Creating and managing reports, feeds, and widgets in CloudForms Management Engine
Red Hat CloudForms 4.0 Monitoring, Alerts, and Reporting

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

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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. If you have a suggestion for improving this guide or have found an error, please submit a Bugzilla report at http://bugzilla.redhat.com against Red Hat CloudForms Management Engine for the Documentation component. Please provide specific details, such as the section number, guide name, and CloudForms version so we can easily locate the content.
# Table of Contents

## CHAPTER 1. CLOUD INTELLIGENCE DASHBOARD
- 1.1. ADDING A WIDGET ................................................................. 4
- 1.2. Resets to the Default Set of Widgets .......................... 4
- 1.3. REMOVING A WIDGET ....................................................... 4
- 1.4. ZOOMING IN TO A CHART WIDGET .............................. 4
- 1.5. OPENING A CHART OR REPORT WIDGET IN ITS OWN WINDOW ........................................... 5
- 1.6. MINIMIZING OR MAXIMIZING A WIDGET ......................... 5
- 1.7. DOWNLOADING A REPORT WIDGET AS A FILE ................... 5

## CHAPTER 2. CREATING DASHBOARD WIDGETS
- 2.1. CREATING A REPORT WIDGET .......................................... 6
- 2.2. CREATING A CHART WIDGET ........................................... 7
- 2.3. CREATING AN RSS FEED WIDGET ................................. 8
- 2.4. CREATING A MENU WIDGET ........................................... 9
- 2.5. EDITING A WIDGET ....................................................... 9
- 2.6. COPYING A WIDGET ..................................................... 9
- 2.7. DELETING A WIDGET ................................................... 10
- 2.8. IMPORTING A WIDGET .................................................. 10
- 2.9. EXPORTING A WIDGET .................................................. 10
- 2.10. GENERATING WIDGET CONTENT IMMEDIATELY ................. 10

## CHAPTER 3. REPORTS
- 3.1. RUNNING REPORTS .......................................................... 12
  - 3.1.1. Generating a Single Report ...................................... 12
  - 3.1.2. Scheduling a Report ................................................ 13
  - 3.1.3. Modifying a Report Schedule .................................... 15
  - 3.1.4. Running a Scheduled Report Immediately ..................... 15
- 3.2. VIEWING REPORTS ........................................................ 15
  - 3.2.1. Changing Report Views ......................................... 15
  - 3.2.2. Report Download Buttons ..................................... 16
  - 3.2.3. Downloading a Report .......................................... 16
  - 3.2.4. Showing a Report in Full Screen ............................. 16
- 3.3. ADDING A REPORT ...................................................... 17
- 3.4. COPYING A REPORT .................................................... 23
- 3.5. EDITING A REPORT ..................................................... 23
- 3.6. DELETING A REPORT ................................................... 24
- 3.7. IMPORTING A REPORT .................................................. 24
- 3.8. EXPORTING A REPORT .................................................. 24
- 3.9. REPORT MENUS .......................................................... 24
  - 3.9.1. Managing Report Menu Accordions ......................... 25
  - 3.9.2. Managing Report Menu Folders .............................. 26
  - 3.9.3. Organizing Reports in Report Menus ....................... 27

## CHAPTER 4. USAGE
- 4.1. ACCESSING USAGE DATA ................................................ 28

## CHAPTER 5. CHARGEBACK
- 5.1. CHARGEBACK RATES ...................................................... 29
  - 5.1.1. Memory Used Cost ................................................ 29
  - 5.1.2. CPU Total Cost ..................................................... 29
  - 5.1.3. CPU Used Cost ..................................................... 29
  - 5.1.4. Storage Allocated Cost .......................................... 30
CHAPTER 1. CLOUD INTELLIGENCE DASHBOARD

Cloud Intelligence shows your virtual environment’s 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 the information you want to see upon login.

1. Navigate to Cloud Intelligence → Dashboard.
2. Click (Add a Widget).
3. Select the widget you want to add from the list.

NOTE
Only widgets that are not currently showing on the dashboard will appear in this list.

1.2. REPLACING THE DEFAULT SET OF WIDGETS

You can reset to default set of widgets according to your needs with the following steps:

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.

