudForms Management Engine infrastructures.

Procedure: To Import a Policy, Policy Profile, or an Alert

1. Copy the file to import to a location that is accessible to your CloudForms Management Engine Console.
2. Navigate to **Control** → **Import/Export**.
3. Click **`Browse`** to navigate to the location of the file.
4. Select the file, and then click **`Open`** from the file selection box.
5. Click **`Upload`**.
6. Verify that these are the policies or policy profiles that you want to import.
7. Click **`Commit`**.

9.2. EXPORTING A POLICY, POLICY PROFILE, OR AN ALERT

1. Navigate to **Control** → **Import/Export**.
2. From the Export dropdown, select policy profiles, policies, or alerts, depending on what you want to export.



3. From the Available Profiles or Available Policies or Available Alerts list, select the items to export. Use the **`Ctrl`** key to select multiple items to export into one file.
4. Click **`Export`**.

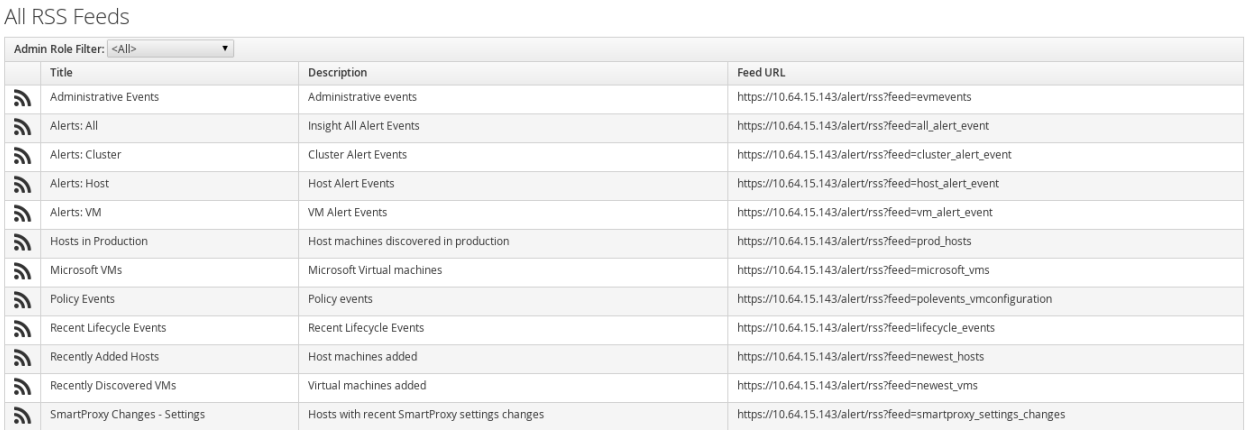
5. Follow the prompts in your browser to save the file.

CHAPTER 10. RSS

Use RSS to view RSS feeds based on administrative roles. You can subscribe to the RSS feeds and have them delivered to an RSS reader.

Procedure: To Access RSS

1. Navigate to **Cloud Intelligence → RSS**.


All RSS Feeds

Admin Role Filter: <All>

	Title	Description	Feed URL
	Administrative Events	Administrative events	https://10.64.15.143/alert/rss?feed=evmevents
	Alerts: All	Insight All Alert Events	https://10.64.15.143/alert/rss?feed=all_alert_event
	Alerts: Cluster	Cluster Alert Events	https://10.64.15.143/alert/rss?feed=cluster_alert_event
	Alerts: Host	Host Alert Events	https://10.64.15.143/alert/rss?feed=host_alert_event
	Alerts: VM	VM Alert Events	https://10.64.15.143/alert/rss?feed=vm_alert_event
	Hosts in Production	Host machines discovered in production	https://10.64.15.143/alert/rss?feed=prod_hosts
	Microsoft VMs	Microsoft Virtual machines	https://10.64.15.143/alert/rss?feed=microsoft_vms
	Policy Events	Policy events	https://10.64.15.143/alert/rss?feed=polevents_vmconfiguration
	Recent Lifecycle Events	Recent Lifecycle Events	https://10.64.15.143/alert/rss?feed=lifecycle_events
	Recently Added Hosts	Host machines added	https://10.64.15.143/alert/rss?feed=newest_hosts
	Recently Discovered VMs	Virtual machines added	https://10.64.15.143/alert/rss?feed=newest_vms
	SmartProxy Changes - Settings	Hosts with recent SmartProxy settings changes	https://10.64.15.143/alert/rss?feed=smartproxy_settings_changes

You can filter the list of RSS feeds by administrative role using the Admin Role Filter drop down.

