

# Managing physical grouping of infrastructure devices in OpenManage Enterprise Power Manager

## Abstract

This white paper provides guidance to group devices in a manner that reflects their physical organization in the data center.

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## Revisions

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## Acknowledgments

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## Acronyms

Acronyms	Expansion
OME	Open Manage Enterprise
PMP	Power Manager Plugin
OMEPM	Open Manage Enterprise Power Manager
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
PDU	Power Distribution Unit
API	Application Programming Interface
CSV	Comma-separated values

## Executive summary

Use this white paper to organize devices in the console that represent their physical placement in the data center. It also covers the associated benefits of physically grouping the devices in OpenManage Enterprise console and Power Manager plugin.

# 1 Creating physical groups

This section explains how various data center hierarchies can be created in the form of device groups in OpenManage Enterprise where Power Manager plugin is installed. It details out importance of a hierarchy, guidelines for an acceptable hierarchy, and various types of physical groups that can be created using the hierarchy.

## 1.1 Supported physical group hierarchies

There are certain constraints the physical hierarchy must adhere to.

When selecting the **Group Hierarchy** and **Parent Group** fields, ensure that you use the following hierarchy.

Table 1 Deployment and Configuration guide definition

Parent Group	Group Hierarchy
Data Center	Room, Aisle, Rack
Room	Aisle, Rack
Aisle	Rack
Rack	NA

The following table depicts the supported creation and movements of physical groups within the physical hierarchy group.

Table 2 Physical groups

Group type	Data Center	Room	Aisle	Rack
<b>Data Center</b>	No	No	No	No
<b>Room</b>	Yes	No	No	No
<b>Aisle</b>	Yes	Yes	No	No
<b>Rack</b>	Yes	Yes	Yes	No

## 1.2 Physical group hierarchy attributes

The following table provides a list of attribute/field names for creating a physical group along with a brief description about each field, if it is a mandatory field, and the supported inputs for that field.

Table 3 Physical groups hierarchy attributes

Field	Description	Mandatory	Value Range
Name	Provide a unique name for the physical group.	Yes	Combination of characters, special characters, and numbers  Limit: 1–255 characters
Description	Provide brief information about the physical group.	No	Combination of characters, special characters, and numbers  Limit: 0–255 characters

Group Hierarchy	Defines the category under <b>Parent Group</b>	Yes	<ul style="list-style-type: none"> <li>• Data Center</li> <li>• Room</li> <li>• Aisle</li> <li>• Rack</li> </ul>
Parent Group	Represents the high-level hierarchy for the physical group	Yes	<ul style="list-style-type: none"> <li>• Physical Hierarchy</li> <li>• Previously created Physical Groups</li> </ul>
Power Capacity (W)	Provide the maximum defined power consumption of the physical group.	Yes, only for the <b>Rack</b> group.  Optional for data center, room, and aisle groups.	Recommended limit: 1–629365631
Space Capacity (U-SIZE)	Provide the rack capacity for rack management purpose.  <b>Note:</b> This option is only applicable for Racks.	Yes	Recommended limit: 1U – 80U

---

**Note:** If you are logging in as a Device Manager, only the device groups and devices that are in your scope are available for viewing and management. For example, if you are logging in as a Device Manager DM1 user, you can view only the devices and groups that are assigned to a Device Manager DM1 user.

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### 1.3 Physical group hierarchy menu

1. Log in to Dell EMC Open Manage Enterprise and navigate to **Devices** page.
2. On the **Devices** page, in the left pane, expand the **PLUGIN GROUPS** section.
3. In the **Physical Hierarchy** section, click more options, and then click **Create New Physical Group**.
4. Each physical group and their siblings in a physical group hierarchy are identified by a unique name.



Figure 1 Create new physical group



## 1.4 Creating datacenter physical group

The Datacenter type physical group represents the entire data center. If you plan to manage multiple datacenters in a single console, then ensure that you create multiple data center physical groups.

1. Click **PLUGIN GROUPS > Physical Hierarchy > Create New Physical Group** option to launch physical group creation wizard to provide the physical group's information.

The screenshot shows the 'Create Physical Group Wizard' interface. At the top, it says 'Create Physical Group Wizard' and 'Provide the physical group information'. The form has the following fields:

- Name:** Data Center - India
- Description:** Data Center India
- Parent Group:** Physical Hierarchy (dropdown menu)
- Group Hierarchy:** Data Center (dropdown menu)
- Power Capacity (W):** 100000 (input field)
- Power Capacity (BTU/Hr):** 341000 (displayed value)

Below the description field, there is a note: '(Maximum characters: 255) You have 238 characters left.' At the bottom right, there are 'Finish' and 'Cancel' buttons.

Figure 2 Create New Physical Group Wizard – Data Center

2. Provide **Name** and **Description** for the group.
3. Each **physical group** and their siblings in a physical group hierarchy are identified by a **unique** name.
4. Select the **Group Hierarchy** as **Data Center** and **Parent Group** with the defined power capacity.
5. Provide the **Power Capacity (W)** as maximum defined power consumption of the physical group.
6. Power Capacity (BTU/Hr) is calculated and displayed based on the Power Capacity (W).
7. Click Finish. The Datacenter physical group is created successfully.

The API to create a physical group is: <https://<IP>/api/GroupService/Actions/GroupService.CreateGroup>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

## 1.5 Creating Room physical group

The Room type physical group represents sections inside a data center. Use this group to represent a room or a floor which is physically separated from its peers.

1. Click **PLUGIN GROUPS > Physical Hierarchy > Data Center > Create New Physical Group** option to launch Physical Group creation wizard to provide the physical group's information.

## Creating physical groups

Create Physical Group Wizard  
Provide the physical group information

Name: Room 01

Description: Description  
(Maximum characters: 255)  
You have 255 characters left.

Parent Group: Data Center - India

Group Hierarchy: Room

Power Capacity (W): 100000

Power Capacity (BTU/Hr): 341000

Finish Cancel

Figure 3 Create New Physical Group Wizard – Room

2. Provide **Name** and **Description** for the Room.
3. Select the **Group Hierarchy** as **Room** and **Parent group** as DC or default with the defined power capacity.
4. Provide the **Power Capacity (W)** as maximum defined power consumption of the physical group.
5. Power Capacity (BTU/Hr) will calculated and displayed based on the Power Capacity (W).
6. Click Finish. The Room physical group is created successfully.

The API to create a physical group is: <https://<IP>/api/GroupService/Actions/GroupService.CreateGroup>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

## 1.6 Creating Aisle physical group

The Aisle type physical group represents an aisle or a row of racks. You can have multiple aisles based on the actual layout of the racks in a data center.

1. Click **PLUGIN GROUPS > Physical Hierarchy > Data Center > Room > Create New Physical Group** option to launch Physical Group creation wizard to provide the physical group's information.

Create Physical Group Wizard  
Provide the physical group information

Name: Aisle 01

Description: Description  
(Maximum characters: 255)  
You have 255 characters left.

Parent Group: Room 01

Group Hierarchy: Aisle

Power Capacity (W): 100000

Power Capacity (BTU/Hr): 341000

Finish Cancel

Figure 4 Create New Physical Group Wizard - Aisle

2. Provide **Name** and **Description** for the Aisle.
3. Select the **Group Hierarchy** as **Aisle** and **Parent Group** as room/DC/Default with the defined power capacity.
4. Provide the **Power Capacity (W)** as maximum defined power consumption of the physical group.
5. Power Capacity (BTU/Hr) will calculated and displayed based on the Power Capacity (W).

6. Click Finish. The Aisle physical group is created successfully.

The API to create a physical group is: <https://<IP>/api/GroupService/Actions/GroupService.CreateGroup>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

## 1.7 Creating Rack physical group

The Rack type physical group represents a single enclosure that accommodates multiple infrastructure devices. A rack has a fixed unit size, which cannot change unless it is physically replaced in the data center. Any device can only be placed inside a rack, and hence, creating a rack group is mandatory to organize devices in a physical hierarchical structure.

1. Click **PLUGIN GROUPS > Physical Hierarchy > Data Center > Room > Aisle > Create New Physical Group** option to launch Physical Group creation wizard to provide the physical group's information.

Create Physical Group Wizard  
Provide the physical group information

Name: Rack 01

Description:   
Description  
(Maximum characters: 255)  
You have 255 characters left.

Parent Group: Aisle 01

Group Hierarchy: Rack

Power Capacity (W): 10000

Power Capacity (BTU/Hr): 34100

Space Capacity (U-SIZE): 21

Finish Cancel

Figure 5 Create New Physical Group Wizard - Rack

2. Provide **Name** and **Description** for the Rack.
3. Select the **Group Hierarchy** as **Rack** and **Parent Group** as Room/Aisle/DC/default.
4. Provide the **Power Capacity (W)** as maximum defined power consumption of the physical group.
5. Power Capacity (BTU/Hr) will calculated and displayed based on the Power Capacity (W).
6. Provide **Space Capacity (U-SIZE)** for rack management purpose.
7. Click Finish. The Rack physical group is created successfully.

The API to create a physical group is: <https://<IP>/api/GroupService/Actions/GroupService.CreateGroup>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

## 2 Editing physical groups

This section explains about modifying the properties of a physical group after it is created. It also helps to revise the parameters that are crucial for various computations.

1. Click **PLUGIN GROUPS > Physical Hierarchy > Rack >Edit Group** option to launch Physical Group Edit wizard to provide the physical group's information.

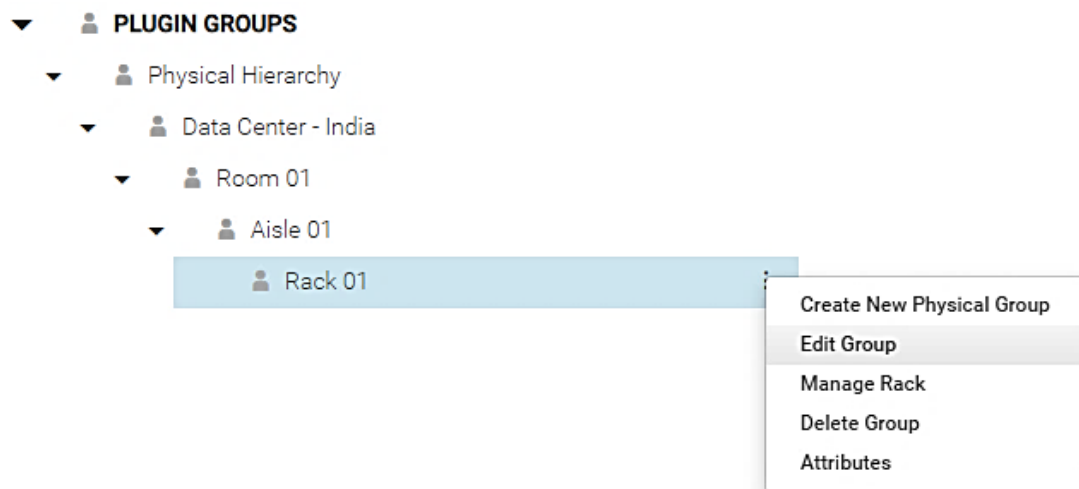


Figure 6 Option for Edit Physical Group

Figure 7 Edit Physical Group

2. Edit **Name** and **Description** for the Rack and Edit **Parent Group** for changing the hierarchy.
3. Edit **Power Capacity (W)** as maximum defined power consumption of the physical group.
4. **Power Capacity in (BTU/Hr)** will be calculated and displayed based on the Power Capacity (W) value entered.
5. Edit **Space Capacity (U-SIZE)** for rack management purpose.
6. Click Finish. The Rack physical group is edited successfully.

The API to edit a physical group is: <https://<IP>/api/GroupService/Actions/GroupService.UpdateGroup>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

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**Note:** You cannot edit the Group Hierarchy after creating a physical group.

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**Note:** The power capacity for a group is the sum of power consumption of the devices within the group, and a suggestion for the total group power capacity is displayed below the Power Capacity field.

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**Note:** If a device is already placed, then the Rack U size cannot be decreased below the highest occupied rack slot.

