Being Green

By David van Geilswyk

This article is important to you, your family, and your friends. Please let me explain why. (Yes it's always about "you"—validation at last.) Green is the new executive color. Forget dark blue. Green has found its way into the steering committee meetings. CFO's love green, because it saves money (also thought of as green), which is a win-win. If CEOs have green, they love it. If they don't, they hate it, because they don't have it. Since green is so important to your executives, then it should also be important to you. How else can you better demonstrate your value than to help them achieve their objectives, help them to be green?

Green is for the environment. It makes the world a better place to live in—for your friends, your family, for yourself. I know, you are already doing your part. You recycle at home, in the office, and everywhere else. (Well at least when you can find recycling bins.) If it was possible you would take a bicycle to work—if the commute was not quite as far, the weather was a little better, and it was not as dangerous (the cars are bad enough, but the buses will kill you!) I know you work in IT. What difference can you make? The answer is you can make a substantial difference. Let me explain how…

The Data Center

Over 85% of data centers were built more than 7 years ago. In the past 10 years the number of servers in the computer room is 6 times greater. Storage utilization for the same period is up almost 70%. With the use of BladeCenters, power usage per rack has gone from 2-3kW per rack to 20-30kW per rack. This is a direct result of inexpensive computing and has led to the three key facility issues we see today. They are:

1. Excessive Heat
2. Insufficient Power
3. Shortage of Floor Space

We are at a point where power and cooling are now exceeding server spending. Take a look at a fair-sized computer room of 25,000 square feet. The cost of power to run that data center for 1 year is about $2.6 million. Cost savings outlined in this document can reduce that annual cost by 50%. That is significant reduction and is the equivalent of taking 1,300 automobiles off the road.

Computer Room Infrastructure

Technology has advanced significantly in the past 10 years; this includes our UPS and HVAC systems. These systems are in most cases as old as the computer rooms and we get an advantage in replacing them with updated systems. By replacing these systems we gain the efficiencies of the newer technology plus a reduction in power consumption. For example, using a new HVAC system can reduce operating costs by 45%. By just switching to water from air there is a savings of 15% in energy costs.

Computer Power Usage

We all know that computers use power and servers use even more power due to the redundancy that is built into them. Most of the power used in a system comes from only a few components. They are as follows:

- 44% – AC to DC transitions, DC to DC deliveries, and fans for air movement
- 30% – processor
- 11% – memory
- 08% – hard disk

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In the past couple of years, significant advancements have been made, including a CPU power reduction of 15% with a performance increase of 35%. Memory now has 3 times the density, is 5 times faster, and requires 80% less power. Power supplies have also benefitted from increased efficiencies as they convert AC to DC. Older power supplies were only 65 – 75% efficient and for 1,000W of power they gave off 300W in heat. New power supplies are 90% efficient and give off only 90W of heat by comparison.

Server Virtualization

Typical CPU utilization rates on Intel servers can be quite low. I know there are a few servers which never seem to have enough headroom in terms of processing power, but most servers in the computer room are under utilized. In fact, on average most servers run at about 10% CPU utilization. So if we took 4 servers running at about 10% using a total power consumption of 8kW and did nothing more than use virtualization to consolidate them onto one system, that system would run at 50% (the additional 10% used by the virtualization software) and you would reduce your power consumption by almost 6kW.

Being Green

There is an old saying that you cannot manage what you don't measure. The trick is to monitor and manage. How much does it cost to power the computer room as part of the overall facility? Does this include the HVAC? Use power management tools such as IBM Director's Power Executive and those of your UPS to diagnose and understand your power utilization. This will allow you to measure your improvements. You can take it a step further by forming a *green task force*. Look at the overall power utilization at your facility. You can review efficiencies that can be gained through upgrades and the use of new cooling technologies.

Many hydro providers now provide serious rebates to fund the reduction of power consumption. (See page 2 of this issue for more information.) These rebates are available to both large, medium, and small companies for demonstrated power reduction. If you can measure and manage your power utilization to half of what it is, and demonstrate this, you will have once again done your part and given green to your executives—and green is the new executive color. **M-R**

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