Overcoming Eight Common Power Management Challenges

How intelligent, logical and complete power management solutions provide relief for some of today's worst power-related headaches

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Executive Summary

Today, many organizations use standalone software from multiple vendors to monitor and manage their uninterruptible power systems (UPSs), power distribution units (PDUs) and other crucial power quality and environmental devices. Short on features and poorly integrated with other management resources, these outdated applications only add further complexity to a variety of common power-related administrative challenges.

This white paper discusses eight such challenges, and shows how a new generation of intelligent, logical and complete power management solutions can help data center managers tackle each of them effectively and efficiently.

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Common power monitoring and management problems

Though no two organizations are exactly alike, their IT and facilities staffs often face similar power monitoring and management issues. Fortunately, the latest generation of intelligent, logical and complete power management solutions can help organizations address those issues more successfully.

1. Aggregating power quality device information

To be certain that all of their power quality systems are functioning properly, data center managers need complete, real-time status information from every such device in their IT infrastructure. At present, however, several factors make assembling a consolidated view of power protection and distribution systems tricky.

For one, most businesses today use UPSs and PDUs from multiple manufacturers. Some of those systems lack a connector card, and most of them come with standalone power management solutions that can be difficult to integrate. In addition, many older power management solutions are incapable of monitoring power quality systems outside the data center in locations such as branch offices and lab facilities. The end result of all these issues is that data center managers end up with a fragmented and incomplete view of their power infrastructure.

Today's intelligent power management solutions help organizations address these problems by providing a truly global view of their power quality infrastructure through a single console. Such systems are compatible with network-enabled power devices—including most UPSs, environmental sensors and PDUs—no matter where they are located. Thus, IT and facilities personnel can easily monitor and manage all of their power quality hardware, both inside and outside the data center, and reduce their exposure to costly and disruptive downtime.
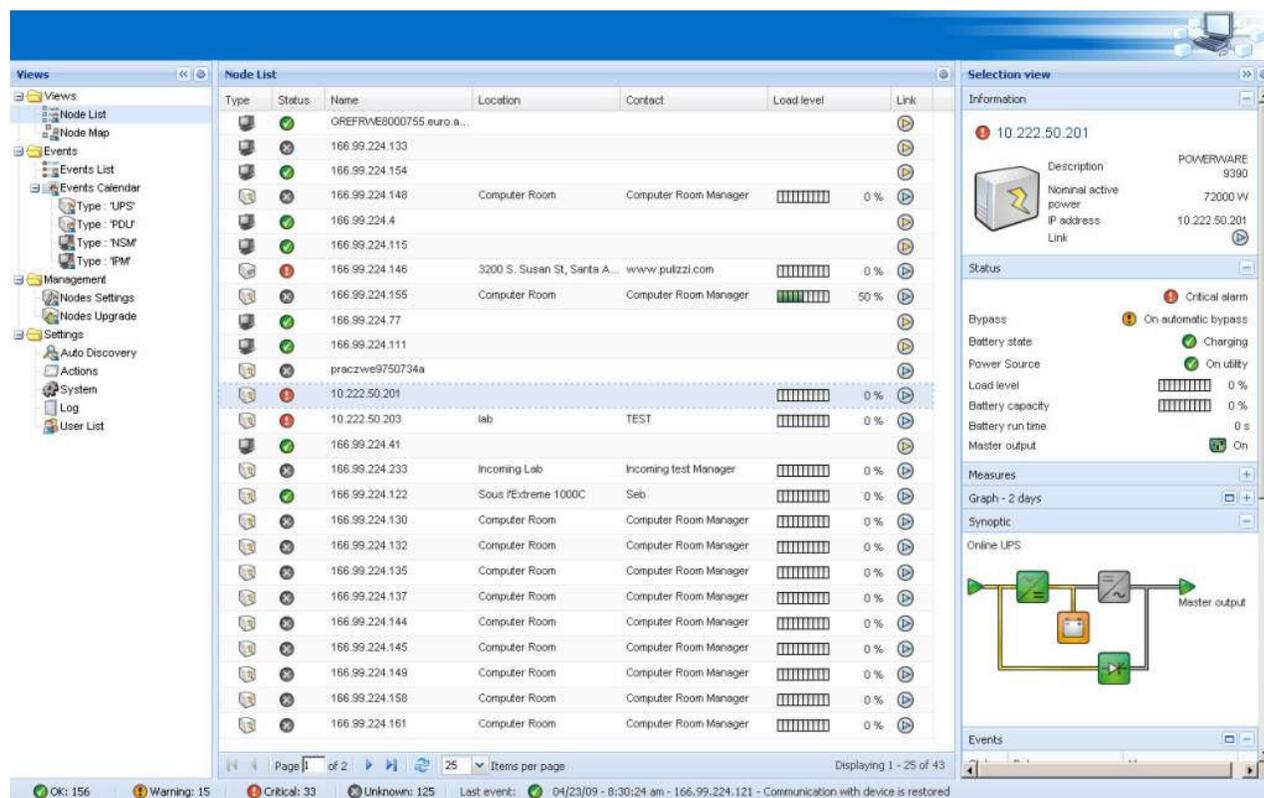

