Dell OpenManage Power Center-A way to utilize rack(s) space and power efficiently

Guide to utilize rack(s) space and power in the most efficient way using Dell OpenManage Power Center

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Executive summary

Dell™ OpenManage™ Power Center™ (OMPC) along with Dell iDRAC7™ Enterprise brings a new level of control and effectiveness to space and power management in a data center. Using this tool, the data center administrator can finally resolve challenges such as overuse and mismanagement of server power, brownouts, loss of cooling, and underutilization of rack space.

Engineers at Dell Product Group, in collaboration with Intel®, have developed the OMPC application that can be used by data center administrators to manage the space and power utilization in the racks. The tool enables you to monitor and manage the space and power utilization in the racks by identifying underutilized rack(s) with respect to both available space and unused power.

This white paper focuses on how the OMPC tool can be used to monitor and manage space and power utilization in a rack to get optimal results.

OMPC provides real-time, 24x7 graphical representation of space and power being utilized in a rack under its rack utilization section. Additionally, all critical alerts with respect to space and power utilization and an integrated reporting feature that helps to generate rack power consumption reports make this a perfect supervisor to deal with poor space and power management of rack(s). The tool helps to increase server count per rack, which eventually enhances the ROI.

Dell OpenManage Power Center provides the following mechanism to deal with poor space and power management of rack(s):

- Graphical representation of free versus used rack(s) space under data center, room, and aisle
- Graphical representation of free versus used rack(s) power under data center, room, and aisle
- Generation of critical events with respect to rack(s) power consumption
- 24x7 real time monitoring of underutilized rack(s) with respect to space
- 24x7 real time monitoring of underutilized rack(s) with respect to power
- Integrated reporting module to generate reports for rack(s) consuming maximum power
- Integrated reporting module to generate reports for rack(s) consuming least power

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The following is a high-level overview of the various sections in the white paper:

- Section 2: Provides an overview of OMPC
- Section 3: Describes what initial setups are required before OMPC starts monitoring space and power utilization
- Section 4: Describes all the features that make space and power management possible
- Section 5: Provides a use case that uses OMPC
- Section 6: Summarizes the overall solution and explains why Dell OpenManage Power Center is the best tool to deal with poor space and power management of rack(s).

1   Introduction

OMPC is an extension to the Dell OpenManage Enterprise Console™ which connects to Dell PowerEdge™ R/T/M-Series servers with Intel® Node Manager. The system administrator authenticates access to these devices through the integrated Dell Remote Access Controller (iDRAC) Version 7. OMPC provides real time space, power and thermal monitoring for up to four-thousand servers in a data center.

In short, OMPC enables data center administrators to manage rack space and power consumption by providing real time data about space and power utilization in the racks. Administrators can use this data to formulate new methods to optimize space and power usage in the data center.

1.1   Scope

This white paper explains how OMPC can help data center administrators to utilize rack space and power in the most efficient way.

1.2   Audience

This white paper is intended for IT professionals and administrators who have deployed or are planning to deploy Dell OpenManage Power Center, which can monitor space and power consumption of rack(s).

This white paper provides an overview of how OMPC can be used to deal with poor space and power management of rack(s). However, the reader is expected to have sufficient understanding of a data center, aisle, room(s), rack(s) and server(s).

2   Initial infrastructure setup for space and power management

For a proper space and power management, data center physical layout should be defined in the tool which means room(s), aisle(s) and rack(s) has to be arranged in an organized manner. A well-defined room(s), aisle(s) and rack(s) arrangement within a data center helps in computing power consumption and headroom values accurately (An accurately modelled data center is key towards monitoring and managing space and power consumption with respect to rack(s)).

3   OMPC features: supporting space and power management

Once the device(s) are allocated in the rack(s), the below OMPC features assist the data center administrators to monitor and manage the space and power utilization of racks, thus helping them to have an optimum device count per rack. This, in turn, leads to an enhanced ROI. Let's have a look at these features one by one:

3.1   Space utilization graph

Dell OpenManage Power Center allows data center administrators to view graphical representation of rack utilization with respect to space and power consumption. This information helps in determining the available space and unused power within specific rack(s) that can be further used at the time of adding new device(s).

