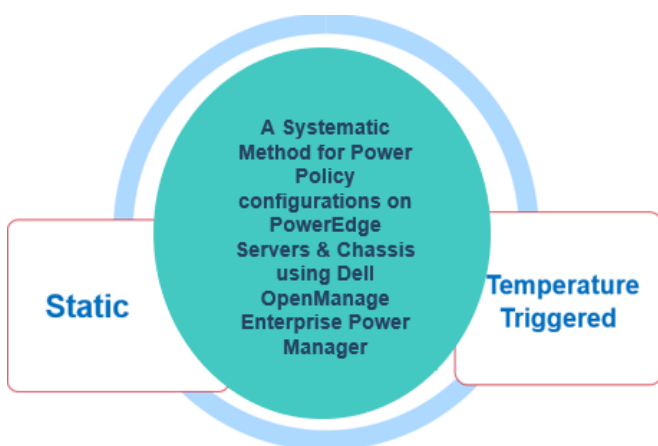


Static Power and Temperature-Triggered Policies with OpenManage Enterprise Power Manager



Abstract

This technical white paper provides an overview about effective utilization of Power and Temperature-Triggered Policies in a datacenter environment with Dell OpenManage Enterprise Power Manager.

February 2023

Revisions

Date	Description
August 2020	Initial release with OpenManage Enterprise 3.4.1 and Power Manager 1.2 versions.
February 2023	Modified to update the screenshots and details of Policy wizard changes introduced as part of Power Manager 3.1.

Acknowledgements

This paper was produced by following members of the Enterprise System Software development team.

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Acronyms

Acronym	Expansion
OME	OpenManage Enterprise
iDRAC	Integrated Dell Remote Access Controller
CMC	Chassis Management Controller
MSM	Modular System Management
MCM	Multi Chassis Management
MM	Management Module
REST	Representational State Transfer
GUI	Graphical User Interface
EPR	Emergency Power Reduction
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
API	Application Programming Interface
PDU	Power Distribution Unit

Executive Summary

This technical whitepaper describes the significance of static power and Temperature-Triggered policies in modern datacenters and the application of same with Dell OpenManage Enterprise Power Manager. It also talks about:

- How to decide on power cap values and apply Power Manager policies
- Types of policies—static power policy and Temperature-Triggered policy
- How to enable, disable and delete policies from Power Manager
- Importance of group level hierarchies for power and Temperature-Triggered policies

This document provides a comparative study of power and energy consumption in devices when a power policy is applied from Dell OpenManage Enterprise Power Manager.

1 Introduction

Dell OpenManage Enterprise Power Manager is a plugin in Dell OpenManage Enterprise console and uses fine-grained instrumentation to provide increased visibility over power consumption, anomalies, and utilization.

Deployment of power policy helps to manage the power cap for a device, or a group of devices monitored in Power Manager. When a power policy is enabled, it enforces user-defined power limits on the system. With user-defined policies, the system performance is dynamically adjusted to maintain power consumption close to the specified threshold.

If a custom power cap is not set, then the system applies the default Hardware Power Protection Policy. This power protection policy is independent of the user-defined policy.

You can schedule power policies to set different power limits for different time durations. For example, an administrator can configure a lower power cap during out of business hours when workload is less and a higher limit during business hours when you require a better performance. Being able to set these limits can improve the overall rack density as the lower power consumption helps to add more devices to the existing rack hierarchy.

2 Prerequisites for Power Policy Deployment

This section provides an overview about the list of prerequisites required for performing static power and Temperature-Triggered policy actions on Power Manager monitored devices and groups.

2.1 License Requirements

Apply policies on Servers (iDRAC) or Chassis managed by Dell OpenManage Enterprise Power Manager with OpenManage Enterprise Advanced / OpenManage Enterprise Advanced + and corresponding iDRAC or CMC Enterprise or iDRACDatacenter licenses.

Table 1 License Requirements for policy actions on servers

iDRAC Versions	iDRAC Express License	iDRAC Enterprise License	iDRAC Data Center License	OME Advance/ Advanced+ license	Supported Policy Actions
12G and above	✓	✗	✗	✗	None
	✗	✓	✗	✗	None
	✗	✗	✓	✗	None
	✓	✗	✗	✓	None
	✗	✓	✗	✓	Static, Temperature-Triggered
	✗	✗	✓	✓	Static, Temperature-Triggered

Table 2 License Requirements for policy actions on chassis

Chassis Models	CMC Enterprise License	Supported Policy Actions
PowerEdge MX7000	Not Applicable	Static, Temperature-Triggered
PowerEdge M1000e	Not Applicable	Static, Temperature-Triggered
PowerEdge VRTX	✓	Static, Temperature-Triggered
PowerEdge VRTX	✗	None
PowerEdge FX2s	✓	Static, Temperature-Triggered
PowerEdge FX2s	✗	None

Note: Refer to the compatibility Matrix section in [OpenManage Enterprise Power Manager User's Guide](#) to check the supported list of PowerEdge servers and chassis.

2.2 User Privileges and Accessibility

- OpenManage Enterprise user privileges
 - The OpenManage Enterprise users can trigger policy actions on Individual Devices with Administrator or Device Manager privileges.
 - Only the Administrators can perform the group level policy actions.
- Managed Device Access—when you are discovering devices in OpenManage Enterprise, ensure that:
 - The management console (iDRAC or CMC or MM) is reachable.
 - The onboarding task is successful.
 - The discovered servers and chassis are in Managed state.
 - The System Lockdown Mode is disabled on iDRAC console for 14th generation and above servers.

3 Create Static Power Policy

Create and apply static power policy either on Individual devices or groups (Static and Physical Groups) by performing the following steps:

Prerequisite: To create a policy for static or physical groups, ensure that there is minimum of one device monitored in the group.

1. Add Individual devices or groups in Power Manager.
2. To create a Static Power Policy, login to Dell OpenManage Enterprise and navigate to **Plugins>Power Management > Policies** tab.
3. Click Create.
4. In **General** section of Create Policy wizard:
 - Select the policy type as **Static**.
 - Provide a policy name and description (optional).

The policy is enabled by default after creation. Uncheck the Enable option if the policy need not be enabled upon creation.

Create Policy ? X

General
 Devices/Groups
 Settings
 Schedule
 Summary

Type: Static
 Name:
 Description:
 Enable: ☒

Step 1 of 5 Next Cancel

Figure 1 Create static power policy

5. In **Devices/Groups** section, select the option to add Device or Group that is monitored in Power Manager.
 - To Add Device
 - a. Select the **Device** option and click **Select Device**.
The **Select Device** page is displayed which lists all the devices monitored in Power Manager.
 - b. Select the device and click **Add Selected**.

Note: You can select only a single device or group while creating a Static power or Temperature-Triggered policy.

Create Static Power Policy

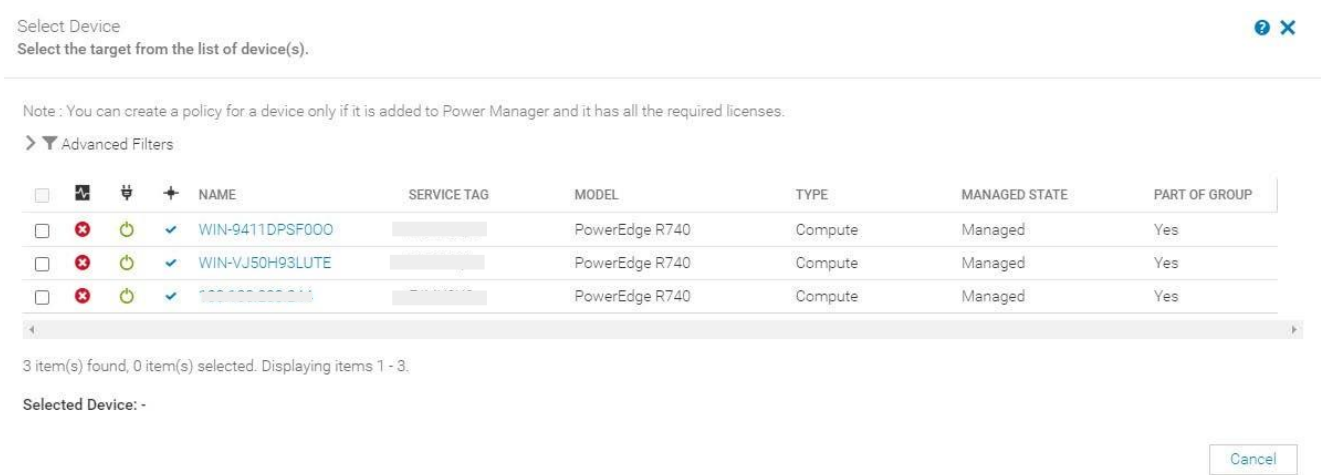


Figure 2 Section to select device for applying static power policy

- To Add Group
 - Select the **Group** option and click **Select Group**.
The **Select Group** page is displayed that lists all the static and physical groups monitored in Power Manager.
 - Select the group and click **Add Selected**.

