



## Solutions

Best Practices for Overcoming Barriers, Reducing Energy Costs and Delivering IT Value

- Mike Walker, President, Beacon Consultants Network Inc.



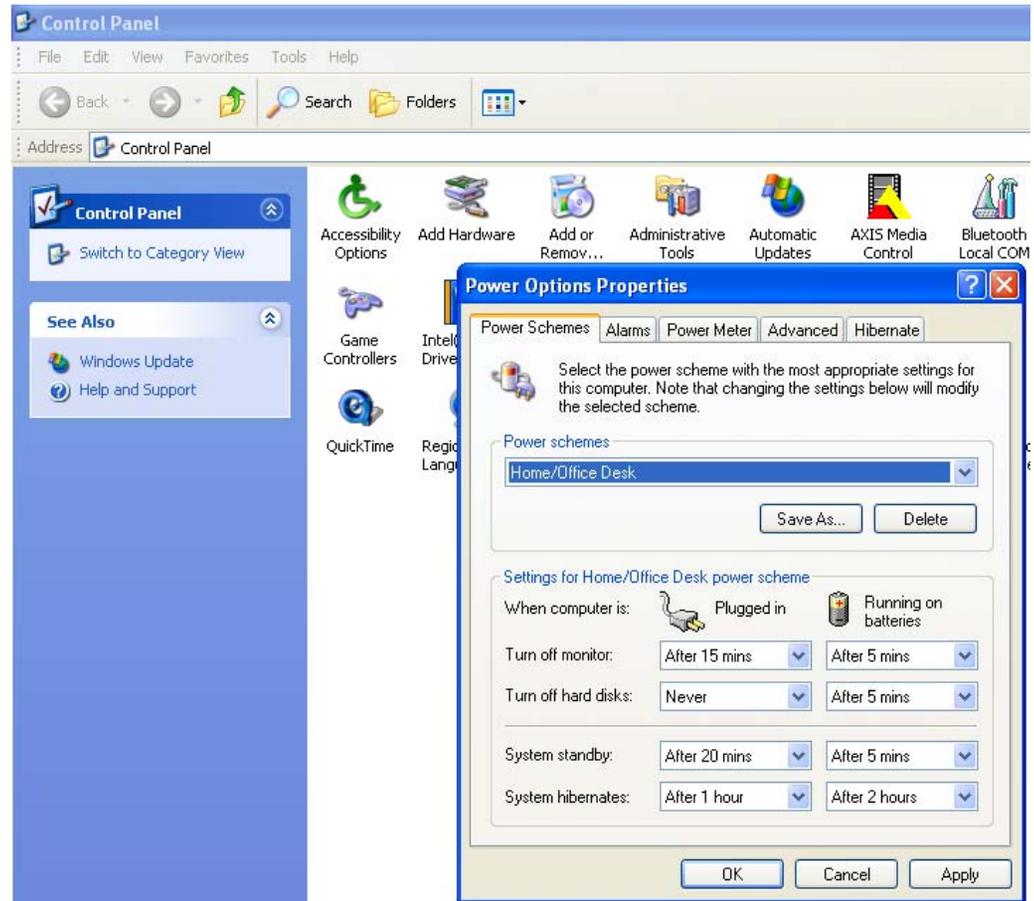
# Overview

- Computer power management basics
- Two implementation challenges
- Tools for activating power management settings
- Ensuring that sleep settings don't interfere with patching
- Case studies
  - Fusion Trade, Inc.
  - Verizon
  - City of Miami
  - University of Pittsburgh Medical Center
  - Union Bank



# What is Power Management?

- System standby and hibernate place the **computer** (CPU, hard drive, etc.) into sleep mode after a pre-set period of inactivity
- Mouse or keyboard input can quickly wake computer
- Built into Windows, Mac OS X, some varieties of Linux
- Settings simply need to be activated



# Monitor Power Management: No-Brainer

- Easy to activate
- Can't interfere with software patching
- Saves \$10-35+ per monitor annually



Most organizations already utilize MPM features

# Computer Power Management: More Challenging, More Savings

- System Standby (S3)
  - Drops power to 1-3 W
  - Wakes up in seconds
  - Saves \$10-40 per PC annually
- Hibernate (S4)
  - Drops power to 1-3 W
  - Wakes up in 20+ seconds
  - Saves work if power is lost
  - Saves \$10-40 per PC annually



