Dell SRM 5.1.1.0

Web Portal Guide

5.1.1.0

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DELL Technologies

Notes, cautions, and warnings

NOTE: A NOTE indicates important information that helps you make better use of your product.

CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

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Web Portal Guide

Topics:

Information you can find here

Find information about viewing and editing reports, managing users, and customizing the interface to meet the needs.

- Browsing Reports - for users who want to change how reports are displayed.
- Editing Reports - for users and administrators who want to edit and create reports.
- Customizing User Settings - for users who want to set personal preferences or manage custom reports.
- Report Library - for users and administrators who work with installed SolutionPacks.

- Administering the Interface - for administrators who want to customize the interface for all users.
- Managing Users - for administrators who want to add users and set up user restrictions.
- Managing ReportPacks - for users and administrators who want to create, import, and export ReportPacks.
- Administration UI - for administrators who want to manage, configure, update, or expand system components.
- Alerting - for users and administrators who want to enable, disable, configure, or create alert definitions, define alerts from data in scheduled reports, probe alerts, or manage other alerting components.

For the latest related documentation on Dell SRM, go to SRM Support Site.

For latest release notes, security guides, software updates, or information about products, go to SRM Support Site.

Key terms

Review these commonly used terms before you begin using the interface.

Aggregation

Two types of values are stored in the database: real-time values and aggregated values. Real-time values are the actual values that are collected by the collectors. Aggregated values are the compound of several real-time values. Aggregated values improve report performance and save disk space. Aggregated values are created and updated as real-time values are collected. This way, aggregated values are always current and precise. A default installation contains 1 hour, 1 day, and 1 week aggregates.

Backend

The backend module receives, normalizes, and consolidates the collected data and pushes it to the database. The backend performs data aggregation.

Browse mode

The Browse mode is the default mode of the user interface. In Browse mode, you can generate and view reports by clicking the report nodes in the tree. In Browse mode, an expansion on a device property appears as one node per device in the report tree.

Collector

Collectors are lightweight modules that gather time series data from supported devices and configuration items and ingest it into the processing pipeline as raw values.

Data point

A data point is one unit of data that contains a timestamp, metric, and value.

Edit mode

In Edit mode, you can create reports, edit existing reports, and customize the report tree. When the interface is in Edit mode, the report tree tools that are used to add, delete, cut, copy, paste, and link report nodes are displayed. In Edit mode, the nodes in the report tree are not expanded as they are in the Browse mode. The report pane displays the report configuration tabs.

Expansion

Expansion dynamically creates sub nodes. Sub nodes add levels to a report so that you can analyze. When a node is set to expand, the node transforms itself from a single node to as many nodes as there are matches of the specified property name in the dataset. By using expansion, you can define a report that automatically creates and deletes nodes based on the properties

that are found in the dataset. For example, as devices are added to the network, they are automatically added to the report when their properties match the expansion criteria.

Filtering

A filter is an expression that limits the number of metrics that are displayed in a report. Filtering is vital to configuring a report because it determines the report's dataset. You can manually create a filter when you know which properties and values to include in a filter, or you can use the Filter Wizard to help you define the filter.

Frontend

The frontend refers to the main user interface that displays time series and event-based data in reports. The frontend interfaces with the database.

Metric

A metric is a quantity that can be collected and reported on, such as: CPU usage, throughput, and capacity.

Node

Nodes appear in the report tree. You click a node to generate and see a report. Reports appear on the right side when you select a node. Nodes can have parent and child nodes (sub nodes).

Property

A property is metadata that is associated with a metric. For example, an ifInOctets metric could also contain information about the device type supplying the value and the device name.

Root node

A root node is the topmost node of a branch in the report tree.

What's New in SRM

The SRM frontend URL prompts a pop-up dialog known as **New Features** once you login. The pop-up dialog lists the new features which are part of current SRM release. You have the option to select **Do not display this message again** checkbox option in the pop-up dialog, if you do not want to see the dialog again in successive logins.

You can access the **New Features** page from the Help section at any time. This feature is available for all User Roles supported by OTB in SRM. The SRM admin can disable this feature based on the **User Role** from **Admin UI** > **Users & Security** > **Users & Roles** > **Manage Roles** > **[Role]** > **Modules & Restrictions Access** > **Watch4net Frontend** > **New Features dialog display**. Admin can control the enabling or disabling of this feature for any user from **SRM Admin UI** > **Users & Security** > **Users & Roles** > **Manage Users** > **User Status** .

Browsing reports

Browse mode is the default mode of the user interface. In Browse mode, you can generate and view reports by clicking the report nodes in the tree.

You can do the following in browse mode.

- Examine in most reports to get more detailed reports.
- Change how reports are displayed, including the type of table or graph that is used to display the data.
- Customize the look, and feel of the displayed metrics.

- Change the type of aggregation and the type range of the report.
- Create a dashboard of favorite reports.
- Take a snapshot of a report.
- Print, email, and export reports.
- Schedule reports.

Navigation styles

The navigation column on the User Interface provides access to all reports. You can choose between the Icon Navigation and Tree Navigation styles. The Administrator sets the default style for the installation.

Default style	Each user account can override the global default style and set their own preferred style in the **Navigation Style** field at **Profile** > **User Settings** > **Preferences**.
Icon Navigation	The Icon Navigation style helps preserve space on smaller-sized windows. Initially, it shows only a thin column of icons. To browse to a report, click an icon. A second column of categories appears. To expand a category, click it, and click again to select a report. Notice the scrollbar on the expanded second column. The second column disappears when you click a report. To browse further into the reporting structure, use the tabs, dashboards, and links in the reporting pane.
Tree Navigation	The Tree Navigation style can display the entire reporting structure, with multiple nodes expanded at once. Use the arrows to expand or contract the nodes. To display a report, click any entry in the tree. You can also use the tabs, dashboards, and links in the reporting pane to browse around the reporting structure.

Set default navigation style

The navigation style controls the look and feel of the left navigation column in the reporting interface.

About this task

This procedure sets the global default navigation style.

Steps

1. Click **Profile** > **User Settings** > **Preferences**.
2. In **Navigation Style**, make a selection.

Option	Description
Use default navigation	The default navigation of the portal.
Use icon navigation	The navigation column contains icons that expand into reporting categories.
Use tree navigation	The navigation column is a hierarchical tree of report names.

3. Click **Save**.

Make icon navigation column static

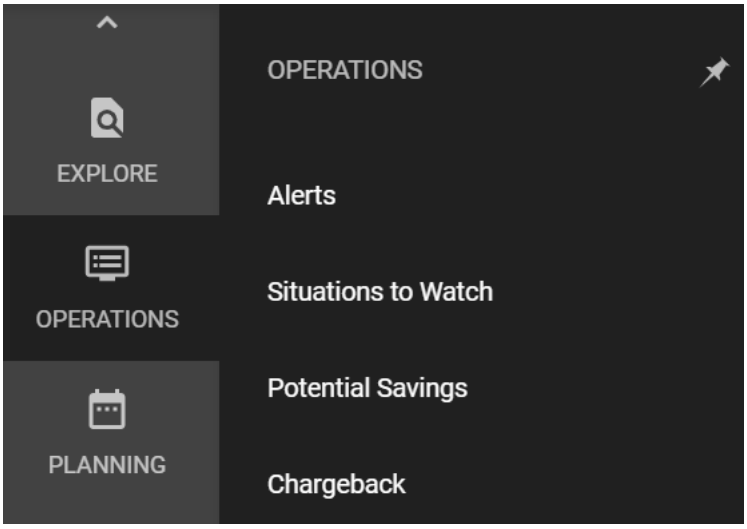
For the icon navigation style, use the pin to switch the second column between temporary and static states.

About this task

In its default state, the second column disappears when you select a report. You can pin the second column so it remains visible and the report pane moves to the right to accommodate it.

Steps

1. Click the pin at the top of the icon navigation bar.



2. Click the pin again to return the second column to a temporary display.

Displaying and canceling reports

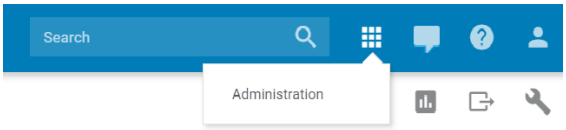
When you browse to a report on the Console, the system starts generating that report using the most recently collected data. If you browse away from the page to another report, the system cancels the first report and starts generating the new report.

Here are some important hovers over remember about displaying reports.

Data collection occurs in scheduled intervals	There might be many data collectors in the system, each gathering data from different components in the infrastructure. Each collector is configured with a collection interval. Depending on how the administrators configured the various collectors, you might see some infrastructure activity, reflected in reports within 15 minutes, and others not for a day or more.
One report per user session at a time	The Console generates one report per user session at a time. If you browse to another report while the first report is still generating, the first report is canceled, and the new report generation starts. If you are waiting for a long-running report to generate, do not click around examining other reports expecting the original report to finish running in the background.
Scheduled reports generate in the background	Scheduled reports do not affect the "one report per user session" rule. If you consistently depend on reports that take a long time to generate, you can put those reports on an automatic schedule, and view them in their completed state whenever you need them. Use **Tools** > **Schedule this Report** . You can request that the report be emailed or stored on a remote system. You can request that the report be emailed, stored on a remote system, or stored for Console viewing under **My Reports** > **Stored Reports**.
Reports in Stored Reports are snapshots, and are not regenerated	When you browse to a report in the **My Reports** > **Stored Reports** node, the snapshot of data from the stored date/time redisplays. The report is not regenerated. You can store a snapshot using **Tools** > **Store this Report**, or schedule the report as mentioned earlier.

User Interface menu options

The User Interface contains a set of menu options in the upper right corner of every report page.



Quick Search	Searches a predefined set of database properties for a requested value.
Administration	Contains links to administrative interfaces:

- **Administration**—Opens the **Administration** interface. In the Administration interface, you can view the Physical servers in **Table View** and **Graph View**.

Help

Contains options for more information:

- **Documentation**—Opens the product Help topics.
- **About**—Information about the current software versions and licensing messages
- **New Features**—Opens the New Features dialog which lists the new features that are part of the current SRM release.

Feedback

Opens the Feedback window which enables the users to provide feedback on the product and its features.

Profile

Contains Information and options for the current login session:

- Shows the username of the logged in user
- Shows the role of the user
- **User Settings**—Displays the User Settings page, to set user-specific information, including a password change and user preferences, and manage custom reports.

> **NOTE:** In the Admin UI, the password expiry duration for SRM users is configurable and can be configured between 1-365 days. To customize the password expiry duration, go to **Administration** > **Users & Security** > **Manage Users** and click **Password and Security Settings** and click **Save**. Click **Cancel** to close the **Password and Security Settings** page. Once the password is changed, the SRM user must log out and log in again for the password changes to be effective. For more information about password policy, see Dell SRM Admin Guide.

- **Log Out**—Ends the current session.

Modifications

Contains options for changing or creating report definitions:

- **New Report**
- **New Dashboard**
- **Edit Dashboard**
- **Publish Dashboard**
- **Delete Dashboard**
- **Save Dashboard As**
- **Advanced Search**
- **Edit Reports**

Export

Contains output formats for saving the displayed report. To configure the output, click the Tool icon next to a format.

Tools

Contains options for saving, sending, storing, fixing number of reports per page, and scheduling automatic runs of a report.

- **Revert to Default Report**
- **Revert Layout Positions**
- **Exculde Time Period**
- **Favorite this Report**
- **Schedule this Report**
- **E-mail me this Report**
- **View in Full Page**
- **Print-Friendly page**
- **Show Report URL**
- **Store this Report**

Search features

Use the search features to retrieve information from the database and locate reports containing relevant information.

Quick Search

Searches a predefined set of database properties for a requested value. This search feature returns an organized set of links to the reports that contain the value. To start a Quick Search, type a search

	string in the **Search** text box in the banner area, and press **Enter**. The search string must be at least three characters and not contain wildcards.
Advanced Search	Provides a filter for defining detailed search conditions and an expansion field for defining what to return and how to organize the results. To start an Advanced Search, click **Modifications** > **Advanced Search**.

In either case, you can view the results in the report window and also in a **Search Results** node that is created in the report tree.

Quick search

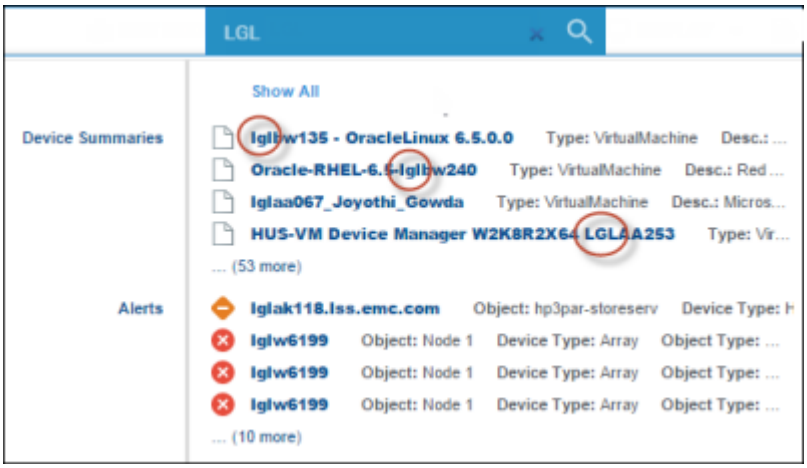
To perform a quick search, type the search string in the **Search** text box in the banner, and press Enter. The search returns links to reports about the found values.

About this task

NOTE: The search string must contain at least three characters and no wildcards.

The search is case insensitive, and finds occurrences of the string anywhere in the property value (that is, at the beginning, middle, or end of the value). The result is a categorized list of links to reports that contain the matched value.

For example, the following search for LGL finds device names containing that value, and returns links to major reports about those devices. In this case, the links are to the device summary reports and to alerts on those devices.



The search looks at a limited set of predefined properties in each of the product databases. The following table shows the database properties that are searched.

NOTE: The categories correspond to databases. The installation might not use all of the databases.

Table 1. Properties searched within each database

Categories			
Device Summaries (APG)	**Alerts**	**Compliance Breaches**	**VMware Events**

`device`
`serialnb`
`ip`
`devdesc`
`model`
`vendor`
`domain`
 	
WWPNs for:
• Server HBA ports
• FC switch ports
• Storage ports
	`severityAsString`
	`owner`
	`parttypedisplayname`
	`partdisplayname`
	`eventdisplayname`
	`category`
	`fullmsg`
	`eventSource`
	`devtype`
	`device`
		`breachName`
		`device`
		`policy`
		`rule`
			`datastore`
			`device`
			`Message`
			`VM`
			`Host`
			`User`

Table 1. Properties searched within each database

Categories			
Device Summaries (APG)	**Alerts**	**Compliance Breaches**	**VMware Events**
• VNX host ports			

The search results are links to reports. Results are presented in the following ways:

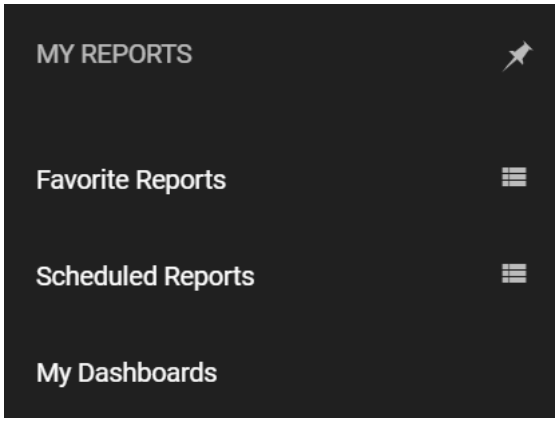
- A popup shows a preview of results. Click the popup to go to the full result list or to a specific result.
- The full result list is a tabbed report by category.
- The navigation tree shows the search results in a node under **My Reports** > **Search Results**.

Steps

1. In the **Search** box at the top of any report page, type a search string, and press **Enter**.
   - The search is case insensitive. For example, `lgl` finds lgl and LGL.
   - The search string must contain at least three characters.
   - The search finds occurrences of the string in the beginning, middle, and end of values.
   - Do not use wildcards in the search string.
2. In the pop-up preview of search results, do any of the following:

Action	Result
Click **Show All** or one of the result categories on the left.	A tabbed **Search Results** report opens, showing all results, which are organized by category. Click a link in any of the lists.
Click a link in the list.	The selected report opens.

3. To return to the search results after navigating to a report, do either of the following:
   - Use the browser's **Back** button.
   - Use the Search Results node in the report navigation tree, located under **My Reports** > **Search Results**.



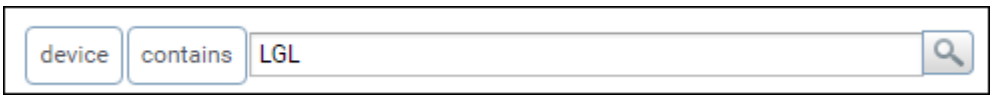
NOTE: Only one search node is saved. If you perform another search, it overwrites the first search node.

Advanced search

To perform an Advanced search, click **Modifications** > **Advanced Search**. The dialog box provides filtering and expansion fields.

Steps

1. Click **Modifications** > **Advanced Search**.
2. To define the search, right-click in the **Filter** box.
   Here is a filter that searches for device names that contain the string `LGL`.



3. In the **Expansion** field, type one or more properties to define nodes in the search results.

   For example, if you type `device`, the search results contain nodes corresponding to each device that matches the filter. If you type `bunit device`, the search results contain nodes for business unit from the records that match the filter, with sub nodes for the device values.

   Click the **Property Selection Helper** for help with selecting properties.

4. In the **Search Base** field, select where you want to apply search and view results.

   The search results node is subject to filters on nodes higher up in the hierarchy. Choose one of these options:

   - To add the search results node at the root, select **search from root**.
   - To add the search results under the node in the navigation tree that is selected in Step 1, select **search from the selected node** .

5. Click **Apply**.
   The search results appear as a report. If multiple expansion fields were specified, click a row in the report to see the sub nodes.

   To browse to the results in the report tree, click **My Reports** > **Search Results**.

   NOTE: Multiple expansion nodes are better viewed in the Tree Navigation style.

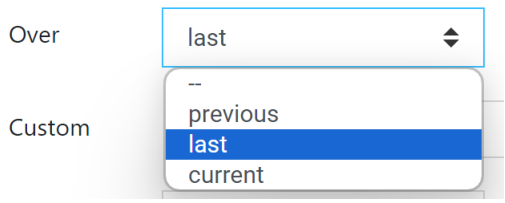
Changing Time Selection Options

Options in the Time Selection area control the time period aggregates and the span of time that is covered in a report.

Steps

1. In each report, click calender icon.
2. In the **Time Selection** area, change one or more of the following parameters:

Display values	Choose the sampling period used to collect data from the database. Sampling period is one of: • **real -time** • **1 hour** • **1 day** • **1 week** **NOTE:** Selecting **real-time** for the display value gives the same output no matter which aggregation option is selected.
Using aggregation	Choose the type of sample collected from the database. Sample type can be: • **average** • **min** • **max** • **sum** • **last** • **count**
Time Range Quick Switch	Time range defines the time that the report should cover. The range consists of a time span and a duration.
Time span	Choose the type of time span in the first drop-down list. Time span specifies when the reporting period starts and ends.

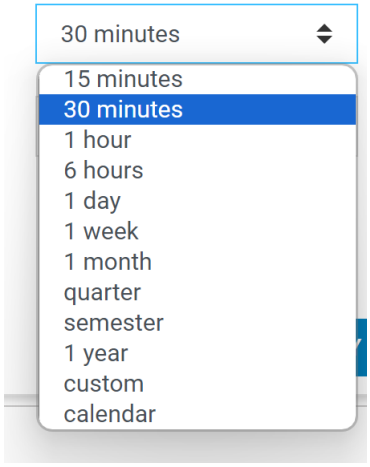


- **previous**—The reporting period starts and ends in the past.

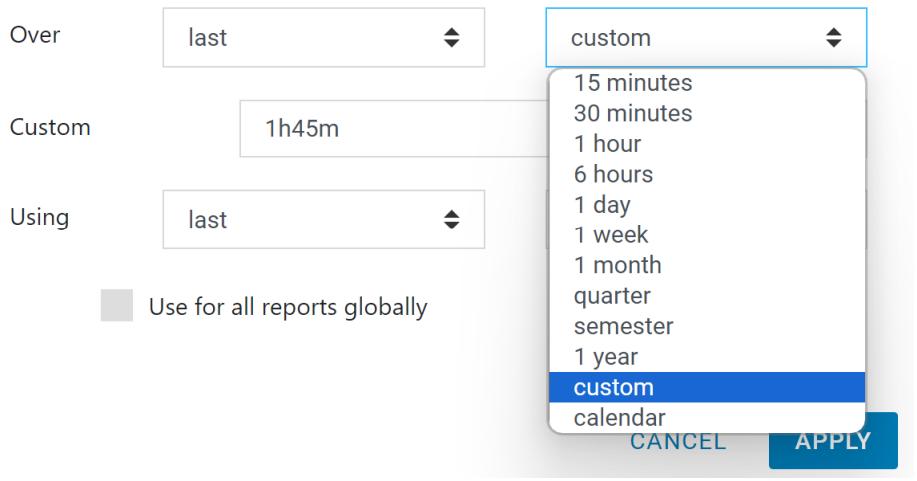
- **last**—The reporting period starts at the appropriate interval counting back from the current time, and ends at the current time.
- **current**—The reporting period starts in the past and ends in the future, and includes the current point in time. (Metrics are for a partial reporting period.)

See the table below for more information about time spans.

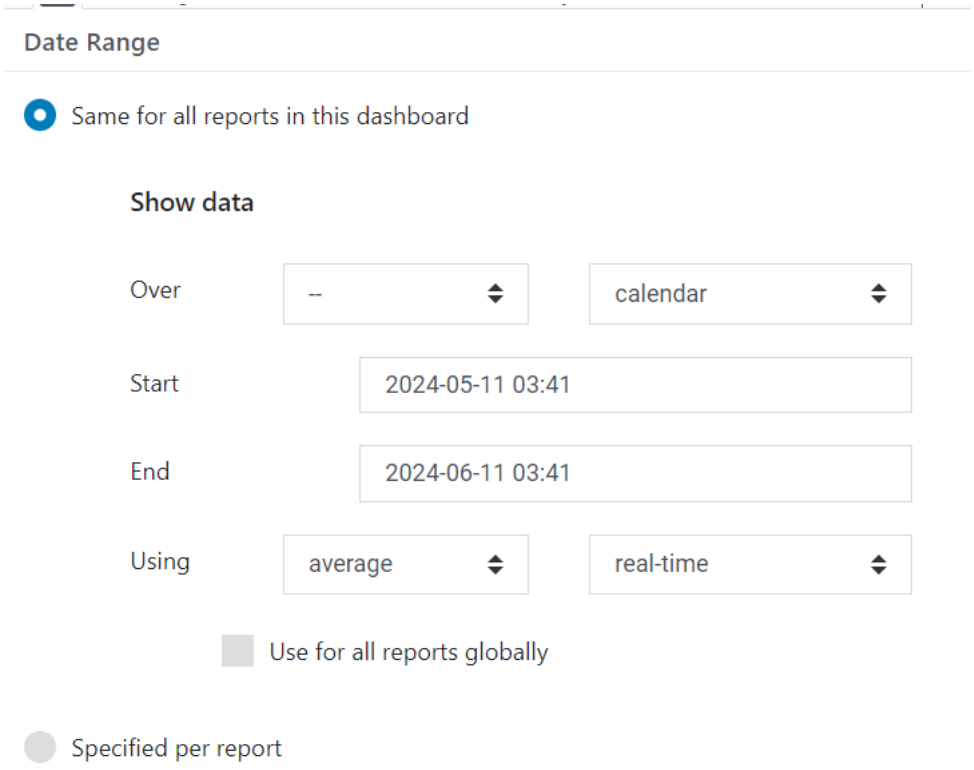
Duration Choose a duration in the second drop-down list. Duration specifies the length of the reporting period.



The **custom** option lets you specify an exact span of time, such as 1M2w (1 month and 2 weeks) or 1h45m (1 hour and 45 minutes).



The **calendar** value lets you specify an exact date or time range, as shown here:



3. Click **Apply** in the **Actions** area.

Results

Table 2. Time span examples

Time Span Value	Explanation
previous	The reporting period starts and ends in the past.
last	The reporting period starts at the appropriate interval counting back from the current time, and ends at the current time. Examples: Last hour: If the time is currently 10:15 AM, metrics are for 9:15 AM to 10:15 AM. Last week: If today is Thursday, March 12, metrics are for days Thursday to Thursday, March 5 to March 12. Last month: If today is March 12, metrics are for February 12 to March 12, inclusive.
current	The reporting period starts in the past and ends in the future, and includes the current point in time. (Metrics are for a partial reporting period.) Examples: Current hour: If the time is currently 10:15 AM, metrics are for 10:00 AM to 11:00 AM. Current week: If today is Thursday, March 12, metrics are for Monday to Sunday, March 9 to March 15, inclusive. Current month: If today is March 12, metrics are for March 1 to March 31, inclusive.

Feedback on product features

This feature is introduced in SRM for the users to provide feedback on the usage of the product and its features.

About this task

Follow the steps to provide feedback in the context of product usage.

Steps

1. Click **Feedback** .
   The **Feedback** window is displayed.
2. Enter the comments or feedback on the Dell SRM features in **Your Feedback** box.

   NOTE: This field is mandatory.

3. Click **Choose File** to upload the supporting files.

   NOTE: The file size must be less than 10 MB.

4. In **Email Address**, enter the user's email address.

   NOTE:
   - By default, the system reflects the current user's email address.
   - By default, **You may contact me for more information** check box is enabled.

5. Click **Submit**.

Results

The feedback is shared successfully.

Saving display settings

Changes to Display settings apply to the current report and current session only. Use the following methods to make the changes more permanent.

- Click **Tools** > **Store this Report**. All the changes are stored as a report under **My Reports** > **Stored Reports**. This version of the report persists across sessions, but is visible only in the user account.
- To save the changes as the default display for all users, use **Modifications** > **Edit Reports**. On the **Report Configuration** tab, look for the following fields to change the reporting periods:
  - **Default Duration**
  - **Sampling Period**
  - **Sampling Type**

Locking Time Selection settings for your session

By default, changes to the Time Selection settings apply only to the currently displayed report. You might want to lock the settings so they apply to other reports.

About this task

If you apply new **Time Selection** settings, the new settings can be applied to same for every report in the dashboard or specified per report. Applying same setting for every report can be useful, for example, to have a snapshot in time for comparing equivalent graphs for a device.

NOTE: In a report type of **mixed using defaults**, time setting changes, do not apply to the child reports. The child reports in a **mixed using defaults** report always use the default time settings in the original report definition. Dashboards are often **mixed using defaults** reports.

To lock and unlock **Time Selection** settings:

Steps

1. Click calender icon in the report.
2. Make changes to the **Time Selection** settings.
3. Check the **use for all reports globally** .
4. Click **Apply**.
5. To hide the calender menu, click outside of it.
   You can now browse other reports and retain the locked time selections.
6. To unlock the settings, click calender icon in the report and then clear the **use for all reports globally**.
7. To return the current report to its default settings, click **Revert to default report** in the **Actions** area.

Exporting a report

You can export reports into PDF, Excel, CSV, XML, SVG, PNG, or .jpg formats.

About this task

The export feature sends the contents of the currently displayed report to the selected output format.

NOTE: On a tabbed report, the export applies only to the contents of the currently displayed tab.

Steps

1. Click **Exports** .

   NOTE: If a format name is disabled, that format is not available for the currently displayed report.

2. To configure an output format:
   a. Click the icon next to the format name, if available.
   b. Complete the format-specific dialog box.

PDF	Configures page size, orientation, and layout.
Excel	Configures column layout and whether to show or hide titles, time ranges, and descriptions.
CSV	Configures column layout and whether to show or hide titles, time ranges, and descriptions. **NOTE:** Excel and CSV results are similar, but differences exist in column and title layouts.

   c. Click one of the following:
   - **Save and Export**—Save the settings on the dialog box and export the report using the settings on the dialog box. The changes pertain to all reports. They apply to your user account and persist across login sessions.
   - **Export**—Export the current report using the configuration settings but do not save the settings.

3. To export without formatting, click a format name in the list.
4. Respond to your browser's prompts to save the file in your wanted location.

Using Tools

With utilities on the Tools menu, you can use a wizard to quickly define a new report, get a report URL for referencing purposes, prepare a print-friendly page, save a snapshot of the currently displayed report, create report bookmarks, define a typical normal schedule for a report, and email a report.

Changing Report Type options

You can change some aspects of a report's presentation for the user account and current session.

Steps

1. Click **Tools** .
2. In the **Layout** area, you can change the report display:

Option	Description
Display	Controls the width of reports. • **Default display** uses a default width. • **Fixed number of reports per line** controls the width of a single report based on how many reports you set per line. Use the slider that appears to set the number of reports per line. • **Fixed width for reports** sets the width of all reports on a line. Use the slider that appears to set the width. For example, you can set a line of gauge reports so they are all small or all large.

3. Click **Apply**.

Getting the complete URL for the current report

With the complete URL of a report, you can email the link to a report or bookmark the report in your browser.

Steps

1. Click **Tools** > **Show Report URL**.
   The URL for the currently displayed report appears in a dialog box.
2. Copy the URL.

Printing a report

You can print a hard copy of a report for your records.

Steps

1. Click **Tools** > **Print-friendly page** .
   A page appears in a new tab without the navigation tree.
2. Use the print feature of the browser to print the page, and then close the tab.

Storing a snapshot of a report

You can store a point-in-time copy of a report at a mentioned time.

Steps

Click **Tools** > **Store this report**.

A snapshot of the report is stored under **Stored Reports**. When one or more stored reports are available for a node, a drop-down list is displayed after the report is generated, which gives you the option of selecting a stored report. By default, the stored reports are synchronized with nodes every hour or whenever you click **Stored Reports**.

After viewing a stored report, to browse back to the real-time data version, select the drop-down next to the report date and choose **Revert to real-time data**.

Saving a favorite report

Favorite reports are like bookmarks that give you quick access to reports you use frequently.

Steps

1. Click **Tools** > **Favorite this Report**.
2. Optionally name the report.
3. Optionally click the **Use as Login Report** option if you want this report to display when you log in.
4. Click **Save**.
   The report appears in the navigation tree under **My Reports** > **Favorite Reports**.

Displaying a favorite report at login

You can mark one of your favorite reports to automatically appear in the report pane after you log in.

Steps

1. In the navigation tree, click **My Reports** > **Favorite Reports**.
2. Expand the blue bar for the report you want to display at login.
3. Click **Use as login report**, and then **Save**.

Creating a scheduled report

Scheduled reports are generated at fixed times and saved. The saved results can be stored under My Reports, which are emailed, or analyzed by the alerting module.

Steps

1. Click **Tools** > **Schedule this Report**.
2. Type a name for the report.
3. Set the schedule for generating the report.
   When the scheduled report is generated, it queries the database for the latest data.
4. To enable the schedule, select **Active**.
   To disable the schedule, clear the **Active** selection. If required, you can enable it later. But, ensure that you have saved the scheduling and report disposition information before disabling the schedule.
5. To configure the disposition of the generated reports, use one or more of the other tabs.

Tab	Description
Storage	Store the reports under the **My Reports** node.
Email	Send the report to a list of recipients.
Alert	Send the report data to the alerting module.

6. Click one of the following:

Option	Description
Cancel	Exit the scheduled report dialog box without saving the report.
Save	Save the new scheduled report, and use the report's default time settings as configured in the report definition.
Save modified report	Save the new scheduled report, and use the time settings as configured in the Display menu.

7. To do changes or add additional dispositions, edit the scheduled report.

Store a scheduled report in Stored Reports

You can store a generated report in the **Stored Reports** node on the Console. You can send email notifications every time a new version is stored.

About this task

If you complete only the Scheduling tab and click **Save**, a stored report is the default disposition of a scheduled report. To view the stored report, browse to **My Reports** > **Stored Reports** > ***scheduled_report_name***.

Steps

1. Create a new scheduled report or edit an existing report.
2. Click the **Storage** tab.
3. Select **Store this report**.
   The checkbox is selected by default when you create a new scheduled report.
4. For **Recipients**, type the email addresses to receive notifications each time the report is generated.
   Leave this field blank if you do not want notifications.
5. Click **Save**.

Emailing a scheduled report

You can email the results of scheduled report runs to a list of recipients. You can choose one or more formats to send.

Prerequisites

For successful email messages, an administrator must configure an SMTP server.

Steps

1. Create a new scheduled report or edit an existing report.
2. Click the **Email** tab.
3. Configure the email recipients, subject, and message of the email to send.
4. For **Formats**, select one or more formats for the report, such as PDF, CSV, or an image file.
   The format types that are not applicable for the report type are grayed out.

   A blue configuration bar appears for each format selected.
5. Optionally, click a blue bar to expand it and change the export settings for the format.
6. Click **Save**.

Results

After each scheduled run of the report, an email is sent to the list of recipients, with the report in each of the selected formats included as attachments.

Send a scheduled report to a remote location

You can transfer generated report files, in one or more formats, to specified URLs.

About this task

The file names of the transferred reports are the scheduled report name that is assigned on the **Scheduling** tab with an appended date, as follows:

reportName_date.extension

Steps

1. Create a new scheduled report or edit an existing report.
2. Click the **Remote Transfer** tab.
3. Click **New Remote Location**.

4. For URL, type a well-formatted URL.
   The **?** icon next to this field contains more information and examples of acceptable URLs.

   The acceptable formats are:

   - ftp://user@host:port/directory
   - ssh://user@host:port/directory
   - smb://domain\user@host:port/directory
   - file:///directory/sub-directory/

   The files will have the name of the scheduled report followed by _DATE.
5. For **Password**, it is mandatory for SSH, SMB, and FTP methods. For local remote transfer, password is optional.
6. For **Formats**, select one or more formats to transfer, such as PDF, CSV, or an image file.
   The format types that are not applicable for the report type are disabled.

   An expandable arrow appears for each selected format.
7. Optionally, click an arrow to expand a format type and change the export settings that are used by the format.
8. Click **Save**.

Remote Transfer through FTP

NOTE: For FTP SRM vAPP fresh and upgrade, run the following commands in the path /etc/firewalld/zones :

1. firewall-cmd --permanent --zone=trusted --add-source=<ip-of-ftp>
2. firewall-cmd --reload

Once the command is run, a success message is displayed and a trusted.xml file is generated.

NOTE: For SRM vAPP upgrade environment, the above steps must be re-applied post the SRM latest upgrade.

Remote Transfer through SMB

In SRM, for executing file transfer using SMB Protocol, samba installation in SUSE, RHEL OS is required.

Remote Transfer through Local

For local remote transfer, password is optional.

Send a scheduled report to the alerting module

You can send report data to the alerting module for analysis. Based on the report data, the alerting module can then generate alerts or other actions.

Prerequisites

Based on the report data, you can generate alerts or notifications. For which, an alert definition that is defined in the alerting module, is required with these components:

- Filter - Identifies the report name to process. The <name> element in the XML file identifies the report name.
- Conditions, comparators, and so on. — Identifies the metrics to analyze and the conditions that cause actions. The <th> elements in the XML file identify metric names.
- Actions — Defines the actions, such as writing to a log, sending an email, sending HTTP/HTTPS request, or generating an SNMP alert message.

The alert definition must be enabled to process the data.

About this task

Use this tab to send the report data, in the form of an XML file, to the alerting module.

Steps

1. Create a new scheduled report or edit an existing one.
2. Click the **Alert** tab.
3. To start sending data to the alerting module, select the alerting module.
   Clear the alerting module selection if you no longer require to send data to it.
4. Click **Save**.

Results

Every time the report is generated, an XML file containing the data is forwarded to the alerting module. If there is no enabled alert definition to process the data, nothing else happens on the alerting side.

Using advanced settings

In typical situations, you do not need to use this tab.

About this task

The system uses default settings to manage memory and resources for report generation. In a few unusual circumstances, those default settings might not be adequate. This tab provides a way to override the system defaults for reports that need additional resources.

If a scheduled report is not completing as expected or is consuming excessive resources that you want to limit, you can edit the scheduled report and adjust the advanced settings.

Steps

1. Click **My Reports** > **Scheduled Reports** > ***scheduled_report_name***.
2. Click the **Advanced Settings** tab.
3. To determine whether to change the setting, click the **?** icon next to each field.
4. Click **Save**.

Edit scheduled report settings

You can change the settings on a saved scheduled report.

Steps

1. Click **My Reports** > **Scheduled Reports** > ***scheduled_report_name***.
2. Change any setting on any tab.
3. Click **Save** on any tab.

Launching a scheduled report now

You can launch a scheduled report at any time.

Steps

1. In the report tree:

Navigation Style	Description
Tree	Go to **My Reports** > **Scheduled Reports**.
Icon	Go to **My Reports** > **Scheduled Reports** >  . The  appears in the menu to the right of **Scheduled Reports**.

2. In the right pane, right-click the report that you want to run, and select **Launch now**.
   Watch the **Status** column for notification that the report is finished running.

Emailing a report to yourself

You can send a PDF of the currently displayed report to your email address.

Prerequisites

1. To add or verify your email address, click **Settings** in the banner. On the **User** tab, complete the **Email Address** field.
2. For successful email messages, an administrator must configure an SMTP server.

Steps

To send a PDF of the currently displayed report to your email address specified in user settings, click **Tools** > **E-mail me this Report**.

Displaying a report in a new browser window

You can view a report by itself in a browser window.

Steps

1. Click **Tools**.
2. Click **View in Full Page**.

Results

The report appears in a new browser.

Report headers

The title area of a report contains useful tools, links, and information.

Table 3. Report headers

Line	Short Description	Explanation
1	Breadcrumb line	Shows the report path of the current report Some components in the path are active links.
2	Report title	Shows the last two components of the report path.
3	Date/time span	Shows the date and time span being reported on, followed by the date/time settings that control the time span. Default date/time settings are specified in the report definition. You can change the settings for the user session on the **Display** menu.

The column headers in table reports also provide useful tools and information.

Table 4. Tools and information

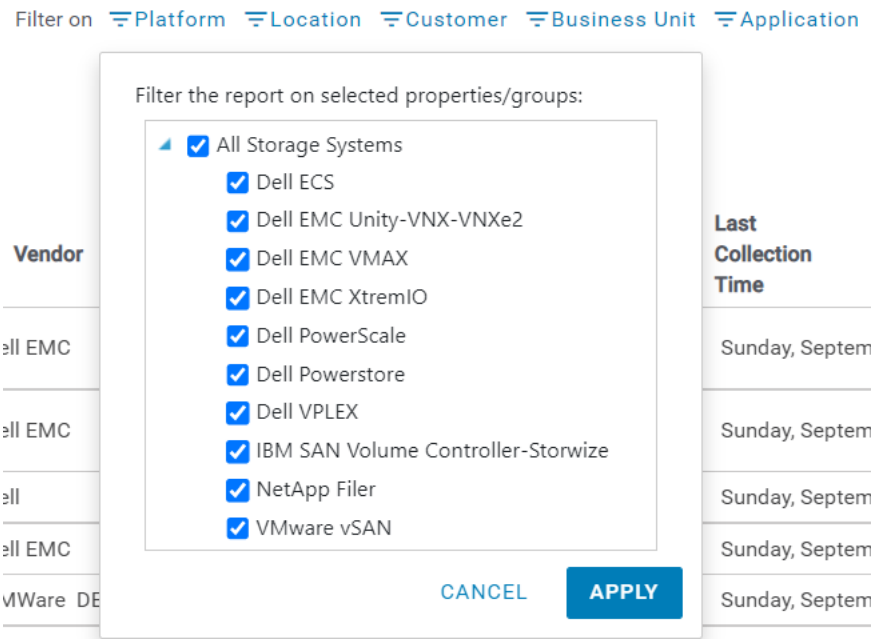
Tool	Explanation
	Filters the report by the values in the column.
	Indicates that the report is sorted by column. Indicates whether the sort order. To perform a sort by column contents, click the header. Click the header again to reverse the sort.
Tooltip	Hover the cursor over a column heading to show a column description. You can customize this description in **Modifications** > **Edit Reports**.

Filtering a report using group filters

Group filters appear across the top of the report. They present a dialog box of check boxes that let you select multiple values to filter on.

About this task

The dialog box lists only the values that are relevant to the current report. The list reflects the database and is further limited by the report filter in the report definition. For example, the following filter on the Platform property lists only the platforms that are being monitored at the installation and are relevant to the report definition:



Note the following information about group filters:

- If there are no values in a filter dialog box, the installation is not populating that property, or no values apply to the current report.
- In a table report, the values that appear in a group filter dialog box are not limited by column filters that might be in effect on the table. For example, a **Situations to Watch** report might contain a column filter that eliminates rows that are based on values in that column. In that way, a **Situations to Watch** report typically contains just a few rows. The group filter dialog box, however, continues to list all values relevant to the entire report, not just to the displayed rows.
- A group filter can be defined for any database property using features in EDIT MODE.
  - When a group filter is defined on a data enrichment property that is maintained in the **Administration** > **CONFIG** > **Groups & Tags** > **Manage Groups** module, the values in the dialog box are the group names as defined under Groups Management. Some groups have predefined names. Other groups define a Default group, and expect each installation to create additional groups.
  - When a group filter is defined on a collected property, the values in the dialog box are the property values from the database.

Use the following procedure to set group filter values.

Steps

1. Click the icon for a group filter.

   A dialog box of values appears.
2. Select one or more values to include in the report, and click **Apply**.
   The icon for the applied filter changes color to indicate that the filter is active.

   The report redisplays, including only the data for the values you specified in the filter. For example:

   - In a table report, the filter eliminates rows from the table.
   - In a consolidated bar chart, the filter eliminates data from the metric calculations.
3. If multiple filters are available, optionally apply additional filters to further limit the displayed results.

4. To cancel a filter, click the filter icon and select **Clear**.

Working with personal views

You can create your own personal dashboards of favorite reports for you.

Creating a personal view of selected reports

A personal view is a dashboard of several of your favorite reports.

About this task

When you create your first personal view, a new node is created under My Reports. The new node is also named My Reports. You can define more than one personal view.

Steps

1. Mouse over the upper-right corner of a report.
   A set of icons appears.
2. Click the pin icon.
3. If you did not yet create a personal view, click **New Personal View** to create one. Otherwise, select the view in which to add the report.
4. To view your personal view, click **My Reports** > **My Reports** > ***personal_view_name*** in the navigation tree.

Comparing reports in a Personal View

Based on an existing pinned report, you can create a report, for comparison purposes.

Steps

1. Select the pinned report in a **Personal View**.
2. Click **Compare to new report** from the gear icon.
3. Type a name for the new report.
4. Make the required changes.
5. Click **Ok**.

Editing a report context in a Personal View

You can edit an existing pinned report for customization purposes. It also includes the context, which is the filter properties that are applied to a report's parent and linked node.

Steps

1. Select the pinned report in a **Personal View**.
2. Click **Report context** from the gear icon.
3. Make the required changes.
4. Click **Ok**.

Working with dashboards

A dashboard is a collection of reports that all display on the same page. You can rearrange and resize the reports in a dashboard.

Dragging a report to a new position

You can move a report to a different position in the report pane.

Steps

1. Mouse over the upper right corner of a report.
   A set of icons appear.
2. Click and hold the **Drag this element to another place** icon and move the report.

Arranging reports in the report pane

By default, multiple reports are stacked one on top of one another. You can display multiple reports side by side.

Steps

1. Click **Tools**.
2. In the **Layout (Fixed number of reports)**, select how many reports to display per line.
3. Click **Apply**.

Creating a Dashboard

You can create a dashboard through **Modifications**.

Prerequisites

You should have read and write permission to create a dashboard.

Steps

1. To create a dashboard, click **Modifications** > **New Dashboard**.
2. Provide a name and description for the dashboard and click **Create**.
   The new dashboard appears under **My Reports** > **My Dashboard**.

Resizing a report

You can adjust the width and height of a report to accommodate the display by using the report resize icons.

Steps

1. Mouse over the upper right corner of a report.
   A set of icons appear.
2. Click a resize icon.
3. To save the change, click **save**.

Sharing a Report

You can create a report and publish it to share the report across users through **Shared Dashboards**.

Prerequisites

To share a report, you should have Storage Administrator Users role and set Default Access for All Templates to read and write.

Steps

1. Create a dashboard. To create a dashboard, click **Modifications** > **New Dashboard**.
2. Provide a name and description for the dashboard and click **Create**.
   The new dashboard appears under **My Reports** > **My Dashboard**.
3. Pin a report to the newly created dashboard. To pin a report, hover over the upper-right corner of a report. A set of icons appears. Click the pin icon.
   The **New Report** page appears. It provides options to pin the report to an existing dashboard or create a new dashboard.
4. Select the existing dashboard or create a new dashboard to pin the report.
5. Publish the dashboard to share the pinned reports across the users. To publish a report, browse to **My Report** > **My Dashboards** . Select the dashboard which you want to share. Click **Modifications** and click **Publish Dashboard**.
   The shared dashboard appears under **Shared Dashboards**.

Working with table reports

You can customize table reports while in Browse Mode.

Applying filters to table columns

Filtering on a table column redisplays the report, showing only the rows that match the filter condition.

About this task

The filter icon () in a column header indicates that the column can be filtered. Columns with metrics, dates, and times cannot be filtered.

Steps

1. Click the  icon in the column header.
2. In the text box that appears, type the filter value using any of these methods:

   NOTE: The values are case-insensitive.

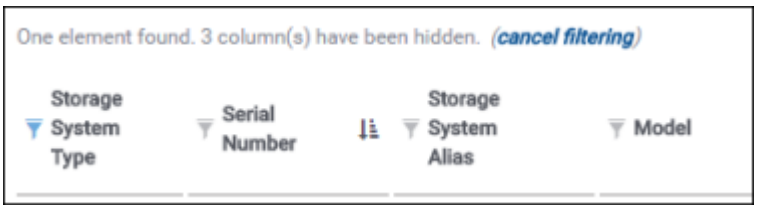
   - Type a valid value for the column.
   - Type a space, wait for the system to show suggestions, and select from the list.
   - Start typing a value, wait for the system to show suggestions that start with the entry, and select from the list.
   - Type a value containing wildcards. Supported wildcards are:

%	Matches any character any number of times. For example: ○ **`VPLEX%`** matches any value that starts with VPLEX . ○ **`%04`** matches any value that ends with 04. ○ **`%Unified%`** matches any value that contains the characters Unified in the beginning, middle, or end.
*	Same as %.
_	Matches any one character. For example: **`__.%.%.%`** matches any IP address whose first component is 2 digits.

3. Press **Enter**.
   The report redisplays, showing only those rows with values that match the filter.

   Also, the following visual cues remind you that a filter is in effect:

   - The filter icon for the filtered column is blue.
   - The phrase **cancel filtering** appears in the sentence above the table.



4. To revert to the original report, click **cancel filtering**.

Sorting on a table column

You can change the sort order of a table report. The column headers indicate the sort columns.

About this task

There are two ways to change the sort order of a table report.

Temporary change	To sort the table by that column, click the column header.
Customize table columns	To set a more permanent sort and to specify more than one sort column, use the **Customize Table Columns** icon above the upper right corner of the table.

For a temporary sort change, use this procedure:

Steps

1. Click a column header.

   Based on the column you requested, the table redisplays in resorted order. The icon appears in the column header, indicating that the report is sorted by this column.
2. To reverse the sort order in that column, click the icon.
3. To sort by a different column, click the new column header.
   The report is resorted based on the new sort request.

Show, hide, rearrange, and sort table columns

The **Customize Table Columns** icon lets you make custom changes to a table report while still in Browse mode.

About this task

Show or hide columns	You can customize a report by hiding unwanted columns. Some reports define hidden columns. For example, many reports define columns for the business unit, customer, and location data enrichment fields, but hide the columns by default. If the installation defines values and data enrichment rules for one or all of those optional fields, those columns become meaningful.
Rearrange columns	You can move columns to appear in the preferred order.
Sort	You can override the default sort order that is defined for a table. You can specify one or multiple columns to use for sorting.

Steps

1. Click **Customize Table Columns**, located in the menu that appears when you hover the cursor over the upper right corner of the table.
   The **Table Customization** dialog box appears.
2. To change the order of columns in the table, drag column names up or down in the **Displayed Columns** list.
3. To show or hide columns in the table, choose one of the following:

Option	Description
Display the column	The column is always displayed.

Option	Description
Hide the column if it is empty	The column is hidden if its cells on the current report page are all empty. With this option, a sparsely populated column might appear on one page and be hidden on the next page.
Never display the column	The column is always hidden.

NOTE: These options might not always be available. The underlying report definition controls whether users can show or hide a column.

4. To sort the table (based on the values in one or more columns):
   a. Drag the columns to use for sorting to the **Sorted Columns** list.
      Drag a column into the sorted columns box, not the white space below it.
   b. For each sorted column, select **Ascending** or **Descending**.
   c. Drag to rearrange the sorted columns according to the sort order needed.
5. Click one of the following:

Button	Description
Apply	Apply changes on the report until it expires
Save and Apply	Apply changes and save permanently (until you save other changes)
Revert to default report	Cancel changes and revert to the report as defined in Edit mode
Revert to saved customization	Return to values saved with **Save and Apply**

Using the Actions Menu for performing actions on a report

To display an Actions Menu, right-click a table cell or icon. The selections on the menu depend on the current report.

Steps

1. Right-click a report table cell or icon.
   Depending on the report, the Actions Menu appears containing one or more actions that you can take on the data in the row.
   NOTE: Not all tables have Action Menus that are associated with them.
2. Select an action from the menu.

Working with graphical reports

You can customize graphical reports while still in Browse Mode.

Toggling values in graphs

When metrics appear in the legend, you can toggle their display on the graph.

Steps

1. Click the metric in the legend that you do not want displayed.
2. To display the remaining metrics, click **Apply**.

Setting upper and lower bounds to graphs

You can change the displayed range of values for a graph.

Steps

1. In the **Lower Bound** field, type the lowest value to display.

2. In the **Upper Bound** field, type the highest value to display.
3. Click **Apply**.

Reverting to the original bounds of a graph

If you have changed the bounds of a graph, use this procedure to revert to the original bounds.

Steps

1. In the **Lower Bound** field, delete the value.
2. In the **Upper Bound** field, delete the value.
3. Click **Apply**.

Changing the appearance of graphs

You can customize the curve, width, marker, and color of graph metrics.

Steps

1. Display a graph.
2. Click the **Settings** > **Customization Graph** icon.
3. Change the curve, width, marker, and color for the metric.
4. Click **Ok**.

Displaying detailed graph data in a popup

With dynamic graphs, you can hover over a graph metric to display details about a selected point.

Steps

1. Display a graph.
2. In the **Report Type** area, select the type of graph.
3. Hover over the metric to display the time and value of a selected point.

Zooming in on graph data

With dynamic charts, you can view graph details by enlarging an area of the graph.

Steps

1. Click **Display**.
2. In the **Report Type** area, click **Rendering**.
3. Select **dynamic charts**.
4. Click **Apply**.
5. Use the mouse to select an area of the graph.
   The graph zooms in to display the selected area.

Zooming in on data while displaying the complete time range

With dynamic charts, you can zoom in on a period of time while also displaying the complete time range of the report.