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
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

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

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

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

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. 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.

![Basic Information](image)

5. 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.

![Report Options](image)

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**.

![Timer](image)
7. Select a **Time Zone**. 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.

   **NOTE**
   If you change the time zone, you will need to reset the starting date and time.

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**.

**2.2. CREATING 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**. 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.

   **NOTE**
   If you change the time zone, you will need to reset the starting date and time.
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

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

   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

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

2. Click the **Dashboard Widget** accordion and click the **Menus** folder.

3. Click ![Configuration](Configuration), then click ![Add a new Widget](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 `*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

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

2. Click the **Dashboard Widgets** accordion and select the widget you want to edit.

3. Click ![Configuration](Configuration), then ![Edit this Widget](Edit this Widget).

4. Make the required changes.

5. Click **Save**.

### 2.6. COPYING 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.

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.

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.

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

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: by scheduling the report, or running the report 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

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.

<table>
<thead>
<tr>
<th>Queued At</th>
<th>Run At</th>
<th>Source</th>
<th>User ID</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/21/11 14:14:11 UTC</td>
<td>10/21/11 14:00:22 UTC</td>
<td>Requested by user</td>
<td>admin</td>
<td>Finished</td>
</tr>
<tr>
<td>10/21/11 14:00:08 UTC</td>
<td>10/21/11 14:00:22 UTC</td>
<td>Requested by user</td>
<td>admin</td>
<td>Finished</td>
</tr>
</tbody>
</table>

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

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.

   ![Basic Information](image)
   - 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 **General Configuration** 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.

   ![Report Selection](image)

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 Appliance’s 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**.
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

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

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.

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.

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

2. Click the report to view. Click one of the following buttons for the view you want.

   - Click ![Graph View](image) for **Graph View**.
   - Click ![Hybrid View](image) for **Hybrid View**.
   - Click ![Tabular View](image) 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.

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 Section 3.1, “Running Reports”.

4. Click on the report download buttons for the type of export you want.

   - Click ![Download this report in text format](image) to download as text.
   - Click ![Download this report in csv format](image) to download as a comma-separated file.
   - Click ![Download this report in PDF format](image) 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.

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.

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.

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.

![Chart Settings](image)

- 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 categorized or evaluated against others, 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.

![Timeline Settings](image)

- 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. By copying a report, 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.

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.

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.

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.

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.
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**, there are 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

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**

If you are creating a new accordion, **Top Level** must be 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**, then click on **Top Level** in the **Reports** area.
5. When you are finished adding accordions, click \(\checkmark\) (Commit folder management changes). To revert, click \(\times\) (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 folders that are meaningful to you.

### 3.9.2. Managing 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 \(\rightarrow\) 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 \(\uparrow\) (Move selected folder to top) to move the folder to the top of the list.

   - Click \(\uparrow\) (Move selected folder up) to move the folder up.

   - Click \(\downarrow\) (Move selected folder down) to move the folder down.

   - Click \(\downarrow\) (Move selected folder to bottom) to move the folder to the bottom of the list.

   - Click \(\cancel{\square}\) (Delete selected folder and its contents) to delete an accordion.

   - Click \(\cancel{+}\) (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 \(\checkmark\) (Commit folder management changes). To revert, click \(\times\) (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

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 Capacity Planning in the Deployment Planning Guide.

4.1. ACCESSING 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.
   - 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 General Configuration.

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.

- $2.5 \text{ GHz} = 2500 \text{ MHz}$
- $2500 \text{ MHz} \times 0.01 \text{ (per MHz per day)} = $25 \text{ CPU Used Cost}$

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.

- $536,870,912,000 \text{ bytes} = 500 \text{ GB}$
- $500 \text{ GB} \times 0.10 \text{ (per GB per day)} = $50 \text{ Storage Allocated Cost}$

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.

- $268,435,456,000 \text{ bytes} = 250 \text{ GB}$
- $250 \text{ GB} \times 0.10 \text{ (per GB per day)} = $25 \text{ Storage Total Cost}$

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.