Figure 1. *A comprehensive view of power and environmental devices by power management solutions.*

Furthermore, intelligent power management solutions typically come with auto-discovery functionality that accelerates and simplifies the setup process by detecting power devices on the network automatically. They

can even discover and support UPSs with no connector card, provided such devices are directly connected to a network-enabled PC. That gives administrators a truly comprehensive view of their power quality hardware. Administrators can also group and display devices in logically-arranged tree structures that enable them to identify and manage their power systems more easily.
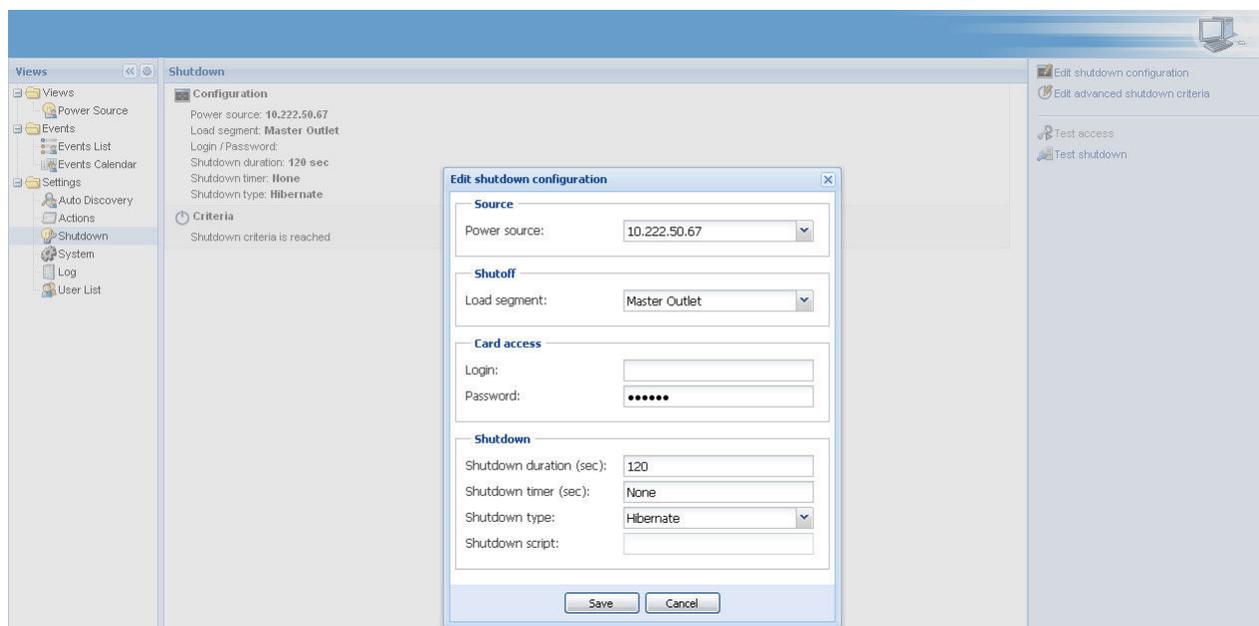

Figure 2. Should a power outage threaten to outlast UPS battery capacity, intelligent power protection software can shut down impacted servers automatically and gracefully.

