

IPM Virtualisation - Power Management



Product Manager – Software and Connectivity APAC

IPM Virtualization Overview Agenda

- IPM Overview
- IPM for Virtualization environment
- Solutions for Non Virtualization environment & Industrial Application
- IPM Certification

IPM - Software Defined Power Management



Virtualization Integration



Infrastructure Shutdown



Environmental Monitoring



Health Check



Remote Management



Industry Validated

Intelligent Power® Manager



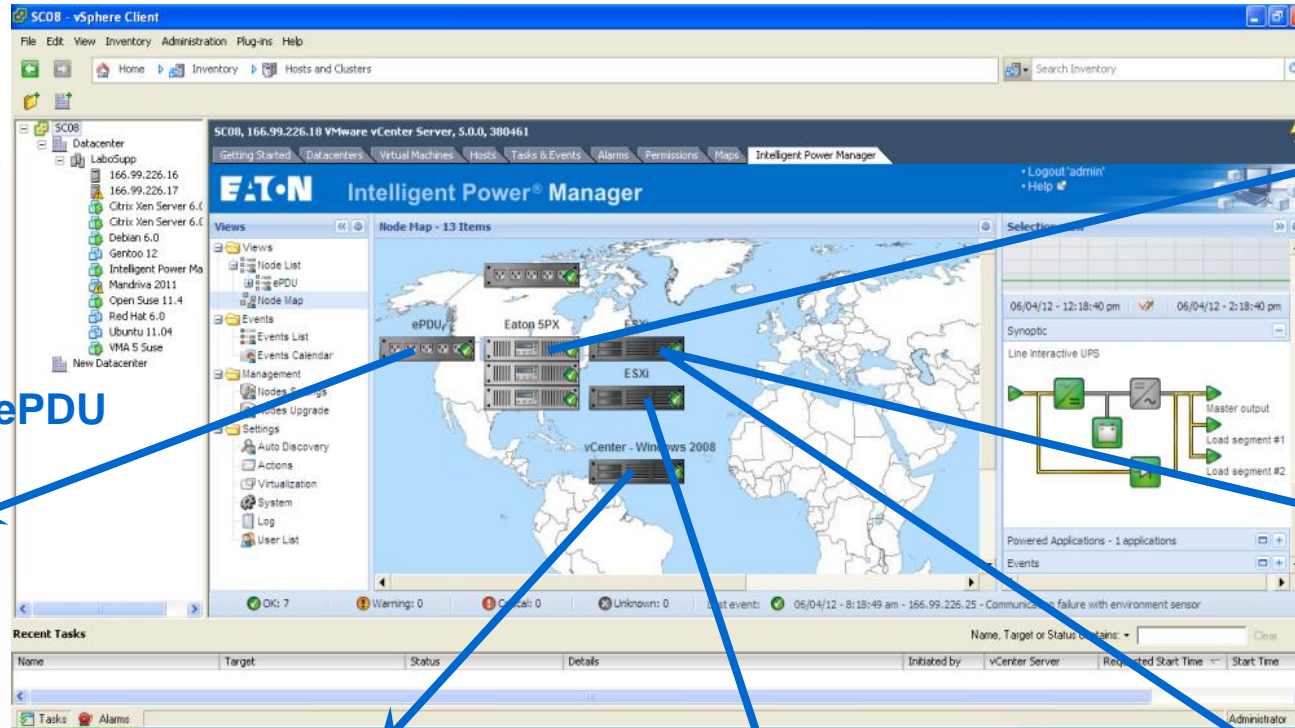
UPS



Cisco UCS Servers



Storage Devices



ePDU

Integrated inside the main virtualization platforms

Hyper Converged Devices



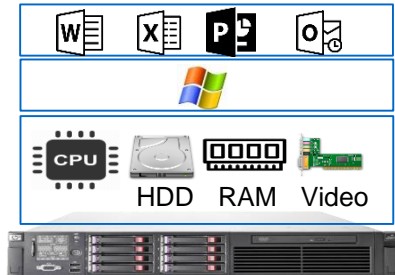
Microsoft Partner Network

Virtualization • Converged Infrastructure: Integration with EMC • Cisco • NetApp

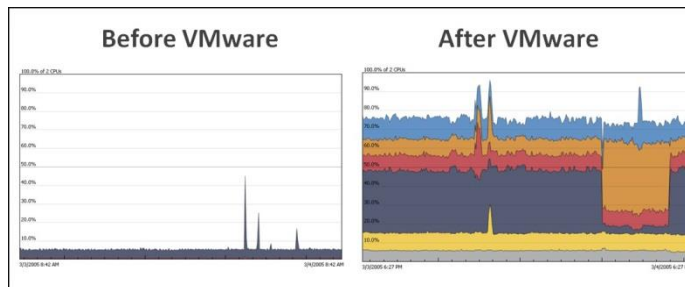
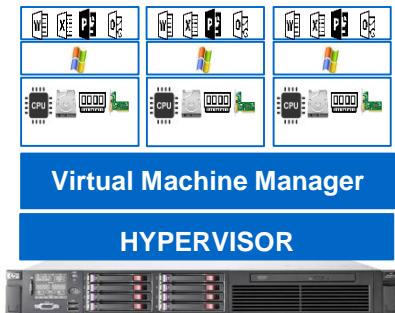
IPM For Virtualization