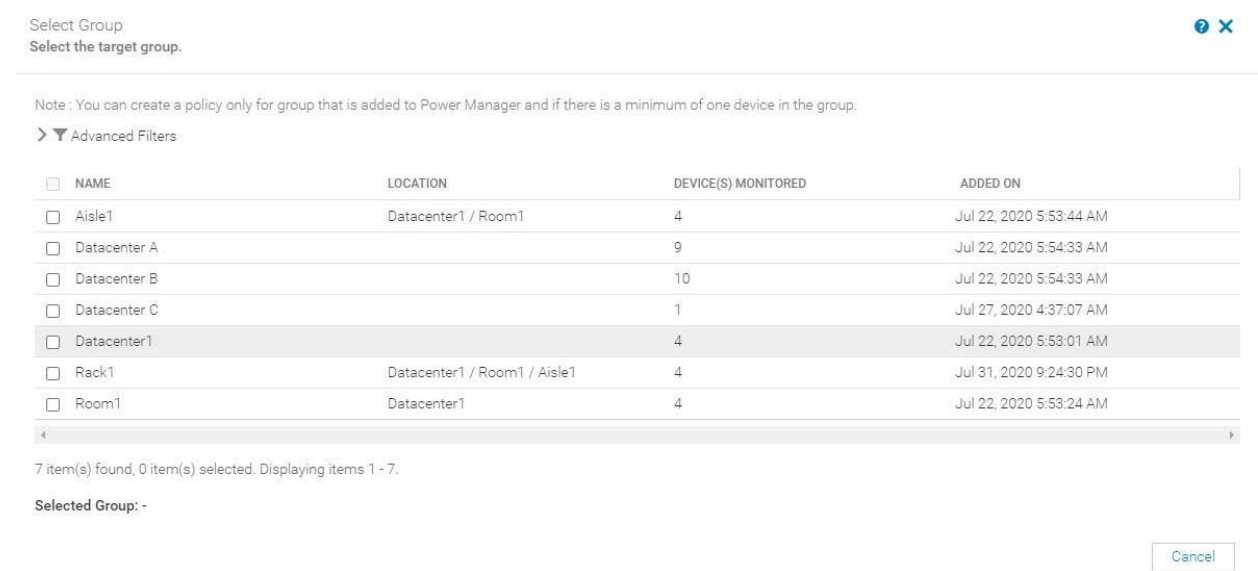


Figure 3 Section to select group for applying static power policy

Note: Static and physical groups monitored in Power Manager are available for selection of creation of policy, by default. However, the location details are displayed only for physical groups with group tag as Room, Aisle or Rack.

- c. The list of all monitored groups in Power Manager can be filtered either by Group Name or Group Type. Available options for Group Type filter include All, Static and Physical.

Select Group

Select the target group.

Note : You can create a policy only for group that is added to Power Manager and if there is a minimum of one device in the group.

▼ Advanced Filters

Clear All Filters

Name

Type

Physical

<input type="checkbox"/>	NAME	LOCATION	DEVICE(S) MONITORED	ADDED ON
<input type="checkbox"/>	Aisle1	Datacenter1 / Room1	4	Jul 22, 2020 5:53:44 AM
<input type="checkbox"/>	Datacenter1		4	Jul 22, 2020 5:53:01 AM
<input type="checkbox"/>	Rack1	Datacenter1 / Room1 / Aisle1	4	Jul 31, 2020 9:24:30 PM
<input type="checkbox"/>	Room1	Datacenter1	4	Jul 22, 2020 5:53:24 AM

4 item(s) found, 0 item(s) selected. Displaying items 1 - 4.

Selected Group: -

Cancel

Figure 4 Select Group section when the Group Type is selected as Physical

Select Group

Select the target group.

Note : You can create a policy only for group that is added to Power Manager and if there is a minimum of one device in the group.

▼ Advanced Filters

Clear All Filters

Name

Type

Static

<input type="checkbox"/>	NAME	LOCATION	DEVICE(S) MONITORED	ADDED ON
<input type="checkbox"/>	Datacenter A		9	Jul 22, 2020 5:54:33 AM
<input type="checkbox"/>	Datacenter B		10	Jul 22, 2020 5:54:33 AM
<input type="checkbox"/>	Datacenter C		1	Jul 27, 2020 4:37:07 AM

3 item(s) found, 0 item(s) selected. Displaying items 1 - 3.

Selected Group: -

Cancel

Figure 5 Select Group section when the Group Type is selected as Static

- 6. Select a group and click **Next** to navigate to **Settings** section.
- 7. In **Settings** section, provide the **Power Cap** value for the selected device or group.
- 8. Enter the **Power Cap** value(s) or percentage for the selected device or group with reference to the historical **Power Utilization** values.
 - Power History Details—to configure the suitable **Power Cap** values, refer to the **Power Data** information.

11 Static Power and Temperature-Triggered Policies with OpenManage Enterprise Power Manager

DELLTechnologies

Internal Use - Confidential

- Minimum, maximum and average power metrics are displayed for the selected device or group based on the **Monitoring Time Period** selected. You can refer these power metrics for **1 Day, 7 Days, 1 Month** or **3 Months** from the drop-down menu.
- In case of groups, the overall Power Cap value is the aggregate of **Power Cap** values of individual devices which are monitored as part of the group.

The minimum, average and maximum power data values are displayed based on the aggregated metric values of devices monitored as part of group for specific monitoring time periods.

The **Recommended Range** for the group displayed in Power Data are the aggregate of **Recommended range** values of monitored devices in the group.

Create Policy

General

Devices/Groups

Settings

Schedule

Summary

Policy Type:

Static

Selected Group:

Rack1

Power Cap Limit

903

Watt

(Recommended Range : 637 - 903)

3079

BTU/Hr

100

%

Power Cap Limit for a group

> Advanced Filters

DEVICE NAME	IDENTIFIER	MODEL	POWER CAP LIMIT	PERCENTAGE OF RANGE (%)	LOWER B...	UPPER B...	MINIMUM	AVERAGE	MAXIMUM
WIN-EN7MM3T...	500YYL3	PowerEdge ...	903	100	637	903	306	310	317

1 item(s) found. Displaying items 1 - 1.

Duration

1 Day

Power Data (Watt)

Data collected on: Feb 8, 2023 12:00:00 AM

Minimum: 311

Average: 312

Maximum: 317

Step 3 of 5

Previous

Next

Cancel

Figure 6 Power Settings section after a group is selected

For **Individual Devices**, the recommended range is values are retrieved from the device inventory. The minimum, average and maximum power history values are displayed based on the metric values displayed in **Monitoring Metrics** tab for the selected device with respect to the monitoring time period.

Create Policy ? X

General	✓	Policy Type:	Static i
Devices/Groups	✓	Selected Device:	100.98.68.243
Settings	✓	Power Cap Limit i	<div>539 Watt</div> <div>(Recommended Range : 447 - 539)</div> <div>1838 BTU/Hr</div> <div>100 %</div>
Schedule			
Summary			

Step 3 of 5

Previous
Next
Cancel

Duration 1 Day v

Power Data (Watt)
 Data collected on: Feb 8, 2023 12:00:00 AM

Minimum: 69
 Average: 72
 Maximum: 74

Figure 7 Power Settings section when a device is selected

Due to few device limitations, Power Manager maintains static **Recommended Range** values. For the following list of PowerEdge servers, **Recommended Range** threshold is always a static range:

Table 3 Devices with static range of Lower Bound and Upper Bound values

Server Generation	Server Model	Power Cap Value Range (Watts)
14G	VxRail G560	0 - 32767
	VxRail G560F	
	PowerEdge C6420	
	PowerEdge R6415	
	PowerEdge R7415	
	PowerEdge R7425	
13G	PowerEdge C6320	0 - 700
	PowerEdge C6320p	

9. Click Next and navigate to **Schedule** section.
 - a. Schedule a static power policy for a later time or enable the policy for always on the selected device or group.
 - b. In **Time Span**, select **Always** for the policy to be active from the time of creation. If the policy does not have to be active always when enabled, click **Range** and provide a time range during which the policy must be active when it is enabled.
 - c. In **Day(s)**, select **Always** for the policy to be active every day after it is enabled. If the policy does not have to be active always, click **Daily** to select specific days on which the policy is active when enabled.
 - d. In **Active Date**, select the date range when the policy is active when enabled. Select **Always** for perpetual schedule.

Create Policy

General

Devices/Groups

Settings

Schedule

Summary

Time Span

Day(s)

Active Date

Always

Range

From

07

:

17

PM

To

10

:

00

AM

Always

Daily

Every

SUN

THU

MON

FRI

TUE

SAT

WED

Always

Range

From

2023-02-08

To

2023-02-09

Step 4 of 5

Previous

Next

Cancel

Figure 8 Schedule options (Time Span, Day(s), Active Date) for static power policy

Create Policy

General

Devices/Groups

Settings

Schedule

Summary

ATTRIBUTE	VALUE
Name	P1
Policy Description	Policy for Rack1
Enabled	True
Selected Group	Rack1
Power Cap Limit	903 Watt
Date Range	Always
Time Span	Always
Day(s)	All

Step 5 of 5

Previous

Finish

Cancel

10. In Summary section, view the details that are provided and click Finish. The policy is created successfully.

Figure 9 Review policy inputs on Summary section

All static power policies that are created in Power Manager for devices or groups are listed in **Plugins > Power Management >Policies** tab.