2. Protecting workloads during power outages

Since no power utility or power grid is infallible, data centers are virtually guaranteed to experience electrical service interruptions at least occasionally. Minimizing the impact of such incidents is among a data center manager's most important responsibilities.

UPSs offer crucial assistance by providing emergency backup power. However, should an electrical outage exceed the runtime of their UPS batteries, organizations must shut down affected servers promptly to prevent software corruption and data loss. Today, unfortunately, many data centers must execute that process manually, forcing them to engage in a high-stakes race against time whenever they encounter a prolonged power loss.

Intelligent power management software helps technicians deal with power outages more efficiently. For starters, the latest power management solutions let technicians divide receptacles on their UPS hardware into separate load segments that can be monitored and administered individually. By grouping their least important infrastructure resources together in distinct load segments, companies can position themselves to make non-essential systems the first ones they shut down during a power outage. That conserves battery capacity and maximizes the amount of backup power available to keep mission-critical devices up and running.

In addition, during extended electrical service interruptions next-generation power protection solutions can shut down affected servers and network devices gracefully and automatically, protecting unsaved work and preserving data integrity.

3. Monitoring and managing virtualized server environments

Eager to lower hardware spending, simplify management and ensure continual uptime, businesses are rapidly implementing server virtualization in their data centers. In fact, nearly 50 percent of server workloads will be running on virtual machines by the end of 2012, according to analyst firm Gartner Inc.

Many organizations use virtualization management software to administer their virtual environments. Such systems provide centralized control over host servers, virtual machines, storage and more. At present, though, many users of virtualization management suites must employ a separate set of management tools to monitor their power infrastructure, weakening the productivity of their technicians and potentially delaying response times when problems occur.