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### 3 Adding devices in physical groups

This section explains about organizing the devices in Rack physical groups. It details out workflows that are associated with adding different types of devices that are supported in OpenManage Enterprise.

1. Click **PLUGIN GROUPS > Physical Hierarchy > Rack > Manage Rack** option to open Manage Rack.

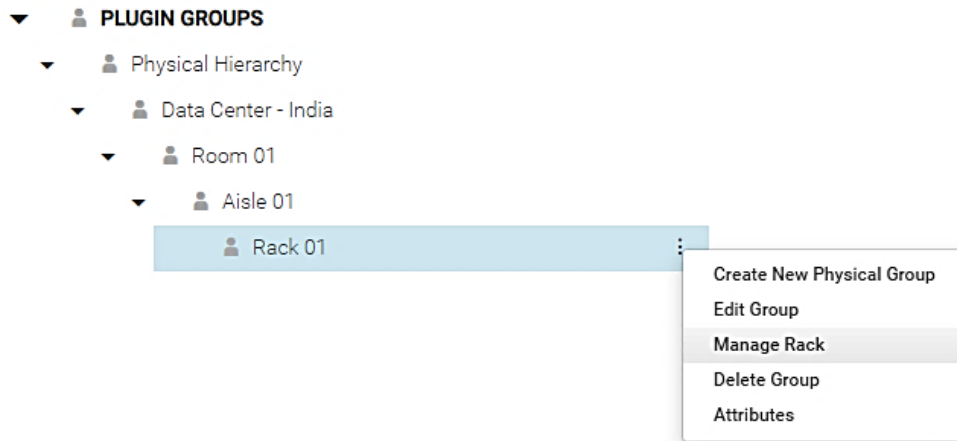


Figure 8 Physical group hierarchy

Use the **Manage Rack** wizard to:

- Add devices to specific rack slots
- Rearrange devices within a rack
- Remove devices from a rack
- Move device to another rack
- Associate supported devices with a rack



Figure 9 Manage rack

The API to manage a rack is: <https://<IP>/api/PowerService/PhysicalGroups/GroupDetails<id>/Devices>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

Consider the following before managing the devices in a physical group:

- Add the size of the unmonitored device that you plan to add to a physical group.
- Emergency Power Reduction (EPR) is not enabled on the group.
- The rack slot option is available for the following types of devices:
  - Chassis
  - Rack servers
  - Storage
  - Network switches
  - Unmonitored devices.
- Physical groups are automatically added to Power Manager and devices in the physical group are also added as individual to working set, if they have the valid licenses.

### 3.1 Adding a discovered server or chassis in a rack

A discovered Dell server or chassis can be added to a rack without any additional steps. After the devices are added to physical groups, they are part of Power Manager's monitoring list. Hence, it is not recommended to update unit size of these devices as the same is fetched from the device during discovery process. Power Manager automatically starts monitoring various metrics from the ones meeting the criteria that are added to a rack.

1. Click **PLUGIN GROUPS > Physical Hierarchy > Rack > Manage Rack**
2. To add devices discovered in OpenManage Enterprise, click **Add to Rack Slot**. The **Add Device(s) To Rack Slots** wizard is displayed.
3. In the **Select Device(s)** section, select the devices and click **Next**.

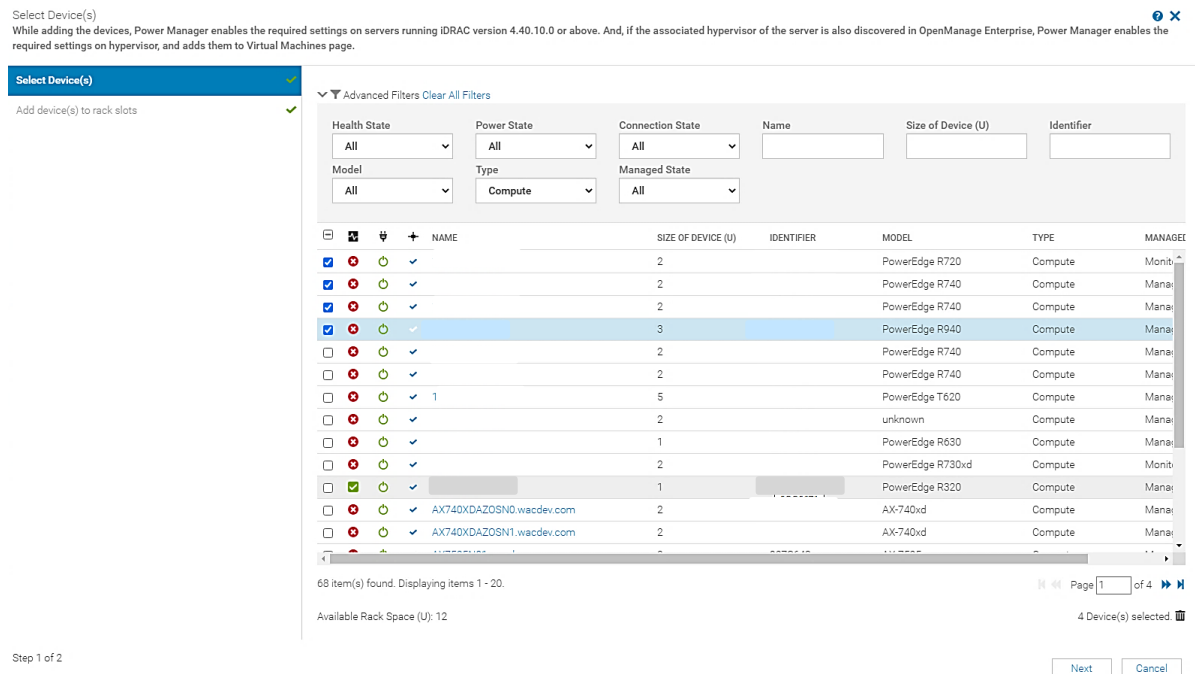


Figure 10 Add to Rack Slot – Select Device(s)

The API to view the rack capable devices is:

<https://<IP>/api/PowerService/PhysicalGroups/CapableDevices>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

- In **Add device(s) to rack slots**, by default, the devices are automatically added in the available slots in the rack. To add a device at a specific slot, select the Auto drop-down menu and select the required slot.

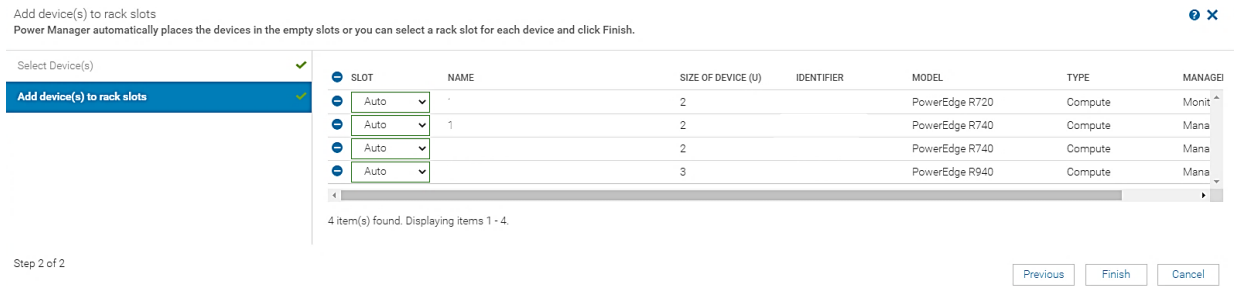


Figure 11 Add to Rack Slot – Add device(s) to rack slot

- Click **Finish**. The devices that are added are graphically displayed on the **Manage Rack** page.

The API to add devices to the rack is:

<https://<IP>/api/PowerService/PhysicalGroups/Actions/PhysicalGroup.AddMemberDevices>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

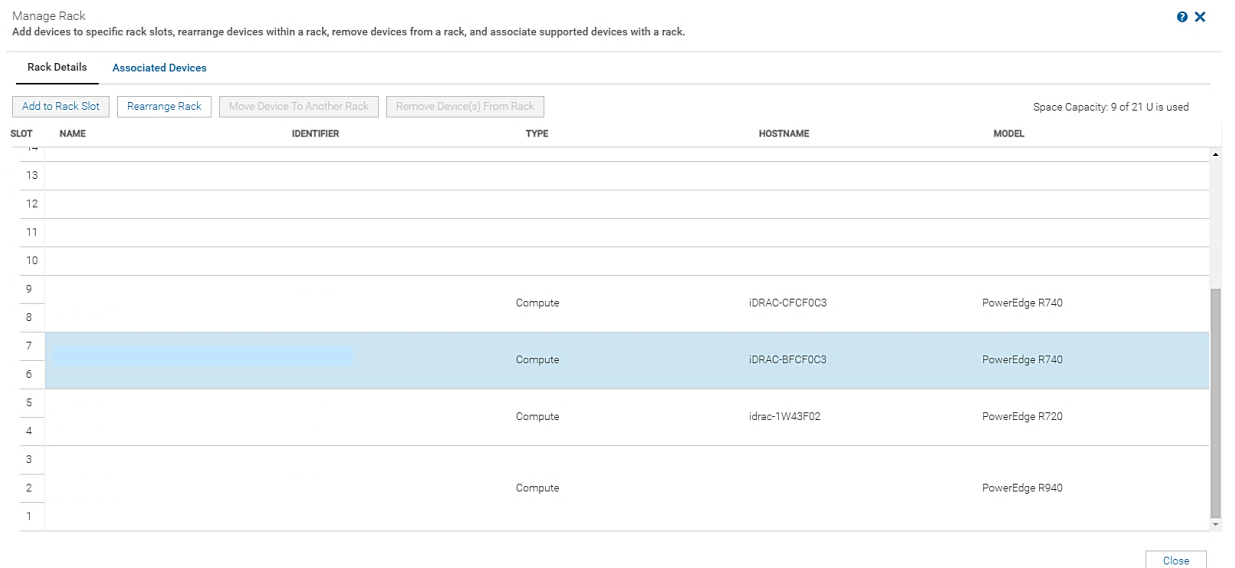


Figure 12 Manage Rack

## 3.2 Adding a discovered storage, network, or non-Dell device in a rack

Add the unit size and estimated power consumption for each discovered device (storage, network, or non-Dell device) before adding them to a rack. You can get the unit size and power consumption estimate from the device specification or from a manual inspection. This step ensures that the device is occupying the right amount of space when added to a rack and contributes to the rack power and space headroom calculations.

### 3.2.1 Specifying device unit size and estimated power

This section explains about how to specify unit size and estimated maximum power consumption of a device.



## Adding devices in physical groups

1. Select one device from the list.
2. Right side Device Details for Power Manager panel.
3. Click **Update Details** to update the device details.