APPENDIX A. REGULAR EXPRESSIONS

In CloudForms Management Engine, regular expressions can be used to search the contents of a file for a specific string for use in a condition. Below are listed the items most commonly used with CloudForms Management Engine to search strings. These are a small subset of all the items available to use in regular expressions. If you are unfamiliar with regular expressions, there are many resources available on the Internet, including www.regular-expressions.info. Note that if you want to search a file, you must collect it as part of a host analysis profile.

Table A.1. Regular Expressions

Anchors	
^	start of string
$	end of string
Character Classes	
\s	white space including spaces, tabs, and line breaks
\S	not white space
\d	digit, same as [0-9]
\D	not digit
\w	word
\W	not word
Quantifiers	
*	0 or more of preceding characters

Anchors	
+	1 or more of preceding characters
?	0 or 1 of preceding character
Escape Character	
\	put before a metacharacter to search for that actual character
Metacharacters	
^ [. $ { * (\ +) | ? < >	must be used with the Escape Character if you are searching specifically for it
Special characters	
\n	new line
\t	tab
Groups and Ranges	
.	any character except new line (\n)
(a|b)	a or b
()	group
[abc]	a or b or c
[^abc]	not a or b or c

Anchors	
[a-q]	letter between a and q
[A-Q]	upper case letter between A and Q
[0-7]	digit between 0 and 7
Pattern modifiers	
i	case insensitive
Other helpers	
.*	swallows text between 2 words
\s+	guarantees minimum of 1 whitespace between 2 words
\s*	guarantees 0 or more whitespace between 2 words
^\s*	beginning of line with zero or more whitespace
\s+.*	swallows all text and white space between 2 words
\d+	guarantees minimum of 1 number between 2 words
<\w>	identical to <[a-zA-Z0-(_]>

Table A.2. Examples

Description	Regular Expression
([A-Za-z0-9]+)	Letters, numbers, hyphens
Find the line beginning with sshd. Then, using a colon : as delimiter, check that the value four ":" over is equal to 99999	^sshd:[^:]*:[^:]*:[^:]*:99999:
Verify that PASS_MAX_DAYS exists starting in position 1 and a value after it is ⇐ 90	^\s*PASS_MAX_DAYS\s+([0-9]|[1-8][0-9]|90)
Verify that ROOTPW (in any case) exists on an uncommented line	/[#]*ROOTPW/i
Verify that line in file starts with size and the value after is ⇐ 4096k	^\s*size\s+(409[0-6]|40[0-8][0-9]|[123][09]{3}|\d{1,3})k
Find line with string restrict 127.0.0.1 that starts in position 1 to ensure it is not commented out	^\s*restrict\s+127\.0\.0\.1
Find an uncommented line that contains "/home". There will be additional text before the desired string	[#]*\/home

APPENDIX B. REPORTABLE FIELDS IN CLOUDFORMS MANAGEMENT ENGINE

CloudForms Management Engine (CFME) provides a set of out of the box reports covering a variety of areas. These fields are collected by CFME from the different parts of the infrastructure. Most of the fields are named directly as the vendor would name them. However, there are some fields that CFME calculates given this data. Note that this list may vary by Provider and may change as new Providers are added to CFME. Also, note that the value returned by each reportable field below is in megabytes (MB).

Table B.1. Clusters

Reportable Field
Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
Datastores : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Datastores : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Datastores : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg

Reportable Field
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
Provider : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Provider : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Provider : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
VMs : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
VMs : Memory - Avg Used for Collected Intervals 30 Day Avg
VMs : Memory - Avg Used for Collected Intervals 30 Day High Avg

Table B.2. Datastore Files

Reportable Field
Datastore : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Datastore : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Datastore : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
VM Template : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
VM Template : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg

Reportable Field
VM Template : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
VM Template : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
VM and Instance : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
VM and Instance : Memory - Avg Used for Collected Intervals 30 Day Avg
VM and Instance : Memory - Avg Used for Collected Intervals 30 Day High Avg
VM and Instance : Memory - Avg Used for Collected Intervals 30 Day Low Avg
Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
File Share.File System.Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
File Share.File System.Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
File Share.File System.Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
File Share.File System.Logical Disk.Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
File Share.File System.Logical Disk.Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg

