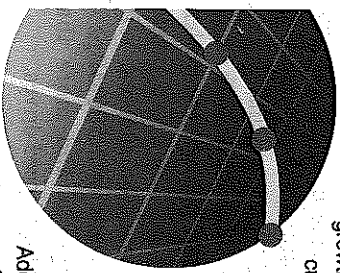


IBM Fellow Predicts Moore's Law Is Reaching Its End

In early April, speaking at the 2009 International Symposium On Physical Design, IBM Fellow Carl Anderson of IBM's Systems & Technology Group likened the semiconductor industry to the railroad, aviation, and automotive industries, all of which experienced exponential growth before reaching a point when that growth ran dry. "There was exponential growth in the railroad industry in the 1800s; there was exponential growth in the automobile industry in the 1930s and 1940s; and there was exponential growth in the performance of aircraft until [test pilots reached] the speed of sound. But eventually, exponential growth always comes to an end," *EE Times* quoted Anderson as stating.

Subsequently, Anderson's logic would mean the pending end of Moore's Law, which Intel co-founder Gordon Moore famously brought forth in the 1960s, predicting that the size of chips would halve about every 18 months while speeds doubled. To date, Moore's prediction has held mostly true. Anderson, however, believes that although the semiconductor industry is apt to see continued exponential growth, it will only occur for another generation or two of processors and likely include only such cutting-edge semiconductor solutions as multi-core processors.



Additionally, designers are finding that current physical processor designs aren't necessary to execute common applications, Anderson says, and only a select few manufacturers can foot the considerable bills associated with research and design of next-gen processors, as well as building and operating modern fabs.

Looking Ahead

Anderson predicts that optical interconnect, 3D chip, and accelerator processor technologies are still on track for exponential growth, with rack-to-rack optical interconnects to become commonplace and chip-to-chip interconnects upcoming but on-chip optical signaling still years off. Dr. Robert Castellano, president of The Information Network, a semiconductor research and consulting company, says the "main solution is to go to 3D."

"I liken the technology to the airline industry," Castellano says. "People wanted to go faster, so they made the Concorde. But flying it was a loss-maker for the airlines. Now, they are moving more people at slower speeds and not losing as much. Instead of improving on the Concorde, which holds 100 people, the airlines' mindsets are set at moving more people, hence the double-decker Airbus A-380. IC [integrated circuits] manufacturers are rethinking that now as processing issues such as TSV [through silicon via] are getting all the attention and will be moving soon to 3D at a much relaxed nodal point, perhaps 45nm."

In related news that would conflict with Anderson's prediction, DARPA recently awarded Al Hajimiri, a California Institute of Technology electrical engineer professor, \$6 million over four years to research a "self-healing" circuit technology. Such a circuit would reportedly involve circumventing defective transistors; currently, when even one transistor in a circuit fails, the entire circuit fails.

by Blaine Flaming

FEATURED PRODUCT

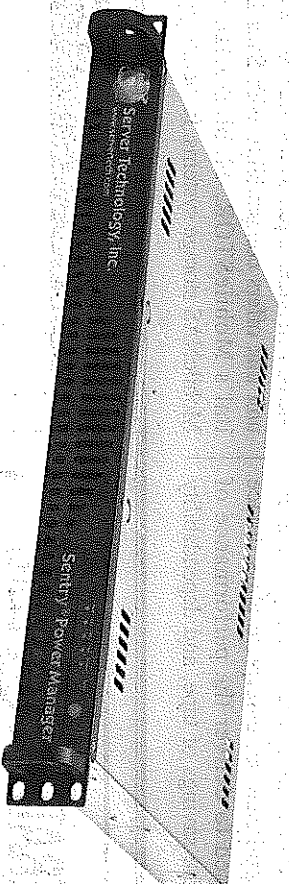
Powerful Management

Server Technology's Sentry Power Manager Gives IT A Centralized View Of Distributed Power Networks

by Sue Hildreth

MANAGING YOUR data center's energy usage is important for reducing costs and ensuring good performance. But keeping track of IT power consumption and maximizing energy efficiency is much more difficult when your IT infrastructure is dispersed across multiple remote locations.

That's when centralized power management software becomes useful. From a single interface, an IT manager can view power, environmental, and alarm conditions of all the power distribution units on the network. Without centralized power management, checking on the health of the PDUs would require going unit by unit across the net-



becoming aware that these high-power-demand racks require some troubleshooting to determine how much of a power draw will result as they expand."

Automation & Security

Sentry Power Manager provides features aimed at making it easier for remote IT managers to manage several locations at once. The system provides a "global view" to allow managers to see at a glance the entire network of devices and also offers multiple views for different concerns, such as current load, temperature, humidity, and capacity.

