

Green Days @ Lyon

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Power management in virtual server environment

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Green Days January 2012

Power Management in virtual server environment

Agenda

- Eaton Corporation
- Power Management Software suite
- Power management integration in Virtualization

Powering businesses worldwide for 100 years



- Founded in 1911 by J.O. Eaton
- World Headquarters in Cleveland, Ohio USA
- Regional Headquarters in Shanghai, China; Morges, Switzerland; Sao Paulo, Brazil
- Innovation Centers in the USA, China and India
- Customers in more than 150 countries
- 2010 sales of \$13.7 billion, 55% of sales outside the U.S.
- Approx. 70,000 employees
- Chairman & CEO –Alexander M. Cutler

Eaton is a leader across the power management spectrum

We provide reliable, efficient and safe power management for...



Cities & Buildings



Industrial & Machinery



Information Technology



Transportation



Infrastructure



Energy & Utilities



Power Management Software Suite

Products managed in Montbonnot HQ

Single Phase UPS



Pulsar Series - Powerware Series - E Series

Rack mounted 3 Phase UPS



BladeUPS

ePDU



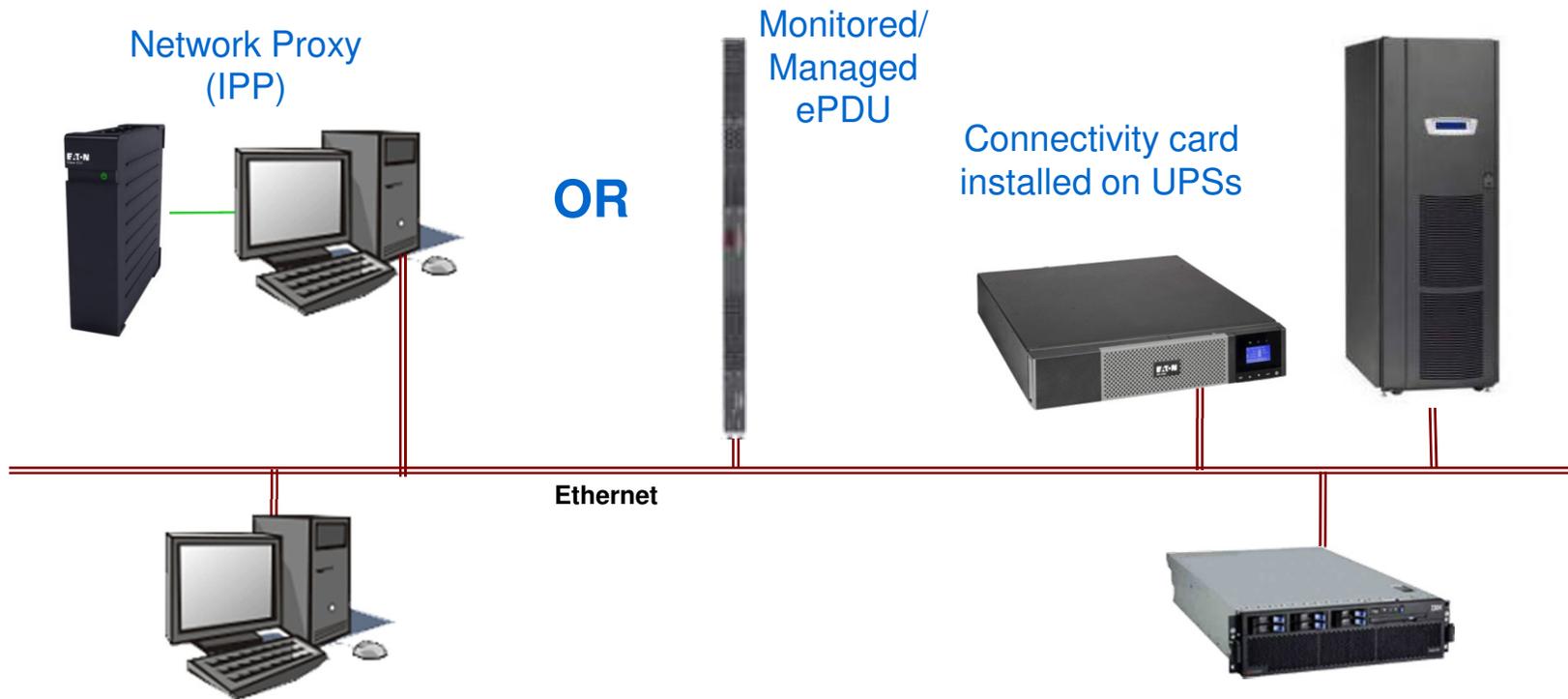
Software & Connectivity



Critical Sales-enabler for IT Channels

IT Network UPS management

Connectivity



Intelligent Power Manager – standalone or plugged into virtual environment

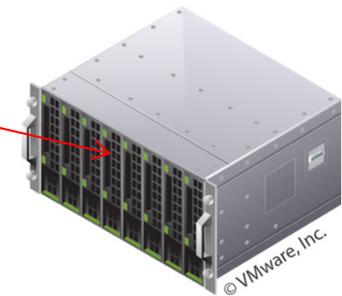
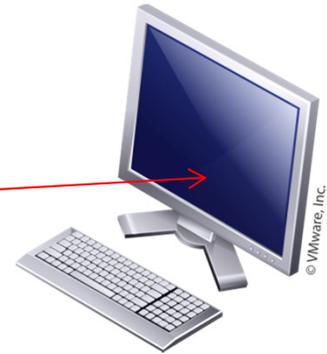
Intelligent Power Protector – installed on protected equipment