Steps

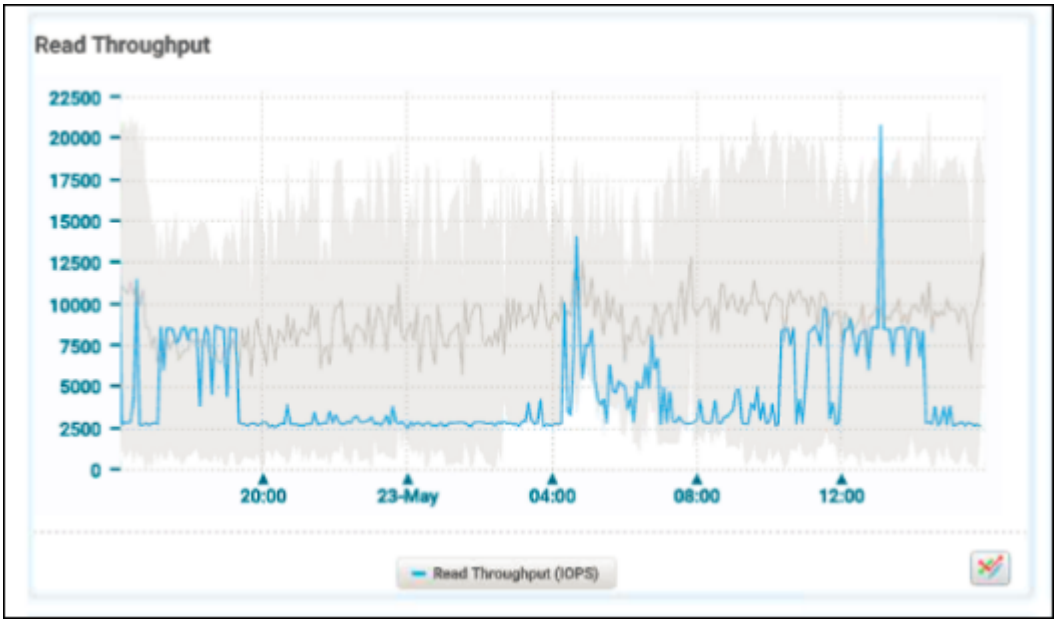
1. Click **Display**.
2. In the **Report Type** area, click **Rendering**.
3. Select **dynamic charts**.

4. Click **Apply**.
5. Click the magnifying glass icon.
   A smaller graph is displayed.
6. Use the mouse to select an area of the smaller graph.
   The graph zooms in to display the selected area.

Reading baseline reports

Baseline reports show performance information about a single metric over a 24-hour period. The baseline helps you understand whether the current value of the metric is normal or a deviation that indicates a problem.

The following example baseline shows current and baseline values over time for a read throughput metric.



A baseline report contains the following information:

- Blue line—Shows the value of the metric over the last 24 hours.
- Gray line—Shows the average of the metric over the past 4 weeks, for the same day of the week and hours represented by the blue line.
- Shaded gray area—Shows the range of all values that are collected over the last 4 weeks for the same day of the week and hours represented by the blue line.

A baseline report needs more than 1 week of data before it can display the gray line representing the baseline average. When less than 1 week's values are available, only the blue line showing values for the last 24 hours appear on the report. A baseline is fully functional when 4 or more weeks of data are available.

Baselines are useful for interpreting performance metrics. The baseline lets you compare the current value of a metric to the average value over time. A deviation from the average stands out visually, drawing the attention of the user. You can also notice trends in the performance over time.

Working with topology reports

Topology reports show relationships between components in the infrastructure. You can analyze from a topology map to detailed reports about the components.

Topology reports

A topology report displays a graphical representation of the configuration items in the infrastructure and how they are linked together.

Topology reports depend on successful discovery of configuration items. Only discovered configuration items appear in the report.

A topology report consists of connected nodes. A node represents a configuration item.

- To analyze the home report or other available details for that node below the topology map, click a node icon.
- To expand the topology to show more detail, click the **+** symbol on a node icon.
- To contract an expanded node, click the **-** symbol in the lower-left corner.
- To display a tooltip, hover the cursor over any node or port symbol. Tooltips show details such as model names, utilization metrics, or port numbers.

Finding and filtering nodes on topology reports

You can find and filter specific nodes on a topology report.

Steps

1. On a storage system mixed report, hover the cursor over the **Topology Map** title.
   A text box and several buttons appear.
2. To find a node on the topology report, type the beginning of the node name in the text box and click **Find a node** (magnifying glass).
3. To restrict the map to show one node only, type the beginning of the node name in the text box and click **Filter nodes** (funnel).

Metric Reports

A metric is data unit that you can regularly poll from a given instance out of a given object, device, service, or system. It is sometimes compared to a Key Performance Indicator (KPI). A metric value is always a numerical value and is stored in the time series databases.

About this task

A property is used to describe a metric. You can better describe metrics by adding more properties, and even create your own data property names and definitions. Every metric is collected with their own set of properties. The model is unlimited and can be used to describe any object.

Dell SRM gathers many types of data from a storage infrastructure, depending on the installed options and SolutionPacks. In general, reports are populated by the following types of data:

- Capacity data provides the status of volume, sizing, and capacity utilization statistics, is considered as a measurement type of data collected, and based on a regular schedule.
- Performance data provides the instantaneous activity of an indicator, such as throughput rate, response time, IOPS, and CPU usage.
- Event data is composed of notifications that are received from a managed system. The event data differs in nature from a measurement that is collected at a regular scheduled. Examples of event data include: CPU utilization warning, high memory consumption, and disk running out of space.
- Metadata is more commonly known as properties. These refer to a set of associated data that is used to define the collected data (Capacity, Performance, and Event). It can refer to the system name, element name, version number, location, and many more.

To access metric reports:

Steps

1. Log in to SRM Admin UI.
2. Browse to **System Admin** > **System Operations** > **Data Model**.

Results

The report lists the unique metrics available in Database based on the below data model:

```
SRM-DATA-MODEL --+-- Table
                 |
                 +--+ Expand on source
                    |
                    +--+ Expand on devtype
                       |
                       +--+ Expand on parttype
                       |  |
                       |  +--+ Expand on datagrp
                       |     |
                       |     +--+ Expand on name (metric Table which contains all the properties attached for this metric)
                       |
                       +--+ no parttype
                          |
                          +--+ Expand on datagrp
                             |
                             +--+ Expand on name (metric Table which contains all the properties attached for this metric)
```

Editing reports

Use Edit mode to create reports, edit existing reports, and customize the report tree.

The user account must have appropriate permissions to enter into the Edit mode.

To enter into the Edit mode, click **Modifications**  > **Edit Reports**. Although you can browse to different reports from Edit mode, it is easier to browse to the report you want to edit first.

Changes that you save in Edit mode are visible to all users, unless the changes are made under the **My Reports** node.

About the Edit mode interface

The interface changes in Edit mode, providing ways to change both the current displayed report and the report navigation tree.

Report Navigation	The report navigation column on the left changes into a tree of nodes and displays a set of icons across the top for editing the tree. With the icons, you can add a report to the tree, copy and paste a report to a different location in the tree, or delete a report.
Report window	The reporting window on the right changes and displays a set of tabs that define all attributes of the current report. To change the report definition, change settings in the tabs.

Report tree tools

The report tree tools are icons that appear above the report navigation tree in Edit mode. The icons provide report tree management features, such as creating a report, copying and pasting reports to another location in the tree, and deleting reports.

Table 5. Report tree tools

Icon	Description
 Create a new report	Creates a report node as a child of the selected one. The node is called New Report and can be customized.
 Cut the selected report	Cuts a report node to be pasted elsewhere in the tree. After you paste it, the report node is deleted from its original location.
 Copy the selected report	Copies a report node and its children to be pasted elsewhere in the tree. Although the report node and its children appear in its original and new location, copied report nodes are not linked in any way.

Table 5. Report tree tools (continued)

Icon	Description
	Changes that are made to a copy are not reflected in the original report. Use the Link tool to create shortcuts.
Paste as child report	Pastes a copied or cut report node.
Paste as a link	Creates a link to a previously copied report node. A linked node is not a copy of the original report node, but a reference to it. Any changes that are made to the original report node are applied to the link node. Be careful because the link is broken if you remove, move, or alter the tree structure around the linked node. A broken link has a warning icon.
 Delete the selected report	Deletes the selected report node and all of its children. This action cannot be reverted.

Report editing tabs

The report editing tabs appear in the reporting window in Edit mode.

Each tab contains parameters that are used to generate the report. These parameters define the report presentation, the report contents, and how the report interacts with other reports.

Table 6. Edit mode tabs

Tab	Description
Filtering & Expansion	Defines the basic properties of the report node, what are reported on, and how the data fields are expanded within the report.
Report Configuration	Defines the core settings for the report, the report type, the period of the report, and level of data aggregation. The report type (such as table, graph, heat map, mixed) determines the parameters that appear on the Report Details tab.
Report Details	Defines the detailed appearance and contents of the report. The parameters on this tab are specific to the report type. For a table, it is where you define all of the attributes of columns in the table. For a graph, it is where you define the attributes of the axes.
Formula	Manages formulas that are applied to the node.
Interactivity	Controls the interaction between reports.
Pre-generation	Generates reports on a predetermined schedule.

Using My Reports as a workspace

The **My Reports** node provides a workspace for creating reports, editing reports, and testing changes.

About this task

Changes that you save while in Edit Mode is visible to all users, unless the changes are made in the **My Reports** node.

NOTE: Dell Technologies does not recommend to directly update the global reports.

Use any of the following methods to move a report into the **My Reports** node.

Steps

1. Pin the report to a personal view.
2. Copy and paste a report from the main tree into the **My Reports** node. Do not use a link if you want to keep your copy separate from the copy in the main report tree.

To make your changes visible to all users, coordinate with an administrator to prevent multiple users from simultaneously editing the same template. Administrators might have you:

- Edit directly.
- Copy and paste.
- Extract the report as a template, add the template to a ReportPack, and hook the ReportPack to nodes in the main report tree. This method provides the best way to control the hooks and manage the tree hierarchy.

Simultaneous edits by multiple users

If more than one user has write access to reports outside of **My Reports**, then it is possible for two users to edit report templates simultaneously, affecting each other's changes.

Templates or ReportPacks can become corrupted as a result. Only when the first user is finished editing, saves the changes, and logs out of the session can another user safely edit a report affecting the same template.

The following permission controls and change management procedures are recommended to avoid potential problems with multiple users affecting the same template:

1. Write access to global report templates should be assigned to a limited number of Administrator users. Assign this limited permission on **Administration** > **Users & Security** > **Users & Roles** > **Manage Roles** > **New Role** > **Template Access**. Most users should have read-only access to templates.
2. Instruct users to edit reports only under **My Reports**. It is always safe because the changes are visible to only the current user and templates are not affected. No special permission is required.
3. Implement an internal change management process for users to submit requests to an Admin requesting changes to the global reports.
4. Always make a backup of the report tree before you begin making major changes to reports or the report tree outside of the **My Reports** node. You can create a report tree backup on **Settings** > **Custom Reports** > **download a backup**.

Workflow for creating reports

When creating a report, decide first on the metrics to include, and then set the report type and the report details.

The workflow for creating reports is as follows:

1. Enter into the Edit mode.
2. Using the tools at the top of the report navigation tree, create the node for the new report in the report tree. There are two basic approaches:
   - Copy an existing report to use as the basis for the new report.
   - Create a report from scratch.

   Either way, the remaining part of the workflow is the same.
3. Using the **Filtering and Expansion** tab, select the metrics to display in the report. Since the database may contain thousands of metrics, you must use filtering and expansion to narrow the metrics to display in a report.
4. Using the **Report Configuration** tab, set the type of report you want, such as a table or graph, and specify the period and aggregation to use in a report.
5. Depending on the report type that is selected, the **Report Details: <*Report Type*>** tab appears where you set the parameters for presenting information in the report.
6. Using the **Formula** tab, you can apply formulas to any node of the tree to perform advanced computations on any number of values.

Related concepts

Filtering and expansion tab
Report Configuration tab
Report Details tabs
Formula tab

Workflow for creating a mixed report

Mixed reports let you combine several reports in a single report page or apply an overlay that displays events on top of a typical graph.

About this task

The following types of mixed reports are supported.

Mixed report	Uses the report type from any child node but retains the selected period and aggregation from the selected node. This report is compatible with the mixed defaults report.
Mixed using defaults	Uses the default report settings from any child node. This report is compatible with the mixed report.
Overlay	Displays events that are superimposed on top of a graph report and a child table report listing a superset of events that are plotted in the overlays.
Tab report	Shows a tabbed interface for navigating to reports.

A mixed report uses the child nodes in the report tree as the source of the reports to include. To create nodes, use the report tree tools to add a report or copy and paste reports.

Steps

1. Create a node in the report tree for the mixed report.
2. Under the new node, create child nodes for the reports in the mixed report.
3. In the report tree, select the parent node.
   The configuration tabs for that report appear in the report window.
4. On the **Report Configuration** tab, select the type of mixed report.
   Select **mixed**, **mixed using defaults**, **overlay**, or **tab**.
5. On the **Filtering & Expansion** tab, expand the **Child Node Ordering** section.
   The child nodes from the report tree are automatically listed there.
6. Edit the ordering of the nodes, if needed.
7. Click **Save**.
8. To see the shell of the mixed report, click **Browse mode**.
   For example, if you selected a tab report, you can see the tabs across the mixed report page.
9. Click **Edit mode** and complete the configuration for the mixed report and all of its child reports.

Filtering and expansion tab

Filtering and expansion affect the report node properties. These properties are crucial to every node and report type because they determine what data is retrieved from the database.

The name of the report node, the filter that is used for metric selection, and some advanced settings that you can adjust are on the **Filtering and Expansion** tab.

Filtering

The filter of a node is an expression that is used to select the metrics that make up the basic content of the report. Because the filter determines the report's dataset, it is a vital part of the overall report configuration. To set the filter correctly, you must know properties and its meaning. The collectors collect these properties. There are several ways to create a filter. If you know what properties and values you want to set, you can manually edit a filter. You can also use the **Filter Wizard** to help you define a filter.

Expansion

The expansion setting is central to how the report tree works. It enables the quick generation of report trees, expanding its branches as it transforms individual nodes into multiple nodes. Expansion can automatically create and delete nodes as they appear or disappear in the database.

Related concepts

Workflow for creating reports
Report Configuration tab
Report Details tabs
Formula tab

Related references

Syntax for filter expressions

Related tasks

Defining the report metrics using a filter
Specifying the expansion properties for sub nodes
Configuring the advanced parameters for a report node
Setting the child node ordering

Defining the report metrics using a filter

A filter narrows the scope of data to display in a report. The **Filter Wizard** helps you build filters. You can either edit the filter expressions that are already created or build your own expressions.

Steps

1. In Edit mode, click the **Filtering & Expansion** tab.
2. In **Filter**, right-click **<any command>** > **Refine** > **using a wizard**.
   The **Filter Wizard** helps you build a filter to narrow the scope of data to display. The wizard can help you build complex filters that use logical operators.
3. Type the name of a property.
   For example, typing **`device`** causes the **Filter Wizard** to display a list of known devices based on the data that are stored in the database.
4. Select a property value.
   Each property has a value. For example, the value of the device property is the device name.
5. In **Use the filter of this node for**, specify how to use the filter.
6. In **Display Policy**, select how you want to display nodes.
7. Click **Save**.

Related concepts

Filtering and expansion tab
Complex node expansions
Filtering and expansion parameters

Related references

Syntax for filter expressions

Syntax for filter expressions

You can build personal filter expressions using predicates and operators that can be combined by parenthesis. Before creating personal filter expressions, practice with the Filter Wizard.

Predicates

Predicate	Description
property='pattern'	Selects a variable based on a pattern. This pattern is a string that can contain SQL wildcards, such as the percent sign (%) and underscore (_).
property='value'	Selects a variable with the exact value match.
property	Selects only the variable of the specified property.
#<database type>-<database name>:id	Selects the variable with the ID in the specified database. When using a cache group in the context of the APG-Property-Store, the database name is the cache group name. For example: `#APG-DB:ALL` For events, use the name of the corresponding resource in the APG.xml file with the FLOW-keyword. For example: `RPE2:ALL`
#<database type>-<database name>:ALL	Selects every variable in the specified database. For example: `#APG-DB:ALL`
#<database type>:ALL	Selects every variable in the specified database type. For example: `#APG:ALL`
*	Indicates no filter is applied and everything in the database is available for filtering.

Operators

Operation	Operator
AND	&
OR	| (pipe)
NOT	!
Is	=
Strictly is	==

Guidelines

Follow these guidelines when building and editing filter expressions:

- Enclose property values in single quotes. For example: `devtype=='Router'`
- Use the AND or OR operators to search for two or more property values. For example: `devtype=='Router' & parttype=='interface'`
- Use parenthesis to enclose predicates and operators. For example: `device=='Router_A' & (parttype=='Interface' | parttype=='Port')`

Related concepts

Filtering and expansion tab
Complex node expansions
Filtering and expansion parameters

Related tasks

Defining the report metrics using a filter
Specifying the expansion properties for sub nodes
Configuring the advanced parameters for a report node

Setting the child node ordering

Specifying the expansion properties for sub nodes

Based on the properties you select, expansion dynamically creates sub nodes under a report. When a node expands, the node transforms itself from a single node into as many nodes as there are matches of the specified property name.

About this task

You set expansion in Edit mode and display the expanded nodes in Browse mode.

Steps

1. In Edit mode, click the **Filtering & Expansion** tab.
2. Expand **Expansion**, and select **Properties** from **Expand On** drop-down list.
3. Click **Add a Property**.
   The **Property Selection Helper** contains one or more tabs of properties.
4. Select one or multiple properties from the tabs.
   The properties selected display in the **Selected Properties** field.
5. Click **OK**.

Related concepts

Filtering and expansion tab
Complex node expansions
Filtering and expansion parameters

Related references

Syntax for filter expressions

Complex node expansions

Complex expansions perform calculations within the context of an expansion.

With complex node expansions, you can:

- Separate properties, each having a list of values.
- Based on matching criteria group and remove nodes.
- Remove filters that are applied to parent nodes.

Complex expansion types

You create complex expansions using the following expansion types:

- sql
- regex
- dual-regex
- split
- hide
- in-list

Based on a subpart of a property value, the expansion types create groups.

Expansions use pattern matching and transformations. The syntax for complex expansions is: `property<type=complex expansion type;param1=value1;param2=value2;...>`, where the expansion type is a string to identify which complex expansion to use. You cannot use the semicolon (;) or greater than (>) characters in a parameter value.

Combined Regex/Apg Pattern Match (type=sql)

Based on a pattern, this expansion uses two typical expressions and transformations to create groups. It is similar to the Dual Regex Pattern Match except that the values are matched in groups using a filter instead of a typical expression. Since this expansion is quicker than the others, use this one whenever possible.

This expansion uses these parameters:

value-match	The first typical expression that is matched against the property values.
value-replace	The replacement string that is applied to the previously matched values. The result of this replacement is the group name.
group-match	A typical expression that is matched against the previously generated group names.
group-replace-sql	A replacement string to create a pattern (with % and _ wildcards) to match property values to include in this group.

The expansion occurs in these phases:

- For each distinct property value, tries to match the property value with value-match. If the value matches, then replaces it using the replacement string value-replace. The resulting value creates a node in the tree.
- For each node created in the first phase, applies a transformation on its name using the typical expression group-match and replacement string `group-replace-sql`. This transformation creates a valid pattern that is applied to the created node as `property='pattern'`.

For example, if there are three devices in a network, the property device is expanded in three values: dev-w4n-montreal, router-w4n-montreal, server-w4n-toronto. To use the location to group devices, do the following:

- Create location groups from the device names with this expression: `^.*-w4n-(.*)$ → $1`
- To match the groups montreal and toronto, use a matching device. A matching device is a device whose name ends with the group name, which is the city name in this example. For the montreal group, the matching filter is `'device=%-montreal'`.
- The expansion result is: `device<type=sql;value-match=^.*-w4n-(.*)$;value-replace=$1;group-match=^(.*)$;group-replace-sql=%-$1>`

Regex Pattern Match (type=regex)

This expansion type is a simplified version of the two previous types. Most of the time, the values that are used to create group names belong to those groups, and only to those groups. This is what the Regex Pattern Match does, skipping the post matching phases of the Dual Regex Pattern Match and the Combined Regex/Pattern Match.

This expansion uses these parameters:

value-match	The first typical expression that is matched against the property values.
value-replace	The replacement string that is applied to the previously matched values. The result of this replacement is the group name.

For example, if there are three devices in a network, that expands the property device into three values: dev-w4n-montreal, router-w4n-montreal, and server-w4n-toronto. To use the location to group devices, do the following:

The expansion occurs in these phases:

- For each distinct property value, tries to match the property value with value-match. If the value matches, then replaces it using the replacement string value-replace.
- The resulting value creates a node in the tree. The value that is transformed into the group name is automatically included in the group.
- The expansion result is: `device<type=regex;value-match=^.*-w4n-(.*)$;value-replace=$1>`

Dual Regex Pattern Match (type=dual-regex)

This expansion uses these parameters:

value-match	The first typical expression matched against the property values.

value-replace	The replacement string that is applied to the previously matched values. The result of this replacement is the group name.
group-match	A typical expression that is matched against the previously generated group names.
group-replace-regex	A replacement string to create a typical expression from the group name, to match property values include in this group.

The expansion occurs in these phases:

- For each distinct property value, matches the property value with `value-match`. If the value matches, replaces it using the replacement string `value-replace`. The resulting value creates a node in the tree.
- For each node created, applies a transformation on its name using the typical expression `group-match` and replacement string `group-replace-regex`. This transformation creates a third typical expression.
- Rematches any property value with this typical expression. It works similar to a filter. The group node selects it if the value matches.

For example, if there are three devices in a network, the property device is expanded into three values: dev-w4n-montreal, router-w4n-montreal, and server-w4n-toronto. To use the location name to group these devices, do the following:

- Create location groups from the device names with this expression: `^.*-w4n-(.*)$ → $1`
- To match the groups montreal and toronto, use a matching device. A matching device is a device whose name ends with the group name, which is the city name in this example. For the montreal group, the matching typical expression is `^.*-montreal$`.
- To match a device in a group, build the previous typical expression from the group name with this replacement: `^(.*)$ → .*-\\Q$1\\E`
- The result is this expansion: `device<type=dual-regex;value-match=^.*-w4n-(.*)$;value-replace=$1;group-match=^(.*)$;group-replace-regex=.*-\\Q$1\\E>`

Split Property Expansion (type=split)

This expansion type creates reports using a relation between objects. A relation stores one or several object names, such as a device name, in another object's property, such as the remote system property.

This expansion uses these parameters:

value-separator	The character that is used to separate entries in the targeted property.
property-separator	The character that is used to separate properties when values contain multiple entries.
properties	The name of the properties. The split operation extracts the values of these properties. You can use multiple occurrences if more than one property must be identified in the generated filter.
level-up	Parent nodes to be skipped in the construction of the node's filter.
name-override	You can use a specific name for the created node.

In this example, the collected data includes the property `peerifs`that identifies peer interfaces. It contains a list of device-part pairs that is expressed similar to this: `peerifs='device1,part1;device1,part2;device2,part1'`

To create a node for each distinct device-part pair and associate a filter to each node that selects the correct data: `device=='device1' & part=='part1'`. The result is: `peerifs<type=split;value-separator=~;;property-separator=,;properties=device;properties=part;level-up=5>`

You can use the tilde (~) character to escape the semi-column when it is the targeted character to split values or properties. If you want the filter to contain multiple parts, you can use the properties parameter several times. If not overridden by the `name-override` parameter, the name of the resulting node is the name of the matched value.

In this example, you can use the `split` expansion to void the filtering effect of parent nodes. This is useful when the filter is incompatible with the data you want to report on. For example, to report on interface utilization (`parttype='Interface'`) of devices with a Filesystem (`parttype='Filesystem'`), split on a property, create the filter using the same property, and use the `level-up` parameter to void the effect of the selection filter: `device<type=split;properties=device;level-up=1>`.

Hide expansion (type=hide)

This expansion is used to prevent a property from being displayed when expanding on multiple properties.

For example, if you want to expand a node on `device,deviceid` because you have some hosts sharing the same device property. Deviceid is used to prevent hosts with the same device property from being merged into a single node, but the deviceid property is a long text string that you do not want to have displayed. By using the hide expansion (`device,deviceid<type=hide>`), the expansion works as it normally does only the deviceid is not displayed.

Example of hosts without using the hide expansion:

- example-host1, afekru23417
- example-host2, fdg98713424
- example-host3, dsfhng32442
- example-host3,dfsanl123412
- example-host4,134wf343244

Example of hosts using the hide expansion:

- example-host1
- example-host2
- example-host3
- example-host3
- example-host4

In-list expansion (type=in-list)

This expansion checks if the value of a property is inside a list of another property value. Expansion occurs only if the value of a property in the parent is inside the property list value of a child.

This expansion uses these parameters:

Values separator	The value separator.
List property	Property containing the list.
Name override	Can be used to override the generated node names.
Level up	Tells how many nodes should be skipped in the filter computation.

Related references

Syntax for filter expressions

Related tasks

Defining the report metrics using a filter
Specifying the expansion properties for sub nodes
Configuring the advanced parameters for a report node
Setting the child node ordering

Configuring the advanced parameters for a report node

Advanced parameters provide features that enable you to create complex custom reports.

Steps

1. In Edit mode, click the **Filtering & Expansion** tab.
2. Expand **Advanced Parameters**.
3. In **Use filter on unmatched variables**, select how variables that are not selected are treated.
4. In **Report Display Preference**, select how the report is generated.
5. Select the node icon for the report node.
6. In **Top N for events**, type the limit of results to return.

7. Click **Save**.

Related concepts

Filtering and expansion tab
Complex node expansions
Filtering and expansion parameters

Related references

Syntax for filter expressions

Setting the child node ordering

You can order child nodes either by position or alphabetically.

Steps

1. In Edit mode, click the **Filtering & Expansion** tab.
2. Expand **Child Node Ordering**.
3. Drag and drop the children to either the **Ordered by Position** or **Ordered by Name** lists.
4. Click **Save**.

Related concepts

Filtering and expansion tab
Complex node expansions
Filtering and expansion parameters

Related references

Syntax for filter expressions

Add or remove group filters

A group filter appears in the header of a report. It provides a convenient way for users to filter a report on a predefined property or set of properties.

About this task

A group filter presents values for one or more properties in a checkbox format. Users can select multiple property values under a property, and the report is filtered to show data for the selected values. Any property that appears in the report can be used in a group filter, including the data enrichment properties.

Use this procedure to add or delete a group filter. For group filter syntax information, see Group Filter in the Help topic named **Filtering and expansion parameters**.

Steps

1. In Edit mode, click the **Filtering & Expansion** tab.
2. Expand the **Group filter** section.
3. To add a filter:
   a. Click **Add Property**.
   b. Click **Simple** at the top of the dialog box.
   c. Select the property that you want to create a filter for.

      To be meaningful, the property must be used in the report. Use the **Report Details** tab to research the property names that are used in the report.
   d. To combine properties in the same filter, select multiple properties and then click **Selected properties must be grouped** at the lower-right of the dialog box.
   e. Click **OK**.

f. Click **Switch to list** and edit the expression if needed.

4. To remove a filter:
   a. Click **Switch to input field**.
   b. Remove a property from the expression.
5. Click **Save**.

Filtering and expansion parameters

You define the scope of data to include in a report on the **Filtering & Expansion** tab. You define the basic properties of a report, such as its name, ID, icon, and when and how to display the report in the tree.

Name

The name of the report that you are creating. If you use expansion, the report name represents the expansion evaluation.

Unique identifier

You can link between reports by using the identifier. When you paste a report as a link, you can use the unique identifier if it exists. A unique identifier consists of letters, numbers, and the characters period (.) comma (,) dash (-), underscore (_), or spaces. You can also use report identifiers to define report restrictions and to control branches to be skipped by the frontend search engine.

This option is hidden by default. To access this option, click the anchor icon to the right of the **Name** field.

Filter

A filter is an expression that limits the number of metrics that are displayed on a report. A filter is vital to configuring a report because it determines the dataset of the report. You can manually create a filter when you know which properties and values to include in a filter, or you can use the **Filter Wizard** to help you define the filter.

Use the filter of this node for

Use this field when using both expansion and a filter.

expansion only	Applies the filter while expanding the node using expansion. Any nodes that do not match the filter are not created. Selected variables are not affected by the filter. The filter is used to craft the expansion, but the filter is not used when you analyze. This is useful when you are doing a filter on a property which is not shared by every raw data (like devdesc).
selection only	Applies the filter after node expansion. The system performs expansion without taking the filter into account, and passes each resulting node through the filter. The system expands on everything and then applies the filter for underlying data. This is useful when you have inventory reports, where some expansions can have zero children.
expansion and selection	Combines both expansion and selection. The filter of the node is used for node generation and each resulting node for the variables it selects. The system expands on matching raw data. The filter is kept when drilling down.

Display Policy

Use this field to simplify the presentation of the report tree by hiding certain report nodes and showing only relevant report nodes.

Always show the node	Always shows the node in the report tree. This is the default behavior.
Hide if no variable is selected	Hides the node if its filter does not select any metric.
Hide if the node is a leaf	Hides the node if it does not have any children. This is particularly useful with expanded nodes, as they may expand into an empty list.

Hide if no variable is selected or if the node is a leaf	This is a combination of the **Hide if no variable is selected** and **Hide if the node is a leaf** policies.
Hide in Browse mode but use for report computation	This policy is useful when you define a node to build reports above it in the tree, but not as a report itself. When you chain formulas, use this policy.
Always hide this node	Never shows the node in the report tree. This can temporarily disable a report and any formulas applied to this node.
Hide except when it's the target of a link	Hides the node except when it is the target of a link.
Show this node only in the tree and not in the report	Forbids drilling down to this node from a parent report.

Expand on every

This setting is central to how the report tree works. Expansion dynamically creates sub nodes. Sub nodes add levels to a report so you can analyze. When a node is set to expand, the node transforms itself from a single node to as many nodes as there are matches of the specified property name in the dataset.

By using expansion, you can define a report that automatically creates and deletes nodes that are based on the properties found in the dataset. For example, as devices are added to the network, they are automatically added to the report when their properties match the expansion criteria.

Group filter

This setting creates property-specific filters in Browse mode. The result is a filter icon with the property name at the top of the report, and an associated dialog box that lists values in a checkbox format. This feature works with any property, including the property tagging filter (PTF) groups that are managed in the **Administration** > **CONFIG** > **Groups & Tags** > **Manage Groups** interface.

Add Property adds a property to the group filter expression.

Simple	Adds a simple filter for a database property, including flat groups managed in **Administration** > **CONFIG** > **Groups & Tags** > **Manage Groups**. To add a simple filter: 1. Click **Add Property** > **Simple**. 2. Select the property. Use the **Report Details:Table** tab to research properties that appear in the table. 3. To combine multiple properties into the same filter, select the properties and then click **Properties must be grouped**.
Complex	Adds a filter with a dialog box of choices that matches the hierarchy of group names in a hierarchical group type managed in **Administration** > **CONFIG** > **Groups & Tags** > **Manage Groups**. For example, in Groups Management, Device Grouping is a hierarchical group that expands on the `nodegrp` property. To add a filter for a hierarchical group type: 1. Click **Add Property** > **Complex**. 2. Choose **Expand on groupping ui formatted data enrichment properties**. 3. Follow the steps in the expansion wizard. 4. To match the group management interface, use the /character as the hierarchical (level) separator and the | character as the expansion-separator. 5. Click **OK**. Here is the complex expansion for the `nodegrp` property. It creates a hierarchical dialog box of filter values that matches the hierarchy of device group names that are defined in Groups Management. `nodegrp<type=groupping-ui;level-separator=/;expansion-separator=|>`

All selected properties are combined into a single group filter expression. After adding properties, click **Switch to List** to see the entire group filter specification. You can make adjustments to the syntax. The syntax for multiple filters is described in the table:

Table 7. Syntax for multiple filters

Syntax	Description

`prop1 prop2`	Creates separate filters and dialog box for each property. For example, the following expression creates a filter for a complex expansion on the `nodegrp` property and several additional filters for simple properties.
	`nodegrp<type=groupping-ui;level-separator=/;expansion-separator=|> customer location sstype arraytyp`
	`Below is the result in Browse mode,`
	`with the dialog box for the Storage System Type filter open.`

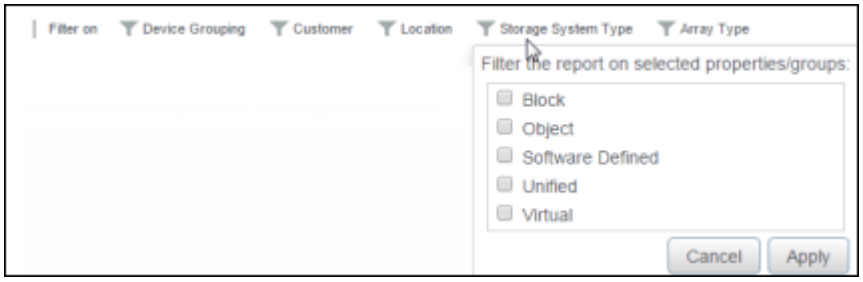
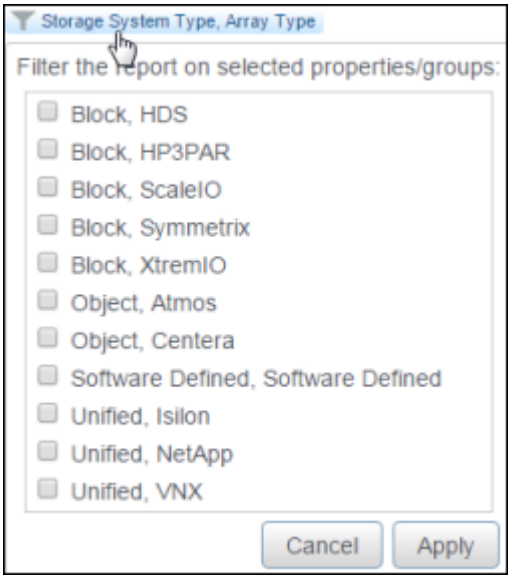
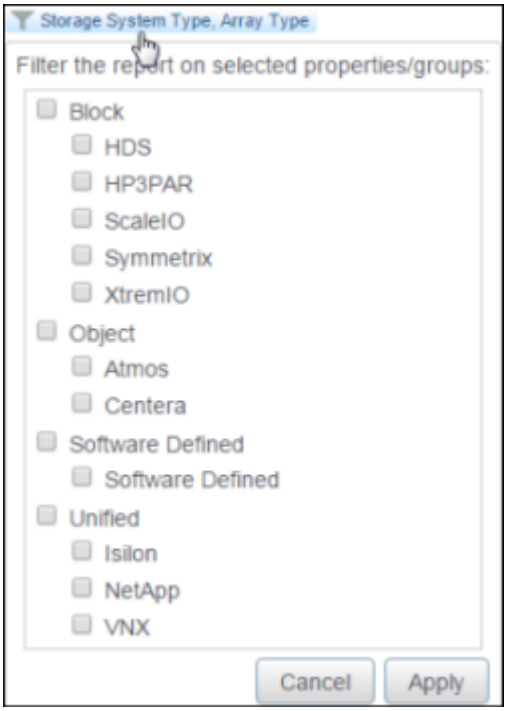
	
`prop1,prop2`	Combines two properties into the same filter and generates a dialog box with all value combinations in a flat list. Here is an example with two properties, and the resulting dialog box in Browse mode. `(sstype,arraytyp)` 
`(prop1),(prop2)`	Combines two properties into the same filter and generates a dialog box with value combinations in a hierarchical list. Here is an example with two properties, and the resulting dialog box in Browse mode. `(sstype),(arraytyp)`

Table 7. Syntax for multiple filters (continued)

Syntax	Description
	

Use filter on unmatched variables

Use this field to create nodes using variables that are not selected by the sibling nodes.

No	The node acts as an Others or Unmatched node.
For the edit node filter	Selects all the variables that are not selected by the sibling nodes with reference to the Edit mode filters. For example, if a few sibling nodes select the same IP address, the Other node selects all the other IP addresses. If there is no expansion, there is no distinction between the Edit and Browse node filters. Use this setting in most cases. If there is an expansion, this setting returns the unmatched results of the sibling filters as they appear in Edit mode. This differs from how the resulting node filters are expressed in Browse mode, and provides different results.
For the resulting browse node filter	Use this setting when using the **Top N for the events** property to select a reduced set of results in the expansion, or when doing complex expansions that result in a partial list of results. In both cases, the unmatched results are evaluated against the filters of the expanded nodes in Browse mode, resulting in all variables that are not chosen by any expanded nodes. In both cases, the results are subject to any parent node filters. You can use filters on these other variables that the node with the unmatched option selects.

Report Display Preference

You can use a stored report instead of creating a report that takes a considerable amount of time to generate.

Use Real Time Values	The report is generated on-the-fly.
Prefer Stored Report	When you click the report node, the most recent and available stored report appears. Otherwise, the report is generated on-the-fly.
Use Only Stored Report	When you click a report node, the most recent and available stored report appears. Otherwise, a notice appears, indicating the system cannot display the report.

Node Icon

You can use a node icon for the following report areas:

- As a small icon in the tree alongside the node name
- As a medium icon on the report alongside the element titles
- As a large icon in icon reports

If you want to choose an icon automatically, use the default icon.

Top N for events

You can limit the number of results that are returned, which can significantly speed up the time it takes to generate reports. This setting is only applicable for events, and is only visible if it was declared in at least one of the event mapping files being used.

Child Node Ordering

You can arrange child nodes manually by dragging and dropping them in **Ordered by Position**, or you can arrange them alphabetically in **Ordered by Name**. You only can see this field if child nodes exist.

Related references

Syntax for filter expressions

Related tasks

Defining the report metrics using a filter
Specifying the expansion properties for sub nodes
Configuring the advanced parameters for a report node
Setting the child node ordering

Report Configuration tab

Use the **Report Configuration** tab to define the core settings for a report, including the report type, the time period of the report, and the aggregation used.

The settings on this tab deal with the report preferences that are used by default when the corresponding node is selected in Browse mode.

Related concepts

Workflow for creating reports
Filtering and expansion tab
Report Details tabs
Formula tab
Report configuration parameters

Related tasks

Defining report types

Defining report types

A report type determines the layout of a report. You select the report type on the **Report Configuration** in **Edit Mode**tab. You can also select the report type in**Display Mode** through settings icon in each report.

Steps

1. In **Display Mode**, indicate how you want multiple reports to appear on the report page.

The default behavior displays one report after another report.

2. In **Report Type**, click the layout to use for the report.

   The report types are divided into the following categories:

   - Tables
   - Graphs
   - Aggregated
   - TopN
   - Misc
   - Mixed

   Within a report category, all the report details are the same. This means that you can change the **Report Type** to another one in the same category and the report settings remain applicable. After you save the settings, the report details are saved from session to session, even if you switch to another report type.

3. In **Report Rendering**, select the type of rendering to apply to the report.
4. In **Default Duration**, specify the time range to display on the report.
5. In **Sampling Period**, indicate the time interval to use to collect data from the database.
6. In **Sampling Type**, specify the aggregation to use.
7. Click **Propagate time selection on drill-down** to apply the report's time periods to its sub-reports.
8. In **Report Description**, type the information to display at the top of the report. You can use XHTML in tags in the description.
9. In **Displayed Properties**, click **Add property** for each property that you want to include in the report header. You can select one from a list of default properties or type a custom property.

Related concepts

Report Configuration tab

Report configuration parameters

Report configuration parameters

You set the type, the time period, the rendering, the aggregation, and the description of a report on the **Report Configuration** tab. You can also use the advanced settings of **Report Configuration** tab to define the time zone and indicate whether to use dynamic maintenance periods.

Display Mode

Indicate how to place multiple reports on the report page for viewing. The default behavior displays one report after another report. You can also manually rearrange reports on a page.

Report Type

Select which report type to use for displaying metrics on this node.

Report Rendering

Select the rendering to apply on the report, including any displayed sub-report.

Dynamic rendering is available on standard charts and provides better zooming and analyzing tools than the static one. However, it can have a performance impact if enabled on many reports simultaneously.

Default Duration

Select the time range to display on the report. Sometimes, this time range is not taken into account. For example, if the report is using a formula where the duration is explicitly selected, this default value is bypassed. You can exclude time periods from the report by clicking the calendar icon.

Sampling Period

The aggregate interval to use to gather data from the database. You can also configure the report to use aligned data for one of the aggregates.

Sampling Type

The aggregation to use to gather data from the database. This is not applicable to some report types, such as pie charts and horizontal bars.

Propagate time selection on drill-down

Enable the temporal settings of the current report to use for all child reports when drilling down to them from the report in the page area. The settings are:

- Default Duration
- Sampling Period
- Sampling Time

Report Description

This description displays at the top of a report. You can use XHTML in tags in the description.

Displayed Properties

These properties display at the top of the report, which includes the contact name and location. The default name of the property can appear in its title, which displays in the gray text box.

Always use this setting when the report is for a single device because only one value appears for each added property.

Time Zone

Specify the time zone for a report generated on the current node. **Inherit** means that the time zone is inherited from the parent node. If there is no parent, the report uses the time zone from the profile of the current user.

The first field indicates whether the report uses universal time, the default, or whether the time period is aligned. Universal time indicates that the time period corresponds to the report's time zone in the adjacent list, and the data shown in the report is relative to its time zone. For example, selecting the last hour of data displays data from the current time, which is 10:00 America/Montreal time, and appears along the x-axis, back to 9:00 America/Montreal time. If you are monitoring a device in Montreal, you can see its activity data between 9:00 to 10:00. If you are also monitoring devices in Paris at this time, the activity data is between 3:00 and 4:00 AM Europe/Paris.

The other effect of universal time is that daily and weekly aggregates are delineated on UTC time. For example, the daily aggregation period for America/Montreal is from 18:00 - 19:00 whereas the Montreal time zone offset is UTC - 5 hours.

Align data on UTC using tz property with the following reference

This setting time shifts the data from different time zones to align them. The setting aligns data in order for the time zone to be independent in the report. Aligned data displays using aligned aggregates.

The effects of aligned time zone aggregates are:

- Data from different time zones is time-shifted to a universal day where data is expressed according to the local time zone where the data was recorded. For example, data at 9:00 locally is aligned with data at 9:00 at a remote time zone. Data can then be compared at each time zone in relation to how users experience it during a typical day or week. Without using aligned aggregates, data from different time zones is expressed in relation to the local time zone of the report.
- For aligned daily and weekly aggregates, days and weeks are delineated according to 24 hour 7 day periods where time zones are aligned. Without using aligned aggregates, days and weeks are delineated according to UTC.

When you use aligned data, the second time zone list sets the reference. This is important when choosing data from the last day. If the data is aligned and America/Montreal is the reference point, and it is 13:00 in Montreal and you display the last day of information, the data returned is from 13:00 today to 13:00 yesterday. If you choose Europe/Paris as the reference, and it is

19:00 in Paris, the last day extends the report from 19:00 on the current day to 19:00 yesterday and there will not be information in the report for the last 6 hours in Montreal because it has not occurred yet in the day where the time zones are aligned.

Reference is important if time zones occur on different days. The day the report covers is determined by the reference time zone.

For this functionality to be available, it must be configured in the backend and the frontend. Whether there are daily and weekly aligned aggregates is determined in the backend setup. For aligned aggregates of one hour or less, the frontend computes them on the fly on a best effort basis if aligned time zones are enabled. Some aggregates are not generated: the local time of the aggregate must be a number of whole hours offset from UTC for the one hour aligned aggregate to be computed. Locations with an additional half-hour offset such as Asia/Kolkata (UTC +5:30), are not computed.

You are not explicitly informed whether time zone aligned aggregates are available, but in most cases, if Align data on UTC using tz property with the following reference is available in the first time zone list, aligned time zone aggregates are available for each sampling period.

These constraints apply to aligned data:

- Maintenance periods configured in the interface appear in graphs but not used for computations or in tables. If you configure a maintenance period from 8 to 9, this period is highlighted in the graph, and pertains to 8 to 9 in all time zones, as the data is aligned.
- Do not use the Outage Editor with aligned data as the results are inaccurate.
- Do not plot events on the same graphs as aligned data with an Overlay, as the results are inaccurate. Events cannot be aligned across time zones as time series data can.

Dynamic Maintenance Periods

Set the maintenance period to use for this node according to the one set in the Outage Manager. Maintenance periods are incompatible with aligned time zones.

Outages type

Set the type to the category set in the Outage Manager.

Outages property

Set the value to the property you would like to use for matching. If the value of the property matches one of the objects in the Outage Manager, that outage is applied.

Enable Audit Logging

If you want to enable the audit logging for the My Reports and it's derived branches, then tick the Enable Audit Logging check box. This feature is disabled for non-custom reports as logging is always enabled for non-custom report. If any of the report has this option enabled, then all the following child reports inherit the property and cannot be overridden.

Related concepts

Report Configuration tab

Related tasks

Defining report types

Descriptions of report types

In **Edit** mode, on the **Report Configuration** tab, choose the **Report Type**.

Tables

The following report types appear in the **Tables** category.

Table 8. Table report types

Report Type	Description
List	Lists the child node names of a parent. You can examine to more detailed reports. This is the default report type.
Standard table	Displays one row per child node. You select the columns, such as availability. You then expand the table node with child nodes in the report tree, which automatically generates the data in the rows of the report. For example, if a child node expands on host, each row contains data about individual hosts in the network.
Metric-based table	Displays the metrics of the child nodes.
Interactive table	Controls the display of adjacent reports. You can browse from one report to another while maintaining a list of reports on the same page. The reports that display next to the interactive table are the child nodes of the interactive table. You can place these tables in mixed reports.
Item	Displays a limited amount of data as an icon. You can define up to 5 data values (columns) and place them in desired locations within the icon. There can be only one sub node (that is, only one row when converted to a standard table).

Graphs

Table 9. Graph report types

Type	Description
Simple chart	Gathers variables from the selected node. Draws a single graph showing variables as points over a time series.
Bar chart	Gathers variables from the selected node. Draws a single graph showing variables as bars over a period of time. It is compatible with a simple chart and baseline reports.
Children-based chart	Gathers variables from the child nodes of a selected node. Draws a single graph with one metric per child node. It is compatible with the stacked chart and the stacked bar.
Per children charts	Gathers variables from each child node to create a simple chart, and then combines all charts into a single report.
Hierarchy charts	Gathers variables for each node in the tree to create a simple chart, and then combines all charts in a hierarchy that mirrors the tree structure.

Aggregated

Table 10. Aggregated report types

Type	Description
Stacked chart	Displays the aggregate value of each child node in an area that is connected by time series points, and each child node is stacked on top of one other. For example, it can stack the traffic of each router, showing the total traffic of a network by interface. This report is compatible with the children-based chart and the stacked bar chart.
Stacked bars	Displays values in vertical bars instead of connected time series points. This report is compatible with the children-based chart and the stacked chart.
Status	Aggregates data for each child node using a selected function over a time period. Each child node displays as a color symbol that can show its aggregated value and node name.
Heat map	Displays metrics in a two-dimensional grid. The cells are color-coded according to defined thresholds.
Tree map	Displays metrics in a hierarchy using size and color. Based on the tree hierarchy, each branch is given a rectangle, which is then tiled with smaller rectangles to represent the metric aggregation from each child node.

Table 10. Aggregated report types (continued)

Type	Description
Gauge chart	Displays a snapshot of the health of an indicator. It uses a single aggregate value of a child node. You set the thresholds to color code the range of values for this measurement.

TopN

Table 11. TopN report types

Type	Description
Horizontal bars	Similar to a stacked chart but instead of plotting each time series, it aggregates each time series into a single value, which is shown as a percentage. This report is compatible with the single horizontal bar and the pie chart reports.
Single horizontal bar	Uses the same data as the horizontal bar but displays the proportion of each child in relationship to all children in a single bar.
Time ratio bars	Similar to the horizontal bar report except the bars show color pieces, each representing a certain interval value. The length of pieces show the ratio of time in percentages for the corresponding interval values. For example, you can view the percentage of time a device is experiencing critical, major, or no problems within a time range.
Pie chart	Similar to the horizontal bar report except displays the results in a pie shape. This report is compatible with horizontal bars and single horizontal bar reports.

Misc

Table 12. Misc report types

Type	Description
Baseline	Displays two lines, black and colored, and a gray zone. The colored line is the average value of the selected metric. The black line is the baseline and the surrounding grayed zone represents the deviation from the minimum and maximum value of the baseline.
Icons	Displays icons and associated descriptions.
External	Displays a referenced web page.
Map	Displays child nodes as a point on a geographical map.
Topology	Displays a graphical representation of discovered configuration items in an infrastructure and how they are linked together.

Mixed

Table 13. Mixed report types

Type	Description
Mixed	Displays the set of child reports that are defined in the report tree on a single report page. All child reports use the selected time range and aggregation of the parent mixed report.
Mixed using defaults	A mixed report that always uses the default time range and aggregation that is defined for each child report.
Overlay	Plots events defined in a table report onto a graph.
Tab	Displays a parent report with child reports as interactive tabs.

Report Details tabs

Use the **Report Details** tabs to define the settings for a specific report type.

The **Report Details** tab name and the parameters appearing on the tab change according to the type of report you select on the **Report Configuration** tab. The following sets of report details are available:

- **Report Details: Table**
- **Report Details: Graph**
- **Report Details: TopN Graph**
- **Report Details: Map**
- **Report Details: Heat Map**
- **Report Details: Treemap**
- **Report Details: External**
- **Report Details: Topology**
- **Report Details: Overlays**
- **Report Details: Status**

Related concepts

Workflow for creating reports
Filtering and expansion tab
Report Configuration tab
Formula tab
Table report parameters
Graph report parameters
TopN report parameters
Map report parameters
Heat Map report parameters
Treemap report parameters
External report address
Topology report parameters
Overlay report parameters
Status report parameters

Table reports

You can add columns to a table, change the configuration of sub nodes that populate the rows, or change the formatting of cells in the table.

Table columns are defined as attributes, properties, values, or aggregations or combinations of other columns. You can add new columns and change the order of the columns.

A table row is generated for each sub node. Usually, the sub node is expanded on a property.

Scrollable table

For a table with multiple pages, you can enable infinite scrolling feature in the report pane.

Steps

1. Click the **Report Details** tab.
2. Expand the **Display Options**.
3. For Paging Mode, select the **Scrollable table**.
4. Click **Save**.

Related concepts

Using threshold definitions

Setting threshold definitions in tables

Set thresholds to visually alert you when a metric has exceeded a threshold.

Steps

1. Click the **Report Details: Table** tab.
2. Expand **Value** .
3. Expand **Value Settings**.
4. In the **Thresholds Definition** section, select the name of the threshold, type a value, and select a color for each threshold you want to define.
5. In **Value Formatter**, select how exceeded thresholds are displayed in the report.
6. Click **Save**.

Related concepts

Using threshold definitions

Setting the number of rows to display per page

For a table with multiple pages, you can set the number of rows to display per page in the report pane.

Steps

1. Click the **Report Configuration** tab.
2. Expand **Display Options**.
3. In **Paging Limit**, type the number of rows to display per page.
4. Click **Save**.

Change a column header tooltip

You can customize the tooltip that describes the column when a user hovers the cursor over the column header.

Steps

1. Click the **Report Details: Table** tab.
2. Expand the blue bar for the column whose description you want to change.
3. Change the contents of the **Description** field.
4. Click **Save**.