Virtualization Quick Glance

Traditional

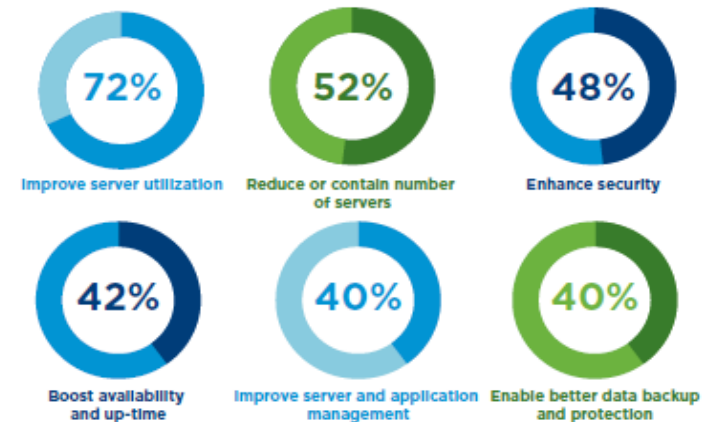


Virtualized

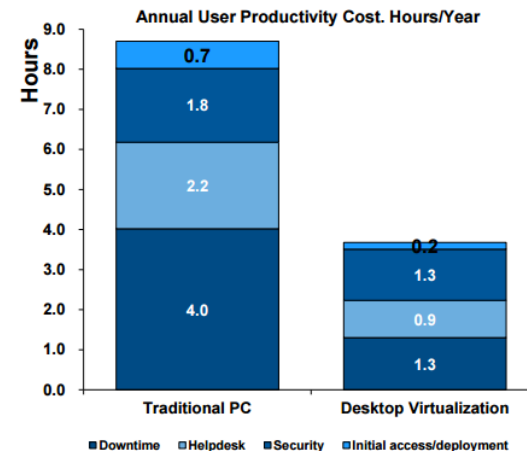


Benefits for Datacenter Managers

Traditional Benefits of Virtualization*



*Based on a VMware-sponsored study of business employing fewer than 1000 employees.



Market opportunity – Converged Infra and Cloud Computing

Converged Systems Outlook, 2012–2018



Note: For details, see Worldwide Integrated Systems 2014–2018 Forecast: State of the Market and Outlook (IDC #232616, November 2014).

Source: IDC, 2014

Source: Cisco Analysis, 2014

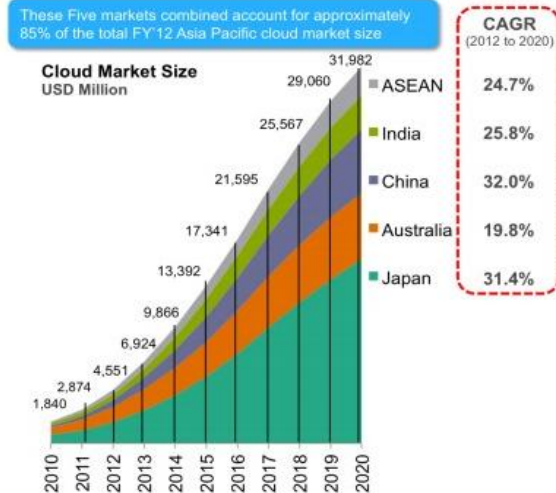


Source: Cisco Global Cloud Index, 2013–2018

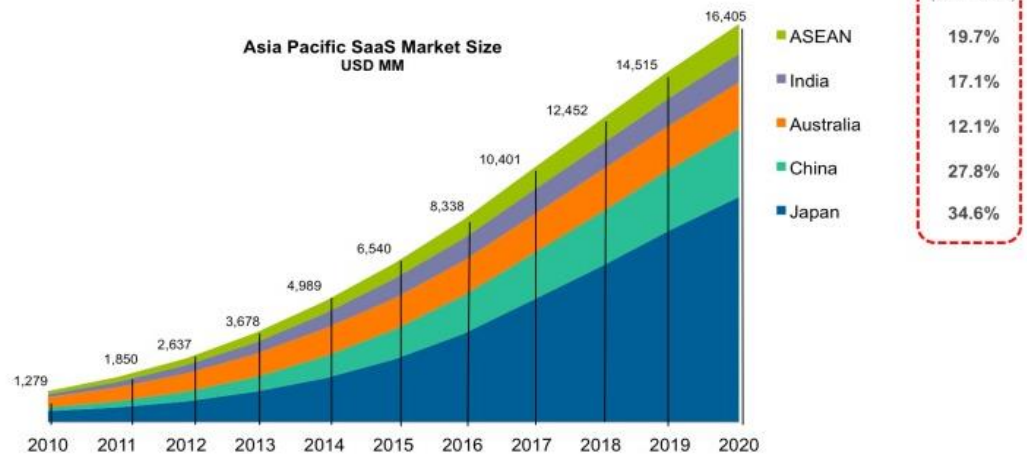
Total Data Center Workloads in Millions							
	2013	2014	2015	2016	2017	2018	CAGR 2013–2018
Asia Pacific	16.3	20.9	28.4	37.9	48	61.2	30%
Central and Eastern Europe	2.3	2.7	3.1	3.6	4.3	5.1	17%
Latin America	2.6	3.2	3.9	4.7	5.7	6.9	21%
Middle East and Africa	1.8	2.3	2.9	3.5	4.3	5.2	24%
North America	56.1	62.8	68.7	73.9	80.3	88	9%
Western Europe	29.2	33.3	36.5	39.7	42.2	45.1	9%

Source: Cisco Analysis, 2014

APAC Virtualization Growth



SaaS Market Forecast Across Asia Pacific



• CAGR – Compounded Annual Growth Rate
• ASEAN includes Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam

• Source : Forrester Report "Sizing the cloud Markets"
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- By 2018, IDC expect 20+ million users will use virtualized created desktops.
- By 2018, 40% of all virtualization sessions will be delivered through cloud

UPS Markets

Table 68 - The Asian market for UPS by vertical market
Revenue (\$m)

	Historic		Base Year		Forecast				CAGR 2014-19
	2012	2013	2014	2015	2016	2017	2018	2019	
Cloud/IT Services	371.3	378.6	334.0	324.7	332.3	353.6	373.8	392.8	3.3%
Colocation	215.2	227.1	196.0	194.8	206.0	224.5	244.6	268.3	6.5%
Content Delivery/Networks	374.0	377.2	336.4	322.4	326.5	338.7	351.0	366.6	1.7%
Content Providers & Media	330.9	335.3	302.5	292.3	297.2	312.6	329.1	347.3	2.8%
Education	67.3	62.2	60.5	55.7	53.8	52.9	52.2	51.9	-3.0%
Energy/Utilities	177.6	175.1	162.1	146.1	138.1	136.4	137.2	139.3	-3.0%
Financial/Insurance	306.7	311.0	273.5	264.4	269.2	275.2	275.7	274.7	0.1%
Government	236.8	233.9	208.1	199.5	198.9	202.8	204.9	206.7	-0.1%
Healthcare/Insurance	134.5	135.2	125.8	119.5	120.5	121.9	118.0	120.7	-0.8%
Manufacturing/Industrial	207.2	202.8	188.8	174.0	170.9	171.4	173.9	177.1	-1.3%
Retail	80.7	78.4	77.4	73.1	71.4	68.8	67.1	65.5	-3.3%
Transportation	94.2	94.6	84.7	80.7	79.1	79.2	80.2	80.4	-1.0%
Other	94.2	92.6	70.2	72.4	76.5	76.0	76.1	76.1	1.6%
Revenue	2,690.4	2,704.0	2,420.0	2,319.6	2,340.5	2,413.9	2,483.8	2,567.2	1.2%
Annual Growth		0.5%	-10.5%	-4.2%	0.9%	3.1%	2.9%	3.4%	