Supervision / Administration software

Protection software

Intelligent Power Software Suite

- Two software products
 - **Intelligent Power Manager:** software for extensive remote monitoring and management
 - Compatible with Windows PCs and servers; VMware's vCenter™; Citrix XenCenter and Microsoft's SCVMM
 - **Intelligent Power Protector:** shutdown software for extended power outages
 - Compatible with Windows, several versions of Linux; VMware's ESX™ and ESXi™; XenServer, RedHat KVM and Microsoft's Hyper-V™



IPM View

EATON Intelligent Power® Manager • Logout 'admin'
• Help

Views

- Views
- Node List
- Power Source
- Node Map
- Events
- Events List
- Events Calendar
- Management
- Nodes Settings
- Nodes Upgrade
- Settings
- Auto Discovery
- Actions
- Shutdown
- System
- Log
- User List

Node List

Type	S...	Name	IP address	Mac Address	Description	Serial n...	L...	Load le...	Outlet group	Link
	+	10.222.22.23	10.222.22.23		EATON 9E 30	UPS #1	C...	[0 %		
	✓	10.222.23.2...	10.222.23.220		PXGX UPS + EATON 9...	C...	[3 %			
	✓	10.222.23.2...	10.222.23.221		PXGX UPS + EATON 9...	C...	[3 %			
	✓	9395 at CEC	10.222.23.222		PXGX UPS + EATON 9...	C...	[2 %			
	✓	10.222.23.2...	10.222.23.229		PXGX UPS + EATON 9...	C...	[0 %			
	✓	10.222.23.2...	10.222.23.233		PXGX UPS + EATON 9...	9...	[2 %			
	✓	10.222.23.2...	10.222.23.234		PXGX UPS + EATON 9...	9...	[3 %			
	✓	10.222.23.2...	10.222.23.235		PXGX UPS + EATON 9...	9...	[1 %			
	✓	10.222.39.1...	10.222.39.179	00:20:85:FD:18:64	Powerware 9130 700	GC515...	C...	[1 %		
	✓	10.222.39.19	10.222.39.19		Windows NT/5.01.03				Load segment ...	
	✗	10.222.39.1...	10.222.39.192	00:20:85:FD:66:15	EATON 9E 60	300002...	C...	[0 %		
	✓	10.222.39.1...	10.222.39.193		PXGX UPS + Bev's 9125	B...	[0 %			
	✓	10.222.39.1...	10.222.39.198		POWERWARE 5125	T...	[0 %			
	✗	10.222.39.33	10.222.39.33		Windows NT/5.01.03	F...				
	✗	10.222.39.36	10.222.39.36		Windows NT/5.01.03				Load segment ...	
	✓	10.222.39.41	10.222.39.41		Windows NT/5.01.03				Load segment ...	
	✓	10.222.39.59	10.222.39.59		Windows NT/5.01.03				Load segment ...	
	✓	10.222.49.60	10.222.49.60		PXGX UPS + EATON P...	R...	[0 %			
	✓	10.222.50.1...	10.222.50.191	00:22:d5:00:15:e9	Monitored ePDU		[3 %			
	✓	10.222.50.1...	10.222.50.192	00:04:F3:02:30:03	Switched ePDU		[0 %			
	✗	10.231.63.10	10.231.63.10		Windows NT/5.01.03				Master output	
	✗	10.231.63.2...	10.231.63.201		Windows NT/5.01.03	A2			Master output	
	✗	10.231.63.28	10.231.63.28		Windows NT/5.01.03				Master output	
	✗	10.231.63.44	10.231.63.44		Windows NT/5.01.03				Master output	
	✗	10.231.63.64	10.231.63.64		Windows NT/5.01.03				Master output	

Selection view

Information

10.222.22.23

Description: EATON 9E 30
 Nominal apparent power: 30000 VA
 IP address: 10.222.22.23
 Serial number: UPS #1
 Class: Management Card / HEB1
 Location: Computer Room
 Contact: Computer Room Manager

Status

Device fault: UPS fault
 Battery state: Resting
 Power Source: On utility
 Load level: 0 %
 Battery capacity: 0 %
 Battery run time: 0 s
 Master output: Master Off