Change refresh rate

For table reports, you can turn the automatic refresh feature on or off, or change the refresh rate.

Steps

1. Click the **Report Details: Table** tab.
2. Click to expand the **Display Options** section.
3. For **Refresh Interval (secs)**, type an integer to set a new rate, or type 0 to turn off automatic refresh.

Adding a column

You can add details to tables by adding columns for the kind of information you want to add, such as node attributes, metric properties, and metric values.

Steps

1. Click the **Report Details: Table** tab.

2. Add a column by clicking **+Attribute**, **+Property**, **+Value**, **+Aggregated**, or **+Combined**.

Option	Description
Attribute	Information about the node such as the node ID, node name, node filter.
Property	Metadata about a metric, such as device, device type, group.
Value	Raw value of a metric.
Aggregated	An aggregated value (average, minimum, maximum, or sum) of previously specified value columns.
Combined	Displays the contents of multiple previously specified columns in a single column.

3. In **Column Name**, type a name for the column.
4. Select the attribute, property, or value to display in the column.
5. In **Column Description**, type a description of the column that appears as a tooltip when the user hovers the cursor over the column header.
6. Click **Save**.
7. Click **BROWSE MODE**.
8. Verify that the new column appears in the table.

   If not, do the following:

   a. Hover the cursor over the upper right corner of the table, and click the **Customize Table Columns** icon.
   b. Find the new column name in the list and ensure that **Display the column** is selected.
   c. Click **Save and Apply.**

      This adds the new column's display preferences to other previously saved custom settings.
   d. If the new column still does not appear, return to Edit Mode, click the **Report Details: Table** tab, and check the value in the **Advanced Properties** > **Display Customization** field.
9. Instruct other users who saved customizations on that report to type the Table Customization dialog box and click **Save and Apply** again.

   This action is required to add the new column to the saved settings.

Formatting metrics in a value column

You can assign formatters to define the presentation of the data in the cell.

About this task

The following formatters are available for table columns that are of type Value. Many of the formatters depend on threshold settings. A column can have multiple formatters. For configuration details about a formatter, see Table report parameters.

Table 14. Formatters for value columns

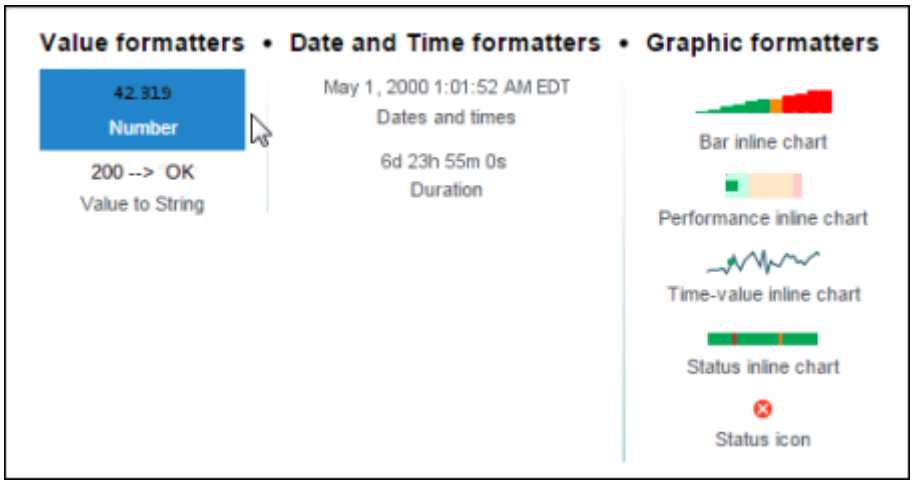
Formatter	Description
Number	Displays the value in numeric form, with specified rounding and prefix or suffix symbols, such as currency symbols.
Value to string	Converts a value to a specified string. You define value-string pairs in the formatter configuration.
Date and time	Displays the date and time when the value was collected, converted from the UNIX timestamp. You specify the format in the formatter configuration. Options are: date and time, date, time, using several format variations (full, long, medium, short) and a custom format based on Java's SimpleDateFormat.
Duration	Formats a number of seconds into larger units, such as weeks, days, hours, and minutes.
Bar inline chart	Displays an inline bar graph whose number of bars depends on the selected sampling period and report time range.
Performance inline chart	Displays a horizontal bar showing the value and where it is located compared to the column's defined thresholds.
Time value inline chart	Displays an inline line graph that plots the metric values over the report's time period.

Table 14. Formatters for value columns (continued)

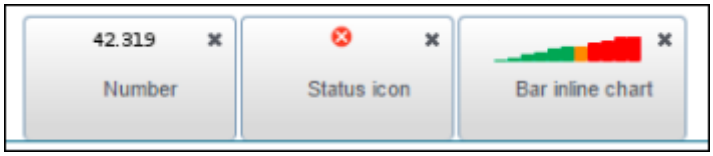
Formatter	Description
Status inline chart	Displays an inline status bar showing the status value over the time period. The line shows the status of each point of a value. The status colors of the band are set according to the threshold severities set on the column.
Status icons	Displays the status icon for the value according to the column's defined thresholds.
Additional Formatters located in the Decorations section	
Row and cell background formatters	Changes the background color for a row or a column cell.
graphic tooltip	Adds or removes a contextual graph that appears like a tooltip when the user clicks a cell.

Steps

1. Click the **Report Details: Table** tab.
2. To add a formatter to a Value column:
   a. Click to expand the blue bar for a Value column.
   b. Click **Value Settings**.
   c. In the Value Formatters section, click **+Formatter**.
   A dialog box of available formatters appears.



   d. Click a formatter to select it.
   The formatter is added to the set of formatters for the column. A rectangle represents each assigned formatter. Here is an example of three formatters that are assigned to a column.



   NOTE: For new columns, the **Number** and **Status icon** formatters appear by default.

   NOTE: To delete an unwanted formatter, click the **X** in the upper right corner.

   e. Repeat these steps to add another formatter.
   A column can have multiple formatters. A scrollbar might appear after adding several formatters.
3. Click a formatter box to expose and configure its optional settings.
   For example, the **Number** formatter lets you define the number of decimal positions, and prefix or suffix strings (for currency symbols, among other uses).
4. (Optional) Rearrange the order of the formatters by dragging and repositioning them.
   The order of the formatters controls the order of appearance in the table cells.
5. (Optional) Under Decorations, configure backgrounds, and add or remove the graphic tooltip.
6. Verify the look of a cell in the **Column Preview** section.

7. Click **Save**.
8. Click **BROWSE MODE** to return to the report and view the new formats.
   Here is an example of two cells from a column using the Number, Status icon, and Bar inline chart formatters. The number formatter is configured using a % symbol as a suffix.

Formatting text and backgrounds in columns

You can use text decorations for any column type to define the formatting of the text in a cell. For value columns, you can also apply colored backgrounds to cells.

Steps

1. In Edit Mode, click the **Report Details: Table** tab.
2. Expand **Value Settings**.
3. In the **Decorations** section, configure the available formatting fields.
   - **Cell background** applies the threshold severity color to the cell. This option is available only for value columns.
   - **Row background** applies the threshold severity color to the entire row. This option is available only for value columns.
   - **Text Mode**
     - **Default Style** has no interactive action.
     - **Link Style** adds an underline when the cursor hovers over the text, indicating a link. To add the link target, see the **Table Interactivity** tab.
   - **Text Color** applies colors to the column text. Choose a predefined Default or Severity color, or choose Custom Color and then define the color.
   - **Text Style** applies font styles to the column values.
   - **Graph tooltip** shows a contextual graph above the cell when the cell is clicked. This option is available only for value columns.
4. Verify the look of the cell in the **Column Preview** section.
5. Click **Save**.

Moving a column

You can change the order of the columns.

Steps

1. Click the **Report Details: Table** tab.
2. Drag and drop a column header to a new location.

Copying a column

You can use column definitions that are already defined as part of a new table report.

Steps

1. Click the **Report Details: Table** tab.
2. Check the columns that you want to copy.
3. Click **Copy**.
4. Browse to another table report.
5. Click the **Report Details: Table** tab.
6. Click **Paste**.
7. Click **Save**.

Deleting a column

You can delete a table column.

Steps

1. Click the **Report Details: Table** tab.
2. Click the trash icon in the column header.

Adding a total row at the bottom of a column

You can add a row to display the total or average value of all the visible rows for a particular column at the end of that column. For example, suppose that you have a column that lists individual storage capacities. You can add a row at the end of that column that displays the sum of all the individual capacities to give you the total capacity.

Steps

1. Click the **Report Details: Table** tab.
2. Click the **Value** icon of the column in which you want to add a summary row.
3. Expand **Summary settings**.
4. In **Label**, type the name for the sum or average that are calculated and displayed, such as Total or Average.
5. In **Generate column**, select either **none** or **sum** or **average**.
6. Click **Save**.

Table report parameters

You define the columns in a table report on the **Report Details: Table** tab. Parameters are based on whether the column is an Attribute, a Property, a Value, an Aggregate of the value from other columns, or a Combined cell showing data from other selected columns.

Attribute

An attribute column displays information about the direct children of the currently selected parent node.

Table 15. Attribute column

Parameter	Description
Column Name	A unique name that appears in the table header.
Description	The description that appears when the user hovers the cursor over the column header. You can edit the description. See the tooltip for information about supported HTML tags, attributes, and classes.
Attribute	Defines the property to retrieve from the requested node. • **Other** displays the name for the property you type in the field box. • **Node ID** displays the node short ID relative to its parent. • **Global ID** displays the complete node ID starting from the root of the tree. • **Node name** displays the name of the node. • **Global name** displays the complete name of the node, starting from the root of the tree. • **Expansion names array** is only applicable if a multi-expansion is applied to the node that appears in the table. Type the index of this zero-based array that contains each part of the multi-expansion. • **Node filter** displays the node short filter, relative to its parent. • **Global filter** displays the complete node filter, starting from the root of the tree. • **Child count** displays the number of children of that node.
Advanced Properties:	
Display Customization	Selects whether the column is displayed in Browse mode. The **Hide if empty** choice means that the column is hidden if its cells on the current report page are all empty. A sparsely populated column might appear on one page and be hidden on the next page.

Table 15. Attribute column (continued)

Parameter	Description
	• **Locked Mode** selections make a permanent selection for all users. Choices are **Always display**, **Hide if empty**, or **Always hide**. • **User Customizable** selections make the initial selection for all users but allow users to change that selection in Browse mode, using the **Table Customization** icon. **NOTE:** If a new column is added after users have saved customizations, those users cannot see the new column unless they return to the Table Customization dialog box and click **Save and Apply** again. This action is required to add the new column to their other saved preferences and make the new column visible in the report. Also see the note in the next field.
Display Condition	• **Show** displays the column. • **Hide** hides the column. • **condition** lets you specify a typical expression to match against the node name. ○ If condition is TRUE, the column shows. ○ If condition is FALSE, the column is hidden. **NOTE:** This hide condition overrides any choices that are made in the **Display Customization** field.
Decorations	Change the look of the text in the column. • **Text Mode** ○ **Default Style** has no interactive action. ○ **Link Style** adds an underline when the cursor hovers over the text, indicating a link. To add the link target, see the **Table Interactivity** tab. • **Text Color** applies colors to the column text. Choose a predefined Default or Severity color, or choose Custom Color and then define the color. • **Text Size** sets the font size for column values. Choose **S** for small, **M** for medium, **L** for large, or **XL** for Extra Large. • **Text Style** applies font styles to the column values. Choose **B** for bold style, **I** for italics style, and **U** for underlined style.
Column Preview	Shows how a cell in the column appears, based on the currently chosen decorations.

Property

A property column displays information about the selected variables of a child node. It can be any collected property, such as a server name for a device.

Table 16. Property column

Parameter	Description
Column Name	A unique name that appears in the table header.
Description	The description that appears when the user hovers the cursor over the column header. You can edit the description. See the tooltip for information about supported HTML tags, attributes, and classes.
Property	Type the name of a property or click the Property Selection Helper icon and select one or more properties.
Selected Value	Specifies the source of the value to retrieve. Choose one of the following: Specifies the source of the value to retrieve. Choose one of the following: • **use filter below** allows the configuration of a specific filter using the **Filter Wizard**. The wizard selects the value to display from the child. • **use default formula result** displays the result from the default formula that is configured on the child node. Select this option only when a default formula is configured. To check or set a default formula, click the child node in the navigation tree and go to the Formula tab on the child. When

Table 16. Property column (continued)

Parameter	Description
	multiple formulas are defined, one of them can be identified as the default formula in the formula's **Results Returned** section. • **use formula result** displays the value that is retrieved from the result of a formula that is applied on the children. Select the formula from the drop-down list.
Filter to Apply	Refines the properties to display in this column. This filter applies to each line of the table, which represents each child node.
Advanced Properties	
Display Customization	Selects whether the column is displayed in Browse mode. • **Locked Mode** selections make a permanent selection for all users. • **User Customizable** selections make the initial selection for all users but allow users to change that selection in Browse mode, using the Table Customization icon.
Display Condition	• To display the column, select **show**, the default. • To hide the column, select **hide.** • If you specify a condition, the column appears when the current node's name matches the typical expression.
Decorations	• **Text Mode** ○ **Default Style** has no interactive action. ○ **Link Style** adds an underline when the cursor hovers over the text, indicating a link. To add the link target, see the **Table Interactivity** tab. • **Text Color** applies colors to the column text. Choose a predefined Default or Severity color, or choose Custom Color and then define the color. • **Text Size** sets the font size for column values. Choose **S** for small, **M** for medium, **L** for large, or **XL** for Extra Large. • **Text Style** applies font styles to the column values. Choose **B** for bold style, **I** for italics style, and **U** for underlined style.
Column Preview	Shows how a cell in the column appears, based on the currently chosen decorations.

Value

A value column retrieves a value from the database. You specify the value with a filter, such as CPU utilization, and the format for the value, such as percentage or bits per second.

Table 17. Value column

Parameter	Description
Column Name	A unique name that appears in the table header.
Selected Value	Specifies the source of the value to retrieve. Choose one of the following: • **use filter below** allows the configuration of a specific filter using the **Filter Wizard**. The wizard selects the value to display from the child. • **use default formula result** displays the result from the default formula that is configured on the child node. Select this option only when a default formula is configured. To check or set a default formula, click the child node in the navigation tree and go to the Formula tab on the child. When multiple formulas are defined, one of them can be identified as the default formula in the formula's **Results Returned** section. • **use formula result** displays the value that is retrieved from the result of a formula that is applied on the children. Select the formula from the drop-down list.
Filter to Apply	Appears only when **filter** is selected in the previous field. Refines the values to display in this column. This filter applies to each row in the table. A row represents a child node.
Time Management	
Sampling Period	Selects the sampling that is set globally on the report, or enforces one from the computed aggregates available in the database. Adjusting this option can significantly reduce report

Table 17. Value column (continued)

Parameter	Description
	generation time. For example, if you are reporting on a month or year, selecting a day or week aggregate instead of real-time dramatically increases the report generation speed. It is important because with such long ranges, such detail is not typically required. The period selection option is related to the sampling period. It is because the application can automatically select a higher aggregate than the one selected when it really fits the report time-range. It provides better performance and scales no matter the report time range. When you unable to change the specified aggregate, always choose this option. However, it can trigger a high report generation time if the report time range is too wide. **NOTE:** When you select a small sampling period, such as real-time, allow for the selection of higher periods for better performance.
Sampling Type	Selects one of the available aggregated values that are stored in the database. You can choose average, min, max, sum, the last value, count, the number of received values, or last timestamp, and the timestamp of the last received value, on the previously selected aggregate period.
Column Time Range(s)	Selects whether to use the global report time range for the values of this column, or a fixed one. A fixed range is relative to the end time of the report. It may also be divided into time slices, creating several columns in Browse mode.
Recover	Determines whether to retrieve all values over the report time range or only the last value. • If all values are retrieved, then they are aggregated into a single value using the function that is selected from the **Temporal Aggregation** drop-down list. • If only the last value is retrieved, the time interval that is used for that retrieval changes based on the report's sampling period setting and the period of time set in the **Time Threshold** parameter. See the tooltip for examples.
Temporal Aggregation or **Time Threshold**	Related to the If the unit of the values does not correspond to what you want to display, this field provides a way to convert the values. **Recover** parameter.
Value Settings	
Scaling Mode	• **none** does not convert values. • **multiply** multiplies all values by the decimal value that you supply in the **by** field that appears when you make this selection. • **divide** divides all values by the decimal value that you supply in the **by** field that appears when you make this selection. • **by unit** converts the existing unit values into new unit values without requiring you to provide the formula. For example, using selections from the drop-down lists that appear, you can convert Celsius to Fahrenheit, or Packets per second into KPkts per second. Explore the drop-down lists to see all the supported conversions.
Value Display	You can hide lines whose values are below a threshold by making a selection from this list. You can choose to display all values, only major and critical values, only critical values, and so on. This parameter lets you generate exception reports that present only relevant data.
Thresholds definition	Defines threshold values for this column.
Value Formatters	Controls the presentation of the metric data in each cell. Click **+Formatter** to view and select a formatter. After adding a formatter, click it to expose its configuration options. The available formatters and their configuration options are listed here. Many depend on threshold settings.

Number
`4.234`
`$4.23`
	Displays the value in numeric form.
	• **Decimal Rounding** — Number of decimal places to display, default is 2.
	• **Value Prefix** — string to display before the metric, such as a currency symbol.
	• **Value Suffix** — string to display after the metric, such as a currency symbol, % symbol.

Table 17. Value column (continued)

Parameter	Description
4.23£ 4%	• **Apply threshold severity color?** — Select to display the value using the color of the matching threshold category.
Value to string 200 --> OK	Converts a value to a specified string. • **Decimal Rounding** — Number of decimal places to display, default is 2. • **No-match fallback string** — Type the string to use if a value does not match any category added under **+ Add value-strings** • **Apply threshold severity color?** — Select to display the value using the color of the matching threshold category. • **+ Add value-strings** — Click to supply the value-to-string conversions you want.
Date and time May 1, 2000 1:01:52 AM EDT	Displays the date and time when the value was collected, converted from the UNIX timestamp. • **Format** — Select a date/time format from the list. • **Apply threshold severity color?** — Select to display the value using the color of the matching threshold category.
Duration 6d 23h 55m 0s	Formats a number of seconds into a duration phrase consisting of larger units (combinations of days, hours, minutes, and seconds). • **Format** — Select a duration format from the list. • **Apply threshold severity color?** — Select to display the value using the color of the matching threshold category.
Bar inline chart 	Displays a horizontal bar graph whose number of bars depends on the selected sampling period and report time range. • **Bar width** — Specify the size of each bar in pixels. • **Bar spacing** — Specify the spacing between bars in pixels.
Performance inline chart 	Displays a vertical bar showing the performance of the value relative to the other values on the page for this column, over the time period. The performance sparkline is like a gauge. It shows the value and where it is located compared to its thresholds. There are no configuration options.
Time value inline chart 	Displays a line graph that plots the metric values over the report's time period. There are no configuration options.
Status inline chart 	Displays a horizontal status bar showing the status value over the time period. The line shows the status of each point of a value. The status colors of the band are set according to the threshold severities set on the column. • **Bar width** — Specify the size of each bar in pixels. • **Bar spacing** — Specify the spacing between bars in pixels.
Status icon 	Displays the status icon for the value according to the column's defined thresholds. There are no configuration options. The status icons are fixed in the system.
Decorations	• **Cell background** applies the threshold severity color to the cell. Choose one of the following: ○ None—no color applied ○ Lighter color—applies a lighter shade of the appropriate threshold color ○ Normal color—applies the threshold color • **Row background** applies the threshold severity color to the entire row. The same options are available as for cell background. • **Text Mode** ○ **Default Style** has no interactive action. ○ **Link Style** adds an underline when the cursor hovers over the text, indicating a link. To add the link target, see the **Table Interactivity** tab. • **Text Color** applies colors to the column text. Choose a predefined Default or Severity color, or choose Custom Color and then define the color.

Table 17. Value column (continued)

Parameter	Description
	• **Text Size** sets the font size for column values. Choose **S** for small, **M** for medium, **L** for large, or **XL** for Extra Large. • **Text Style** applies font styles to the column values. Choose **B** for bold style, **I** for italics style, and **U** for underlined style. • **Graph tooltip** shows a contextual graph above the cell when the user clicks the cell.
Column Preview	Shows how a cell in the column appears, based on the currently chosen decorations, formatters, and thresholds.
Advanced Properties	
Display Customization	Selects whether the column is displayed in Browse mode. • **Locked Mode** selections make a permanent selection for all users. • **User Customizable** selections make the initial selection for all users but allow users to change that selection in Browse mode, using the Table Customization icon.
Display Condition	Selects the display of the column. If specifying a condition, the column displays if the current node's name matches the typical expression.
Complement value?	Converts a value to its complement, such as `1-` value. Values are converted to their complements only after passing through all other processing, such as scaling.
Replace empty values by zero?	Shows zero for values that are empty. Values are replaced by zero only after passing through all other processing.
User per-line maintenance period?	Uses the maintenance period defined that is on each child node. The default uses the maintenance period for the current node, but that may not reflect the real maintenance period for every child.
Allow filtering on the value?	Triggers the use of a JEXL Boolean expression in which the value must match to display. The `$v` variable represents the numeric value. In the following examples, rows are only shown when: • `empty(v)`: the value is empty • `(v >= 0.00 or v < 0.00) and not empty(v)` : the value is (greater or equal to 0.00 or less than 0.00) and not empty • `v > 10.00 or v < 5.00`: the value is greater than 10.00 or less than 5.00 • `v != 0.00 and not empty (v)`: the value is not equal to 0.00 and not empty • `v == 0.00 && not empty(v)`: the value is equal to 0.00 and not empty
Summary Settings	
Label	Label for the summary cell for this column. It is put in front of the aggregated value. If left blank, the cell only contains the value. If all the summary cells have the same label, they are merged into one.
Generate column	Choose the aggregate that you want to apply to the summary column, either **sum** or **average**.

Aggregate

This column type displays an aggregated value that is obtained from other selected columns. The **Aggregate** parameter defines the type of aggregation that is applied to the selected columns.

Table 18. Aggregate column

Parameter	Description
Column Name	A unique name that appears in the column header.
Description	The description that appears when the user hovers the cursor over the column header. You can edit the description. See the tooltip for information about supported HTML tags, attributes, and classes.

Table 18. Aggregate column (continued)

Parameter	Description
Aggregate	Select one of the following: • **Sum**—In the current row, adds the values in all of the selected columns and displays the total. • **Min**—In the current row, compares the values in all of the selected columns and displays the lowest value. • **Max**—In the current row, compares the values in all of the selected columns and displays the highest one. • **Average**—In the current row, computes the average from all of the selected columns and displays the result.
Aggregated Columns	Choose the columns to include in the aggregated value.
Value Settings:	
Scaling Mode	If the unit of the values does not correspond to what you want to display, this field provides a way to convert the values. • **none** does not convert values. • **multiply** multiplies all values by the decimal value that you supply in the **by** field that appears when you make this selection. • **divide** divides all values by the decimal value that you supply in the **by** field that appears when you make this selection. • **by unit** converts the existing unit values into new unit values without requiring you to provide the formula. For example, using selections from the drop-down lists that appear, you can convert Celsius to Fahrenheit, or Packets per second into KPkts per second. Explore the drop-down lists to see all the supported conversions.
Value Display	You can hide lines whose values are below a threshold by making a selection from this list. You can choose to display all values, only major and critical values, only critical values, and so on. This parameter lets you generate exception reports that present only relevant data.
Thresholds definition	Defines threshold values for this column.
Aggregated Formatters	Controls the presentation of the data in the cell. Click **+Formatter** to view formatter names and select one. After adding a formatter, click it to expose its configuration options. The following aggregate formatters are available. Choose either or both.
Number 4.234 $4.23 4.23£ 4%	Displays the value in numeric form. • **Decimal Rounding** — Number of decimal places to display; default is 2. • **Value Prefix** — string to display before the metric, such as a currency symbol. • **Value Suffix** — string to display after the metric, such as a currency symbol, % symbol. • **Apply threshold severity color?** — Select to display the value using the color of the matching threshold category.
Pie chart 	Displays a small pie chart showing the proportion of values falling into the various defined threshold levels. The colors reflect the threshold levels.

Decorations	Change the look of the background and the text in the column.
	• **Cell background** applies the threshold severity color to the cell. Choose one of the following:
	  ○ None—no color applied
	  ○ Lighter color—applies a lighter shade of the appropriate threshold color
	  ○ Normal color—applies the threshold color
	• **Row background** applies the threshold severity color to the entire row. The same options are available as for cell background.
	• **Text Mode**
	  ○ **Default Style** has no interactive action.
	  ○ **Link Style** adds an underline when the cursor hovers over the text, indicating a link. To add the link target, see the **Table Interactivity** tab.

Table 18. Aggregate column (continued)

Parameter	Description
	• **Text Color** applies colors to the column text. Choose a predefined Default or Severity color, or choose Custom Color and then define the color. • **Text Size** sets the font size for column values. Choose **S** for small, **M** for medium, **L** for large, or **XL** for Extra Large. • **Text Style** applies font styles to the column values. Choose **B** for bold style, **I** for italics style, and **U** for underlined style. • **Graph tooltip** adds or removes a contextual graph that appears like a tooltip when the user clicks a cell.
Column Preview	Shows how a cell in the column appears, based on the currently chosen decorations.
Advanced Properties	
Display Customization	Selects whether the column is displayed in Browse mode. • **Locked Mode** selections make a permanent selection for all users. • **User Customizable** selections make the initial selection for all users but allow users to change that selection in Browse mode, using the Table Customization icon.
Display Condition	Selects the display of the column. If specifying a condition, the column displays if the current node's name matches the typical expression.
Complement value?	Converts a value to its complement, such as `1-` value. Values are converted to their complements only after passing through all other processing, such as scaling.
Replace empty values by zero?	Shows zero for values that are empty. Values are replaced by zero only after passing through all other processing.
User per-line maintenance period?	Uses the maintenance period that is defined on each child node. The default uses the maintenance period for the current node, but that may not reflect the real maintenance period for every child.
Allow filtering on the value?	Triggers the use of a JEXL Boolean expression in which the value must match to display. The `$v` variable represents the numeric value. In the following examples, rows are only shown when: • `empty($v)`: the value is empty • `($v >= 0 or $v < 0) and not empty($v)` : the value is (greater or equal to 0.00 or less than 0.00) and not empty • `$v > 10 or $v < 5`: the value is greater than 10 or less than 5 • `$v != 0 and not empty ($v)`: the value is not equal to 0 and not empty • `$v == 0 && not empty($v)`: the value is equal to 0 and not empty
Summary Settings	
Label	Label for the summary cell for this column. It is put in front of the aggregated value. If left blank, the cell contains the value. If all the summary cells have the same label, they are merged into one.
Generate column	Choose the aggregate that you want to apply to the summary column, either **sum** or **average**.

Combined

This column type renders the data from other selected columns in a single cell.

Table 19. Combined column

Parameter	Description
Column Name	A unique name that appears in the column header.
Description	The description that appears when the user hovers the cursor over the column header. You can edit the description. See the tooltip for information about supported HTML tags, attributes, and classes.

Table 19. Combined column (continued)

Parameter	Description
Combined Formatters	Specifies the columns to copy. 1. Click **+Formatter** and select **Copy Column Content**. 2. Click the formatter and select a column name from the drop-down list. 3. Repeat the previous steps one or more times to add the second and additional columns to the combined column. 4. Drag the formatters to rearrange their order of appearance. The **Copy Column Content** formatter is the only formatter available in a combined column. You can format the data using formatters in the original columns.
Column Preview	Shows how a cell in the column appears, based on the currently chosen columns.

Display Options

The **Display Options** section applies to the entire report, rather than to a specific column.

Table 20. Display options section

Parameter	Description
Paging mode	Indicates the number of lines to display on one page of a table. • **Show all values**: all pages are available. • **Do not show if more than N values**: nothing displays when there are more values than what is entered for the Paging limit. • **Show the first N values**: displays only the number of values for the Paging limit. • **Scrollable table**: displays all the rows, rows will be loaded to UI based scrolling down/up.
Paging limit	Defines the length of a table's page according to the values for the Paging mode.
Refresh interval (secs)	Controls the rate of automatic refreshes. Leave blank or type 0 to turn off auto refresh.

Related concepts

Report Details tabs
Graph report parameters
TopN report parameters
Map report parameters
Heat Map report parameters
Treemap report parameters
External report address
Topology report parameters
Overlay report parameters
Status report parameters

Item reports (hero dashboards)

An item report is a type of table report. Each row is displayed as a self-contained item, with the column information mapped to a position in the item.

A series of item reports can create an easy-to-read dashboard, sometimes called a hero dashboard, that makes important information easily visible.

Here are example item reports on a hero dashboard:

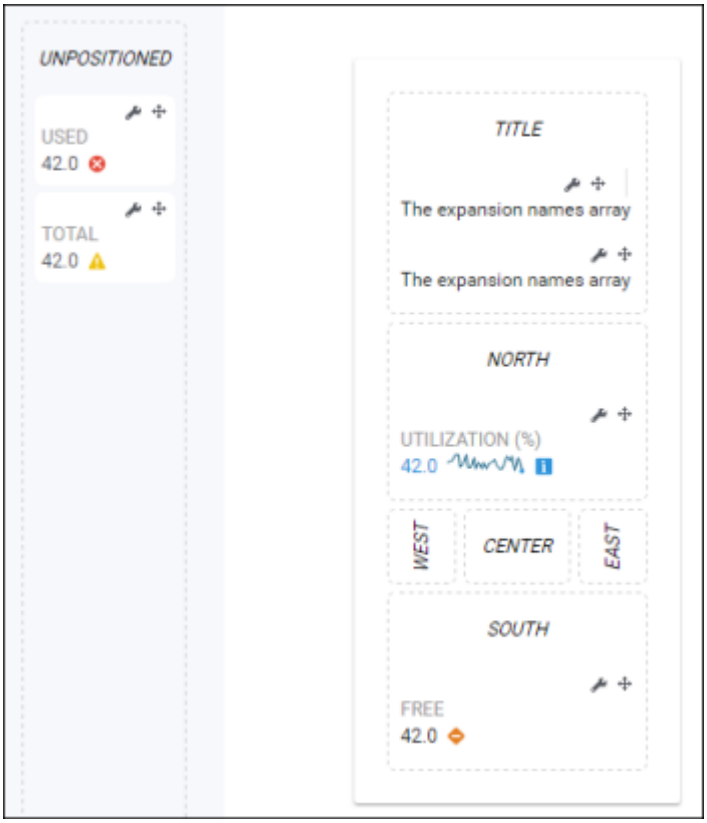
Changing a table report to an item report

You can start with a table report and redefine it as an item report, mapping selected columns to the item.

Steps

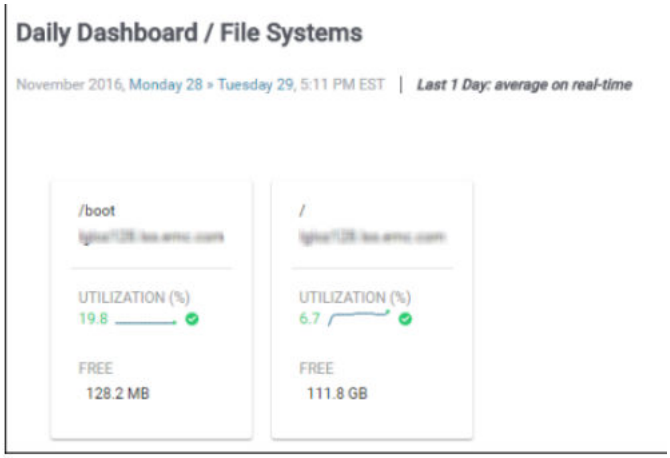
1. Go to **Report Library** > **System Health** > **Miscellaneous Reports** > **Daily Dashboard**.
2. Scroll down and click the **File Systems** report title.
   This isolates the File Systems report to a page by itself.
3. Click **Modifications** > **Edit Reports**.
4. Click the **Report Configuration** tab.
5. For **Report Type**, in the **Tables** category, select **Item**.
6. Click the **Report Details: Item** tab.
7. Expand **Columns Positioning**.
8. For **Container Display Mode**, select **Cards**.
9. For **Item Alignment**, select **left**.
10. Drag columns from the **Unpositioned** section onto the design map at the right.
    For example, here is the starting point, with all columns unpositioned.

Here is the designed item, with 4 of the 6 columns mapped. The columns that remain unpositioned are not displayed in the item report.



11. Click **Save**.
12. Click **BROWSE MODE**.

    Here is the changed report.



Item report parameters

You define information to include in an item report and design the look of the report on the **Report Details: Item** tab.

An item report is a type of table report. To specify the information to include in the report, you define columns, the same as for other types of table reports. A column is defined based on an Attribute, a Property, a Value, an Aggregate of other columns, or a Combined cell of other columns. For more information about adding and configuring columns, see Table report parameters.

The following parameters control the look of the item report, after you have defined the columns.

Container Display Mode	Defines the overall style of each item (each converted row). • **Basic**—Borders are not used. Column labels (subtitles) are not shown. • **Cards**—Each item is enclosed in a border. Column names appear as subtitles for each included column of information.

Item Alignment	Defines whether the item report (all items in the report) is aligned to the left margin, centered, or right margin of the page.
Design Map	Defines which columns to include in the item report, and where to position each column. Drag a column from the unpositioned section to the desired location in the design map. Sections in the design map can hold multiple columns. Click the **Tools** icon that is associated with a column to access the column formatting parameters.

Graph reports

You can add more graphing information or precision to any graph report, including standard, aggregated, and baseline graph reports.

Graph reports plot variables along the X (time) and Y (value) axes. Depending on the graph type, metrics can come from the current node or from the children nodes. You can use time series graphs that display multiple metrics that are related to a data selection or events that show only one series of values per event series.

There are value and baseline graphs that are available on every node of the tree, although baseline graphs require more than one week of data. Value graphs are generated using the properties of a selected node and its filter.

Graph reports can also have two y-axes, with two different sets of metrics plotted against them.

Setting threshold definitions in graphs

Set thresholds to display a dotted line in the graph that lets you see when a metric has exceeded the threshold.

Steps

1. Click the **Report Details: Graph** tab.
2. Under **Thresholds Definition**, select the name of the threshold, type a value, and select a color for each threshold you want to define.
3. Click **Save**.

Related concepts

Using threshold definitions

Setting y-axis range of values

The y-axis of a graph can be changed to display a specific range of values.

Steps

1. Click the **Report Details: Graph** tab.
2. In **Main Y-Axis Boundaries**, type the values that you want to make the main y-axis of the graph.
3. Click **Save**.

Scaling the y-axis

If the unit of the y-axis values does not correspond to what you would like to display, you can change the unit by multiplying or dividing the values by a specified factor.

Steps

1. Click the **Report Details: Graph** tab.
2. Use **Main Y-Axis Scaling Mode** to multiply or divide all the values of the main y-axis by a specified factor.
3. Click **Save**.

Setting the appearance of the graph metrics

You can customize the color and shape of the metrics that are displayed in the graph.

Steps

1. Click the **Report Details: Graph** tab.
2. Under **Metric Customization**, click **Add Customization**.
3. Select the metric you want to customize.
4. From the configuration options, choose whether the metric should be displayed against the main or the secondary axis, and how you want to display the line.
5. Click **Save**.

Changing the legend

You can configure which properties are displayed in the graph's legend to better identify the plotted variables.

Steps

1. Click the **Report Details: Graph** tab.
2. Under **Legend**, click **Edit Properties** and select the properties that you want to display in the legend.
3. Click **Apply**.
4. Click **Save**.

Adding additional statistics to a graph

Enhance a graph with summary statistics about the metrics.

About this task

NOTE: Summary statistics do not exclude values of defined maintenance periods from the computation.

Steps

1. Click the **Report Details: Graph** tab.
2. In the **Settings for Standard Graphs** area, select the summary statistic.

Option	Description
Pinpoint	Displays the minimum and maximum values.
Boxed	Displays a box in the upper left of the graph with minimum and maximum values, the average, and the 95th percentile, which is 95% of the time the value is below this amount.
Trend	Displays a superimposed trending line over the graph, which shows the prevailing direction of the metric.
Logarithmic	Plots the values on a logarithmic scale only if there is more than one metric in the graph. This applies only to simple graphs.
Composite	Displays four supplementary mini-graphs at the bottom showing the evolution of the metric over four different time periods. The default time periods are: the last year, the last six months, the last month, and the last day. The time periods are configurable by your system administrator.

3. Click **Save**.

Graph report parameters

You define the contextual settings of graph reports on the **Report Details: Graph** tab. This includes standard and aggregated graph reports, and the baseline report.

Main Y-Axis Boundaries

You can set up y-axis fixed bounds for the report to automatically focus on a relevant data range. This is useful when the acceptable values of the range are already known, such as availability data.

Main Y-Axis Scaling Mode

You can scale the values on the y-axis. If the values are too high or too low to be meaningful, you can multiply or divide by a factor that produces a meaningful number. You can also choose by-unit and select the required conversion using the offered choices. The Binary scale, such as KiB and MiB, uses 1024 as the scaling factor, and is typically used for computer memory. The Decimal scale, such as KB and MB, uses 1000, and is typically used in storage. Classic was created for the old interpretation of the multipliers where K = 1024.

Thresholds Definition

Critical and major thresholds appear in the graph only if you give them values. You can add as many thresholds as necessary, giving each a different value and color. If there is a second y-axis in the graph, the thresholds you set are applicable only to the main y-axis.

Thresholds have a different meaning for Time Ratio Bar Graphs. For these graphs, thresholds define the intervals for computing the time ratios and the colors of the bars. For example, two thresholds actually define three intervals. The first interval gathers all values below or equal to the lowest threshold. The second interval retrieves all the values above the first and below or equal to the second. The last interval gathers all the values above the second threshold. The unit marked next to the input box tells you how to enter the threshold definitions.

Match metrics using a

Selects the metrics to customize.

property value	Selects all metrics with a given value for a given property.
formula result	Selects the output of a formula that is defined on the current node or one of its children.
child report name	Selects all metrics coming from a given child report. Reports are in Browse mode.
child node name	Selects all metrics coming from a child node. If using expansion, Edit mode may generate several reports.
filter wizard	Selects metrics using a custom filter that you create using the Filter Wizard.
filter manual	Selects metrics using a custom filter that you manually create using expressions.

Configuration

This setting defines whether to display the metric against the main or the secondary axis. You can also specify the line attributes.

Properties in Legend

These properties appear in the legend to identify the plotted variables. You can add as many legends as needed and reorder the properties in the legend.

Legend Visibility

This setting indicates whether to show or hide the legend. When you hide the legend, a more compact display appears.

Legend Items

When you display only selected items, the Others section does not appear. For example, in a pie chart, the indicators in the Others section may be of no interest. Since these are not selected indicators, you can hide them by selecting display only selected items.

Summary Statistics

You have various options for displaying statistical information in a report. The default time periods are the last year, the last six months, the last month, and the last day, which are set by an administrator.

Pinpoint	Displays the minimum and maximum values.
Boxed	Displays a box in the upper left of the graph with the minimum and maximum values, the average, and the 95th percentile, which indicates whether the value is below this amount 95% of the time.
Trend	Displays a superimposed trending line over the graph showing the prevailing direction of the metric.
Logarithmic	Plots the values on a logarithmic scale if there is more than one metric in the graph. This applies only to simple graphs.
Composite	Displays four supplementary mini-graphs at the bottom that shows the evolution of the metric over four different time periods.

Related concepts

Report Details tabs
Table report parameters
TopN report parameters
Map report parameters
Heat Map report parameters
Treemap report parameters
External report address
Topology report parameters
Overlay report parameters
Status report parameters

TopN reports

TopN reports display N number of metrics with the highest values in a specified set of data.

Report types include horizontal bars, single horizontal bar, time ratio bars, and pie chart.

Changing the legend

You can configure which properties are displayed in the graph's legend to better identify the plotted variables.

Steps

1. Click the **Report Details: Graph** tab.
2. Under **Legend**, click **Edit Properties** and select the properties that you want to display in the legend.
3. Click **Apply**.
4. Click **Save**.

Configuring the TopN sections

TopN charts retrieve the same data as normal reports, but instead of plotting a time series, they aggregate each series into a single value. Values that are too small are grouped into an Other section.

Steps

1. Click the **Report Details: TopN Graph** tab.
2. Under **Settings for TopN Graphs**, click **Section order** to select how sections are displayed.
3. Click **Section grouping mode** and select the layout for the sections.
4. In **Value display**, select **absolute** to show the actual metric value, or **relative** to show metrics as percentages of the total along with the absolute values.

5. In **Number of sections**, type the maximum number of sections to display.
6. In **Others section color**, select the color for the Other section.
7. Click **Expand Others section** to expand the Other section into subsections.
8. Click **Save**.

Selecting tooltip information

You can select the properties that are displayed in the tooltip.

Steps

1. Click the **Report Details: TopN Graph** tab.
2. Under **Tooltip Information**, click **Add Property**.
3. Use the Selection Property Helper to select the properties you want to add to the tooltip.
4. Click **Save**.

TopN report parameters

You define how you want data to appear in the TopN graph reports on the **Report Details: TopN Graph** tab.

Scaling Mode

If the unit of the values does not correspond to what you want to display, this field provides a way to convert the values.

- **none** does not convert values.
- **multiply** multiplies all values by the decimal value that you supply in the **by** field that appears when you make this selection.
- **divide** divides all values by the decimal value that you supply in the **by** field that appears when you make this selection.
- **by unit** converts the existing unit values into new unit values without requiring you to provide the formula. For example, using selections from the drop-down lists that appear, you can convert Celsius to Fahrenheit, or Packets per second into KPkts per second. Explore the drop-down lists to see all the supported conversions.

Match metrics using a

Selects the metrics to customize.

property value	Selects all metrics with a given value for a given property.
formula result	Selects the output of a formula that is defined on the current node or one of its children.
child report name	Selects all metrics coming from a given child report. Reports are in Browse mode.
child node name	Selects all metrics coming from a child node. If using expansion, Edit mode may generate several reports.
filter wizard	Selects metrics using a custom filter that you create using the Filter Wizard.
filter manual	Selects metrics using a custom filter that you manually create using expressions.

Configuration

Sets the color for the above-selected metric.

Properties in Legend

These properties display in the graph's legend to identify the variables. To select the properties to appear in the legend, click **Edit Properties**. To reorder their appearance in the legend, hover the cursor over a row and drag it to the required position.

Legend Visibility

Controls the default visibility of the graph's legend. Hiding the legend leads to a more compact display.

Legend Items

Displaying only selected items, hides the Others section for applicable reports in the graph legend. For example, in a pie chart, the indicators in the Others section may be of no interest. Since these are not selected indicators, you can hide them by selecting display only selected items.

Section Order

Defines how to order the sections in the TopN graph. Select **alphabetical** to order the bars using the metric names. Select **descending** to order the bars according to the metric values.

Section Grouping Mode

Sets the layout of sections that belong to the same group. This setting is only applicable to horizontal bar graphs.

Value display

Determines whether metric values are shown as actual metric values (absolute) or as percentages of the total in addition to the absolute values.

Number of Sections

Sets the maximum number of sections to display on a TopN graph. If there are more sections, they are placed in a section called Others.

Others Section Color

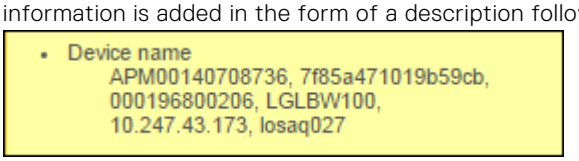
Sets the color of the Others section if defined.

Expand Others Section

When selected, the Others section expands into subsections. Otherwise, it is represented by a single aggregated section. This setting is only applicable to horizontal bars with children that are generated from multiple expansions.

Tooltip Information

Choose properties to add to the tooltips that appear when a user hovers the cursor over a location in the report. The additional information is added in the form of a description followed by the property values. For example:



To select properties, click **Add Property**.

- Type the database property name, such as **`device`**, or click the property selector icon for help.
- Choose the description to appear on the first line.
  - **default** uses the system-provided description for the property. For example, **`Device name`** is supplied for the device property.
  - **none** does not use a description.
  - **custom** lets you supply a phrase.

Related concepts

Report Details tabs
Table report parameters
Graph report parameters
Map report parameters
Heat Map report parameters
Treemap report parameters
External report address
Topology report parameters
Overlay report parameters

Map reports

A map report is a standard table report where each child node displays as a point in a geographical map. You can edit the location and the name of the location as well as the size, color, and shape of marker displayed on the map.

In **Report Type** on the **Report Configuration** tab, you select the map report from the miscellaneous section.

You can edit the following attributes on a map report:

- **Location** locates an element on the map.
- **Name** provides a name to a location, such as device name, region, and sitename.
- **Size** sets the size of the marker. The size of the marker is based on a given metric value, such as the number of devices at the site.
- **Color** sets the color of the marker. The color relies on the threshold definition where green represents no thresholds, yellow represents a major threshold, and red represents a critical threshold.
- **Marker** sets the shape of the marker, such as circle, square, triangle, inverted triangle, pentagon, and sector.

Overriding the location

You can override the location in the selected data if the location is not correctly displayed on the map. For example, "Rome Office" is displayed on the map in Rome, Ohio instead of in Italy. To fix this, you can override the location and set it to "Roma, Italia." The following example overrides the location of device1 with latitude and longitude values: device1=42.2251051 -71.5315623

Steps

1. Click the **Report Details: Map** tab.
2. Click the **Location** tab.
3. Click **Advanced Properties**.
4. In **Location overrides**, type the new location information.

   The locations entered here have precedence over the ones that are found in the selected data. The correct format is: name=location, one pair per line.
5. Click **Save**.

Setting the icon size for child nodes

Icon size is calculated as a ratio between the node's value and the minimum and maximum value of the other nodes. The default minimum and maximum values can be changed if the theoretical min and max are known, such as for a percentage.

Steps

1. Click the **Report Details: Map** tab.
2. Click the **Marker** tab.
3. Type the minimum and maximum values for marker size.
4. Click **Save**.

Example

Suppose Device 1 has a CurrentUtilization of 10 percent while Device 2 has a CurrentUtilization of 13 percent. If you leave the min and max boxes empty, the maximum value is 13 and the minimum value is 10. Therefore, Device 2 has an icon that is the maximum size (64x64 pixels) and Device 1 has the smallest icon possible (16x16 pixels). However, as these are a percentage, you can set the maximum to 100 and the minimum to 0 to ensure that the icons for Device 1 and Device 2 are almost the same size.

Map report parameters

The settings on the **Report Details: Map** tab combine table report settings and map-specific settings to create a map report.

You set map attributes using the tabs in the **Map Item Configuration** section. You define the information to appear on the map in the **Displayed Information** section. This information uses the same column attributes, properties, and values as the table

report. Any changes that are made to the columns in the **Displayed Information** section are replicated in the columns in the **Table Report: Details** tab and conversely.

Map Item Configuration tabs

Name	Defines the column that contains the icon's name. When you hover over an icon, this name is displayed in a tooltip. This information is also used as the title when opening a pop-up by clicking an icon. The selected column can be a property column or an attribute column. You can select from that already configured or create a property or attribute column.
Location	Defines the column that contains the geographical information for each icon. This column can be either a property column or an attribute column. You can select from those already configured or create a property or attribute column. You can also set a secondary location column in case the first one does not contain information or to manually type locations for child nodes. The format to manually type locations is: node-name=location.
Search	Defines the properties that generate related reports for every icon. Adding properties in this box creates a link in each pop-up on the map. Clicking that link displays a search results page with reports similar to the one on the selected node, automatically inserting the selected properties into the search query. The search results page is the same as the one that appears when typing a search query in the search text box in the upper right corner.
Marker	Defines the icon or area marker for each point. Current choices for icons are: circle, square, triangle, inverted triangle, and pentagon. ● Size - Defines the column that determines the size of the icon for each child node. This column can be of any type and must contain a numeric value. You can use attribute, properties, or values that exist, or you can create a new one. The size is calculated as a ratio between the node's value and the minimum and maximum value of the other nodes. These minimum and maximum values can be overwritten if the theoretical min and max are known, such as for a percentage. To override them, type values in the Minimum and Maximum boxes. For example: Assume that you are mapping two devices for which the CurrentUtilization metric determines the size. Device-1 has a CurrentUtilization of 10 percent, while Device-2 has a CurrentUtilization of 13 percent. If the min and max boxes are empty, the maximum value is 13 and the minimum value is 10. Therefore, Device-2 has an icon with the maximum size (64x64 pixels) while Device-1 has the smallest icon possible (16x16 pixels). However, since these values can use a percentage, set the maximum to 100 and the minimum to 0 to ensure the icons for Device-1 and Device-2 are almost the same size, showing a realistic representation. ● Color - Defines the column that determines the color of the icon for each child node. It is a value column and you must set a threshold on the column's value. The defined thresholds determine the icon's color on the map: Green indicates OK; yellow indicates that a major threshold was reached; red indicates that a critical threshold was reached. The current choice for the area marker is sector. ● Azimuth - Indicates the orientation of the area marker (N, S, E, or W). This value is mandatory. The permissible values are 0-359 degrees. There is no default value. ● Radius - Radius value for the area marker in meters. This is an integer value and it is optional. The default value of 500 meters is used if no column is configured for the setting. ● Beam width - Width of the area marker in degrees. This value is optional. The permissible values are 0-359 degrees. The default value of 120 degrees is used if no column is configured for the setting. Sector markers become larger when zooming in and smaller when zooming out, but icon size does not change with zoom level. When an icon on the map is clicked, a pop-up displays the information that is contained in each defined column. The selected name column is shown as the title, and the selected location column is displayed right under the name in italics. Under the location, the other defined columns, including the ones that were used for color and size calculations, are displayed as general information in the order in which they are defined. At the bottom of the popup are links to browse the report and to search for related reports.

Displayed Information

For information about these settings, see Table report parameters.

Related concepts

Report Details tabs
Table report parameters
Graph report parameters

Heat map reports

A heat map report displays metrics in colors in a two-dimensional grid. You group metrics together and set the thresholds to color code the range of values for hot and cold areas. For example, red can indicate a severe problem and a lighter shade of red can indicate a warning.

You can group any combination of metric properties to define the axes of the grid. You can aggregate these metrics over time for one or both axes. The produced heat map report displays the aggregated values according to the specified time unit, which can be an hour, day, week, month, or year.

In **Report Type** on the **Report Configuration** tab, you select the heat map report from the aggregated section.

Heat Map report parameters

You set how you want information presented in a heat map on the **Report Details: Heat Map** tab.

Axes Configuration

Select one of the following expansion types for each axis.

- Select **use report expansion** to expand the axis using the parameters that are specified for the report on the Report Configuration tab. The ordering on the axis is defined by the **Order** field.
- Select **use time expansion** to build a heat map that displays the evolution of variables based on a unit of time (for example, a day, a week, and a month). If you select this value, the **Sampling Period** and **Over** fields appear. For example, you can expand an axis to show a Sampling Period of every day over some time period, such as a week or a year.

If the report duration is 1 year and the x-axis time range is for each 1 day over 1 week, each heatmap value is an aggregate (such as an average, minimum, or maximum) of all values of each time period included in the report duration.