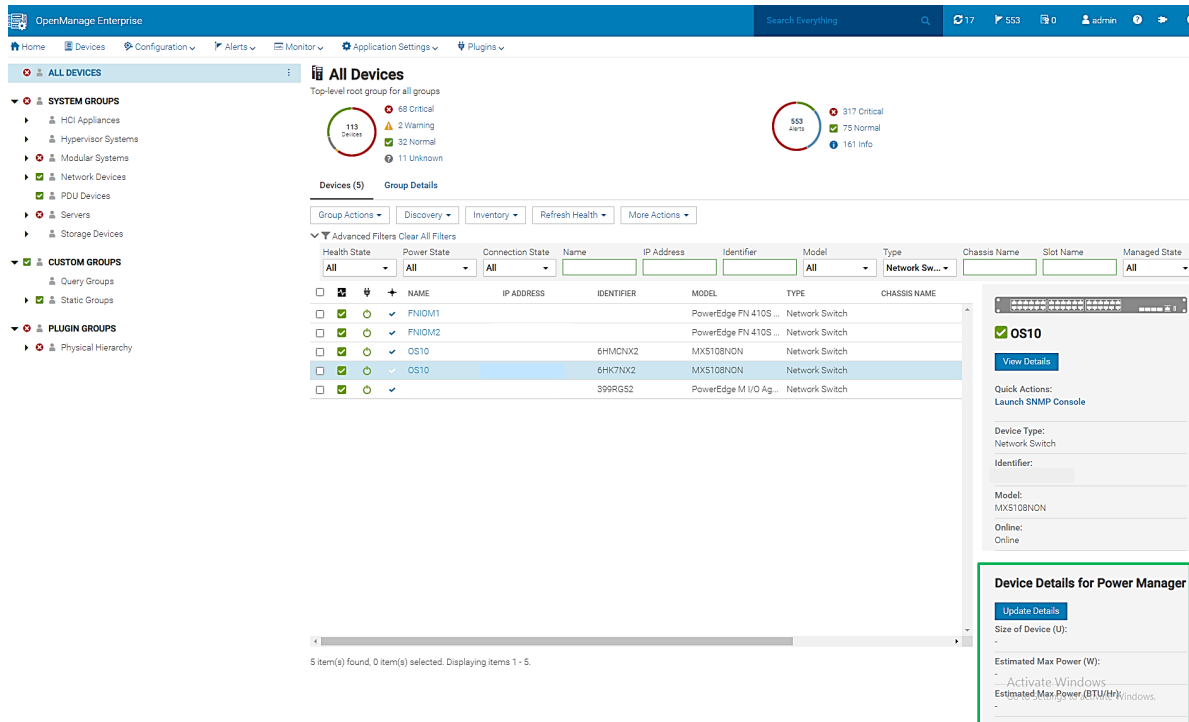


Figure 13 Device Details for Power Manager

The API to view device details is: <https://<IP>/api/PowerService/DeviceDetails>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

4. In the **Device Details** page, provide the Size of Device (U) and Estimated Max Power (W).
5. The **Estimated Max Power (BTU/Hr)** is calculated and displayed based on the entered Max Power.
6. Click **Apply**.

Device Details for Power Manager - OS10 ? X

---

Size of Device (U)

Estimated Max Power (W)

Estimated Max Power (BTU/Hr) 1023

Figure 14 Update device details for Power Manager

The API to update the device details is:

<https://<IP>/api/PowerService/Actions/PowerService.UpdateDeviceDetails>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

### 3.2.2 Adding device to a rack

1. Click **PLUGIN GROUPS > Physical Hierarchy > Rack > Manage Rack**.
2. To add devices discovered in OpenManage Enterprise, click **Add to Rack Slot**. The **Add Device(s) To Rack Slots** wizard is displayed.
3. In the **Select Device(s)** section, select the devices and click **Next**.

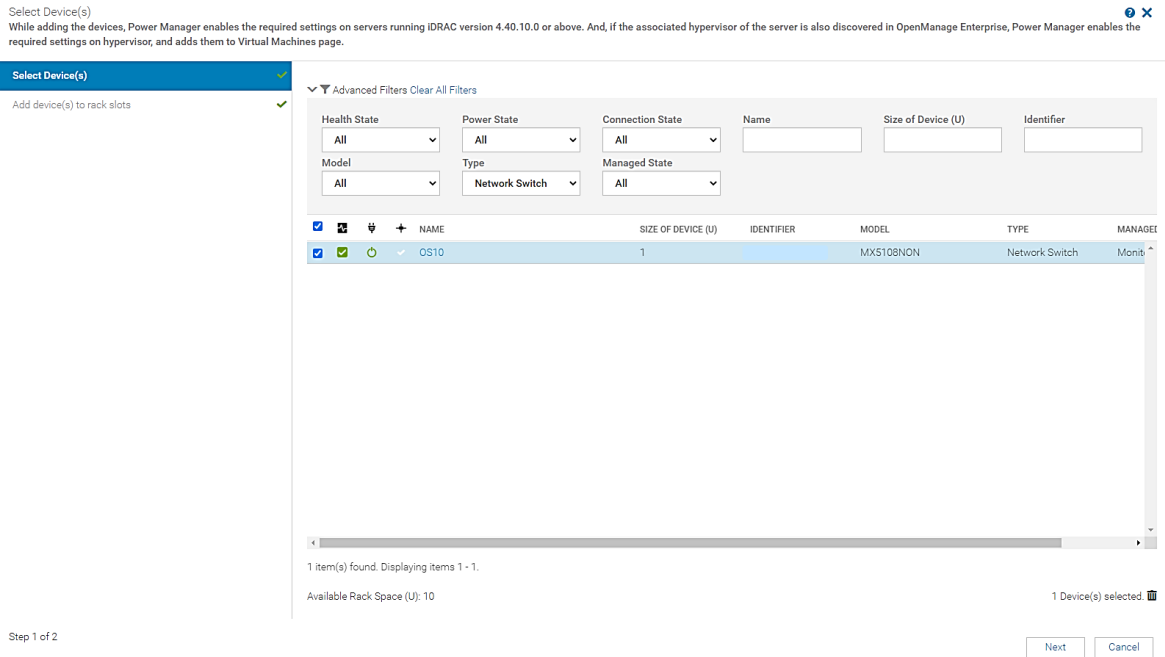


Figure 15 Add to Rack Slot – Select Device(s)

The API to view rack capable devices is: <https://<IP>/api/PowerService/PhysicalGroups/CapableDevices>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

4. In **Add device(s) to rack slots**, by default, the devices are automatically added in the available slots in the rack. To add a device at a specific slot, select the **Auto** drop-down menu and select the required slot.

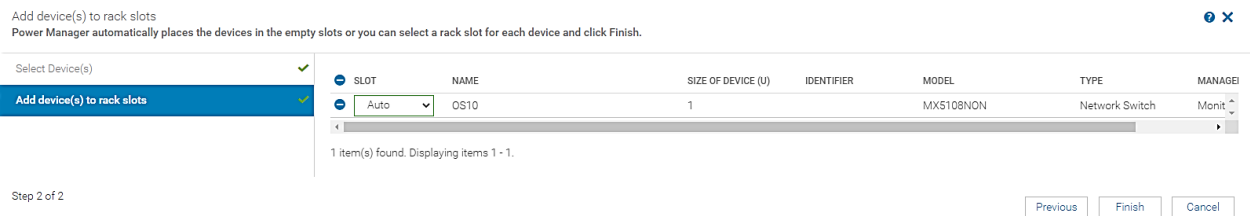


Figure 16 Add to Rack Slot – Add device(s) to rack slot

5. Click **Finish**. The devices that are added are graphically displayed on the **Manage Rack** page.

The API to add devices to rack is:

<https://<IP>/api/PowerService/PhysicalGroups/Actions/PhysicalGroup.AddMemberDevices>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

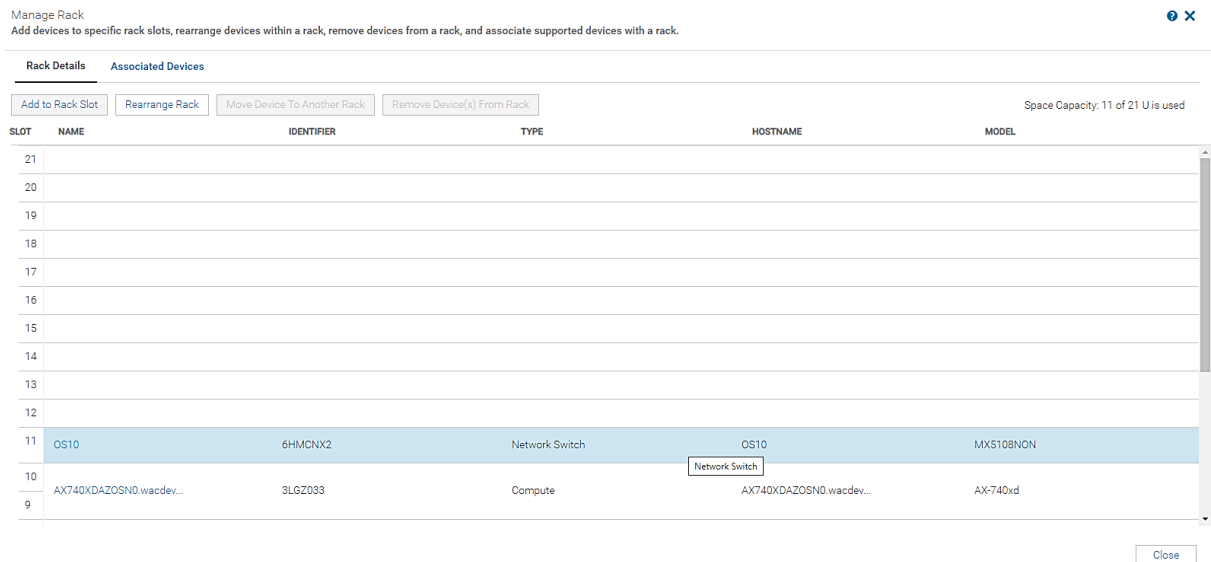


Figure 17 Manage rack -Non dell device

## 3.3 Adding an unmonitored device in a rack

If there are infrastructure devices that cannot be discovered in OpenManage Enterprise, add the devices manually in Power Manager to represent the physical structure. After adding the unmonitored device details, you can add the device to a rack. This results in rather accurate space and power headroom calculations and allows basic visualization of the device in the console.

**Note:** The unmonitored devices are not monitored though Power Manager.

1. Launch OpenManage Enterprise, and then click **Plugins > Power Management > Power Manager Devices**. The **Power Manager Devices** tab is displayed.
2. Click **UNMONITORED > Unmonitored Devices**. All the Unmonitored Devices details are listed on the tab.

The following table has all the field names of the Unmonitored Devices, their description, if it is a mandatory field and the value range:

Figure 18 Unmonitored Device attributes

Field	Description	Mandatory	Value Range
Device Name	Provide a unique device name.	Yes	Combination of characters, special characters, and numbers  Limit: 1–255 characters
Description	Provide brief information about the device you are adding.	No	Combination of characters, special characters, and numbers  Limit: 0–255 characters
Hostname	Provide a hostname.	No	Combination of characters, special characters, and numbers.  Limit: 1-255 characters

Identifier	Provide a unique identifier for the device.	Yes	Combination of characters, special characters, and numbers.  Limit: 1-255 characters
Model	Provide the model name.	No	Combination of characters, special characters, and numbers.  Limit: 0-255 characters
Size of Device (U)	Provide the space occupied on the rack.	Yes	Numbers only  Limit: 1-80
Estimated Max Power (W)	Provide the defined maximum power that the device can consume.	No	Numbers only  Limit: 1–629365631

### 3.3.1 Creating unmonitored devices

This section is about how to create an unmonitored device.

1. Launch OpenManage Enterprise, and then click **Plugins > Power Management > Power Manager Devices > UNMONITORED > Unmonitored Devices**. The Unmonitored Devices tab is displayed.

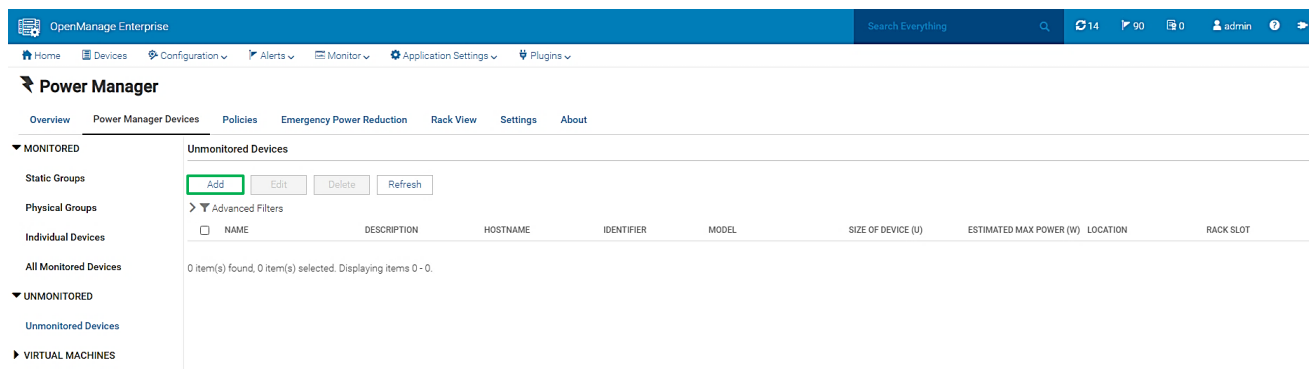


Figure 19 Unmonitored device

2. To add the unmonitored devices, click **Add**. The **Add Unmonitored Devices** wizard is displayed.

Add Unmonitored Device ? X  
 Provide realistic values of the device to view accurate rack utilization details.