Measures

Input frequency: 62 Hz
 Input voltage: 207 V 208 V 208 V
 Input current: 0 A 0 A 0 A
 Bypass frequency: 63 Hz
 Bypass voltage: 207 V 209 V 210 V
 Bypass current: 0 A 0 A 0 A
 Output frequency: 0 Hz
 Output voltage: 0 V 0 V 0 V
 Output current: 0 A 0 A 0 A
 Apparent power: 0 VA 0 VA 0 VA
 Active power: 0 W 0 W 0 W
 Global apparent power: 0 VA
 Global active power: 0 W
 Battery output voltage: 244 V

Environment

Temperature: 22.5 °C

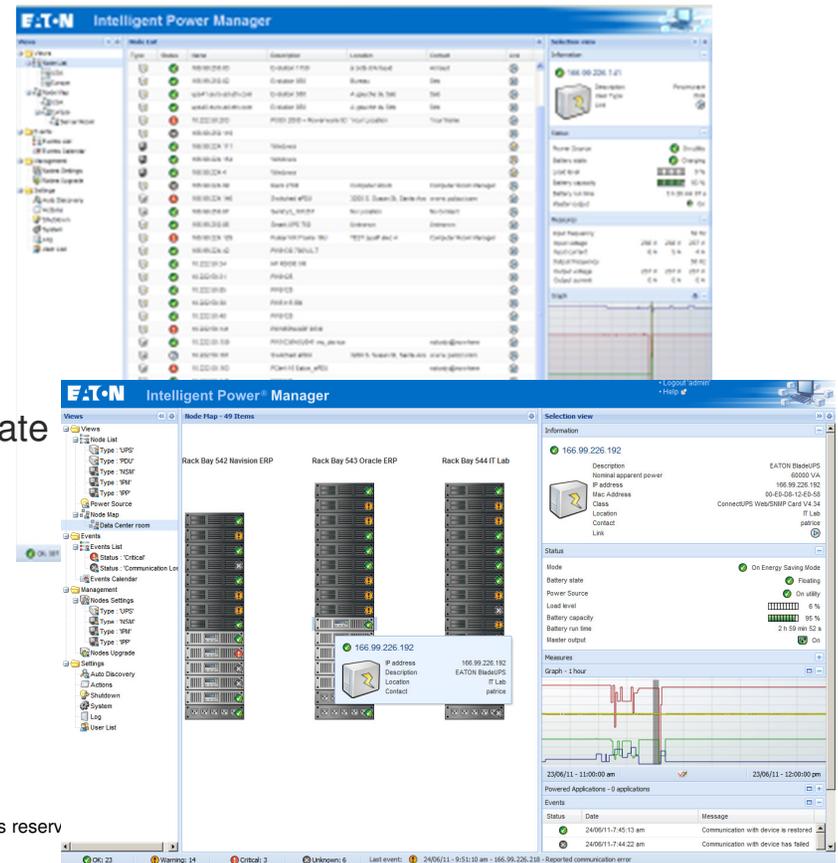
Page 4 of 6 25 Items per page Displaying 76 - 100 of 129

Intelligent Power Manager since 2009

(Supervision and management)



- **Multiple OS** (from Windows 2000 to Seven)
- **Interface**
 - Web 2.0 Interface (Selective refresh, Drag and drop, ...) for Power source supervision, Graphs, Events, Calendar, Statistics, Customized Maps ...
 - Multiple languages (11 including Asian languages) & Multiple Browser (IE, Firefox , Chrome ...)
- **Installation**
 - Light weight package (easy installation without dependencies)
- **Nodes acquisition** (Network, USB, RS232)
 - Multi devices supervision (UPS & ePDU)
 - Multi-applications (IPP)
 - Automatic discovery
 - Redundancy supervision
- **Management**
 - ePDU Power measurement
 - Mass Configuration & Mass update & Automatic update
 - Flexible events and actions
 - Server and UPS Dependency
 - Simple asset management
- **Security**
 - Multi level password & https access



Intelligent Power Protector since 2010

Server Graceful Shutdown



- **Multiple OS** (from Windows 2000 to Seven on x86 & x64 / Linux (native package

- Virtual environment (VM Ware, Hyper V, Xen, KVM)

- **Interface**

- Web 2.0 Interface (selective refresh, Drag and drop, ...) for power source supervision, Graphs, Calendar, Statistics, ...
- Multiple languages (11 including Asian languages) & Multiple Browser (IE, Firefox , Chrome, ...)

- **Installation**

- Light weight package with easy installation (without dependencies)
- Deployment facility (silent install)

- **UPS acquisition** (USB + RS232 + Network)

- Automatic discovery
- **Redundancy**

- **Manageability**

- Mass Configuration & Update
- Automatic update
- Shutdown controller
- Flexible events and actions

- **Security**

- Shutdown alarm protection & ht



Open Source (Network UPS Tools)



- Preferred by Opensource friendly customers (Governments, Universities, Finance, Defense, ...)
- De facto standard
- NUT protocols library is used as a reference
- Integrated in Linux distribution systems
- Designed for High Availability Systems
- Highly secured and mature
- Highly customizable (source code is provided)
- Small footprint
- Vendor neutral
- Platform neutral
- UPS, ePDU, server PSU, ...