Scaling Mode

If the unit of the values does not correspond to what you want to display, this field provides a way to convert the values. Select one of the following:

- **none** does not convert values.
- **multiply** multiplies all values by the decimal value you supply in the **by** field that appears when you make this selection.
- **divide** divides all values by the decimal value you supply in the **by** field that appears when you make this selection.
- **by unit** converts the existing unit values into new unit values without requiring you to provide the formula. For example, using selections from the drop-down lists that appear, you can convert Celsius to Fahrenheit, or Packets per second into KPkts per second (or MPkts, GPkts, or TPkts per second). Explore the drop-down lists to see all the supported conversions.

Order

Defines how to order rows and columns in the heat map when the axes configurations are **use report expansion**. See the tooltip next to the field for explanations of each option.

Show Grid

When selected, draws a border around the heat map cells.

Use Gradient Color

When selected, inserts gradient colors on the heat map cells that are between the closest thresholds.

Thresholds Definition

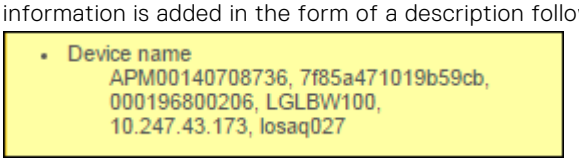
Thresholds do not appear in the report unless you give them values. You can add as many thresholds as necessary, giving each a different value and color. If there is a second y-axis in the graph, the thresholds you set here are applicable only to the main y-axis.

Properties in Legend

These properties display in the graph's legend to identify the variables. To select the properties to appear in the legend, click **Edit Properties**. To reorder their appearance in the legend, hover the cursor over a row and drag it to the required position.

Tooltip Information

Choose properties to add to the tooltips that appear when a user hovers the cursor over a location in the report. The additional information is added in the form of a description followed by the property values. For example:



To select properties, click **Add Property**.

- Type the database property name, such as **`device`**, or click the property selector icon for help.
- Choose the description to appear on the first line.
  - **default** uses the system-provided description for the property. For example, **`Device name`** is supplied for the device property.
  - **none** does not use a description.
  - **custom** lets you supply a phrase.

Related concepts

Report Details tabs
Table report parameters
Graph report parameters
TopN report parameters
Map report parameters
Treemap report parameters
External report address
Topology report parameters
Overlay report parameters
Status report parameters

Treemap reports

A treemap report displays metrics in a hierarchy using size and color. Based on the tree hierarchy, each branch is given a rectangle, which is then tiled with smaller rectangles to represent the metric aggregation from each child node.

In **Report Type** on the **Report Configuration** tab, you select the treemap report from the aggregated section.

Treemap report parameters

You define how to present information on a treemap report on the **Report Details: Treemap** tab.

Number of Levels

Sets the depth of the report. You can select up to three levels. For example, to create a global report showing the total capacity of arrays, pools, and LUNs, set this level to three. To report on the total capacity for arrays and pools only, set this level to two.

Size

These settings determine the area size of the cells for the lower nodes.

Column Name	A unique name that appears in the table header.
Selected Value	Retrieves a value from the following: • **filter** allows the configuration of a specific filter, which selects the metrics to display from the child. • **property value** lets you specify a property. A property field appears when you select this option. • **child count** displays the number of child nodes for the parent node.
Filter to Apply	Selects which metrics to display in this column. This filter applies to each line of the table, which represents each child node.
Sampling Type	Selects one of the available aggregated values that are stored in the database. You can choose inherited from report, average, min, max, sum, last value, count, or last timestamp.
Recover...	Determines if all values are retrieved over the report time range, or only the last value. If all values are retrieved, then they are aggregated to a single value using the selected function.
Time Threshold	The time interval relative to the report time value, which acts like a tolerance interval for data retrieval. If you select real-time, the threshold is in seconds. If you select an aggregate sampling type, the time threshold is a number of periods. **NOTE:** If you set zero for a time threshold while recovering only the last value using a real-time sampling period, an empty table cell may result. Always set a meaningful threshold according to the sampling period.
Scaling Mode	If the unit of the values does not correspond to what you want to display, select multiply or divide from this list. In the corresponding field, you can then type the factor to apply, which allows you to change from bytes to kilobytes, for example.

Color

These settings determine the color of the cells for the lower level nodes.

Column Name	A unique name that appears in the table header.
Selected Value	Retrieves a value from the following: • **filter** allows the configuration of a specific filter through the **Filter Wizard**, which selects the metrics to display from the child. • **formula result** displays the result from a formula that is applied to the child.
Filter to Apply	Selects which metrics to display in this column. This filter applies to each line of the table, which represents each child node.
Sampling Type	Selects one of the available aggregated values that are stored in the database. You can choose average, min, max, sum, the last value, count, the number of received values, or last timestamp, and the timestamp of the last received value, on the previously selected aggregate period.
Recover...	Determines if all values are retrieved over the report time range, or only the last value. If all values are retrieved, then they are aggregated into a single value using the selected function.
Time Threshold	The time interval relative to the report time value, which acts like a tolerance interval for data retrieval. If you select real-time, the threshold is in seconds. If you select an aggregate sampling type, the time threshold is a number of periods. **NOTE:** If you set zero for a time threshold while recovering only the last value using a real-time sampling period, an empty table cell may result. Always set a meaningful threshold according to the sampling period.
Scaling Mode	If the unit of the values does not correspond to what you want to display, select multiply or divide from this list. In the corresponding field, you can then type the factor to apply, which allows you to change from bytes to kilobytes, for example.
Critical Level	The value for the critical threshold level. You can leave it empty to deactivate this level.
Major Level	The value for the major threshold level. You can leave it empty to deactivate this level.
Is critically ascending?	If one of the levels is empty or both levels have the same value, select or clear that setting according to your requirements. This option indicates whether the criticality is rising where a higher number is more

	critical, or descending where a lower number is more critical. If a different number is given for both levels, the direction of criticality is obvious and you do not need select or clear this option.

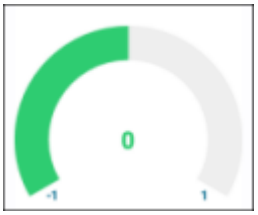
Related concepts

Report Details tabs
Table report parameters
Graph report parameters
TopN report parameters
Map report parameters
Heat Map report parameters
External report address
Topology report parameters
Overlay report parameters
Status report parameters

Gauges

A gauge shows one value in a meter. The report definition defines the value being measured, the upper and lower bounds of the gauge, and optional thresholds for identifying severity.

In the following gauge, the boundaries are defined as -1 and 1. The current measurement is 0.



Threshold that is defined on the measured value can change the color of the gauge. For example, a green gauge indicates that the current value falls within the defined range for Normal, whereas a red gauge indicates a Critical value, according to the defined thresholds.

Gauge report parameters

The **Report Details: Gauge** tab defines the metric to measure, its lower and upper bounds, and threshold ranges.

Value

This section defines the metric value that the gauge is reporting.

Table 21. Value

Parameter	Description
Column Name	A unique, descriptive name. This name does not appear in the report.
Selected Value	Specifies the source of the value to retrieve. Choose one of the following: • **use filter below** allows the configuration of a specific filter using the **Filter Wizard**. The wizard selects the value to display from the child. • **use default formula result** displays the result from the default formula that is configured on the child node. Select this option only when a default formula is configured. To check or set a default formula, click the child node in the navigation tree and go to the Formula tab on the child. When multiple formulas are defined, one of them can be identified as the default formula in the formula's **Results Returned** section. • **use formula result** displays the value that is retrieved from the result of a formula that is applied on the children. Select the formula from the drop-down list.

Table 21. Value (continued)

Parameter	Description
Filter to Apply or **Use time settings from**	**Filter to Apply** appears when **use filter below** is selected in the previous field. The filter defines the value to display in the gauge. This filter applies to each row in the table. A row represents a child node. **Use time settings from** defines which time settings to use for the metric retrieval.
Time Management (appears only when **Selected Value** is a filter)	
Sampling Period	Selects the sampling that is set globally on the report, or enforces one from the computed aggregates available in the database. Adjusting this option can significantly reduce report generation time. For example, if you are reporting on a month or year, selecting a day or week aggregate instead of real-time dramatically increases the report generation speed. It is important because with such long ranges, such detail is not typically required. The period selection option is related to the sampling period. It is because the application can automatically select a higher aggregate than the one selected when it really fits the report time-range. It provides better performance and scales no matter the report time range. When you are unable to change the specified aggregate, always choose this option. However, it can trigger a high report generation time if the report time range is too wide. **NOTE:** When you select a small sampling period, such as real-time, allow for the selection of higher periods for better performance.
Sampling Type	Selects one of the available aggregated values that are stored in the database. You can choose average, min, max, sum, the last value, count, the number of received values, or last timestamp, and the timestamp of the last received value, on the previously selected aggregate period.
Column Time Range(s)	Selects whether to use the global report time range for the values of this column, or a fixed one. A fixed range is relative to the end time of the report. It may also be divided into time slices, creating several columns in Browse mode.
Recover...	Determines if all values are retrieved over the report time range, or only the last value. • If all values are retrieved, then they are aggregated into a single value using the function that is selected from the **Temporal Aggregation** drop-down list. • If only the last value is retrieved, the time interval that is used for that retrieval changes based on the report's sampling period setting and the period of time set in the **Time Threshold** parameter. See the tooltip for examples.
Temporal Aggregation or **Time Threshold**	Specify settings that are related to the **Recover** parameter.
Value Settings	
Scaling Mode	If the unit of the values does not correspond to what you want to display, this field provides a way to convert the values. • **none** does not convert values. • **multiply** multiplies all values by the decimal value that you supply in the **by** field that appears when you make this selection. • **divide** divides all values by the decimal value that you supply in the **by** field that appears when you make this selection. • **by unit** converts the existing unit values into new unit values without requiring you to provide the formula. For example, using selections from the drop-down lists that appear, you can convert Celsius to Fahrenheit, or Packets per second into KPkts per second. Explore the drop-down lists to see all the supported conversions.
Thresholds definition	Defines the thresholds that determine the color of the gauge display.

Lower Bound and Upper Bound

This section defines the values for the lower and upper bounds of the gauge. The parameter names and choices are the same for both lower and upper bounds.

Use value from	Defines how to obtain the boundary value. • Choose **static value** to specify a fixed value for the bound. • Choose one of the other selections to define a value in the same way that you would define values for table columns. You can choose to define an attribute, property, or value column.
Additional parameters	The remaining parameters change depending on the selection of **Use value from**. • For **static value**, specify the fixed value to appear for the bound. • For the other selections, see the descriptions for attribute, property, and value columns in Table report parameters.

Legend

Properties in Legend	Click **Edit Properties** to configure the properties to show in the legend.
Legend Visibility	Choose whether to show or hide the legend.

Editing external reports

An external report is a web page that is displayed in the report pane.

About this task

The **Report Details: External** tab contains the URL of the page to display.

Other report definition tabs, such as **Filtering & Expansion** and **Report Configuration** define the report.

Steps

1. Click the **Report Details: External** tab.
2. Edit the URL in the **External report address** field.
3. Edit other tabs if needed.
4. Click **Save**.

External report address

The **external report address** field on the **Report Details: External** tab contains the URL of the page to display in the report.

With an external report, you can access and display data from external software and display the retrieved data in the report pane. The request for data is included in the URL.

The URL can include the following parameters.

Table 22. URL parameters

Parameter	Example
`${property}` where: *property* is an APG property name from the APG databases.	To filter results from an external database by device, use **`${device}`** in the URL.
`@{attribute}` where: *attribute* is an attribute of the report nodes.	If the **Filtering & Expansion** tab defines device filters, you might want to display the filter values in the report. To do so, use **`@{nodeFilter}`** in the URL.

Example URLs

To query Bing:

```
http://www.bing.com/search?q=${parttype}
```

To query an external defect database and list entries that are associated with a specific device:

```
http://jira.yourcompany.com:8443/issues/?jql=project%3DEMP AND text~"${device}"
```

To open the vSphere client software:

```
https://${device}/vsphere-client/?csp
```

@{*attribute*} values

Use @{*attribute*} to display an attribute of the report node in the report. These attribute parameters represent the same parameters that you can select for an attribute column in a table report.

NOTE: These attributes are the same attributes that you can select in a table report for an attribute column.

Table 23. Attribute parameters

@{*attribute*}	**Description**
@{singleNodeId}	Displays the node short ID relative to its parent.
@{id}	Displays the complete node ID starting from the root of the tree.
@{name}	Displays the name of the node.
@{fullName}	Displays the complete name of the node, starting from the root of the tree.
@{expandedNames[0]}	Is only applicable if a multi-expansion is applied to the node that appears in the table. The index references a zero-based array that contains each part of the multi-expansion.
@{nodeFilter}	Displays the node short filter, relative to its parent.
@{filter}	Displays the complete node filter, starting from the root of the tree.
@{childCount}	Displays the number of children of that node.
@{*other*} where: *other* is any other node attribute. For example, @{depth}.	Displays any other attribute of the node. Useful for debugging purposes.

Related concepts

Report Details tabs
Table report parameters
Graph report parameters
TopN report parameters
Map report parameters
Heat Map report parameters
Treemap report parameters
Topology report parameters
Overlay report parameters
Status report parameters

Topology reports

A topology report displays a graphical representation of the devices within a network and how they are linked together.

You can build and display transactions graphically in a topology report. You can use this report to represent a specific section of a network and to display various data between the different elements within a section. It enables you to represent different pieces of equipment and services and the various metrics and key performance indicators linking them together.

In **Report Type** on the **Report Configuration** tab, you select the topology report from the miscellaneous section.

Report elements

Nodes and edges define a topology report. The nodes represent the different elements of a transaction or the various elements of a topology representing a network section. The edges define the relationships between the nodes. A node can have either none, one, or multiple edges linking to other nodes (n-to-n relationship). The edges are capped with an arrow, pointing from one node to another to represent the flow.

All elements in the report are plotted on a surface that is called a canvas. The canvas has a rectangular shape and consists of tiles that are called cells. A node can only be one cell and a cell can only have one node.

Layers

Layers and map types are collections of nodes and connections between nodes that present a specific view, such as a physical connectivity view or a logical connectivity view. The difference is that you can select multiple layers to be simultaneously displayed for a report, but you can display only one map type for a report at any time.

Display layers through the Layers panel and display a map type with the **Map Type** drop-down list. This list is only visible in topology maps that have been defined to use layers.

Overlays

An overlay is a defined subset of visual indicators, such as bullets, images, spark lines, and color, that provides additional information about nodes and connections in a network. For example, overlays might be defined to inform users about availability, performance, and health. A user can manually display or hide an overlay by selecting or clearing it in the **Layers and Overlays** menu on the topology map.

Hop Count

The hop count is the number of devices that data must pass through from a source to a destination. Topology maps can be defined to display the **Increase Hop Count**, **Decrease Hop Count**, and **Reset Hop Count** icons that enable the number of elements being displayed to increase or decrease according to the number hops selected. The hop icons are not displayed in topology maps that have not been defined to support the feature.

Topology report parameters

You define the source and layout of the report on the **Report Details: Topology** tab. An administrator must configure topology reports before you can set the source and layout for a report.

Mode

The mode of the topology report determines the source of the report. It is fully customizable.

Simple	Displays the instances of classes from the selected topology that meet the report filter. For example, if you select Router as the class, and the instances in the class are R1, R2, and R3 and the report filter is devtype=="Router" and device=="R1"; only the R1 router appears in the report.
Advanced	Use the **Filter** setting to restrict nodes to the report filters. It does not apply to the root nodes because they are the starting point of the graph. The root nodes are always restricted to the report filter.

	For example, if you use this configuration and the report filter is devtype=="Switch", and you do not click the **Filter** checkbox, the hosts appear in the report, although they do not meet the report filter. All switches, which are determined by the report filter and linked to the hosts in the topology, appear in the report.
Drilldown	Renders a report based on the sub-reports of the current report. If the current report has three sub-reports, then three nodes appear. The node is based on the sub-report in Browse mode. Each node is clickable to Drilldown to the sub-reports. For drawing the nodes, you need a template containing the images references. If there is not a template or if the template does not contain references to the sub-report, the interface uses the sub-reports icon. Drilldown mode displays reports that are one level below the topology report to prohibit edges from displaying.
Custom	The topology custom mode report is configured in XML files. You must place the XML file in the `topomap` directory of the WebApps-Resources module. For example, `<APG>/Custom/WebApps-Resources/Default/topomap`.
Topology Service	Uses the Topology service to generate the nodes and relationships.

Topology

Select a topology service that is configured for the frontend application. These are set in the web application's dedicated XML configuration (for example, in `/opt/APG/Web-Servers/Tomcat/Default/conf/Catalina/localhost/APG.xml` on UNIX or in `C:\Program Files\APG\Web-Servers\Tomcat\Default\conf\Catalina\localhost\APG.xml` on Windows.)

XML data retrieval

This defines how the XML describing the report is retrieved. In each case (file path or URL), dynamic values can be injected at runtime by using placeholders. To inject a property, use ${property}. For example: http://www.company.com/query?mydevice=${device}. For topology map services that support it, "hop-count" and "map-type" can also be specified with their default values, using @{hop-count[:default-value]} or @{map-type[:default-value]}. For example: http://www.company.com/query?hopcount=@{hop-count:1}&maplayer=@{map-type}.

Layout

Use this setting to determine the layout of the report.

Organic	Positions the nodes based on a physics simulation of the interacting forces.
Balloon	Positions the child nodes radially around their parents.
Circular	Positions the nodes in a circle.
Hierarchical	Positions the nodes in a hierarchical structure.
Tree	Positions the nodes in a tree structure with the parents at the top right.
Manual	This setting is only available in custom mode.
Orthogonal	Positions the nodes at right angles.

Template

Use this setting to determine how the nodes and edges are drawn. For the simple and advanced modes, the `id-ref` of each node is the same as the class. For Drilldown mode, the `id-ref` is the sub-report in Edit mode. For example, if you have a sub-report named "Router" and you perform an expansion on it, then each node of this expansion has the `id-ref` set to "Router."

If you select more than one template and the same node is located in multiple templates, only one is valid.

For the edge part of the simple and advanced mode, the `id-ref` is formatted as Source.Relation. Destination.

Overlays

Name Assign a name for the overlay. The name appears on a menu of layers and overlays that are displayed on each Topology report.

Display	The value visible causes the overlay to be displayed by default on the Topology report. The value that is hidden causes the overlay to be hidden by default.
Templates	Use the pencil icon to display a list of templates. Select the template in which overlays are defined.

Related concepts

Report Details tabs
Table report parameters
Graph report parameters
TopN report parameters
Map report parameters
Heat Map report parameters
Treemap report parameters
External report address
Overlay report parameters
Status report parameters

Overlay reports

Overlay reports define additional layers to a graph report where events are plotted. You define the events to appear in a graph in a table report.

An overlay report is a mixed report because it displays the child graph report and the child table report on the same page.

In **Report Type** on the**Report Configuration** tab, you select the overlay report from the mixed section.

Configuration process

To configure an overlay report, do the following:

1. Add an overlay report node to the tree and configure it.
2. Configure a graph report as its child.
3. Configure a table report as its child, setting the events to appear in the graph.

Overlay report parameters

You define the selection filter, the tooltip information, and the event attributes on the **Report Details: Overlay** tab.

Display Title

The title does not appear in the reports but appears in the title of the overlay configuration box.

Selection Filter

Filters events from the selected ones in the child table to appear in the overlay. This filter only contains additional properties because the table performs most of the filtering.

Boundaries

Defines the zone in the graph where the events appear. It shows boundaries as percentages where zero is the bottom of the graph and 100 is the top. Use negative numbers to position the event zone below the graph. Use the slider for adjustments. Your selection appears with the overlay title at the top of its configuration box.

Number of Lines

The number of lines to show the events in the graph. You can use one line per 10% of height. The result is alternating lines that are distributed vertically to plot the events.

Main Color

The color value to use for the background of the whole zone. Set to white, **#ffffff**, to disable it.

Display Level

Events and time series are rendered on top of one another. This setting determines how to arrange events and time series in an overlay. To draw overlays under the graph lines, use a negative value. To order different overlays, use numbers for the respective display levels to arrange them from the lowest value to the highest value. You can also use top or bottom as shortcuts for min and max. If multiple overlays overlap, you can choose the order in which they appear, as they are drawn from the lowest value to the highest.

Display Mode

The way to render events. Depending on your selection, settings for events with duration are toggled to display those applicable to lines, dots, or areas.

NOTE: In **Display Mode**, when **Dot** is selected, the child table report will not be available.

Event Limit

The maximum number of events that are displayed in the overlay. Events are displayed using the table order, and after the limit is reached, the rest of the events are not displayed.

Tooltip Title

The name of the property whose value is the tooltip title.

Events Color

The HTML color code for momentary events.

Point Size

The size of the points for momentary events.

Marker Type

The type of marker for momentary events.

Events Color

The HTML color code for durable events.

Line Width

The line width for events with duration.

Line Style

The line style for events with duration.

Dot Size

The size of the dots for durable dot type events.

Start Marker

The marker for the start of events with duration.

End Marker

The end marker for events with duration.

Marker Type

The type of marker for dot type durable events.

Related concepts

Report Details tabs
Table report parameters
Graph report parameters
TopN report parameters
Map report parameters
Heat Map report parameters
Treemap report parameters
External report address
Topology report parameters
Status report parameters

Status reports

A status report aggregates data for each child node using a selected function over a time period. Each child node displays as a color symbol that can show its aggregated value and node name. It enables you to quickly view the status of nodes in relationship to one another, such as their average CPU utilization.

You select the size and symbol to use for the child nodes as well as the thresholds and their colors.

In **Report Type** on the **Report Configuration** tab, you select the status report from the aggregated section.

Status report parameters

You set how you want information presented in a status report on the **Report Details: Status tab**.

Marker Type

Sets the size and symbol to use when reporting on the child nodes. The size values are:

Nano	Generates a high-density color-coded status report that is similar to a heat map. It shows the aggregated value and node name in a tooltip. This is the smallest size for a symbol.
Micro	Generates a high-density color-coded status report that is similar to a heat map. It shows the aggregated value and node name in a tooltip.
Small	Generates a color-coded status report with small status symbols, each displaying its aggregated value and node name.
Medium	Generates a color-coded status report with medium status symbols, each displaying its aggregated value and node name.
Large	Generates a color-coded status report with large status symbols, each displaying its aggregated value and node name.

Show Value

Indicates whether to display the aggregated value inside the symbol and whether to round this value.

Scaling Mode

If the unit of the values does not correspond to what you want to display, select multiply or divide from this list. In the corresponding field, you can then type the factor to apply, which allows you to change from bytes to kilobytes, for example.

Order

Indicates whether to show the child nodes in ascending or descending order.

Top N Mode

Defines whether to display all the status symbols in a report or a certain number that you specify here.

Thresholds Definition

Thresholds do not appear in the report unless you give them values. You can add as many thresholds as necessary, giving each a different value and color. If there is a second y-axis in the graph, the thresholds you set here are applicable only to the main y-axis.

Tooltip Information

Tooltips appear when the user hovers the cursor over a status icon. A tooltip displays one or more property values and, optionally, property names. You specify the properties that appear.

Click **Add** to add a new property to the tooltips. Two fields appear.

- In the first field, type a database property name or click the **property selection helper** and select a property from the list.
- In the second field, specify the label to appear with the value in the tooltip.

Default	Uses the system default name, as shown in the **property selection helper**.
None	Does not use a label.
Custom	Lets you supply the label.

Related concepts

Report Details tabs
Table report parameters
Graph report parameters
TopN report parameters
Map report parameters
Heat Map report parameters
Treemap report parameters
External report address
Topology report parameters
Overlay report parameters

Using threshold definitions

Setting a threshold enables you to visually see when a value has exceeded a threshold in a report.

Threshold definitions can be used in almost all report types. With thresholds, you can set a threshold value and assign it a color to represent that threshold. You can define as many thresholds as you need.

In typical graphs, thresholds appear as dotted lines at the defined values and with the corresponding colors, along with an explanation of each threshold in the legend so you can gauge values that have crossed your defined threshold. In graphs where there is a second y-axis, the thresholds only apply to the main y-axis.

In tables, status tree map reports, and heat map reports, values that fall within a severity range appear in the selected color or display the related severity icon.

Thresholds define the value of the lower boundary of a severity range. The higher boundary of the range is defined by the next highest threshold value. Inclusion of the boundary values in the range is based on severity of the range. The highest severity always wins the boundary value.

You can define ascending (higher value is more critical) severity, descending (lower value is more critical) severity, or a combination of both ascending and descending severities, as shown in the following examples:

Example 1: As a value increases, the severity increases

Suppose that you want to set the following thresholds for a CPU utilization value:

- **Normal** for any value less than 20% utilization

- **Minor** for any value equal to or greater than 20% and less than 50% utilization
- **Major** for any value equal to or greater than 50% and less than 80% utilization
- **Critical** for any value equal to or greater than 80% utilization

The thresholds would be set as follows:

- **Normal**: -Infinity
- **Minor**: 20
- **Major**: 50
- **Critical**: 80

Example 2: As a value decreases, the severity increases

Suppose that you want to set the following thresholds for a free space on disk value:

- **Critical** for any value equal to or less than 20 GB
- **Major** for any value greater than 20 GB and less than or equal to 30 GB
- **Minor** for any value greater than 30 GB and less than or equal to 80 GB
- **Normal** for any value equal to or greater than 80 GB

The thresholds would be set as follows:

- **Critical**: -Infinity
- **Major**: 20
- **Minor**: 30
- **Normal**: 80

Example 3: As a value increases or decreases too much, the severity increases

Suppose that you want to set the following thresholds for a packet jitter value (which can be positive or negative):

- **Unknown** for any value less than -30 ms
- **Critical** for any value equal to or greater than -30 ms and less than -15 ms
- **Major** for any value equal to or greater than -15 ms and less than -10 ms
- **Minor** for any value equal to or greater than -10 ms and less than -5 ms
- **Normal** for any value equal to or greater than -5 ms and less than 5 ms
- **Minor** for any value equal to or greater than 5 ms and less than 10 ms
- **Major** for any value equal to or greater than 10 ms and less than 15 ms
- **Critical** for any value equal to or greater than 15 ms and less than 30 ms
- **Unknown** for any value greater than 30 ms

The thresholds would be set as follows:

- **Unknown**: -Infinity
- **Critical**: -30
- **Major**: -15
- **Minor**: -10
- **Normal**: -5
- **Minor**: 5
- **Major**: 10
- **Criticial**: 15
- **Unknown**: 30

Example 4: Using a Custom severity

A standard severity has a fixed level. In increasing order (from lower to higher), the highest severity always gains the range border values:

- **Undefined**
- **Normal**
- **Informational**
- **Unknown**

- **Minor**
- **Major**
- **Critical**

For example, if you have the following threshold definitions:

- **Major**: -Infinity
- **Minor**: 0
- **Critical**: 10

Then the following ranges are defined:

- **Major**: -Infinity <= value <=0
- **Minor**: 0 < value < 10
- **Critical**: 10 <= value

The range that has the Minor severity does not own the values 0 and 10 because the Minor severity is less than Major (which owns 0) and Critical (which owns 10).

Unlike a standard severity, a Custom severity is not fixed, it is the same as the severity of the range that is defined before it (in terms of value range). For example, if you have the following thresholds set in a table:

- **Major**: -Infinity
- **Minor**: 0
- **Custom**: 5
- **Major**: 10

Then the following ranges are defined:

- **Major**: -Infinity <= value <= 0
- **Minor**: 0 < value < 5
- **Custom**: 5 <= value < 10
- **Major**: 10 <= value

The Custom range has the same severity level as the one set in the range defined before it (Minor). This is why the range using the Custom severity "owns" value 5 but not value 10 (which is owned by a range which has a higher severity: Major).

Mixing standard and Custom thresholds is not recommended.

If you use only Custom severities in all ranges, the behavior is constant because the actual severities are the same. For example, suppose the following thresholds are defined:

- **Custom 1**: -Infinity
- **Custom 2**: 0
- **Custom 3**: 100

Then the following ranges that are defined:

- **Custom 1**: -Infinity <= value < 0
- **Custom 2**: 0 <= value < 100
- **Custom 3**: 100 <= value

If you define ranges with increasing severity:

- **Normal**: -Infinity
- **Minor**: 0
- **Major**: 100
- **Critical**: 1000

Then the following ranges are defined:

- **Normal**: -Infinity <= value < 0
- **Minor**: 0 <= value < 100
- **Major**: 100 <= value < 1000
- **Critical**: 1000 <= value

If you define ranges with decreasing severity:

- **Critical**: -Infinity
- **Major**: 0
- **Minor**: 100

- **Normal**: 1000

Then the following ranges are defined:

- **Critical**: -Infinity < value <= 0
- **Major**: 0 < value <= 100
- **Minor**: 100 < value <= 1000
- **Normal**: 1000 < value

The highest severity always wins the border value.

Related tasks

Setting threshold definitions in tables
Setting threshold definitions in graphs
Scrollable table

Formula tab

You can apply formulas to any node of the tree to perform advanced computations on any number of values. All formulas have at least one result, and each result has additional options for displaying them in different contexts.

Where you use formulas depends on the type of report and the hierarchy of its nodes. When applying a formula to a node, you can plot its result on a graph, insert it into another formula, pass it to another report node, display it in child-based parent report, and display it in a value column in a table on a parent node.

Results can vary when applying formulas to nodes that are subject to an expansion. Depending on the formula type, the aggregation of input parameters from child nodes in a formula can apply to their parent node. You can then view the results in the parent node as an aggregation of the results that are returned by the child nodes.

By using the report editing tools, you can copy formulas from one report to another report.

Handling formula results

The way that you apply formulas depends on how you want to process the results:

- If you want to plot the results of a formula on a simple chart or bar chart for a node, you can apply the formula to the node.
- If you want to use the results of a formula in a table report, apply the formula to a child of the parent table report node.
- You can use formula results from the current node or direct children as parameter inputs on the current node. It lets you add several formulas to a node whose results are combined.
- If you want to use the results of a formula in any child-based report, such as a child-based chart or stacked bars, apply the formula to a child of the node of one of these report types.
- If you want to pass the results of a child node to a parent of the current node, you can apply a formula to the current node. You can apply formulas to nodes in a hierarchy to pass the results further up the tree until you can access them at the desired node level.

Related concepts

Workflow for creating reports
Filtering and expansion tab
Report Configuration tab
Report Details tabs

Formula parameters

You can add predefined formulas on the **Formula** tab and then customize them according to your reporting requirements.

Parameter

The parameter values can be over an interval of time defined in the formula, such as the results of a filter or a child formula. Not all formulas have parameters to type.

Filter on this Node	Uses a standard filter to select the parameter to use. Values are subject to the filter of the current node, its parent nodes, and any other filters applied to the user or role. You can select any filter, but there can be specific values that are required.
Formula Result	Uses the result from a formula as the parameter. A list appears that displays the available results you can use. ● On a child node: Results from formulas of nodes that are direct children of the current node. ● On the current node: Results from other formulas on the current node, which can be used as a parameter value for this formula. Result names are taken from the default name the formula gives the result or the name you give the result.
Constant Value	Types a float value to use as a constant input such as 3.0.
Property Value	Click the Property Selection Helper icon and select a property whose value is the input parameter. You can select only one property to type. You can also type a property name in the Property field. Property values either register as a numeric value, or if not possible, do not return a value.
Combined Parameters	Enables you to combine parameter instances and types of Filter on this Node, Formula Result, Constant Value, or Property Value. How the combined parameters are treated depends on the formula. Usually they are aggregated spatially using the inherited report duration and aggregation settings, or by the time settings defined in the formula. Some formulas treat combined parameters in other ways. See the formula and parameter descriptions for more information.
Empty Parameter	The parameter has no value (null).
Attach properties	Enables you to attach the specified properties from the node to a parameter. If this parameter has a filter, it is also applied to the properties.

Setting

These are constant values used by the formula. You can change the default settings. It can determine, for example, the time range of the report, values that determine SLA objectives and settings that affect the aggregation that the formula uses. Not all formulas have settings.

Result

The results that are returned by the formula. Each result has a default name that you can edit. They are used for these purposes:

- In the legend of graphs to identify each result if Show in Graphs is enabled for them.
- To identify the result when using it as an input parameter for another formula, and when displaying it in a value column of a parent node table report.

Names must be unique. If there are two results with the same name and you want to display the results in a parent table report, only one instance of the name is available, and the result displayed is the aggregate of the formula results with this name. Result names are case-sensitive so you can change the capitalization to differentiate results.

Show in graphs	For simple chart and bar chart graphs, if you select show in graphs for a formula result, the metrics of the node are not displayed. Only the formula results you enabled show.
Default results	You can choose one result from the results for all the formulas on the node to display in a direct parent report that is a child-based report. To do this, select default result for the result. If the result is applied on an expansion, the result that is plotted in the parent node is an aggregation of all child results.

You can pass a node's result to other nodes higher in the hierarchy to use in other formulas. The child result of the current node is passed to the parent. You can also pass a result to another formula on the same node.

Copying a formula

You can copy and paste formula definitions from one report definition to another report definition.

Steps

1. Browse to the report that contains the formula you want to copy.
2. Click the **Report Details: Formula** tab.
3. Check the formulas that you want to copy.
4. Click **Copy**.
5. Browse to the report where you want to paste the formula.
6. Click the **Report Details: Formula** tab.
7. Click **Paste**.
   Paste appears next to **Add Formula**.
8. Click **Save**.

UI interactivity and table interactivity tabs

The interactivity parameters control the results when the user clicks the elements in the report.

Three levels of interactivity are provided.

Default behavior	Check or clear these parameters to switch them on or off. The underlying actions are preconfigured and not editable. • **Default pass through** sends events that are performed on a child report to the mixed report. • **Drilldown on row click** enables or disables a go to a more detailed report when the user clicks a row in a table report. • **Drilldown on title click** enables or disables the go to the full page report when the user clicks the title of a report. For example, a mixed report or list report contains titles to other reports. • **Action Menu** enables or disables the context pop-up menus that exist on some reports. For example, the alerting reports have a context menu for managing alerts. When there is no context menu, the installed default is cleared. • **Allow multiple row selection** enables or disables the appearance of the checkbox column as the first column in a table report. **NOTE:** This field controls whether the multi-row selection column appears. Customization activity is required to associate actions with the checkbox column.
Custom behavior	Click buttons in this section to configure custom behavior. **Jump to report** links an element in a report to another report. The Destination Report Path includes the UID, the node path of the report you are linking to, and optionally, expressions that filter the initial display of the report. For an example report path, click the information icon next to the **Destination Report Path** field.
Custom triggers and adapters	Click **Switch to Advanced Mode** to expose additional customization features. You can create custom triggers for interactive actions and custom adapters to handle additional actions.

Enable multi-row selection and action menu

You can configure an existing action menu to respond to multiple row selections.

Prerequisites

This procedure assumes that the action menu is already defined and associated to the report.

About this task

By default, a right-click action menu applies to a single row. For example, in any alerting report, right-click text in a row to view and use the action menu.

This procedure enables the action on multiple rows.

Steps

1. Browse to the table report that has an action menu that is associated with rows.
2. In **Edit Mode**, click **Table Interactivity**.
3. Select the following fields:
   - **Action Menu** (should already be enabled)
   - **Allow Multiple Row Selection**
4. Click **Save**.
5. Click **Browse Mode**.

   Notice that the column of checkboxes is now visible.
6. Test whether the action menu operates on multiple rows:
   a. Select the checkboxes on several rows.
   b. Right-click the text in one of the selected rows.
      - If the action menu appears, the feature is operational. You can exit the menu and clear the selection for rows.
      - If the message `No actions available` appears, go to the next step.
7. At the command line for the Frontend server, browse to the following folder:

   `<APG>/Custom/WebApps-Resources/Default/actions/`
8. Open the XML file for the appropriate action menu. For example, the default alerting context menu is defined in `event-mgmt.xml`.
9. Add the `multiple` attribute to the `<script>` element as shown here:

```
<script file="ack-event" result="notification" timeout="10000" multiple="multiple-execution">
```

10. Save the file and retest.

Pre-Generation tab

Pre-generated reports are reports that are automatically generated on a predetermined schedule. Pre-generated reports can save users time when they are used to generate reports that take a long time to process. Only administrators can create pre-generated reports. This tab is not available for reports under **My Reports**.

Steps

1. In Edit mode, click the **Pre-Generation** tab.
2. Click New Pre-Generated Report.
3. In **Schedule this report for**, select the user or role for which the report is to be generated.

   The assigned role requires at least one internal user: if the role has only externally authenticated users or no users at all, the report is not generated.
4. In **Name**, type a name for the report.
5. Use the **Schedule** options to select the time to generate the report.
6. Select the instances of this report to generate.

   For example, if a report node has been copied and placed somewhere else in the tree, this menu allows both of those nodes to be generated.
7. Check to send an email about the report generation to the selected recipient.

   NOTE: As per the SRM Reporting framework design,
   - The last stored pre-generated report is listed with session logout and login.
   - From **Edit Reports** > **Pregeneration Report** tab is supported only from the parent node.
   - The time range added for the parent node gets carried out for all the child nodes during stored report generation.

Report URL Syntax

The reports in the interface are available to third-party client tools that use the URL syntax.

URLs

The base URL is: **https://[APGserverIP:port#]/APG/?param=value&param=value**

The URL to display reports on a full page is: **https://[APGserverIP:port#]/APG/report.jsp?param=value&param=value**

The URL to display reports in jpg, png, pdf, svg, xls, and csv formats are: **https://[APGserverIP:port#]/APG/report.*format*?param=value&param=value**

Replace *format* in the above URL with the desired format. For example: **https://[APGserverIP:port#]/APG/report.csv?param=value&param=value**

Tree management

Syntax	Description
`select=<nodeid>`	Displays the report of the specified node.
`expand=<nodeid>`	Expands the selected node and then the parent nodes.
`collapase=<nodeid>`	Collapses the selected node and any child nodes.
`collapaseALL`	Collapses the whole tree.

Report settings

Syntax	Description
`display=<code>`	The code numbers for the display modes: • 0=normal display mode • 1=summary display mode with one graph per line • 2=summary display mode with two graphs per line • 3=summary display mode with three graphs per line
`mode=<code>`	The codes for the report modes: • srt=table report mode • lrt=leaf table report mode • frg=graph report mode • srg=children report mode • nrx=node report mode • vrx=baseline report mode • stk=stacked chart report mode • hb=horizontal bar chart report mode • pie=pie chart report mode • gg=gauge chart report mode • ico=icon report mode • mix=basic mixed report mode • dmx=mixed default preferences report mode
`period=<seconds>`	The period, in seconds, of the selected aggregate. Zero indicates real time. This period must exist in the database.
`type=<code>`	Not applicable when the period is zero. The code numbers for the aggregate types are: • 3=average

	• 4=minimum • 5=maximum • 6=sum • 7=last value • 8=number of aggregated values • 9=timestamp of the last aggregated value
`var_idx=<id>_<id>_<id>...`	A list of indexes that are separated by underscores that restricts the displayed variables.

Graph display preferences

Syntax	Description
`width=<pixels>`	The graph width in pixels.
`lower=<value>`	The lowest value that is displayed on graphs.
`upper=<value>`	The highest value that is displayed on graphs.

Time management

Syntax	Description
`durationType=<code>`	The code to use as the default for the report time range description: • n=not applicable because duration is based on something else such as a timestamp • p=previous duration • l=last duration • c=current duration
`duration=<code>`	The code to use as the default for the report time range: • a=custom code that is a combination of numbers and units • s=seconds • m=minutes • h=hour • d=day • w=week • M=month • y=year You can use as many duration codes as needed for the report time range but you cannot duplicate a code. You can also use calendar in the duration code followed by `start` and `end` or `start_ts` and `end_ts`, as explained in the following rows.
`start=<date>end=<date>`	The time range of the requested report. The *<date>* field has the YYYY-MM_DD HH:MM format. **NOTE:** URL encoding may transform spaces into plus signs and colons and periods into %3A.
`start_ts=<timestamp>end_ts=<timestamp>`	The time range using timestamps of the requested report. These are UNIX timestamps.

Advanced time management

Syntax	Description
`itz=<timezone code>`	The time zone for the report, which uses standard zone names such as America/Montreal.

`tf=<time filter.expression>`	The maintenance period for the report. The <time filter.expression> field consists of *<dom>*,*<dow>*,*<hod>* to represent the following: • dom=comma-separated list of days in a month between 1 and 31. For example, 1, 2, 10 represent the first, second, and tenth day of the month. • dow=comma-separated list of days in a week between 1 and 7, with 1 starting on Sunday. For example, 1 and 2 represent Sunday and Monday. • hod=comma-separated list of hours in a day between 0 and 23. For example, 12 and 13 represent 12pm and 1pm.

Query and variable selection

When using this syntax, always check that the URL encoding did not change spaces into plus signs.

Syntax	Description
`search-base=<base>`	The node from which the search begins. The *<base>* field can contain the root node, which is the default, or another node combined with a parameter.
`q=<search string>`	The query string for the standard or quick search mode. It is a space-separated list of tokens.
`qsp=<search properties>`	The space-separated list of properties in which to search.
`qsg=<grouping properties>`	The space-separated list of node expansion to group query results.
`qf=<search filter>`	The variable selection filter.
`qg=<grouping properties>`	The space-separated list of node expansion to group query results.

Defining custom colors

Custom colors are supported for custom threshold definitions and for text decorations.

About this task

Custom colors are supported for the following definitions in Edit mode.

- The **custom** threshold type lets you define a custom color.
- Text decorations and backgrounds in table columns let you define custom colors.

In the above field definitions, when you click the color patch next to the field, the custom color map appears. In other situations where the color is fixed, clicking the color patch does not open the color map.

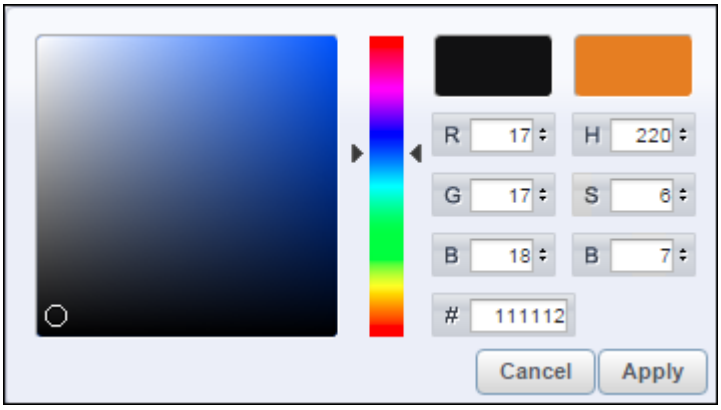
The colors that are associated with threshold severity levels are fixed as follows:

- Normal — Green
- Critical — Red
- Major — Orange
- Minor — Yellow
- Informational — Blue
- Unknown — Gray

Use the following procedure to use the color map to define a custom color.

Steps

1. Click the color patch in a location where a custom color is supported.
   The color map appears.



2. Slide the arrows on the color bar to choose the color family.
3. Drag the white circle to a location on the color map to fine-tune the color within the family.
   You can also use the code designations to define the color if you know them.
4. Click **Apply**.
5. To reuse a defined custom color in another definition, copy the HEX color code in the **#** field and paste the value into the same field in the new definition.

Accessing reports from outside of the Console

You might want to bookmark a report, include the report or its URL in another document or email, or have a third-party application access and display the most current version of a report.

The following methods for accessing a report from outside of the Console are supported:

- Copy the URL of a displayed report in the Console, and save it for use elsewhere.
- Use the Frontend Report Lookup tool to access a report using unique IDs and report paths.
- Construct a URL using supported parameters.

Getting the complete URL for the current report

With the complete URL of a report, you can email the link to a report or bookmark the report in your browser.

Steps

1. Click **Tools** > **Show Report URL**.
   The URL for the currently displayed report appears in a dialog box.
2. Copy the URL.

Report URL Syntax

The reports in the interface are available to third-party client tools that use the URL syntax.

URLs

The base URL is: **`https://[APGserverIP:port#]/APG/?param=value&param=value`**

The URL to display reports on a full page is: **`https://[APGserverIP:port#]/APG/report.jsp?param=value&param=value`**

The URL to display reports in jpg, png, pdf, svg, xls, and csv formats are: **`https://[APGserverIP:port#]/APG/report.`*`format`*`?param=value&param=value`**

Replace *format* in the above URL with the desired format. For example: **`https://[APGserverIP:port#]/APG/report.csv?param=value&param=value`**

Tree management

Syntax	Description
`select=<nodeid>`	Displays the report of the specified node.
`expand=<nodeid>`	Expands the selected node and then the parent nodes.
`collapase=<nodeid>`	Collapses the selected node and any child nodes.
`collapaseALL`	Collapses the whole tree.

Report settings

Syntax	Description
`display=<code>`	The code numbers for the display modes: • 0=normal display mode • 1=summary display mode with one graph per line • 2=summary display mode with two graphs per line • 3=summary display mode with three graphs per line
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`period=<seconds>`	The period, in seconds, of the selected aggregate. Zero indicates real time. This period must exist in the database.
`type=<code>`	Not applicable when the period is zero. The code numbers for the aggregate types are: • 3=average • 4=minimum • 5=maximum • 6=sum • 7=last value • 8=number of aggregated values • 9=timestamp of the last aggregated value
`var_idx=<id>_<id>_<id>...`	A list of indexes that are separated by underscores that restricts the displayed variables.

Graph display preferences

Syntax	Description
`width=<pixels>`	The graph width in pixels.
`lower=<value>`	The lowest value that is displayed on graphs.

`upper=<value>`	The highest value that is displayed on graphs.

Time management

Syntax	Description
`durationType=<code>`	The code to use as the default for the report time range description: • n=not applicable because duration is based on something else such as a timestamp • p=previous duration • l=last duration • c=current duration
`duration=<code>`	The code to use as the default for the report time range: • a=custom code that is a combination of numbers and units • s=seconds • m=minutes • h=hour • d=day • w=week • M=month • y=year You can use as many duration codes as needed for the report time range but you cannot duplicate a code. You can also use calendar in the duration code followed by `start` and `end` or `start_ts` and `end_ts`, as explained in the following rows.
`start=<date>end=<date>`	The time range of the requested report. The *<date>* field has the YYYY-MM_DD HH:MM format. **NOTE:** URL encoding may transform spaces into plus signs and colons and periods into %3A.
`start_ts=<timestamp>end_ts=<timestamp>`	The time range using timestamps of the requested report. These are UNIX timestamps.

Advanced time management

Syntax	Description
`itz=<timezone code>`	The time zone for the report, which uses standard zone names such as America/Montreal.
`tf=<time filter.expression>`	The maintenance period for the report. The <time filter.expression> field consists of *<dom>*,*<dow>*,*<hod>* to represent the following: • dom=comma-separated list of days in a month between 1 and 31. For example, 1, 2, 10 represent the first, second, and tenth day of the month. • dow=comma-separated list of days in a week between 1 and 7, with 1 starting on Sunday. For example, 1 and 2 represent Sunday and Monday. • hod=comma-separated list of hours in a day between 0 and 23. For example, 12 and 13 represent 12pm and 1pm.

Query and variable selection

When using this syntax, always check that the URL encoding did not change spaces into plus signs.

Syntax	Description
`search-base=<base>`	The node from which the search begins. The *<base>* field can contain the root node, which is the default, or another node combined with a parameter.

q=<*search string*>	The query string for the standard or quick search mode. It is a space-separated list of tokens.
qsp=<*search properties*>	The space-separated list of properties in which to search.
qsg=<grouping properties>	The space-separated list of node expansion to group query results.
qf=<*search filter*>	The variable selection filter.
qg=<*grouping properties*>	The space-separated list of node expansion to group query results.

Customizing user settings and custom reports

You can customize user account information, such as the password and associated email address, general UI display preferences, and individual table report display preferences.

You can manage custom reports and run the Broken Links Detection Tool.

To access the **User Settings** dialog, click **Profile** > **User Settings** in the banner area of the User Interface.

Modifying your user data and password

You can change the user data that a global administrator creates. You can modify your password, title, name, and email address that is used to send report notifications.

Steps

1. Click **Profile** > **User Settings**.
2. On the **User Data** tab, edit name and email address.
   An email address is required for certain features, such as emailing reports or requesting notifications.
3. On the **Change Password** tab, change your password.
4. Click **Save**.

Setting the reporting preferences

You can set the behavior for displaying reports for your user account. The choices that you make here override the default settings made by an administrator for the portal or in the user profiles.

Steps

1. Click **Profile** > **User Settings**.
2. Click the **Preferences** tab.
3. Select the **Language** to use.
4. Select the **Navigation Style** to use.

Option	Description
Default	The administrator's setting for the portal
Tree	Hierarchical tree
Icon	Thin icon column

5. In **Report Auto Refresh Rate**, leave blank to turn off auto refresh, or type the interval between redisplays. The default setting comes from the **Administration** > **Users & Security** > **Users & Roles** > **Manage Profiles** configuration.
6. In **Background Reports**, select one of the following:

Option	Description
Show the Question	When a report takes a long time to generate, a question appears asking if you want to wait until the report finishes, or if you want to finish the report in the background and then save it. **NOTE:** For any user session, only one background report can run at a time. If you answer yes when another report is still running, the running report is aborted and it is not generated.
No Background Reports	No question appears because generating a report in the background is not an option.

7. In **Stored Reports**, select whether you want a confirmation email sent to you after a report is saved.
8. Click **Save**.

Setting the first report to appear after login

A user account can set a favorite report that always appears first after login.

Steps

1. Go to the report that you want to set as the login report.
2. Click **Tools** > **Favorite this report**.
   If the report is already favorite, an error states that the link requires a unique name. In this case, you can either:
   - Rename the link to make it unique.
   - Click the **Trash** icon to delete this entry, and expand the existing entry of the same name.
3. Click the **Use as Login Report** button.
4. Click **Save**.

Saving the report tree

Always make a backup copy of the entire report tree before you customize it.

Prerequisites

Ensure that you are logged in with User Interface mode that is enabled to gain access to the **Settings** tab.

Steps

1. Click **Profile** > **User Settings**.
2. Click the **Custom Reports** tab.
3. Click **download a backup** in the text.
4. Click **Save** and browse to the place to store the report tree.

Import a report definition

You can import the XML definition of a node or report into your report tree.

About this task

NOTE: To export the XML definition of a report:

1. Browse to the report whose definition you want to export.
2. Click **Exports** > **XML format**.

Follow these steps to import the definition into another installation.

Steps

1. Click **Modifications** > **Edit Reports**.
   You can only perform this task in edit mode.

BROWSE MODE displays when you are in edit mode.

2. In the left navigation, select the node under which to add the report.
   If you do not select a node, the report is added to the last root node in the tree.
   Selecting **My Reports** or a node under **My Reports** is recommended.
3. Click **Profile** > **User Settings** > **Custom Reports**.
4. Next to **Upload a Branch**, click **Browse** to locate the .XML file to upload.
5. In **Conflict Management**, select the preferred action in case the node or report that you are uploading is using the same ID as an existing node or report:

Option	Description
Duplicate	Provides another ID to the new node or report. The existing node or report keeps its unique ID.
Overwrite	Replaces the existing node or report with the imported node or report.

6. Click **Save**.
7. Click **BROWSE MODE** to view the imported node or report.

Find and Fix Broken Links in Reports

The Broken Links Detection Tool scans the entire report tree and identifies all report links that cannot be resolved. It fixes links if possible and provides best guess suggestions for resolving others.