OMPC allows administrators to view graphical representation of different aspects of rack utilization:

- Used space versus Unused space among the rack(s)
- Used power versus Unused power among the rack(s)

Figure 1 shows rack wise space utilization graph with respect to used versus unused space.

For example, consider a situation where you have added a rack "DC3RK5" of size 21 U and added 4 devices in the rack, each occupying 1 U of space. Then by looking at the below graph, you can clearly say that 4 U of space is being used by DC3RK5 and 17 U of space are available for use.

Figure 1 Rack wise space utilization graph showing used versus unused space

If you look at the above graph [second rack from the left], you can clearly identify that 17 U of headrooms (unused space) are still available in rack DC3RK5. Hence, there is scope to allocate more devices to this rack.

3.2   Power utilization graph

Figure 2 shows rack wise power utilization graph representing used versus unused power.

For example, consider that you have created a rack "DC3RK5" and allocated 5000 W (Watt) to the rack. Then by looking at the below graph you can clearly say that out of 5000 W, DC3RK3 has used 4299 W and still 701 W remaining, which can be utilized by other devices.

Figure 2 Rack wise power utilization graph showing used versus unused power

If you look at the graph [2nd rack from the left], you can see headroom of 701 watt(s) are still available in rack DC3RK3. Hence, more devices can be added to this rack.

3.3 Underutilized rack(s) view with respect to space

The Underutilized Racks section in the OMPC home page contains details of all underutilized racks in which the power capacity and rack space remain unused. Clicking Actual or Percentage will arrange the rack(s) by the actual or utilization percentage of power and rack space.

Figure 3 below shows rack(s) where space are available

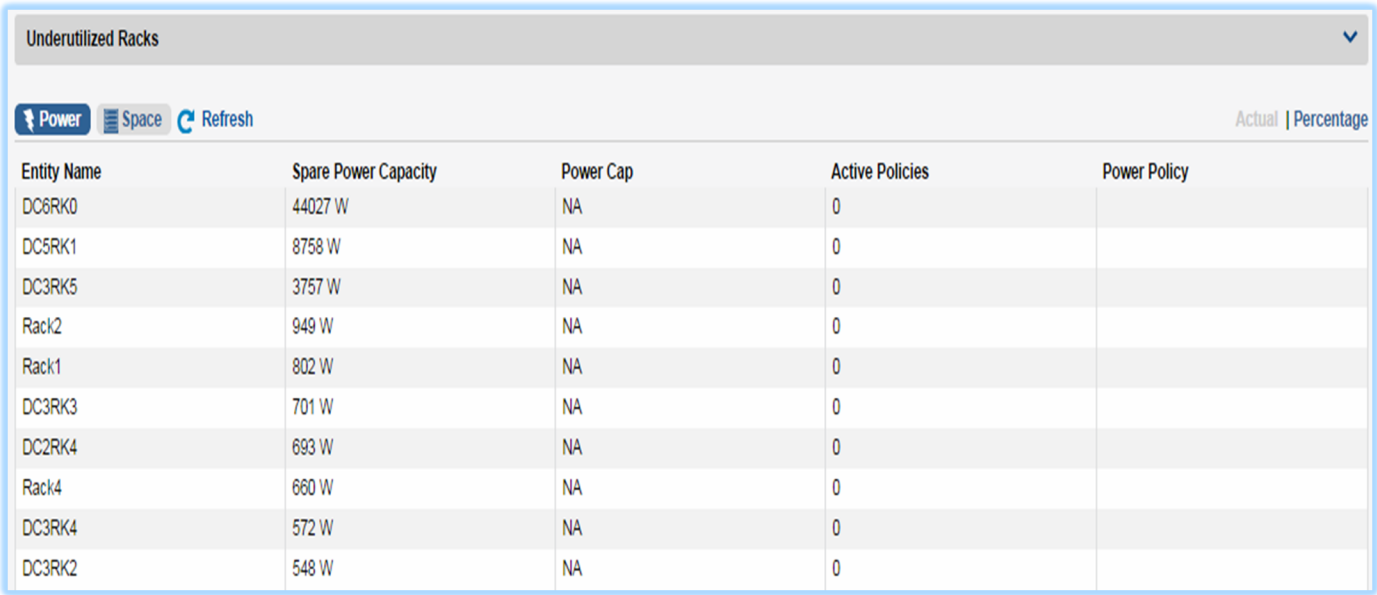| Entity Name	Spare Capacity	Power Cap	Active Policies	Power Policy
DC6RK0	44U	NA	0	
Rack4	22U	NA	0	
Rack1	22U	NA	0	
Rack3	22U	NA	0	
DC5RK1	22U	NA	0	
DC3RK1	21U	NA	0	
DC3RK5	17U	NA	0	
DC2RK3	7U	NA	0	
DC3RK2	5U	NA	0	
DC2RK1	4U	NA	0	