# To Maximize Power Savings, EPA & Climate Savers Recommends:

- Setting monitors to enter sleep mode after 5 - 15\* minutes of inactivity
- Setting computers to enter system standby or hibernate after 30\* minutes of inactivity
  - On notebooks, be sure to activate these settings in the AC power profile — not just the DC (battery power) profile
  - Don't bother with “Turn off hard disks” in AC power profile – savings are trivial



# Two Challenges

1. Activating sleep settings on many computers at once
2. Ensuring that sleep settings do not interfere with the distribution of administrative software updates
  - E.g., Windows security patches, antivirus definitions

Numerous solutions exist, including free software, and software tools that you may already own



# “Free” Solutions for Activating Sleep Settings

- **Template Image Replication**
  - Manually activate CPM and MPM settings in the master template hard drive image before replication & roll out
- **Microsoft’s Windows Vista**
  - Group Policy provides a way to centrally manage MPM and CPM features
- **MSFT Group Policy *Preferences***
  - Provides means to centrally manage Vista and XP machines
- **Login Scripts**
  - Powercfg.exe can be used in a login script to configure MPM and CPM settings in Windows XP and Vista
- **EZ GPO**
  - Provides Group Policy Objects for centrally configuring power management settings in Windows 2000 & XP
- **Windows Task Scheduler**
  - Can force logged-out PCs to go into standby or hibernate



# “Free” Solutions: Summary

Public Domain/ OS Method for Activating Settings on Networked PCs	Operating System Installed on PCs		
	2000	XP	Vista
Microsoft Group Policies			✓ <sup>1</sup>
Microsoft Group Policy Preferences		✓ <sup>1</sup>	✓ <sup>1</sup>
EZ GPO	✓	✓	
Replicating template image	✓	✓	✓
Powercfg.exe in a logon script		✓ <sup>2</sup>	✓
Windows Task Scheduler <sup>3</sup>	✓	✓	✓

[1] Requires either Windows Server 2008 or a Windows 2003 environment being managed via either Windows Server 2008 or Windows Vista

[2] Requires Windows XP Service Pack 2

[3] Windows Task Scheduler doesn't activate power management settings per se, but can be used to place PCs into standby or hibernate mode at specified times.



# Commercial Solutions

- Altiris Manageability Toolkit (from Symantec)
- BigFix
- eiPower Saver Solution
- Green IT Power Management (from Triumfant)
- LANDesk Management Suite (from Avocent)
- NightWatchman and SMSWakeUp (from 1E)
- Power Save (from Faronics)
- Remote Desktop (from Apple)
- SMS/SCCM Companion (from Adaptiva)
- Surveyor (from Verdiem)
- SysTrack Power Management (from Lakeside Software)

**Tip:** Call your energy provider: some utilities offer incentive funding for CPM solutions

Info & case studies: [www.energystar.gov/powermanagement](http://www.energystar.gov/powermanagement)



## Challenge #2: Ensuring that sleep settings don't interfere with software updates

- Configure computers to apply software updates as soon as computers become “available” on the network
- Use Windows Task Scheduler to wake up sleeping computers for updates
- Use Wake-on-LAN to wake up sleeping computers to perform on-demand updates
- Use vPro to wake up sleeping computers
  - Integrates with software update mechanism to switch only required computers on

Future: NICs will have "proxying" capabilities that will maintain network presence, facilitating wake-ups



# Case Studies





## Fusion Trade, Inc.

David Korn, Principal, The Cadmus Group



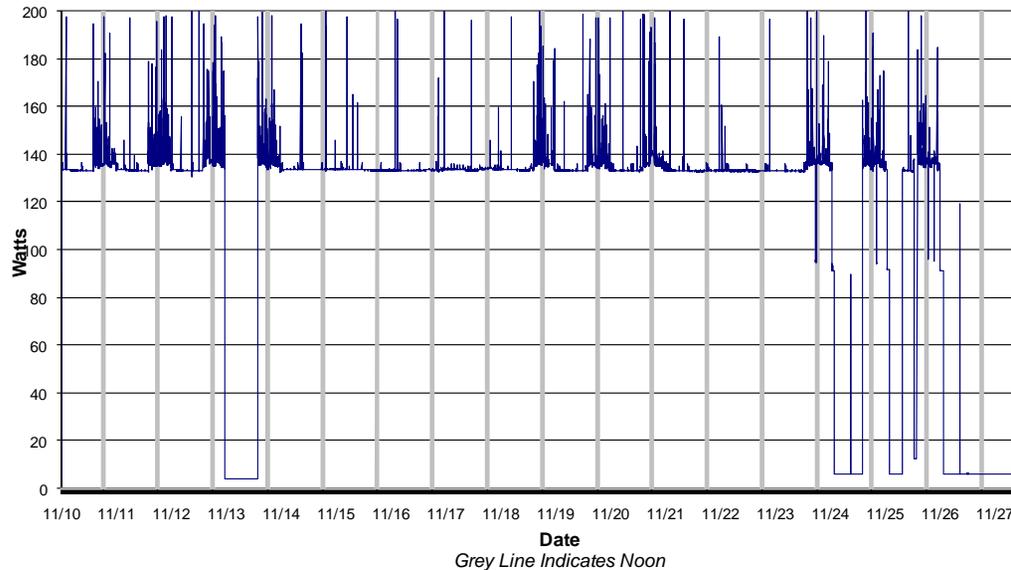
- Each employee workstation includes a WinXP PC & 2 LCD monitors
- Left PCs powered on all day, all night, and weekends to accommodate updates & remote admin
  - A few PCs were configured for monitor sleep
- Wanted a simple way to save energy but not interfere with the end-user productivity, software patching, or remote administration