About this task

Reasons for broken links

As reports are moved, removed, updated, or disabled in the report tree, links to those reports from other reports must be changed. The old links no longer work. Also, pregenerated reports and reports in the **My Reports** node, such as pinned reports, scheduled reports, and favorite reports are based on links that might be broken when reports are moved, removed, or disabled. Changed UIDs result in breaking links to reports that were linked or hooked to the original UIDs. SolutionPack upgrades that include moved or updated reports can impact links. For this reason, whenever a SolutionPack upgrade occurs, the upgrade process schedules the Broken Links Detection Tool to run after a timed waiting period. If you are sequencing multiple SolutionPack upgrades closely together, the waiting period is moved out with each upgrade, so that the Broken Links Detection Tool runs only once after all the upgrades seem to be finished. You can run the Broken Links Detection Tool on demand at any time.

Fixing broken links

The tool fixes many broken lines during its execution. These links are known with 100% certainty to be remapped to other locations. The tool does not show the automatically fixed links. If you are interested in viewing them, you can change the logging level of the daily Tomcat log file. For suggested fixes that do not rate a 100% confidence, the tool presents you with the pathname of the broken link, a suggested path for fixing the link that is based on certain assumptions, and a confidence percentage for how accurate the suggestion might be. You can select whether you want to apply the suggested fix, and the tool applies the fix. If you believe that the suggestion is incorrect, or if there is no suggestion that is provided, you must manually fix the link. The following procedure describes how to run the tool and how to resolve the detected broken links that were not fixed automatically by the tool.

Steps

1. On **APG** page, click **Profile**  > **User Settings**.
2. Click **Custom Reports** tab.
3. In the **Broken Links Detection** section, click **Open Tool**.
   This button launches the Broken Links Detection task. The task runs on the entire report tree. The dialog box that opens shows the results of the run.

   The dialog box shows the following information for each broken link detected:

Table 24. Broken links description

Column	Description
Type	The type of link that is broken. Examples are: Custom reports, Favorites, Pinned, Scheduled, Pregenerated.
Name/Location	The report containing the broken link.
Link will now point to...	The report path of the proposed new link.
Confidence	Percentage of confidence that the new link is correct. • When Confidence is 100%, the tool fixes the link automatically and it is not listed here. The 100% confidence rating occurs when changes match those that are recorded in the mapping files that are installed with the tool. • When Confidence is not 100%, the value is based on how many components in the broken URL were mapped to known new values or new values that are similar to the original. • The lowest level confidence suggestions are based on similar node names to the original path, and similar depths of levels in the hierarchy. Check the suggestion carefully to ensure it is correct, and if not, fix the link manually. • A 0 level confidence rating indicates that the tool could not find any similar report path to suggest. The old and new report path names are too different from each other to be matched. A manual fix is required.

4. Analyze the suggestion in each row.
5. To accept a suggestion, click the box in the first column.
6. Click **Apply Fixes**.
7. When a suggestion is not correct or when there is no suggestion at all, manually fix the link as follows:
   a. Click the **Go To** icon in the **Name/Location** column.
   b. Use any of the following suggestions to manually correct the link path:
      - For Scheduled Reports, Pinned Reports, and Favorites, it is easiest to re-create the link using the User Interface, and delete the outdated report.
      - Correct a link manually: Click **Modifications** > **Edit Reports**, and change either the incorrect UID or the incorrect report path in the report definition. There are various places in a report definition where a link to another report might occur. Save the change, and return to Browse Mode.
      - If there are many reports linking to the same report path, and that report path is not being found, causing many failures for the same reason, consider the following approach: Revert to the previous version, add a UID to the report that is not being found, then upgrade, add the same UID into the report definitions in the new location, and run the tool again. Analyze whether this advanced approach is better than correcting each link manually.
8. Rerun the Link Detection Tool.
9. Repeat these steps until all broken links are fixed.

View Fixed Links in Tomcat Logs

If the logging level is set to `FINE` or `FINEST`, fixed links are logged in the daily Tomcat log file.

About this task

By default, the logging level does not produce information about fixed links, so change the logging level. More log entries increase I/O activity and can impact performance.

The log file name is `catalina.<date stamp>.log` at the Frontend server here:

`/opt/APG/Web-Servers/Tomcat/Default/logs`

The configuration file for changing the log level is:

`/opt/APG/Web-Servers/Tomcat/Default/conf/logging.properties`

You can change the logging level and access the log files on the web portal.

Steps

1. From Administration, go to **SYSTEM ADMIN** > **Server & Modules** > **Modules**.
2. In **Logical Overview** table, search for **Tomcat**.

In case of multiple tomcat instances, select the instance on the frontend VM from the search result.

3. To change the logging level:
   a. Expand the **Configuration Files** blue bar.
   b. Locate the `conf/logging.properties` file and click the **Edit** icon on the row.
   c. Add the following line to the end of the file:

```
com.emc.mnr.links.level=ALL
```

   d. To enable FINEST logs, locate this existing line:

```
1catalina.com.watch4net.apg.logging.jul.handler.RotateFileHandler.level
= FINE
```

   e. Change `FINE` to `FINEST`.
   f. Save the file.
   g. Restart Tomcat.
   h. Rerun the Detect and Fix Links tool to start capturing the additional log entries.
4. To view the log entries:
   a. Expand the **Log Files** blue bar.
   b. Download or view a `catalina.<date stamp>.log` file.

Modifying the default profile settings

You can modify the language, time zone, and logo defined for the default profile on the **Profile Modification: Default Profile** page or on the **Manage Profiles** page. You can change the default logo to your customized logo from this page.

About this task

Steps

1. Browse to **Administration** > **User and Security** > **User and Roles** > **Manage Profile**.
2. Click **Default Profile**.
3. To change default language, time and logo click **Customizable Settings**.
   a. Click **Upload New Logo**.
   b. Click **Choose file**, browse to the new image to upload, and click **OK**.
   c. Select the new logo file name in the **Logo** drop-down list.

   The banner replaces the product name text in the login page, only if no logo has been set in the Default Profile.
4. Select the **Locale**.
5. Select the **Time Zone**.
6. Click **Save**.

Set first report after login

Administrators can control which report appears first after login for each user profile.

About this task

Each user account can override the Profile setting by clicking **Tools** > **Favorite this report** and setting the associated **first report after login** button.

Steps

1. Click **Administration** > **Users & Security** > **Users & Roles** > **Manage Profile** > **Customizable Settings**.
2. For **Login Report**, provide the report identifier, report URL, or report lookup value.

   Click the tooltip for formatting information.
3. Click **Save**.

Using the Report Library

The Report Library node in the navigation tree holds all the reports for the installed SolutionPacks.

Each installed SolutionPack has a corresponding node under Report Library.

Accessing SolutionPack reports

You can access the reports for installed SolutionPacks in Browse Mode.

Steps

1. Click **Report Library**.
2. Click a SolutionPack name.
   The selected SolutionPack node expands, showing a hierarchical tree of categories and reports offered by the SolutionPack.
3. Click a report.

Results

The selected report appears in the report pane.

Viewing the summary of installed SolutionPack

You can view the details of installed SolutionPack in the **Installed SolutionPack** page.

Steps

1. Click **Administration** > **CONFIG** > **SolutionPacks**.
2. Click **Installed SolutionPack**.
3. Select the SolutionPack in the **Installed SolutionPacks** page.

Global portal properties

You can set global properties for the Frontend interface.

Click **Administration** > **CONFIG** > **Settings** to access the **Global Portal Properties** page.

Table 25. Global portal properties

Tab	Settings
Frontend Status	• Set autocomplete behavior for logging in. • Enable or disable maintenance mode for the portal. • Add a message to the login screen.
Default Display	Set the portal-wide logo, banner, language, time zone, and navigation styles.
File Customization	Customize the look and actions in the portal by uploading custom CSS and JavaScript files. Enable keyboard shortcuts and upload hotkey definitions.
Duration Aliases	Define the aliases to use on the portal for time range duration values, such as quarter (for 3 months) and semester (for 6 months).
External Users	• Link the Admin Role or Custom Reports Role to external users. • Allow or disallow external users to schedule reports.

Setting login properties and welcome message

You can define the welcome message and the **Login** page autocomplete behavior.

Steps

1. Click **Administration** > **CONFIG** > **Settings**.
2. Click the **Frontend Status** tab.
3. For **Login Page Autocomplete**, choose from the following options:
   - Retain the default browser behavior.
   - Disable browser autocomplete for both the username and password.
   - Disable browser autocomplete for the password only.
4. Type a customized splash screen message in **Welcome Message**.
   HTML code is accepted.
5. Click **Save**.

Disabling user logins

You can disable all non-administrator logins to perform maintenance.

Steps

1. Click **Administration** > **CONFIG** > **Settings**.
2. Click the **Frontend Status** tab.
3. Click **Maintenance Status** to place the **User Interface** in a maintenance state.
   It disables all logins for non-administrators until you clear this checkbox.
4. Click **Save**.

Set the navigation style

You can change the navigation style for the user account.

About this task

The administrator sets a global default navigation style under **Administration** > **CONFIG** > **Settings** > **Defult Display**. The user account settings can override the global setting.

Steps

1. Browse to , click **Administration** > **CONFIG** > **Settings** > **Defult Display**.
2. In **Report Navigation Style**, make a selection.

Option	Description
Default	The global setting of the administrator
Tree	Hierarchical tree
Icon	Thin icon column

3. Click **Save**.

Customizing the look of the interface

You can change the look of the interface by applying custom CSS and JavaScript files.

About this task

The selected files apply to the reporting interface, the alerting interface, and the Administration interface. The CSS files can customize elements in the interface, such as buttons and menus. The JavaScript files run when a page is loaded.

Use the **File Customization** tab to:

- Upload custom CSS and JavaScript files
- Select the CSS and JavaScript files to apply
- Download, edit, and reload any CSS or JavaScript file

Steps

1. Click **Administration** > **CONFIG** > **Settings**.
2. Click the **File Customization** tab.
3. If needed, click an **Upload** button to upload a file into the system.
4. Click to select one or more files to apply to the interface.

   You can select multiple .css and multiple .js files.
5. To edit files:
   a. Select the files to edit.
   b. Click the appropriate **Download** button.
   c. Edit the files offline, and then upload them.
6. Click **Save**.

Enabling keyboard shortcuts

Keyboard shortcuts enable you to perform common tasks quickly. For example, you can switch between Browse and Edit mode by pressing **`Alt + e`**.

Steps

1. Click **Administration** > **CONFIG** > **Settings**.
2. Click the **File Customization** tab.
3. Check **hotkeys.js**.
4. Click **Save**.
5. Press **`Alt + h`** to view the keyboard shortcuts.

Editing the aliases given to time periods

You can edit the default aliases that represent a time period and a language. For example, quarter is an alias for three months in English. These aliases appear in report titles.

Steps

1. Click **Administration** > **System Admin** > **Tools** > **Duration Aliases**.
2. Edit the default values for the aliases.
3. To add another alias, click **Add alias** and provide the values.
4. Click **Save**.

Assigning system roles to external users

You can assign the Admin Role and the Custom Reports Role to a user who is authenticated in an external system, such as LDAP. You can enable or disable permissions for external users to schedule reports.

Steps

1. Click **Administration** > **User & Security** > **Authentication** > **External Users**.
2. For **Admin Role** and **Custom Reports Role**, identify an external user that is already defined under **Administration** > **Roles** > **External Users**.

   NOTE: Only one external user is accepted in each field.

   - For LDAP, copy a Distinguished Name (DN) from **Roles** > **External Users** . For example:

     `CN=test,OU=my_ldap,DC=lss,DC=emc,DC=com`
   - Otherwise, copy a User Principal from **Roles** > **External Users**.
3. Check the **Scheduling** checkbox to enable external users to schedule reports.
4. Click **Save**.

Scheduled Reports

You can access all scheduled reports from one portal page.

Click **Administration** > **System Admin** > **System Operations** > **Scheduled Report**. The following sub-reports appear on the page: All scheduled reports appear, including the reports that are pending, currently running, pre-generated, such as the daily health report, and any invalid reports.

- Users Scheduled Reports—Lists users that have defined scheduled reports. Click a user to list and manage the reports scheduled by that user.
- Pre-Generated Reports—Lists reports that have a defined pre-generation schedule in their report definition.
- Running Reports—Lists reports that are currently running.
- Invalid Scheduled Reports—Lists reports that are scheduled but cannot run successfully.

Managing scheduled reports

You can edit the properties of a report, launch a report immediately, cancel a running or queued report, remove a report from a scheduled list, and disable a scheduled report from running.

Steps

1. Click **Administration** > **System Admin** > **System Operations** > **Scheduled Reports**.
2. In the **Users Scheduled Reports** table, click a username.
   The **Scheduled Reports** table appears, listing all the reports that the selected user has scheduled.
3. Right-click a report.

   The options that appear depend on the status of the report. For example, **Launch Now** only appears if the report is not running.
4. Choose an option from the right-click menu.

Option	Description
Edit	Modifies the properties of the report.
Enable	If the report is disabled, enable the generation of the report based on its schedule.
Disable	If the report is enabled, disable the generation of the report. The report cannot run until it is enabled.
Launch Now	Runs the report immediately.
Abort Now	Stops a report that is currently running.

Option	Description
Delete	Removes the report from the scheduled list.

Editing the properties of scheduled reports

You can rename a point-in-time report, modify its schedule, change the recipients of a report, and change the instances of the report to generate.

Steps

1. Click **Administration** > **System Admin** > **System Operations.**.
2. Click **Scheduled Report** tab.
3. Select a report and click **Edit**.
4. **Schedule this report for** all the users or only the users in a specified role.
5. To rename the report, type the **Name.**
6. To generate this report at the scheduled time, click **Active**.
7. In **Schedule**, do one of the following:
   - Reset the existing settings to schedule the report.
   - Click **Advanced** to schedule the report using cron.
8. Select the instances of the report to generate in **Report Link**.
9. To send an email about the generation of the report, click **Send confirmation email**, and type the email recipients separated by commas.
10. Click **Save**.

Deleting stored reports

When a stored report is no longer needed, you can remove it.

Steps

1. Click **Administration** > **System Admin** > **System Operations**.
2. Click **Stored Reporta** tab.
3. Click the checkbox in the first column of the report to delete.
4. Click **Delete**.

User Sessions

You can view information about all current user sessions.

Click **Administration** > **User & Security** > **User Sessions** to access the User Sessions page. The page shows the following information for each current user session:

- Login name—Multiple users can log in using the same login name.
- Login date and time
- Last access date and time
- Client IP address
- Client hostname
- Status

Canceling a user session

You can cancel a user's login session, which logs the user out of the interface.

Steps

1. Click **Administration** > **User & Security** > **User Sessions** > **User Sessions**.
2. Right-click the user name, and choose **Kick Out**.

   NOTE: You cannot cancel the session of an administrator.

3. Click **OK** to confirm the action.

Listing reports that are generating

At any point in time, you can determine which reports are currently running.

Steps

1. Click **Administration** > **System Admin** > **System Operations**.
2. Select **Running Reports** tab.

Accessing modules

Modules are components that collect, organize, and process data about hardware components, applications, storage devices, and databases.

Steps

Click **Administration** > **System Admin** > **Servers & Modules** > **Modules**.

Deleting metrics

You can remove metrics that are no longer needed from the database.

Prerequisites

If you added databases to the system, verify that the resource names and resource links of these databases are in the `APG.xml` file. It enables you to delete metrics.

Steps

1. Click **Administration** > **System Admin** > **System Operations** > **Manage Database Metrics**.
2. Create the **Filter** for displaying the metrics to delete.
3. Type the **Maximum results** to appear.
4. To show the timestamp of each metric, click **Show last timestamp for all results**.

   It can increase the search time.
5. Select the **Properties to show** for the search results.
6. Click **Query**.
7. When the search results appear, click each metric to delete.
8. Click **Delete**.

   Until the data in the database is refreshed, these metrics are not removed and may still appear in reports.

Configuring an SMTP server

Configure an SMTP server to enable the email features in the product.

Steps

1. Click **Administration** > **CONFIG** > **Settings** > **SMTP Settings**.
2. Configure the SMTP fields.
3. Click **SAVE CHANGES**.
   You have successfully set the SMTP variables on the Backend (alerting) server. In a one-server setup, these settings also apply to the Frontend server.
4. In a setup with more than one server, set the SMTP variables on each Frontend server.

   NOTE: This step is required in a 4-VM vApp, or if the installation includes more than one Frontend.

   a. On the Backend server, copy the SMTP variables in `/opt/APG/bin/apg.properties`.
   b. On each Frontend server, paste the variables into `/opt/APG/bin/apg.properties`.
5. Restart the Tomcat server.
   a. Browse to **Admin** > **System Admin** > **Server & Modules** > **Modules**.
   b. In **Logical Overview** table, search for **Tomcat:: *instance name - server name*** and click the row.
   c. Click **Restart**.

Managing users and user rights

A global administrator can assign access rights to users and groups to control what they can see and do in the interface.

Roles

Roles group users together to help you manage access to reports, modules, and functionality, such as report editing and report searching. You can also assign administrative tasks to a role.

You assign a user to a role when creating or modifying a user account or a role. There are several default roles that you can use and you can create your own roles. You can assign a user to one or more roles.

If you do not assign a user to a role, the user only sees the Scheduled Reports, Stored Reports, and Favorite Reports branches in the report tree.

Inheritance of privileges

You can define a parent-child relationship in which one role inherits the privileges of another role. In this relationship, the child role uses the parent access rights and restrictions for viewing reports and components and using functionality.

Primary filter

A primary file provides you an additional layer to manage access to metrics shown on reports. You can set up a primary filter to restrict the users of a role from viewing certain metrics on reports.

You can also define a primary filter for a particular user, which is combined with the group's primary filter to place more viewing restrictions on that user.

Profiles

A user contains personal information, such as login credentials. You associate a user with a profile to define the global characteristics of a user, such as language and time zone. Users are automatically assigned to the default profile, but you can add profiles according to your company's global reporting requirements.

Advanced mode

You perform most user management functions in standard mode. However, to establish inheritance between roles, assign administration tasks to a role, and reset default roles to their original settings, you must use advanced mode.

User Management

A user account and associated password are required to log in the system. A user account can be shared, and multiple online sessions can log in with the same account simultaneously.

The **User Management** page lists all user accounts, their status, their profile, whether the profile is enabled, and some optional information about the user, such as name and email address. From this page, you can add new user accounts and edit existing user accounts.

The **User Management** page also lists the number of days left for password expiry as well as the last accessed date of the user.

Adding a user

When you add a user, you set the login credentials and email address in which to send notifications about reports.

Steps

1. Click **Administration** > **USERS & SECURITY** > **Manage Users**.
2. Click **New user**.
3. On the **User Data** tab, type the **User Login**.
   This value is case-sensitive.
4. Type and confirm the password.
5. Select the **Title** of the user.
6. Type the **First Name** and the **Last Name** of the user.
7. Type the **Email Address**.
   This address receives notifications about reports, such as when a certain report is generated.
8. Click **Save**.
   A user can override these settings on the **User Settings** page.

Setting the access rights of a user

You can indicate whether a user is a Global Administrator with full privileges or a Normal User in which you can assign access rights to reports, components, and report templates using roles.

Steps

1. Go to **Administration** > **Users & Security** > **Users & Roles** > **Manage Users**.
2. On the **Users management** page, click a user.
   User Modification: <user_name> page appears.
3. Click the **User Status** tab.
4. From the **User Status** drop-down list, select one of the following:

Option	Description
Normal User	Default status for all users. You can set various access restrictions on components and reports on a normal user.
Global Administrator	Full access to all components and reports. You cannot disable a global administrator from login.
Vault User	User credentials are managed by CyberArk. This is applicable only to CyberArk Password Management.

5. If you want to disable the user from logging in, check **Disabled?**.

This is useful when performing maintenance.

6. If you want to hide the New Feature dialog, check **Hide New Feature Dialog?**.
7. Select the **Profile** for the user.
   The user is automatically added to the default profile if you have not created any profile.
8. Use **Add Role** to assign the user to a default role or other roles that you created.
   The role that you assign the user determines which reports a user can see and modify. The Full Control Users default role enables a user to access and modify all available reports in the tree as well as access most modules and tools.
9. Click **Save**.

Setting the viewing rights of a user

You can create a primary filter to restrict the data that a user can see on a report and restrict a user from viewing custom reports.

Steps

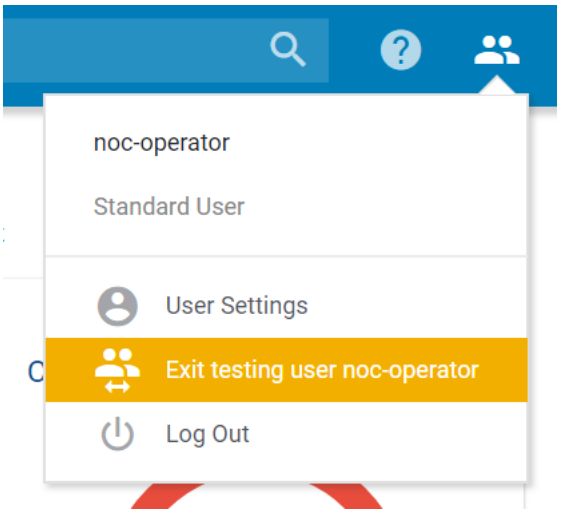
1. Click **Administration** > **User & Security** > **User & Roles**.
2. Click **Manage Users**.
3. Click a user.
4. Click the **Other Options** tab.
5. In **Primary Filter**, define one or more filters that place viewing restrictions on the user.
   These filters are combined to create the primary filter. If the user is assigned to a role with a primary filter, then the role's primary filter is combined with this primary filter to place more restrictions on what the user sees.
6. In **Custom Reports**, indicate whether you want the user to view the reports in the **My Reports** area.
7. Click **Save**.

Test user settings

You can test user settings to check how the settings are applied. Test mode applies settings as if you were logging in as this user.

Steps

1. Click **Administration** > **Users & Security** > **User & Roles** > **Manage Users**.
2. Right-click the user that you want to test, and choose **Test User**.
   You are launched into the User Interface, interacting with the Console as if you had logged in as the user being tested. The username that you are testing appears.



3. Browse reports and edit reports, and perform any other typical functions.
   Any changes that you make, such as editing report settings, are saved with their new settings.
4. To exit test mode, click the **Exit testing user <user name>** next to the test user's name in the banner.

Copying users

You can copy the settings of an existing user to create a user.

Steps

1. Click **Administration** > **User & Security** > **User & Roles** > **Manage Users**.
2. Right-click the user that you want to copy, and choose **Copy** .
3. Click **Save**.

Editing users

You can modify the settings of existing users.

Steps

1. Click **Administration** > **USERS & SECURITY** > **Manage Users**.
2. Select the **User**.
3. Edit user details.
4. Click **Save**.

Deleting users

When you delete a user, all the user properties are removed.

Steps

1. Click **Administration** > **USERS & SECURITY** > **Manage Users**.
2. Select the **User**.
3. Right-click the user you want to delete, and choose **Delete**.
4. Click **Ok** when the warning message appears.

Viewing users

You can generate a list of existing users that shows the status and profile and whether the profile is currently enabled.

Steps

Click **Administration** > **User & Security** > **User & Roles** > **Manage Users**.

Roles management

A role defines rights and restrictions that apply to users assigned to the role.

The **Roles Management** page provides a view of the defined roles in your system, their descriptions, and how many users currently use each role. From this page, you can create roles or edit existing roles. You can also enter Advanced Mode to establish inheritance relationships, assign administration tasks to a role, and reset default roles to their original settings.

Creating a role

Roles group users together to help you manage access to resources such as reports and metrics. You can assign a user to one or more roles.

Steps

1. Click **Administration** > **Users & Security** > **Users & Roles** > **Manage Roles**.
2. Click **New Role** .

3. Type the **Name** and **Description** of the role.
4. In **Primary Filter**, define one or more filters that place viewing restrictions on the users of the role.

   These filters are combined to create the primary filter. If a user in the role is also assigned to a primary filter, then the user's primary filter is combined with this role's primary filter to place more restrictions on what the user sees.
5. To disable users of this role and any associated child roles, click **Disabled?**.

   These users cannot log in until you clear this checkbox. This setting is useful when performing maintenance on a group of users.
6. Click **Save**.

Adding members to a role

You can group users with the same access requirements and restrictions into a role.

Steps

1. Click **Administration** > **Users & Security** > **Users & Roles**.
2. Click the **Manage Roles** tab.
3. Select the role where you want a user.
4. Click the **Members** tab.
5. Use **Add to Role** to assign users to the role.
6. Click **Save**.

Adding external members to a role

If you are authenticating users with an external mechanism, such as LDAP, you can assign groups of users that are defined in the external source to a role.

Steps

1. Click **Administration** > **Users & Security** > **Users & Roles**.
2. Click the **Manage Roles** tab.
3. Select the role.
4. Click the **External Members** tab.
5. In **Bind an external group to this role**, type a group name that is defined in the external source.

   For example, type an LDAP group name.
6. Click **Add to this role**.
7. To add additional groups to the role, repeat the previous two steps.
8. Click **Save**.

Establishing inheritance between roles

If you want to set up a relationship in which one role inherits the privileges of another role, create a parent-child relationship. In this relationship, the child role uses the parent access rights and restrictions for viewing reports and modules and using functionality.

Steps

1. Click **Administration** > **Users & Security** > **Users & Roles** > **Manage Roles**.
2. On the **Role Management** page, click **Advanced Mode**.
3. Select the role.
4. On the **Main Properties** tab, select the parent role from the **Parent Role** list.

   This list only appears when working in advanced mode.
5. Click **Save**.

Setting role access to report templates

For each role, you can specify access rights to individual reports, all reports in a ReportPack, or all reports in all ReportPacks.

Steps

1. Click **Administration** > **Users & Security** > **Users & Roles**.
2. Click the **Manage Roles** tab.
3. Select the role.
4. Click the **Template Access** tab.
5. You can do the following to set role access to report templates:

Option	Description
Access for individual templates	Sets the role access rights for an individual template. The system looks at it first when determining access. You can provide different access levels to a template than its ReportPack. For example, a template can have read/write access although its ReportPack has no access.
Access for individual ReportPacks	Sets the same role access rights for all templates in a ReportPack. You can provide different access levels to the templates in a ReporPack. For example, you can set read-only access to a ReportPack and set no access to a template in that ReportPack.
Default access for all templates	Sets the same role access rights for all templates in all ReportPacks. The system looks at it last when determining access. You can set different access levels to both ReportPacks and templates. For example, the default access can be read/write but you can set no access to specific ReportPacks and templates.

6. Click **Save**.

Next steps

You can use a primary filter to restrict what users of a role see on a report.

Setting component access and restrictions

You can set role access rights to various components and place role restrictions and limits on functionality within certain components. For example, you can restrict users of a role from using Edit mode in the interface. If a role is a child, you can ensure that the access rights of its parent are enforced.

Steps

1. Go to **Administration** > **Users & Security** > **Users & Roles** > **Manage Roles**.
   Roles Management page appears.
2. Click a role.
   Role Modification:<role_name> page appears.
3. Click the **Modules & Restrictions Access** tab.
4. Set the role access for a component:

Option	Description
Inherit	If this is a child role, **Yes** is displayed. For a child to inherit the access rights of a parent, you must select **Yes**.
Enforce	Provides role access to the component.

5. To expand a component, click the component name.
   A component without any restrictions has a circle in front of its name.
6. Specify the restrictions as needed.
7. Click **Save**.

Assigning administration tasks to a role

You can set up a role to act as an administrator. The users of this role can perform user and role management on this role and any child roles. In a large multi-tenancy environment, it is useful because user maintenance does not affect other customers or departments in the system.

Steps

1. Click **Administration** > **Users & Security** > **Users & Roles**.
2. Click the **Manage Roles** tab.
3. Click **Advanced Mode**.
4. Select any of the roles from the table.
5. Click the **Role and User Management** tab.
   This tab only appears when working in advanced mode.
6. Select the role and do the following:
   - To manage this role and any child roles, click **Roles**.
   - To manage the users of this role and any child roles, click **Users**.
7. Click **Save**.

Editing a role

You can modify the settings of an existing role.

Steps

1. Click **Administration** > **Users & Security** > **Users & Roles**.
2. Click the **Manage Roles** tab.
3. Select the role.
4. Make the edits.
5. Click **Save**.

Deleting a role

If a role is no longer required, you can delete it.

Steps

1. Click **Administration** > **Users & Security** > **Users & Roles**.
2. Click the **Manage Roles** tab.
3. Select the role.
4. Click **Delete**.

Removing a user from a role

When a user no longer belongs to a role, you can remove that user from the role.

Steps

1. Click **Administration** > **Users & Security** > **Users & Roles**.
2. Click the **Manage Roles** tab.
3. Select the role.
4. Click the **Members** tab.
5. Use **Remove from Role** to remove the user.
6. Click **Save**.

Resetting default role settings

By resetting roles to their original defaults, you are removing all modifications made to the Full Control Users, Read-Only and Real-Time Grapher Users, Read-Only Users, and Read-Write Users default roles.

Steps

1. Click **Administration** > **Users & Security** > **Users & Roles**.
2. Click the **Manage Roles** tab.
3. Verify that you are working in advanced mode. If not, click **Standard Mode**.
4. Click the **revert roles to factory defaults** link in the text.
5. Click **Ok** when the warning message appears.
   The original default roles appear on the **Role Management** page.

Viewing roles

The Role Management page gives you an at-a-glance view of the roles on your system, their descriptions, and how many users currently use each role.

Steps

1. Click **Administration** > **Users & Security** > **Users & Roles**.
2. Click the **Manage Roles** tab.

Profiles

A profile defines user account attributes that apply to a group of users.

A profile defines the following attributes:

- Locale (language)
- Time zone
- Logo to display in the banner
- Login report to display when the users log in
- Report auto refresh rate

The **Profiles Management** page shows the profiles that are defined in your system and the number of users who are assigned to each profile. From this page, you can create profiles, edit existing ones, and assign users to profiles.

Creating a profile

Profiles enable you to group users and roles together according to your company's global reporting requirements. You can create as many profiles as needed for your locales and time zones.

Steps

1. Click **Administration** > **Users & Security** > **Users & Role**.
2. Click the **Manage Profile** tab.
3. Click on the **New Profile**.
4. Type the **Name** of the profile.
5. Type the **Description** of the profile.
6. Click **Save**.

Customizing a profile

You can customize a profile to meet the language and time zone needs of its users. You can also indicate which report you want to display at user login.

Steps

1. Click **Administration** > **Users & Security** > **Users & Role**.
2. Click the **Manage Profile** tab.
3. Select the profile.
4. Click the **Customizable Settings** tab.
5. Select the **Locale** for the entire interface.
   The default language is the language of the server.
6. Select the **Time Zone** for the profile.
7. Select an image from the logo list to display above the report tree and on the **Login**, **User Interface**, and **Administration** pages.
8. Type the location of the **Login Report**.
   This report appears after users log in. If left blank, the default login report appears.
   To have the default login report display an icons report, type: `?report&select=0&mode=ico&display=2`
9. Type the **Auto Refresh Rate** in seconds.
10. Click **Save**.

Adding members to a profile

Users are automatically assigned to the default profile. You can add these users to new profiles and remove users from the default profile. You can also add roles to a profile.

Steps

1. Click **Administration** > **Users & Security** > **Users & Role**.
2. Click the **Manage Profile** tab.
3. Select the profile.
4. Click the **Members** tab.
5. Use **Add to Profile** to assign users and roles to the profile.
6. Click **Save**.

Adding external members to a profile

If you are authenticating users with an external mechanism, such as LDAP, you can assign groups of users who are defined in the external source to a profile.

Steps

1. Click **Administration** > **Users & Security** > **Users & Role**.
2. Click the **Manage Profile** tab.
3. Select the profile.
4. Click the **External Members** tab.
5. In **Bind an external group to this profile**, type a group name that is defined in the external source.
   For example, type an LDAP group name.
6. Click **Add to this profile**.
7. To add additional groups to the profile, repeat the previous two steps.
8. Click **Save**.

Editing profiles

You can modify the settings of existing profiles.

Steps

1. Click **Administration** > **Users & Security** > **Users & Role**.
2. Click the **Manage Profile** tab.
3. Select the profile.
4. Make the edits.
5. Click **Save**.

Removing a member from a profile

When a user and role are no longer members of a profile, you can remove them from the profile.

Steps

1. Click **Administration** > **Users & Security** > **Users & Role**.
2. Click the **Manage Profile** tab.
3. Select the profile.
4. Click the **Members** tab.
5. Select the member to remove from **Users with this Profile**.
6. Click **Remove from Profile**.
7. Click **Save**.

Viewing profiles

The Profiles page gives you an at-a-glance view of the profiles on your system, their descriptions, and how many users currently use each profile.

Steps

1. Click **Administration** > **Users & Security** > **Users & Role**.
2. Click the **Manage Profile** tab.

Importing users

You can set up users individually in the User Interface or import users with the Administration Tool.

Steps

- For instructions, access the `APG-Administration-Tool.pdf` in the documentation directory of the installation path. For example, `/opt/APG/Doc`.

Authentication Management

User authentication is achieved through realms.

A realm defines how user credentials are obtained and checked. A realm defines the connection, access, and search parameters that are required for authentication.

The default realm is the local realm, which accesses credentials that are stored in the Dell SRM database. You can configure several realms and specify the order that they are used for credential verification.

NOTE: For more information about LDAP authentication, see Dell SRM Administration Guide.

Testing authentication

You can test authentication settings to test the connectivity to the realm.

Steps

1. Go to **Administration** > **USERS & SECURITY** > **Authentication** > **Authentication Settings**.
2. In **Authentication Type**, select the authentication type you want to test.
3. Click **Test Authentication**.
4. Type the **User Name** and **Password**.
5. Click **Test Authentication** to verify user authentication.

Adding realms

You can add realms to define a new authentication source or to enable authentication-related features.

Steps

1. Go to **Administration** > **USERS & SECURITY** > **Authentication** > **Authentication Settings**.
   The **Authentication Settings** dialog box appears.

   Two realms are provided by default after installation:

   - `Local`
   - `LockoutRealm`
2. Click **Add a Realm**.

   The following realm types are supported:

   Table 26. Realm types

Type	Description
Local	Obtains user credentials from the user accounts stored in the Dell SRM database.
LDAP	Obtains user credentials from an LDAP server. LDAPS is also supported.
RoleLock	Prevents users who do not have specific roles from logging in.
LockOutRealm	Prevents users who have too many authentication attempts from logging in.
Keystone	Uses the OpenStack identity service.
Custom	Uses other credential sources.

3. Select an **Authentication Type**.

   NOTE:
   - The Local realm authenticates from usernames and passwords that are configured in Dell SRM. The Local realm is the default authentication method that is activated after installation. It does not require any additional configurations. If you configure an external database, such as Active Directory, for authentication, you still need at least one local user account, with global administrator rights, that matches a domain account.
   - For more information about LDAP configuration, see Dell SRM Administration Guide.
4. Click **Test Authentication** to test connectivity to the realm.
5. If authentication failed, check configured property values or add additional properties as needed for the realm, and retest connectivity.
6. Click **Save**.

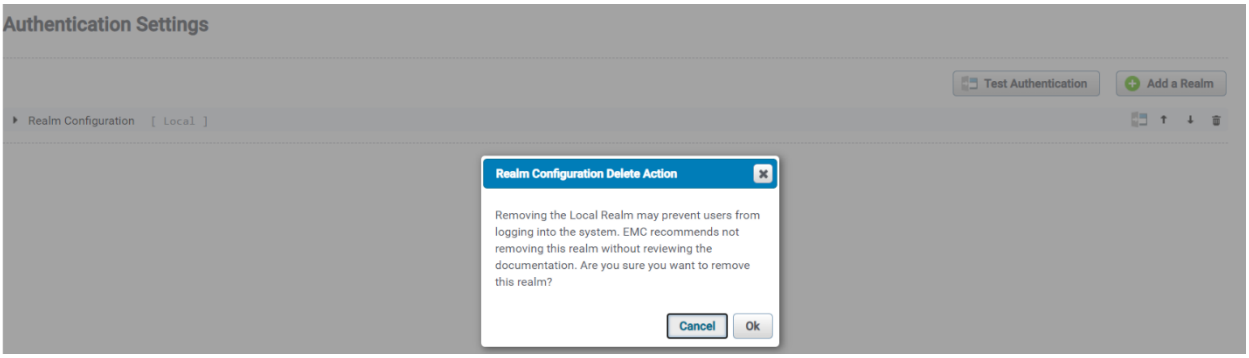
Deleting realms

When a realm is no longer needed, you can remove it.

Steps

1. Go to **Administration** > **USERS & SECURITY** > **Authentication** > **Authentication Settings**.
   All the realms created are displayed.
2. Click **Delete** for the realm you want to delete.
3. Click **Ok**.

NOTE: If you try to delete all the authentication realms, a warning message is displayed as shown below:



NOTE: If the realms are not defined, then the user will not be able to log in to the SRM FE application.

Prioritizing authentication realms

You can set the LDAP server as the first authentication method that is used to check credentials. If you have several realm configurations, the system checks user credentials one after another according to the order they are listed.

Steps

1. Go to **Administration** > **USERS & SECURITY** > **Authentication** > **Authentication Settings**.
   The **Authentication Settings** dialog box appears.

   Two realms are provided by default after installation:

   - `Local`
   - `LockoutRealm`

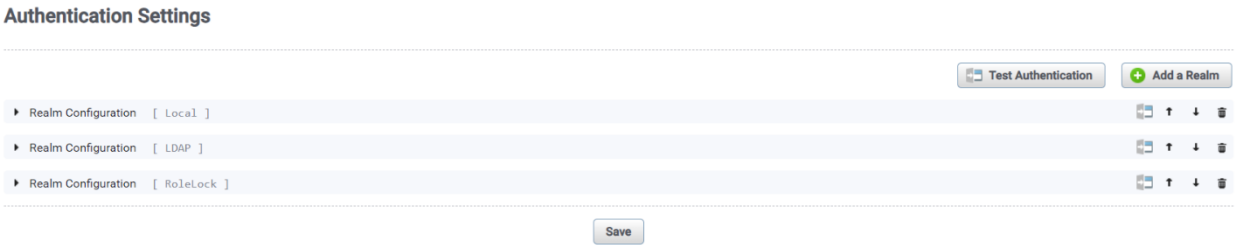


Figure 1. Order of the realm configured

2. To set the order of the authentication methods that are used to check credentials, use the up and down-arrow icons.

Managing ReportPacks

ReportPacks are predefined reports that are dedicated to a specific technology or vendor. Using a ReportPack saves you customization time and effort.

ReportPacks include built-in metrics, formulas, and analytics. They also include report templates.

Creating a ReportPack

A ReportPack is a container for the report templates that you create. A new ReportPack is created as a root node in the tree. Each report template is represented as a report in the interface.

Steps

1. Click **Administration** > **CONFIG** > **Settings** > **ReportPacks**.
2. Click **New ReportPack**.
3. On the **ReportPack Information** tab, type the **Name**, **Version**, and **Description** of the ReportPack.
4. Click **Save**.

Uploading a *<ReportPack>*.arp file

You can add a <ReportPack>.arp file that contains required information and report templates. The ReportPack appears as a root node branch in the tree.

Steps

1. Click **Administration** > **CONFIG** > **Settings** > **ReportPacks**.
2. Click **ReportPacks**.
3. Click **Upload a ReportPack** and select **Choose File** to browse to the *<ReportPack>*.arp file.
   Upload only .arp file types.
4. Click **OK**.

Results

A message displays,

```
The file has been uploaded successfully.
```

Click **Continue**.

Exporting a ReportPack

You can export a ReportPack to back up the *<ReportPack>*.arp file or for use in another system.

Steps

1. Click **Administration** > **CONFIG** > **Settings**.
2. Click **ReportPacks**.
3. Select the report that you want to export.
4. Click **Export** to download the *<ReportPack>*.arp file that contains the required information and templates.
5. Click **Save** to browse to the download location.

Deleting a ReportPack

When a ReportPack is no longer needed, you can remove it and its report templates.

Steps

1. Click **Administration** > **CONFIG** > **Settings**.
2. Click **ReportPacks**.
3. Select the ReportPack that you want to delete.
4. Click **Delete** to remove the ReportPack and its templates.
5. Click **Ok** at the warning message.

Adding a new report template to a ReportPack

You can add a new report template to one or more nodes in the tree. Each report template represents a report in the interface.

Steps

1. Click **Administration** > **CONFIG** > **Settings**.
2. Click **ReportPacks**.
3. Scroll down, and click **+New Template**.
4. On the **Template Information** tab, type the **Name**, **Version**, and **Description** of the report.
5. To add this report to a specific node in the report tree, click **Hook to Another Node** and select where to place the report.
   You can add this report to as many nodes as you want by clicking **Hook to Another Node**. If nothing is selected, the template is added as one of the root nodes of the tree.
6. Click **Choose File**, browse to the template file to add, and follow the browser's prompt to select or open the file.
7. Click **Save**.

Copying a report template

You can copy a report template to another node in the tree.

Steps

1. Click **Administration** > **CONFIG** > **Settings**.
2. Click **ReportPacks**.
3. Select the report to copy.
4. Click **Move / Copy** and select where to copy the report.

Deleting a report template from a ReportPack

If a report is no longer needed by a ReportPack, you can remove it.

Steps

1. Click **Administration** > **CONFIG** > **Settings**.
2. Click **ReportPacks**.
3. Select the report to delete.
4. Click **Delete**.
5. Click **Ok** at the warning message.

Exporting a report as a template in XML format

You can export a report in XML format which can then be used as a report template.

Steps

1. Browse to the report.
2. Click **Edit Mode**.
3. Click **EXPORT** in the banner.
4. Choose **Report Template**.
5. Follow your browser prompts to save the file.
   You can add the extracted template to a ReportPack.

Server Management

The Physical and Logical server overviews enable you to configure, monitor, and manage the servers in the deployment.

After you register the first server, Server and Modules connects to it and retrieves information such as the server status, the modules that are installed on it, and provides access to it through the navigation tree.

Physical Overview

The Physical Overview displays the registered servers and the modules that are installed on each server in a **Table View**. The table displays the server name, average health, CPU utilization, memory utilization, and file system utilization percentage value in different columns of the table. The tool tip on the column name indicates the data range for the presented value. To sort the table according to any of the parameters, click the sorting icon in each column of the table. Sparklines for metrics next to data values give a sense of the pattern of the metric values. You can also change the table view to graph view.

To get more details about a server, click on name of the server. The charts at the top of the page can be configured to display a combination of historical data and real-time data.

Logical Overview

The Logical Overview shows the distribution of the modules based on their categories. To get more details about a module, click the module's name.

Each module page provides:

- Module properties - category, name, version, instance name, install path, and description
- Service status - displays the service status and enables you to stop, start, and restart a service
- Configuration files - enables you to view and edit the module configuration files
- Log files - enables you to view and tail module log files

Registering additional servers

This topic describes how to register remote servers using SRM Admin UI.

Prerequisites

The additional server must be installed.

Steps

1. Click **Administration** > **CONFIG** > **Settings**.
2. Click **Configure Servers**.
3. Click **Register a Server**.
4. Type the following server details:

- Server HostName - links the server to a device in the APG database. To get historical data for the device, Dell Technologies recommends using the same name that is used by APG, which is the server hostname. You can confirm it by looking at APG Health reports in the Frontend. Server HostName is also used as the server display name if you do not create an alias.
- Server Alias - customizes the server display name in Admin UI without any other impact. If you do not create a Server Alias, the hostname is used.
- Server Description - is displayed on the Centralized Management home page in the Physical Overview under each server name. It can be left blank or used to describe a server role.
- WS Gateway URL - contains the URL that points to the remote WebService Gateway. The default configuration is: https://server.name.or.ip:48443/. The WebService Gateway service must be running on the remote server for this to be working.
- WS Gateway Username - is the one from the Gateway credentials. It is configured at its level, and described in its own documentation. Default value is Admin.
- WS Gateway Password - is the one from the Gateway credentials. It is configured at its level, and described in its own documentation. Default value is changeme. On an already configured server, Password field is never displayed again. There is no need to fill it before saving: if left blank, it is removed, but rather left untouched. The only means to empty a saved password is to empty the username as well.
- SSL Validation - can be checked to validate the SSL certification before instantiating communication. When using a self-signed certificate, it should be left cleared. When using a certificate recognized by a certificate authority, it should be checked.
- Operating System - are used to select the packages to send and use on this server. Be sure to set it to the correct value, as setting it to a wrong value causes invalid or corrupted installations.
- Health Values - optional, configures the type of data that are recovered and displayed for this server. Real-time data is collected through the APG Self-Monitoring Collector which provides real-time access to the server metrics. Historical data is retrieved from the usual APG databases and is also based on the metrics that are collected by that collector. Databases are defined in the web application context file. See the section on page 61. The physical overview displays historical data if it is enabled. The per-server view displays real-time data if it is enabled, and if not it falls back to historical data. If it is disabled, charts are hidden.
- Report in Dell M&R - optional, can be used as a shortcut to access a report in the APG frontend. Type the targeted URL and this creates a link to it in the global physical overview. For example, http://apg.server.name.or.ip:58080/APG/#0-4-52664238.
- Server Tags - adds the ability to specify string tags for servers. Tags provide useful information about a server that helps to select the recommended server for installing a SolutionPack component. For example, a server tag could be the last part of the ID of a SolutionPack component, such as "collect." A SolutionPack component with the ID `emc-vnx-collect` would be installed on a server with the tag "collect."

Removing additional servers

This topic describes how to remove remote servers using SRM Admin UI.

Prerequisites

If a scaled-out collector is no longer in use, you can unregister from the existing Dell SRM deployment, and remove the vApp.

Steps

1. SRM Admin page > Configure Servers > Delete the unwanted server (scaled-out collector) > **SAVE**.

   NOTE: There is no confirmation notification for the deletion and the server will removed at the instant the bin icon is clicked.

2. Login to the Collector console using root, run `# manage-modules.sh service remove all`
3. Power off the VM.
4. Delete from the disk.

   NOTE: This MUST only be performed on a scaled-out VM (Collector host) that is no longer in use/required.

Distribute startup of UNIX services

During a system startup on UNIX servers, problems can occur if all services try to start simultaneously. You can distribute service startup by editing the `conf/unix-service.properties` files for each service.

Prerequisites

This procedure only applies to UNIX configurations.

Steps

1. Click **Administration**.
2. Under **System Admin** > **Servers & Modules** > **Services**, browse to a service name.
   For example, collector-managers are services.
3. In the right pane, expand the blue bar for **Configuration files**.
4. Locate the `conf/unix-service.properties` file, and click the **Edit** (pencil) icon on the row.
   In a long list of files, it might be on the second page.
5. Locate lines similar to the following in the middle of the file:

```
start.mode=java
start.target=com.watch4net.apg.v2.collector.Bootstrap
start.param.1=main
start.param.2=start
stop.mode=kill
# timeout is in seconds
stop.timeout=60
```

6. After `start.param.2`, add the following parameter

```
start.delay=n
```

   where *n* is the number of seconds to delay the start of this service on system startup.

   For example:

```
start.mode=java
start.target=com.watch4net.apg.v2.collector.Bootstrap
start.param.1=main
start.param.2=start
start.delay=40
stop.mode=kill
# timeout is in seconds
stop.timeout=60
```

7. Repeat these steps for each service, altering the start.delay value for each service to create a smooth startup.
8. Click **Save**.

Starting and stopping services

The services panel displays the modules that have a service configuration, including those modules whose service entry has been removed.

About this task

The services table displays the module information, its current service status, and an estimate of its last status change. The status column can have multiple values depending on both the service properties and its current state:

- Started - the service is currently running.
- Stopped - the service has been stopped.
- Not installed - the service has been removed and is no longer available.
- Unknown - the current status cannot be determined. This is usually caused by a service that requires administrative privileges to run, such as the Collector Manager when you use the ICMP Collector on UNIX.

If the **Start**, **Stop**, and **Restart** buttons are not available, the service cannot be managed through Centralized Management UI.

- No button visible - occurs on a service that needs to be running to access the server; as a consequence, it cannot be started, stopped, or restarted. You must manually connect to the server using SSH or a remote desktop to perform these operations, for example the Webservices Gateway module.
- All buttons are grayed - Centralized Management UI does not have enough rights to perform operations on this service. This can apply to any service that requires administration privileges, such as the Collector Manager when running the ICMP Collector.
- Only a restart button - this occurs when looking at the Tomcat server that is used to run Centralized Management UI. The restart command is available, but if it were to fail, you must manually connect to the server to fix the issue.

Steps

1. Click **Administration**.
2. Click a server under **System Admin** > **Servers & Modules** > **Services**.
3. Click the service you want to stop or start.
4. Click **Start**, **Stop**, or **Restart**.

Installing modules

Additional modules can be installed on a server.

Steps

1. Click **Administration**.
2. Use the **Home** and select server in the **Physical Overview** .
3. Click the **Packs & Modules** tab.

   NOTE: Click the **Export** button at the bottom of the page to export the details of **Packs & Modules** tab into a CSV file.

4. Select the packages that you want to install and click **Install**.
5. Click **Launch**.
   The Module Installation dialog box appears.
6. Type an instance name.
7. Click **Launch**.

   During the installation process, questions appear in the display. You must answer each question within five minutes or the module installation process is interrupted, which can cause an inconsistent state on the remote server for the module.

   You can remove a module that has been installed by mistake or been moved to another server by clicking **Uninstall**.

Updating modules

When new versions of a module are available, either by running the setup of a new release or by uploading new packages to the central repository, an update button is displayed on the module page.

About this task

If different versions are available, the update button has the option to select the version you want.

Steps

1. Click **Administration**.
2. Use the **Home** and select server in the **Physical Overview** .
3. Click the **Packs & Modules** tab.

   If the module has an update available, the **Update to Latest Version** button is displayed at the upper right corner of the page.
4. Click **Update to Latest Version**.

Accessing and editing configuration files

Using Servers and Modules, you can edit, upload, and remove module configuration files.

About this task

Each module manages its own configuration files, even if the module is used within one another. For example, a collector or filter configuration that is used in a collector manager, is accessible only on the corresponding collector or filter page. The configuration files table only displays the files that are identified by the module as configuration files.

Steps

1. Click **Administration**.
2. Use the **Home** and select server in the **Physical Overview** to browse to the module, service, or task whose configuration file you want to access.
3. Expand the **Configuration Files** block.
4. Click the pencil icon to open the configuration file.
5. Edit the file.

   Be careful when making changes. The configuration file is not checked to ensure that the changes you make are valid.
6. Click **Save**.
   The file gets updated on the server.

Viewing log files

Log files are useful to check on a module that has recently been started or to track down a specific error that has occurred.

About this task

Log files are listed in the order of the last modification, so you usually want to review the first file in the table. The number of files is defined in the logging configuration file, which is called logging.properties.

Steps

1. Click **Administration** > **Sytem Admin** > **Log & Diagnostics**.
2. Use the **Log Files** tab to browse to the module for which you want to view the log.
3. Select the module for which you want to download the log files and click **Download**.

Viewing module tasks

The Task Scheduler is a service that runs scheduled tasks. The Task Scheduler replaces cron on UNIX-based systems and Schedule Tasks on Windows servers. The Task Scheduler runs important tasks, such as refreshing the Frontend-Search index periodically, or performing database maintenance tasks to optimize performance. Scheduled tasks can be viewed for each module.