Intelligent power management solutions integrate closely with leading virtualization management products such as VMware's vCenter™ Server, enabling IT and facilities personnel to view, monitor and administer not only physical and virtual servers but UPSs, PDUs and other power devices through one console. They also enable virtualization management products to provide a comprehensive view of network- and power-related alerts. That spares administrators from having to watch for alarms in two or more different places, and dramatically reduces the chances of serious issues going unnoticed.
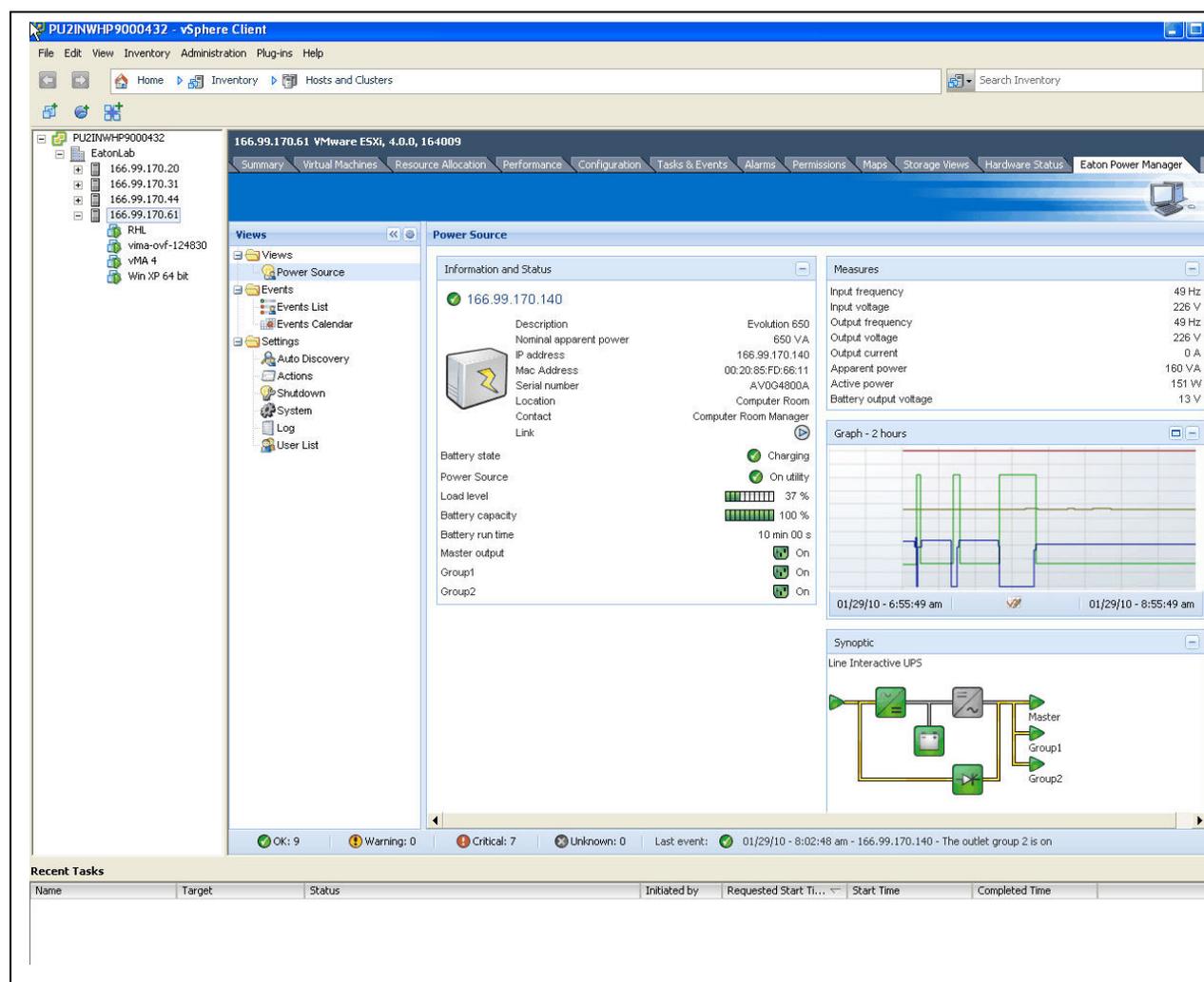

Figure 3. *Intelligent power management systems integrate with leading virtualization management products such as VMware's vCenter Server. In this example, administrators can monitor and manage power systems by clicking a tab in the vCenter Server dashboard.*

What's more, drawing on seamless integration with live migration systems such as VMware's vMotion™, intelligent power management solutions can automatically and transparently move virtual machines from host servers impacted by a power outage to unaffected servers elsewhere on the network; they can even