For groups, the policy details are available in **Group Details > Policies and EPR** tab.

For individual devices, the policy details are available in **Monitoring Metrics > Policies and EPR** tab.

4 Temperature-Triggered Policy

Use Temperature-Triggered policy to prevent damage to devices due to overheating in the event of cooling infrastructure failure. The policy restricts the processing capability of the devices in the group, hence reducing the possibility of any damage to the device due to overheating. The policy helps in maintaining data center temperature to align to the standards defined by American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

Create Temperature-Triggered policy on a Power Manager monitored group (static or physical) by defining a temperature threshold value. After defining the threshold value and enabling the policy, if the average inlet temperature of the group crosses the temperature threshold value, Power Manager enforces an EPR (Throttle) on the group. The source of EPR (Throttle) is displayed as Temperature-Triggered on the EPR page (**Plugins > Power Management > Emergency Power Reduction**).

Following infographics represents **Apply EPR (Throttle)** action from Power Manager in case of a cooling infrastructure failure.

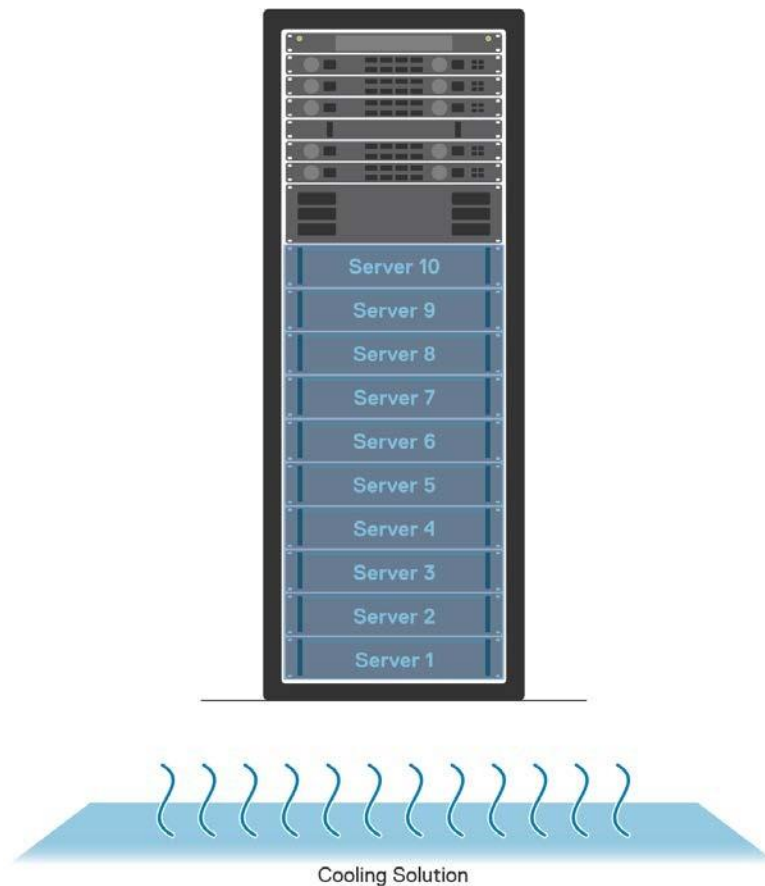


Figure 10 Datacenter with a functional cooling infrastructure. Rack(s) and associated device(s) are monitored in Power Manager as physical group(s).

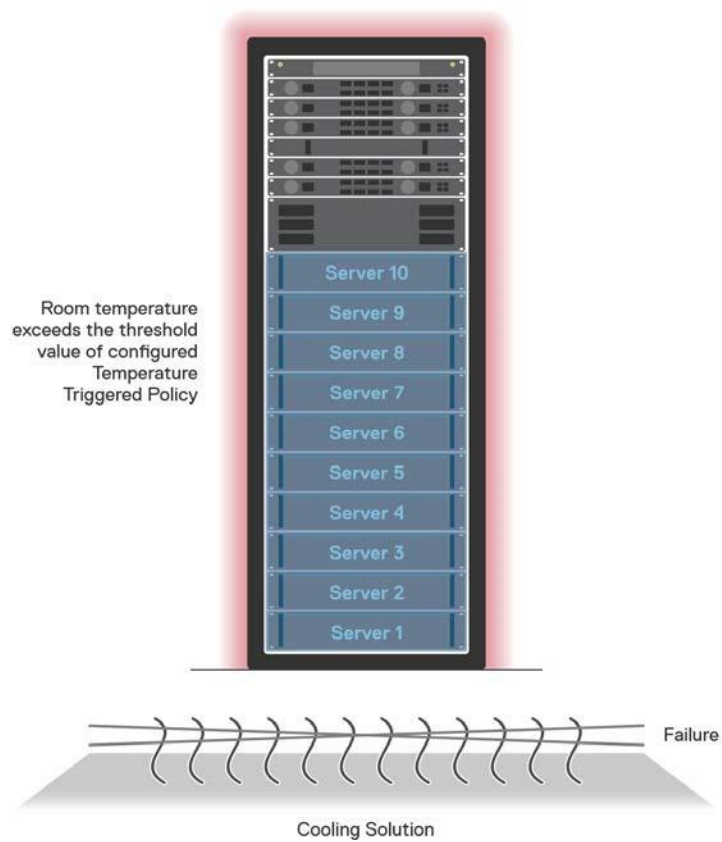


Figure 11 Overheating due to the failure of cooling infrastructure.

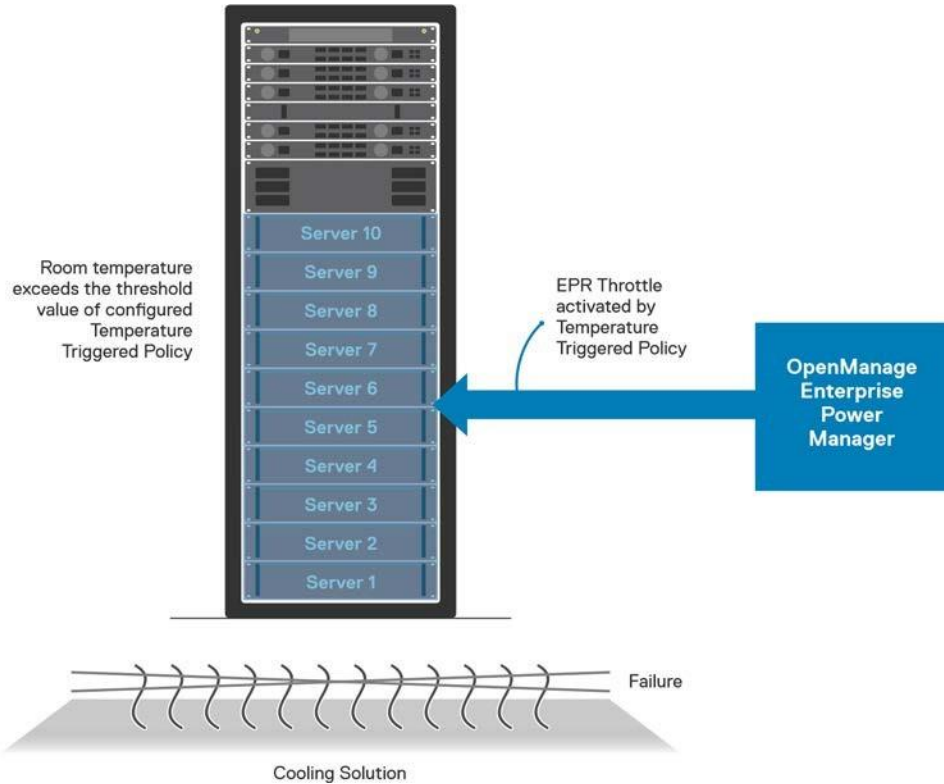


Figure 12 Temperature-Triggered EPR (Throttle) applied by Power Manager.

4.1 Create Temperature-Triggered Policy

To create a Temperature-Triggered policy, perform the following steps.

- 1. Login to OpenManage Enterprise and navigate to **Plugins > Power Management > Policies**.
- 2. Click **Create** to launch the policy creation wizard.
- 3. Select the policy Type as Temperature-Triggered.

Note: Modifying the type of policy after creation is not supported.