- $268,435,456,000 \text{ bytes} = 250 \text{ GB}$
- $250 \text{ GB} \times 0.10 \text{ (per GB per day)} = $25 \text{ Storage Used Cost}$
5.2. CREATING CHARGEBACK RATES

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

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.
   - Use Storage to set chargeback rates for fixed and storage items.
3. Click (Configuration), (Add a new Chargeback Rate) to create a new chargeback rate.
4. Type in a Description for the chargeback rate.
5. For each item that you want to set, type in a rate and select a time option.
6. Click Add.

5.3. ASSIGNING CHARGEBACK RATES

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

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

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.

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.

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

Some timelines, such as Events Operations: All Events, use minutes, hours, and days instead of 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.

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

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 General Configuration.

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**

<table>
<thead>
<tr>
<th>Object ID</th>
<th>Suffix Number Added to PEN</th>
<th>PEN with the Suffix Added</th>
</tr>
</thead>
<tbody>
<tr>
<td>info</td>
<td>1</td>
<td>1.3.6.1.4.1.33482.1</td>
</tr>
<tr>
<td>warn, warning</td>
<td>2</td>
<td>1.3.6.1.4.1.33482.2</td>
</tr>
<tr>
<td>crit, critical, error</td>
<td>3</td>
<td>1.3.6.1.4.1.33482.3</td>
</tr>
</tbody>
</table>
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.

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 the General Configuration guide for more information.

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.

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 Section 7.2, “Creating 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 General Configuration for more information.

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 General Configuration for instructions.

1. Navigate to Control → Explorer.

2. Click the Alerts accordion.
3. Click ☰ (Configuration), + (Add a new Alert).

4. In the Info area:

```
<table>
<thead>
<tr>
<th>Description</th>
<th>Cluster Hourly CPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active</td>
<td>✓</td>
</tr>
<tr>
<td>Based On</td>
<td>Cluster</td>
</tr>
<tr>
<td>What to Evaluate</td>
<td>Hourly Performance</td>
</tr>
<tr>
<td>Notification Frequency</td>
<td>1 Hour</td>
</tr>
</tbody>
</table>
```

- 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 the hostd Log Threshold 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. The following example shows steps to check the host’s log for a failure to validate a virtual machine’s IP address.

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.

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.

   VMware Alarm Parameters
   
<table>
<thead>
<tr>
<th>Management System</th>
<th>Alarm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Center (192.168.254.88)</td>
<td>Virtual machine memory usage</td>
</tr>
</tbody>
</table>

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. The following procedure creates an alert for when a host’s datastore has less than 5% free space.

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

2. Click on the **Alerts** accordion, then click 🔄 (Configuration), 📢 (Add a new Alert).

3. In the **Info** area:

   ![Info](image)

   - 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 *Defining Policies and Profiles*.

![Expression Editor Screenshot](image)