---

Device Name	<input type="text" value="Unmonitored Device 01"/>
Description	<input type="text"/>
Hostname	<input type="text"/>
Identifier	<input type="text" value="XXXXXXX"/>
Model	<input type="text"/>
Size of Device (U)	<input type="text" value="2"/>
Estimated Max Power (W)	<input type="text" value="300"/>
Estimated Max Power (BTU/Hr)	1023

Figure 20 Add Unmonitored Device details

3. Provide a unique **Device Name** and **Description** is brief information about the device you are adding.
4. Provide a **hostname** and a **unique identifier** for the device.
5. Provide the model name and space that is occupied on the rack.
6. Provide the defined **maximum power** that the device can consume.
7. Click **Finish**. Unmonitored device added successfully.

The API to add unmonitored devices that is not supported in OpenManage Enterprise:  
<https://<IP>/api/PowerService/UserDefinedEntities/Actions/UserDefinedEntities.Create>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

### 3.3.2 Viewing unmonitored devices

This section explains about how to view the created unmonitored devices.

1. Launch OpenManage Enterprise, and then click Plugins > Power Management > Power Manager Devices. The Power Manager Devices tab is displayed.
2. Click **UNMONITORED > Unmonitored Devices**. All the unmonitored devices details are listed on the **Unmonitored Devices** tab.

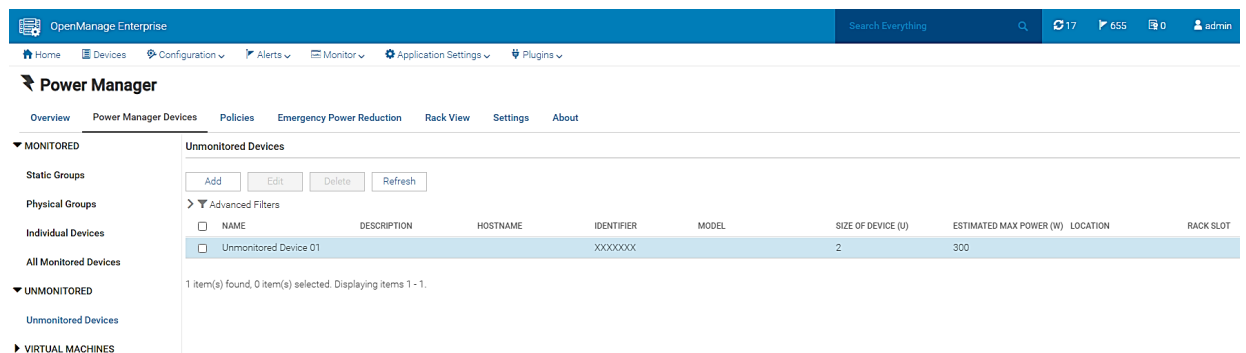


Figure 21 List Unmonitored Device details

The API to view all the unmonitored devices: <https://<IP>/api/PowerService/UserDefinedEntities/Devices>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

**Note:** After adding the unmonitored devices in a physical group under a rack, the location and rack slot columns are populated for this device.

### 3.3.3 Editing unmonitored devices

This section is about how to edit properties of an unmonitored device.

1. Launch OpenManage Enterprise, and then click **Plugins > Power Management > Power Manager Devices > UNMONITORED > Unmonitored Devices**. The Unmonitored Devices tab is displayed.
2. Select a device and click **Edit**.

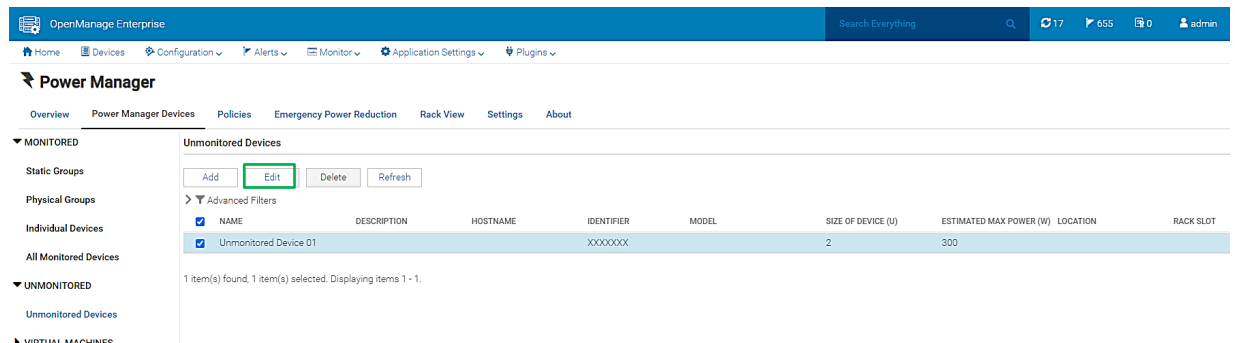


Figure 22 Select Unmonitored Device

3. Click **Finish** to update unmonitored device details.

Edit Unmonitored Device ? X  
 Provide realistic values of the device to view accurate rack utilization details.

Device Name	<input type="text" value="Unmonitored Device 01"/>
Description	<input type="text"/>
Hostname	<input type="text"/>
Identifier	<input type="text" value="XXXXXXXX"/>
Model	<input type="text"/>
Size of Device (U)	<input type="text" value="2"/>
Estimated Max Power (W)	<input type="text" value="300"/>
Estimated Max Power (BTU/Hr)	1023

Figure 23 Edit Unmonitored Device details

The API to edit unmonitored device details:

<https://<IP>/api/PowerService/UserDefinedEntities/Actions/UserDefinedEntities.Update>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

**Note:** If a device is already placed in a rack, then you cannot increase the rack U size if there are no consecutive slots available in the rack.

### 3.3.4 Deleting unmonitored devices

This section is about how to delete unmonitored devices and the result on the rack after deleting the device.

1. Launch OpenManage Enterprise, and then click **Plugins > Power Management > Power Manager Devices > UNMONITORED > Unmonitored Devices**. The Unmonitored Devices tab is displayed.
2. Select the devices and click **Delete**.

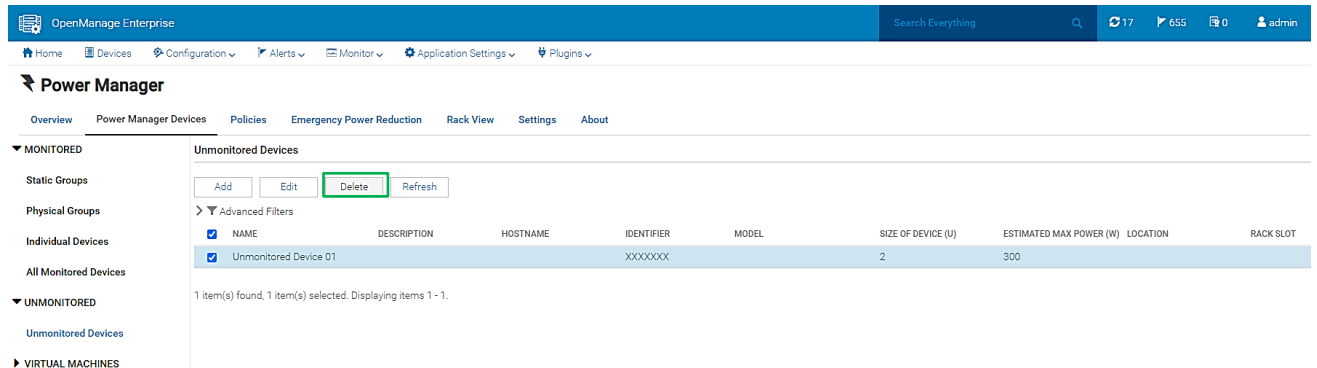


Figure 24 Unmonitored Device list – select the device for Delete

3. In the confirmation screen, click **Yes**.

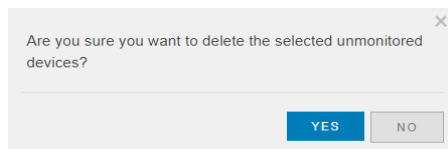


Figure 25 Delete Unmonitored Device – confirmation wizard.

The API to delete an unmonitored device:

<https://<IP>/api/PowerService/UserDefinedEntities/Actions/UserDefinedEntities.Delete>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

### 3.3.5 Adding unmonitored device to a rack

1. Click **PLUGIN GROUPS > Physical Hierarchy > Rack > Manage Rack**.
2. To add devices discovered in OpenManage Enterprise, click **Add to Rack Slot**. The **Add Device(s) To Rack Slots** wizard is displayed.
3. In the **Select Device(s)** section, select the **Type** as **Unmonitored**. It lists all the unmonitored devices.
4. Select the devices and click **Next**.

## Adding devices in physical groups

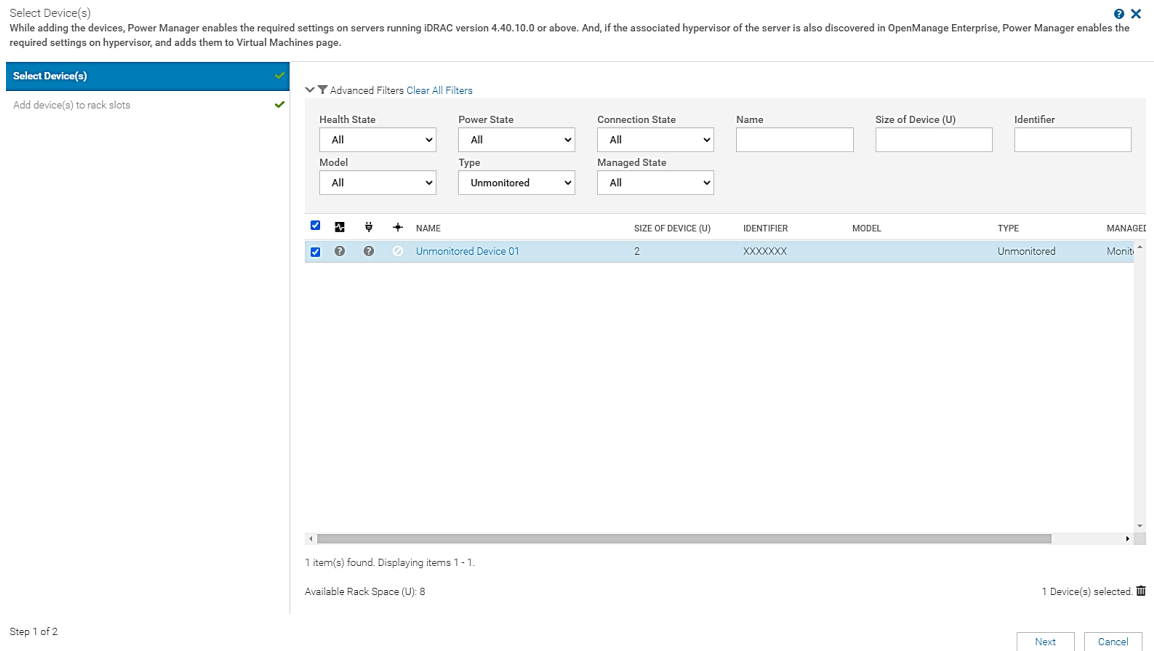


Figure 26 Add to Rack Slot (Unmonitored devices)– Select Device(s)

The API to returns rack capable devices is:

<https://<IP>/api/PowerService/PhysicalGroups/CapableDevices>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

5. In **Add device(s) to rack slots**, by default, the devices are automatically added in the available slots in the rack. To add a device at a specific slot, select the **Auto** drop-down menu and select the required slot.