Create Policy

General

Devices/Groups

Settings

Schedule

Summary

Type: Temperature-Triggered

Name: Temp1

Description:

Enable: ☒

Step 1 of 5

Next Cancel

Figure 13 Create Temperature-Triggered policy

- 4. Enter the policy name and description (optional).
Policy is enabled by default.
To disable the policy after it is created, clear the **Enable** checkbox.
- 5. Select a static or physical group monitored in Power Manager for creating a Temperature-Triggered policy.

Create Policy

General

Devices/Groups

Policy Settings

Policy Schedule

Summary

Select a group for creating temperature-triggered policy.

Device

Group

Select Group

Step 2 of 5

Previous Next Cancel

Figure 14 Select Group from Devices/Groups section

You can filter the list of all monitored groups in Power Manager either by Group Name or Group Type. Available options for Group Type filter include All, Static and Physical.

Note: Both static and physical groups monitored in Power Manager are available for selection by default. Location details are displayed only for physical groups with group tag as Room, Aisle or Rack.

Select Group

Select the target group.

Note:

- You can create a policy only for group that is added to Power Manager and if there is a minimum of one device in the group.
- You can create only one temperature-triggered policy for a group.

> Advanced Filters

NAME	LOCATION	DEVICE(S) MONITORED	ADDED ON
<input type="checkbox"/> Aisle1	Datacenter1 / Room1	3	Jul 22, 2020 5:53:44 AM
<input type="checkbox"/> Datacenter A		9	Jul 22, 2020 5:54:33 AM
<input type="checkbox"/> Datacenter B		10	Jul 22, 2020 5:54:33 AM
<input type="checkbox"/> Datacenter C		1	Jul 27, 2020 4:37:07 AM
<input type="checkbox"/> Datacenter1		3	Jul 22, 2020 5:53:01 AM
<input checked="" type="checkbox"/> Rack1	Datacenter1 / Room1 / Aisle1	3	Jul 31, 2020 9:24:30 PM
<input type="checkbox"/> Room1	Datacenter1	3	Jul 22, 2020 5:53:24 AM

7 item(s) found, 1 item(s) selected. Displaying items 1 - 7.

Selected Group: Rack1

Add Selected

Cancel

Figure 15 Select Static or Physical Group to create Temperature-Triggered policy

Note: Temperature-Triggered policy is supported only for groups monitored by Power Manager and if there is a minimum of one device added in the group.

Note: If a Temperature-Triggered policy is already created for the group, you cannot create another Temperature-Triggered policy for that group.

- In Policy Settings, refer the **Temperature data** section to configure the temperature threshold value. Based on the selection of Monitoring time period value, the temperature details are displayed for selected group.
Select any of the ASHRAE recommended values or a custom value from the **Temperature Threshold** drop-down menu.
- Available ASHRAE recommendations in the drop-down menu are as follows.
 - ASHRAE Class H1 Recommended: 22 °C (71.6 °F)
 - ASHRAE Class H1 Allowable: 25 °C (77 °F)
 - ASHRAE Recommended: 27 °C (81 °F)
 - ASHRAE Class A1 Allowable: 32 °C (90 °F)
 - ASHRAE Class A2 Allowable: 35 °C (95 °F)
 - ASHRAE Class A3 Allowable: 40 °C (104 °F)
 - ASHRAE Class A4 Allowable: 45 °C (113 °F)

Create Policy ? X

General ✓

Devices/Groups ✓

Settings ✓

Schedule ✓

Summary

Policy Type: Temperature-Triggered ?

Selected Group: Rack1

Temperature Threshold

--Select--

20 ↓

Celsius

68 ↓

Fahrenheit

Duration1 Day

Temperature data (Celsius)
Data collected on: Feb 8, 2023 12:00:00 AM
Average: 23
Maximum: 23

Step 3 of 5

PreviousNextCancel

Figure 16 Temperature-Threshold configuration in Policy Settings section

Create Policy ? X

General ✓

Devices/Groups ✓

Settings ✓

Schedule ✓

Summary

Policy Type: Temperature-Triggered ?

Selected Group: Rack1

Temperature Threshold

--Select--

--Select--

ASHRAE Class H1 Recommended: 22 °C (71.6 °F)

ASHRAE Class H1 Allowable: 25 °C (77 °F)

ASHRAE Recommended: 27 °C (81 °F)

ASHRAE Class A1 Allowable: 32 °C (90 °F)

ASHRAE Class A2 Allowable: 35 °C (95 °F)

ASHRAE Class A3 Allowable: 40 °C (104 °F)

ASHRAE Class A4 Allowable: 45 °C (113 °F)

Duration1 Day

Temperature data (Celsius)
Data collected on: Feb 8, 2023 12:00:00 AM
Average: 23
Maximum: 23

Step 3 of 5

PreviousNextCancel

Figure 17 ASHRAE Classes available for selection of Temperature-Threshold

Note: Scheduling a Temperature-Triggered policy is not supported, and the policy is active as long as it is enabled.

8. Review the Summary section after providing the inputs for configuring Temperature-Triggered policy. Summary section gives an overview about the policy name, description, state, assigned group and the configured temperature threshold values. Since Temperature-Triggered policy cannot be scheduled, Date Range, Time Span and Days will be displayed as Always.

Create Policy ? ✕

General ✓

Devices/Groups ✓

Settings ✓

Schedule ✓

Summary ✓

ATTRIBUTE	VALUE
Name	Temp1
Policy Description	Power Policy for Rack1
Enabled	True
Selected Group	Rack1
Temperature Threshold (°C)	20
Date Range	Always
Time Span	Always
Day(s)	All

Step 5 of 5

Previous

Finish

Cancel

Figure 18 Review policy inputs from Summary section

9. After clicking **Finish**, a Temperature-Triggered policy is created and listed in **Plugins > Power Management > Policies** page.

OpenManage Enterprise

Search Everything

44 40 0 admin ?

Home

Devices

Configuration

Alerts

Monitor

Backup / Restore

Application Settings

Plugins

Power Manager

Overview

Power Manager Devices

Policies

Emergency Power Reduction

Rack View

Analyze Usage Metrics

Settings

About

Create

Edit

Enable

Disable

Delete

Advanced Filters

	ENABLED	NAME	DESCRIPTION	TYPE	ASSIGNED TO	CREATED ON	USER
<input type="checkbox"/>	<input checked="" type="checkbox"/>	P1	Temperature Trigger...	Temperature-Trigger...	Rack_1	Feb 20, 2023 10:37:2...	admin

1 item(s) found, 0 item(s) selected. Displaying items 1 - 1.

P1

Temperature Threshold: 22

Date Range: Always

Time Span: Always

Day(s): All

Figure 19 Temperature-Triggered policy listed in policies page

10. When the inlet temperature exceeds the configured temperature threshold value, the Temperature-Triggered policy with EPR Throttle option is applied on the group. The source of EPR is displayed as Temperature-Triggered.

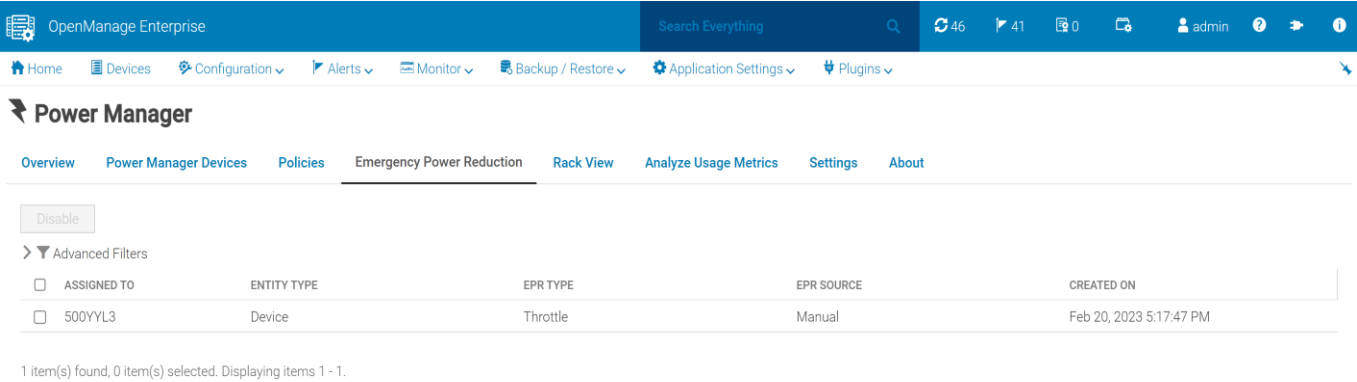


Figure 20 Temperature-Triggered EPR Throttle listed in Emergency Power Reduction tab

Note: You cannot manually disable the EPR Throttle applied by virtue of a Temperature-Triggered policy. However, after the inlet temperature reduces Power Manager automatically removes the EPR.

