Advanced Power Management: Operating Smarter Data Centers with IBM Systems Director Active Energy Manager and VMware vSphere

ENERGIZING THE ENERGY MANAGEMENT IN YOUR DATA CENTER

Given the risks of energy costs and availability around the globe, energy efficiency is a key driver for today’s businesses. To stay on top of energy consumption and data center infrastructure costs, IT and data center managers need effective ways to monitor and manage energy usage across IT systems throughout the data center. In essence, they need the tools to run smart data centers. Now, with a long history of joint innovation, IBM® and VMware® have come together to provide an integrated power management solution that offers a new level of insight into power consumption. Both IBM and VMware offer innovative tools to maximize the energy efficiency of your data center.

IBM: Power-Efficient Platforms

IBM is at the forefront of delivering the new enterprise data center, with the hardware, software, and services known worldwide as an evolutionary model for smart and efficient IT service. More and more companies are learning that IBM Systems Director offers a power-efficient platform management foundation for achieving smarter systems in the data center. IBM Systems Director provides a comprehensive suite of tools to help organizations manage and optimize their data center resources, improve server performance, and reduce energy consumption.

WHY IBM AND VMWARE POWER MANAGEMENT?

- VMware virtualization helps you reduce the energy demands of your data center through server consolidation.
- IBM’s proven platform management tools help you manage and optimize your data center resources.
- The IBM hardware platform together with the VMware vSphere Hypervisor virtualization platform can integrate power and performance information to enable greater levels of energy savings and improve your servers’ performance per watt.

IBM and VMware are actively responding to the growing concern of government agencies like the U.S. EPA with data center energy consumption.
Director Active Energy Manager™ is central to IBM’s energy-efficient technologies and services. The solution adds the layer of intelligence needed to assess IT power consumption across the data center for efficiency gains and cost reduction.

**VMware: Consolidated, Virtualized Systems**

VMware is a global leader in cloud infrastructure. The company offers extremely high levels of availability and responsiveness for applications and services with VMware vSphere™—a complete, robust platform for virtualization in demanding data centers around the world. VMware vCenter™ automates and simplifies the administration of data center operations, particularly virtualization management tasks. VMware vSphere Hypervisor™, based on the VMware ESXi architecture, unlocks the vSphere Hypervisor functionality and offers companies an easy way to get started with virtualization to enhance the efficiency of the data center, and especially to optimize energy usage.

**INTEGRATED POWER MANAGEMENT**

To help you better manage power consumption, IBM System x hardware, IBM Systems Director Active Energy Manager, and VMware vCenter now work together in the data center, interacting to strengthen your power management capabilities. The tools first assess the power and cooling characteristics of your individual IBM System x servers containing power measurement hardware components. With vSphere 4.1, vCenter provides the monitored information to Active Energy Manager, including actual and latent CPU utilization data, which accounts for CPU power management states, to Active Energy Manager. Using this detailed side-by-side information presented in both vCenter and Active Energy Manager graphical charts, your IT staff can set policies and configurations that allow greater energy savings.

**Active Energy Manager**

With Active Energy Manager, you can monitor and manage power usage, monitor server inlet and exhaust air temperatures, and identify where additional cooling may be required on your IBM and non-IBM IT equipment. Active Energy Manager is part of a larger energy-management implementation that includes hardware and firmware components. Using real-time monitoring in Active Energy Manager, you can save energy costs through automated and manual power management activities.

The Active Energy Manager plug-in for IBM Systems Director allows you to:
- Monitor power and environmental values of resources.
- Track historical trends and current sensors for power, power cap, temperature, humidity, dew point, CPU speed, and energy-related events associated with resources monitored by Active Energy Manager.
- Display the amount of energy used for a given resource or group of resources over a specified period of time and calculate the corresponding cost of that energy.
- Reduce stranded energy by enforcing energy allocation in your data center via server energy caps.
- Use event automation plans to automate power-related tasks.
- Maximize performance per watt of a server by comparing server energy consumption to server output using CPU utilization from the vSphere Hypervisor.

**FIGURE 1**

*Active Energy Manager using vSphere Hypervisor data showing varying levels of performance per watt using energy and CPU utilization.*
vCenter

VMware helps you reduce the energy demands of your data center through server consolidation, and vCenter enables monitoring and dynamic management of your servers for additional energy savings. VMware vSphere Hypervisor™ (ESXi) 4.1 controls CPU deep-sleep states to further reduce platform energy consumption during periods of low utilization. The new vSphere Client has a simple-to-use interface for choosing among supported host power management policies. In addition, your IT staff can view the history of host energy consumption and energy cap information on the vSphere Client performance screen on most IBM System x, BladeCenter® and System x iDataPlex™ platforms with integrated power meters.

When running on selected IBM System x platforms, the vSphere Client plug-in enables you to:

- Display context-sensitive UI controls in the vSphere Client so users can invoke Active Energy Manager functionality.
- Display power trend information for a selected physical server in vSphere Client received from Active Energy Manager.
- Display Active Energy Manager and Director Resource Navigator pages for a selected physical server in vSphere Client.
- Launch the complete IBM Systems Director console in a separate window.
- Automatically map an ESXi host to the corresponding service processor.

Increase Energy Management, Reduce Power Consumption

VMware and IBM were first in the industry to provide a well-aligned performance-per-watt system that accurately reports power consumption and CPU performance, as presented and tested at the VMworld® 2009 conference. This collaboration is producing technologies that display and manage energy usage of individual hosts and virtual machines within the data center. With the combined energy management expertise of IBM and VMware, you can better understand the energy efficiency of your platforms and workloads, and reduce ongoing data center costs.

For more information:

- VMware and IBM solutions: www.vmware.com/go/ibm
- VMware vSphere: www.vmware.com/products/vsphere/
- VMware vCenter: www.vmware.com/products/vcenter/
- IBM virtualization: www.ibm.com/virtualization/vmware
- IBM Systems Director: www.ibm.com/systems/software/director/
- IBM Systems Director Active Energy Manager: www.ibm.com/systems/software/director/aem/

THE POWER MANAGEMENT SOLUTION:

- IBM System x 3850 X5 server
- IBM System x 3950 X5 server
- IBM System x 3690 X5 server
- IBM BladeCenter HS22V server
- IBM BladeCenter HX5 server
- IBM System x iDataPlex servers
- IBM Systems Director 6.2
- IBM Systems Director Active Energy Manager 4.3
- IBM Systems Director Active Energy Manager plug-in for vSphere Client
- VMware vSphere 4.1
- VMware vSphere Hypervisor
- VMware vCenter

FIGURE 2

Display of power trend information for a selected physical server in vSphere Client.