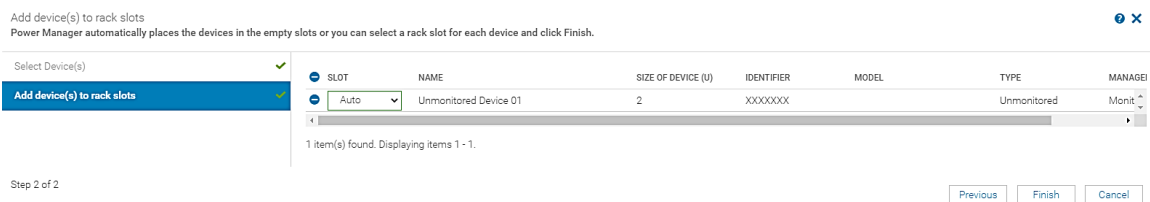


Figure 27 Add to Rack Slot (Unmonitored devices) – Add device(s) to rack slot

6. Click **Finish**. The devices that are added are graphically displayed on the **Manage Rack** page.

The API to add a device as a member to a physical group at the rack level:

<https://<IP>/api/PowerService/PhysicalGroups/Actions/PhysicalGroup.AddMemberDevices>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.



## Adding devices in physical groups

Manage Rack  
Add devices to specific rack slots, rearrange devices within a rack, remove devices from a rack, and associate supported devices with a rack.

Rack Details Associated Devices

Add to Rack Slot Rearrange Rack Move Device To Another Rack Remove Device(s) From Rack

Space Capacity: 13 of 21 U is used

SLOT	NAME	IDENTIFIER	TYPE	HOSTNAME	MODEL
21					
20					
19					
18					
17					
16					
15					
14					
13					
12	Unmonitored Device 0...	XXXXXXXX	Unmonitored		
11	OS10		Network Switch	OS10	MX5108NON
10	AX740XD4ZOSN0.wacdev...		Compute	AX740XD4ZOSN0.wacdev...	AX-740xd
9					

Close

Figure 28 Manage rack – Unmonitored device

### 3.4 Associating a discovered PDU with a rack

A discovered rack Power Distribution Unit (PDU), or a power strip, can be associated with a rack. A rack can have more than one PDUs associated with it. Power-related metrics are automatically monitored from capable PDUs post association. This acts as an alternate source of power consumption data for the rack.

1. Click **PLUGIN GROUPS > Physical Hierarchy > Rack > Manage Rack** option to Manage Rack.
2. For associating discovered PDU with the rack in OpenManage Enterprise, click **Associate Device** tab, and click **Associate to Rack**.

Manage Rack  
Add devices to specific rack slots, rearrange devices within a rack, remove devices from a rack, and associate supported devices with a rack.

Rack Details Associated Devices

Associate to Rack Remove Device(s)

<input type="checkbox"/>	NAME	IDENTIFIER	MODEL	TYPE	POWER RATING	OUTLET COUNT	MANUFACTURER	HARDWARE REVIS...	FIRMWARE VERSION
--------------------------	------	------------	-------	------	--------------	--------------	--------------	-------------------	------------------

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

Close

Figure 29 Associate Devices

3. In the **Select Device(s)** section, select the devices and click **Next**.

## Adding devices in physical groups

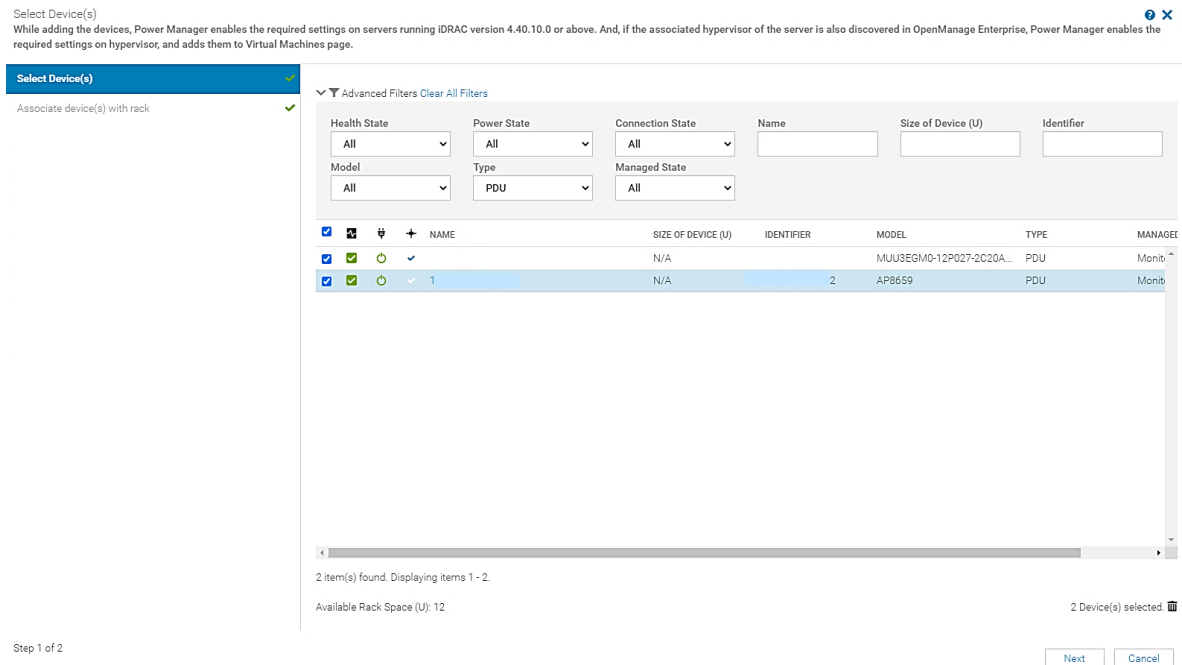


Figure 30 Associating PDUs to physical rack

The API to return rack capable devices: <https://<IP>/api/PowerService/PhysicalGroups/CapableDevices>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

4. In the **Associate device(s) with rack** section, by default the slot is N/A.

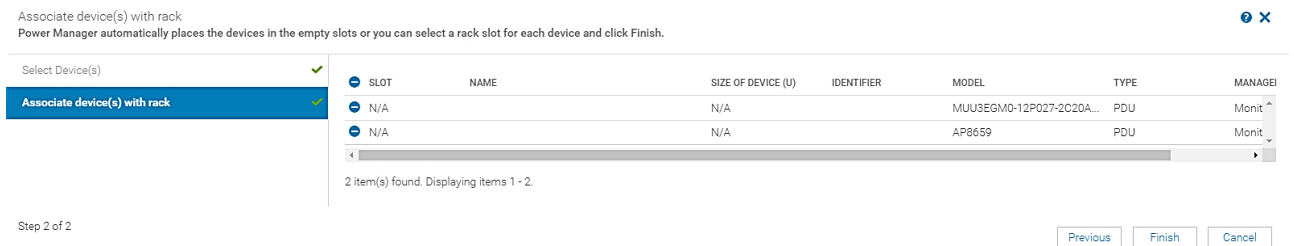


Figure 31 Associate Device(s) with rack

The API to add a device as a member to a physical group at the rack level:

<https://<IP>/api/PowerService/PhysicalGroups/Actions/PhysicalGroup.AddMemberDevices>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

5. Click **Finish**.
6. The devices that are added are graphically displayed on the **Manage Rack > Associative Devices** tab.

## Adding devices in physical groups

Manage Rack  
Add devices to specific rack slots, rearrange devices within a rack, remove devices from a rack, and associate supported devices with a rack.

Rack Details **Associated Devices**

Associate to Rack Remove Device(s)

<input type="checkbox"/>	NAME	IDENTIFIER	MODEL	TYPE	POWER RATING	OUTLET COUNT	MANUFACTURER	HARDWARE REVIS...	FIRMWARE VERSION
<input type="checkbox"/>	1		MUU3EGM0-12P027-2C20A...	PDU	N/A	12	Vertiv	gmmb	5.6.1
<input type="checkbox"/>	1		AP8659	PDU	N/A	24		02	6.5.6

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

Close

Figure 32 Associate Device(s) list

The API to return all the PDU devices that are associated to a specific rack:

<https://<IP>/api/PowerService/PhysicalGroups/GroupDetails<id>/AssociatedDevices>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

---

**Note:** Ensure that the PDU devices are discovered in OpenManage Enterprise.

---

## 4 Creating physical group through CSV file

This section is about how to create a physical hierarchy by importing a pre-populated CSV file. Creating numerous groups and adding devices to the physical groups is a time-consuming process for an existing data center using the User Interface. Hence, it is helpful for automating the group creation process for a medium to large scale datacenters. You can replicate the data center structure in a CSV file and import this file in Power Manager to create the physical hierarchy and add the devices to the groups. Also, you can re-import the CSV file when the group is updated to reflect the latest datacenter structure.

Consider the following points before creating and importing the CSV file:

- Only Administrators can import the CSV files.
- OME or PMP can check that the devices mentioned in the .csv are pre-discovered in OME.

Ensure that the physical group you are creating adheres to the hierarchy as follows:

Table 4 Physical group supported hierarchies

Physical group	Supported hierarchies
Data Center	Room, Aisle, Rack
Room	Aisle, Rack
Aisle	Rack
Rack	NA

- When creating a rack in a physical group, ensure that you provide the rack name, power capacity, and space capacity.
- Each physical group and their siblings in a physical group hierarchy are identified by a unique name.
- To add a device in a physical group:
  - Ensure that only one device details are entered in each row. A device is identified by a unique identifier. Because the identical devices are ignored while importing, and only the devices with unique identifiers are added in a rack slot.
  - To place the device in a particular slot, ensure that you provide the rack slot information.
- When you are considering multiple device allocations on the same physical group hierarchy, you can duplicate the fields. However, only the rack slot and device identifier are the unique fields.
- View details about the import job by selecting the **Physical Group CSV Import Task** job on the **Jobs** page. You can view the status about each row added in the file on the **Execution Details** page.

### 4.1 Sample CSV File

The following image is an example of the supported format of a CSV file:

	A	B	C	D	E	F	G	H
1	DATACENTER	ROOM	AISLE	RACK	POWER CAPACITY	SPACE CAPACITY	SLOT	DEVICE IDENTIFIER
2	DC_ADC	ROOM1	AISLE1	RACK1	1500	21	1	C
3	DC_ADC	ROOM1	AISLE1	RACK2	2000	24	5	
4	DC_BDC	ROOM1	AISLE1	RACK1	1500	21	1	HC.....
5	DC_BDC	ROOM1	AISLE1	RACK2	2000	24	5	B.....

Figure 33 Sample CSV file format

The following table lists all the field names of the CSV file and their descriptions:

Table 5 Description of the CSV columns

Column Name	Description
DATACENTER	Data center Name
ROOM	Room Name
AISLE	Aisle Name
RACK	Rack Name
POWER CAPACITY	Rack Power Capacity
SPACE CAPACITY	Rack Space Capacity
SLOT	Rack Slot Number
DEVICE IDENTIFIER	Device Identifier or Service Tag

## 4.2 Importing physical hierarchy from CSV file

1. Launch **OpenManage Enterprise** and click **Plugins > Power Management > Power Manager Devices>Physical Groups**. The **Power Manager Devices** tab is displayed.