move virtual machines to co-located cloud data centers. As a result, businesses can weather even serious power outages without suffering data loss or application downtime.
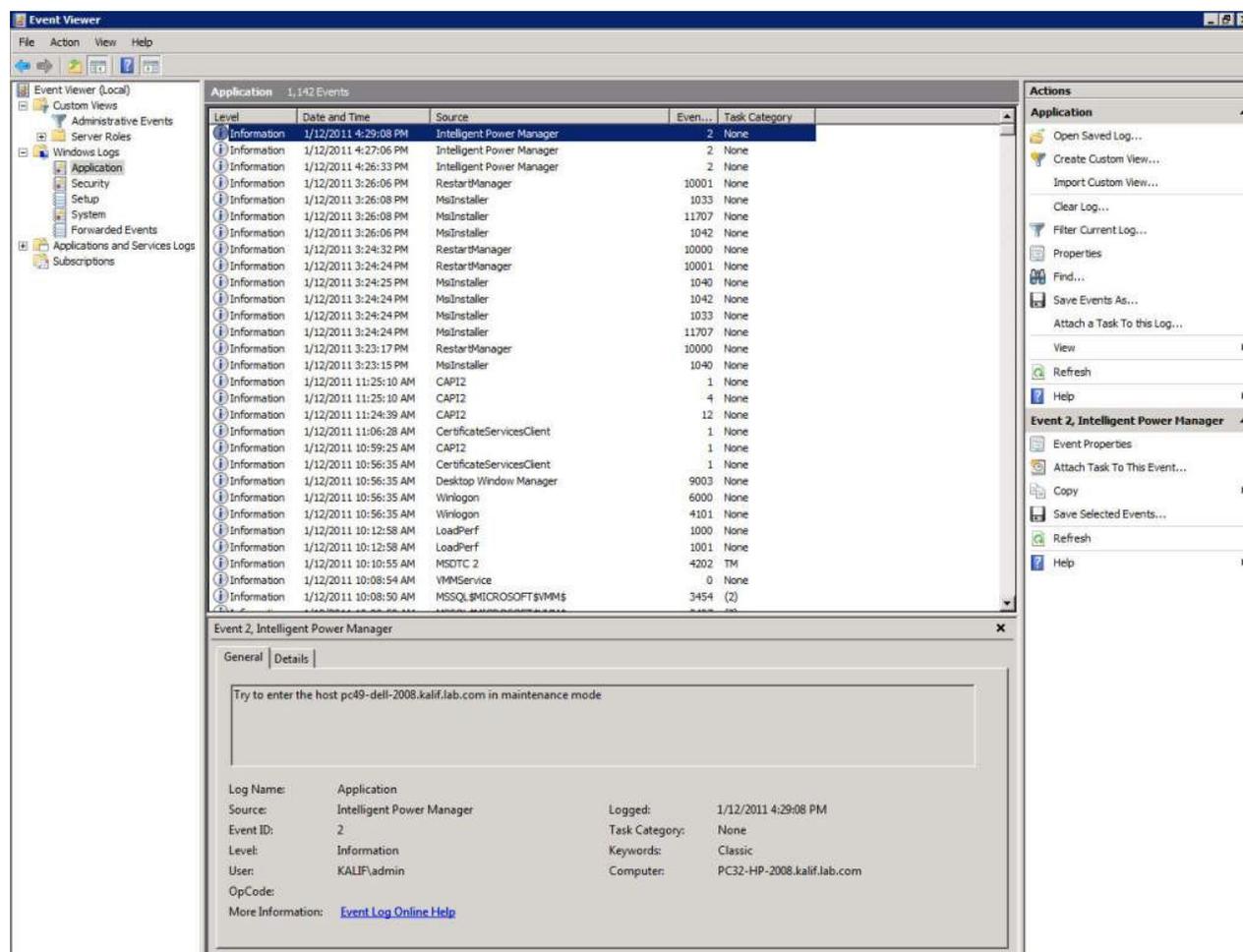

Figure 4. Integration with virtualization management systems like vCenter Server enables intelligent power management solutions to log power-related events alongside other infrastructure events. vCenter can then act on those events automatically, moving or shutting down virtual machines as needed.

Similarly, some power management systems draw on tight connectivity with leading asset management solutions to optimize power efficiency and virtual workload distribution across server racks automatically. For example, should an organization's asset management software detect that a server enclosure is nearing its power or cooling limit, the power management system can swiftly and automatically instruct the virtualization management system to move workloads onto host devices in other racks with spare capacity.

4. Maintaining power system reliability

In an emergency, the effects of a UPS failure can be devastating. Yet most organizations today are ill-equipped to spot warning signs of future trouble, such as deteriorating performance or an overheating battery.

Intelligent power management products provide real-time notification of such issues as they develop, empowering technicians to take action before serious breakdowns occur. Administrators can even specify whether they wish to receive such alerts through e-mail, network popups or in other ways.