Source: IHS

© 2015 IHS

UPS Markets

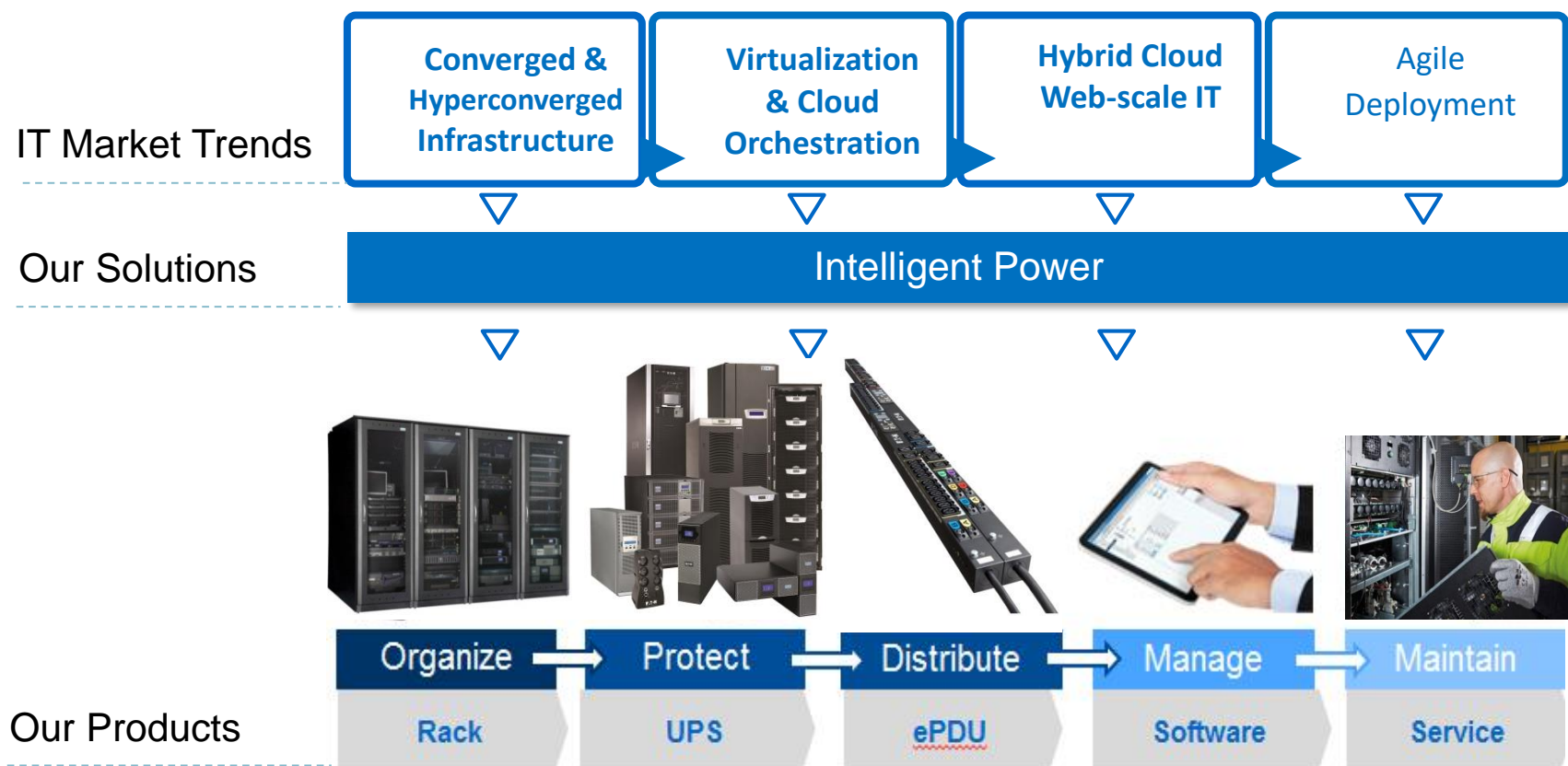
TABLE 1

Potential Economic Impact by Country (US\$M)

Estimated Savings Due to Servers Avoided	Australia	India	Indonesia	Japan	Malaysia	PRC	Singapore	Thailand	Total
Server Spending	4,223	2,371	798	16,643	652	21,641	1,980	622	48,829
Power and Cooling	1,483	666	203	6,012	128	8,505	521	190	17,708
Floor Space	54	28	6	1,489	9	326	53	6	1,972
Server Admin	3,108	827	242	8,822	249	15,241	1,101	214	29,804
Total	8,867	3,891	1,250	32,866	1,039	45,714	3,655	1,032	98,314

What IPM Offer for Data Centers

Enable the Agile Datacenter



Partnering with the industry's best to support evolving customers needs

Solution validations



Technology alliance memberships



VMware-Ready Certified

- IPM is delivered as a Virtual Appliance (VA) for an easy integration inside the vCenter dashboard

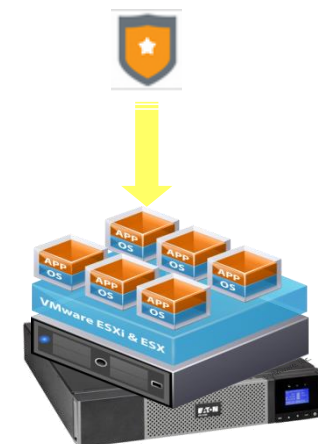
Virtual Machine
to download

New Intelligent Power® Manager v1.50 (free license for 0-10 nodes)
New Launch a VMware SRM plan directly from IPM

For the 10-100 nodes License please order ref 66925 Intelligent Power Manager Silver.
For the unlimited License please order ref 66926 Intelligent Power Manager Gold.