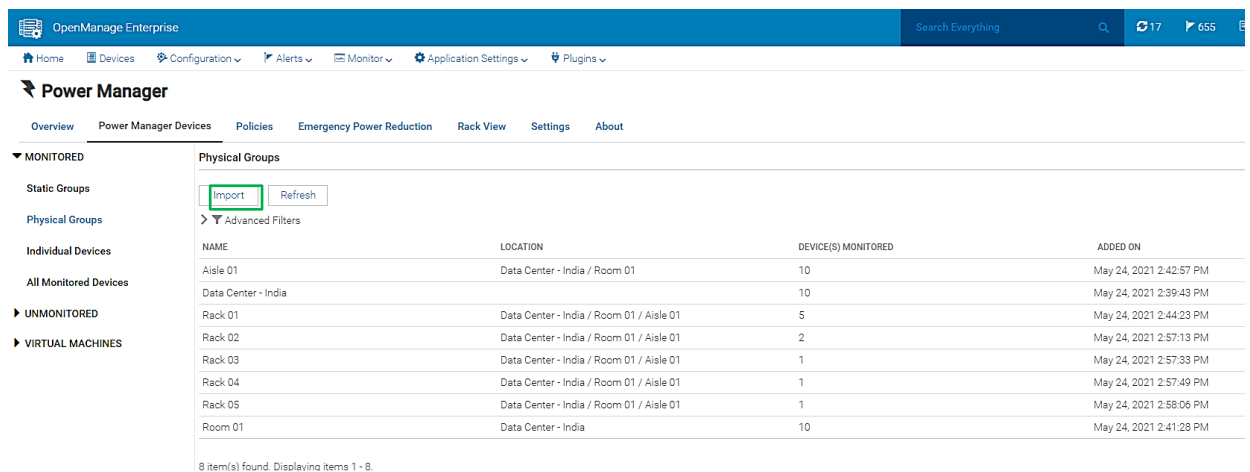


Figure 34 Physical group list

2. Click **Physical Groups**, and then click **Import**. The **Import physical groups from CSV file** page is displayed.

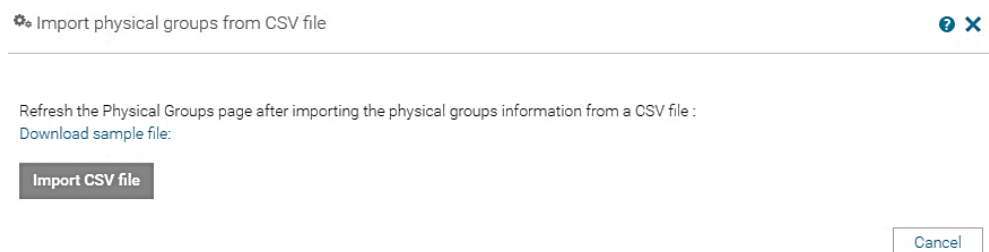


Figure 35 Import physical groups from CSV file

3. Optional: To view the format of the CSV file, click **Download sample file**. A sample CSV file is downloaded which you can use as a reference for adding the groups information.
4. To upload the CSV file and create the physical groups, click **Import CSV file**. The groups are created successfully after importing the CSV file for valid entries.

## 5 Reorganizing devices in physical groups

This section is about how to move devices within a rack or across racks to reflect physical movements in data center. To keep physical structures up to date in the console to get accurate results.

### 5.1 Moving devices within a rack

This operation is to keep the physical group structure aligned to the data center when a device is physically moved from one rack slot to another.

1. Click **PLUGIN GROUPS > Physical Hierarchy > Rack > Manage Rack** option to Manage Rack.
2. Click **Rearrange Rack**. The **Update Rack Slots** page is displayed.

Manage Rack  
Add devices to specific rack slots, rearrange devices within a rack, remove devices from a rack, and associate supported devices with a rack. ⓘ ✕

**Rack Details**   **Associated Devices**

Space Capacity: 7 of 21 U is used

SLOT	NAME	IDENTIFIER	TYPE	HOSTNAME	MODEL
13					
12					
11					
10					
9					
8					
7	5		Compute		PowerEdge R320
6	1c		Compute	iDRAC-CFCF0C3	PowerEdge R740
5					
4	1		Compute	iDRAC-BFCF0C3	PowerEdge R740
3					
2	idrac-1W43F02		Compute	W	PowerEdge R720
1					

Figure 36 Manage rack with selected devices

3. To change the slot for a device, click the drop-down menu and select an empty slot.

Update Rack slots  
Update the rack slot of the device using the drop-down menu. ⓘ ✕

SLOT	NAME	SIZE OF DEVICE (U)	IDENTIFIER	MODEL	TYPE	MANAGED STATE
7		1		PowerEdge R320	Compute	Managed
1	idrac-1W43F02	2		PowerEdge R720	Compute	Monitored
3		2		PowerEdge R740	Compute	Managed
9		2		PowerEdge R740	Compute	Managed

4 item(s) found. Displaying items 1 - 4.

Figure 37 Update rack slots

4. Click **Finish**. The device slot is updated.

The API to update physical group member rack slots is:

<https://<IP>/api/PowerService/PhysicalGroups/Actions/PhysicalGroup.UpdateSlots>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

## 5.2 Moving devices across racks

This operation is to keep the structure aligned when a device is physically moved from one rack to another rack.

1. Click **PLUGIN GROUPS > Physical Hierarchy > Rack > Manage Rack** option to Manage Rack.
2. Locate the device that you want to move using the vertical scroll bar of the rack and select the device.

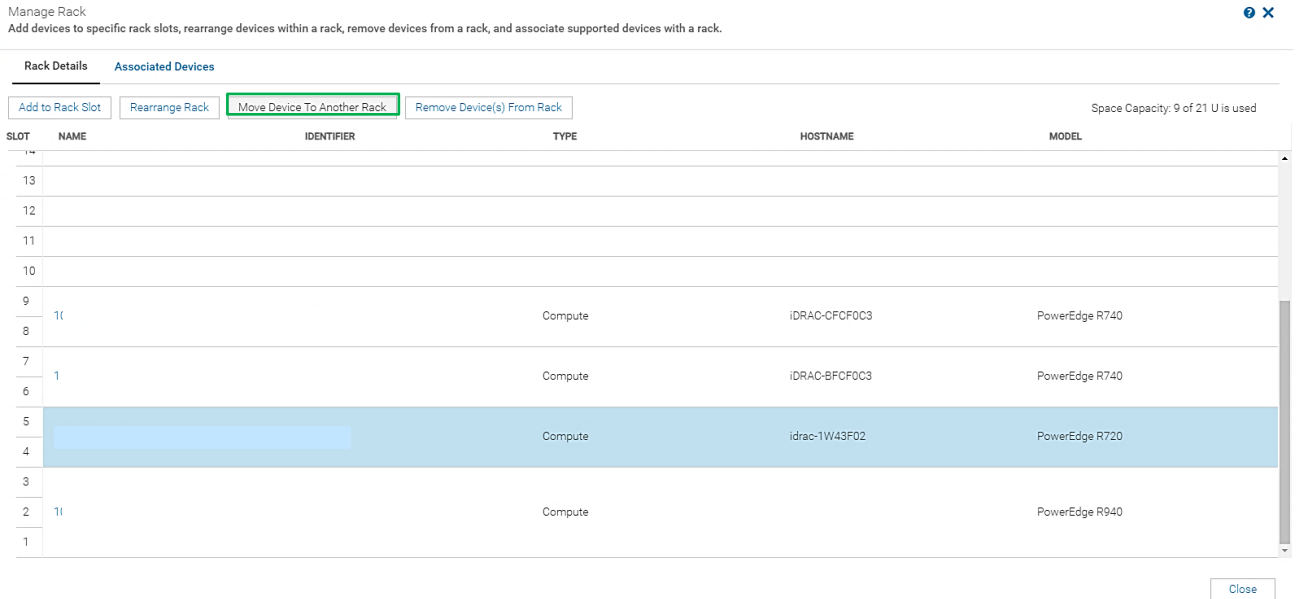


Figure 38 Manage Rack

3. Click **Move Device to Another Rack**. The **Select Group** page is displayed to select the rack to move the devices.

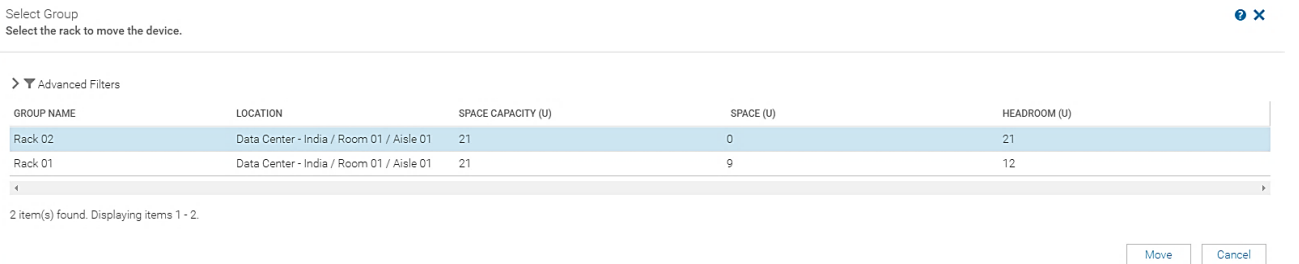


Figure 39 Select group

4. Click **Move** to move the device to another rack.

The API to move a device to another rack is:

<https://<IP>/api/PowerService/PhysicalGroups/Actions/PhysicalGroup.MoveDevice>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

**Note:** If there is any EPR on the group and the device is removed from the group, then the EPR is also deleted from the moved device.

---

**Note:** If there is an EPR on the destination group, then the movement of the device to this group is blocked.

---



## 6 Removing devices from physical groups

This section explains about how to remove devices from rack physical groups. This is important when you are decommissioning the devices in a data center.

1. Click **PLUGIN GROUPS > Physical Hierarchy > Rack > Manage Rack** option to Manage Rack.
2. Locate the device that you want to move using the vertical scroll bar of the rack and select the device(s).

### 6.1 Removing a device from a rack

This operation is to remove a device from a rack after it is decommissioned.

1. Click **PLUGIN GROUPS > Physical Hierarchy > Rack > Manage Rack** option to Manage Rack.

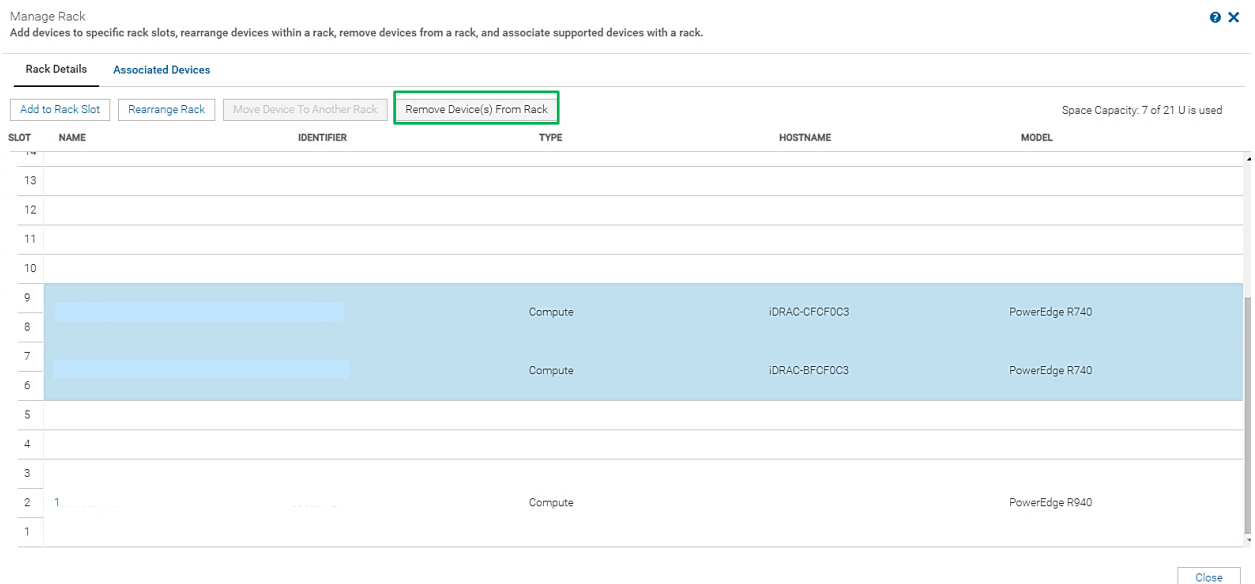


Figure 40 Manage rack with selected device(s)

2. Click **Remove Device(s) From Rack**.
3. In the confirmation page, click **Yes**. The devices are removed from the rack.