Additionally, the latest power management systems collect and archive enterprise-wide UPS performance data. Drawing on that information, administrators can generate a variety of informative reports, or export data to spreadsheet programs for deeper analysis. That, in turn, can help them prevent downtime by proactively identifying and addressing impending failures, overloaded UPSs or UPSs in need of rebalancing.
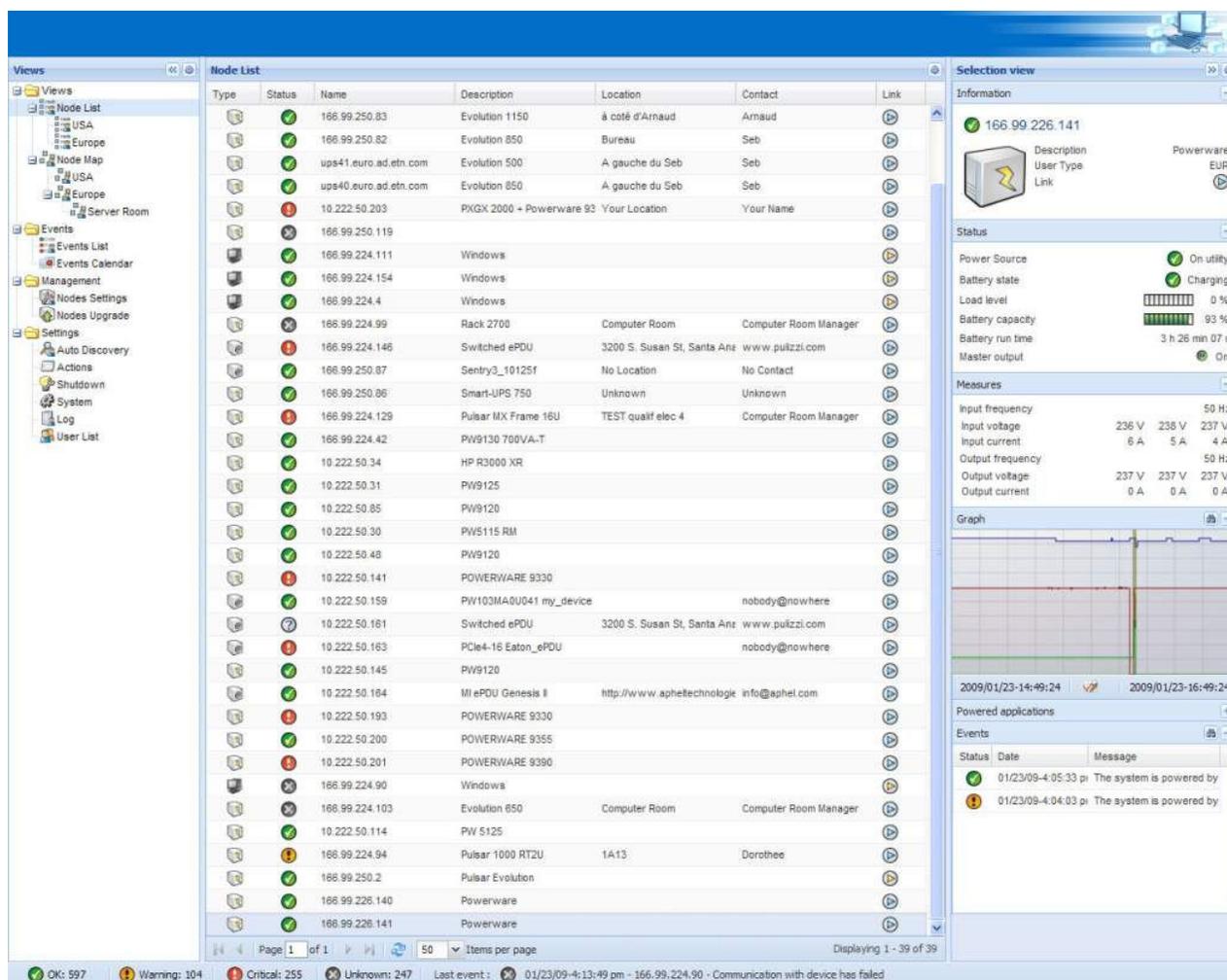

Figure 5. Intelligent power management systems provide access to detailed reporting data that organizations can use to track performance trends and proactively address power system anomalies that could lead to downtime.