VMware vCenter - VMware vCenter leading centralized platform for managing VMware environments(From VMware).
Eaton is the only VMware-Ready certified power vendor, showing that we are fully endorsed by the software



VMware vCenter Eaton Support - vSphere Client

File Edit View Inventory Administration Plug-ins Help

Home Inventory Hosts and Clusters

Search Inventory

VMware vCenter Eaton Support
DataCenter Support
Cluster Support 2nd Floor
166.99.226.16
166.99.226.17
Debian 6.0
Debian Lenny 5.0
Gentoo 11.2
Mandriva 2011
Open Suse 11.4
Red Hat 6.0
Ubuntu 11.04
Ubuntu 11.04 Trainee#1
VMA vide IP 105
vSphere Management Assistant (v)

VMware vCenter Eaton Support, 166.99.226.18 VMware vCenter Server, 5.0.0, 380461

Getting Started Datacenters Virtual Machines Hosts Tasks & Events Alarms Permissions Maps Eaton Power Manager

EATON Intelligent Power® Manager

Views
Node List
Power Source
Node Map
Events
Events List
Events Calendar
Management
Nodes Settings
Nodes Upgrade
Settings
Auto Discovery
Actions

Typ...	Status	Name	Description	Location	Contact	Link
		169.254.79.100	Windows NT/...			
		166.99.226.63	Evolution 1150	France Viseo...	Soft Support...	
		sc06.support.eat...	VMware ESX...			
		sc07.support.eat...	VMware ESX...			
		166.99.226.67	EX 3000	Viseo A2-01	Software su...	
		166.99.226.20	SwitchedPD...	No Location	No Contact	
		166.99.226.24	PW107MAOU...		nobody@no...	
		166.99.226.93	Evolution 1150	Computer Ro...	Computer Ro...	
		SC08	Windows NT/...			

Selection view

Information

166.99.226.67
Description EX 3000
Nominal apparent power 3000 VA
IP address 166.99.226.67
Serial number AQ3K0300V
Class Network
Management Card / HE
Location Viseo A2-01
Contact Software support
Link

Maps Eaton Power Manager

• Logout 'admin'
• Help

VMware vSphere Web Client



vSphere Web Client - Windows Internet Explorer provided by Eaton-Powering Business Worldwide

https://vcenter04.mbt.lab.etn.com/443/vsphere-client/#extensionId=vsphere.core.host.summary;context=com.vmware.vcore.mode%3A%... Certificate Error

File Edit View Favorites Tools Help

Favorites vSphere Web Client

vmware vSphere Web Client root@locates Help Search

vCenter vesxi10.mbt.lab.etn.com Actions

Getting Started Summary Monitor Manage Related Objects

vesxi09.mbt.lab.etn.com
vesxi10.mbt.lab.etn.com
vesxi11.mbt.lab.etn.com
Debian6-01(VMTtools)
Debian6-02(VMTtools)
Debian6-03(NOVMTtools)
Debian6-03(VMTtools)
FakeWithoutNothing(Alv)
FakeWithoutNothing(Sh)

Logical Processors: 2
NICs: 1
Virtual Machines: 4

USED: 1.10 GB CAPACITY: 4.00 GB
STORAGE FREE: 1.18 TB
USED: 4.46 TB CAPACITY: 5.64 TB

State: Connected
Uptime: 8 days

Host is not in compliance with the attached profile.

Hardware

Manufacturer	VMware, Inc.
Model	VMware Virtual Platform
CPU	2 CPUs x 2.49 GHz
Memory	1,130 MB / 4,095 MB
Virtual Flash Resource	0.00 B / 0.00 B
Networking	vESXi10.mbt.lab.etn.com
Storage	8 Datastore(s)

Host Profile Compliance

Status: Not Compliant
Profile: Profile1

Related Objects

Power Source

Status	OK
Name	10.130.34.1
Description	Evolution 1150
Location	MBT Lab-Com-Rack-01-Test
Contact	Aurelien

Open IPM

Fault Tolerance
Configuration

My Tasks More Tas
Work In Progress
Host conn...
Alarms
All (...) Ne... Ack...
vesxi10.mbt.lab.etn...
Host UPS PowerFa...
vesxi09.mbt.lab.etn...
Host UPS PowerFa...
vesxi11.mbt.lab.etn...
Host UPS PowerFa...
DEV FileServer GN...
Datastore usage o...



Eaton is the only Power Management Provider with a **seamless** integration software into VMware vSphere Web Client

IPM 1.52

Triggering actions @VM Level

The screenshot displays the Eaton Intelligent Power Manager (IPM) 1.52 interface. The left sidebar shows a tree view with categories like Views, Events, Management, and Settings. The main area is divided into a 'Node List' table and a 'Selection view' panel on the right.

Node List Table:

Type	Status	Name	Description	Location	Contact	Link
VMware VirtualM...	✓	Debian6-02 (VMTools)	VMware VirtualM...	vesxi11.mbt.lab...		
VMware VirtualM...	✓	FakeWithoutNothing (AlwaysStop...	VMware VirtualM...	vesxi11.mbt.lab...		
VMware VirtualM...	✓	FakeWithoutNothing(ShouldRun)	VMware VirtualM...	vesxi11.mbt.lab...		
VMware VirtualM...	✓	Debian6-04 (VMTools)	VMware VirtualM...	vesxi11.mbt.lab...		
VMware VirtualM...	✓	Debian7-vCenter04-4	VMware VirtualM...	vesxi11.mbt.lab...		
VMware VirtualM...	✓	Fake1	VMware VirtualM...	vesxi11.mbt.lab...		
VMware VirtualM...	✓	vSphere Replication Appliance	VMware VirtualM...	vesxi10.mbt.lab...		
VMware VirtualM...	✓	Debian6-03 (NO VMtools)	VMware VirtualM...	vesxi09.mbt.lab...		
VMware VirtualM...	✓	Debian7-vCenter04-3	VMware VirtualM...	vesxi09.mbt.lab...		
VMware VirtualM...	✓	Debian7-vCenter04-5	VMware VirtualM...	vesxi09.mbt.lab...		
VMware VirtualM...	✓	Debian7-vCenter04-2	VMware VirtualM...	vesxi09.mbt.lab...		