There is a dedicated website!

- <http://pqsoftware.eaton.com>



Choose your Language:

English

Protection/Supervision :

- ▶ Point to Point
- ▶ Network

Settings :

- ▶ UPS
- ▶ Others

Firmware :

- ▶ Cards
- ▶ UPS

Related Links :

- ▶ Help me choose
- ▶ Lastest releases
- ▶ FAQs
- ▶ Software Support

- ▶ Software compatibility
- ▶ Others Products



Software Downloads

Point to Point solution

Personal Solution-Pac (PSP) is ideally suited for power management of personal computers (and their associated peripherals) with a serial / USB connection to the UPS.

EATON Network Solution

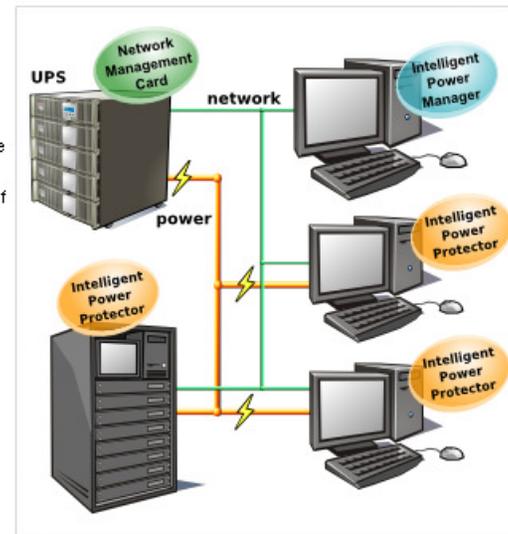
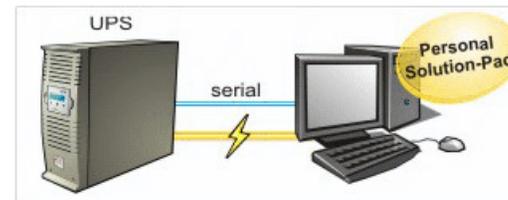
provides these 3 main functions:

▶ **Connecting** the UPS to the network through a **Network Management Card** inserted into the UPS **or** through the « Shutdown Controller » feature of the **Intelligent Power® Protector** software.

▶ **Protecting** your computers by installing an **Intelligent Power® Protector** software on each server.

▶ **Monitoring** your UPS through:
- Your Internet browser.
- The EATON **Intelligent Power® Manager**

Software Download

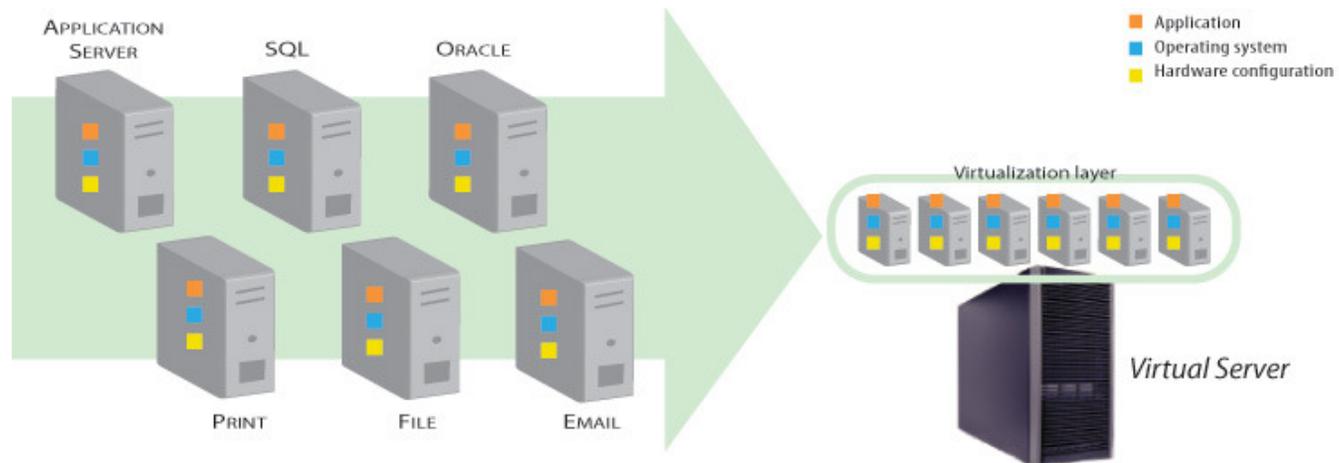




Power management integration in Virtualization

Virtualization

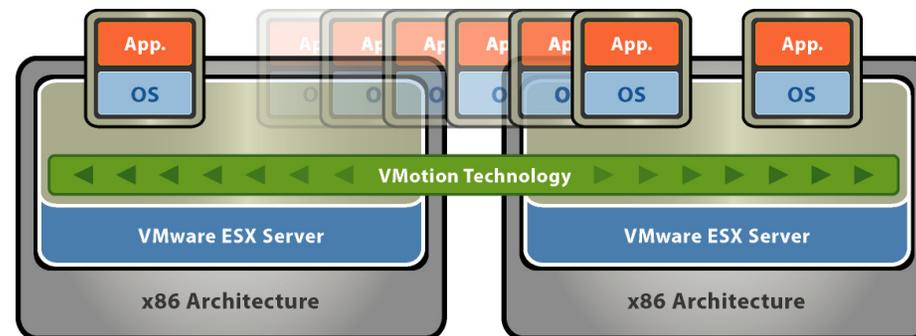
- What is virtualization ?