5. Administering remote data centers

Network infrastructures are more distributed than ever these days. Most large companies maintain multiple data centers, and even midsize organizations often have IT assets in more than one place. However, the power management systems that most businesses utilize at present can support only one site at a time. Moreover, to access those systems, technicians often must use a dedicated workstation physically located within the data center or other facility being managed.

Intelligent power management solutions, by contrast, can monitor and control network-enabled power devices wherever they are positioned. Thus, technicians can administer not only the facility they are in but remote data centers as well through the same console. What is more, the latest power management systems feature Web-based interfaces, so IT and facilities managers can run them from any device in any location, so long as it is equipped with a browser and has access to the network.

6. Tracking power quality assets

Data centers are dynamic environments in which equipment is constantly being added, removed and re-located. As a result, IT and facilities managers often struggle to maintain complete and accurate records of how many power devices they own and where those devices reside.

Intelligent power management solutions simplify asset tracking by making it easy to record changes in an organization's power infrastructure, such as moves, additions and retirements. And since the latest power management systems have visibility into every power system on the network, their asset tracking abilities extend beyond the data center to branch and local deployments as well. Additionally, most intelligent power management software offers functionality that technicians can use to file notes about the physical location of power and environmental devices, further simplifying asset management. Finally, some power management systems interface automatically with asset management solutions, further streamlining the asset tracking process.
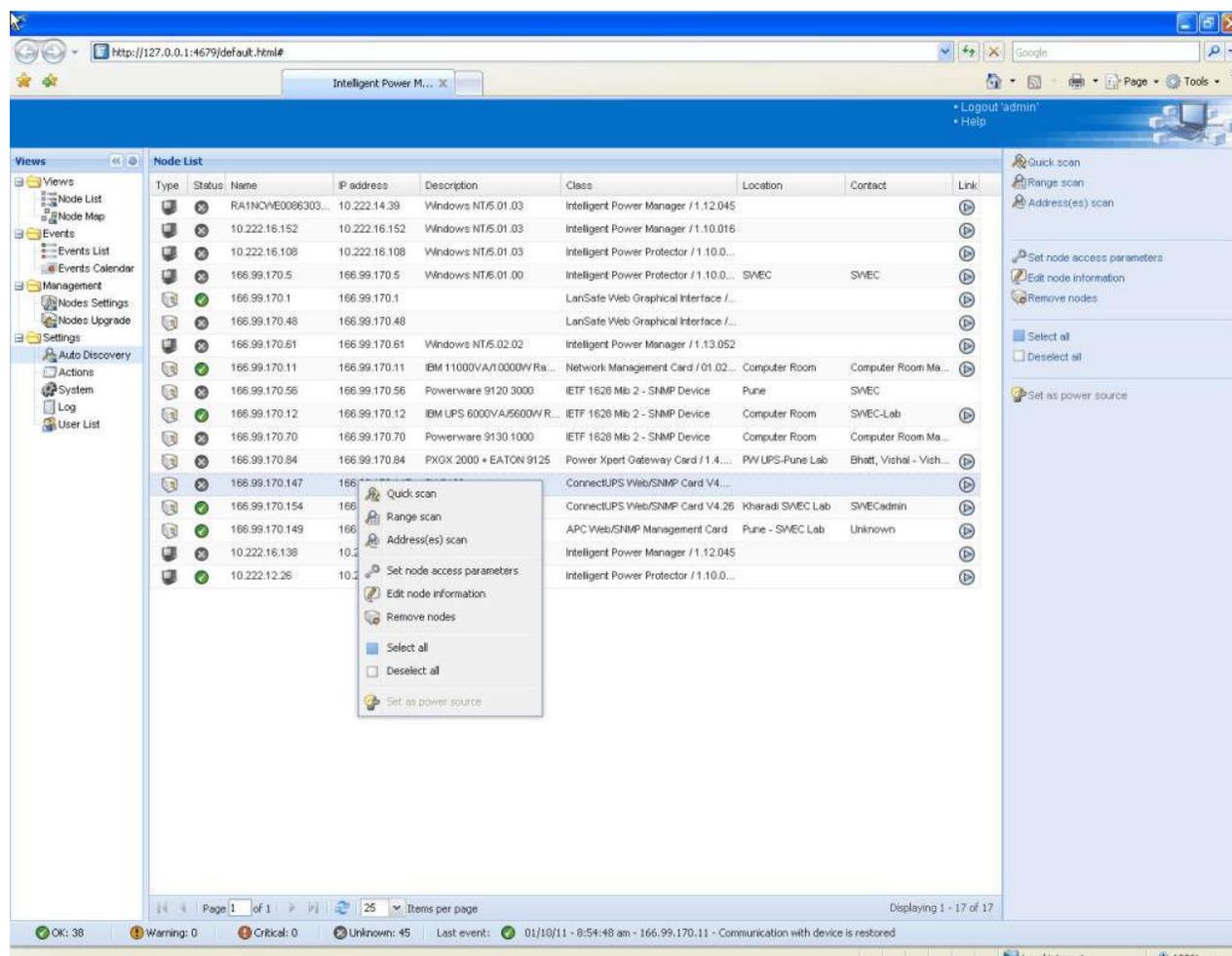