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**

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

2. Click on the **Alerts** accordion, then click **気軽に** *(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**

<table>
<thead>
<tr>
<th>Driving Event</th>
<th>Explanation (Thresholds, Description)</th>
<th>Proposed Action if Alert is Raised</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVM Server Start</td>
<td>Alert is raised when an EVM Server starts.</td>
<td></td>
</tr>
<tr>
<td>Driving Event</td>
<td>Explanation (Thresholds, Description)</td>
<td>Proposed Action if Alert is Raised</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>EVM Server Stop</td>
<td>Alert is raised when an EVM Server stops.</td>
<td></td>
</tr>
<tr>
<td>EVM Server Not Responding</td>
<td>Alert is raised when one EVM server detects that another EVM Server has not responded in (2 minutes).</td>
<td>This is a sign of a problem that should be investigated. Check logs.</td>
</tr>
</tbody>
</table>
| 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. |
<p>| 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/. |</p>
<table>
<thead>
<tr>
<th>Driving Event</th>
<th>Explanation (Thresholds, Description)</th>
<th>Proposed Action if Alert is Raised</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EVM Server High App Disk Usage</strong></td>
<td>The EVM Servers app disk is 80% full. This check is run as part of a system schedule.</td>
<td>Possibly EVM temp files are being left around.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Threshold configured in Advanced Settings.</td>
</tr>
<tr>
<td></td>
<td>server:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>events:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>:disk_usage_gt_percent: 80</td>
<td></td>
</tr>
<tr>
<td><strong>EVM Server High Log Disk Usage</strong></td>
<td>The EVM Servers log disk is 80% full. This check is run as part of a system schedule.</td>
<td>Logs are getting too big or are not being log rotated properly every day. Check most recent logs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Threshold configured in Advanced Settings.</td>
</tr>
<tr>
<td></td>
<td>server:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>events:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>:disk_usage_gt_percent: 80</td>
<td></td>
</tr>
<tr>
<td><strong>EVM Server High DB Disk Usage</strong></td>
<td>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.</td>
<td>Database or database logging is getting too large. May need FULL vacuuming of PostgreSQL database.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Threshold configured in Advanced Settings.</td>
</tr>
<tr>
<td></td>
<td>server:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>events:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>:disk_usage_gt_percent: 80</td>
<td></td>
</tr>
<tr>
<td><strong>EVM Worker Started</strong></td>
<td>Alert is raised when a worker is about to start.</td>
<td></td>
</tr>
<tr>
<td><strong>EVM Worker Stopped</strong></td>
<td>Alert is raised when a worker is requested to stop.</td>
<td></td>
</tr>
<tr>
<td><strong>EVM Worker Killed</strong></td>
<td>Alert is raised when a non-responsive worker does not restart on its own and is killed.</td>
<td></td>
</tr>
<tr>
<td>Driving Event</td>
<td>Explanation (Thresholds, Description)</td>
<td>Proposed Action if Alert is Raised</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>EVM Worker Not Responding</td>
<td>Alert is raised when a worker has not responded for 2 minutes (:heartbeat_timeout) or has not started within 10 minutes (:starting_timeout).</td>
<td></td>
</tr>
<tr>
<td>EVM Worker Exceeded Memory Limit</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>EVM Worker Exceeded Uptime Limit</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>EVM Worker Exit File</td>
<td>Alert is raised when the scheduler worker exits due to a pending large ntp time change.</td>
<td></td>
</tr>
</tbody>
</table>

## 7.12. EDITING AN ALERT

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

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.

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.

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

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.

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 needs change.

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.

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.

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.

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.

To view and filter RSS feeds:

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

2. Filter the list of RSS feeds by administrative role using the **Admin Role Filter** dropdown.

### All RSS Feeds

<table>
<thead>
<tr>
<th>Admin Role Filter</th>
<th>Title</th>
<th>Description</th>
<th>Feed URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative Events</td>
<td>Administrative events</td>
<td></td>
<td><a href="https://1644.15.340/alerts/feed/premiseevents">https://1644.15.340/alerts/feed/premiseevents</a></td>
</tr>
<tr>
<td>Alerts: All</td>
<td>Bright All Alert Events</td>
<td></td>
<td><a href="https://1644.15.340/alerts/feed/all_alert_event">https://1644.15.340/alerts/feed/all_alert_event</a></td>
</tr>
<tr>
<td>Alerts: Host</td>
<td>Host Alert Events</td>
<td></td>
<td><a href="https://1644.15.340/alerts/feed/host_alert_event">https://1644.15.340/alerts/feed/host_alert_event</a></td>
</tr>
<tr>
<td>Hosts in Production</td>
<td>Host machines discovered in production</td>
<td></td>
<td><a href="https://1644.15.340/alerts/feed/hosts/hosts">https://1644.15.340/alerts/feed/hosts/hosts</a></td>
</tr>
<tr>
<td>Microsoft VMs</td>
<td>Microsoft Virtual machines</td>
<td></td>
<td><a href="https://1644.15.340/alerts/feed/microsoft_arms">https://1644.15.340/alerts/feed/microsoft_arms</a></td>
</tr>
<tr>
<td>Policy Events</td>
<td>Policy events</td>
<td></td>
<td><a href="https://1644.15.340/alerts/feed/policyevents_unconfiguration">https://1644.15.340/alerts/feed/policyevents_unconfiguration</a></td>
</tr>
<tr>
<td>Recently Replaced Events</td>
<td>Recently Replaced Events</td>
<td></td>
<td><a href="https://1644.15.340/alerts/feed/replaced_events">https://1644.15.340/alerts/feed/replaced_events</a></td>
</tr>
<tr>
<td>Recently Added Events</td>
<td>Host machines added</td>
<td></td>
<td><a href="https://1644.15.340/alerts/feed/recently_hosted">https://1644.15.340/alerts/feed/recently_hosted</a></td>
</tr>
<tr>
<td>Recently Discovered VMs</td>
<td>Virtual machines added</td>
<td></td>
<td><a href="https://1644.15.340/alerts/feed/recently_discovered_vms">https://1644.15.340/alerts/feed/recently_discovered_vms</a></td>
</tr>
<tr>
<td>SmartProxy Changes - Settings</td>
<td>Hosts with recent SmartProxy settings changes</td>
<td></td>
<td><a href="https://1644.15.340/alerts/feed/smartproxy_settings_changes">https://1644.15.340/alerts/feed/smartproxy_settings_changes</a></td>
</tr>
</tbody>
</table>
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](http://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