About this task

A task has four parts:

- A schedule, which indicates the time of execution
- The maximum time the task can take to run
- An action to take on execution
- Locks that prevent tasks from running simultaneously

Steps

1. Click **Administration**.
2. Use the **Home** and select server in the **Physical Overview**.
3. Click the **Tasks** tab.
   A table of tasks shows run statistics and current task status.

4. Click a task to access the following:
   - Configuration files for the task. You can view or edit the files.
   - Log files for each execution of the task. It can help troubleshoot tasks that did not complete successfully.
   - **Disable** button. You can cancel a pending task execution or interrupt it once it has started. There is no confirmation and the task is immediately canceled.
   - **Run now** button. You can start execution immediately, rather than wait for the next scheduled run.

Package management

Using Manage Packages, you can manage how packages are used when installing or updating modules.

A package is a module that is frozen at a certain code version. Packages are used to determine when new versions of modules are available and to install and update module instances. Modules are components of the core software, such as: backends, web servers, collectors (XML Collector, and SNMP Collector), and filters (Property Tagging Filter, and Cross-Referencing filter). Modules can be installed and managed separately. When a module is installed, that instance of the module has a unique instance name so that it can operate separately from other instances of the same module. By default, the name of a module instance is "Default." You can manage the installed packages at **CONFIG** > **Settings** > **Manage Packages**.

The Packages Listing displays the package names, versions, and operating systems. Operating system is important as it determines whether the package can be installed on a particular server or not. You can hover over the Status column to see where packages are installed. You can install a package multiple times on the same server.

Package synchronization

Packages can be retrieved, cleaned up remotely, or discarded from the Manage Packages repository, which by default is located at Packages Listing.

Synchronization has the following options:

- Retrieve the last packages - connects to each server and fetches the latest version of their packages. It is the easiest way to install new packages as it runs the installer and then runs the synchronization.
- Retrieve all the packages - retrieves every available package from the servers, not just the latest ones. It is useful if you need a version that is not the most recent one.
- Remove remote packages - performs a cleanup of the remote servers. For each server, every package that is not installed on it is removed from its repository to free the disk space on the server.
- Remove old versions from repository - performs a cleanup on the Centralized Management UI package repository and keeps the most recent version of each package, and the versions that are currently installed on the remote servers.

A summary is displayed for each server with the count of globally added or removed packages and the file size. For example, on the central repository, adding two packages and removing five packages results in a count of negative three packages.

License management

Using License Management you can add, delete, and check for expired licenses.

Licenses are linked to a host.

NOTE: For using XML license management, refer Admin guide.

Obtaining a permanent license

Obtain a permanent license by creating a Service Request (SR).

Prerequisites

Ensure you have a login with root, APG, or system administrator privileges to perform this task. The user apg is the account that the application uses instead of root.

Steps

1. Type the command for your operating system to obtain the host ID:

Operating system	Command
UNIX	`/opt/APG/bin/manage-licenses.sh host-id`
Windows	`C:\Program Files\APG\bin\manage-licenses.cmd host-id`

2. Copy the host ID information to a clipboard or to a text file.
3. For product licenses, go to Dell Online Support at Dell Support Site.
4. Browse to **Service Center** > **Product Registration & Licenses**.
5. Paste the host ID information into the Service Request.

Obtaining a temporary license

Obtain a 30-day temporary license file by creating a Service Request (SR).

Steps

1. For product licenses, go to Dell Online Support at Dell Support Site.
2. Browse to **Service Center** > **Product Registration & Licenses**.
3. Create the Service Request.

Adding licenses

You must upload a license file whenever you install a new SolutionPack or ReportPack. The license enables views and reports to display.

Prerequisites

- Obtain the required license file by creating a Service Request on Dell Online Support.

Steps

1. Click **Administration** > **System Admin** > **Licenses**.
2. Click **Manage Licenses**.
3. In the right pane, click **Upload**.
4. In the **License Upload** dialog box, browse to your license file. Click **OK**.
   Licenses in a .zip file are extracted and appears in the **Licenses Listing** table.
5. When `License Upload Complete` appears, click **OK**, and then click **Continue**.
6. If you have remote servers in a distributed environment, click **Synchronize** to add the licenses to the remote servers.

Synchronizing licenses

Use license synchronization when licenses have been installed or removed while the server was not reachable or unregistered. Synchronization uses the licenses that are in the license repository.

Steps

1. Click **Administration** > **System Admin** > **Licenses**.
2. Click **Manage Licenses**.
3. In the right pane, click **Synchronize**.
4. In the **License Synchronization** dialog box, select one of the following:

Option	Description
Uninstall licenses	Uninstalls and removes licenses that are not available in the license repository. You cannot recover these licenses except if you have stored the license files elsewhere.
Install new licenses	Searches the licenses in the license repository and ensure they are properly installed on every remote server that is reachable. This is the most commonly used synchronization option.

5. Click **OK**.

Dell Technologies Connectivity

The Dell Technologies Connectivity is a software-based, secure access point for remote support activities between Dell and the Dell information infrastructure.

Alerts raised in SRM for Dell Technologies Connectivity configuration issues

The following are the two Alerts that are raised in SRM for Dell Technologies Connectivity Configuration issue:

- Dell Technologies Connectivity Send Config Failed
  - Message: Sending of configuration details to Dell Technologies Connectivity server failed. Then ensure that:
    - Dell Technologies Connectivity is enabled.
    - Access Key and PIN are valid.
    - Install valid SRM licenses.
    - Connectivity to Dell Technologies connectivity server is successful.
- Dell Technologies Connectivity Disabled
  - Message: The Dell Technologies Connectivity service is disabled. Enable Dell Technologies Connectivity in the **CONFIG** > **Settings** menu. Enabling Dell Technologies Connectivity helps Dell to provide proactive support to improve the product usage experience.

For more information about configuring Dell Technologies Connectivity, see SRM Admin Guide.

Logs and diagnostics

The system modules write to log files that are accessible from the Console. The Diagnostic files are a collection of configuration and log files that can help analyze problems.

Accessing log files

You can download or view the log files generated by the system modules. You can watch the end of any log file.

Steps

1. Go to **Administration** > **System Admin** > **Logs & Diagnostics** > **Log Files**.
   The table shows all the available log files, when they were last modified, and their size.
2. To view the end of any file, click the **Tail** icon in the **Filename** column.
   A window opens showing the last set of entries in the file.
3. To watch as new entries are added, click the **Tail** icon, and then scroll to the end of the window.
   As new entries are written to the log, they are visible at the end of the list and the display rolls up.
4. To view the entire contents of a file that is less than 1 MB, click the **View File** icon in the **Filename** column.
5. To download files, click the checkboxes to select the rows, and click **Download**.

Generating and downloading diagnostic files

Diagnostic files are a collection of system configuration files and log files that can help in researching problems.

Steps

1. Go to **Administration** > **System Admin** > **Logs and Diagnostics** > **Diagnostic Files**.
2. Click **Generate diagnostic files**.

   This action generates a Zip file of XML, CSV, properties, script, and java files that define your current configuration and implementations. Some log files are also included.

   When generation is completed, a **Download** button appears.
3. Click **Download** to access the Zip file.

Discovery Center

Discovery Center provides a central location to view and manage all devices which are monitored by the SolutionPacks. In Discovery Center, you can add new devices to be monitored, change device connection credentials and parameters, and test connectivity to devices.

Starting Dell SRM 4.5, Discovery Center is case insensitive. This feature is added to avoid discovery of the same device which can lead to discrepancies in reporting and also helps in avoiding redundant collection cycles. The Discovery Center search feature is case insensitive and displays the discovered devices irrespective of the case of Search text box. While trying to add devices, Discovery Center checks if the device is already present in any other case. If it is, the device is not added.

- Add feature would generate a message mentioning that Device is already present.
- Import CSV feature only allows device attributes to be changed, but a new device in a different case is not added.

There are several ways to add new devices:

- Add a single device manually
- Add devices in bulk by importing a CSV file
- Add devices using discovery

Discovery Center contains two sections:

- The **Manage Discovery** section is where you perform all add device and manage device activities.
- The **Discovery Wizard** section contains collector information that is required by the automatic discovery operations.

Manage Discovery

The **Manage Discovery** is organized by device type. You perform all device management activities on this page.

The list of device types on the **Manage Discovery** page is based on the SolutionPacks that are installed.

Click a device type row to manage devices of that type. Management activities include:

- Review the list of devices that are actively being monitored.
- View and change connection credentials and other device-specific parameters.
- Test connectivity to each device.
- Add or delete devices.
- Backup device details

Adding a new device manually

Using **Discovery Center** you can manually add a new device to be monitored.

Prerequisites

To add a new device, you must already have a SolutionPack installed that supports that device type.

Steps

1. Browse to **Administration** > **Discovery** > **Manage Discovery**.
2. Select the SolutionPack.
3. On the **Collected Devices** tab, click **Add**.
4. In the device configuration dialog box, type the parameters for the new device.

   The configuration dialog box is device-specific. See the product SolutionPack documentation for information about each field.
5. Click **Validate and add**.

   The validation tests connectivity to the device using the provided information. If an error indicator appears, correct the information and click **Test** to try again.
6. Click **OK** to confirm addition of device.
   The new device appears in the Collected Devices table in blue and italicized, indicating that it is not yet saved in the system.
7. Click **Save**.
8. Click **Ok** to confirm the save.
9. Click **Ok**.

   The **Status** column represents the discovery results. You can click the status icon to view the discovery results.

   If the connectivity status is a green check, the new device is now being monitored.

Adding devices using CSV files

You can import a properly formatted CSV file to add devices.

Each device type provides a template that describes the required format of the CSV file for the device type. You can also export existing devices into a CSV file.

Importing a CSV file

You can import a CSV file containing information about new devices to be monitored.

Prerequisites

- To import new devices, you must already have a SolutionPack installed that supports the device type to be imported.
- Due to the addition of fields **Secure Vault** and **Unique Key** in the **Manage Discovery** page, the older CSV files that are used for devices will not work. To import devices in Discovery Center, use the new CSV template from the Discovery Center and move the data from old CSV files to the new template.
- The fields **Secure Vault** and **Unique Key** should not be left empty in the CSV files during import. Use the default value * for Unique Key and **false** for Secure Vault, in case the values are not available.

About this task

To get a template of the CSV file for a specific device type, use the **Export Template** button.

Steps

1. Browse to **Administration** > **Discovery** > **Manage Discovery** > ***SolutionPack***.
2. On the **Collected Devices** tab, click **Import**.
   The **Import new devices** popup appears.
3. For **Merge the devices to the existing ones?**

Option	Description
Do not check the option	Overwrite the current list of devices with the devices from the CSV file.
Check the option	Keeps the current list of devices and add (merge) devices that are contained in the CSV file to the current list.

4. Click **Choose File**.
5. Browse to the CSV file.

6. Click **Ok**.
7. Click **Continue**.
   The new devices appear in the Collected Devices table in blue and italicized.
8. Click **Save**.
   The **Save Devices** popup is displayed.
9. To overwrite or merge the devices, click **Ok**.
10. Click **Ok**.

Exporting devices

You can export the list of devices currently being monitored.

Steps

1. Browse to **Administration** > **Discovery** > **Manage Discovery** > ***SolutionPack***.
2. On the **Collected Devices** tab, click **Export**.
   Follow the browser's prompts to save the file.

Exporting a CSV file template

A template shows the expected format of the CSV file for the bulk import of devices. The template includes headers.

Prerequisites

To export a CSV template file, there must already be one device of that device type available.

Steps

1. Browse to **Administration** > **Discovery** > **Manage Discovery** > ***SolutionPack***.
2. Click **Export**.
   Follow the browser's prompts to save the file.

Add devices using discovery

The discovery feature uses saved information in discovery groups to find new devices. A discovery group is specific to a device type.

The following procedures are required to implement discovery for a device type:

1. Register a collector server that supports discovery for the device type.

   NOTE: The discovery method is supported by many, but not all, device types.

2. Create one or multiple discovery groups for the device type.
3. Trigger discovery for a discovery group.
4. Distribute the discovery results to the collector.

Registering a new collector server

To use the automatic discovery features, you must first register the collector server that supports the device type you want to discover.

Steps

1. Go to **Administration** > **CONFIG** > **Settings** > **Manage Discovery Backends**.
   The table lists the system's Backend servers.
2. Click the row for a Backend server.
   The collector servers that are registered to perform discovery are listed. The table also shows the discoverable device types that are supported by each collector server.

NOTE: If the table is empty, no collectors are registered.

3. To see a list of unregistered collector servers, click **Register**.
4. Select one or more servers from the list, and click **Register**.

   If you are collecting VMware vSphere vSAN & VxRail events, select the primary backend that you want to use for discovering the events.

   When registration finishes, all the currently registered collectors are shown, with their supported discoverable device types.

Create a discovery group

A discovery group stores the connection information, credentials, and other configuration information that is required to discover a group of devices. For example, you might set up discovery groups to store IP address ranges or subnets and appropriate connection credentials.

Prerequisites

Before you can create discovery groups and use the discover feature, the collection server that is associated with the device type must be registered.

- If the **Discovery Groups** and **Discovery Results** tabs are grayed out, the collection server is not registered.
- If the **Discovery Groups** and **Discovery Results** tabs are not shown, discovery is not supported for the device type.

Steps

1. Go to **Administration** > **Config** > **Groups & Tags** > **Manage Groups** > ***device_type***.
2. Click **Create**.
3. Type a name for the discovery group and click **OK**.
4. Add entries into the tables to provide the discovery information for the group.

   NOTE: The discovery group fields are different for each device type. For information about the fields, see the SolutionPack installation documentation.

   Use the following buttons to add information into the tables:

Button	Description
Add new entry...	Add discovery information manually.
Import...	Import a file containing discovery information.
Export	Export discovery information to take a backup or reuse it for other discovery groups.
Export template	Export a template to your Downloads folder. You can complete the template with discovery information, and then import the file with the **Import** button.

5. Click **Save**.
   You can now choose the group in a discover operation.

Discover devices

Discovery finds devices based on the seed information in a discovery group.

Prerequisites

Use the **Discovery Group** tab to create a discovery group or research the settings in discovery groups.

Steps

1. Go to **Administration** > **Config** > **Groups & Tags** > **Manage Groups** > ***device_type***.
2. On the **Collected Devices** tab, click **Discovery.**

   If the **Discover** button is not available, ensure that the appropriate collector is registered and that at least one discovery group is defined.
3. Select a **Discovery Group** name.

4. Select a **Discovery Mode**.
   - Use **Full Discovery** the first time you discover a group.
   - Use **Incremental Discovery** to discover a newly added device.
5. For **Automatically distribute results?**:
   - Select this option to distribute the results of discovery to the collector.
   - Do not select this option if you want to review and approve the discovery results before incorporating them into the system.
6. Click **OK**.
   If you requested automatic distribution, the results of the discovery are visible on the **Collected Devices** tab, and also on the **Discovery Results** tab.
7. If you did not request automatic distribution, go to the **Discovery Results** tab to review the results and distribute them.

Distribute (import) discovery results

If you did not request the discovery process to distribute results, you can examine and distribute the results on the **Discovery Results** tab.

About this task

Steps

1. Go to **Administration** > **Config** > **Groups & Tags** > **Manage Groups** > ***device_type***.
2. Click the **Discovery Results** tab.
   The table shows an overview of discovery requests, by discovery group.
3. To see details about the discovered devices, click a discovery group name.
4. To import the discovered devices into the system (so that monitoring activities can start on them), click **Import to Collected Devices**.
5. Complete the pop-up dialog box as follows:

Option	Description
To delete all existing devices of this device type, and add the results of this discover group discovery	Click **OK**.
To retain existing devices, add the newly discovered devices, and update any existing devices if configuration changes were discovered	Click the **Merge** checkbox and then click **OK**.

6. To view the new set of devices being monitored, click the **Collected Devices** tab.
   Review the devices and credentials to avoid lockout of devices due to multiple attempts of incorrect credentials. Dell Technologies recommends creating groups in such a way that devices have a minimal set of credentials to be tried against. Dell Technologies recommend using common public-private key pairs for multiple devices.

Discovery Wizard

The Discovery Wizard is a tool to ease the initial deployment and configuration of the most commonly used Solution Packs.

After upgrading to Dell SRM 4.3, you may want to use the Discovery Wizard to quickly enable the Solution Packs and add the corresponding devices that you would like to report on.

Starting Dell SRM 4.5, Discovery Wizard is case insensitive for the supported SPs. This feature is added to avoid discovery of the same device which can lead to discrepancies in reporting and also helps in avoiding redundant collection cycles.

For more information about how to use the Discovery Wizard, see Dell SRM Installation and Configuration Guide.

Back up device details

You can export the list of devices that are actively being monitored in the Device Discovery page using scheduled tasks (Backup Device Details scheduled task). You must configure the FTP server details to export the device information.

Steps

1. Browse to **Administration** > **Discovery** > **Manage Discovery**.
2. Click **Backup Devices**.
3. In the **Configure FTP Details** page, type the FTP Hostname and FTP port.
4. In the **Folder Path**, specify the path to save the exported device details.

   NOTE: If no folder path is specified, a folder with the current date is created in the FTP server where the device details are saved.

5. Type a valid FTP server username and password.
6. Click **Submit**.

   The FTP server details are configured and saved successfully.

   NOTE: After configuring the FTP server details, run the Backup Device Details scheduled tasks to export the list of devices. For more information about scheduled tasks, see Dell SRM Admin Guide.

Groups Management

Groups Management is a data enrichment interface. It provides a quick way to add additional properties to collected records.

The Groups Management UI lets you create values for a preconfigured property. You also create the match rules (called membership rules in the UI) that filter collected records to of assign the new value to the matching records. For example, in the Customer group, you can create a Customer value and then create the rules defining which collected records should be enriched with the new value.

Predefined groups are installed with SolutionPacks that use them. For example, any of the SolutionPacks that support LUN service level tagging I install the Service Level by LUNs group. If none of the corresponding SolutionPacks are installed, you cannot see that group in your Groups Management node.

Each group is defined in a configuration file. These configuration files are used to specify the key-properties and new-properties for the Property-Tagging-Filter, the type of group (flat or hierarchical), and the properties to display in the Groups Management preview table. An advanced user can create a configuration file to create a group under the Groups Management node.

Flat and hierarchical groups

A group type is either flat or hierarchical.

Flat groups

In flat groups, collected data can match only one rule and the property being added can have only one value per matched database entry. The Service Levels by LUNs is an example of a flat group. The Service Level for a particular LUN can be gold or platinum, but not both. The Service Level property (`psvclvl`) can store only one value.

In a flat group type, the group names appear in a simple list. The order of the group names is important. The matching is performed in the order of the groups that are listed, and the first match wins.

Hierarchical groups

In hierarchical groups, collected data can match one or more rules. As a consequence, the new property can store one or more values. These values are separated by pipes (|).

Platform is an example of a hierarchical group type. A particular device can match the rules for All Hosts and also for UNIX Hosts. Therefore, the stored property value could be `"All Hosts|unix"`.

NOTE: A subgroup does not inherit the rules from its parent. The underlying rules must be constructed correctly to support the hierarchy.

The ordering of the rules does not matter in a hierarchical group.

Summary of groups

The Groups Management UI supports a predefined set of group types, each with a predefined purpose. It is important to use and populate each group type according to its intended purpose.

The following table contains a high-level description and intended purpose for each of the group types that the Groups Management UI supports. Each group type tags collected data with one or more additional properties.

NOTE: The installation might not contain all these group types. SolutionPacks install them since they are using it.

Table 27. Summary of predefined group types

Group type	Purpose
Business Unit, **Location**, **Customers**, and **Application**	These four properties are used for filtering and reporting based on customer-defined attributes. Many reports contain predefined (but hidden) columns for these properties. Those same reports include predefined group filters for these properties, for easy filtering by selected customer, location, application or business unit values. Installations can use these four properties for any wanted purpose. For example, to track storage usage by applications, you might populate the Business Unit property with application names, and set up the rules to filter on storage assets that are used by specific applications.
Platform	This property is used for filtering and reporting based on platform type. Each installed SolutionPack adds to the list of predefined Platform values. Many reports contain the Platform group filter, for easy reporting by selected platforms.
Service Level by LUNs Service Level by File Share Service Level by Bucket	These properties are used for Service Level Agreement (SLA) classifications for global reporting by service levels. In addition, a cost per GB property, which is required for chargeback reporting, is associated with each service level. Predefined service levels are installed users can create customized service levels as well, with restrictions.
Block Chargeback Grouping File Chargeback Grouping	These properties define rules that group storage assets for the purpose of global chargeback reporting. The chargeback reports show costs by service levels within each grouping. Predefined groupings are installed users can create customized groupings for reporting purposes. **NOTE:** Object chargeback grouping uses the object namespaces and buckets that are defined on ECS assets.
ECS Capacity Rates	This group defines several properties that are used for billing rates for AWS S3 object storage that is managed on ECS assets. The billing reports appear under **Report Library** > **Amazon AWS** > **Operations**.

Setting cost basis for chargeback reports

Chargeback reports use a cost per GB configured on the service level.

Steps

1. Go to **Administration** > **Config** > **Groups & Tags** > **Manage Groups** > ***service_level_group_type***.
   - For block chargeback, select **Service Level by LUNs**.
   - For file chargeback, select **Service Level by File Share**.
   - For object chargeback, select **Object Service Level**.
2. Click to select a service level name, and then click **Edit**.
3. In **cost per GB**, type the cost basis for this service level.

Cost is numeric with no assumption of any specific currency. Type an integer or a decimal value. If you type 3, the cost for 100 GB is 300. If you type .3, the cost for 100 GB is 30.

4. Click **Save**.

Overview of the Groups Management UI

For each group type, you can create group name values and edit the rules of membership in the groups.

The following image shows the Groups Management UI for the Block Chargeback group type.

NOTE: The interface is slightly different for hierarchical and flat groups, but the concepts are the same.

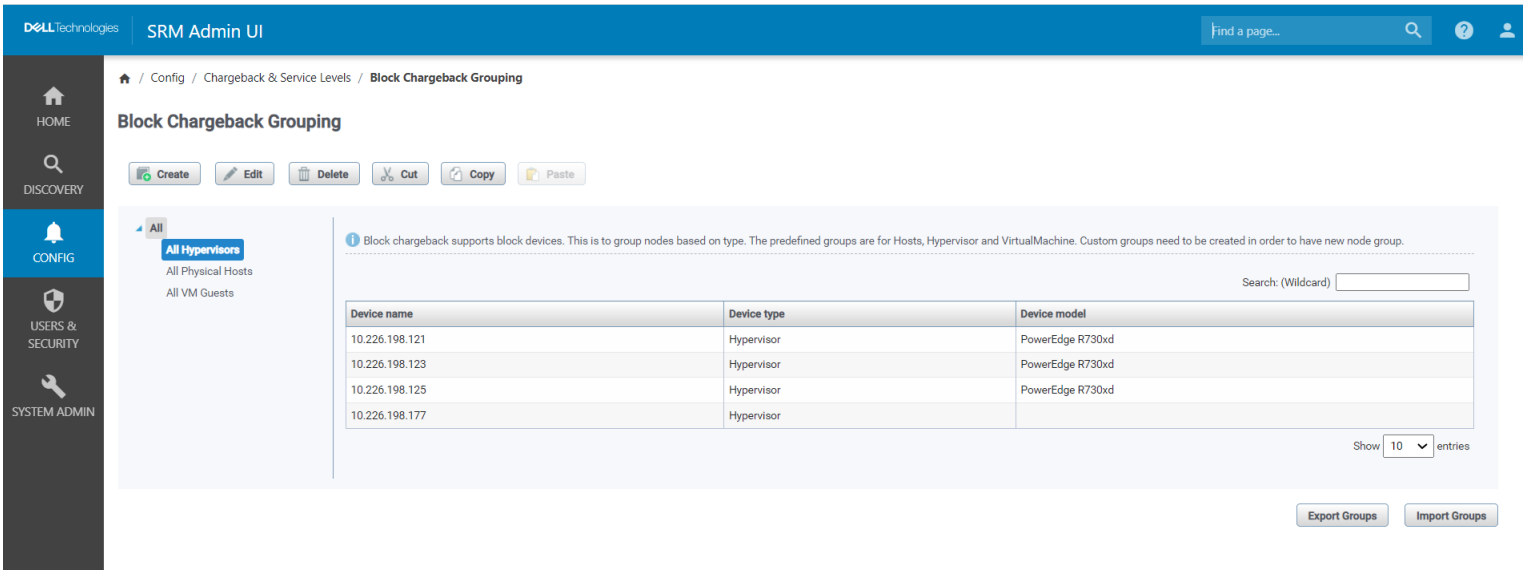


Figure 2. Groups Management UI

1.	Group Type	The group type represents predefined properties in the database. In this case, Block Chargeback Grouping represents the `nodegrp` property already that is already defined in the database.
2.	Action Buttons	The action buttons are used to manage the group of property values. For example: • **Create** creates a new possible value for the `nodegrp` property. • **Edit** edits the rules of membership that is associated with a property value. The set of actions is different for flat and hierarchical group types.
3.	Group names	The group names are the possible values of the data enrichment property. In this example, the `nodegrp` property can have the value All Hypervisors, All Hypervisors - Compliance, or any other value in the hierarchy.
4.	Preview table	The preview table lists a partial view of objects in the database that match the rules for a selected value. For example, with All Hypervisors selected, the preview table lists hypervisors but not physical hosts or VM guests.
5.	Export/ Import actions	These actions manage the underlying CSV file that is associated with this group type.

Select a group name and then click **Edit** to see the match rules for that group name. For example, select **All Hypervisors** and click **Edit** to see the rules that control when the value All Hypervisors is assigned to the `nodegrp` property in a collected entry.

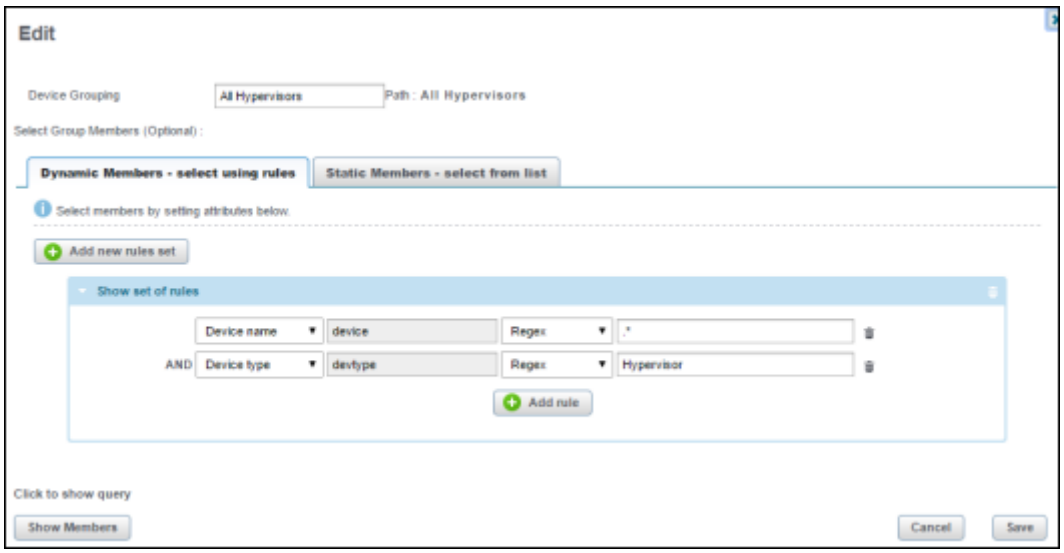


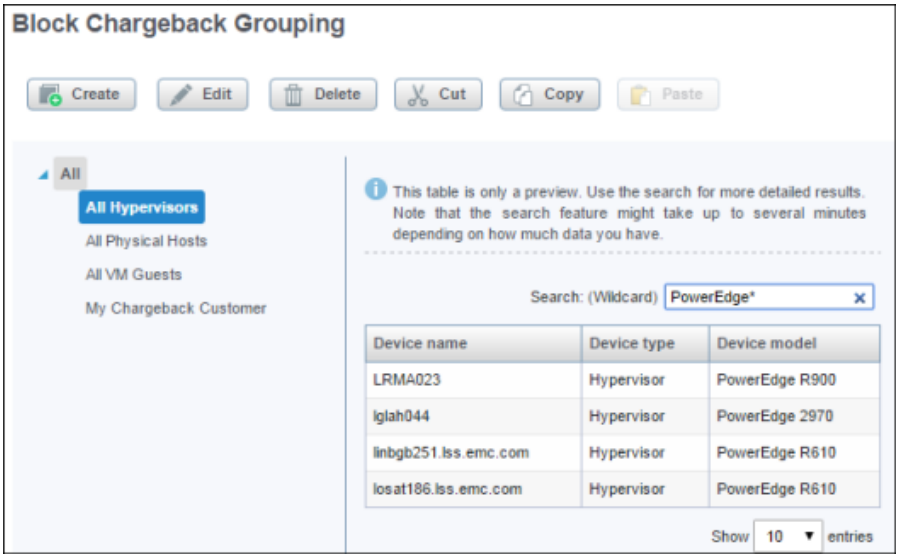
Figure 3. Groups Management UI—Rules

Use the preview table

The preview table shows the members of a selected group and some additional information about the members.

Steps

1. Go to **Administration** > **Config** > **Chargeback & Service Levels** > **Block Chargeback Grouping** > ***group_type***.
   The page opens with the preview table showing the first 10 members of the first group on the page.
2. To see more members, use the **Show entries** drop-down box to adjust the number of entries displayed.
3. In cases where there are potentially many members, search for specific members using the **Search** text box.
   Type an exact value for any of the columns in the table, or use the * wildcard for a partial value search. The search operates on any of the columns in the preview table.
   For example, the search in the following figure (`PowerEdge*`) finds the members of the All Hypervisors group that match a device model starting with PowerEdge.



   The wildcard can appear anywhere in the search phrase. For example, the search in the following figure (`*lss*`) finds all entries with the character sequence of `lss` anywhere in a value.

4. To preview another group, click to select the wanted group name.

Create a group

The **Create** action creates a property value and specifies the match rules for when that value is tagged to collected data.

About this task

Following is a general procedure for creating a group. Some group types, because of their intended purpose, have logical restrictions on the membership rules. For these and other limitations, see the individual group descriptions.

Steps

1. Go to **Administration** > **Config** > **Group & Tags** > **Manage Groups** > ***group_type***.
2. In a hierarchical group type, click the parent under which you want the new group to appear.

   NOTE: This step does not apply to flat groups.

3. Click **Create**.
4. In the first text field, type the new group property value.

   For example, to create a Customer value, type the Customer name. It is the value that is added to tagged records.
5. If additional text boxes are displayed for additional properties, type those values.

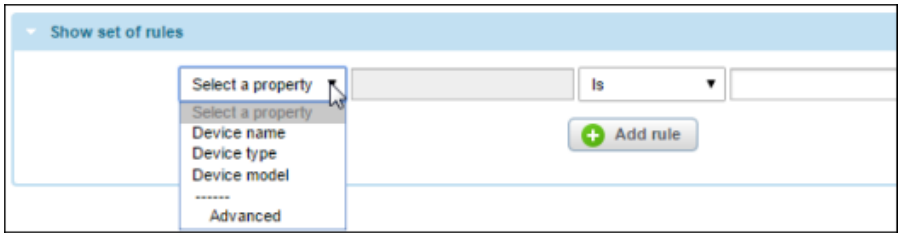
   For example, the service level groups display the Cost per GB field.
6. For flat or hierarchical groups, add dynamic rules to define the records that are tagged with the new property values.

   NOTE: For flat groups, dynamic rules are the only way to add members. For hierarchical groups, the UI shows tabs for **Dynamic Members** and **Static Members**. Click **Dynamic Members**.

   A dynamic member definition consists of one rule or multiple rules ANDed together to create a rule set. You can , or multiple rules sets to create a detailed filter.

   The following steps provide guidelines for creating dynamic rules.

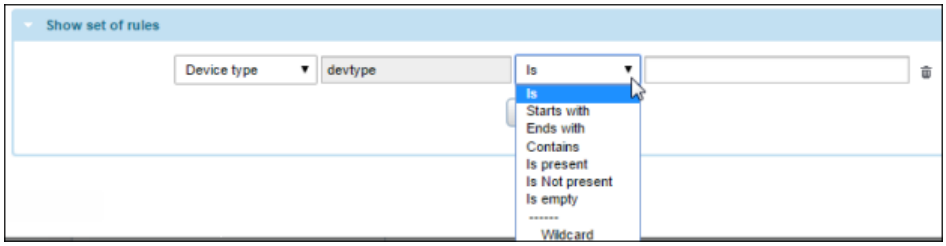
   a. From the drop-down list, choose **Select a property**.

   Then do either of the following:

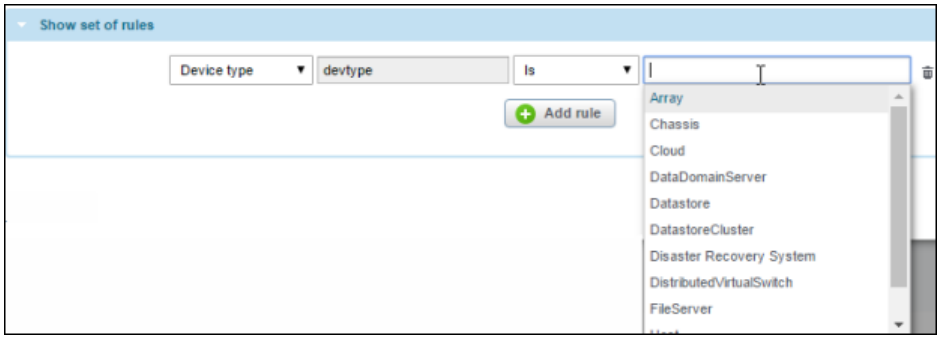
   - Select one of the suggested property descriptions. The actual property name is automatically provided in the next text box. For example, if you select **Device type**, the property name `devtype` appears in the text box.
   - Select **Advanced**, and then provide a database property name in the next text box.

   b. In the second drop-down list, select an operation. To use wildcards in the value, select **Wildcard**.

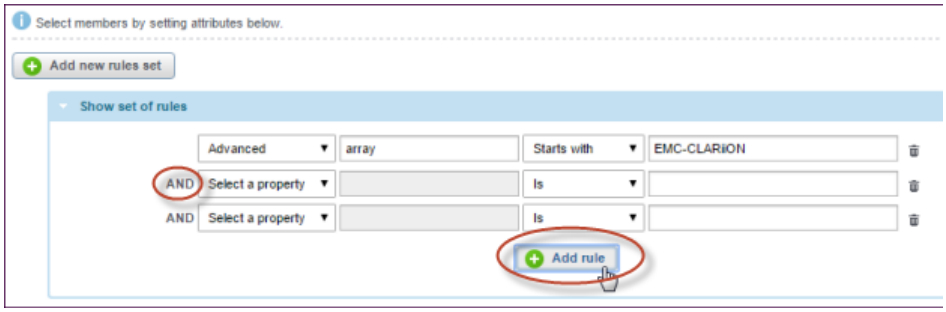


c. In the last text box, provide the property value.

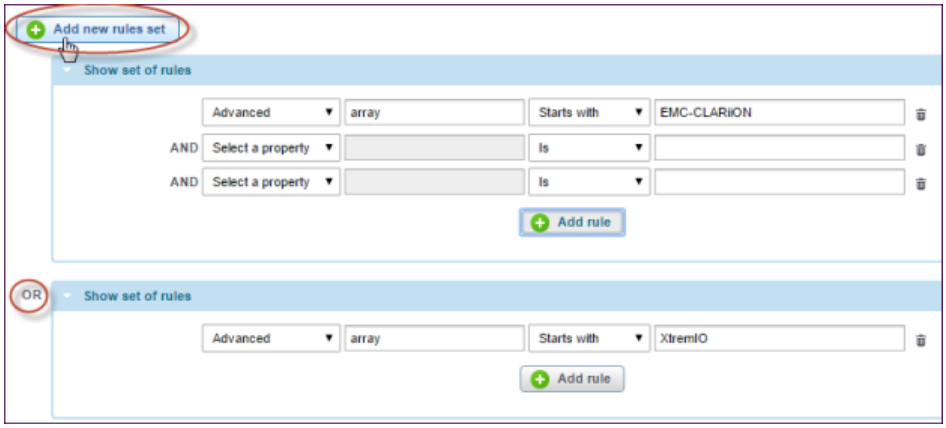
To see suggested values that are based on the property that is named in the first text box, click the box. The suggestions are obtained from existing discovered values in the infrastructure.



d. To AND another rule, click **Add Rule** inside the ruleset box.



e. To OR another ruleset, click **Add new ruleset** outside of the existing ruleset box.



f. To verify defined membership, click **Show Members**.

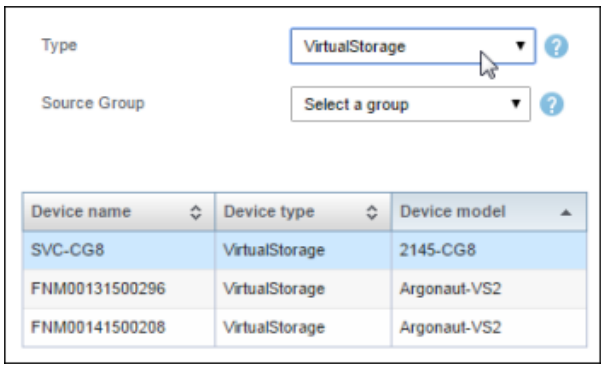
7. For hierarchical groups, optionally add static members.

Static members are ones that you select from a list and manually add to the membership.

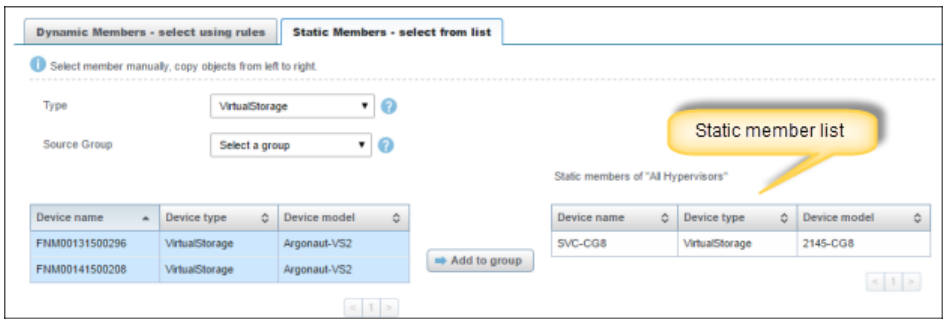
NOTE: Static and dynamic members are combined to create the total membership for a group.

a. Click the **Static Members** tab.

b. To populate the preview table, make selections from the **Type** or **Source Group** drop-down lists. It creates a subset of items to choose from.



c. To add a static member to the group, select a row in the preview table and click **Add to group**.
The selection moves to the static member list.



8. Click **Save**.

Edit a group

To change the membership rules for the group or change the new property values that are associated with the group, edit a group.

Steps

1. Go to **Administration** > **Config** > **Group & Tags** > **Manage Groups** > ***group_type***.
2. In the right pane, select the group to edit by clicking it.
3. Click **Edit**.
4. Change the property values in the text boxes at the top of the page, if needed.
5. Change or add to the membership rules, as needed.
6. Click **Save**.

Results

If you change a group name, all new tagging after the change uses the new group name. Regarding existing records in the database:

- The old group name is overridden by the new group name, if you change only the group name, the change is applied the next time the PTF process runs.
- You see both the old and new names in reports for a while, if you change both the group name and the rule definition, until the old group name ages out of the reports.

View and reorder rules

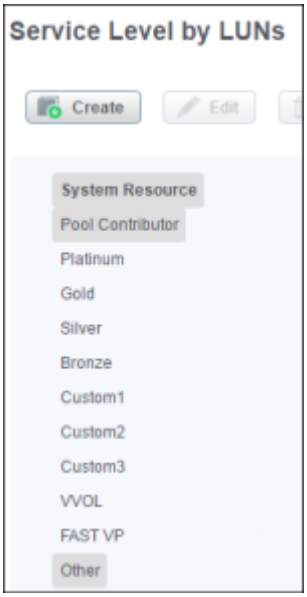
For flat group types, the order of the group names affects the order that the rules are processed and the tagging outcome. You can review all rules for all groups, and reorder the groups to change the processing order of the rules.

About this task

The **Reorder** and **View All Rules** buttons only appear on the dialogs for flat groups.

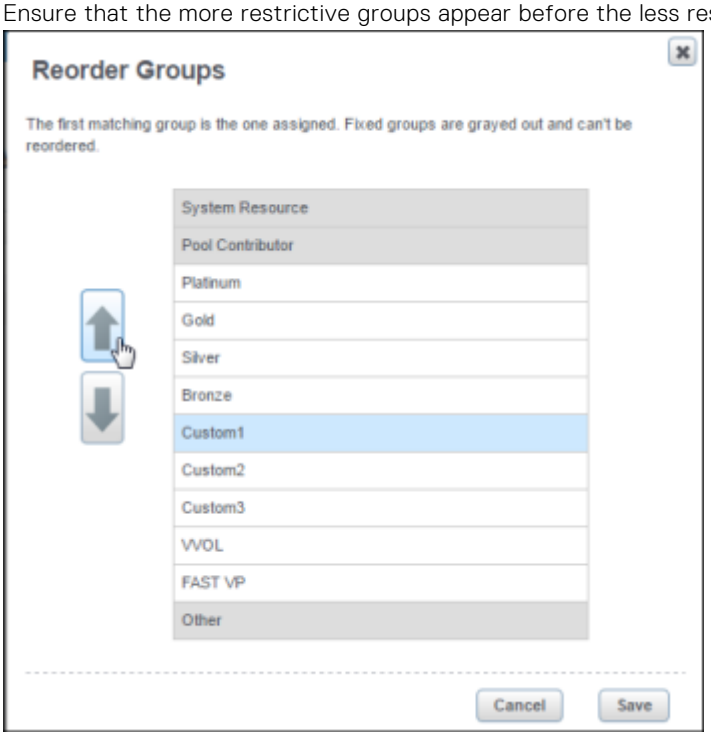
The new properties in flat groups can contain only one value. The first group name whose rules match the collected data is assigned. Ensure to order the groups so the most restrictive groups are first.

For example, in the list of service level groups, System Resource and Pool Contributor identify specialized storage uses. After that, Platinum rules are most restrictive. At the bottom of the list, Other is general and acts as the catchall group when no other rules match.



Steps

1. Go to **Administration** > **Config** > **Group & Tags** > **Manage Groups** > ***group_type***.
   This procedure is relevant to flat groups only.
2. To view all rules for all groups, click **View All Rules**.
3. To exit the list of rules, click **OK**.
4. To reorder the rules, click **Reorder**.
5. Click the group whose placement you want to change.
6. Use the arrows to change that group's place in the list.
   Ensure that the more restrictive groups appear before the less restrictive groups.



7. Click **Save**.

Create a group by copying an existing group

In hierarchical group types, you can quickly create a group with almost the same rules as an existing group by copying and pasting the existing group.

About this task

The **Copy** and **Paste** buttons are only available on the dialogs for hierarchical group types.

Steps

1. Go to **Administration** > **Config** > **Chargeback & Service Levels** > **Block Chargeback Grouping** > ***group_type***.
2. Click to select the existing group that you want to copy, and then click **Copy**.
3. Click to select the group in the hierarchy that is the parent of the new group, and then click **Paste**.
   The new group appears under the selected group. It has the same name as the copied group.
4. Click to select the new group, and then click **Edit**.
5. On the **Edit** dialog box, change the group name and alter or add to the rules and static member selections, as needed.
6. Click **Save**.

Get group membership rules as regex expression

You can see the complete membership rules for a group as a single regex expression.

Steps

1. Go to **Administration** > **Config** > **Chargeback & Service Levels** > **Block Chargeback Grouping** > ***group_type***.
2. Click to select the group name whose membership rules you want to see.
3. Click **Edit**.
4. Click **Click to show query** at the bottom of the **Edit** page.

Manage groups by exporting and importing files

As an alternative to creating and editing group names in the UI, developers or administrators can manage groups by exporting and importing files.

About this task

The Groups Management UI creates and maintains the underlying configuration files that support the group definitions. You can export and save those files to a location outside of Dell SRM for backup purposes or to view and edit the settings. You can import an edited version into Dell SRM.

NOTE: Editing files offline and importing them is an advanced activity. End users are recommended to edit group settings using the **Edit** and **Create** buttons on the Groups Management UI.

Steps

1. Go to **Administration** > **Config** > **Group & Tags** > **Manage Groups** > ***group_type***.
2. On the group type page, click **Export** and follow the browser's prompts to save the Zip file.
3. Extract the files with an extract utility.
   Two files are supported by each group type:

XML configuration file	The .XML file defines the Property Tagging Filter (PTF) configuration for the group type. It includes: • The `<files>` element defines the name of the associated data input file (the .CSV file), and the characters used in the file for delimiters and wildcards.

- The `<key-properties>` element defines the structure of the rules that are used to match existing data in the database.
- The `<new-properties>` element defines the names of the new properties to add when a match occurs.

Typically, you do not change this file. Use it to interpret the format of the .CSV file.

CSV data input file

The .CSV file contains the group names and definitions in the acceptable format as required by the PTF. Each line represents a group name, with all the rules that define members of that group and the new property values for that group.

For example, for the **Service Level by LUNs** group type, each line contains the defining rules for membership in a group, and, at the end of each line, the chargeback cost basis, the minimum and maximum response rates, and the service level name.

4. To import files:
   a. Ensure that you have preserved an exported version of the existing settings.

      NOTE: This step is important. You are about to overwrite the existing settings.

   b. Archive the edited .CSV file and the .XML file into a Zip file. Both are required.
   c. Click **Import**, and choose the Zip file to upload.
   d. Click **OK**.

Configuring server settings for online updates

You can configure the server to get the latest online updates from the server.

Steps

1. Click **Administration** .
2. Go to **CONFIG** > **Update System** > **Manage Online Update**.
3. Ensure that you are on the **Settings** tab.
4. Check the **Enabled** checkbox.
5. Type the Dell Online Support username and password.
6. To test connectivity to the update server, click the  icon.

   The  icon indicates that connectivity to the server failed.
7. Click **Save**.

Enabling the online update task

Enable the Online Update task to download the latest updates from the Dell Update server automatically.

Steps

1. Click **Administration** > **Home**.
2. On the **Physical Overview** page, click ***<host_name>*** **-Front End** where the Online Update task has to run.
3. Click **Tasks**.
4. Type **`OnlineUpdate`** in the **Search** bar.
5. Click the **OnlineUpdate** to run the scheduled task.
6. Click **Enable**.

   NOTE: By default, this task is set to run once everyday at 12AM. You can customize the task schedule by editing the configuration file.

Disabling the online update task

If you prefer to manually download the updates from the Dell Update server, you can disable the Online Update task.

Steps

1. Click **Administration** > **Home**.
2. On the **Physical Overview page *<host_name>* - Front End**, click the where the Online Update task has to run.
3. Click **Tasks**.
4. Type **`OnlineUpdate`** in the **Search** bar.
5. Click the **OnlineUpdate**to run the scheduled task.
6. Click **Disable**.

Running the online update task manually

At any time, you can run the Online Update task manually to access the available updates.

Steps

1. Click **Administration** > **Home**.
2. On the **Physical Overview** , click the *<host_name>* - Front End where the Online Update task has to run.
3. Click **Tasks**.
4. Type **`OnlineUpdate`** in the **Search** bar.
5. Click the **OnlineUpdate** scheduled task.
6. Click **Run Now**.

About CyberArk

CyberArk is a digital vault, which is responsible for securing, managing, maintaining, and auditing SRM device passwords.

SRM is qualified with Password Repository (Cloud CyberArk) and Password Management (On-prem distributed CyberArk).

For more information about CyberArk, see Dell SRM Admin Guide.

Temporarily suppress metric collection and alerts for a device in maintenance mode

Maintenance editor temporarily suppresses collection of alerts and metrics from devices during the maintenance period. The trend or alert data from devices are not collected during the device maintenance period. This ensures that the data during maintenance period does not impact trends or averages or generate spurious alerts on the availability of the device.

The **Maintenance Management** page displays all the outages that are already created for devices.

For more information about Creating Maintenance period for devices in SRM Frontend, see Dell SRM Administrator Guide.

SolutionPacks

SolutionPacks provide an easy and quick way to add technology-specific dashboards and reports to your system. SolutionPacks are installed from the SolutionPack Center.

In SolutionPack Center, you can browse each of the SolutionPacks to learn more about what each SolutionPack monitor and the kinds of reports and dashboards that are provided with the SolutionPack. Before you can install a SolutionPack, you must have a license.

Installing a SolutionPack

You can install a SolutionPack from CONFIG.

Prerequisites

- Determine whether you need a SolutionPack license file by checking the feature names and expiration dates that are listed in **Administration** > **System Admin** > **Licenses** > **Manage License** .
- Core modules must be up-to-date in all servers because not all module dependencies are validated during the installation or update process.

About this task

Core modules are modules that are not installed by a SolutionPack. Examples of core modules include webapps, module-manager, license-manager, java, mysql, backend, tools, and so forth. Update these core modules: **Databases**, **Backends**, **Frontends**, **Miscellaneous** (except Blocks).

Steps

1. Browse to **Administration** > **CONFIG** > **SolutionPacks**.
2. Select **Browse & Install SolutionPacks**.
3. Select the SolutionPack in the **Browse and Install SolutionPacks** page.
4. Read the summary information and click **Install**.
5. Select the components to install.
   a. Type the instance name.
   b. Select the server in one or more list boxes. For example, select the server in the **Data collection** and **Reports** list boxes.
   c. Click **Next**.
6. For each list box you select, a screen appears.
   a. Click **Next** after you complete each screen.
   b. Click **Install** after you complete the last screen.

   The installation process begins.
7. Select the maximize arrow next to each component to view the installation process.

   When the installation successfully completes, green checkmarks appear.

Next steps

After the installation is complete, select **Administration** > **CONFIG** > **SolutionPack** > **Installed SolutionPack** to verify the installed SolutionPack.

Reconfiguring a SolutionPack

You can change the configuration of a SolutionPack.

Steps

1. Browse to **Administration** > **CONFIG** > **SolutionPacks** > **Installed SolutionPacks**.
   A table that lists all the installed SolutionPacks appears.
2. Click the SolutionPack name that you want to reconfigure.
   A summary description about the SolutionPack appears, followed by a table of configurable components.
3. Click the **Edit** (pencil) icon for the component you want to reconfigure.
4. Make changes on the dialog box that appears, and click **Reconfigure**.
5. Click **OK**.

Installing a SolutionPackBlock

A SolutionPackBlock adds features to the system that are not associated with any particular SolutionPack.

About this task

Similar to a SolutionPack, you configure a SolutionPackBlock when you install it. You can reconfigure it later.

For more information about configuration parameters in a SolutionPackBlock, see the *Dell M&R Advanced Administration Guide* and other guides in the Dell SRM portfolio.

Steps

1. Browse to **Administration** > **CONFIG** > **SolutionPacks** > **Installed SolutionPacks**.
   The table shows the installed SolutionPackBlocks and their instance names.
2. Click **Add Component**.
   This table shows all available components for installation.
   NOTE: You can install multiple instances of the same component.
3. Click the SolutionPackBlock to install.
4. Work through all the dialog box, completing each one and clicking **Next**.
   The last dialog box contains the **Install** button, rather than **Next**.
5. Click **Install**.
6. Click **OK**.

