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General Information

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Curbing IT Power Usage

New Ideas To Save Energy In Your Data Center

Thanks to energy hogs such as blade centers, data center energy costs are high. SMEs will find it hard to absorb these kinds of financial hits without some help. Fortunately, there are more than a few ways to curb power consumption.

■ Measure Power Consumption

According to Chris Loeffler, product manager of the data center solutions group at Eaton (www.eaton.com), one of the biggest trends in data center energy savings is toward looking at how to monitor or meter data center power consumption (through power consumption metrics).

Data centers should start by measuring their power consumption across all of IT. "SMEs can't afford to do much submetering. But, they can afford a power consumption monitor that they can plug selected equipment in to see how much electricity is being consumed by a range of representative equipment," says Simon Mingay, research vice president at Gartner.

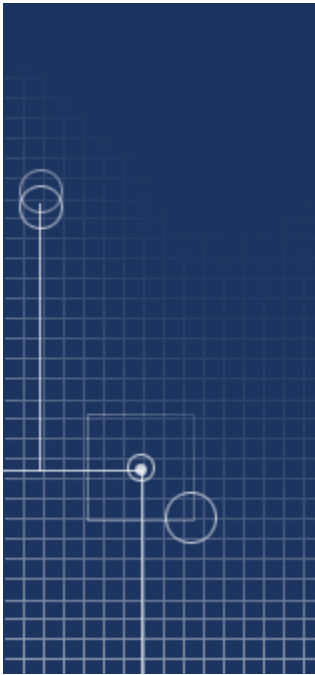
For SMEs that can't afford the power monitor setup, equipment vendors (server and air-conditioning unit companies) have power consumption numbers available. These often come from the vendor's customers. This information can be used to model power consumption of the IT infrastructure (using simple spreadsheets), according to Mingay.

■ More Is Less

SMEs need to distribute higher power voltages out to their equipment, according to Loeffler. That's because today's servers run more efficiently at higher voltage.

"Data centers benefit from increased power in the same rack footprint because the higher voltage uses less current per server," says Loeffler. Therefore, according to Loeffler, an SME can reduce the size of the cabling or put more equipment in the same space and utilize better cooling practices.





In the North American market, an SME should raise the voltage from 120 volts to 208 volts, according to Loeffler. "If we want to put a number behind that efficiency gain using that higher voltage, the efficiency of the power supply at full load would increase two to three percentage points. It may increase even more when using the redundant power supply designs in today's servers," he says.

■ Approach Air Differently

"One of the things that wastes a lot of energy in the data center is the mismanagement of air," says Michael Mallia, chief executive officer of AFCO Systems (www.afcosystems.com), a green data center solutions provider.

Many SMEs still use the hot aisle/cold aisle theory from IBM (www.ibm.com) in their data centers, which was developed in 1992, according to Mallia. The IBM approach was a way to begin to manage air distribution in the data center at a time when cooling wasn't a major issue. "This approach wasn't put together with an exponential growth in server densities in mind," Mallia says.

Today's servers, particularly blade centers, put a lot of heat in a very small space. To address that and keep cooling costs down, air distribution has to be just right so the room is not over-cooled or under-cooled, according to Mallia.

If the air distribution isn't right, too much cool air can get back to the CRAC (computer room air conditioner). The cooling system will think there is too much cool air in the room and generate less air, leaving the room too hot, according to Mallia. "The server inlet temperatures need to be as even as possible across the room," Mallia says. When they balance the temperatures throughout the room, SMEs save a lot of energy.

■ Spin Down The Storage Disk Drives

According to David Weiss, chief executive officer of Dataprobe (www.dataprobe.com), a disaster recovery and prevention technology innovator, one of the quickest returns on data center energy savings techniques comes from low-cost ways of getting the power turned off when not needed.

One of the best ideas around turning the power off is spinning down storage disk drives when they are not in use, according to Richard Solomon, host interactive architect at LSI (www.lsi.com), a leading storage technologies vendor and member of The Green Grid.

Data center storage drives run about 10,000 to 15,000rpm, whether they are in use or not. By turning off the motors that spin these drives, the data center can spin them down during idle times. "A disk drive motor is a big motor, so shutting down that motor saves a lot of energy," Solomon says.

Solomon gives the following example: Take a typical 15,000rpm enterprise-class drive with an estimated operating mode power of 8 watts and an idle time power of 5.8W. Assume the drive electronics (with the rotational drive motor off) draw about 1W, on the generous side. That's a drop from a 5.8W draw to a 1W draw by simply spinning down the drive. "That's more than an 80% power reduction," says Solomon.

SMEs need to work with their storage vendors to get firmware that will let them spin down these drives (if standby mode is not already available in the current drive configuration), according to Solomon. This will provide an immediate and substantial savings. If the drive has a standby mode that will power down the rotational motor, use it.

■ Shut Off Servers During Non-Peak Hours

Data centers in Japan are using UPS and software automation to safely shut down servers at certain times of the day, such as evenings and other non-peak hours. The software safely reboots the servers before peak hours return, according to Loeffler. These data centers keep only the most essential equipment running during off-peak times. By using this idea, an SME can save 30% to 40% off the power consumption it would normally see during non-peak hours, according to Loeffler.

■ End With Savings

Starting with good metrics, SMEs can pinpoint where the data center energy hogs are hiding. Then, they can develop a plan to manage them better or shut them down (if only some of the time). ■

by David Geer

Quick Energy Saving Tips

Simon Mingay, research vice president at Gartner, gives a few key tips for fast ways to improve energy savings in your SME.

- Make sure raised-floor, plenum-area obstructions such as cabling are not blocking airflow to the vents.
- Make sure to get the chilled air where it needs to go and don't vent hot air straight into other cabinets, servers, or equipment.
- Turn on the power-management features that came with your existing equipment.
- Make sure all equipment that is plugged in and drawing current is actually being used. "We are finding that most IT operations can reduce their power consumption by as much as 5 to 10% simply by identifying and removing equipment that is no longer in use or has very low utilization," says Mingay.

Develop An Attraction For Heat Extraction

More and more, data centers are examining the benefits of heat extraction for their cooling systems rather than simply using bulk cooling, according to Chris Loeffler, product manager of the data center solutions group at Eaton (www.eaton.com).

SMEs accomplish heat extraction by isolating the cold and hot air returns from one another. They do that by ducting the hot air back into the air conditioner's hot-air return, Loeffler explains. "This way, an SME doesn't need specialized liquid cooling close to the racks; it's done mechanically with the ducting itself," he says.

The efficiency gain rises from being able to cool only about an 8kW load per rack

to cooling a 20kW load per rack, according to Loeffler; that is an energy efficiency gain of about 25%.

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