- “Implementation Resources” page of ENERGY STAR website ([www.energystar.gov/lowcarbonit](http://www.energystar.gov/lowcarbonit))
- Downloaded free EZ GPO tool
  - Allows network administrators running Active Directory to configure and manage CPM settings with Group Policy Objects
- Deployed Windows Task Scheduler to wake up sleeping machines at night to accommodate centralized updates using WSUS
  - During normal business hours, WSUS allows the PC to download updates. Once downloaded, updates sit in queue
  - 90 minutes after the user leaves for the day, the computer sleeps
  - At 3:00 AM, the Windows Task Scheduler wakes the computer and installs updates in the queue

- Estimating the energy savings potential
  - Received assistance via a conference call from ENERGY STAR contractors
- Remote access to sleeping PCs for support
  - The administrator can send a wake packet using FusionWOL (or any comparable Wake-on-LAN tool) and then “remote in” using Remote Desktop Protocol (RDP)
  - When the RDP session ends, the PC goes back to sleep

- Based on metering, EPA estimates energy savings at roughly 450 kWh, or \$70 annually per workstation

**Power Use at B. Masterson's PC (Watts UP 1215)**  
 Read at power strip attached to computer, 2 LCD monitors and headset  
 Monitor shut down set to 45 minutes; System standby set to 90 minutes



From November 11th to 24th, baseline behavior is observed. On November 24th, computer sleep settings were activated.



Verizon



Chris Maylor, Director, Systems Architecture





## Verizon: Situation

- 11,000 Win2k & XP PCs in 14 locations
- Left PCs powered on at night to push out software patches & security updates
- Utilized EZ GPO to configure monitor sleep, saving approx. \$5 million/yr
- Wanted an integrated power management and Wake-on-LAN solution that would work across multiple Windows platforms





## Verizon: CPM Solution

- Core CPM solution leverages BigFix Power Management
  - Set monitors to sleep after 15 min, computers after 30 min of inactivity
- Near real-time visibility into which computers were “live,” and which were in sleep mode or powered off, allowing for accurate estimate of power use
- Able to set sleep policies independent of a PC’s logged in or logged out state
- Utilized Wake-on-LAN to bring PCs out of standby mode for overnight patching & upgrades





# Verizon: Challenges Overcome

- Some PCs were simply too old to run any additional software, lacking sufficient memory and/or disk space
- Mapping sleep policies to physical locations: important for utility rebates





## Verizon: Results

- Saving approximately \$65 per PC *annually*
  - On top of savings already realized from monitor sleep
- Reduced the hours that PCs are 'on' from > 23 to < 16 hours
  - When weekends are included, PCs are in standby an average of 16-17 hours per day
  - At any given time, at least 25% of standby-enabled machines are in sleep mode
- Wider implementation across ~ 185,000 PCs should save about \$7 million per year net of project costs
  - Energy savings equivalent to that needed to light nearly 88,000 homes annually





## City of Miami

Marco Sanchez, Network Administrator





# City of Miami: Situation

- 2,800 desktop & notebook PCs on a 4-year replacement cycle
  - Mostly Dell GX620 and HP 7900 models
- PCs were left powered on 24/7 for patching, backups, remote control
- Upgrading 900 PCs and wanted “native” (Microsoft) solutions for PC power management, patching, app deployment, backup and remote control