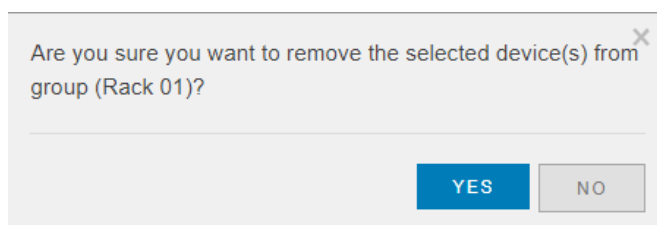


Figure 41 Remove Device(s) – confirmation box

The API to remove a device from rack is:

<https://<IP>/api//PowerService/PhysicalGroups/Actions/PhysicalGroup.RemoveMemberDevices>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

**Note:** If you have applied an Emergency Power Reduction (EPR) on the device or a group, then you cannot remove the device or group from Power Manager.

**Note:** When the device is removed from the rack, it is still monitored in Power Manager if it is added as an individual device in Power Manager.

## 6.2 Disassociating a PDU from a rack

This operation is to remove the association of a PDU with a rack after it is physically removed from a rack. A PDU is removed from a rack if it is being decommissioned or if it is associated with another rack in the data center.

1. Click **PLUGIN GROUPS > Physical Hierarchy > Rack > Manage Rack** option to Manage Rack
2. Click **Manage Rack** wizard to add devices to specific rack slots, rearrange devices within a rack, remove devices from a rack, and associate supported devices with a rack.
3. To disassociate a discovered PDU with a rack in OpenManage Enterprise, click **Associate Device** tab.

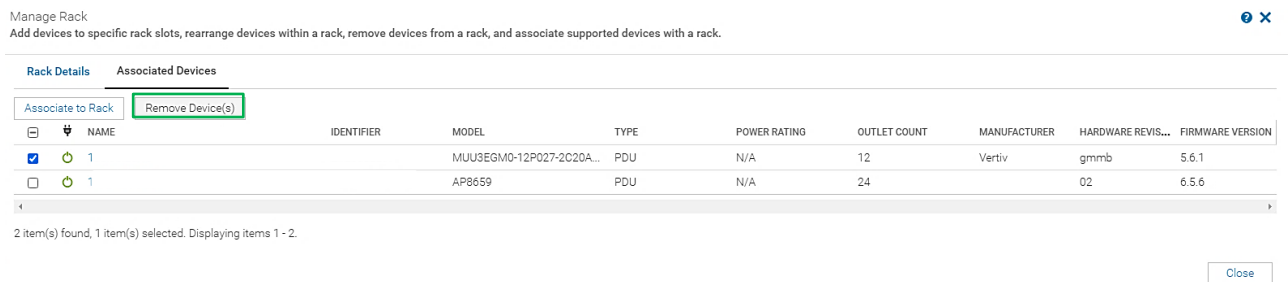


Figure 42 Associative device list

The API to view all the PDU devices that are associated to a specific rack:

[https://<IP>/api/PowerService/PhysicalGroups/GroupDetails\(GroupID\)/AssociatedDevices](https://<IP>/api/PowerService/PhysicalGroups/GroupDetails(GroupID)/AssociatedDevices)

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

1. Select the PDU's from the list and click **Remove Devices**.
2. In the confirmation page, click **Yes**. The devices are disassociated from the rack.

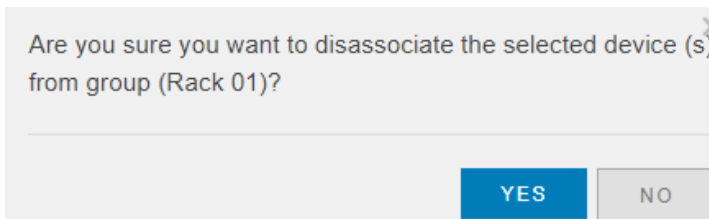


Figure 43 Disassociate device - confirmation box

The API to remove device from a physical group at the rack level:

<https://<IP>/api/PowerService/PhysicalGroups/Actions/PhysicalGroup.RemoveMemberDevices>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

## 7 Visualizing Headroom and Underutilized Racks

This section is about how power and space headroom can be observed in physical groups. This helps to determine current density of infrastructure devices in a data center. The information also helps in data center planning activities by clearly highlighting the available power and space at each group hierarchy level.

### 7.1 Visualizing power and space headroom in Group Details

1. Click **PLUGIN GROUPS > Physical Hierarchy > Rack**.
2. Click **Group Details** tab, and then click **Headroom** tab.
3. Headroom has two sections that show the **Power Headroom** and **Space Headroom**. The **Power Headroom** shows the used and available power capacity. And, the **Space Headroom** shows the used and available space capacity rack.

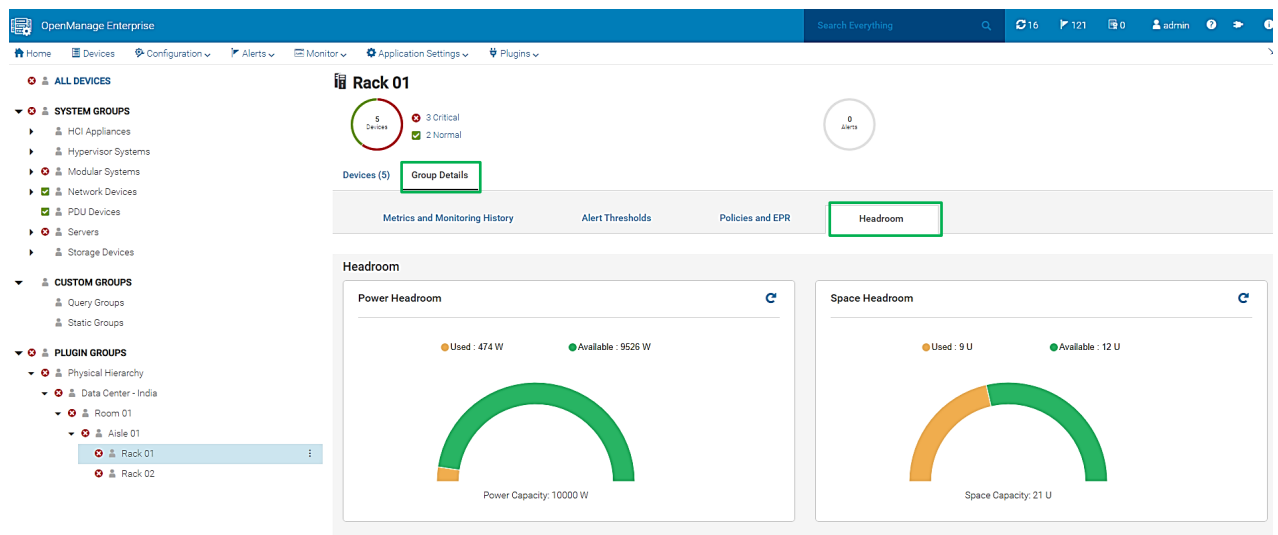


Figure 44 Power and space headroom – group details

The API to view all the devices such as supported and unsupported or either of them under the physical group in a rack: [https://<IP>/api/PowerService/PhysicalGroups/GroupDetails\(<GID>\)/Devices](https://<IP>/api/PowerService/PhysicalGroups/GroupDetails(<GID>)/Devices)

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

### 7.2 Visualizing power and space headroom in overview page

1. Launch OpenManage Enterprise, and then click **Plugins > Power Management > Overview**.

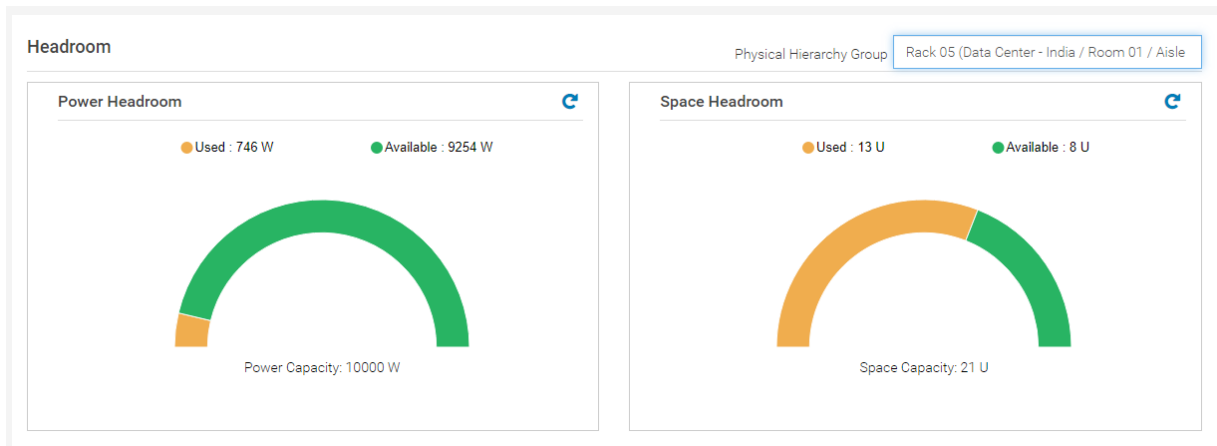


Figure 45 Power and space headroom – Overview page

### 7.3 Visualizing top 10 underutilized racks for power

This dashlet provides information about the racks that are consuming minimum power among all the racks available in Power Manager. This information is useful to identify those racks which can host more devices. This information is useful to move devices across racks reducing the burden on other racks that have the highest power consumption.

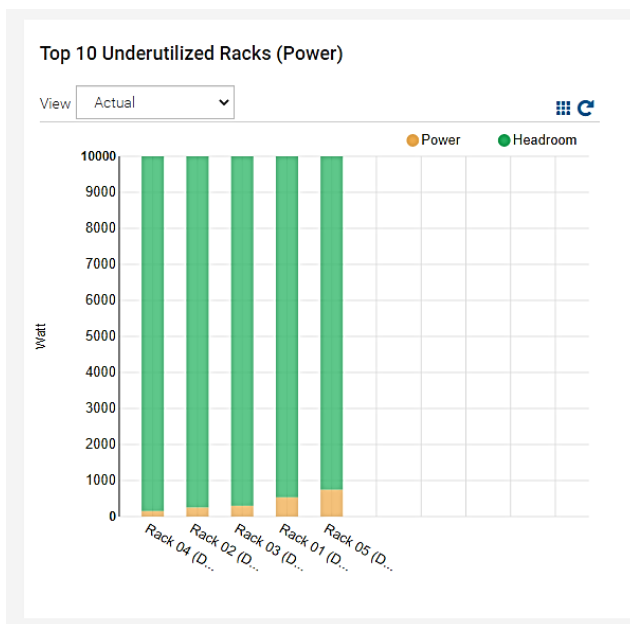


Figure 46 Top 10 underutilized racks (for power)

### 7.4 Visualizing top 10 underutilized racks for space

This dashlet provides information about the racks that are consuming minimum space in the data center. This information is useful to perform capacity planning and to identify the racks that have the capacity to accommodate more devices. This is especially useful when you are planning to purchase more devices for the data center.

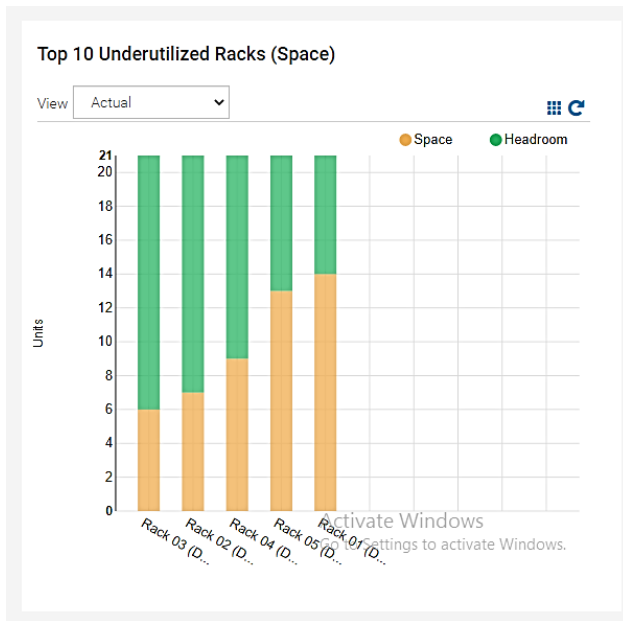


Figure 47 Top 10 underutilized racks (for space)

## 8 Visualizing racks of physical groups

This section explains about how to view all racks within a physical group. It provides a bird's eye view of data center structure making it easy to perform various operations on racks and constituent devices.