- Consolidation of IT applications on virtual machines instead of having dedicated servers per application
- Virtual machines are independent from physical servers

Virtualization Increases business continuity

- The capability to move and balance the load (VMs)
 - vMotion on VMware
 - Live Migration on Microsoft
 - Xen Motion on Citrix XenServer
 - Live Migration on Redhat Enterprise Virtualization

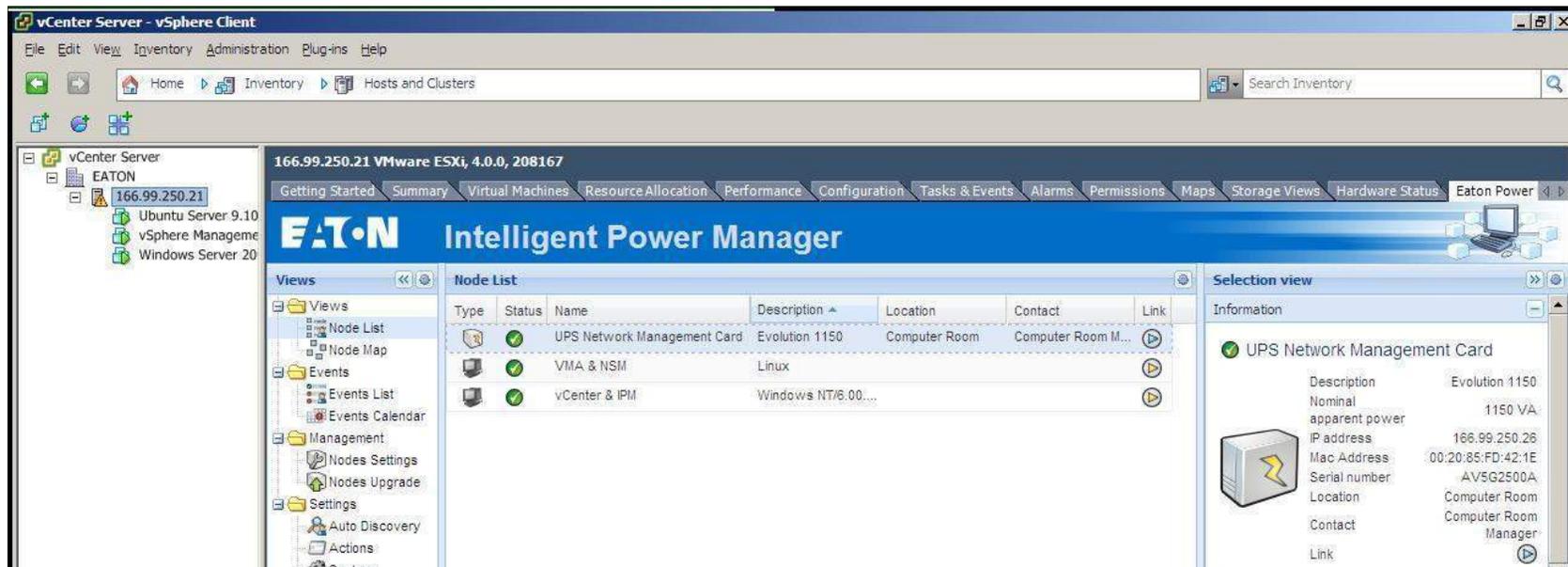


Virtualization API

- VMware vCenter and ESX/ESXi
 - SOAP over HTTP
- Citrix XenServer
 - XML-RPC over HTTP
- Microsoft SCVMM
 - PowerShell

Power integration in IT Software (VMware)

- Register IPM as a Plug-In in vCenter
- Register new type of event (Power Event)
- Create new alarms triggered from events



The screenshot shows the vCenter Server - vSphere Client interface with the Eaton Intelligent Power Manager (IPM) plug-in installed. The main window displays the 'Node List' table, which contains the following data:

Type	Status	Name	Description	Location	Contact	Link
UPS Network Management Card	OK	Evolution 1150	Evolution 1150	Computer Room	Computer Room M...	
VMA & NSM	OK	Linux	Linux			
vCenter & IPM	OK	Windows NT/6.00...	Windows NT/6.00...			