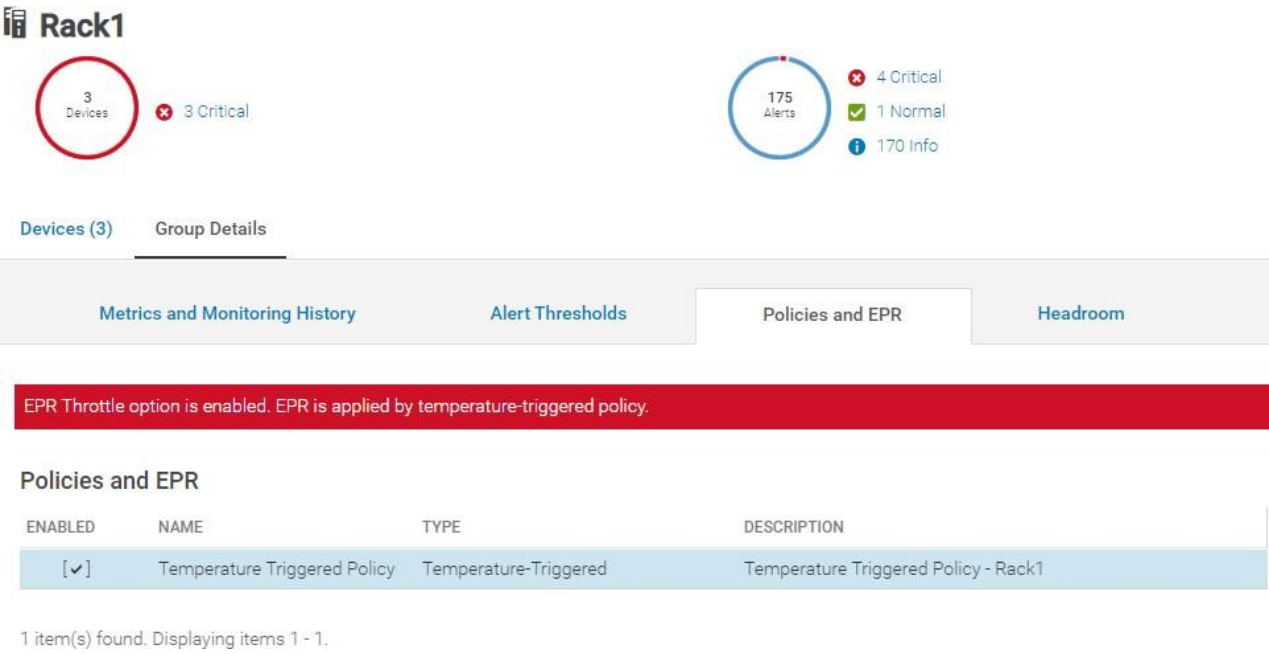


Figure 21 Temperature-Triggered policy and EPR listed in Group Details tab

Corresponding audit log entries are available in **Monitor > Audit Logs** tab for when a Temperature-Triggered EPR is enabled or disabled for selected groups.

Message ID—CPWR0047, Severity—Critical, Category—Configuration

Message—The temperature of the group <Group Name> has exceeded the threshold temperature set by the temperature triggered policy <Policy Name>.

Message ID—CPWR0050, Severity—Info, Category—Audit

Message—The Emergency Power Reduction feature is successfully enabled on the group <Group Name> by using the temperature triggered policy <Policy Name>.

Note: Power Manager cannot apply Temperature-Triggered EPR (Throttle) when the group already has EPR (Throttle or Shutdown) applied manually or when all the devices monitored as part of the group has EPR (Throttle or Shutdown) applied individually. Following audit log entry is generated in this case.

Message ID—CPWR0023, Severity—Warning, Category—Configuration.

Message—Unable to enable the Emergency Power Reduction feature on the target <Device Name> because the feature is already enabled on the target.

4.2 Disable Temperature-Triggered Policy

Manually disabling a Temperature-Triggered EPR is not supported. After the temperature normalizes, Power Manager automatically removes the EPR after the next metric collection. The duration of metric collection is based on the data gathering interval set in the **Plugins > Power Management > Settings** tab.

EPR Throttle applied by virtue of Temperature-Triggered policy is removed from Power Manager and the target device when the corresponding policy is disabled, deleted or if the temperature threshold is updated to a value higher than average temperature of the group.

5 Other Policy Actions

This section provides an overview about various policy actions supported on Power Manager monitored devices and groups.

5.1 View Policy

There are two methods to view a policy in Power Manager.

To view a policy from the Policies tab, perform the following steps:

- 1. To view all policies created for devices or groups in Power Manager, navigate to **Plugins > PowerManagement > Policies** tab in OpenManage Enterprise.
- 2. You can filter the list of available policies and alphabetically sort by **State, Name, Description, Type** or **Assigned To** values using **Advanced Filters**. Following is a brief description on the list of categories available.

State—filters the policies based on the state of the policy. The supported filters are **All, Enabled, Disabled**.

Name —filter policies based on the policy name.

Description—filter policies based on description.

Type—filter policies based on the policy type. The supported filters are **All, Static,** and **Temperature-Triggered**.

Assigned To—filter policies based on device or group to which the policy is assigned to. To clear the filters, click Clear All filters.

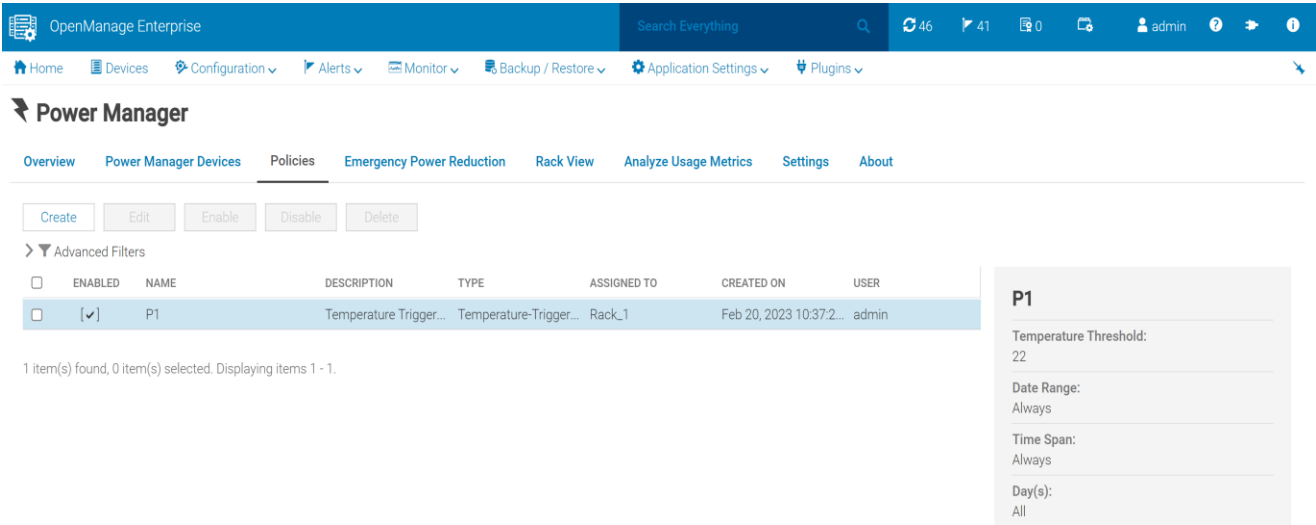


Figure 22 List of all policies in Power Manager

To view policies from Individual Devices and groups, perform the following steps:

3. In OpenManage Enterprise, click **Devices > Device Name > Monitoring Metrics > Policies and EPR**.

All the policies applied to the device are displayed with the corresponding details.

To view all the policies created for a group, click **Devices > Group Name > Group Details > Policies and EPR**.

The policies applied to the group are displayed with the corresponding details.

5.2 Edit Policy

You can modify existing power or Temperature-Triggered policies based on the change in power consumption history or average temperature generated by the devices or groups.

Consider the following before editing a policy:

- You cannot modify the type of policy after creation.
- You cannot modify the device or group selection after creation.

To edit a policy, perform the following steps:

1. From OpenManage Enterprise, navigate to **Plugins > Power Management > Policies**.
2. Select a policy and click **Edit**.
3. Modify the attributes through the Policy wizard and click **Finish**.

5.3 Disable Policy

The limit on power consumption applied through EPR on the group can be removed by disabling the policy. To disable a policy, go to either **Plugins > Power Management > Policies** tab or **Edit Policy** wizard.

From OpenManage Enterprise, click **Plugins > Power Management > Policies**. The Policies tab is displayed.

1. Select the policy and click **Disable**. In the confirmation window, click **Yes**.

OR

Select the policy and click **Edit**. The **Edit Policy** wizard is displayed.

- a. In General section, clear the **Enable** check-box and click **Finish** from the **Summary** section.

The policy is disabled successfully.

