Energy Star MOU4 Proposal

Introduction

- Energy Star MOU4 Draft outlines the many remaining challenges to address
- Industry needs flexibility to meet the challenges
  - To allow innovation
  - To control cost
  - To work within our business practices and plans
- Following proposal attempts to streamline the process by leveraging the common platform characteristics of desktop and workstation computers
- Note: all examples used in this proposal are for illustrative purposes and in no way account for all concerned manufacturer platforms

The Challenges with the Existing Draft

- Platforms are difficult to quantify in terms of types
- One “size” does not fit all, but how many “sizes” are enough?
  - Basic vs. High-Performance Desktop?
  - Enthusiast-Gamer Desktop vs. 1-Socket Workstation?
  - 2-Socket and 4-Socket Workstations?
  - Entertainment PCs vs. Set Top Boxes?
  - Game Consoles?
  - Desktop-Discrete Servers vs. Desktop?
- Performance benchmarking is an open-ended question
  - What type of benchmark(s) guarantees fairness?
  - How many benchmarks are appropriate to cover all markets?
  - How long will it take to specify and develop? How much will it cost?
  - How often will the benchmarks need to be updated for new operating systems, new technology trends, new E* specifications, etc., …?

Proposal

- Equate performance to the quantity of compute resources in the platform itself and derive idle, sleep, and standby values from the configured system
- Use the following base components to form an idle equation
  - Number of CPU Sockets
  - Number of CPU Cores
  - Total Installed Platform Memory (GB) – includes system and graphics buffer memory
  - Installed Hard Disk Drive Storage (GB)
    - Installed versus user accessible in the case of RAID
    - Alternative approach is to use number of physical drives
  - Number of Graphics Processors
  - Power Supply Rating (W)
- Apply weighted factors to each term to eliminate any one term from dominating
  - Weighted factors account for manufacturing tolerances and variance
  - Factors are holistic in nature versus applying directly to the correlated component
    - Ex. A bigger power supply is required to support a higher performing CPU. The CPU is required to match the requirement for more system memory in order to run a particular application effectively.
- Derive Sleep and Standby values as percentages of Idle
- Set the weighted factors appropriately to meet program goals – ex. 40% inclusion in 2007
- Use these base components to define platform configurations manufacturers must test to use E* label.

Formulas

Idle (W) = $\alpha * $ Pwr Supply Rating(W) +

$\beta * $ Platform Memory(GB) + $\theta * $ Graphics Processors(no) +

$\gamma * $ CPU Cores(no) + $\zeta * $ CPU Sockets(no) +

$\rho * $ Storage(GB)

Sleep (W) = 5W < Idle Level $*$ 10% < 10 W

Standby (W) = 2W < Idle Level $*$ 4% < 3W

- α, β, γ, θ, ζ, and ρ represent weighted factors for each component class. See next slide for examples

Example Data

Pwr Supply (W) α = 7.5%	System Memory (GB) β = 10	Graphics Processors (number) $\theta = 10$	CPU Cores (number) $\gamma = 10$	CPU Sockets (number) ζ = 5	Storage (GB) ρ = 5%	**Idle (W)**	**Sleep (W)**	**Standby (W)**
200W	512MB (0.5GB)	1	1	1	60GB	**48W**	**5W**	**2W**
300W	512MB (0.5GB)	1	1	1	80GB	**57W**	**5.7W**	**2.3W**
350W	1GB	1	2	1	120GB	**67W**	**6.7W**	**2.7W**
400W	1.125GB	1	2	1	160GB	**84W**	**8.4W**	**3W**
450W	2.5GB	2	2	1	400GB	**124W**	**10W**	**3W**
600W	4.5GB	2	4	2	400GB	**180W**	**10W**	**3W**

80-Plus Power Supply Compromise

- 80-Plus, PFC power supplies will not be possible for all manufacturers in 2007
- One compromise may be to add a 7th term to the idle equation for 2007 that rewards manufacturers who implement 80-Plus.
- In 2008 or beyond the term could be phased out to reflect EPA's desire for a more challenging specification in the future.

Example – provide 5W allowance using 80-Plus during idle in 2007:

Idle (W) = $\alpha *$ Pwr Supply Rating(W) + $\beta *$ Platform Memory(GB) +
$\theta *$ Graphics Processors(no) + $\gamma *$ CPU Cores(no) +
$\zeta *$ CPU Sockets(no) + $\rho *$ Storage(GB) +
5W * (80Plus == yes)

- While it may seem counter intuitive to provide more idle power, EPA data shows attributable savings to the utility providers with PFC supplies
- Provides industry the option to implement in 2007 with an incentive to qualify more products

Conclusion

- An idle equation based on weighted factors and component values is a straight-forward, holistic method to define platforms and manufacturer test requirements
- The equation method indirectly reflects cost and performance without actual hard classifications and benchmarks being defined
- Method tracks to a wide range of platform types by sliding continuously along the interval between basic desktops and high-end workstations
- Weighted factors eliminate “gaming” the system by not relying on a single factor
- Future Energy-Star specifications can direct our energies at just tuning the factors appropriately for the market conditions