The 'Selection view' on the right provides detailed information for the selected 'UPS Network Management Card':

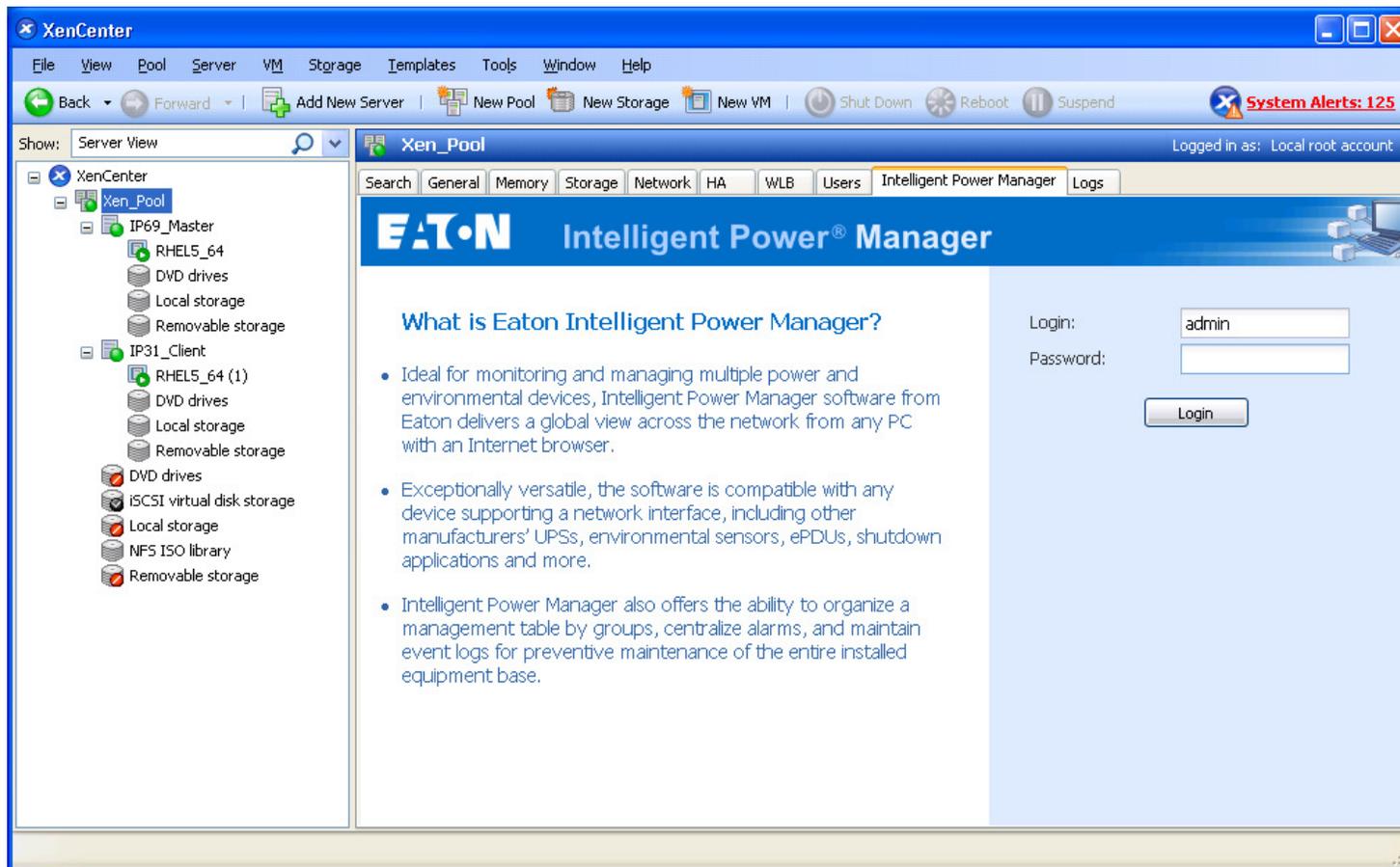
- Description: Evolution 1150
- Nominal apparent power: 1150 VA
- IP address: 166.99.250.26
- Mac Address: 00:20:85:FD:42:1E
- Serial number: AV5G2500A
- Location: Computer Room
- Contact: Computer Room Manager

Power Event trig Alarms

The screenshot displays the VMware vCenter Intelligent Power Manager interface. The left sidebar shows a tree view of hosts, with 'sc07.support.eaton.com' circled in red. The main pane shows the 'Node List' with two entries for 'sc07.support.eaton.com' and 'sc08.support.eaton.com'. The right pane shows the 'Selection view' for 'sc07.support.eaton.com', with the 'Power Source' section circled in red, showing a warning icon and the IP address '166.99.226.67'. At the bottom, the 'Triggered Alarms' table shows a single entry for 'Host UPS PowerFailure (On Battery)' on 'sc07.support.eaton.com' at '07/11/2011 15:18:10', which is also circled in red.