Selection view: Debian6-02 (VMTools)

Information:

- VMware VirtualMachine
- Description "Debian GNU/Linux 6 (64-bit)" on vesxi11.mbt.lab.etn.com
- IP address: 10.130.34.254
- Mac Address: 00:50:56:9c:9b:fd
- Class: VMware VirtualMachine / vmx-08
- Location: vesxi11.mbt.lab.etn.com
- Link: [icon]

Status:

- Connection state: ✓ Connected
- Power state: ✗ Powered Off
- Tools running state: ✗ Not running

Power Source: [icon]

Events:

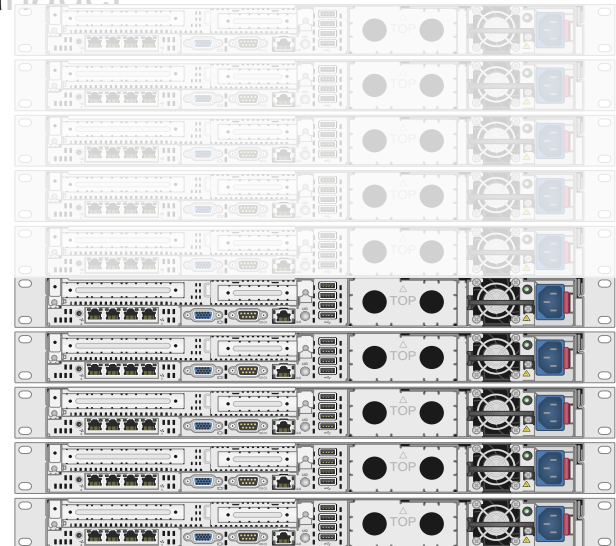
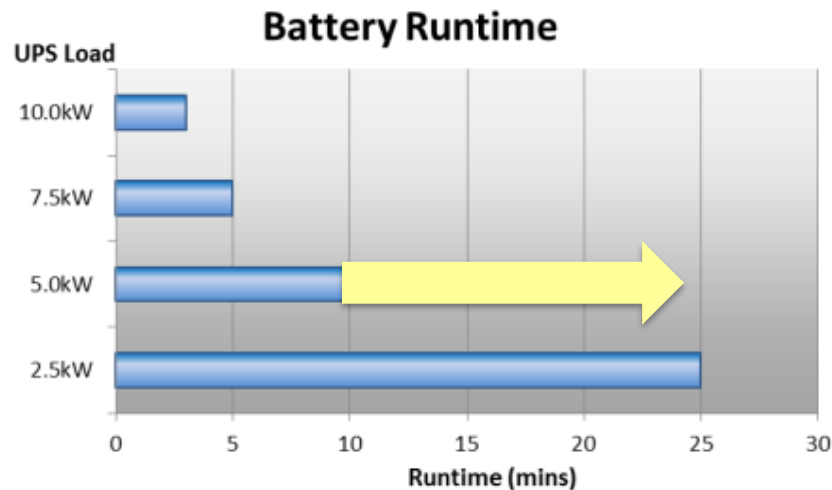
Status	Date	Message
✓	11/09/2014-16:52:57	Communication wit...

If UPS < 30% Battery level then trigger vMotion

If UPS goes on Battery then Graceful Shutdown VMs

Load shedding

- Suspend non-critical virtual machines, consolidate critical virtual machines
- Shut down unused servers
- Work with VMware Distributed Power Manager



50% drop in load equates to 250% of original runtime

IPM 1.52: Triggering SRM plans on power/envIRON. events

Production Site



SRM

Back-up site



Create a new SRM action

Action active*:	<input checked="" type="checkbox"/>
Action name*:	<input type="text"/>
UPS*:	<input type="text"/>
UPS event*:	Select a UPS event...
Site*:	Select a site...
Recovery plan*:	Select a recovery plan...
Action delay (in seconds):	0

Save Cancel

Business continuity ensured!

Cisco UCS and Power Capping



Add a connector Cisco UCSM Component

Product: Cisco UCS Manager

Hostname or IP address: Hostname or IP address

Port: 80 (default)

Username:

Password:

Save Cancel

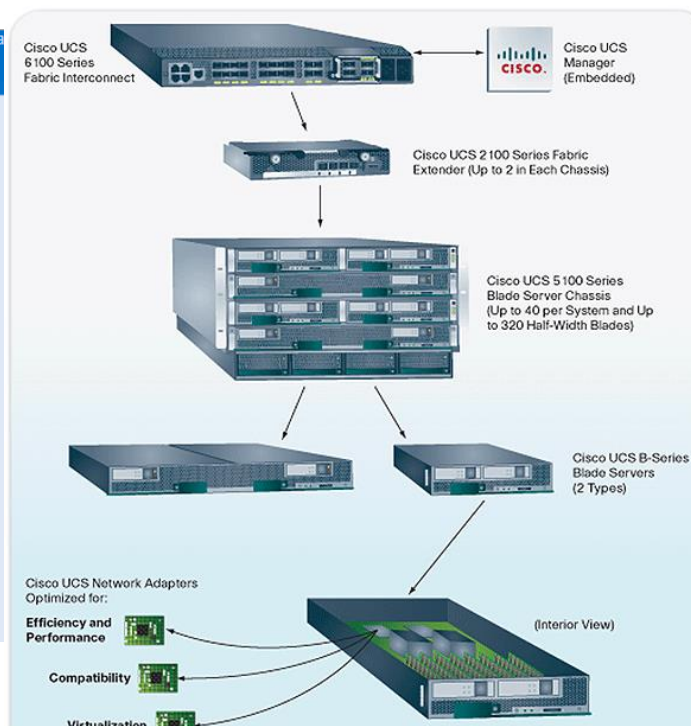


Eaton Intelligent Power Manager

Views: Node List, Node Map, Events Logs, Management, Settings, Infrastructure Connectors

Infrastructure Connectors

Hostname or IP address	Plugin State	Connection State	Product
Product: Cisco UCS Manager (1 Item)			
ucspe01.support.mbt.lab.etn.com		✓	Cisco UCS Manager
Product: Cisco UCSM Component through UCS Manager (5 Items)			
sys/chassis-1/blade-7		✓	Cisco UCSM Component through UCS...
sys/chassis-1/blade-6		✓	Cisco UCSM Component through UCS...
sys/chassis-1/blade-3		✓	Cisco UCSM Component through UCS...
sys/chassis-1/blade-2		✓	Cisco UCSM Component through UCS...
sys/chassis-1/blade-1		✓	Cisco UCSM Component through UCS...
Product: New VMware vCenter (1 Item)			
Product: VMware ESX/ESXi through vCenter (3 Items)			



