

Datacenter Trends: Innovations in Intelligent Power Management

Abstract

Intelligent power solutions allow administrators to remotely power cycle servers and devices and troubleshoot problems, reducing server downtime by providing direct access to power control. Several important aspects of intelligent power management products can help promote uptime and allow for more effective power management. These features include smart load shedding, centralized management capability, branch circuit protection, and three-phase power.

Power management is a top concern for data center managers.(1) To efficiently and effectively manage power, data center managers are increasingly implementing remote or “intelligent” power management solutions, which leverage hardware and/or software to monitor and control server-level power state and condition. Intelligent power can be used in environments of varying sizes, with solutions available for a wide range of applications—from control of a few outlets in a small office/home office (SOHO) environment or standalone kiosk to integrated vertically mounted solutions for medium to large-sized datacenters.

Intelligent Power Management

Intelligent power solutions allow administrators to remotely power cycle servers and devices and troubleshoot problems, reducing server downtime by providing direct access to power control. In a 2005 survey conducted by Cyclades, organizations that used intelligent power products reported an average recovery time of 10-30 minutes for remotely managed devices, compared to 1-2 hours for devices that were not remotely managed. (2)

In addition to reducing downtime and shortening the mean time to repair, intelligent power products offer several significant benefits including: providing administrators with the ability to proactively monitor and protect mission-critical equipment with onboard or third-party environmental monitoring devices, eliminating or reducing late night trips to the datacenter and reducing third-party service calls for server reboots, and allowing the implementation of cost-effective “lights-out” operation at remote offices and branch locations.

Innovative Features of Intelligent Power Management

Several important features of intelligent power management products can help promote uptime and allow for more effective power management. These features include: smart load shedding capability, centralized management capability, branch circuit protection, and three-phase power.

Smart Load Shedding

This feature, which is embedded in firmware already in many Server Technology intelligent power products, allows administrators to automatically “shed”, or perform a graceful shutdown of designated non-essential devices when certain pre-defined conditions occur, helping to avoid equipment damage and downtime when problems arise. (3) For example, administrators can specify that non-critical devices are automatically shed when an intelligent power device is notified (via SNMP) that a UPS is on battery-power status. In addition, load shedding can also be set to take place when probes within 10 feet of an intelligent power device measure temperatures that exceed predefined thresholds, or when true RMS (root-mean-squared) current levels are greater than set thresholds. In addition, administrators can configure the system to restore power through autorecovery to shed devices if adverse conditions have been reversed (i.e., UPS is on main power and/or temperature and current load are normal). (4)

Integrated Management

Integrated management platforms aggregate access to multiple devices, including power, making management more efficient and allowing administrators to access, troubleshoot, and power cycle devices quickly if problems occur. Server Technology’s Enterprise View PDU manager provides centralized access to Sentry CDUs, Sentry Power Tower products, and Sentry Commander devices. While Server Technology products can be centrally managed, each device has its own IP address for individual access if necessary. The Enterprise View PDU manager also allows administrators to leverage their existing investments by supporting Netbotz and APC environmental monitoring equipment, as well as environmental monitoring appliances by other manufacturers.

Other vendors also offer products for integrated management. For example, Avocent’s DSView3 software can be used to manage the Avocent Cyclades PM family, which integrates with Cyclades ACS console servers and KVM switches, allowing power control and console management from the same interface. Avocent’s DSView3 software can also be used to manage Sentry remote power management products. Raritan’s remote power control solutions integrate with Raritan’s Paragon, IP-Reach, and Dominion products and can be managed through the CommandCenter Secure Gateway appliance.

Branch Circuit Protection

Branch circuit protection can help prevent outages and losses, as each branch of grouped outlets has its own fuse or circuit breaker to isolate power anomalies and issues. Branch circuit protected devices typically fall into two categories, molded case circuit breakers listed to the UL (Underwriters Laboratories) 489 standard, or fuses listed to the UL 248 standard. (5) Server Technology products use fuses for branch circuit protection; APC products use circuit breakers. Server Technology's Sentry CDU family offers built-in branch circuit protection for single-phase 110V, 208V, and 240V circuits and three-phase 208V circuits.

Three-Phase Power

Recently, because of the rise in the use of blade servers and high-density computing clusters, power has become an even greater issue. Newer equipment often requires significantly more power for the same footprint, with demands as high as 40 kW per cabinet. (6) This high-power trend is expected to continue, with estimates that blade servers will be the fastest growing server form factor through 2009. (7) Due to this increased power demand, most of today's high-density server environments require, at a minimum, single-phase 208V power. To help mitigate this increased demand for power, particularly for applications that require 24-48 outlets, many administrators are choosing to implement 208V three-phase power, because compared to single-phase power, 3-Phase power uses fewer circuits, provides a more balanced power load, reduces the overall number of PDUs needed to power equipment, and significantly increases available amperage into the server rack. While three-phase power technology is not exclusive to remote power management products, many solutions can accommodate or incorporate it. To meet the demand of high-density servers, Server Technology offers several three-phase power options, including 208 V 60A 3 Phase power. For planning purposes, datacenter managers need to be aware of the existing circuitry in their datacenters, and at a minimum, should plan on incorporating 208V 30A single phase circuits or 208 V 30A 3-phase circuits into IT infrastructure to meet the current and future power demands of high-density environments.

Choose the Right Intelligent Power Solution

42U provides complete datacenter management solutions, including intelligent power, KVM over IP, environmental monitoring, server rack cooling, and rackmount solutions. A 42U sales engineer can help you sort through potential intelligent power management solutions and select the one most appropriate for your organization's particular needs and environment, allowing you to take advantage of all the innovative features that remote power management offers. The team at 42U specializes in assessing needs, creating solutions, and supporting clients, to ensure that IT professionals maximize their use of current technologies to improve overall business performance.

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