Green Days @ Lyon

Power management in virtual server environment

Aurélien Bégou (aurelienbegou@eaton.com)
Dominique Lallement (dominiquelallement@eaton.com)
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

© 2012 Eaton Corporation. All rights reserved
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

Network Proxy (IPP)

OR

Monitored/Managed ePDU

Connectivity card installed on UPSs

Ethernet

Intelligent Power Manager – standalone or plugged into virtual environment

Supervision / Administration software

Intelligent Power Protector – installed on protected equipment

Protection software

© 2012 Eaton Corporation. All rights reserved
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™
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 packages))
  - 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 & https access & Multi level password
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](http://pqsoftware.eaton.com)
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
Power Event trig Alarms
Power integration in IT Software (Citrix)

What is Eaton Intelligent Power Manager?

- Ideal for monitoring and managing multiple power and environmental devices, Intelligent Power Manager software from Eaton delivers a global view across the network from any PC with an Internet browser.
- Exceptionally versatile, the software is compatible with any device supporting a network interface, including other manufacturers’ UPSs, environmental sensors, ePODs, shutdown applications and more.
- Intelligent Power Manager also offers the ability to organize a management table by groups, centralize alarms, and maintain event logs for preventive maintenance of the entire installed equipment base.
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

![Diagram showing the movement of VMs from one virtualization layer to another](image)
Demo : Citrix – Xen Server

- Citrix_IPM demo 4 dec 2011.mp4
Typical Cloud Architecture

SaaS (Google Docs, Office, salesforce.com, ...)

PaaS (Google Apps, Java, Azure, ...)

IaaS (Amazon, Openstack, Eucalyptus, ...)

Virtualisation Management (vCenter, XenCenter, SCVMM, ...)

Virtualisation (vSphere, Xen, KVM, Hyper-V, ...)

Infrastructure (Dell, HP, IBM, Lenovo, ...)
## Virtualization support

<table>
<thead>
<tr>
<th>Description</th>
<th>VMware</th>
<th>Hyper-V</th>
<th>Xen</th>
<th>Enterprise Virt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host Server / Hypervisor</td>
<td>Eaton</td>
<td>APC</td>
<td>Eaton</td>
<td>APC</td>
</tr>
<tr>
<td>Virtual Machine Shutdown</td>
<td>ESXi</td>
<td>✓✓</td>
<td>✓✓</td>
<td>✓✓</td>
</tr>
<tr>
<td></td>
<td>(IPP)</td>
<td></td>
<td>(IPP)</td>
<td></td>
</tr>
<tr>
<td>Virtual Machine Manager</td>
<td>vCenter</td>
<td>SCVMM</td>
<td>XenCenter</td>
<td>RHEV-M</td>
</tr>
<tr>
<td>VM Management as a System (like a physical server)</td>
<td>✓✓</td>
<td>✓✓</td>
<td>✓✓</td>
<td>✓✓</td>
</tr>
<tr>
<td></td>
<td>(IPM)</td>
<td>(IPM)</td>
<td>(IPM)</td>
<td></td>
</tr>
<tr>
<td>vCenter Shutdown without one installation per VM</td>
<td>✓✓</td>
<td>x</td>
<td>✓✓</td>
<td>✓✓</td>
</tr>
<tr>
<td></td>
<td>(IPM)</td>
<td></td>
<td>(IPM)</td>
<td></td>
</tr>
<tr>
<td>Migration</td>
<td>vMotion</td>
<td>Live Migration</td>
<td>XenMotion</td>
<td>Live Migration</td>
</tr>
<tr>
<td>Triggering VM Migration on electrical alarms</td>
<td>✓✓</td>
<td>x</td>
<td>✓✓</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>(IPM)</td>
<td>(IPM)</td>
<td>(IPM)</td>
<td></td>
</tr>
</tbody>
</table>
For more information

- Learn more about the new Intelligent Power Software Suite and view the product demo at [www.eaton.com/intelligentpower](http://www.eaton.com/intelligentpower)