Agentless monitoring, power capping & shutdown for Cisco UCS Servers

[Virtualization](#) • [Converged Infrastructure](#): Integration with [EMC](#) • [Cisco](#) • [NetApp](#)

Power capping

- Power capping to avoid catastrophe
 - Reduces generator load
 - And / or extends battery run time
- Servers have built-in capability
 - To change internal working conditions (i.e., CPU speed) to reduce power consumption
 - To change to desired power level in watts

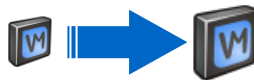
New Infrastructure Shutdown



IPM automatically identifies the vCenter & itself as critical applications and selects the vCenter host as the last one to go down



IPM graceful shutdown non critical VMs



IPM migrates critical VMs to the vCenter's host



IPM Graceful shutdown non critical host



IPM graceful shutdown the last host & criticals VMs

DNS

DHCP

vCenter

IPM



Host #1



Host #2



Battery mode

46%

4.6kW

4.6kVA

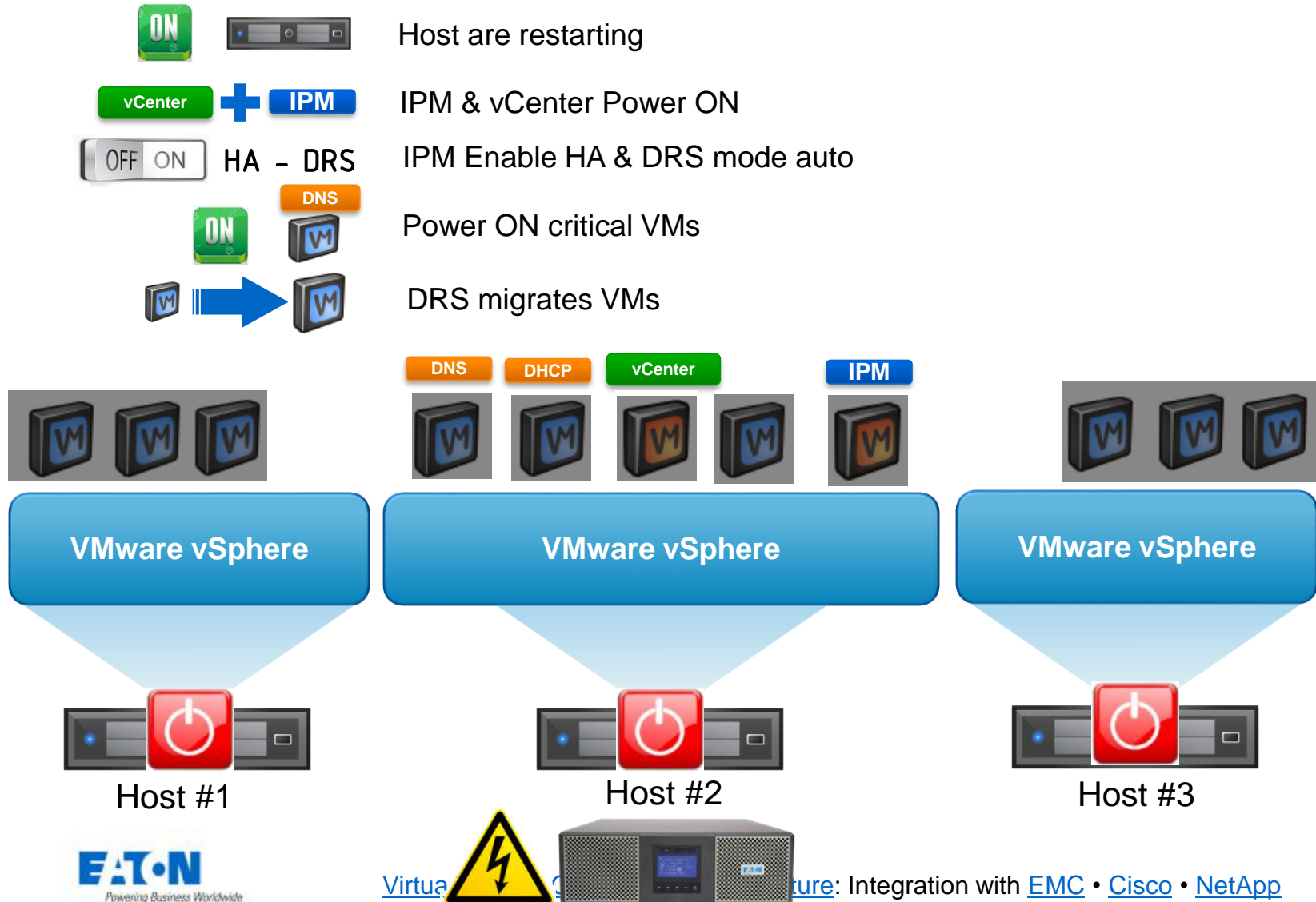
Efficiency: 95%

92%

24min

1EBM

Infrastructure restart process



Eaton IPM Direct Connection

STORAGE



Add a connector

Product: **NetApp Storage**

Hostname or IP address:

Username:

Password:

CLOUD



Add a connector

Product: **OpenStack**

Hostname or IP address:

Secured protocol: ☐

Port:

Username:

Password:

Project:

SERVICES



Add a connector

Product: **Cisco UCS Manager**

Hostname or IP address:

Port:

Username:

Password:

VIRTUALIZATION



Add a connector

Product: **Virtualization**

Note: Please refer to the informations about disabl

- VMware vCenter
- VMware ESX/ESXi
- Microsoft SCVMM
- Citrix XenCenter
- Citrix XenServer Pool

SERVICES

HPE OneView

Add a connector

Product: **HP OneView**

Hostname or IP address:

Username:

Password:

Data Center ROI using Eaton IPM

1

Shed non-critical loads to give increased battery runtime (or lesser generator loading) to critical workloads or reduce temperatures

2

Fail-over critical loads to DR site using VMware SRM (planned migration) to avoid data loss

3

Power cap servers to give increased runtime to critical workloads or reduce temperatures