Reconfiguring a SolutionPackBlock

You can change the configuration of a SolutionPackBlock.

Steps

1. Browse to **Administration** > **CONFIG** > **SolutionPacks** > **Installed SolutionPacks**.
   The table shows the installed SolutionPackBlocks and their instance names.
2. Scroll to the second table on the screen, called **Other Components**.
3. Click the **Edit** (pencil) icon for the component you want to reconfigure.
4. Make changes on the dialog box that appears, and click **Reconfigure**.
5. Click **OK**.

Troubleshooting

This section provides SolutionPack troubleshooting tips that can be used to resolve common SolutionPack issues.

- What to do if data does not appear in any reports
- What to do if data does not appear in some reports
- Viewing collector errors in the Collector-Manager log files

What to do if data does not appear in any reports

Troubleshooting steps if data does not appear in any reports.

Steps

1. After the completion of at least three collection cycles, verify if data is populating into the reports. If there is still no data in the reports, continue to the next step.
2. To import data into reports, run the scheduled task. If there is still no data in the reports, continue to the next step.
3. To view the log files for errors, browse to **System Admin** > **Logs & Diagnostics** > **Log Files** > **Collector-Manager::<*instance name*>**.

What to do if data does not appear in some reports

Troubleshooting steps if data does not appear in some reports.

Steps

1. Run the scheduled task to import data into reports. If there is still no data in the reports, continue to step 2.
2. Search for the metric in the database.
3. To view the log files for errors, **System Admin** > **Logs & Diagnostics** > **Log Files** > **Event-Processing_Manager::Instance name**.

   To troubleshoot the errors, enable the Event-Spy for the Event Processing Manager.

Viewing collector errors in the Collector-Manager log files

Review the Collector-Manager log files to troubleshoot problems with data collection.

Steps

1. To view the log files for errors, **Admin** > **System Admin** > **Log Files**.
2. Expand **Collecting**.
3. Click the Collector-Manager for the collector instance.
   Collector-Manager: *<Collector-Manager instance> - <host_ID>*

Data enrichment

The Data Enrichment page enables you to quickly add tagging to data coming from a collector-manager or an event-processing manager. To access the data enrichment page, select the data enrichment root node from the tree or select the data enrichment node that is located under the physical node.

The collector manager and/or the event-processing manager must be running to tag data and there must be at least one property tagging filter (for the collector manager) and one event property tagger (for the event processing manager).

The tagging status provides an indication of how the module is running:

- Running - the module is running.
- Module is not running - the module is not running.
- Server not reachable - the target server might be down.
- WS not Supported - the module is running but cannot get a response from the webservice. The module might be too old and does not support the web service.
- Unknown - any other errors.

To add a new property tagging filter or a new event property tagger to the list of tagging, click **Register a new module** and select a server, category, and the modules to register.

The Data Enrichment page cannot be used to modify property tagging filters or event property tagger configurations that contain an accessor.

Values that are not correctly written in the property tagging filter or event property tagger datafile appear in red italics. You cannot edit that value, but you can delete the row.

Using the Data Enrichment UI

Use the data enrichment GUI to create the properties and define the rules for tagging data with the property values.

Here is the sequence of tasks that are required to add a property, populate it, verify it, and make it visible in a report.

1. Register a Collector Manager
2. Create new tagging structure
3. Populate the tag set rows
4. (Optional) Run the import property task and restart Collectors
5. Verify the new property

6. Add the new property to a report

Register a Collector Manager

To enable a PTF to run, you must associate it, or register it, to a Collector Manager.

About this task

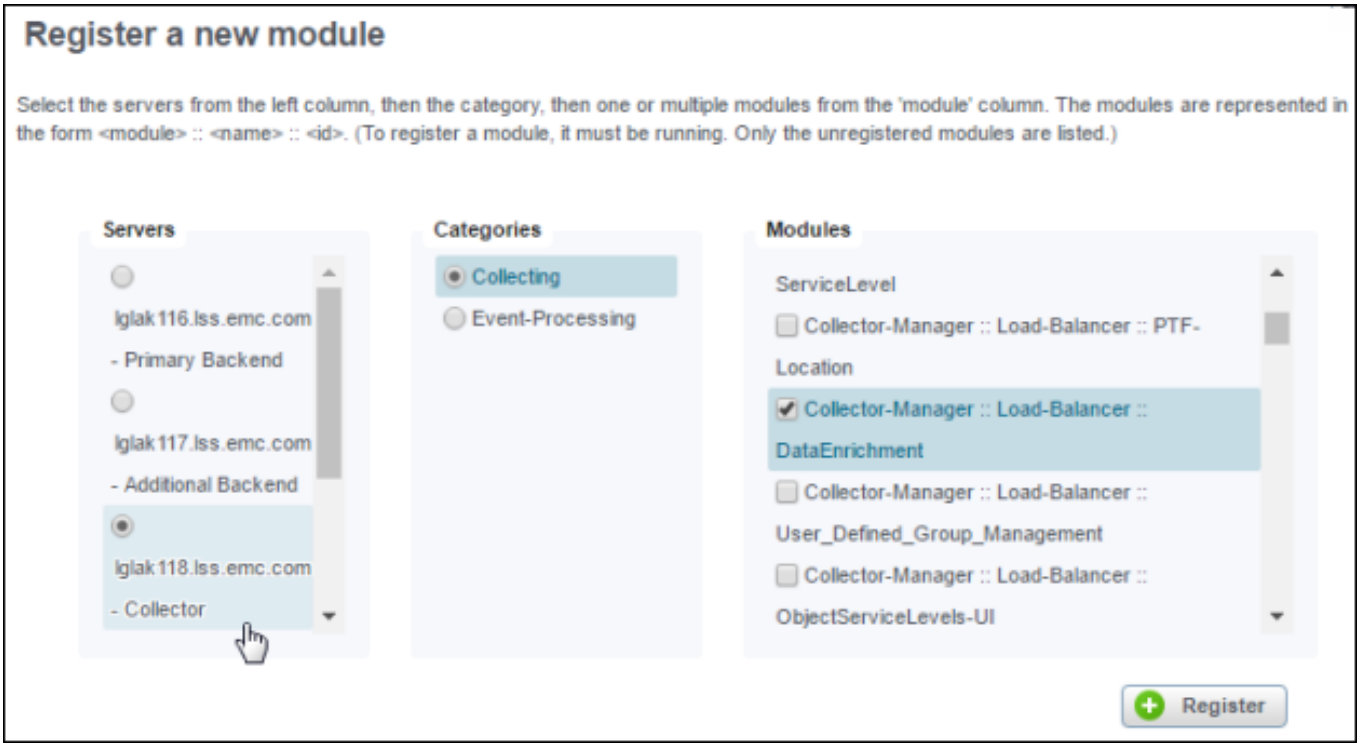
To associate a data enrichment PTF to a Collector Manager, you register the Collector Manager.

Typically, a collector server hosts many Collector Managers. Typically, you want all collectors to use the same PTF to consistently tag data and populate the new properties. A best practice is to register a single module, the `Collector-Manager :: Load-Balancer :: DataEnrichment` module, to minimize overhead and ensure that the same set of tagging rules is used on all data that are processed on a collector server.

If there is a reason to use different sets of rules for different Collector Managers, you can register each Collector Manager separately, and associate different tagging rulesets to each one.

Steps

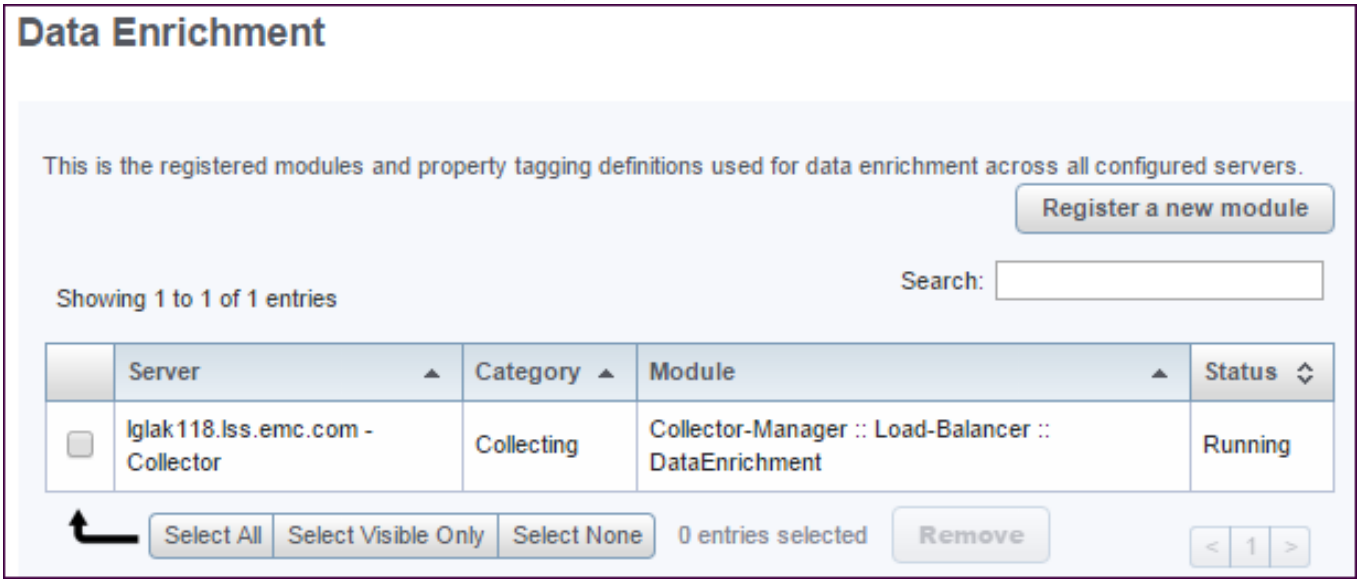
1. Log in to the Console and go to **Administration** > **Config** > **Group & Tags**.
2. Click the **Manage Data Enrichment** tab.
3. In the right pane, click **Register a new module**.
4. In the **Servers** column, select the server that hosts the data collecting module that you want to register.
   Typically, select the **Collector** server. However, other server types also host a few collecting modules.
5. In the **Categories** column, select **Collecting**.
6. In the **Modules** column, select one or more modules that you want to participate in the property tagging.
   For typical applications, choose `Collector-Manager :: Load-Balancer :: DataEnrichment`.


Register a new module
Select the servers from the left column, then the category, then one or multiple modules from the 'module' column. The modules are represented in the form <module> :: <name> :: <id>. (To register a module, it must be running. Only the unregistered modules are listed.)
Servers
lglak116.lss.emc.com
- Primary Backend
lglak117.lss.emc.com
- Additional Backend
lglak118.lss.emc.com
- Collector
Categories
Collecting
Event-Processing
Modules
ServiceLevel
Collector-Manager :: Load-Balancer :: PTF-Location
Collector-Manager :: Load-Balancer :: DataEnrichment
Collector-Manager :: Load-Balancer :: User_Defined_Group_Management
Collector-Manager :: Load-Balancer :: ObjectServiceLevels-UI
Register

NOTE: The list shows only running modules. If the wanted module is not in the list, exit and check the status of the Collector Manager under **Administration** > **Home** > **Physical Overview** > ***server_name*** > ***collector_manager_name***. Use the **Start** or **Restart** buttons on the page if needed.

7. Click **Register**.

The **Data Enrichment** page redisplays, and the newly registered module appears in the table. You can now associate property tagging rules to the module.



Create new tagging structure

To match against and the new properties to add, define the new tagging structure by defining the keys.

Steps

1. Log in to the Console and go to **Administration** > **Config** > **Group & Tags**.
2. Click the **Manage Data Enrichment** tab.
3. Click a row for a registered module.
   The tagging page appears.

   This page contains a blue bar for each defined tag set.

   NOTE: Dell SRM is installed with a predefined tag set named **global-enrichment**.
4. (Optional) Click the **global-enrichment** entry to expand it.

   Examine the structure of this predefined tagging structure as a preview to the next few steps. Notice the following:
   - This tagging structure contains one key, `device`.
   - It contains four possible properties to add to records when a collected `device` value matches a rule.
   - To populate the tagging structure, you would create rows in the table that specify the collected `device` values to match and the resulting four property values to add.
   - The **bunit**, customer, and location properties can also be managed using the Groups Management interface.
5. To go with defining a new ruleset structure, click **New tagging**.
   A new blue bar appears, with input fields for defining the new tag set.
6. For **Name**, create a unique name for the new tag set.

   This name becomes the name of the CSV input file containing the rules that you define in the tag set.
7. To define a key for the structure, click **Add new key** and complete the details in the dialog box.
   a. For **New column**, start typing the APG database field name that you want to match on, and select the field from the list.
   b. For **after**, select the position of this new key in the key set. (For the first key, the position must be **first**.)
   c. For **Default value**, optionally type a default value for this field.

      Type field in the next step specifies the value format. **Default value** is used as follows:
      - A first record is created that uses all the default values.
      - If you add a key into an existing structure that was already populated with records, the default value is used in all the existing records.

   d. For **Type**, select the type of match value to use for this field when populating the ruleset.

      The following table provides guidelines for choosing an appropriate type. See Type attribute for PTF keys for descriptions and syntax of acceptable match values for each **Type**.

Table 28. Type Description

Type	Description	Notes
Range	The match value must be a number range.	Used only for number range matches. Syntax examples for match values are: • [1:10] to match 1 through 10 inclusive • [0:100] to match 0 through 99.99999
String	The match value must be an unquoted, exact-match, case-sensitive string.	String matches have good performance, supporting long files (>100,000 lines) with minimal impact.
Regex	The match value must be a Java normal expression.	Try to avoid using this type. Although a regex match is powerful, it is CPU-intensive. Dell Technologies recommends using one of the SQL wildcards matches instead.
Wildcard	The match value must be a SQL pattern. Case-insensitive.	**Wildcard** and **Wildcard-CI** are the same. (Both perform case-insensitive SQL pattern matching.) Wildcards are:
Wildcard-CS	The match value must be a SQL pattern. Case-sensitive.	

Table 28. Type Description (continued)

Type	Description	Notes
Wildcard-CI	The match value must be a SQL pattern. Case-insensitive.	
Smarts Wildcard	Used for Dell Service Assurance Suite/ SMARTS integrations.	Not Applicable

Wildcard	Description
%or *	Any multiple characters
_or?	Any one character
\	Escape character if needed

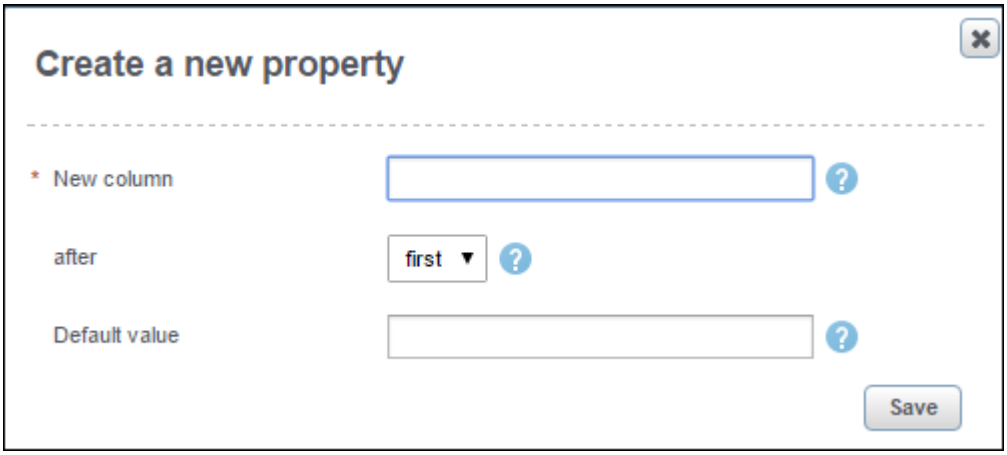
e. For **Delete after use**, indicate whether to delete the matched property from the collected data after tagging is complete.

WARNING: Use this option with extreme caution. Deleting the fields can break the data model. Usually leave cleared.

The **Delete after use** option is useful if the intention is to replace a collected property and value with a new property and value.

f. Click **Save**.

8. To add additional keys to the structure repeat the previous step.
9. To define a new property, click **Add new property** and complete the details in the dialog box.



a. For **New column**, type a name for the new database property.

NOTE: APG database property names are limited to eight characters. If you use more than 8, the property name is truncated to 8.

NOTE: If you reuse a name that exists in the APG database, the rules populate the existing property. Dell Technologies recommends creating a property.

b. For **after**, select the position of this new property in this tag set. (For the first property, the position is always **first**.)

c. For **Default value**, optionally type a default value for this field.

It is used as follows:

- A first record is created that uses all the default values.
- If you add a property into an existing structure that was already populated with records, the default value is used in all the existing records.

d. Click **Save**.

10. To add additional properties to the tag set structure repeat the previous step.
11. After creating all keys and all properties, click **Save All**.
12. On the **Save Data Enrichment** dialog box, select the modules that should use this tagging structure.

Select all that apply if you have multiple registered modules.

13. Click **Update**.
    The tagging page reappears with a new blue bar for the new tag set.

Type attribute for PTF keys

PTF keys are defined using a Type attribute. The Type defines the format of the match values.

View the defined Type for a key

You can view the Type that was defined for a key by hovering the cursor over the column header until a tooltip appears for that column. The following image shows that the vendor key was defined with a Type of string. It means that the values you provide in that column must be strings, and cannot include wildcards.

Type attribute values

The following list defines each Type value.

String	An unquoted string, where the string must match exactly.
Wildcards	Wildcard characters are accepted in a match value. There are multiple types that use wildcards: • **Wildcard**-Case insensitive. Same as **Wildcard-CI**. • **Wildcard-CS**-Case sensitive. For example, `Z` does not match `z`. • **Wildcard-CI**-Case insensitive. For example, `Z` matches `Z` or `z`. The following values are supported in the match values for keys with wildcard types: • %or* -Any multiple characters • _or?-Any one character • \-Escape character if needed
Range	A range of numeric values is accepted as the match value. Decimal values are permitted. The following rules apply: • Specify the beginning and ending integer or decimal values • Separate the two values with a semi-colon • Enclose the phrase with brackets, as follows: [ ] enclosing brackets indicate inclusive] [non-enclosing brackets indicate exclusive combinations are permitted Range value examples: • [5:20] -Matches any value 5 through 20, including 5 and 20. • [5:21]-Matches any value greater than 5 and less than 21. • [5:20]-Matches any value 5 up to but less than 20. 19.5 would match. • [0.5:1]-Matches any value 0.5 to 1, inclusive.
Regex	Any Java normal expression is supported as the match value.

@ values

The following special values are available for keys:

- **@DEFAULT-"**"**-Matches all values.
- **@EMPTY-"" (no space)**-Matches a property that exists but is empty.
- **@NULL -"@@"**-Matches when the property does not exist.
- **@MATCHALL-"%%"**-Always matches, including when the property does not exist.

Populate the tag set rows

To match and to add new property values populate the tag set with the key values.

About this task

There are several ways to populate the rows:

- Add rows manually using the Console interface. This method creates a .CSV file using the name of the tagging set.
- Import a CSV or .XSL file.

  NOTE: Importing a file overwrites all entries currently in the table.

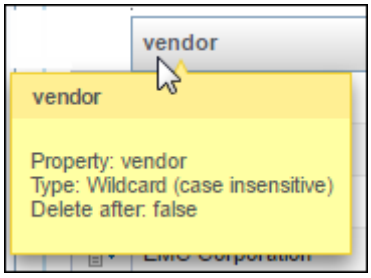
- Add a few rows using the Console, and then download the file, edit it to add more rows, and upload it.
- Add a few rows using the Console, and then open the file in the Console, edit it, and save it.

Key values must match the Type attribute that was configured for the key or use one of the special @ values.

Steps

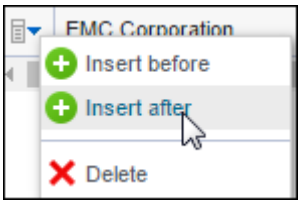
1. Log in to the Console and go to **Administration** > **Config** > **Group & Tags**.
2. Click the **Manage Data Enrichment** tab.
3. Click a registered module that is associated with the tagging set that you want to populate.
   A blue bar appears for each tagging set.
4. Click to expand the tagging set that you want to populate.
5. To type the first row:
   a. Click the first key field and type, or select a match value.
      The value for a key field must be either:
      - A value that conforms to the key's Type attribute (Range, String, Regex, or Wildcard).
      - One of the @*value* selections.

      To view the Type attribute for a key, hover the cursor over the column heading until the tooltip appears.

      In the example above, a valid wildcard match value is **lgl*** to match all device names that start with LGL or lgl.

   b. Click each key field, and provide a match value.
   c. Click each property (result) field, and provide the wanted value for the new properties.
   d. To commit a row press **Enter**.
6. To type subsequent rows, right-click the list icon at the beginning of a row, and select either **Insert before** or **Insert after** to place the new row in the wanted spot.



Rows are processed in the order in which they appear in this table (or the file). Row order can affect results, especially when you are using wildcards, normal expressions, or ranges. A subsequent row can overwrite a match by a previous row. Typically, you would start with the most general rule, such as a match on @DEFAULT or @MATCHALL, and end with more specific rules.

7. Click **Save**.
   This command saves the table contents to a file. The file name is the tag set name with an extension of `.csv`.
8. On the **Save Data Enrichment** dialog box, select all the registered modules that the file applies to, and click **Update**.
   The file is saved on each registered server, under `Collecting/Property-Tagging-Filter/module-name/conf/tagset_name`.
9. To export a tag set file, click **Export CSV** or **Export XSL**.
10. To import tagging set values from an external file:

    NOTE: Importing a file overwrites all entries currently in the table.

    a. Click **Import CSV** or **Import XSL**.
    b. Follow the browser prompts to import the file.
    c. Click **Save** after importing the file.
    d. Select all the registered modules that the file applies to, and then click **Update**.
11. To automate the data enrichment:
    a. Click **Schedule PTF**.
    b. Enter the required details and click **Submit**.
    c. Click **Continue** after getting connection successful message.

    NOTE: To schedule the automation task or manually run the task: Go to **CONFIG** > **Settings** > **Scheduled Tasks** > **Data Enrichment**.

View and edit the PTF input file

After creating a few rows using the Console interface, you can view the file to determine the required format, and then manually add additional rows or import a file in the proper format.

About this task

There are two ways to view and edit a saved PTF input file.

- Export the file, edit it in a text editor, and then import it.

  NOTE: Importing a file overwrites all entries currently in the table.

- Open the file in the Console's text editor.

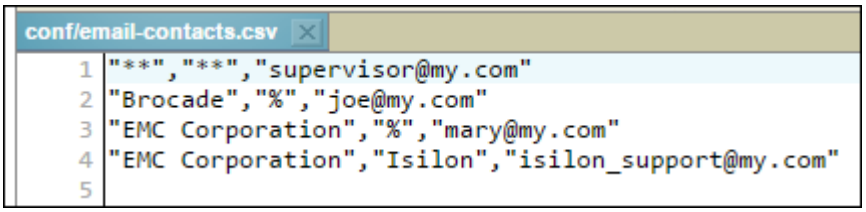
Either way, you notice that the @*values* and wildcards that are used in the Console entry are translated into standardized wildcard values.

Steps

1. To export and import a PTF input file:
   a. Go to **Administration** > **Config** > **Groups & Tags** > **Manage Data Enrichment** .
   b. Click a registered module that you associated to the tag set.
   c. Expand the tag set name.
   d. Click **Export** or **Import**.
2. To open the file on the Console:
   a. Go to **Administration** > **Home** > **Physical Overview** > ***registered-server-name*** > **Modules** > **Collecting** > **Property-Tagging-Filter :: *registered-module-name***.
      The *registered-server-name* is typically a **Collector** server. The *registered-module-name* is typically **Load-Balancer**.
   b. In the right pane, expand **Configuration Files**.
   c. Locate the `conf/tag-set-name.csv` file.
   d. Click **Edit** (pencil icon) next to the file.
      The file opens in the Console file editor.

3. Add additional rows using the format of the existing file.

   For example, here is the `conf/email-contacts.csv` file.

   Notice that **@DEFAULT** values that are entered on the Console were translated into **"**"**. If you add rows, use the **"**"** notation, not the **@DEFAULT** notation.

4. After editing or importing an edited input file, apply the updates to all registered modules that use the tag set.

   NOTE: If there is only one registered module that uses the tag set, this step is not needed.

   a. Go to **Administration** > **Config** > **Groups & Tags** > **Manage Data Enrichment** .
   b. Select all modules that use the tag set associated with the edited file.
   c. Click **Update**.

Edit a ruleset

You can change the structure of the ruleset by adding or deleting keys and properties. You can edit the values in the rows,

Steps

1. Log in to the Console and go to **Administration** > **Config** > **Groups & Tags** > **Manage Data Enrichment** .
2. Click a registered module that is associated with the tagging ruleset that you want to edit.
   A blue bar appears for each tagging ruleset.
3. Click to expand the tagging ruleset you want to populate.
4. To delete a key or a property from the structure, click **Delete** (trashcan icon) in the column header.
   This action removes the column and all values.
5. To add a row, right-click the list icon in a row and select **Insert Before** or **Insert After**.
   For entry instructions, see Populate the tag set rows.
6. To delete a row, right-click the list icon in the row and select **Delete**.
7. To edit a value in a row, click the value, provide a new value, and press **Enter** to commit the changes.
8. To save the table, click **Save**, and then **Update** to apply the changes to selected registered modules.

(Optional) Run the import property task and restart Collectors

Data enrichment processing depends on the configured intervals for the database property import task and the Collectors. For quicker data enrichment results, you can run them manually.

About this task

It might take a day for all involved processes to run. The appearance of new properties depends on the following:

- The database import-properties task must run. This task updates the in-memory database cache on the Frontend.
- The collecting process must run the Property-Tagging-Filters. For accurate tagging results, sometimes two collection cycles are required.

If needed, you can run these processes manually.

Steps

1. To run the database property import task manually:
   a. Click **Administration** > **Home** > **Physical Overview** > ***server_name*** **- Front End** > **Tasks** > **Database** > **import-properties-Default** .
   b. In the right pane, click **Run Now**.

2. To restart a Collector-Manager:
   a. Click **Administration** > **Home** > **Physical Overview** > ***collector_server_name*** .
   b. With the wanted collector server selected, click the **Services** tab.
   c. Select a Collector-Manager, and click **Restart**.

   A Collector-Manager calls all the individual collecting components in its configuration, such as the stream and XML collectors and the PTFs.

Verify the new property

After the new property has propagated through the system and the new PTF tag set is applied to collected data, you can see the property using Frontend tools.

Steps

1. In the User interface, click **Modifications** > **Advanced Search**.
2. In the **Expansion** field, click the icon for the **Property selection helper**.
3. To locate the new property, click the APG tab, and then use the search field at the bottom of the dialog box.

   When searching, remember that a long property name was truncated to the first eight characters.

   If the new property does not appear in the list, wait an hour and try again.
4. If the new property appears in the list, select it and exit the property selection helper.
   The new property name should appear in the **Expansion** field. Delete any other property names.
5. Click **Apply**.
   The search result lists the values for the property that have so far been applied to records in the database. It can take up to a day for all collectors to run, depending on settings at the site.

Add the new property to a report

To make the new property visible, add it to a report.

About this task

If you choose a report that includes the keys on which the tagging was based, you do not must redefine the report filter.
The following example adds a column to a table report, assuming that the existing filter captures records that include the new property.

Steps

1. Browse to the table report, and click **Modifications** > **Edit Reports**.
2. Click the **Report Details: Table** tab.
3. Click **+ Property**.
4. Scroll to the end of the property list (blue bars) and expand the **Property:** * bar.
5. Configure the new column:
   a. For **Column Name**, type the column header.
   b. If the user hovers the cursor over this column header for **Description**, type the description that appears in the tooltip.
   c. For **Property**, type the new property name.
   d. Click **Save**.
6. To return to the report click **BROWSE MODE**.

Enabling impact analysis

Enable Impact Analysis to receive alerts that provide details about the effects of an event and to populate impact details on reports.

Prerequisites

Impact Analysis uses the event change listener in the SolutionPack for Configuration Compliance. The SolutionPack for Configuration Compliance must be installed and configured before you can enable Impact Analysis.

About this task

Impact Analysis gives users additional information about effects of an event in the SAN Environment. For example, if a switch port goes down many paths from host to LUN can be affected and become unavailable. Impact Analysis displays alerts for these paths. Similarly, if a disk fails or faults, the user receives alerts for all LUNs that are carved from the disk.

Steps

1. Browse to **Administration** > **CONFIG** > **SolutionPacks** > **Installed SolutionPacks**.
2. Under **Other Components**, click the pencil icon for **Alert Consolidation**.
   The **Reconfiguring Window** appears.
3. Click the **Enable Impact Analysis** checkbox.
   To disable Impact Analysis, clear the checkbox.
4. Type the hostname or IP address of the host of the compliance change event listener. This host is typically the Compliance Backend host.
5. Type the change event listener port number, typically 2060.
6. Click **Reconfigure.**
   If the operation succeeds, an **OK** button is enabled.
7. Click **OK.**

Alerting Module

The Alerting module provides access to alerting administration and development features that are performed using the Web Portal.

This information is general to the Dell SRM core. For more information about alerting, see:

- Product documentation—Alerting implementations are product-specific. The product documentation provides relevant alerting implementation details. See Dell Support Site for links to product documentation.
- Backend documentation—The Alerting features are flexible and offer many opportunities for customization. For information about the alerting infrastructure and supporting configuration files, see the *Dell M&R Advanced Administration Guide*, available on Dell Support Site.

Alerting reports

Users access the alerting reports on the User Interface, in Browse mode.

Change the refresh rate on alerting reports

Alerting reports are installed with preconfigured automatic refresh interval set to 180 seconds. You can change that value. To disable automatic refresh, change the setting to 0.

About this task

At installations with a few alerts, you can reduce the refresh interval to as low as 15 seconds.

For larger events databases (with a total number of active alerts more than a few thousand), it may take a while for the alerting reports to load. Besides if those reports have the automatic refresh interval set too low, the alerting reports become unusable. You can increase the refresh interval or disable automatic refresh.

If automatic refresh is disabled, you can refresh manually with the refresh feature of browser to update the report as needed.

NOTE: New alerts that originate from SNMP can take up to 4 minutes to appear in the alerting reports. This delay is independent of the refresh interval setting.

Steps

1. Go to the report whose refresh rate you want to change, and then click **Modifications** > **Edit Reports**.
2. Click the **Report Details: Table** tab.
3. Scroll to the bottom, and expand **Display Options**.
4. Set the **Table refresh behavior** option as **set interval**.
5. Change the value in **Refresh interval (secs)**.
   To disable automatic refresh, type 0.
6. Click **Save**.
7. To return to the report display, click **BROWSE MODE**.

Alerting infrastructure

The alerting module consists of various components that are installed on the Alerting Frontend and the Alerting Backend and a separate database only for alerts.

Alerting Frontend

In most installations, the Alerting Frontend is the Primary Frontend. The components on the Alerting Frontend are the user-facing components:

- Alerting reports show information from the database.
- Alert Definitions define all the conditions that cause events to be written to the database. Alert definitions also define other actions that can occur, such as an email notification, an entry to a log file, or a trap to a third-party application.
- Alert Templates are useful for consistency in creating alert definitions.
- Alert Adapters and Grouped Boxes customize the alerting module and are mostly for developer use.

Alerting Backend

In most installations, the Alerting Backend is the Primary Backend. The components on the Alerting Backend include all the supporting processes for consolidating events from various sources into a single format and for writing the consolidated alerts to the Events database.

Alerting (Events) database

The Events database contains two tables.

genericevents_live table	This table stores all ACTIVE alerts. The **All Alerts** report on the Console, and all the reports that are filtered versions of it, are based on the entries in this table. An ACTIVE alert is one whose `Active` property has the value `1`.
genericevents_archive table	This table stores INACTIVE alerts until they are purged from the system. An INACTIVE alert is one whose `Active` property has the value `0`.

Access the alerting portal page

The alerting page lets you create, edit, enable, and disable alert definitions. It also accesses the templates, adapters, and grouped boxes nodes.

About this task

The URL to the Alerting page is `<Tomcat server address>/alerting-frontend`. For example:

```
http://localhost:58080/alerting-frontend
```

From the user interface, use these instructions:

Steps

1. If you are in the reporting interface, click **Administration**.
2. Click **Config** > **Alerts**.

Alerting node tools

The tools above the alerting node tree manage the node hierarchy.

The tools can be unavailable depending on the node you select.

	Creates an element under a list node and opens the element edit page. If you select another node before saving the new node, the new element is deleted.
	Copies the element.
	Pastes the copied node if it is a list that contains the same type of elements.
	Exports the element to an XML file.
	Imports an XML file to the Manager.
	Deletes the element.

Alert definitions

An alert definition defines the actions that should occur when an event meets defined conditions.

For an event to result in an action, such as an email notification or getting added to the database, it must match a valid and ENABLED alert definition.

SolutionPacks install predefined alert definitions appropriate to their function and devices. You can create custom alert definitions.

An alert definition contains the following components:

- An entry point filter defines which events are handled by this alert definition. The filter operates on the fields (properties) in the event data. The filter identifies events by matching values in data fields, such as a MIB name and field, or a collector name and metric, or an event name and device type.
- Operations and conditions are optional components in an alert definition. Operations provide a way to change the metric data in an event. Conditions test the data and provide alternate outcomes for different actions.
- Actions define what should occur as a result of the event, such as an email, logging file entry, sending HTTP/HTTPS request, SNMP trap to an Events database, or traps to other applications. Only events that are written to the Events database appear in the alerting reports.

Access alert definitions

You can configure and enable or disable alert definitions. You can also view a graphical representation of the alert definition, modify it (such as add or remove actions or change the filter), and add new alert definitions.

Steps

1. Click **Administration** > **CONFIG** > **Alerts** > **Manage Alert Definitions**
2. Expand the alert definition folders until the alert definition name appears.
   In the right pane, the **Type** column indicates whether the entries are folders or alert definition names.

	Alert definition folder
	Contextualized alert definition
	Non-contextualized alert definition

3. In the table in the right pane, right-click an alert definition, and choose one of the following actions.

Edit	Provides a graphical view of the components in the alert definition, with access to each component. You can add, delete, and change the configuration of components. Use this option to add or remove components, such as actions or comparators.
Configure	Provides access to the configuration dialogs for each component in the alert definition. Use this option to change the configuration of a component, such as email recipients on Mail actions or threshold values in comparators. **NOTE:** The modified threshold values are retained after the system upgrade.
Probe	Unavailable. Probes are implemented as a Test button when you configure an alert definition.
Enable/ Disable	Activates or inactivates the alert definition. **NOTE:** The state of an alert definition, if modified, is retained even after the system upgrade.
Delete	Removes the alert definition from the system.

NOTE: If you click (as opposed to right-click) an alert definition, the UI invokes either the **Edit** or **Configure** action, depending on the last choice you made using the right-click menu.

4. To set the default action (**Configure** or **Edit**) for the current session when you click an alert definition, select the required option one time on the right-click menu.

About configuring alert definitions

An alert definition defines the actions that should occur when an event meets defined conditions. The conditions are sometimes configurable.

The Alerting Frontend interface presents the configurable parts of an alert definition as fields that you can easily configure. For example, here is the form for configuring utilization thresholds for an alert that is related to switch ports.

An alert definition must be ENABLED for the specified actions to occur.

Components in an alert definition

An alert definition contains at least one entry point filter and one action. It can contain multiple entry points and actions, and optional operations and conditions that change and evaluate data elements in the event data.

Entry point

The entry point is the filter defining which events are to be handled by this alert definition. The filter operates on the fields (properties) in the event data.

NOTE: In the alerting process, the event data is normalized into a standard format, but the event is not yet in any database. Therefore, the filter wizard might not be able to prompt you with all valid values. To write a filter, you must research the source of the event and its normalization rules.

Here is an example entry point filter for the **Backend Processing Delay** alert definition in the System Health folder. The source for this alert is the metric that is called ProcessingDelay collected by the APG_Health collector.

Figure 4. Filter in an alert definition

An alert filter typically includes a test for the source of the event. The following table shows some often used field names for filtering on event sources in Dell SRM.

Table 29. Field names for filtering on event sources

Event type	Event source filter	Example
Metric-based thresholds from collectors	`source=='collector_name'`	`source=='APG_HEALTH'`
Events from the event listener	`source=='name_GenericEvent'`	`Source=='VMAX-GenericEvent'`
Events from SNMP traps	`Source='vendor_in_MIB%' & ( sourcedomainname==MIB_data_field`	`Source='Cisco%' & ( sourcedomainname=='cieLinkDown' | sourcedomainname=='cieLinkUp' )`
Events from scheduled reports	`source=='report_name'`	`reportName=='apg report'`

Operations

Operations evaluate incoming data to see if they should go to the next component or be dropped. A large set of operations are available, including case, arithmetic, aggregation, time window, date, and so on.

Here is a Time Window operation that calculates an average.

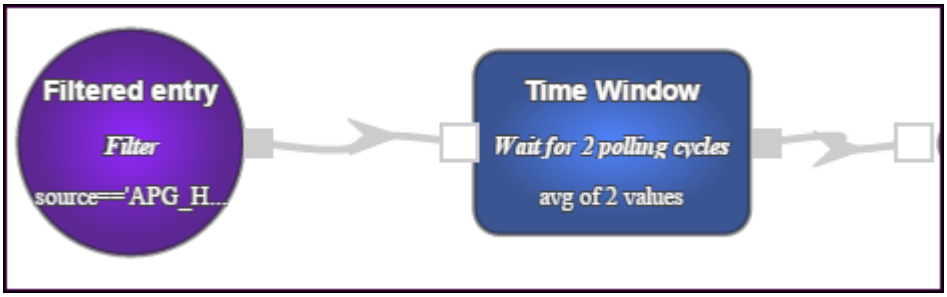


Figure 5. Operator in an alert definition

Conditions

Conditions let you set up multiple outcomes in the same alert definition. Each outcome is based on the results from a condition, and would typically have different actions that are associated with them. Two types of conditions are available.

- Comparators let you define value tests. A common technique in Dell SRM is a chain of comparators, each one using a different comparator value. The outcomes are a series of SNMP traps creating Critical, Major, Minor, and finally a Clear Trap, all on the same property, and in the same alert definition.
- Counters let you count occurrences within a specified time range.

Here is an example comparator that uses Log actions as outcomes. Since the Alert Trap action is missing, events that are processed by this alert definition do not make it into the Events database.

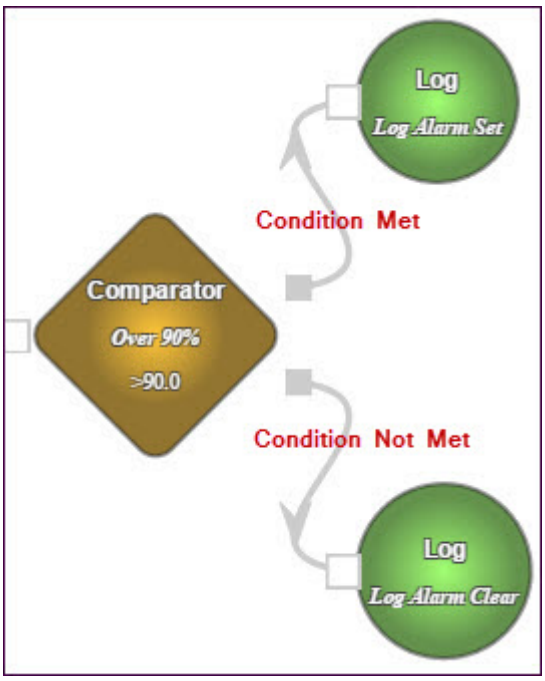


Figure 6. Comparator with two outcome paths

Actions

The following actions are available:

- An SNMP Alert Trap or Clear Trap, which gets the event into the alerting database or subsequently clears it.
- A Log action, which writes the event to a log file.
- A Mail notification, which sends an email to preconfigured email addresses.
- A Webhook Action, which sends an HTTP/HTTPS POST request to the preconfigured URL. For more information about Webhook, see Dell SRM Alerting Guide.
- An SNMP trap to a third party, such as another management system.

NOTE:

- Do not add the Dell Technologies Connectivity Event action to any alert definition. The Dell Technologies Connectivity Event action is for Dell use only.
- The Send to SAM action is for use by customers who have Dell Service Assurance Suite installed.

Here is a set of comparators, each one associated with two outcome paths. The Alert Trap contents in each action are similar. The difference would be the severity that is set in the trap contents.

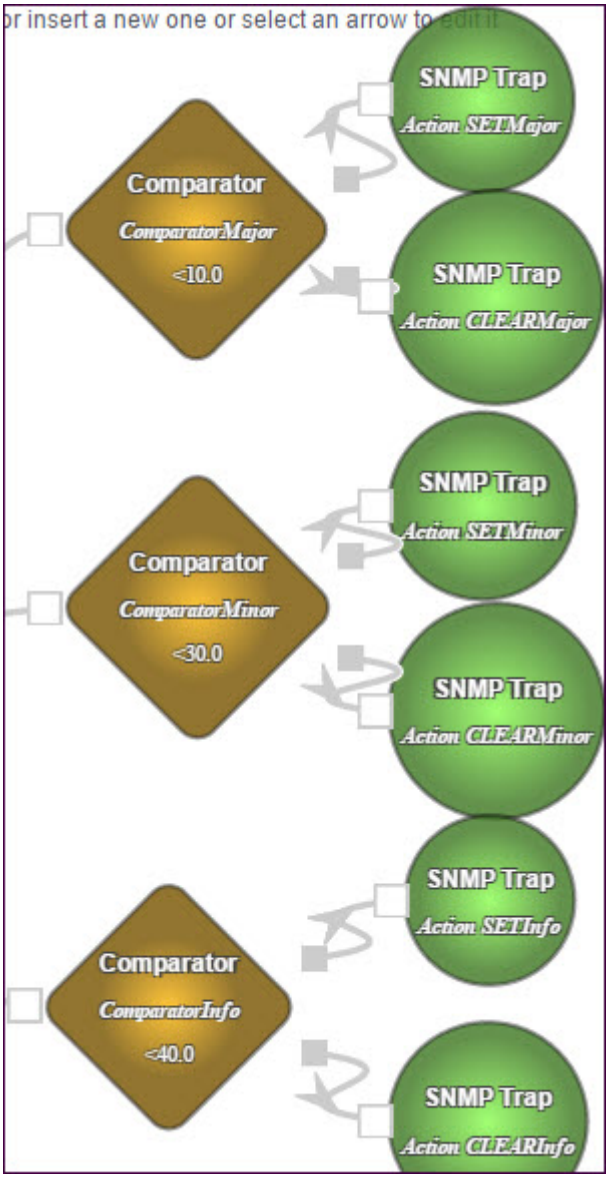


Figure 7. Actions in an alert definition

Example: Putting it all together

Here is an alert definition that contains two entry points to define two data fields, and then performs several operations to derive a new value. There are three conditional tests on that value, and the outcome actions are a series of Alert Traps with different severities and corresponding Clear Traps.

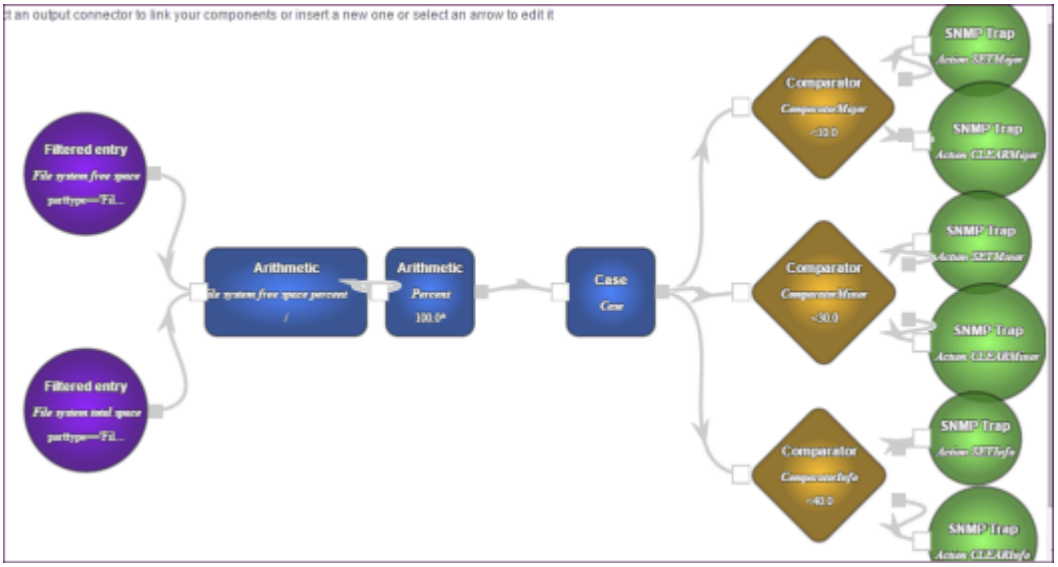


Figure 8. Example alert definition

This is the **Percentage of File System Free Space Alert** in the System Health folder, in case you want to explore how all the components are configured.

Contextualized and non-contextualized alert definitions

Contextualized alert definitions allow for more than one set of configuration values. Different named contexts can be configured differently.

Contextualized alert definitions provide the following advantages:

- If future SolutionPack upgrades change the alert definition, the customized parameter settings are not affected because the contexts are saved separately from the alert definition.
- You can define several contexts, or sets of values, for the same parameter set, and enable or disable the contexts separately. For example, you might have different settings for production and testing, or you might preserve the installed values in the default context and create a context for the customized values.

When you configure a contextualized alert definition, you select the context that you are providing values for. You can create and name new contexts.

Non-contextualized alert definitions can have only one set of configuration values.

Contextualizing an alert definition

You can add contextualization to components in an alert definition and set the values for the default context.

About this task

This procedure describes how to add contextualization to a component in an alert definition This is a one-time process that sets up a component and parameter for contextualization. Thereafter, users can add additional contexts by right-clicking the alert definition and selecting **Configure**.

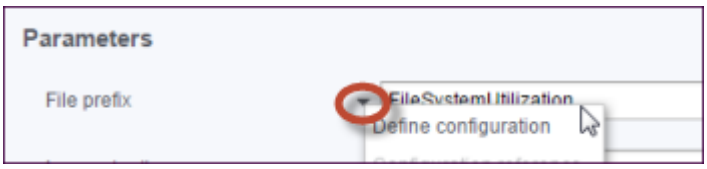
Many alert definition components, including all threshold Comparators, are contextualized out of the box. Administrators can use this procedure to contextualize the alert definition components that are not contextualized.

NOTE: The Action components, such as webHooks, traps, logging, and email notifications, do not need to be contextualized. Those configurations are not overwritten.

Steps

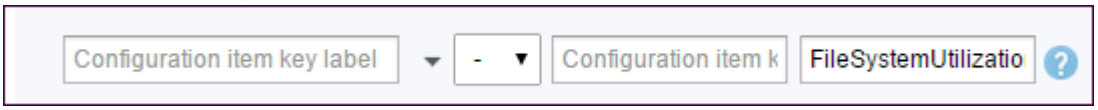
1. Right-click the alert definition and choose **Edit**.
2. Double-click the component in the alert definition that you want to contextualize.
   A configuration dialog box appears for the component.

3. Click the small down-arrow next to the configurable element, such as a parameter or filter, and choose **Define configuration**.

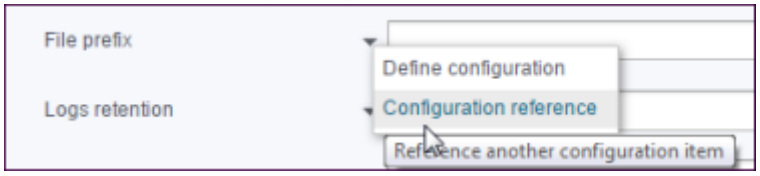


Here is the arrow for a filter:

A set of context configuration fields appears.



4. Complete the fields:
   - For **Configuration item key label**, type a name for this parameter that the user sees on the configuration window.
   - For ordering, optionally select the order in which the parameters appear on the configuration window.
   - For **Configuration item key**, type a key that is used to uniquely identify the context and reference the context in other contexts within the same alerting definition. For example, an alert definition might have 3 log actions for different conditions. By using a key, you can configure the log action component one time and then reference it in the other components by choosing **Configuration Reference** when you configure the second and third components.



   - For the last field, type the default configuration that appears in the field when the user adds a context.
5. Click **OK**.
6. Repeat steps 3 and 4 for additional parameters in the component.
7. Click **Save** below the alert definition whiteboard.
8. As a best practice, add the first context.

   Otherwise, the component remains unconfigured.
   a. Return to the alert definition list, right-click the alert definition, and choose **Configure**.
   b. Click **Add**.
   c. Provide a name for the context. A best practice is to name the first context **Default**.
   d. Click **Save**.

Results

The alert now appears in the alert definition list with an icon indicating that it is contextualized. Users can configure it to add additional contexts, and enable or disable the contexts.

Configuring an alert definition

The Configure action lets you change the filter and configurable settings in an alert definition, add new contexts and configure them if appropriate, and test or probe the alert definition results.

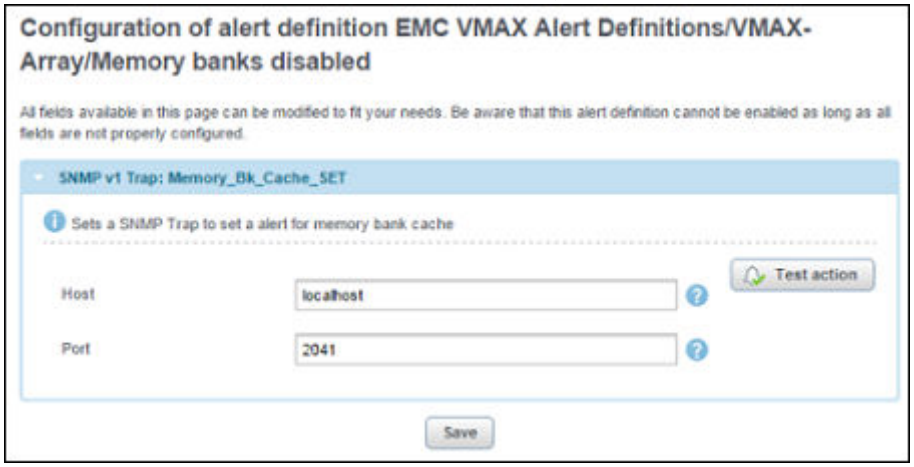
About this task

For example, alert definitions often compare values in an event to a configurable threshold setting. A filter defines which events to consider. If an alert definition is contextualized, you can you define different filters or threshold values and name them.

NOTE: Not all alert definitions are contextualized.

Steps

1. Click **Administration** > **CONFIG** > **Alerts** > **Manage Alert Definitions**.
2. In the table of alert definitions, expand the folders to find the alert definition to configure.
3. Right-click the alert definition and choose **Configure options**.
   - If the alert is contextualized, you see one or more named contexts, with the configurable parameter names and the values for each context. Out of the box, one context is named **Default**.
   - If the alert is not contextualized, you see the configurable parameters and the current settings.