<table>
<thead>
<tr>
<th>Anchors</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>^</td>
<td>start of string</td>
</tr>
<tr>
<td>$</td>
<td>end of string</td>
</tr>
</tbody>
</table>

**Character Classes**

<table>
<thead>
<tr>
<th>Character Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>\s</td>
<td>white space including spaces, tabs, and line breaks</td>
</tr>
<tr>
<td>\S</td>
<td>not white space</td>
</tr>
<tr>
<td>\d</td>
<td>digit, same as [0-9]</td>
</tr>
<tr>
<td>\D</td>
<td>not digit</td>
</tr>
<tr>
<td>\w</td>
<td>word</td>
</tr>
<tr>
<td>\W</td>
<td>not word</td>
</tr>
</tbody>
</table>

**Quantifiers**

<table>
<thead>
<tr>
<th>Quantifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>0 or more of preceding characters</td>
</tr>
<tr>
<td>+</td>
<td>1 or more of preceding characters</td>
</tr>
<tr>
<td>?</td>
<td>0 or 1 of preceding character</td>
</tr>
</tbody>
</table>

**Escape Character**

<table>
<thead>
<tr>
<th>Escape Character</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>\</td>
<td>put before a metacharacter to search for that actual character</td>
</tr>
</tbody>
</table>

**Metacharacters**

<table>
<thead>
<tr>
<th>Metacharacters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>^[^ .{.*(+)</td>
<td>?&lt;&gt;]</td>
</tr>
</tbody>
</table>
### Anchors