Object	Status	Name	Triggered	Acknowledged	Acknowledged By
sc07.support.eaton.com	Alert	Host UPS PowerFailure (On Battery)	07/11/2011 15:18:10		

Power integration in IT Software (Citrix)



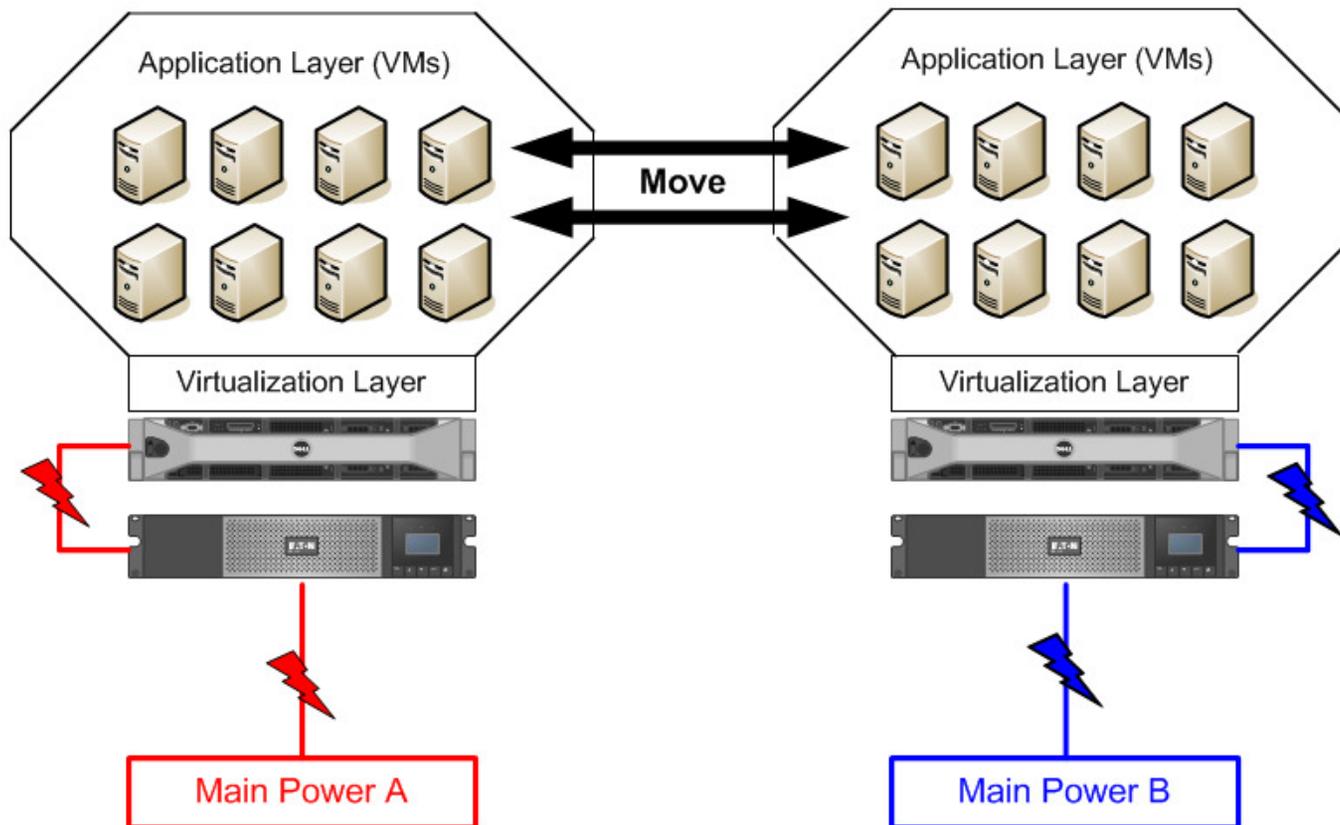
The screenshot displays the XenCenter application window. The title bar reads "XenCenter" and the menu bar includes "File", "View", "Pool", "Server", "VM", "Storage", "Templates", "Tools", "Window", and "Help". The toolbar contains buttons for "Back", "Forward", "Add New Server", "New Pool", "New Storage", "New VM", "Shut Down", "Reboot", and "Suspend". A "System Alerts: 125" notification is visible in the top right. The main content area is titled "Xen_Pool" and shows a tree view on the left with nodes for "Xen_Pool", "IP69_Master", "RHEL5_64", "IP31_Client", and "RHEL5_64 (1)". The right pane displays the "Intelligent Power Manager" interface, which includes a search bar, tabs for "General", "Memory", "Storage", "Network", "HA", "WLB", "Users", "Intelligent Power Manager", and "Logs", and a login form with fields for "Login:" (containing "admin") and "Password:", and a "Login" button.