1. Launch OpenManage Enterprise, and then click **Plugins > Power Management > Rack View**. The **Rack View** tab is displayed.

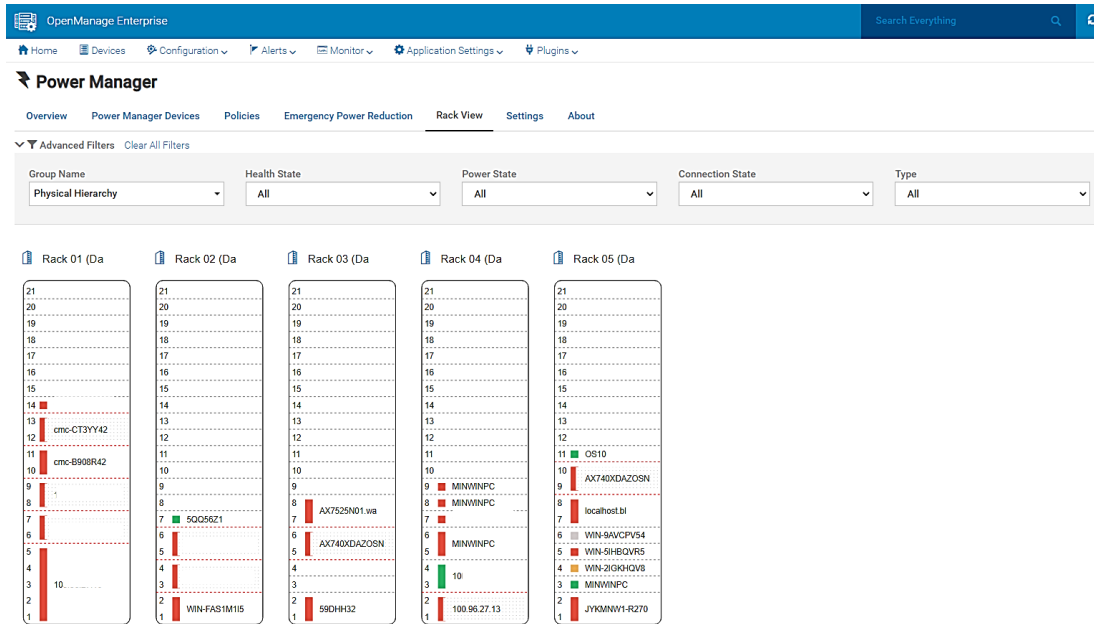


Figure 48 Rack View

2. Click **Rack Name** to expand the Context Menu with **Manage Rack**, **Group Details** and **Create Policy**.

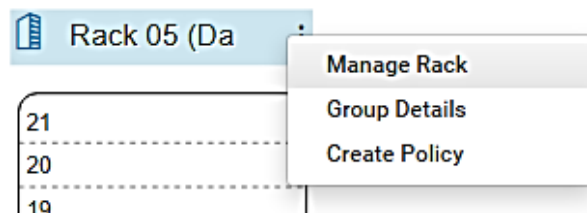


Figure 49 Rack view options

3. Mouse hover to the **Rack Name**. A tooltip is displayed with details about the rack name with hierarchy, and the number of monitored and unmonitored devices.

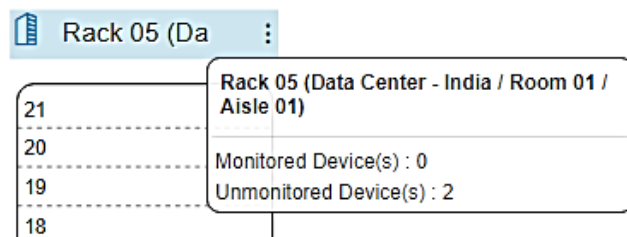


Figure 50 Rack view – rack details tooltip

4. Mouse hover a **Device**. A tooltip is displayed with details about the device name, model, type and average power.

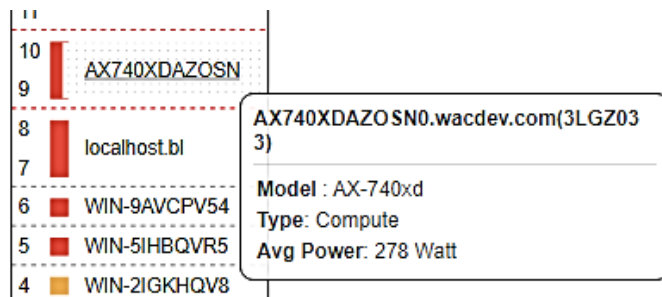


Figure 51 Rack view – device details tooltip

---

**Note:** Some devices that are part of a physical group do not have a link because, the device is not supported in Power Manager.

---

---

**Note:** If you are logging in as a Device Manager, only the device groups and devices that are in your scope are available for viewing and management. For example, if you are logging in as a Device Manager DM1 user, you can view only the devices and groups that are assigned to a Device Manager DM1 user.

---

## 9 Deleting physical groups

This section explains about how to delete a physical group from the console. You can delete a group from Power Manager console when they no longer exist in the data center or if they were created for trial purposes.

1. Click **PLUGIN GROUPS > Physical Hierarchy >Delete Group** option to launch the Confirmation box.

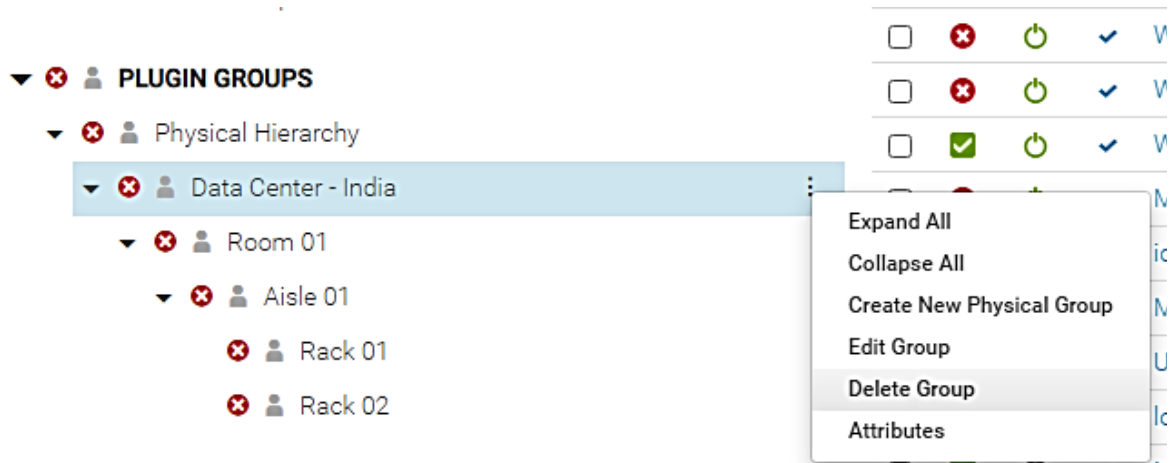


Figure 52 Delete physical group

2. Click **Yes** to delete the physical group.

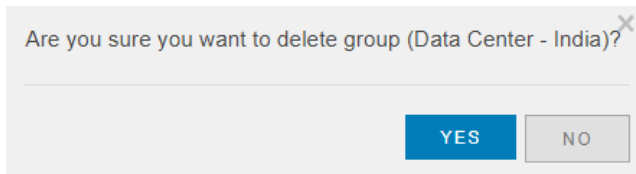


Figure 53 Delete group - confirmation box

The API to delete a group is: <https://<IP>/api/GroupService/Actions/GroupService.DeleteGroup>

For more information about the Power Manager APIs, see the OpenManage Enterprise Power Manager API document available on the support site.

---

**Note:** Ensure that **Emergency Power Reduction (EPR)** is disabled on the physical group.

---



## 10 Physical group reports

These reports are by default that is displayed after installing Power Manager. This report contains predefined parameters which when run gives device data over a certain time interval.

### 10.1 Physical group report for space headroom

- **Type:** Built-In
- **Description:** This report contains space headroom detail of physical groups added in Power Manager.
- **Advantages:** The benefit of this report is to know the space headroom information. You can use it for capacity planning in a data center.

Below is a sample of the report run:

Reports > Power Manager: Space Headroom Report for Physical Groups

[Download](#) [Email](#)

Power Manager: Space Headroom Report for Physical Groups					Jun 11, 2021 8:00:41 PM
Description: This report contains space headroom detail of physical groups added in Power Manager					
GROUP NAME	LOCATION	TOTAL SPACE (U-SIZE) ...	UTILIZED SPACE (U-SIZ...	UTILIZATION PERCENT...	
Room 01	Data Center - India	105	49	46.67	
Aisle 01	Data Center - India / R...	105	49	46.67	
Rack 02	Data Center - India / R...	21	7	33.33	
Rack 04	Data Center - India / R...	21	9	42.86	
Rack 01	Data Center - India / R...	21	14	66.67	
Rack 03	Data Center - India / R...	21	6	28.57	
Rack 05	Data Center - India / R...	21	13	61.90	
Data Center - India		105	49	46.67	

8 item(s) found. Displaying items 1 - 8.

Figure 54 Space headroom report for physical group space headroom details

### 10.2 Physical group report for power usage

- **Type:** Built-In
- **Description:** This report contains overall power usage, and available headroom of physical groups added in Power Manager.
- **Advantages:** The benefit of this report is to know the power headroom. You can use it in capacity planning.

The following is a snippet after running the report:

Reports > Power Manager: Power Headroom Report for Physical Groups

[Download](#) [Email](#)

Power Manager: Power Headroom Report for Physical Groups					Jun 11, 2021 8:03:57 PM
Description: This report contains overall power usage and available headroom for Physical groups added in Power Manager					
GROUP NAME	LOCATION	ALLOCATED POWER (W...	STRANDED POWER (W...		
Room 01	Data Center - India	100000	97539		
Aisle 01	Data Center - India / R...	100000	97539		
Rack 02	Data Center - India / R...	10000	9722		
Rack 04	Data Center - India / R...	10000	9786		
Rack 01	Data Center - India / R...	10000	9306		
Rack 03	Data Center - India / R...	10000	9578		
Rack 05	Data Center - India / R...	10000	9147		
Data Center - India		100000	97539		

8 item(s) found. Displaying items 1 - 8.

Figure 55 Space headroom report for physical group power usage

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**Note:** If you are logging in as a Device Manager, only the device groups and devices that are in your scope are available for viewing and management. For example, if you are logging in as a Device Manager DM1 user, and a group G1 is assigned to the Device Manager DM1 user, you can view only the devices in the G1 group.

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## 11 Conclusion

Using this white paper that one can easily create and maintain physical structure of a data center in OpenManage Enterprise console and Power Manager. And, the benefits of using these features are covered.

## 12 Technical support and resources

[Dell.com/support](https://dell.com/support) is focused on meeting customer needs with proven services and support.

### 12.1 Related resources

- Knowledge Base for Dell EMC OpenManage Enterprise [Link](#).
- Knowledge Base for Dell EMC OpenManage Enterprise Power Manager [Link](#).
- Dell EMC OpenManage Enterprise Power Manager Version 2.0 User's Guide [Link](#).
- Dell EMC OpenManage Enterprise Power Manager RESTful API Guide version 2.0 [Link](#).
- Dell EMC OpenManage Enterprise Power Manager 2.0 Release Notes [Link](#).