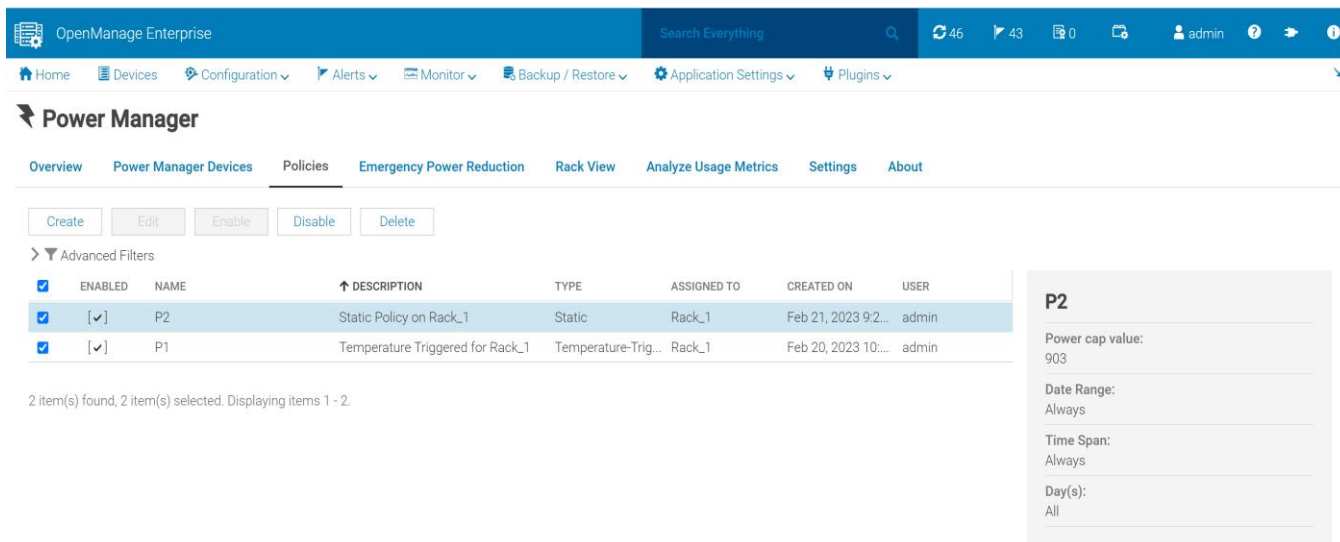


Figure 23 Multiple options available on Policies tab

5.4 Enable Policy

Activate policies created for devices and groups by enabling them.

To enable a policy, perform the following steps:

1. From OpenManage Enterprise, navigate to **Plugins > Power Management > Policies** and enable a policy by using any one of the following methods:
At the time of creation or while editing the policy, select the Enable option from **Create Power Policy** wizard.
OR
Select the policy from **Plugins > Power Management > Policies** and click **Enable**.

5.5 Delete Policy

Use the delete option to remove the policies from Power Manager that are not in use. By deleting an active policy, the restriction applied on power consumption through EPR on groups will be removed automatically.

To delete a policy, perform the following steps:

1. From OpenManage Enterprise, navigate to **Plugins > Power Management > Policies**.
2. Select the policies and click **Delete**.

Note: If you delete an active Temperature-Triggered policy, the Temperature-Triggered EPR is automatically removed from the group.

6 Comparative study of Resource Utilization with Static Power Policy configured from Power Manager

There was a comparative study done to identify the overall power utilization for devices and groups when a static power policy is applied from Power Manager.

Tests have been performed by applying static power policy on a group of four PowerEdge R740 servers which are monitored as part of a static group in Power Manager.

- Aggregated power utilization by default
 - The maximum and minimum power utilization for the monitored group was in range of ~426 Watts and ~328 Watts.
 - The average power consumption was ~357 Watts before imposing the power cap on the monitored group.

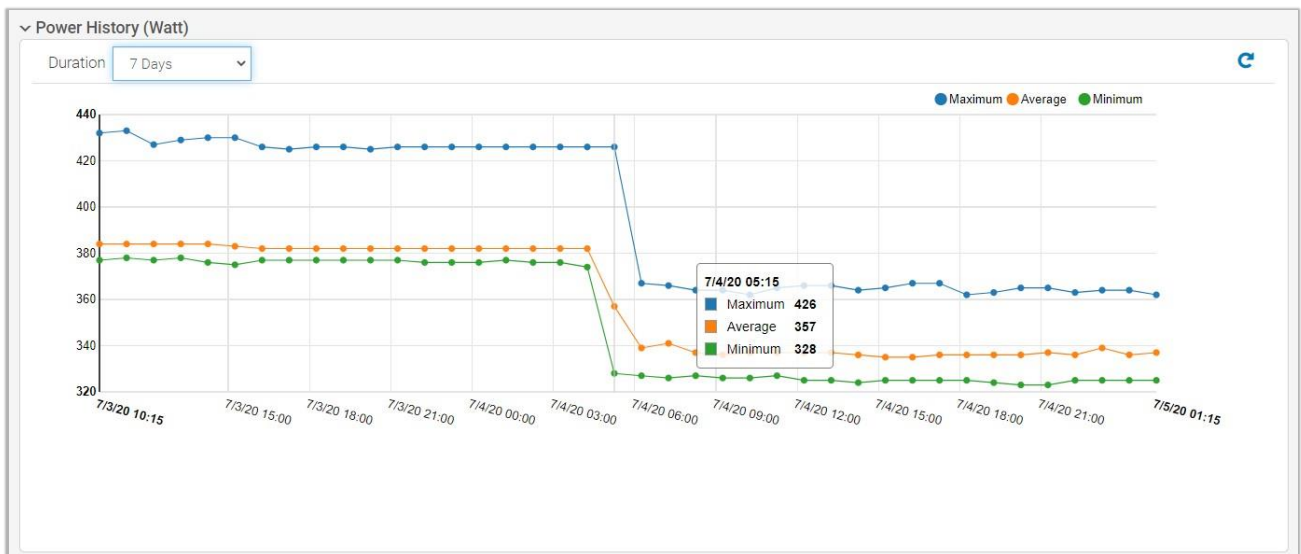


Figure 24 Power history details of a monitored group without power capping

- Aggregated power utilization with static power policy
 - With reference to the image attached, a 75% Power Cap was applied on the monitored group after 05:30 (07/04/2020) and the power utilization was rechecked in the next metric gathering interval.
 - The average power utilization was brought down to ~ 336 Watts with the maximum and minimum power utilization and within the range of ~ 363 Watts and ~ 324 Watts.

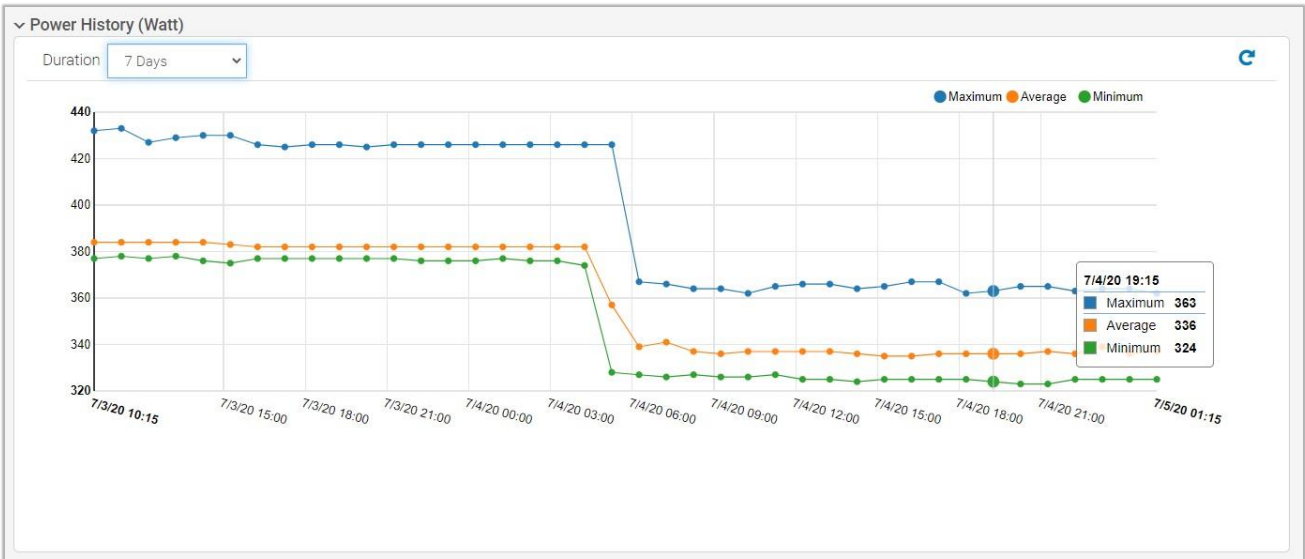


Figure 25 Power history details of a monitored group with power capping

7 Frequently Asked Questions

Can I remove Individual Devices or Static Groups from Power Manager after applying an active static power policy?

Description:

Removal of static groups and Individual Devices with active power policy (**Static**) is allowed from Power Manager (**Plugins > Power Management > Monitored Devices and Groups**). The applied power cap values are automatically removed from the monitored devices and the power policy is automatically deleted in PowerManager.

