

Understand & Solve Data Center Power Problems

Tips To Identify & Fix Possible Issues

TWO PROCLAMATIONS CONCERNING power are nearly impossible to dispute. One, power-related problems will happen sooner or later, and two, when they do they can be incredibly costly. A Ponemon Institute study conducted in 2011 found that data center outages ranged in cost from \$38,969 to about \$1.02 million per organization for an overall average cost of more than \$500,000 per incident. Given such dire possibilities, it is critical for data center managers to know what could happen and how to fix it.

✓ *Know Common Problems*

Some power problems are more common than others. Among these are battery-related issues. Jim Hall, marketing manager at Staco Energy (866/261-1191; www.stacoenergy.com), cites battery failure as the No. 1 cause of power interruptions in data centers. Proactive battery monitoring is of the highest priority to ensure

emergency power backup, including primary and secondary backup addressing such areas as cross-over batteries for starting emergency generators, he says.

Other common power problems relate to unbalanced and inefficient power distribution, poorly managed capacity planning/management, and human error. The Ponemon Institute study cited the use of UPSes lacking appropriate load capacity as a main cause of outages.

Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net), says in recent years, power requirements for racks have increased rapidly primarily because of an upsurge in the use of blade servers and other high-density equipment. The increase has “proven some traditional methods of providing power and cooling to the rack to be inadequate,” she says. “Finding a balance between providing sufficient power and cooling to the rack and not

spending an arm and a leg on equipment and energy costs can be a challenge.”

✓ *Get To The Root Of The Problem*

Poor planning, Viars says, “is likely the most common cause of power-related problems.” To save money, IT managers often don’t plan for the future, she says. When growth inevitably occurs, they wind up in a tight spot due to budget or time constraints. “It might cost a little bit more upfront, but making sure that you are considering future potential for growth will ensure that your network can smoothly transition into expansion,” she says.

Marc Eisenberg, senior systems engineer at Server Technology (www.servertech.com), cites human error as a major problem. “The biggest factor is guessing how much power is needed, how much power is available, and how much is used,” he says.

Using a power-management tool can take the guesswork out of these questions, he says.

Staco Energy’s Hall says it’s not uncommon for small to midsized enterprises to lack guidance and need benchmarking to help identify best practices. “Typical symptoms are running out of power and cooling capacity and, to a lesser extent, out of space,” he says. Where overcapacity related to unguided provisioning is concerned, there’s an acute need for outside assistance, he says.

Hall advises taking a universal best practices approach toward power use and efficiency on the demand side (processors, server PSUs, storage, other IT loads, etc.) and supply side (MV transformer/switchgear, UPS, distribution, cooling, lighting, etc.). Every 1 watt saved on the demand side, he says, saves the equivalent of about 3 watts of supply side losses. “By focusing on both, which are approximately equal users of total energy,



higher savings leverage is provided by energy use on the demand-side IT loads,” he says.

✓ *Prevent Problems*

Viars says it may be difficult to prevent power-related problems from occurring if the data center requires high-density equipment. However, she says, “ensuring that you’re prepared to accommodate the power requirements will help prevent any issues with power distribution in the data center.” Ensure the data center can accommodate 120V and 208V power, she says. “To prevent downtime, it’s integral to select backup power options that not only provide ample capacity for your current equipment but also have potential for growth or expansion,” she says. “For large-scale applications, redundant power solutions are a must.”

Hall says measurement and upfront planning are essential to optimizing results and ROI. “Energy Star-rated IT equipment and

virtualization are high on the priority list for demand side,” he says. High reliability, energy efficiency, and cooling (which accounts for more than two-thirds of average energy use) best practices are high priorities for the supply side, he says.

When it comes to prevention, on the supply side carefully consider expected outcomes and business needs and priorities before planning and creating the power infrastructure, he says. By designing the entire power-delivery infrastructure upfront, most potential problems can be prevented and optimized for the future, he says. On the load side, begin by focusing on expected outcomes by targeting business needs and computing capacity. “It’s better to have a plan in place to avoid the typical cycle of firefighting and fixing,” he says, which often leads to sub-optimized IT outcomes that don’t account for future requirements.

✓ *Monitor For Problems*

Eisenberg says it’s imperative for data center managers to understand where and how power is being used. Monitoring, however, “means more than just a ‘spot in time measurement,’” he says. Managers need enough data to build valuable trends. A good benchmark of trend/monitored data enables evaluating the state of the data center and turning “assumptions into knowledge,” he says.

He advises monitoring for unbalanced power distribution using a tool that enables managers to associate PDU in-feeds/branches with lines. These downstream lines, he says, equate to the lines of upstream devices, such as a UPS. A combination of downstream lines can be formed into a circuit. Managers can use the aggregated information in the circuit to compare actual monitored power values

from the server cabinet to the higher-level UPS, he says. “The main benefit is to compare actual numbers and use it to decipher larger, upstream readings.”

Eisenberg says managers can address issues related to poorly managed capacity planning/management by creating and enforcing usage rules/thresholds to enforce capacity planning best practices.

Using a tool to define the maximum capacity for a PDU or cabinet and viewing the usage to eliminate guesswork and manage better use of existing infrastructure limitations are also essential, he says. Management tools can also address inefficient distribution, he says. “Efficient distribution means many things—load balancing as well as minimizing stranded power,” he says. Tools that provide reports, trends, and views that show where power is being used can help spot problem areas and remedy issues. 

Bonus Tips:

✓ *Safeguard The Network*

“In most operations, all functionality boils down to the network one way or another,” says Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). If a network fails, production halts and services are interrupted, meaning no services for clients and financial losses, she says. “Planning ahead is essential for maintaining a network with minimal planned downtime and virtually no unplanned downtime,” she says.

✓ *Keep Alert Remotely*

Viars says that, depending on the equipment and enterprise’s size, basic monitoring software is often included free or is available at a nominal fee. Many systems “can provide alerts remotely, so that no matter where you are you’ll know if something isn’t quite right with your network,” she says. Advanced monitored PDUs cost more but can save considerable time and money long-term by helping eliminate after-hours trips to the data center to reboot devices.

✓ *Create A Model*

One way to better address power problems is by creating a model in which IT and facilities work together to deliver expected business outcomes—something easier said than done, says Jim Hall, marketing manager at Staco Energy (866/261-1191; www.stacoenergy.com). “Often, in both SME and enterprise organizations, silos exist by function, often without an overall executive-driven plan being identifiable,” he says. Split incentives for IT and facilities costs and priorities can override opportunities to develop synergies between the two groups.

✓ *Keep Your Eye On New Innovations*

Marc Eisenberg, senior systems engineer at Server Technology (www.servertech.com), says new innovations aimed at power include PIPS (Per-Inlet Power Sensing) and POPS (Per-Outlet Power Sensing). The granular information both can gather at the inlet and/or outlet level gives data center managers more insight into actual consumption numbers rather than aggregate readings. PIPS and POPS also provide readings on power factor and crest factor, which yield valuable data about the actual power line, he says.