# City of Miami: CPM Solution

- Deployed Windows Vista on desktops & notebooks
  - Central management of power settings via Vista Group Policies
  - Monitors sleep after 15 min, computers after 25 min of inactivity
- Used EZ GPO tool to activate sleep settings on WinXP computers
- Utilized Wake-on-LAN & vPro to bring PCs out of sleep state
  - Capability to “wake up” sleeping computers to deploy updates and applications, or to take remote control of user PCs
  - vPro platform built into Intel motherboards
    - Supports remote management irrespective of OS state
    - Does not require more complex deployment of Wake-on-LAN “Magic Packet”





# City of Miami: Challenges Overcome

- Ensuring all PCs were correctly configured
  - Wake on user USB mouse/keyboard input (utilized Powercfg.exe)
  - NIC & vPro
- Learning curve for Wake-on-LAN/vPro technology
- Enabling Group Policies for Windows Vista
- Changing BIOS setting in some PCs to allow wake-up





# City of Miami: Results

- PCs in sleep mode more than 80% of the time
- Estimated savings: \$100-115 per PC per year
  - Total annual savings by Q4 2009: \$150,000\*
  - Reducing cooling load: \$45,000 in additional savings
  - 600 tons of CO2 emissions avoided annually
- Total project investment
  - Approx. 140 hours of staff time

\*Based on deployment to 1800 PCs by year's end





# University of Pittsburgh Medical Center

Jack Mulliken, Systems Analyst - Desktop Design and Integration



# UPMC: Situation

- 35,000 desktop PCs
- PCs were left powered on 24/7 for IT Access
  - SMS updates, patches, Remote Desktop
- Currently going through a significant refresh cycle and migration to HP



# UPMC: PC Power Management Solution

- Deployed Verdiem SURVEYOR
  - Centralized management of power settings
  - Multiple groups based on location and user type
  - Different power schemes for the day, evening and night to maximize saving and minimize disruption to user
- “Wake on Web” for remote access users
  - Easy user interface allows for self-service wake requests
  - Utilizes WOL managed by SURVEYOR
- Integrating with SMS for SW distribution
  - Machines automatically wake when required advertisement is scheduled

# UPMC: PCPM Challenges Overcome

- End-user adoption
  - Internally selling the savings
  - Educating end users of no impact to daily productivity
- Device driver updates
  - Some older HW screens would not respond after wakes

# UPMC: Results

- Annual savings: \$25-40 per PC
- Material contribution to reducing UPMC's carbon footprint
  - Eliminates more than 1 million kWh of wasted IT consumption per year
- No disruption to end user while maximizing power savings
  - Realized that one-size does not fit all
- Reporting actual usage and savings achieved



## Union Bank

David Korn, Principal, The Cadmus Group





# Union Bank: Situation

- 12,500 PC's: 30% HP, 50% IBM, 20% other
- Windows environment managed by Microsoft's System Management Server (SMS) 2003
- PC's left powered 24/7 for patching, updates, inventory management
- Objectives:
  - Conserve PC energy, reduce carbon emissions
  - Improve IT productivity (increase patching and update coverage)
  - Ensure no end-user disruption during business hours



# Union Bank: Solution

- Deployed Adaptiva's *Companion*
- Utilized automatic scheduled shutdown capabilities
  - Shut down PCs at 7 PM, critical 24\*7 systems excluded
  - User has the option to defer shutdown
  - User data is saved prior to shutdown
- Waking up computers for maintenance
  - Wake-on-LAN used to wake a PC if it is off; timer used if in sleep state
  - Patching done at 2 AM, PCs powered on at 7 AM for work
  - Easy installation: no router configuration, no security issues
  - Restores original power state post task completion





# Union Bank: Challenges Overcome

- Getting user buy in for power off
  - Phased approach involved and educated end-users
  - Started with voluntary shutdown and graduated to automatic shutdown
- Some PCs required Wake-on-LAN to be enabled in the BIOS
  - Companion automatically configures Wake-on-LAN on network cards, but...
  - Enabling Wake-on-LAN in the BIOS requires the use of OEM tools
    - Dell Open Manage
    - HP/Compaq Insight Manager





# Union Bank: Results

- PCs switched off 7 PM - 7 AM & during weekends
- PC energy use reduced by 58%
  - Annual savings of 3.2 Million kWh, or \$378,000
    - Equivalent of powering 320 homes annually
  - 2313 tons of CO<sub>2</sub> emissions avoided annually
- IT benefits: increased patch and update coverage
- Qualified for utility rebate from So. Cal. Edison
  - Up to \$15 per PC
  - Fully covered the cost of Companion



# Join us online at the Computer Power Management Forum

*Share your questions, experiences,  
and feedback at*

<http://forum.powermanagement.org>