	SEVERITY	TIME STAMP	USER	MESSAGE ID	SOURCE ADDRESS	CATEGORY	DESCRIPTION
<input type="checkbox"/>	i	Aug 1, 2020 5:41:14 AM	Internal_Process	CPWR0032	Internal	Configuration	The power policy Datacenter A is successfully deleted.
<input type="checkbox"/>	i	Aug 1, 2020 5:41:13 AM	Internal_Process	CPWR0021	Internal	Configuration	The Power Cap feature is disabled on the target HZRK6Q2 .
<input type="checkbox"/>	i	Aug 1, 2020 5:41:13 AM	Internal_Process	CPWR0021	Internal	Configuration	The Power Cap feature is disabled on the target FJMX8X2 .
<input type="checkbox"/>	i	Aug 1, 2020 5:41:13 AM	Internal_Process	CPWR0021	Internal	Configuration	The Power Cap feature is disabled on the target F7CK6Q2 .
<input type="checkbox"/>	i	Aug 1, 2020 5:41:09 AM	admin	CPWR0039	10.107.17.38	Configuration	The group(s) are successfully removed from the Power Monitoring list.

Figure 26 Audit Logs on removing a static group with active static power policy

Can I remove Individual Devices or Static Groups from Power Manager after applying a Temperature-Triggered policy?

Description:

Following are the two use cases related to Temperature-Triggered policy and static group management in Power Manager:

- Static Group with inactive Temperature-Triggered policy (when Temperature-Triggered EPR is not applied)
 - You can remove a static group from Power Manager when the created Temperature-Triggered policy is not in effect; that is when the average temperature of the group is lesser than the configured temperature threshold. After removing the static group from Power Manager, the Temperature-Triggered policy (in inactive state) is automatically removed from **Plugins > Power Management > Policies** tab.
 - The behavior remains the same with individual devices when Temperature-Triggered EPR is applied on a device by virtue of a Temperature-Triggered policy.
- Static Group with active Temperature-Triggered policy (when Temperature-Triggered EPR is applied)
 - You can remove a static group from Power Manager when the created Temperature-Triggered policy is in active state; that is the average temperature of the group is more than the configured Temperature-Threshold and an EPR is applied by Temperature-Triggered policy.
 - Following message is displayed on attempting to remove a static group with active Temperature-Triggered policy.

Unable to remove the selected group(s) from Power Manager.

CPWR0029—Unable to remove disassociate devices or groups from the Power Manager because the Emergency Power Reduction feature is active on <Group Name>.

- The behavior remains the same with individual devices when Temperature-Triggered EPR is applied on a device by virtue of a Temperature-Triggered policy.

Can I create multiple power policies for a monitored device or group from Power Manager?

Description:

Power Manager supports creating multiple power policies for a monitored device or group (static or physical). If multiple policies are active on a device, either by policies set on the device or by policies set on the group in which the device is a part of, the most restrictive power cap among the policies is applied on the device.

For example, when an active policy with power cap value of 500 Watts is applied on a device, and then another active policy with power cap value of 750 Watts is applied on the same device, the policy with power cap value of 500 Watts is applied on the device as this policy has the most restrictive power cap value.

Note: When the most restrictive power policy is disabled or deleted from **Plugins > Power Management > Policies** tab, the next most restrictive power policy is active on the device or group.

Can I create multiple Temperature-Triggered policies for a monitored static or physical group from Power Manager?

Description:

Power Manager supports creating and applying only one Temperature-Triggered policy on a static or physical group. Also, you can apply the Temperature-Triggered policy on a group along with active static power policies.

Can I add a device with an active static policy (applied at individual device level) into a static or physical group monitored in Power Manager?

Description:

Following is a detailed scenario:

1. Discover and add a device in Power Manager and apply a static policy at device level from **Plugins > PowerManagement > Policies** tab.
2. Create a static or physical group and add the group in Power Manager.
3. Add the device with active power policy in the group in Power Manager.

Result:

You can add a device with policies to a static or physical group. Static policy applied at device level is maintained even when the device is added or removed from a static or physical group monitored in Power Manager.

Can I add a Power Manager monitored device (without policy) into a group (static or physical) monitored in Power Manager with active policy applied at Group level? Will the static policy applied in group level be automatically imposed on the device after adding it to the static or physical group?

Description:

Following is a detailed scenario:

1. Discover and add some devices (Device1, Device2) in Power Manager.
2. Create a group (static or physical) in OpenManage Enterprise and add the group in Power Manager (**Plugins > Power Management > Monitored Devices and Groups > Static Groups or Physical Groups**).
3. Add Device1 in the monitored group and apply a static power policy on group level (From **Plugins > PowerManagement > Policies** tab).
4. Add Device2 (without policy) to the group with active power policy.

Result:

Addition of Device2 is successful to the group. Static policy applied at group level is effective on Device1 but has no effect on Device2 which is added later.

What happens to the policy applied in Individual Device level (StaticPolicy1) when the same device is added to a group (static or physical) monitored in Power Manager with another policy (StaticPolicy2) already applied on the group level?

Description:

Following is a detailed scenario:

1. Discover and add some devices (Device1, Device2) in Power Manager. Apply StaticPolicy1 on Device1.
2. Create a static or physical group with Device2 in OpenManage Enterprise and add the group in Power Manager.
3. Create StaticPolicy2 for the monitored group from **Plugins > Power Management > Policies** tab.
4. Add Device1 with an active policy (StaticPolicy1) to the group with an active policy (StaticPolicy2).

Result:

Addition of Device2 is successful to the monitored group. StaticPolicy2 applied at group level is effective on Device2, whereas only the StaticPolicy1 is active on Device1.

Will the power cap applied by virtue of a Static Group be removed from the member device, when the device is removed from a Static Group?

Description:

Following is a detailed scenario:

1. Discover and add some devices (Device1, Device2) in Power Manager
2. Create a static or physical group with Device2 in OpenManage Enterprise and add the group in Power Manager.
3. Create StaticPolicy1 for the monitored group from **Plugins > Power Management > Policies** tab.
4. Add Device1 to the group with an active policy (StaticPolicy1).
5. Remove Device1 from the group.

Result:

Power cap applied by virtue of a Static Group is removed from the device when device is removed from the static group.

Will the power cap applied by virtue of a physical group be removed from the member device, when the device is removed from a physical group monitored in Power Manager?

Description:

Power Cap applied by virtue of a physical group is removed automatically by Power Manager when the device is removed from a physical group with active static power policy. Corresponding audit log entries are available in **Monitor > Audit Logs** as follows:

Message ID—CPWR0021, Severity—Info, Category—Configuration Message—

The Power Cap feature is disabled on the target <Device Name>.

Note: This case is applicable when few devices are removed from a physical group and the configured power cap value is still effective on other devices present in the group.

What happens to the power policy applied on a static or physical group, when all devices are removed from a monitored group with active policy?

Description:

After removing all the devices from a static or physical group having an active power policy, the policy is also removed automatically from **Plugins > Power Management > Policies** tab. The power cap values are also automatically removed from the devices that were part of the group.

Note: Behavior remains the same even if all the devices are removed from a static or physical group with Temperature-Triggered policy in inactive state.

What happens to the Temperature-Triggered EPR applied on a static or physical group, when all devices are removed from a monitored group with active Temperature-Triggered policy?

Description:

After removing all the devices from a monitored group, the Temperature-Triggered policy and EPR applied on a static or physical group are removed automatically (in **Plugins > Power Management > Policies** and **Plugins > Power Management > Emergency Power Reduction** tabs). The EPR Throttle applied by virtue of Temperature- Triggered policy is also automatically removed from the devices that were part of the group.

What happens to the policy applied on an Individual Device or static group, when the entity is deleted from OpenManage Enterprise?

Description:

The configured power cap values are maintained in the device, when a Power Manager monitored device or static group is deleted from OpenManage Enterprise. The power or Temperature-Triggered policies linked to a deleted entity is automatically removed from **Plugins > Power Management > Policies** tab.

Resolution:

To disable the Power Policy on target device(s), go to the iDRAC, CMC or MSM console of the target device and remove the configured Power Cap value.

What happens to the policy applied on a physical group, when the physical group is deleted from OpenManage Enterprise?

Description:

The configured power cap values are removed from the device, when a Power Manager monitored physical group is deleted from OpenManage Enterprise. Corresponding audit log entries are available in **Monitor > Audit Logs** as follows:

Message ID—CPWR0021, Severity—Info, Category—Configuration Message—

The Power Cap feature is disabled on the target <Device Name>.

The power or Temperature-Triggered policies linked to a deleted group are automatically removed from **Power Management > Policies** tab.

What happens if I modify power cap values for a device directly through the management console (iDRAC, CMC or MSM), after configuring the same from Power Manager?

Description:

In this scenario, there is a mismatch between the power policy details displayed in Power Manager when compared to the actual power cap values at device level. The power cap is reapplied on the target device when the static power policy is edited from Power Manager or when the schedule has arrived for a scheduled static power policy.