4. For a contextualized alert, you can:
   - Change the values in any of the existing contexts, including the **Default** context or any other named context.
   - Create a context, as follows:
     a. Click **Add**.
     b. Name the new context, and click **OK**.
     c. Type values in the new context.
   - Choose **Enable** or **Disable** for each context. When multiple contexts are enabled, the incoming events are processed multiple times, once for each enabled context.
5. For a non-contextualized alert, change the values in one or more fields.
6. Click **Save**.

   If the alert definition is enabled, the change takes effect immediately.

Editing an alert definition

You can change or add additional components to an alert definition.

About this task

By editing an alert definition, you can change the filter or add or delete the actions or operations in the alert definition.

NOTE: Do not add the Dell Technologies Connectivity Event action to any alert definition. The Dell Technologies Connectivity Event action is for Dell use only.

Steps

1. Go to **Administration** > **CONFIG** > **Alerts** > **Manage Alert Definitions**.
2. Expand nodes until the alert definition you want to edit appears in the table in the right pane.
3. In the right pane, right-click the alert definition and choose **Edit**.

   A graphical representation of the alert definition appears on a whiteboard, with an expanding list of available components on the right.

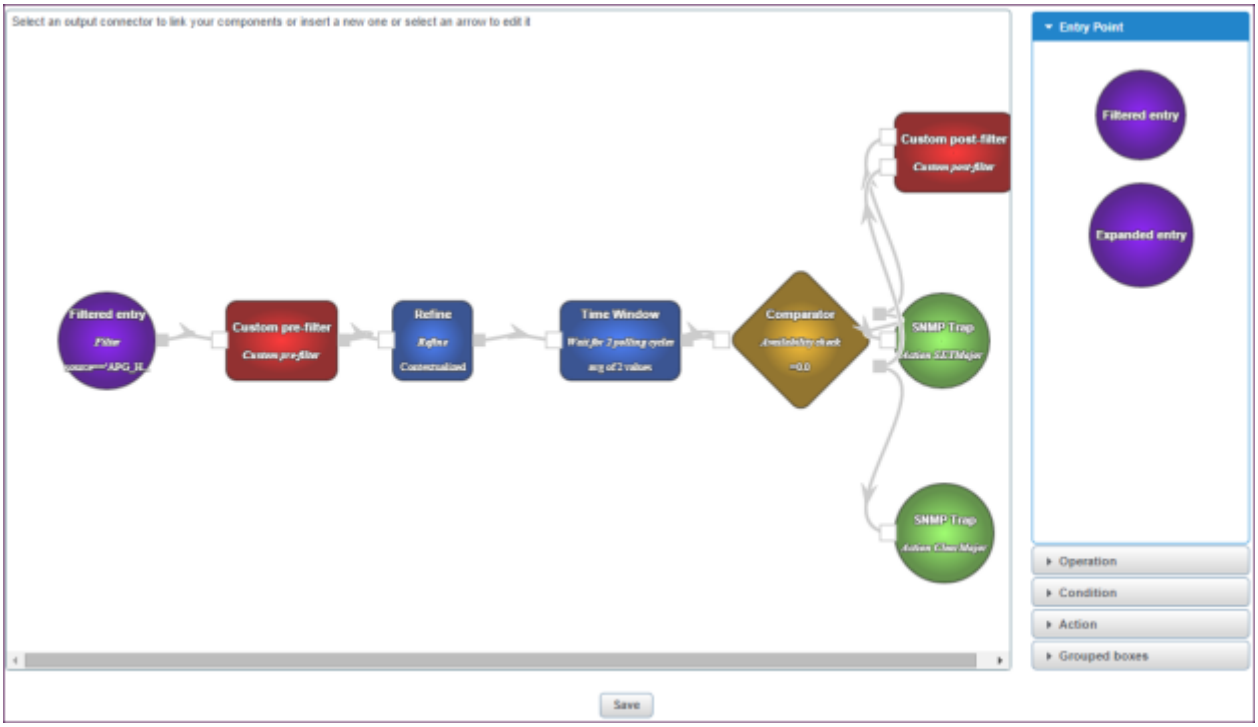


Figure 9. Graphical representation of an alert definition

4. To reconfigure an existing component:
   a. Hover the cursor over the component until a menu of small icons appears above the component, and click **Edit** (pencil icon).

      For example, to refine the filter in the Filtered Entry, hover the cursor over the Filtered Entry component in the alert definition.

   b. Make changes to the component's configuration in the dialog box that appears.
   c. To preserve the changes and exit the dialog box, click **OK**.
5. To add component:
   a. In the list of components on the right, click the type of component you want to add.

      The type expands to show all available components in that category. For example, click **Action** to show all the action components.

b. Drag the symbol for the desired component from the list onto the whiteboard.

   For example, to add an email notification action, drag the Mail object.

c. Complete the configuration dialog box that appears when you release the drag, and click **OK**.

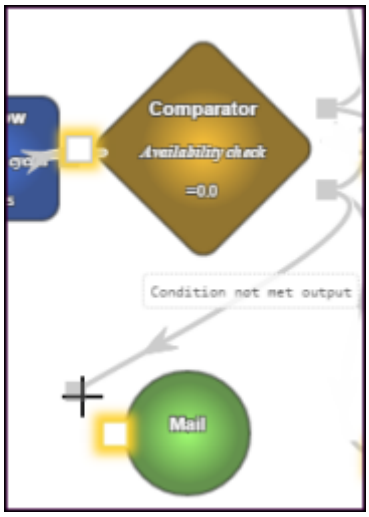
   To reconfigure the component later, hover the cursor over the symbol and click the **Edit** icon that appears.

d. Add the new component into the alert definition flow by dragging a line between connection points on the symbols.

   - Start the drag from an exit connection point.
   - Drag to an entry connection point.

   Exit connection points are on the right side of a symbol. Entry connection points are on the left.

   The following example connects the "Condition not met" exit point of a Comparator to the Mail action. (The alert definition sends an email when the condition is not met.)



6. Click **Save** at the bottom of the whiteboard to save all changes to the alert definition.

Enable/disable alert definitions

Many alert definitions are installed in the disabled state. If you want the events that are defined by their filters to generate alerts enable the alert definitions.

About this task

You can enable or disable alert definitions at the folder level, subfolder level, or individually.

Steps

1. Go to **Administration** > **CONFIG** > **Manage Alert Definitions**.
2. To enable or disable alert definitions:
   a. Click folder rows in the right pane until the folders or individual alert definitions that you want to enable or disable appear as a row in the table.
   b. Select one or more rows in the right pane using the check boxes in the first column.
   c. Click **Enable** or **Disable** at the bottom of the page.

   If you selected a folder, all alert definitions under that folder are affected, including the contents of any sub-folders.
3. In the right pane, use the **State** column to determine the status of individual alert definitions.

   NOTE: The state of an alert definition, if modified, is retained even after the system upgrade.

Table 30. Alert Definition Status

State column	Description
Empty	This state column is a folder. Click it to show its contents.
	The alert definition is enabled.
	The alert definition is disabled.
	The alert definition requires some configuration before you can enable it. Right-click the row and choose **Configure**.

Creating alert definitions

You can use alert definition examples to help you get started with constructing alert definitions.

Steps

1. From the Alerting page, click **Alert definitions**.
2. Click the **Create Alert Definition** icon above the tree.
   A whitespace opens with components that are listed on the right.
3. Drag an **Entry Point** component onto the whitespace and configure it.

   When you release the drag, a dialog box for configuring the component opens.

   The Entry Point filter works like report filters do in the main user interface.

   The difference between using a filter in the Alerting Frontend and the Backend is the suggestions that are shown in the wizard. The Alerting Backend is not bound to a database, so the list of known properties and values is created at runtime. So, it is normal to have no suggestions when you use the wizard immediately after starting the Alerting Backend.
4. In the component list on the right, expand the type of component you want to work with next.
5. Drag a component onto the whitespace and configure it.

   You can rearrange components later by dragging them.
6. Continue to drag components and configure them, ending with an Action component.
7. Connect components to define the processing flow for an entry that is captured by the entry point filter.

   Every component has connectors, which are yellow squares. To link components, click an output connector on the right side of a component, and drag to an input connector on the left side of another component. When the input connector turns green, release the drag.

   NOTE: To delete a connection, drag the line off the input connector point and release. The connecting line disappears.

   There is no limit to the number of objects that you can link to the same output.
8. When you are finished adding components, click **Save**.
9. In **Name**, type a name for the alert definition.
10. In **Description**, type a description for the alert definition.

11. Click **Save and enable** or **Save and disable**.

    NOTE: For a detailed list of metrics and reports, see 4.4 Metrics and Reports, and for a detailed list of properties definitions, see 4.4 Properties Definitions.

About the Dell Technologies Connectivity alert definitions

Do not change or reconfigure the Dell Secure Remote Support (Dell Technologies Connectivity) alert definitions.

The System Health SolutionPack and SolutionPack for Configuration Compliance include the optional features that forward alerts about certain health conditions and breaches for end of support for data center devices to Dell. The features are installed and configured during System Health SolutionPack and SolutionPack for Configuration Compliance installation by the alerting block question.

NOTE: Unless you configure the Dell Technologies Connectivity settings in the alerting block question, no information is sent to Dell.

A set of Dell Technologies Connectivity alert definitions is associated with this feature. Note the following:

- The Dell Technologies Connectivity alert definitions are hidden by default. To unhide the alert definitions, see the next section.
- Do not change or reconfigure the Dell Technologies Connectivity alert definitions.
- Do not add the Dell Technologies Connectivity Event action (used in the Dell Technologies Connectivity alert definitions) to other alert definitions.
- The alert definition **Enable** and **Disable** commands do not apply to the Dell Technologies Connectivity definitions. The Dell Technologies Connectivity definitions are always enabled when the System Health SolutionPack alerting block is installed, and always disabled otherwise.

Unhide the Dell Technologies Connectivity alert definitions

You can optionally unhide the Dell Technologies Connectivity alert definitions to view them.

Steps

1. On the **SRM Admin UI** page, go to **Administration** > **Profile** > **User Settings** > **Extras**.
2. Enable the **Display hidden definitions** button.
3. Click **SAVE CHANGES**.
   The Dell Technologies Connectivity alert definitions appear in the **Alert definitions** list.

   NOTE: The alert definition is for viewing only. Do not change it.

Alert definition component reference

An alert definition is a sequential set of components that filters events and takes appropriate action. There are four types of alert definition components.

Entry point filter	Defines the events and metrics to examine. Every alert definition requires an entry point filter.
Operations	Define operational actions on the filtered event data. Operations are optional.
Conditions	Define test conditions on the event data. Different actions can depend on conditional outcomes. Conditions are optional.
Actions	Define the actions to take, such as creating an SNMP trap to forward to the alerting backend or write a log entry. At least one action component is required for the alert definition to have any results.

Entry Point filter

The Entry Point filter works like report filters in the main user interface.

The difference between using a filter in the Alerting Frontend and the Backend is the suggestions that are shown in the wizard. The Alerting Backend is not bound to a database, so the list of known properties and values is created at runtime. Because of this, it is normal to have no suggestions when you use the wizard immediately after starting the Alerting Backend.

Operations

Operations evaluate incoming data to see if they should go to the next component or be dropped.

No Operation

This operation does not do anything. Use it if an entry needs separate senders in its process when all the entries come from the same operation, such as a Previous Polling Operation. It is a good way to make a used connector (red) of a grouped box available as an output if needed.

Case

This operation creates logical output groups that send data to each next operation until one has its condition met, such as a group of alert levels that send an alert only once for the highest level of alert. The order of criticality of the next components is the order of link creation, so the next component link is the highest level and if its condition is met when the next data is received, the other next components will not receive data.

Constant Arithmetic

This operation applies an operator on each entry data with a constant value.

Value	Value that is used by the operator.
Operator	The arithmetic operator (+, -, / or *)
Constant is left operand	Select this if the constant value must be the left operand.

Data Arithmetic

This operation applies an operator on two data lines that are defined by the filter.

Operator	The arithmetic operator (+, -, / or *)
Time limit	Maximum delta between the two values in minutes.
Left operand	Optional and needed only if you use an operator that produces a different result depending on the order of the operand, such as - and /. This parameter must contain the name of the sender who sends the data that must be the left side of the operation.
Group by	Properties, each separated by a white space, that create a logical group of values for the operation.
Value filter	Optional and is necessary only if the entries of this operation come from the same input, as it defines two different elements of the same group.

Constant Math

This operation applies a complex mathematical operation to the data.

abs	The abs function which returns the absolute number.
ceil	The ceil function which returns the smallest value but greater than the argument.
exp	The exp function which returns the exponential value raised to the power of a double value.

floor	The floor function which returns the largest value but less than the argument.

Configurable Math

This operation applies a complex mathematical operation using a parameter to the data.

Operation	The mathematical operation
Value	Value applied to the second parameter of the selected operation

History Operation

This sliding window operation collects a range of values bounded by the number of values or the time range of the values. The output of the collected values can be their minimum, maximum, sum or average.

Wait for period	Optional and for a time only bounded buffer, this flag is set if the buffer must wait a full period before computing values.
Time range	Optional and is the time window of the collected values in minutes.
Window length	Optional and is the values number to collect in the sliding window.
Output	Min, max, avg, or sum

Previous Polling Operation

This sliding window operation keeps a series of previous polling for each data ID and distributes it to the outputs.

Time range	Optional and is the time window of the collected values in minutes.
Window length	Number of previous polling to keep

Data Repeater

This operation blocks or allows output for every data that have their timestamps outside the timeframe.

Update timestamps	Select this to have the timestamps of each repetition be the current timestamp; do not select this to have the actual timestamp used.
Repetitions	Repetition number for each ID. 0 = unlimited
Repeat period	Time in minutes between repetitions

Date

This operation blocks or allows the output of data that does not have a timestamp within the timeframe.

Block if in range	Select this to block data if the timestamp is in the range you set here.
Start time	Inclusive start time of a day, following a hh:mm 24 hour format
End time	Exclusive end time of a day, following a hh:mm 24 hour format. End time must be later than start time.
Start day **End day**	Optional. select this if the time range can be repeated for successive days, such as 8:00 to 17:00 Monday to Friday.

Properties To Values Creator

This operation takes a list of properties and creates a value for each property that contains a numeric value. The original data is not sent to the next components. Type a list with each property that is separated by a white space.

Timestamp To Value Creator

This operation creates data with the data timestamp as its value. The original data is not sent to the next components.

Alive Timer Operation

This operation sends the last received data to the next components only when no data for the same ID has been received before the timer expires.

Inform only once	Select this to send non-updated data to the next components only once rather than at the end of each period.
Timer	Period of the timer. This value cannot be lower than 5, as every 5 minutes a check is made to see if any ID is not updated.

Conditions

A condition verifies a condition of the data before sending it to its actions or operations. Conditions can be stateful or stateless. In a stateless condition, new data is sent to the next component. A stateful condition sends the data only when the state is changed. For example, if state of ID A = true, data is sent only when the state is false.

Constant Comparator Operation

Compares data with a constant value and adds the ADDED_THRESHOLD property containing the comparator in the output data. Data that meets the conditions is sent to the true actions or operations. Data that does not meets the conditions is sent to the false actions or operations.

Stateless	Select this to send the result for each piece of data received, or do not select this to send data if a state changes for an ID.
Constant value	Constant value that is used to compare data
Operator	Operator of the comparison (<, <=, >, >=, = or !=)

Property Comparator Operation

Compares data with a numeric property that is contained in the data.

Stateless	Select this to send the result for each piece of data received, or do not select this to send data if a state changes for an ID.
Property	Must be a valid number to compare data with its value
Operator	Operator of the comparison (<, <=, >, >=, = or !=)

Data Comparator Operation

Compares two pieces of data coming from two entries and defined by a grouping filter. Each comparison ends with the piece of data on the left sent to the true actions or operations when the condition is met, or to the false actions or operations if the condition is not met.

Stateless	Select this to send the result for each piece of data received, or do not select this to send data if a state changes for an ID.
Operator	Operator of the comparison (<, <=, >, >=, = or !=)
Left operand	Must contain the name of the sender who sends the data that must be the left side of the operation.
Time limit	Maximum delta between the two values in minutes
Group by	Properties that create a logical group of values for this operation

String Comparator Operation

Compares one of the fields in the data with a custom string. Each piece of data with a condition met is sent to the true actions or operations, or to the false actions or operations if the condition is not met.

Stateless	Select this to send the result for each piece of data received, or do not select this to send data if a state changes for an ID.
Field name	Name of the field in the data to use in the comparison
Comparator	Type of comparison (equals, contains, starts with or ends with)
Compare to	Custom string used in the comparison

Data Counter Operation

This operation counts the number of data with the same ID and sends it to its true actions/operations when the count reaches the counter in the time limit.

Stateless	Select this to send the result for each piece of data received, or do not select this to send data if a state changes for an ID.
Time range	Time window boundary of the collected values in minutes
Count	Counter

Grouped Data Counter Operation

This operation is useful to do an AND of previous conditions for data related by properties with different IDs. If the count of received related data matches the counter before the time limit, the last data is sent to its true actions or operations.

Stateless	Select this to send the result for each piece of data received, or do not select this to send data if a state changes for an ID.
Time range	Time window boundary of the collected values in minutes
Count	Counter
Group by	A list of properties separated by white spaces that create a logical group of values for the operation

Sender Counter Operation

This operation counts the number of data from the sender and sends them to their true actions or operations when the count reaches the counter in the time limit.

Stateless	Select this to send the result for each piece of data received, or do not select this to send data if a state changes for an ID.
Time range	Time window boundary of the collected values in minutes
Count	Counter

String Counter Operation

This conditional operation counts the times that data with the same ID has a property equal to a comparator, and sends them to their true actions or operations when the count reaches the counter in the time limit. To make a counter with more string operations, use a stateless String Comparator with a Sender Counter.

Stateless	Select this to send the result for each piece of data received, or do not select this to send data if a state changes for an ID.
Time range	Time window boundary of the collected values in minutes
Count	Counter
Field name	Name of the field in the data to use in the comparison

Compare to	Custom string that must match the field value

Actions

Actions inform users of new or resolved problems in their system or run an auto resolving process.

About action data

Each alert data comes with a series of properties. Since most of the time they are coming from the Watch4net collectors, they are the same properties that you find when editing a report. When the Alerting Backend is running, you can have a view of those properties either in an entry point filter or when probing an active definition.

For example, suppose you want to send an email reporting the current CPU utilization for a specific CPU in a device based on the alert data below:

```
AlertData: {
                VALUE: 25
                TMST: 123456789 (unix timestamps)
                ID: uniqueId for this metric
                properties: {
                                devtype: Array
                                device: VPLEX1
                                parttype: CPU
                                part: CPU0
                                name: CurrentUtilization
                }
}
```

You would add the following as the content of the email message:

```
Device PROP.'device' currently has a PROP.'name' on its PROP.'part' of VALUE.
```

This would translate dynamically as:

```
Device VPLEX1 currently has a CurrentUtilization on its CPU0 of 25.
```

Log action

This action writes an entry in a log file. If two actions write to the same file, use the same parameters except for the content, because the Alerting Backend cannot guarantee which configuration is used. The default directory for the log files is Backends/Alerting-Backend/Default/logs.

Table 31. Log action

Parameter	Description
File prefix	Complete directory path and prefix of each log file. The prefix is followed by _index.log, where the index is incremented until it reaches the retention parameter. Newest log files have the lowest index, so the current log is always _0.log.
Log retention	Maximum number of log files kept.
Rotation time	Optional if rotation-entry is used. Maximum timeframe in minutes of the log content before its creation.
Rotation entries	Optional if rotation-time is used. Maximum entries in a log file.
Entry content	Content of the log entry. To add the value, date or ID of the current data, use the keywords VALUE, TMST, or ID. To add a property of the current data, use the keyword PROP.'propertyName'.

Mail action

This action sends an email message when triggered. For successful email messages, an SMTP server must be configured as described here.

Table 32. Mail action

Parameter	Description
To	Comma-separated list of recipients
Subject	Subject of the email. To add the value, date or ID of the current data, use the keywords VALUE, TMST, or ID. To add a property of the current data, use the keyword PROP.'propertyName'.
Message	Content of the email. To add the value, date or ID of the current data, use the keywords VALUE, TMST, or ID. To add a property of the current data, use the keyword PROP.'propertyName'.

SNMP Trap action

This action sends an SNMP trap when activated. SNMPv1, SNMPv2, or SNMPv3 traps are supported.

NOTE: You cannot change the SNMP version on an existing trap action. Instead, drag a new SNMP action to the whiteboard, define it as needed, and delete the older action.

The following header fields appear on a new SNMP component.

Table 33. SNMP Trap action

Field name	Description
Name	Unique name for this component in the alert definition.
Type	Select SNMP v1, SNMP v2, or SNMP v3. The fields in the **Parameters** section change to match the version specification.
Description	Customized description for this trap action.

The following fields appear in the **Parameters** section of an SNMP component.

Table 34. Parameters section

Parameter	Description
Host	Receiver of the traps
Port	Receiving port
Community	Community of the traps

The following parameters change to match the SNMP version selected in the header.

SNMPv1	SNMPv2	SNMPv3
Enterprise OID	Trap OID	Trap OID
Trap OID	-	Engine ID
Generic ID	-	Username
Enterprise specific ID	-	Authentication Protocol (MD5 or SHA)
Variables OID format (legacy or RFC)	-	Authentication Password
-	-	Private Protocol (DES or AES)
-	-	Private Password

Table 34. Parameters section (continued)

Parameter	Description
Trap content	Comma-separated list of the content for each variable of the trap. A comma is escaped if it is preceded by a period. To add the value, date or ID of the current data, use the keywords VALUE, TMST, or ID. To add a property of the current data, use the keyword PROP.'propertyName'. There is no limit to the number of variables in the trap content.

External Process action

This action runs an external process on the Alerting Backend when triggered. To add the value, date, or ID of the current data, use the keywords VALUE, TMST, or ID. To add a property of the current data, use the keyword PROP.'propertyName'.

Table 35. External process action

Parameter	Description
Command	Command to run
Command parameters	Optional. Comma-separated parameters of the command, for example -n 200. A comma is escaped if it is preceded by a period.
Environment parameters	Optional. Comma-separated list of environment parameters of the terminal in key=value format (ex: JAVA_HOME=/opt/...). A comma is escaped if preceded by a period.

Send to SAM action

This action sends an alerting notification to a Smarts SAM Console.

Table 36. Sent to SAM action

Parameter	Description
Host	SAM hostname or IP address
Port	SAM port
Domain name	Name of domain where Dell Smarts is installed
Domain username	Username to connect to the Dell Smarts domain
Domain password	Password to connect to the Dell Smarts domain
Broker username	Username to connect to the SAM broker.
Broker password	Password to connect to the SAM broker.
Operation type	Type of operation that is involved (clear or notify)
Source	Name(s) of the domain or domain group(s) that have originally diagnosed and notified, directly or indirectly, current occurrences of this event. If there is more than one original domain, the attribute lists each separated by a comma. When the notification is cleared, the last clearing domain stays in the value. Type: string
User	Notification user
EventName	Name of the event. This attribute, along with ClassName and InstanceName uniquely identified this event. Type: string
EventType	Indicates the nature of the event (MOMENTARY or DURABLE). A MOMENTARY event has no duration. An authentication failure is a good example. A DURABLE event has a period during which the event is active and after which the event is no longer active. An example of a durable event is a link failure. Type: string
Severity	Enumerated value that describes the severity of the event from the notifier's point of view: • Critical : Action is needed NOW and the scope is broad (for example, an outage to a critical resource)

Table 36. Sent to SAM action (continued)

Parameter	Description
	• Major : Action is needed now. • Minor : Action is needed, but the situation is not serious currently • Unknown: Element is unreachable, disconnected, or in an otherwise unknown state. • Normal : Event is purely informational . Type: unsigned int
Notification properties	ICS_Notification property from the Smarts Java API.

Dell Technologies Connectivity event action

NOTE: Do not add the Dell Technologies Connectivity event action to any alert definitions.

The System Health SolutionPack includes an optional feature that forwards alerts about certain health conditions to Dell. The Dell Technologies Connectivity event action is for the exclusive use by Dell for the Dell Technologies Connectivity alert feature.

Webhook action

This action sends an HTTP/HTTPS POST request to the URL configured in the webHook definition, every time the configured alert condition occurs.

Table 37. Webhook action

Parameter	Description
URL	HTTP/HTTPS URL to post the message. Only a single URL is accepted. The URL must be in lowercase.
Secret	Secret is a pass-phrase that is shared between the customer and SRM. The POST includes an SHA signature in the header that is generated using the secret and the payload. Upon receipt of a POST request, the server uses the secret to verify that the delivery was initiated by SRM or ignore the signature.
WebHook Content	Use the preconfigured value or edit as required. To add a property of the current data, use the keyword PROP.'propertyName'.

For more information, see Dell SRM Alerting Guide.

Creating adapters

An adapter takes data and translates it to alerting data.

Creating a Values Socket Listener Adapter

This adapter waits for values from the socket connector in the collecting.xml file. The data has the properties adapterName containing the name of this adapter and adapterType containing RVSocketListener.

Steps

1. From the Alerting page, click **Adapters**.
2. Click the **New element** icon above the tree.
3. From the **Type** list, select **Values Socket Listener Adapter**.
4. In **Name**, type a descriptive name for the adapter.
5. In **Port**, type the port that the adapter takes its incoming raw data from.

Creating an Events Adapter

This adapter waits for events from a generic-event-writer in the processing.xml file. The data has the properties adapterName containing the name of this adapter and four parameters.

Steps

1. From the Alerting page, click **Adapters**.
2. Click the **New element** icon above the tree.
3. From the **Type** list, select **Events Adapter**.
4. In **Name**, type a descriptive name for the adapter.
5. In **Value**, optionally type the name of the field containing the decimal value of the event to be used in the operation, such as bytes for flow events. You can leave this box blank for a strings only event.
6. In **Properties**, type a comma-separated list of the properties that are used in the entry point or special components.

   If the default data type of a property does not give the best display format, type the data type of the field with the field name separated by a comma, for example SRC_PORT:INT. The data types can be Boolean, byte, bytes, double, float, int, long, numeric, short, object, or string. The data type is implementation-specific for the type of data the adapter is parsing.
7. In **Timestamps**, optionally type the field that contains the timestamps of the events. Otherwise, the current timestamps are used.
8. In **Port**, type the port that the adapter takes its incoming raw data from.

Creating a report data adapter

This adapter parses exported reports. The properties of the data are the report displayed properties and the report name (property = reportName). Table reports contain the non value columns and the name of the value column (property = name). Graph reports have the legend of each series (property = name). Each file parsed is deleted after parsing. The resulting data has the properties adapterName containing the name of this adapter and adapterType containing APGXmlReportAdapter.

Steps

1. From the Alerting page, click **Adapters**.
2. Click the **New element** icon above the tree.
3. From the **Type** list, select **Report Data Adapter**.
4. In **Name**, type a descriptive name for the adapter.
5. The **Time check** is the time between each check which is set by default to 60 minutes. You can change this default value to the required value.
6. In **Directory**, optionally type the subdirectory under the Alerting custom directory that contains the files to parse.
7. In **File name regex**, type the file name regex. You can use the * wildcard character.

Creating a File Data Adapter

This adapter parses each file corresponding to a file name regex in a directory. Each file parsed is deleted after parsing.

Steps

1. From the Alerting page, click **Adapters**.
2. Click the **New element** icon above the tree.
3. From the **Type** list, select **File Data Adapter**.
4. In **Name**, type a descriptive name for the adapter.
5. In **Directory**, optionally type the subdirectory under the Alerting custom directory that contains the files to parse.
6. The **Time check** is the time between each check which is set by default to 60 minutes. You can change this default value to the required value.
7. In **File name regex**, type the file name regex. You can use the * wildcard character.
8. Upload any parser or formatter files you want to use.

Creating alert templates

Templates enable you to pre-configure values and add them to an alert definition.

Creating alert templates

Alert Manager comes with preconfigured templates. You can edit the existing templates or create new ones.

Steps

1. From the Alerting page, click **Templates**.
2. Click the **New element** icon above the tree.
3. In **Family**, select the type of template to create.

Option	Description
Entry Point	The Entry Point filter works like report filters on the APG Frontend. It filters the flow of incoming data for alert definition.
Operation	Operations evaluate incoming data to see if they should go to the next element or be dropped.
Condition	A condition verifies a condition of the data before sending it to its actions or operations. Conditions can be stateful or stateless. In a stateless condition, new data is sent to the next component. A stateful condition sends the data only when the state is changed. For example, if state of ID A = true, it sends data only when the state is false.
Action	Actions inform users of new or resolved problems in their system or run an auto resolving process.

4. In **Name**, type a name for the template.
5. In **Description**, type a description for the template.
6. Use the Filter Wizard to select the properties you want to filter on.
7. Click **Create.**

Using preconfigured alert templates and examples

Alert Manager comes with preconfigured templates and example alert definitions. You can edit the existing ones or create ones based on the templates and examples.

About this task

There are several example alert definitions. Alert definition components can reference a template. Log and Traps are the most frequently used actions in alert definitions. We provide a log template and two trap templates.

Steps

1. To view an example alert definition:
   a. From the Alerting page, click **Alert definitions** > **Examples**.
   b. In the right pane, right-click an alert definition name and select **Edit**.
2. To view a preconfigured template:
   a. From the Alerting page, click **Templates** > ***template_name***.
   b. Review and edit the template contents before associating it to alert definitions.
3. To edit the default trap templates to work in your environment:
   a. From the Alerting page, click **Templates** > ***default trap template***.
   b. In the **Template Parameters** section, examine the **Trap Content** field.

      The preconfigured trap template lists all possible alert properties, including some properties that are user-defined. It is probable that your MIB does not contain fields for the entire list of properties. In that case, any SNMP trap action component that references the default alert trap template does not work.
   c. Replace any property in the list that does not exist in your MIB with the value `null`.

      The order of properties is important in a template.

NOTE: To preserve the out-of-the-box template for future use, create a template with an edited list of properties.

Here is an example edited property list.

```
PROP.'id',PROP.'Name',null,PROP.'count',PROP.'eventstate',PROP.'Source',PROP.'parttype
',PROP.'part',PROP.'eventname',PROP.'parttypedisplayname',PROP.'partdisplayname',PROP.
'eventdisplayname',PROP.'fullmsg',PROP.'devtype',PROP.'device',PROP.'sourceip',PROP.'s
ourcedomainname',PROP.'sourceeventtype',PROP.'value',PROP.'active',PROP.'timestamp',nu
ll,null,null,null,null,PROP.'acknowledged',PROP.'eventtype',PROP.'category',PROP.'even
ttext',PROP.'severity',PROP.'impact',PROP.'certainty',PROP.'inmaintenance',PROP.'troub
leticketid',PROP.'owner',PROP.'systemdefined1',null,null,null,null,PROP.'userdefined1'
,null,null,null,null,null,null,null,null,null,null,null,null,null,null,null,null,null,
null,null
```

d. Click **Save**.

4. To associate a template to an SNMP trap action:
   a. Under **Alert Definitions**, click an alert definition folder.
   b. In the table in the right pane, right-click the alert definition name and select **Edit**.
      The diagram of components for this alert opens.
   c. Click the **Edit** (pencil) icon above the SNMP trap action component (a green circle).
   d. In the **Edit Component** dialog box that opens, in the **Template** field, select the appropriate template name from the drop-down list.

Setting up a log template

This example shows creating a template based on the Log template. Logs are frequently used actions in alert definitions.

Steps

1. From the Alerting page, expand **Templates**.
2. Click **Log Template**.
3. In **Description**, type a description for the new template.
4. In **File prefix**, type the directory path and prefix for each log file.
   The log files are created in the Alerting-Backend/instance/Alerts folder and named log_INDEX.log, where index is incremented until it reaches the log retention limit. The newest log files have the lowest index, and the current log is the 0 log.
5. In **Logs retention**, type the number for how many logs you want to keep.
6. In **Rotation time**, type a value for the maximum time in minutes that log data is gathered before the log is created.
   This value is optional if you are setting a value for rotation entries. In this example, the logs files are rotated once a day (1440 minutes).
7. In **Rotation entries**, type a value for the maximum number of entries per log file.
   This value is optional if you are setting a rotation time. In this example, the log is rotated when the 0 log file has 5000 entries.
8. In **Entry content**, type the properties for the log entry.
   To add the value, date or ID of the current data, use the keywords VALUE, TMST, or ID. To add a property of the current data, use the keyword PROP.'propertyName'. In this example, each line of the log contains: DEVICE with PART -> NAME = VALUE.
9. Click **Save**.

Setting up a trap notify and trap clear template

This example shows how to create a template based on the Trap Notify template. Traps are frequently used actions in alert definitions. A Trap Notify alert sends an alert to your fault management system. The Trap Clear deactivates the alert.

Steps

1. From the Alerting page, expand **Templates**.
2. Click **Trap Notify Template**.

3. In **Description**, type a description for the new template.
4. In **Host**, type the host that receives the traps.

   The host is the address of the SNMP trap manager and should be changed if it is not on the same host as the alerting backend.
5. In **Port**, type the trap manager port.162 is the default for this protocol.
6. In **Community**, type the trap community. Public is the default.
7. In **Generic ID**, type the generic ID of the trap.
8. In **Enterprise specific ID**, type the specific ID of the trap format for the generic type.
9. In **Trap content**, type the content for each variable of the trap, which is separated by commas.

   Commas are escaped if they are preceded by a \. To add the value, date or ID of the current data, use the keywords VALUE, TMST, or ID. To add a property of the current data, use the keyword PROP.'propertyName'. Dell Technologies recommends that you do not change the content of the traps as the order of the properties match our trap configuration. You can change the last three properties to ones you define. The only difference between Trap Notify and Trap Clear is the number value in the Trap content: 2 is notified and 4 is clear.
10. Click **Save**.

Grouped boxes

Grouped boxes are containers of standard alerting components, which are linked in the same way as alert definitions, that you can use in an alert definition or other grouped boxes.

With grouped boxes that you can:

- Create a subset of boxes such as baseline computations that you can reuse in multiple definitions. Grouped Boxes can contain any alert definition component and can easily be reused.
- Create a single box that has its instances that are updated whenever it is modified, unlike templates that do not have a link. When you make a change to a grouped box, the change is immediately propagated to all the alert definitions that use it.

Unlike alert definitions, which are grouped boxes have free inputs and outputs on any number of components, whether they are linked or not. The free connectors appear as inputs or outputs on the group box that you can use to link to other components. You can hover over a free connector to see its source component, which is its name, and the input/output type, for example Condition met output.

Grouped boxes are created like alert definitions with these exceptions:

- Entry points are not required to save a grouped box.
- Connectors have three possible states: red, yellow, and green.
- When you save a grouped box, the resulting box in the definitions is a red box and its connectors are the unused input/output connectors of its internal components. No configuration is needed when using a grouped box in a definition. The description of the configuration is the description that you type when you save the grouped box.

Creating a Grouped Box

You can create and edit Grouped Boxes and use them in alert definitions. Grouped Boxes can contain any alert definition component and can be easily reused.

Steps

1. From the Alerting page, click **Grouped boxes**.
2. Click the **New element** icon above the tree.
3. Edit the Grouped Box definition by dragging entry points, operations, conditions and actions on the page, and editing their parameters. Unlike alert definitions, entry points are not mandatory for grouped boxes.
4. Link the components in a logical flow for how you want the data to be evaluated.

   Connectors have three states:

   Green represents free input or output connectors. You can link within the scope of the Grouped Box you are working on or leave the connector free, in which case it appears as a free connector on the Grouped Box when it is used in an Alert Definition.

   Red represents a connector that is linked with another element within the Grouped Box. The data flow between these connectors takes place in the Grouped Box, and the connectors are not visible and cannot be linked to in the Grouped Box.

Yellow represents connectors that have been used within an Alert Definition. You can hover over a yellow connector and see a list of the alert definitions that use it, including the component that links to it. A yellow connector cannot be linked to in the source Grouped Box as it is already occupied in one or more Alert Definitions, and it cannot be deleted until it is freed in the Alert Definitions it is linked to.

You can use a Grouped Box within another Grouped Box but not within itself. Grouped Boxes that are used within a Grouped Box display their available connectors.

5. Click **Save**.

Probing alerts

Probing helps you confirm the behavior of an alert definition. Do a probe to test the elements in an alert definition in real time to see how data is evaluated at each component, and how many times actions have been triggered.

Probes help you spot problems with how you construct your alert definitions, so that you can adjust them and retest until your alerts are satisfactory. This helps you to construct ever more complex alerts to match the increasing complexity of your network.

Probing is available only to users who have write permission.

Preparing for probing

Before you start probing, you can make these changes to improve the success of probing your alert definitions.

- Ensure the alerting sources, such as timeseries, events, text, or report data, are correctly configured to be sent to the Alerting Backend.
- Reduce the polling intervals of one or more collectors, or how often source data is sent to an Alerting Backend, so that your probing yields more results that correspond to the timeframe. If, for example, the default polling for the Smarts Collector uses four minutes, you would have to wait four minutes for every probe result. You can change the Smarts Collector to 10 seconds for the duration of the probing, and then switch it back for production.
- Reduce the sampling property that determines how many properties per data sample are preserved. This is controlled by the alerting.suggestion.sample property in the `module.properties` file that is located at `<APG>/Backends/Alerting-Backend/<instance>/conf`. By default this property does not appear, and 1 in 100 properties are kept. For example if polling takes place every 10 seconds, it can take a long time to accumulate enough properties for effective probing. You can change this to 1:1 for the duration of your probing session.
- Filter hints and sampled properties are dependent on the data coming into the Alerting Backend. You can increase the number of hints and sampled properties by adding and adjusting the alerting.suggestion.sampling property in the `module.properties` file that is located in the conf directory of the Alerting Backend.

Probing an alert definition

Use probing to test an alert definition in real time.

Steps

1. From the Alerting page, click **Adapters**.
2. Enable the adapter you want to use.
3. In the tree, click **Alert definitions**.
4. Enable the alert definitions that you want to use.
5. In the **Alert definitions** list, click the alert definition you want to probe and click **Probe**.
   The alert definition whiteboard appears.
6. Edit the probe settings.

Option	Description
Filter	Applies a filter to the probe results. This affects only the probe results and not the alert definition. Use a standard filter. Only a subset of properties may appear in the wizard depending on how many samples were cached. You can adjust this by changing the value of the alerting.suggestion.sampling property, in the `module.properties` file, at `<APG>/Backends/Alerting Backend/<instance>/conf`.

Option	Description
Show in probes	Selects the property to show in all probe results. The properties appear at the beginning of each result line followed by the selected sampled properties. They appear only when you probe a link. • **Sender name**: component the line of alerting data originated from. • **Destination name**: component the line of alerting data is flowing to. • **Variable ID**: report node the line of alerting data originated from. The variable ID format depends on the adapter type. • **Variable value**: value from the line of alerting data to be evaluated by the alert definitions, unless a string in the data is selected for evaluation, such as a string comparator. • **Variable timestamps**: timestamp associated with the line of alerting data. It is converted from a UNIX timestamp to a human-readable form for clarity in the probes. For category graphs this is when the report was generated in the main user interface.
Properties	Selects properties whose names and values appear in probe results. You can select **All** to display all the available properties.

7. Test or clear a component or link by clicking it. The component is highlighted and its information appears in an area of the same color.
8. To disable the Probe UI, for example to edit the definition to refine the probe results, click anywhere in the tree, and then click the alert definition you were working with. From here, you can edit it.

Probing a report

You can test how a report is alerted on. This procedure has three major steps: set up a scheduled report to be alerted on and generate it, create an alerting definition for the report, and probe the alert definition.

About this task

Notes about report probe results:

- Some components, such entry points and operations, may be less interesting to probe, as they return only their descriptions and settings.
- Actions, besides listing all their settings, show the number of times they have been executed. You can see in real time the effect the report data had on the number of times the action that is executed by watching this number during the probing session.
- Enabling links displays the information in each line of alert data according to the selections in the Probe window. Since there is no filter that all data is parsed and every property with its value appears. Depending on where the link is located in the alert definition, a subset of alerting data lines appear according to how they are routed from previous components in the chain.

Steps

1. Set up a scheduled report to be alerted on and generate it:
   a. In the main user interface, browse to a report that contains alerting data.
   b. Using the **Display** menu, set the range to 1 month.
   c. Using the **Tools** menu, select **Schedule this Report**.
   d. Set the schedule to **Every month**.
   e. Click the **Alert** tab and select the Alerting Backend that contains the alert definitions to test with the data from this scheduled report.
   f. In the tree, click **Scheduled Reports**, right-click the report, and then click **Launch now**.
   g. The Report Data Adapter, which parses reports from the Frontend, is automatically created the first time that it receives a report from the Frontend to be alerted on. The Report Data Adapter is named AUTO_CREATED_APG_REPORT_ADAPTER. On the Alerting interface, change its Time check parameter to 1 (minute), so that reports that are received from the Frontend are parsed and can be probed. You can change this back to a larger interval after the alert definitions are ready for production, to reduce the load on the server that is caused by needless polling.
2. Create an alerting definition for the report:
   a. On the Alerting Frontend, click **Alert Definitions** > **Examples** > **Multiple Severities Comparator** and above the tree click the **Copy** and then the **Paste** icon. Rename it Utilization Over Month Alert.
   b. Click the newly created alert definition in the tree to display its components.
   c. Mouse over its entry point and click the **pen** icon to edit it.

d. In the **Edit Components** dialog box that appears, delete the contents of the filter. You can change its name and description.
e. You can add a filter later, but first test the unfiltered content using a probe, and include a filter from the Probe UI for iterative testing purposes. Alert definitions pass their data to the next component only if the state data has changed from a previous data line in a series. This is useful, for example, if instead of using the Report Data Adapter, you use the Values Socket Listener Adapter to directly input UtilizationPct metric data about the file systems that are received by the Smarts-Collector through the Collector-Manager, and do not want to continually trigger an alert when a file system is over a certain value, but only is parsed the first time it crosses the threshold, and subsequently when it is under the threshold. In this example, the report is parsed once a month and all the data are parsed to see which thresholds are crossed for each line of alerting data. Therefore, edit each Comparator condition to enable their Stateless check boxes.
f. Save and enable the alert definition.
g. To ensure the Report Data Adapter named AUTO_CREATED_APG_REPORT_ADAPTER is enabled, click it in the adapter list and click **Enable**. You can disable any other adapters so that you can concentrate on the report data being received from the APG Frontend, if this does not impact other required running alerts.

3. Probe the alert definition:
   a. From the Alerting page, click **Alert Definitions**.
   b. Click **Utilization Over Month Alert** > **Probe**.
   The alert definition appears with the Probe window on the left, and space at the bottom of the screen for the probe results.
   c. Enable a few of the components and links of the alert definition to see the data flowing through them by clicking each one.
   For each component or link clicked, a probe result window appears at the bottom of the screen.
   d. Open up another browser window, return to the main user interface and on the **Scheduled Reports Management** page, right-click the scheduled report you configured to be alerted on and click **Launch now**.

Create alerts from scheduled reports

The metrics that appear on reports can be the source of an alert.

Process flow to alert on a scheduled report

An alert might enter the system as a metric from a scheduled report.

You can configure a report for alerting using the Schedule a report tool. Data from a report that is scheduled for alerting is converted into XML form and then parsed into alerting data by the APG Report Data adapter. Report Data Adapter has a default time to check for generated xml file to 60 minutes. You can also configure the time check value to the required value.

The alerting data is sent to the Alerting Backend, where the alert definitions evaluate the alerting data. This alerting method depends on an alert definition that filters on the report name and one or more report metric names. The alert definition defines the conditions that generate an alert, such as a value that is exceeded.

You can evaluate any metric that appears on the report. You can also use operations in the alert definition to create a new metric value from the data on the report, and generate alerts on the calculated value.

Prerequisites for creating alerts from scheduled reports

To alert on reports, all the following elements must be in place.

- The Alerting Frontend and the Alerting Backend must be configured as described in Configure the alerting engine.
- Communication between the APG Frontend and the Alerting Backend must be configured if they are on different servers. See Configure alerting communication.
- An APG Report Data Adapter must be defined in the Alerting Frontend. This adapter is created automatically the first time a report is parsed by alerting.
- Alert definitions must exist in the Alerting Frontend to gather data from the reports. The procedure Create a scheduled report alert includes how to create the appropriate alert definition.

Configure the alerting engine

Configure the service of the Alerting Backend to make alerts accessible to the Alerting Frontend.

It is an Administrator task. Configure the Alerting Engine with the following set of JVM arguments.

Table 38. Configuring alerting engine

File	Required	Description
alerting.config.file	Yes	Configuration file containing the list of definitions, adapters, components, and templates.
alerting.snmp.oid	Yes	SNMP OID used by the SNMP trap action.
`alerting.max.crunching.thread`	-	Number of threads that are used for the crunching of incoming data. Default is 5.
alerting.conf.dir	-	Directory containing the configuration schema files. Default is AlertingBackendDir/conf.
alerting.custom.conf.dir	-	Directory of the custom configuration files for some components. Default is AlertingBackendDir/custom.
alerting.suggestion.sampling	-	Sampling of properties catching for the suggestions. Default is 100.
alerting.suggestion.limit	-	The number of values kept for each property. Default is 1000.
alerting.mail.from	-	The From address of a mail action. Default is noreply@mybusiness.com.
alerting.probe.size	-	Probe buffer size. Default is 5 MB.
alerting.probe.ttl	-	Probe time to live in seconds. Default is 60 seconds.

Although not mandatory, alerting is used with the APG values. To enable collecting these values, edit the Alerting connector in the `Collecting/Collector-Manager/Default/conf/collecting.xml` file from the APG installation directory. The connector should look like this:

```
<!-- This collecting component connects the collecting process to the Alerting itself,
using a
plain text socket. -->
<connector enabled="false" name="Alerting" conf="Collector-Manager/Default/Cache-
Connector/conf
/alertingconnector.xml" />
```

The file `alertingconnector.xml` creates a socket on port 2010, which is the listening port of the default APG Values Socket Listener adapter of the Alerting Backend. By enabling both the connector and the adapter, Alerting can trigger on APG values.

Configure alerting communication

If the APG Frontend and the Alerting Frontend are not on the same server, add lines to the APG.xml file so that the Frontend knows which Alerting Backend instances it can send reports to.

About this task

This procedure assumes that the APG Frontend and the Alerting Frontend and Backend are configured.

Steps

1. On the server where the Alerting Frontend resides, open alerting-frontend.xml, at `<APG>/Web-Servers/Tomcat/<Instance>/conf/Catalina/localhost`.
2. Copy the alerting properties.

   For example, if you have two Alerting Backends configured, you copy these lines:

```
<Resource name="manager/Local Manager" auth="Container"
type="com.watch4net.alerting.jmx.AlertManagerFactory"
factory="org.apache.naming.factory.BeanFactory" user="admin" pass="changeme"
url="service:jmx:rmi:/
//jndi/rmi://localhost:52569/jmxrmi" />
<Resource name="manager/Second Manager" auth="Container"
```

```
type="com.watch4net.alerting.jmx.AlertManagerFactory"
factory="org.apache.naming.factory.BeanFactory" user="admin" pass="changeme"
url="service:jmx:rmi:/
//jndi/rmi://localhost:52570/jmxrmi" />
```

3. On the server where the Alerting Frontend resides, open APG.xml, at `<APG>/Web-Servers/Tomcat/<Instance>/conf/Catalina/localhost` and paste the lines that you copied from the `alerting-frontend.xml` file anywhere in the <context> tags.
4. If the Alerting Frontend references the local Alerting Backend, replace localhost in each copied entry with the IP address of the Alerting Backend.
5. Restart Tomcat.

Create a scheduled report alert

To configure alerts from scheduled report data, perform the following steps:

Steps

1. Schedule the report for alerting:
   a. On the Console, browse to the report that has the metric you want to alert on and click **Tools** > **Schedule this report**.
   b. On the **Scheduling** tab, define how often and when to run this report.
   c. On the **Alert** tab, select **Local Manager**.
   d. Click **Save**.
2. Enable the APG Report Data Adapter.
   a. Go to **Administration** > **CONFIG** > **Alerts** > **Adapters**.
   b. Look for **APG Report Data** adapter. If it is in the list of adapters, use the table in the right pane to ensure it is enabled.
   If the adapter is not listed, perform the following step.
3. (One-time step) Add the APG Report Data adapter:
   a. On the User Console, go to **My Reports** > **Scheduled Reports**.
   b. In the right pane, right-click the report that you scheduled for alerting, and choose **Launch now**.
   This action adds the APG Report Data adapter to the list of adapters if it is not already there, and enables it.
4. Create an alert definition that includes:
   a. A filter that identifies the report name and one or more metrics.
      - **'reportname==*report name*'**
      - **'name==*metric name*'**
   b. Conditions that evaluate the metric and define outcome paths. You can optionally include operations that create new metric values from the entry metric data.
   c. To make the alert appear in alerting reports, include SNMP Alert Trap and Clear Trap actions on the outcome paths. Other actions are also valid, such as log, email, or SNMP notifications.
5. Enable the alert definition.
6. Launch the report again, or wait for the next scheduled run.
   Each time the report runs, the Alerting Backend receives the data and generates or clears alerts when conditions in the alert definition are met.
   You can use probing to simulate conditions and test the results.

Report data parsing

The APG Report Data adapter parses the data in the scheduled reports that it receives.

The APG Report Data adapter generates alerting data from scheduled reports. The data and related properties depend on the report type.

Each data point in a report, such as a point in a graph or a table row with a value column, results in a line of data that can be evaluated by an alert definition.

Common properties

Each line of alerting data output by the APG Report Data adapter has the following properties.

Timestamp
Value
Name
ReportName

The displayed properties with their values from the header of the report are included with the lines of alerting data from the report. If it is a mixed report, the lines of alerting data from each child report have these common properties, although usually properties are used only in individual reports for a single device.

Tables

Each row of a table report results in one line of alerting data per value column that can be evaluated by an alert definition.

- The value column of the table is used for alert definition evaluation, unless something else is specified for evaluation, such as a field in a string operation.
- The column name of the value column is used as the property value of the name property. The name is what the report editor named the column.
- Data from other table columns are input as additional properties, with their column names used as the property names. The name is what the report editor named the column.

Graphs

In a standard time-series graph, each timestamp (point on the graph), generates a line of alert data that can be evaluated. In a graph with four lines (metrics), at each timestamp there are four lines of data.

The value of the property name is derived from the legend, even if the legend is hidden as it is in Mixed Reports.

For horizontal bar and pie charts, each category in the graph results in a line of alerting data that contains the following information:

- Relative value in percentage of the metric compared to the other categories.
- Value of the name property, which is the name of the report.
- Timestamp of each line of alerting data, which, for these types of reports, corresponds to the time when the report was generated instead of the period of time that the report covers. Do not use these types of reports for time-based alerting.
- Section property for each line of alerting data, which corresponds to the legend for the category reported on in the data.
- The absoluteValue, which is the absolute value of the metric for the category for the report period.
- The totalValue, which is the sum of the absolute values for every category in the graph.

Baseline graphs

Baseline graphs are like other time series graphs with these additional characteristics:

- One alerting data line is created for each timestamp with the value of the metric and its name, according to the contents of the legend, using the value of the name property.
- The baselineValue property is added, which is an average for the metric at the specified time over the last month.
- The baselineMin is added, which is the minimum value that is recorded for the metric at the specified time over the last month.
- The baselineMax is added, which is the maximum value that is recorded for the metric at the specified time over the last month.

You can use a formula to vary the length of the baseline instead of using the default, which is the past 4 weeks.

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