Figure 6. Intelligent power management solutions make tracking and managing power-related assets easier.

7. Managing use-based electricity billing schemes

Looking to apportion costs more fairly and encourage more efficient consumption of resources, data centers are increasingly adopting use-based electricity billing schemes in which facilities managers charge a

company's various divisions separately for their share of the power bill. Collecting the division-level usage statistics necessary to make such schemes work, however, can be a challenge.

Intelligent power management solutions help simplify that task by enabling facilities managers to monitor and manage power quality devices in groups that correspond to their various business units. They can then create reports showing how much power each group consumed, and bill the appropriate business unit accordingly.

8. Configuring and updating firmware

For most organizations today, upgrading firmware on UPS connector cards is a tedious and expensive process in which technicians must physically visit and update each device individually. Intelligent power management systems, however, enable administrators to upgrade all of their UPS hardware at once over the network, significantly reducing the cost and complexity of rolling out new commands, features and functions.

Conclusion

The outdated and poorly integrated monitoring and management software many organizations rely on at present offers little help with many of today's most common and pressing power-related challenges.

Fortunately, however, organizations now have access to a new generation of intelligent, logical and complete power management solutions that are significantly better equipped to help companies overcome such challenges. Using these systems, IT and facilities personnel can view comprehensive information about network-enabled power and environmental systems, protect both physical and virtual servers during power outages, perform proactive maintenance and more — from any location and on any device with a network connection and Web browser. Organizations eager to preserve data integrity and keep mission-critical systems continuously available should further investigate the latest power management products to learn more about the assistance they can offer in relieving painful power-related headaches.

About Eaton

Eaton Corporation is a diversified power management company with 2010 sales of $13.7 billion. Celebrating its 100th anniversary in 2011, Eaton is a global technology leader in electrical components and systems for power quality, distribution and control; hydraulics components, systems and services for industrial and mobile equipment; aerospace fuel, hydraulics and pneumatic systems for commercial and military use; and truck and automotive drivetrain and powertrain systems for performance, fuel economy and safety. Eaton has approximately 70,000 employees and sells products to customers in more than 150 countries. For more information, visit www.eaton.com.

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