Resolution:

It is recommended to configure power cap on devices only through one management console. Configuring the power policies or different power cap values on target devices from Power Manager User Interface (UI), REST Interfaces or the management consoles such as iDRAC, CMC, MCM, or MSM effect the parity of data between devices and management consoles.

What happens to the static power policy configured on a device when the installed OpenManage Enterprise Advanced license is expired or deleted?

Description:

When OpenManage Enterprise Advanced license/Advanced plus is expired or deleted, the device gets automatically removed from Power Manager. The configured power policy is removed from **Plugins > Power Management > Policies** tab and the power cap value is disabled on the target device.

Resolution:

It is recommended to add the device to Power Manager and redeploy the power policy after running inventory task post license updates.

Why are few devices and groups (static or physical) are not selectable in Create Policy wizard?**Description:**

If the devices or groups are not compatible with Power Manager, then you cannot select them in the **Create Policy** wizard.

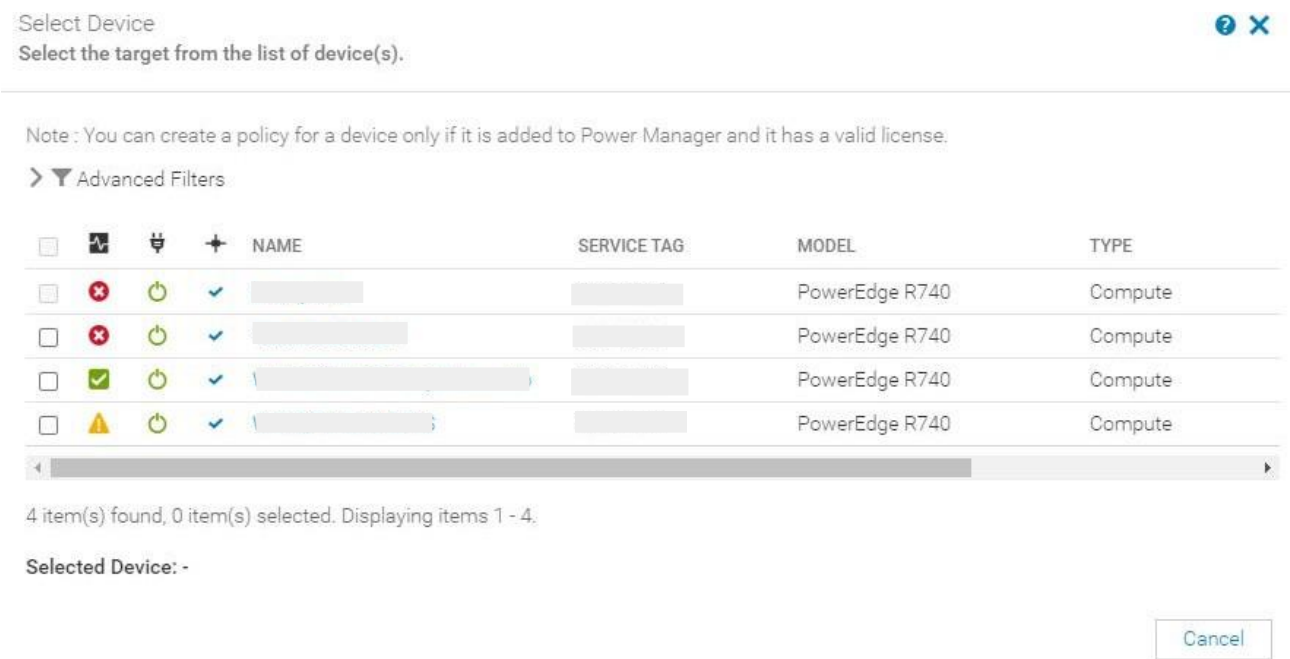


Figure 27 Device linux-yb6e is greyed out in Create Policy wizard

Resolution:


Ensure that the following prerequisites are met before applying a Static or Temperature-Triggered policy for a monitored device or group:

- The devices with valid OpenManage Enterprise license with no (or expired) iDRAC Enterprise or iDRAC Data Center License or CMC Enterprise are greyed out on the selection page.
- Empty groups or groups with no Power Manager capable devices are greyed out on the selection page.
- While creating a Temperature-Triggered policy, the groups with already existing Temperature-Triggered policies are not available for selection.

Are there any notifications available when a membership change has occurred on a group with active power policy or when the configured power cap gets violated?**Description:**

A warning alert related to Power Configuration with ID **CPWR0012** is generated to indicate that the group membership of monitored group is updated.

Meanwhile, a critical alert with Event ID **CPWR0013** is generated to indicate that the configured power policy for a monitored group is violated.

 **CPWR0012**

Source Name:
Rack1

Device Type:
Unknown Device

Subcategory:
Power Configuration

Detailed Description:
The group membership properties of the following groups are successfully updated as identified in the message.

Recommended Action:
For optimized power performance, it is recommended that you re-evaluate the power policies applied to these groups.

 **CPWR0013**

Source Name:
Rack1

Device Type:
Unknown Device

Subcategory:
Power Configuration

Detailed Description:
The power policy of the group identified in the message is violated because of the devices added to the group.

Recommended Action:
Reevaluate the power policy based on the newly added devices, and update the power cap value, if necessary.

Figure 28 Power Configuration related alerts on group membership changes and policy violation cases

Can I apply static or Temperature-Triggered policy on an MX7000 chassis which is configured as a member in MCM mode?









Description:

You cannot configure power cap values directly on an MX7000 chassis which is added as a member in MCM group.

Select Device
Select the target from the list of device(s).

Note : You can create a policy for a device only if it is added to Power Manager and it has all the required licenses.

> Advanced Filters

<input type="checkbox"/>					NAME	SERVICE TAG	MODEL	TYPE	MANAGED STATE	PART OF GROUP
<input type="checkbox"/>							PowerEdge MX7000	Chassis	Managed	No
<input type="checkbox"/>							PowerEdge MX7000	Chassis	Proxied	No

2 item(s) found, 0 item(s) selected. Displaying items 1 - 2.

Selected Device: -

Cancel

Figure 29 Member chassis in Proxied state is greyed out

Meanwhile, you can enable power cap value on a Lead MX7000 chassis and the same power configuration is replicated on the member MX7000 chassis based on the propagation rules configured for **Power** attribute in MSM console.

Note: Power policy applied on Lead MX7000 chassis is not replicated on the member MX7000 chassis if **Power** attribute is not selected in the propagation rules configured for MCM group.

Edit Chassis Group ? X

Define Group ✓

Add Members ✓

Group Name:

Group Description:

Onboarding Permissions: ☐ Automatic ☒ Manual

Propagate Configuration To Members:

All	<input type="checkbox"/>
User Authentication	<input type="checkbox"/>
Network Services	<input type="checkbox"/>
Alert Destinations	<input type="checkbox"/>
Local Access Configuration	<input type="checkbox"/>
Power	<input checked="" type="checkbox"/>
Proxy Settings	<input type="checkbox"/>
Time Settings	<input type="checkbox"/>
Security Settings	<input type="checkbox"/>
Session Inactivity Timeout Configuration	<input type="checkbox"/>

*Selected configurations will automatically be deployed to all group members

Step 1 of 2

Next Finish Cancel

Figure 30 Select configurations in MSM to deploy on all group members

Audit log entries are available in OpenManage only for the power cap value enabled on Lead MX7000 chassis since the propagation of power configuration is managed by MSM.

When you configure a power or Temperature-Triggered policy on static or physical group, and a member MX7000 chassis is monitored as part of the same group, power cap or EPR configurations are not applied by Power Manager on the member MX7000 chassis, but are applied for the remaining Power Manager capable devices in the group.

Are there any restrictions on plugin infrastructure actions (disable, update, uninstall) when power or Temperature-Triggered policy is enabled from Power Manager?

Description:

Disabling or uninstalling Power Manager is restricted when there is an active policy(static or Temperature-Triggered) on a monitored device or static group. However, Power Manager update is successful even with active policies.



Figure 31 Message on disabling Power Manager with active policies

Resolution:

Disable the policy and then try to uninstall or disable Power Manager.

Note: With active policies configured from Power Manager, OpenManage upgrade is successful, and the policies are maintained in the same state post update.

8 Technical Support and Resources

- Dell.com/support is focused on meeting customer needs with proven services and support.
- To watch quick and short videos about handling the PowerEdge server components, visit the [QRL video website](#).
- [Storage technical documents and videos](#) provide expertise that helps to ensure customer success on Dell storage platforms.

8.1 Related Resources

- Knowledge Base for Dell OpenManage Enterprise [HTML](#)
- Knowledge Base for Dell OpenManage Enterprise Power Manager and Power Center [HTML](#)
- Dell OpenManage Enterprise Power Manager Version 3.1 User's Guide [PDF HTML](#)
- Dell OpenManage Enterprise Power Manager RESTful API Guide version 3.1 [PDF HTML](#)
- Dell OpenManage Enterprise Power Manager 3.1 Release Notes [PDF HTML](#)