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VERIZON'S MONITOR AND PC POWER MANAGEMENT INITIATIVE COULD SAVE \$7 MILLION ANNUALLY

Windows "sleep" features cut energy costs by \$65 per computer annually

Note: The mention of any company name or product does not constitute endorsement by EPA or by Verizon.

Verizon activated Windows sleep features on about 11,000 PCs in a pilot study conducted at 14 company locations in 2008. Based on the trial, Verizon estimates that a wider implementation across approximately 185,000 PCs could save about \$7M per year net of project costs¹. Because sleeping PCs and monitors generate less heat, Verizon anticipates additional annual energy savings from reduced office air conditioning loads. By fully activating monitor and computer power management features on its computers, Verizon could achieve energy savings equivalent to that needed to light nearly 88,000 homes annually.

Power management features – including what are commonly known as "sleep" settings – automatically place monitors and computers into a low power sleep mode after a pre-set period of inactivity.³ Touching the mouse or keyboard wakes up monitors and PCs within seconds, allowing users to resume work without delay.

Computer power management features don't just save money: They're good for the environment. Because saving energy prevents pollution associated with generating electricity, deploying the features to approximately 185,000 of Verizon's PCs would prevent more than 252,000 tons of carbon dioxide emissions – equivalent to planting 52,000 acres of trees.²



Monitors First

Changing Windows power management settings in a corporation the size of Verizon required the use of several software tools and a staged approach to implementation. The company began by activating sleep settings on monitors for its Windows 2000 and XP machines.

As early as 2003, Verizon energy managers were working with EPA's ENERGY STAR Program to activate Windows sleep features on PC monitors. At the time, most of Verizon's computer displays utilized cathode ray tube (CRT) technology, each burning 60 or more watts of power. In sleep mode, the same monitors used only 1 to 2 watts of power.

To configure monitors to enter sleep mode after 15 minutes of inactivity, Verizon deployed EZ GPO, a free software tool available for download at www.energystar.gov/lowcarbonit. It's estimated that the energy reduction achieved through monitor sleep alone saves Verizon more than \$5M annually.

Realizing Greater Opportunities for Savings

Looking to build on that success, Verizon managers recognized that placing inactive computers into system standby – not just monitors – would save substantially more energy. That's because Verizon employees had to leave their PCs powered on at night so important software patches and security updates could be pushed to the machines while they were not being used. As a result, the average desktop PC was burning roughly 65 watts of power all night long – about the same as leaving the lights on all night in every office and cubicle. System standby, on

¹Energy savings estimates are based on the EPA's ENERGY STAR Computer Power Management Savings Calculator, available online at www.energystar.gov/lowcarbonit. Assumes national average commercial electricity rate of \$0.11/kWh.

²Based on EPA estimates.

³A typical Pentium IV computer uses 50 to 70 watts when active and only 2-3 watts in sleep mode (system standby or hibernate). A CRT monitor uses about 60 watts and a LCD about 35 watts. Both use only 1-3 watts in sleep mode.



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the other hand, would drop PC power consumption to 1 to 3 watts. PCs automatically entering system standby could save power during the workday as well, when people left their offices for meetings or lunch. While laptops consume less power than desktops – 25 to 35 watts -- system standby could still cut laptop energy consumption to 1 to 3 watts, a sizable savings.

ENERGY STAR's free EZ GPO software tool allows IT managers to activate PC sleep settings: including system standby and hibernate modes. However, activating sleep settings is only half of the challenge – and arguably the easier half. Ensuring that sleep settings do not interfere with the distribution of important software patches and updates (e.g., Windows security patches, antivirus definitions) is the other half of the computer power management implementation challenge.

Fortunately, there are many ways to patch PCs that “go to sleep” when inactive. For instance, with a feature called Wake-on-LAN (WOL) is activated, a network administrator can wake sleeping machines at any time in order to perform on-demand software patches or updates. Alternatively, client computers can be configured to apply software patches and updates as soon as computers become available on the network, such as during the user log-in process. A feature called Windows Task Scheduler can also wake sleeping computers at a designated time to download and install updates.

Finding the Right Applications

After reviewing these and other options, Verizon IT managers decided they needed an integrated power management and Wake-on-LAN solution that would work across multiple Windows platforms. Enter PC Powerdown.