It has an Auto Discover feature that can scan the network and identify of all of the CDUs (cabinet power distribution units) on

work—not a fun prospect in an organization with more than a handful of PDUs.

"Each PDU has its own Web server, so you'd have to ping the IP address of each one," says Calvin Nicholson, director of product marketing for Server Technology (800/835-1515; www.servertech.com). "At some point, it becomes difficult to manage that way."

Server Technology recently released its centralized power management product, the Sentry Power Manager, which can monitor, manage, and control multiple Sentry devices in an IP network. The Sentry Power Manager can be used in conjunction with an integrated building management system or by itself to monitor PDUs on the network and create reports on power consumption trends.

According to Michael Perrino, vice president of PTS Data Center solutions (www.ptsdcs.com), centralized power management software has become increasingly popular as rack density, power usage, and energy costs have all risen.

"For every new build or re-rack and stack, we see high demand for centralized monitoring," says Perrino. "People are

a specific IP address range. It then downloads the information about the CDUs to the Power Manager, which saves the IT department from needing to locate each CDU on the network and input its data.

Often, security concerns dictate that employees should have access only to those things they need to do their jobs. The Sentry Power Manager includes the ability to separate the viewing and administration of PDUs based on the location or job responsibilities of the employee and lets IT admins create layers of access so IT teams will see only the parts of the network they need to see.

"You don't want people touching devices that aren't theirs. There's always the fear on switched units that someone will turn off something that isn't theirs," Nicholson says. "There are different levels that you can set, from administrative all the way to view-only. They can configure the different access permissions that people have, what devices they can access, what units they have, and so on."

Managing To Optimize Performance

To help IT administrators determine where inefficiencies in power usage are

Sentry Power Monitor Features

- Central interface to access multiple network-monitored Sentry cabinet power distribution units by global view or by temperature, humidity, current, or device status
- Control of all networked Sentry cabinet power distribution units
- Control of Sentry POPS (Per-Outlet Power Sensing) Cabinet PDUs that monitor on a per-outlet basis
- Power information including kilowatt and kilowatt-hour information for billing, power monitoring, trending, and power reports
- ODBC (Open Database Connectivity)-compliant database that permits power and additional information to be exported to a building management or other system
- Management and monitoring of all alarm conditions

C O N T A C T

Server Technology
Sentry Power Manager
(800) 835-1515
www.servertech.com

Description: The Sentry Power Manager allows for a global view of thousands of Sentry power distribution units based on temperature, humidity, current, and device status and is capable of reporting power information per kilowatt and kilowatt per hour. It also provides trend reports based on temperature, humidity, in-feed load, in-feed power, watts/unit area, and system total power.

Interesting Fact: IT equipment power information from the Sentry Power Manager can be used to gauge data center efficiency for PUE and DCIE, which are power efficiency ratings from the Green Grid.

within their infrastructures, the Sentry Power Manager has trend reports that will display information over time. These reports let IT investigate where there are anomalies in power consumption, such as excess consumption for no good reason or little consumption indicating that perhaps a device should be turned off altogether. Factors such as the humidity of the data center or the time of day are variables that could impact usage, and by examining consumption at a very granular level, data center administrators can uncover ways to save money without cutting corners: in many cases, it might improve performance by freeing up power for more important applications.

"There are a number of things you can do," Nicholson says. "[For example,] we have customers that operate by the 10% rule, in which roughly 10% of the devices aren't doing any useful work. If devices aren't being used or [are] not being used at a certain time of day, then you can turn them off. So you can look at things from a capacity planning perspective to understand where you have the capability to install new devices, or you can use the [trend reports] to bill back services to internal customers."

"Large or medium-sized businesses can benefit from the technology," says PTS' Perrino. "The insight will offer opportunities to combine racks of equipment to make



Server Technology
Solutions for the Data Center Equipment Cabinet

a more efficient use of space, cooling, installed power, and density."

The Power Manager's ability to provide granular readings on energy usage—kilowatts per hour for a device or for a cluster of devices, for instance—makes it possible to determine efficiency metrics such as PUE (power usage effectiveness) and DCIE (data center infrastructure efficiency). PDU and DCIE are metrics that were introduced last year by The Green Grid (www.thegreengrid.org), an industry association concerned with improving the energy efficiency of data centers. These metrics are aimed at helping admins separate their facility power consumption from their IT power consumption.

More companies are interested in efforts such as The Green Grid, given the high cost of energy and constant demand for more power in the data center.

"There's a huge amount of interest [in Green Grid metrics]," says Nicholson. "Some customers are being told they can't get additional power. If you want to determine your efficiency to see if more power is available for the IT load, you need to know what your PUE or DCIE is." ■