Or any combination of above features

Eaton Software Competitiveness



IPM Feature	End User Benefit	Eaton IPM/IPP	Second best
Server shutdown	Graceful Shutdown of VMs and host servers in case of power failure	✓	✓
Plugs into Virtualization Platforms - tab (traditional vSphere client)	Higher productivity - view from single plane of glass	✓	✓
Plugs into Virtualization Platforms vCenter web client – VMware's new method	Higher productivity - view from single plane of glass - works with VMware's future look of vCenter	✓	✗
Power capping with Cisco UCS Manager	Extends battery run time	✓	✗
Agentless server shutdown	Achieve shutdown function from one point with less setup work	✓	✓
Storage shutdown	Can send signals to NetApp storage devices for shutdown as appropriate	✓	✗
Converged infrastructure compatibility	vBlock Ready, NetApp Flexpod, EMC VSPEX	✓	✗
Disaster recovery/avoidance	Works with VMware Site Recovery Manager to initiate planned migration to back-up site on power event notification with no data loss	✓	✗
Localisation	User interface supports multiple languages	✓	✗

IPM For Non-Virtualization

Increase Battery Runtime of 3 phase UPS

- **Non Virtualization**

- Make IT servers non critical and non using Servers in Hibernate mode **to extend the battery runtime**
- Shutdown any electrical devices using ePDU when there is power failure
- **Send Email or run the custom script** when power failure
- Monitoring and managing Equipment's like Cameras and other IT devices using ePDU
- Using HP and Cisco **Limiting Power Usage** or **Power Capping** to reduce the Loads on Generators
- **Remote Graceful Shutdown** of Storage Servers



Custom Scripts



 **Shutdown Now**

- **Virtualization**

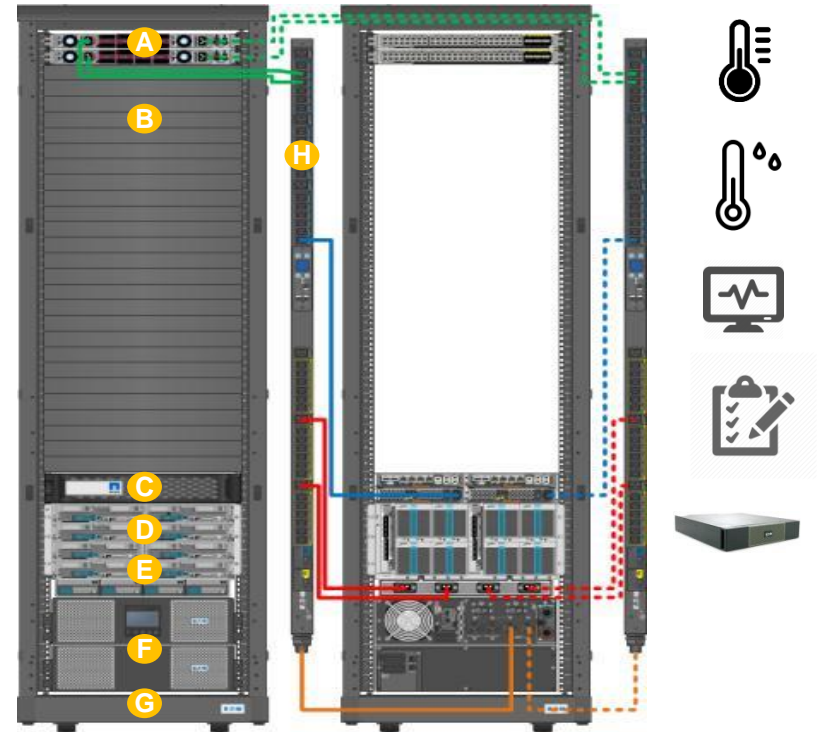
- **Load Shedding** (of non critical Virtual as well as Physical servers)
- **Live Migration** of Virtualization
- **Disaster Recovery** for Two sites Manager



Disaster Recovery

Making Your Rack Intelligent

- Remotely monitoring **UPSs** and **ePDU**, Storage devices
- Control outlets, schedule ePDU power cycles
- Configure switching of ePDU outlets based on various conditions like Temperature, humidity, current levels etc.
- Fifth Element in **Rack** along with VMware ready **9PX** UPSs
- Smart Power Handling for entire Rack using **IPM**
- Monitor Temperature and Humidity using Eaton Environmental monitoring Probe(**EMP**)



Rack Devices		Eaton Solutions for Rack	
A	Network Switch	G	S-Series Rack
C	Storage	B	Blanking Panels
D	Compute Servers		Cable Management
E	Switch	F	UPS(9PX 11 kVA)
D	Hypervisor	H	ePDU
			EMP
			IPM

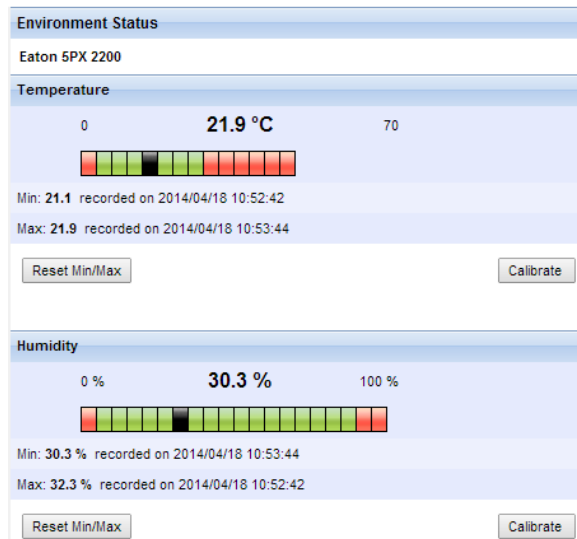
Managing Large Distributed Network

- Remotely monitor dozens of devices like UPS, ePDUs, storage devices, virtualization components and other devices from single pane of glass
- Manage the virtualization from the remote location
- Easily connect with third party UPS
- Connect and monitor third party ePDU
- Connect and monitor third party SNMP devices



IPM 1.52: Triggering actions on enviromental alarms

Thanks to the EPM probe that can be connected to the UPS or to the ePDU, Load Shedding, Infrastructure shutdown & SRM can be triggered from an environmental alarm



Managing Large Distributed Network

- Send Email, Alerts and Custom Scripts based on temperature, current or any other power events
- Remote monitoring of Multiple UPSs, ePDUs and other devices
- Manage Monitor Servers – Cisco, OpenStack, VMware, Citrix
- Scheduling maintenance of Power UPS and ePDU
- Industry - Relay Card, Modbus Cards, Network Cards



Custom Scripts








MAINTENANCE

Relay Devices



IPM – Fifth Element in Converged Infrastructure

Target Virtualization and CI	
Virtualization	
Compute	
Networking	
Storage	
Integrated power management	



PDU

- Remotely switch power outlets on and off.
- Monitor power outlets individually.
- Manage and control downstream devices.