The Power Protection

- **Local Protection Agent (IPP)**
 - Closer to the server
 - Need to be installed on each server
 - Installation not always possible (VMware ESXi)
- **Remote Protection and Management (IPM)**
 - Network is critical for the protection
 - Single point of failure

Before the Shutdown

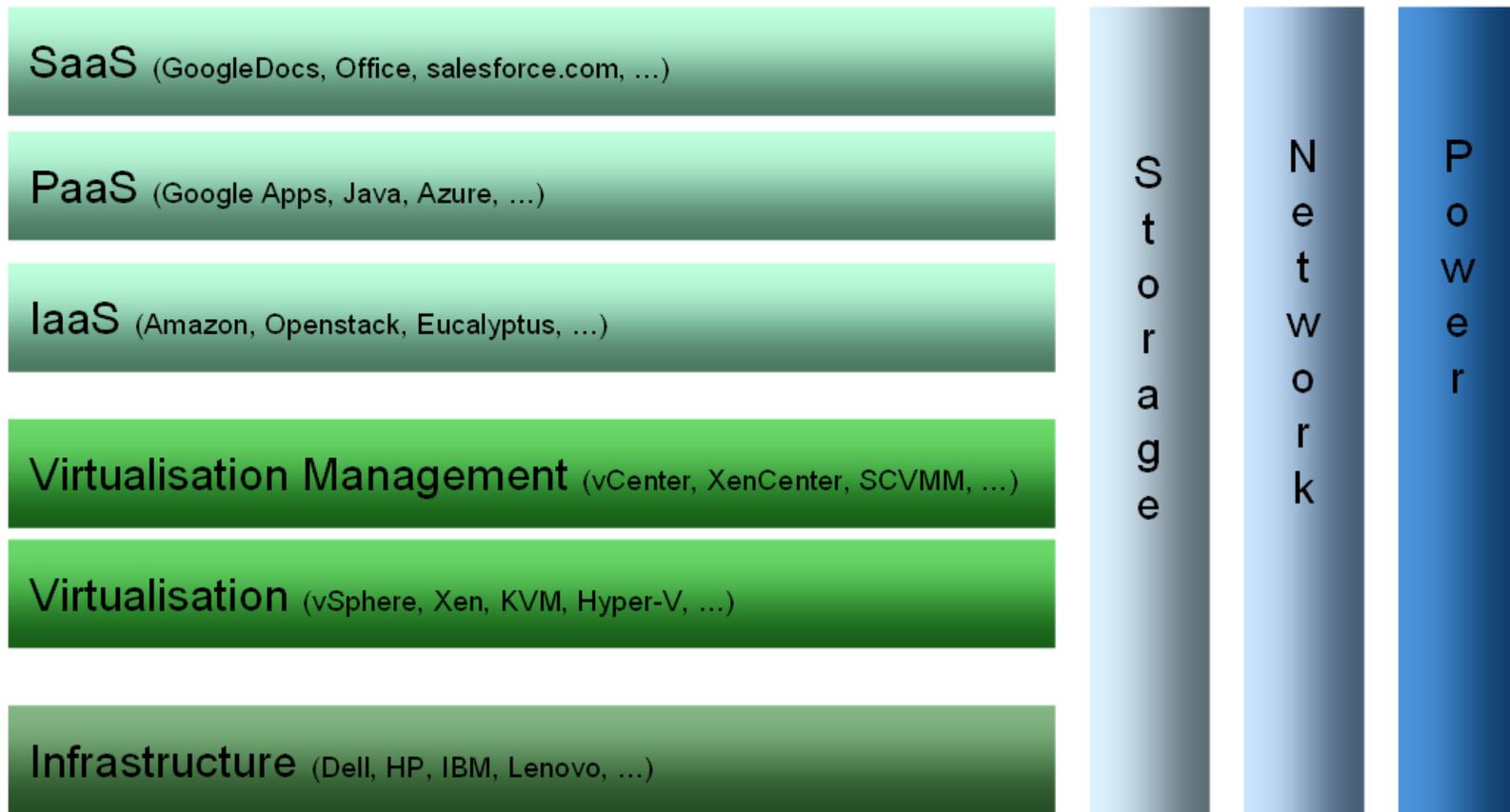
- Move load (VMs) on safe place



Demo : Citrix – Xen Server

- [Citrix IPM demo 4 dec 2011.mp4](#)

Typical Cloud Architecture



Virtualization support

									
	Description	VMware		Hyper-V		Xen		Enterprise Virt.	
		Eaton	APC	Eaton	APC	Eaton	APC	Eaton	APC
Host Server / Hypervisor	Virtual Machine Shutdown	ESXi		Hyper-V		XenServer		RHEV-H	
		✓ (IPP)	✓	✓ (IPP)	✓	✓	✗	✗	✗
Virtual Machine Manager	VM Management as a System (like a physical server)	vCenter		SCVMM		XenCenter		RHEV-M	
		✓ (IPM)	✗	✓ (IPM)	✗	✓	✗	✗	✗
	vCenter Shutdown without one installation per VM	✓ (IPM)	✗						
Migration	Triggering VM Migration on electrical alarms	vMotion		Live Migration		XenMotion		Live Migration	
		✓ (IPM)	✗	✓ (IPM)	✗	✓	✗	✗	✗

For more information

- Learn more about the new Intelligent Power Software Suite and view the product demo at www.eaton.com/intelligentpower



EATON

Powering Business Worldwide