Emerging IT and Energy Star PC Specification Version 4.0: Opportunities and Risks

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Donna Sadowy, AMD

Defining the Goal

- The ITI members and EPA share a common goal: save energy by improving the energy efficiency of IT products.

- A key principle for the goal should include:
  taking into account new IT technology when establishing criteria for the PC specification.

Holistic Analysis

- Consider use issues

    - user disabling of power management

    - user deployment of single application per server

- Numeric criteria for operating modes may not enable highest PC energy efficiency.

- Virtualization technology, optimization efforts allow pooling IT for increased energy efficiency.

Emerging IT Technology

- Shifting workloads
- System expandability
- Changing home use
- Virtualization/optimization
- Multicore processors
- Microprocessor technology

Emerging IT Technology: Shifting Workloads

- Workloads that were previously deployed in a mainframe server environment are moving to "lower end" servers, workstations and desktop PCs.

- Multicore processors and 64-bit capability are two enabling technologies.

Emerging IT Technology: Platform Expandability

- 64 bit PC platforms are being designed to enable future expansion rather than platform replacement.
- A growing expectation of enterprise computing is that PC platforms can be scaled out to handle scale-up of workloads.
- Thin clients and blade PCs expand the number of users.
- One option - sliding scale for power consumption based on power supply, similar to current specification.

Emerging IT Technology:
Platform Expandability and Power Supplies

- Bundled power supplies must provide sufficient power for a PC system with:

    - maximum number of add-in cards
    - maximum bus powered external devices
    - maximum amount of memory
    - maximum number of, and speed of, CPUs
    - maximum graphics card capability
    - maximum amount of disk drives
    - safety/contingency factor

Emerging IT Technology: Virtualization

- Virtualization technology allows pooling of computer hardware resources and sharing of computer cycles.

- Applications and operating systems (OS) can be isolated from one another while running on the same hardware.

- Both hardware and software virtualization possible: allows access to shared resources that can be scaled according to demand.

- Now being offered on server platforms; networked PCs in future?

- How do you define idle or sleep in a virtual environment?

Emerging IT Technology: Multicore Processors

- Multicore processors enable multitasking as well as multiple users of a PC system.

- Individual cores can be optimized for application and operating environment.

- Multicore processors more energy efficient than increasing clock speeds (power envelopes, shared architecture e.g. memory, I/O.

- System latencies (time to complete applications) decreased.

Emerging IT Technology: Multicore Processors

- More PC security demanded by users.

  - Multicore processors enable PCs to run antivirus software in real time protection modes.

- Software, now both single threaded and multi-threaded applications.

- Individual cores can be used to manage distinct threads while coexisting in a lower latency operating environment.

Emerging IT Technology: Home PC Applications

- Movement to mobile platforms
- Introduction entertainment PCs
- Home office more common
- Security a growing issue
- Changes in operating systems and user interfaces

Emerging IT Technology:
Home PC Applications

- Multiusers, multitasking

- More expandable modular systems, e.g. removable media devices

- VOIP communications

- UWB wireless connectivity to CE devices (lower energy consumption, shorter distances than current Bluetooth and WiFi)

- Home storage peripherals allowing sharing resources, e.g. PC, digital camera, printer

Microprocessor Technology

- Efficiency as part of performance equation
- New designs, e.g. multicore processors
- Manufacturing technology to reduce leakage, capacitance, etc. is in use or under development; some examples:
    - Silicon on insulator
    - Strained silicon
    - Metal gates

Emerging IT Technology

- Thank You!

- Any Questions