



VM Power Mapping with OpenManage Power Center (OMPC) 4.0

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SUMMARY

To date in the x86 space, tracking power consumption at the level of individual VM's on a server has not been possible. Power charges are consequently spread evenly to all VMs on the server. This results in lower than proportional allocations to some VMs, higher than proportional charges to others.

VM Power Mapping, new in **OMPC 4.0**, overcomes this issue by tracking power consumption of the individual VMs, enabling System Administrators to better:

- 1) balance workloads
- 2) identify power issues or spikes
- 3) provide accurate power consumption chargebacks to users

Tracking power consumption in virtualized servers

Server virtualization is pervasive in data centers, delivering tangible and significant benefits for resource allocation, high availability, and the formation of an agile data center. A typical data center can have 20 - 100 VMs per physical server with varying workloads, belonging to multiple departments or entities. Many characteristics of the VM's can be viewed by the systems administrator, who can take action on them. To date, however, in the x86 space, one important aspect of VM's that cannot be tracked is power consumption of individual VM's.

The need for power metering

Without metering by VM, detailed and accurate power consumption and cost can't be charged to the responsible user or business unit. Under current capabilities, as a data center admin reviews the power consumption and allocates power charges, the admin simply divides the physical server power consumption by the number of VMs on the server. In other words, the power consumption (and power billing) is spread like peanut butter across all the VMs.

But resource utilization is not spread evenly, of course, and what happens when a single VM is using the majority of the physical server resources including power? This workload rides along as a "free rider", consuming a disproportionately large amount of power compared to its power bill. Alternatively, the VM might need to be moved to its own, dedicated server where it pays the full power bill. This alternative, unfortunately, entails further capital expense to acquire, install, manage and maintain the additional server.

The solution to this problem

To overcome this challenge, Dell EMC will introduce OpenManage Power Center (OMPC) 4.0 in Summer 2017. The new OMPC 4.0 discovers and reports power consumption for the individual VMs on a physical server. Dell EMC refers to this functionality as **VM Power Mapping**.

OMPC 4.0 maps power consumption by:

- discovering the hypervisors
- enumerating the virtual machines on the discovered hypervisor
- metering CPU utilization percentage by the virtual machine
- proportionately distributing the power consumed by the whole server to each individual virtual machine

Each hypervisor discovered is associated to a physical server based on the matching Dell EMC service tag. This process will help to ensure an accurate and proportionately equitable allocation of the power consumption to the individual VMs.

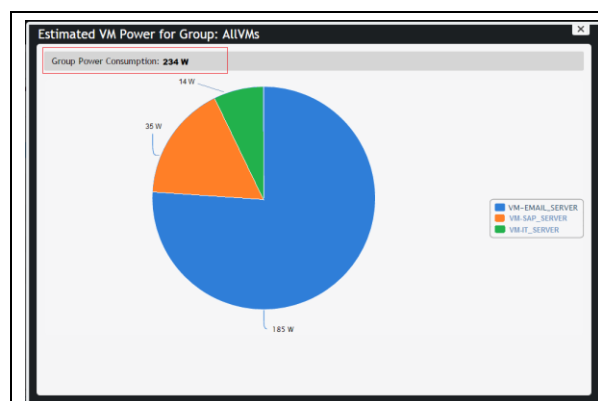


Figure 1: Sample screen shot of OMPC 4.0 with VM Power Mapping – graphical view gives quick, at-a-glance assessment of power consumption by VM

Status	Virtual Machine	Device	Hypervisor #	Hypervisor Host	Hypervisor Version	VM Group
Online	Ubuntu 12.04 LTS	Server - 10.239.151.218	10.239.151.122	VMware ESX	6.0.0 build-2494085	
Online	Windows 2008 R2 SP1	Server - 10.239.151.218	10.239.151.122	VMware ESX	6.0.0 build-2494085	vmg (vimg)
Online	Windows 2008 R2 SP1	Server - 10.239.151.218	10.239.151.122	VMware ESX	6.0.0 build-2494085	
Online	Windows 2008 R2 SP1	Server - 10.239.151.218	10.239.151.122	VMware ESX	6.0.0 build-2494085	

Virtual Machine Details		Device Details	
VM Identifier	10.239.151.218-10.239.151.218-10.239.151.218	Service Tag	323WV1
vCPU Count	4	CPU Count	4
Current CPU Utilization(%)	3	Current CPU Utilization(%)	11
Power Consumption	31 W	Power Consumption	102 W
Time of Discovery	January 3, 2017 2:07 PM	Hypervisor Discovery Time	January 3, 2017 2:05 PM

Figure 2: Sample screen shot of OMPC 4.0 with VM Power Mapping – deeper detail of each VM is provided in table format

VM Mapping reports new with OMPC 4.0

- VMs which use the most amount of power (highest average)
- VMs which use the least amount of power (lowest average)
- VM/Group MIN/MAX/Average and instantaneous power numbers

Hypervisor support with the initial release.

The initial release of VM Power Mapping in OMPC 4.0 will support VMware ESXi (Version 5.5 and later) and Microsoft Windows Hyper-V (Version 2012 and later) hypervisors.

Supported hardware

OMPC 4.0, including VM Power Mapping, runs on Dell EMC PowerEdge 12th-, 13th- and 14th-generation servers.

Summary

Dell EMC PowerEdge customers will benefit from this new functionality by knowing the power consumption of the individual VMs, enabling them to better 1) balance workloads; 2) identify power issues or spikes; and 3) provide accurate power consumption chargebacks to users. Currently, server power consumption is spread evenly across all the VMs on a physical server. With OMPC 4.0, coming Summer 2017, power consumption for each VM on the server can be accurately metered, such that the entity owning the VM can be charged proportionately.