PC Powerdown, which leverages Verizon's selected power management software, offers near real-time visibility and control of desktop, laptop, and monitor power consumption.

Verizon IT managers could see which computers were “live” on the network, and which computers were in sleep mode or powered off. By tracking “on-time” and assumptions about power use for each end point, PC Powerdown allowed Verizon to accurately estimate PC power use – and power savings from sleep settings. Because Windows power settings are user-based, PCs may or may not sleep

properly when no user is logged in. PC Powerdown allowed IT managers to set sleep policies effective independently of a computer's logged in or logged out state. Finally, PC Powerdown utilizes Wake-on-LAN technology to wake PCs from standby for over-night software patching. In other words, PC Powerdown could be programmed to “wake” PCs from standby mode when a security

patch or software upgrade needed to be delivered to that machine. Once the patch is delivered and installed, the machine returns to standby mode.

Working with Verizon's Real Estate group, Chris Maylor, the project leader for the company, and his team took PC Powerdown for a “test drive” earlier this year. Working with deployment groups of about 2,000 to 2,500 PCs, they “pushed” the software to approximately 11,000 PCs in 14 Verizon locations using their standard software distribution application. Having decided to deploy PC Powerdown instead of EZ GPO to manage PC sleep settings, Verizon used their software distribution application to uninstall EZ GPO on client PCs, in order to ensure that the two applications didn't conflict. Maylor's team configured PC Powerdown to put monitors into standby mode after 15 minutes of inactivity, and PCs into system standby after 30 minutes of inactivity.

As is the case with any large-scale software deployment, Maylor recalls that the biggest challenge was getting the PC Powerdown software pushed to and installed on all 11,000 PCs. Fortunately PC Powerdown provides enough information about end-point (PC) hardware that it was possible to head-off potential problems. During the initial

“PC Powerdown” is a perfect solution. It eliminates the power consumption formerly expended when PCs were left on overnight so that critical security patches could be installed,”

-- Chris Maylor, Verizon IT director and project lead



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push, 96% of the PCs responded appropriately. Remaining PCs which did not respond were simply too old to run any additional software, lacking sufficient memory and/or disk space.

Another challenge: mapping sleep policies to a large number of physical locations. This one-time effort will allow Verizon to qualify for utility sponsored incentive programs that pay as much as \$15 per PC for activating sleep features for PCs located within the utility's service area.

"Verizon is the largest single contributor to the ENERGY STAR Low Carbon IT Campaign. Their contribution to a cleaner environment serves as an example for others to follow – and the impressive energy savings speaks for itself"

-- Steve Ryan, ENERGY STAR Low Carbon IT Campaign Manager

Results

Because PCs are rarely plugged into dedicated power circuits, isolating the impact of sleeping PCs on energy bills isn't always straightforward. PC energy consumption usually shows up on the same electricity bill as energy used by office appliances, elevators, heating and cooling systems, and lighting. Seasonal fluctuations and normal business cycles add to the complexity. "What we do know is that PC Powerdown reduces the number of total daily hours that PCs are 'on' from over 23 hours to less than 16 hours on average, providing 7 hours of additional energy savings," Verizon's Maylor said. At any given time, at least 25% of standby-enabled machines are in sleep mode. When weekends are included, PCs are in standby an average of 16 to 17 hours per day. By tracking the "on-time" and assumptions about power use for each type of PC on its networks, PC Powerdown could provide a fairly accurate estimate of PC power use – and power savings from sleep settings.

The Future

Verizon plans to continue rolling out PC Powerdown and computer sleep settings, ultimately deploying the application to as many as 185,000 computers across the company.

In the meantime, Verizon continues to experiment with promising technology including Intel's vPro technology, which can help manage PC power use. A set of features built into a PC's motherboard and other hardware, vPro allows remote access to the PC -- including monitoring, maintenance, and management -- independent of the state of the operating system or power state of the PC. In other words, vPro gives the IT department the ability to power a PC on or off as long as there is a network connection and the device is plugged in. This capability eliminates the dependency on WOL, which requires specific PC and network configuration.

For More Information

To learn how to activate power management features on your network, please [visit www.energystar.gov/lowcarbonit](http://www.energystar.gov/lowcarbonit) or contact Steve Ryan, US EPA ENERGY STAR Program: 202-343-9123, ryan.steven@epa.gov.