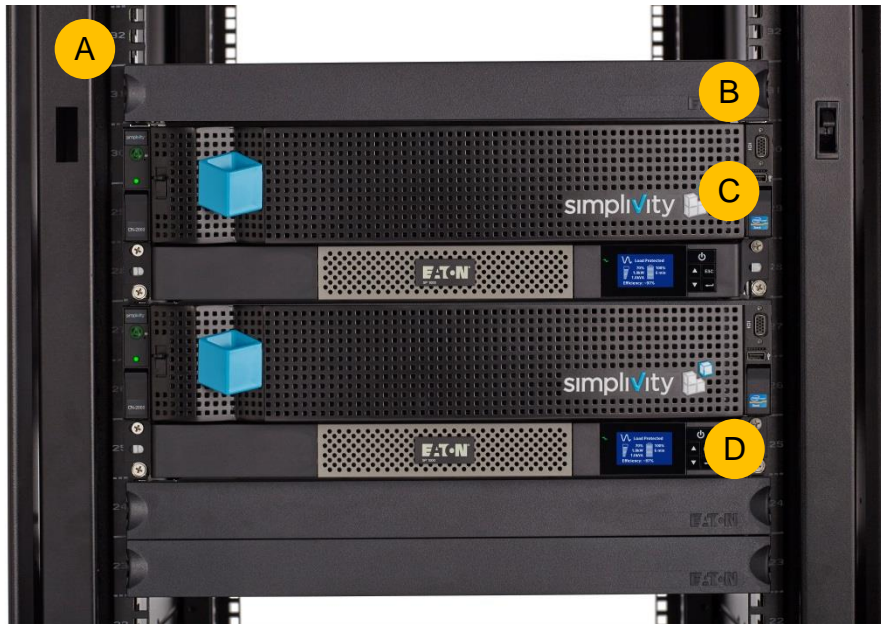
Management software

- Manage all of their converged IT and power protection assets through a single console.
- Respond to power anomalies automatically.
- Manage power protection systems remotely.

UPSs

- Notify converged infrastructures of utility failures, causing their automated management systems to initiate business continuity measures.
- Give converged infrastructures the emergency power they need to complete virtual machines migrations before gracefully shutting down servers and storage systems.
- Safeguard converged hardware from potentially hazardous power impurities

SimpliVity powered by Eaton deployment



	Type	Qty	Description
A	Rack	1	Eaton RE/REC enclosure
B	Rack options	1	Blanking panels/cable management
C	Hyperconverged Infrastructure	2	SimpliVity OmniCube CN2200
D	UPS	2	5P 1550 VA Network Ready UPS
	NMC	2	Network management card
	EMP	1	Environmental monitoring probe
	Power Management Software	1	Intelligent Power Manager version 1.52

The Eaton/SimpliVity validated solution provides unparalleled data protection in the event of a power anomaly, ensuring uptime and availability.

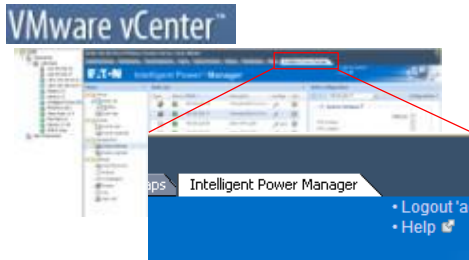
IPM Perfect Fit in SMB with Virtualization

- SMB typically have 1-10 Racks
- DCIM too complex and Expensive for SMB
- Basic Feature SMB need is monitor, control and manage.
- IPM offer perfect fit with low cost and powerful virtualization features



EAT•N
Intelligent Power
Manager

Top power management software differentiators



Hypervisor plug-in

- Manage and control power infrastructure inside vCenter and XenCenter

Disaster Recovery- SRM

- Initiate SRM for vMotion to DR site without data loss

Load shedding

- Keep Mission critical applications running longer on battery
- Suspend non-critical VMs while consolidating critical ones to shutdown unused servers.
- Sequential shutdown and start up

Remote Agentless Management

- Agents consume server resources, IPM requires no agent on production servers
- Graceful server shutdown with no agents running on server or VMs

IPM's capabilities keep the mission-critical applications running

How to start a power conversation

What happened the last time you suffered a power disruption?

What did you do about it?

Engineer-focused

- How would it benefit you to manage your power infrastructure simultaneously within your virtualization platform?
- Do you want the ability to remotely manage your servers and VMs? Facilitate load shedding? Integrate to Cisco's UCS server power capping?
- What is your strategy for utilizing a disaster recovery site for failover in the event of a long-term outage?
- If you already have a power infrastructure, when was the last time you tested it?

Manager-focused

- What is your business continuity plan? Does it meet required service level agreements?
- Are you centralizing your IT infrastructure management?
- Are you monitoring/managing your power infrastructure?
- Are your more experienced and best paid staff still performing manual tasks during power disruptions?
- How would automating your business continuity plan enable you to achieve your business goal?

IPM Licensing

IPM Features	BASIC	SILVER	GOLD
# power nodes monitored	Up to 10	11 - 100	101 + (about 600 top end)
Protected servers (IPP) and Virtual servers	✓	✓	✓
Storage shutdown module	✓	✓	✓
Generic drivers and third party devices	✓	✓	✓
Configuration policies	✓	✓	✓
Plugin for VMware vCenter	✓	✓	✓
Advanced event / action with custom events	✗	✓	✓
Generic SSH action	✗	✓	✓

Download it & Give it a try!

Intelligent Power Software

Connectivity card

ePDU

Free for 10 Nodes (Node=> UPS, ePDU, Servers, Storages etc)

Free for 10 Nodes (Node=> UPS, ePDU, Servers, Storages etc)

<http://powerquality.eaton.com/Support/Software-Drivers/default.asp>



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