<table>
<thead>
<tr>
<th>Special characters</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>\n</td>
<td>new line</td>
</tr>
<tr>
<td>\t</td>
<td>tab</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Groups and Ranges</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>.</td>
<td>any character except new line (\n)</td>
</tr>
<tr>
<td>(a</td>
<td>b)</td>
</tr>
<tr>
<td>()</td>
<td>group</td>
</tr>
<tr>
<td>[abc]</td>
<td>a or b or c</td>
</tr>
<tr>
<td>[^abc]</td>
<td>not a or b or c</td>
</tr>
<tr>
<td>[a-q]</td>
<td>letter between a and q</td>
</tr>
<tr>
<td>[A-Q]</td>
<td>upper case letter between A and Q</td>
</tr>
<tr>
<td>[0-7]</td>
<td>digit between 0 and 7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pattern modifiers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>case insensitive</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other helpers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>.*</td>
<td>swallows text between 2 words</td>
</tr>
<tr>
<td>\s+</td>
<td>guarantees minimum of 1 whitespace between 2 words</td>
</tr>
<tr>
<td>\s*</td>
<td>guarantees 0 or more whitespace between 2 words</td>
</tr>
<tr>
<td>^\s*</td>
<td>beginning of line with zero or more whitespace</td>
</tr>
<tr>
<td>\s+.*</td>
<td>swallows all text and white space between 2 words</td>
</tr>
<tr>
<td>\d+</td>
<td>guarantees minimum of 1 number between 2 words</td>
</tr>
<tr>
<td>&lt;\w&gt;</td>
<td>identical to &lt;[a-zA-Z0-[_]&gt;</td>
</tr>
<tr>
<td>Description</td>
<td>Regular Expression</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>([A-Za-z0-9]+)</td>
<td>Letters, numbers, hyphens</td>
</tr>
<tr>
<td>Find the line beginning with sshd. Then, using a colon : as delimiter, check that the value four &quot;.&quot; over is equal to 99999.</td>
<td>^sshd:[^.:]<em>[^.:]</em>:99999:</td>
</tr>
<tr>
<td>Verify that PASS_MAX_DAYS exists starting in position 1 and a value after it is (\leq 90).</td>
<td>^\s*PASS_MAX_DAYS\s+([0-9]</td>
</tr>
<tr>
<td>Verify that ROOTPW (in any case) exists on an uncommented line.</td>
<td>/[#]*ROOTPW/i</td>
</tr>
<tr>
<td>Verify that line in file starts with size and the value after is (\leq 4096)k.</td>
<td>^\s*size\s+(409[0-6]</td>
</tr>
<tr>
<td>Find line with string restrict 127.0.0.1 that starts in position `1 to ensure it is not commented out.</td>
<td>^\s*restrict\s+127.(0</td>
</tr>
<tr>
<td>Find an uncommented line that contains /home. There will be additional text before the desired string.</td>
<td>/[#]*home</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Reportable Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg</td>
</tr>
<tr>
<td>Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg</td>
</tr>
<tr>
<td>Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg</td>
</tr>
<tr>
<td>Datastores : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg</td>
</tr>
<tr>
<td>Datastores : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg</td>
</tr>
<tr>
<td>Datastores : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg</td>
</tr>
<tr>
<td>Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg</td>
</tr>
<tr>
<td>Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg</td>
</tr>
<tr>
<td>Hosts : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg</td>
</tr>
<tr>
<td>Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg</td>
</tr>
<tr>
<td>Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg</td>
</tr>
<tr>
<td>Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg</td>
</tr>
<tr>
<td>Miq Templates : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max</td>
</tr>
<tr>
<td>Provider : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg</td>
</tr>
<tr>
<td>Provider : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg</td>
</tr>
<tr>
<td>Provider : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg</td>
</tr>
<tr>
<td>VMs : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max</td>
</tr>
<tr>
<td>VMs : Memory - Avg Used for Collected Intervals 30 Day Avg</td>
</tr>
</tbody>
</table>
Table B.2. Datastore Files

<table>
<thead>
<tr>
<th>Reportable Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMs : Memory - Avg Used for Collected Intervals 30 Day High Avg</td>
</tr>
<tr>
<td>Datastore : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg</td>
</tr>
<tr>
<td>Datastore : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg</td>
</tr>
<tr>
<td>Datastore : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg</td>
</tr>
<tr>
<td>VM Template : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg</td>
</tr>
<tr>
<td>VM Template : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg</td>
</tr>
<tr>
<td>VM Template : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg</td>
</tr>
<tr>
<td>VM Template : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max</td>
</tr>
<tr>
<td>VM and Instance : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max</td>
</tr>
<tr>
<td>VM and Instance : Memory - Avg Used for Collected Intervals 30 Day Avg</td>
</tr>
<tr>
<td>VM and Instance : Memory - Avg Used for Collected Intervals 30 Day High Avg</td>
</tr>
<tr>
<td>VM and Instance : Memory - Avg Used for Collected Intervals 30 Day Low Avg</td>
</tr>
<tr>
<td>Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Avg</td>
</tr>
<tr>
<td>Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day High Avg</td>
</tr>
<tr>
<td>Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Low Avg</td>
</tr>
<tr>
<td>Reportable Field</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>File Share.File System.Logical Disk.VMs : Memory - Aggregate Used for Child VMs for Collected Intervals 30 Day Max</td>
</tr>
<tr>
<td>File Share.File System.Logical Disk.VMs : Memory - Avg Used for Collected Intervals 30 Day Avg</td>
</tr>
<tr>
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| 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 |

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<td>File Share.File System.Logical Disk.VMs : Memory - Avg Used for Collected Intervals 30 Day High Avg</td>
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<td>File Share.File System.VMs : Memory - Avg Used for Collected Intervals 30 Day Low Avg</td>
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<tr>
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### Table B.4. EVM Groups

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### APPENDIX B. REPORTABLE FIELDS IN CLOUDFORMS MANAGEMENT ENGINE

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**Table B.5. Hosts**

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### Table B.6. Images

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