Reportable Field
File Share.File System.Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
File Share.File System.Logical Disk.Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
File Share.File System.Logical Disk.Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
File Share.File System.Logical Disk.Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
File Share.File System.Logical Disk.VMs : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
File Share.File System.Logical Disk.VMs : Memory - Avg Used for Collected Intervals 30 Day Avg
File Share.File System.Logical Disk.VMs : Memory - Avg Used for Collected Intervals 30 Day High Avg
File Share.File System.Logical Disk.VMs : Memory - Avg Used for Collected Intervals 30 Day Low Avg
File Share.File System.VMs : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
File Share.File System.VMs : Memory - Avg Used for Collected Intervals 30 Day Avg
File Share.File System.VMs : Memory - Avg Used for Collected Intervals 30 Day High Avg
File Share.VMs : Memory - Avg Used for Collected Intervals 30 Day Low Avg
Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg

Reportable Field
Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
VMs : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
VMs : Memory - Avg Used for Collected Intervals 30 Day Avg
VMs : Memory - Avg Used for Collected Intervals 30 Day High Avg
VMs : Memory - Avg Used for Collected Intervals 30 Day Low Avg

Table B.3. Datastores

Reportable Field
Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
File Share.File System.Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg

Reportable Field
File Share.File System.Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
File Share.File System.Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
File Share.File System.Logical Disk.Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
File Share.File System.Logical Disk.Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
File Share.File System.Logical Disk.Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
File Share.File System.Logical Disk.VMs : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
File Share.File System.Logical Disk.VMs : Memory - Avg Used for Collected Intervals 30 Day Avg
File Share.File System.Logical Disk.VMs : Memory - Avg Used for Collected Intervals 30 Day High Avg
File Share.File System.Logical Disk.VMs : Memory - Avg Used for Collected Intervals 30 Day Low Avg
File Share.File System.VMs : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
File Share.File System.VMs : Memory - Avg Used for Collected Intervals 30 Day Avg
File Share.File System.VMs : Memory - Avg Used for Collected Intervals 30 Day High Avg
File Share.File System.VMs : Memory - Avg Used for Collected Intervals 30 Day Low Avg

Reportable Field
File Share.Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
File Share.Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
File Share.Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
File Share.VMs : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
File Share.VMs : Memory - Avg Used for Collected Intervals 30 Day Avg
File Share.File System.VMs : Memory - Avg Used for Collected Intervals 30 Day High Avg
File Share.File System.VMs : Memory - Avg Used for Collected Intervals 30 Day Low Avg
File Share.Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
File Share.Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
File Share.Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
File Share.VMs : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
File Share.VMs : Memory - Avg Used for Collected Intervals 30 Day Avg
File Share.VMs : Memory - Avg Used for Collected Intervals 30 Day High Avg
File Share.VMs : Memory - Avg Used for Collected Intervals 30 Day Low Avg
Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg

Reportable Field
Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
VMs : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
VMs : Memory - Avg Used for Collected Intervals 30 Day Avg
VMs : Memory - Avg Used for Collected Intervals 30 Day High Avg
VMs : Memory - Avg Used for Collected Intervals 30 Day Low Avg

Table B.4. EVM Groups

Reportable Field
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg

Reportable Field
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
VMs : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
VMs : Memory - Avg Used for Collected Intervals 30 Day Avg
VMs : Memory - Avg Used for Collected Intervals 30 Day High Avg
VMs : Memory - Avg Used for Collected Intervals 30 Day Low Avg
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
VMs : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
VMs : Memory - Avg Used for Collected Intervals 30 Day Avg
VMs : Memory - Avg Used for Collected Intervals 30 Day High Avg
VMs : Memory - Avg Used for Collected Intervals 30 Day Low Avg

Table B.5. Hosts

Reportable Field
Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
Cluster : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Cluster : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Cluster : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
Datastores : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Datastores : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Datastores : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
Provider : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Provider : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg

Reportable Field
Provider : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
VMs : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
VMs : Memory - Avg Used for Collected Intervals 30 Day Avg
VMs : Memory - Avg Used for Collected Intervals 30 Day High Avg
VMs : Memory - Avg Used for Collected Intervals 30 Day Low Avg

Table B.6. Images

Reportable Field
Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
Cluster : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Cluster : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Cluster : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
Datastore : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg

Reportable Field
Datastore : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Datastore : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
Datastores : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Datastores : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Datastores : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
Host : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Host : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Host : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
Provider : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Provider : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Provider : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
Provisioned From Template : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Provisioned From Template : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Provisioned From Template : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
Provisioned From Template : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max

Reportable Field
Provisioned VMs : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg
Provisioned VMs : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg
Provisioned VMs : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg
Provisioned VMs : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
Service.VMs : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max
Service.VMs : Memory - Avg Used for Collected Intervals 30 Day Avg
Service.VMs : Memory - Avg Used for Collected Intervals 30 Day High Avg
Service.VMs : Memory - Avg Used for Collected Intervals 30 Day Low Avg