Figure 3 Underutilized rack(s) with respect to available space

Here you can easily view rack(s) which are being least used with respect to space and can be utilized further for newly brought in servers as well as for migrating servers from loaded rack(s).

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3.4 Underutilized rack(s) view with respect to power

OMPC allows you to view the names of the rack(s) where power remains unused. Clicking Actual or Percentage link will display the rack(s) by the actual or utilization percentage with respect to rack power.

Figure 4 shows rack(s) where power is available

Entity Name	Spare Power Capacity	Power Cap	Active Policies	Power Policy
DC6RK0	44027 W	NA	0	
DC5RK1	8758 W	NA	0	
DC3RK5	3757 W	NA	0	
Rack2	949 W	NA	0	
Rack1	802 W	NA	0	
DC3RK3	701 W	NA	0	
DC2RK4	693 W	NA	0	
Rack4	660 W	NA	0	
DC3RK4	572 W	NA	0	
DC3RK2	548 W	NA	0	

Figure 4 Underutilized rack(s) with respect to unused power

Here you can view the rack(s) which are being least used with respect to power and can be utilized further for newly brought in servers as well as for migrating servers from loaded rack(s).

3.5 Generating power utilization reports

Using Dell OpenManage Power Center, racks power consumption reports can be generated as described below:

The Power Hoarders Rack report displays the rack devices that are the maximum power consumers. The result is calculated based on the lowest headroom of the devices over a specific time period.

The Power Frugal Rack report displays the rack devices that are the least power consumers. The result is calculated based on the highest headroom of the devices over a specific time period.

These reports can be downloaded and shared across stakeholders for their feedback and will help in decision making and further rack management planning.

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4 A simple use case using OMPC

4.1 Act as a decision maker while allocating device(s)

Consider a scenario where a data center administrator has to allocate 100 new device(s) to existing rack(s). Here OPMC will play a vital role while allocating these device(s) in the most efficient rack(s) with respect to power and space by looking at the below parameters:

- By viewing the underutilized rack(s) section at OMPC dashboard with respect to space, admin will get an idea about where [in which rack] unused space is available.
- By viewing the underutilized rack(s) section at OMPC dashboard with respect to power, admin will get an idea where [[in which rack] unused power is available.
- By viewing the rack utilization section, admin can track used versus unused space graph either Data center-wise, Room-wise, and Aisle-wise and decision can be made where to add the newly available servers.
- By viewing the rack utilization section, admin can track used versus unused power graph either Data center-wise, Room-wise, Aisle-wise and decision can be made where to put newly available servers.
- By viewing the events section, all critical events with respect to racks power consumption are logged that are very helpful in finding racks consuming unnecessary power.
- By viewing the reports section, reports for least/maximum power consuming racks can be generated and analyzed.

The above features provided by OMPC enable a data center administrator to take sound decisions with respect to allocation of devices in each rack, based on the available space and power consumption units in the racks. OMPC helps administrators do all this, without manual intervention by way of physically checking each server.

5   Solution summary

By tracking and reporting space and power usage in the racks, OMPC helps to identify the anomalies with respect to space and power consumption and reassign underutilized servers or those that are approaching maximum capacity. This helps you to maximize the server count per rack and have a more dense data center, thus leading to a huge reduction in your IT costs and a rise in your ROI.

A   Additional resources

Support.dell.com is focused on meeting your needs with proven services and support.

DellTechCenter.com is an IT Community where you can connect with Dell Customers and Dell employees for the purpose of sharing knowledge, best practices, and information about Dell products and installations.

For more details, visit:

- http://www.dell.com/powercenter
- http://www.delltechcenter.com/powercenter