March 18, 2009

Environmental Protection Agency
ENERGY STAR Program

We appreciate the EPA's efforts at standardizing energy efficiency and consumption of computing devices, as reflected in this ENERGY STAR Computer Server Draft 4. We are pleased to submit our comment for your review.

Sincerely yours,
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We have reviewed the Energy Star Draft 4 Computer Server Specification and have the following comment.

Dell considers cooperation and support of the Energy Star standards to be an essential component in the ongoing efforts to reduce the impact of climate change. Dell is still concerned with the developments of the Energy Star standard targeted at Servers. We consider the EPA and specifically the Energy Star program our partner in this effort.

Dell Detailed Comments and Recommendations for the Draft 4 ENERGY STAR Server Specification

The proposed implementation date for introduction of the Energy Star for Server standard is not adequate for deploying a standard of this magnitude and complexity. With immediate implementation of the Energy Star for Computer Servers standard Dell's view is this implementation does not meet the spirit or the intent of Energy Policy Act of 2005. Specifically,

"provide appropriate lead time (which shall be 270 days, unless the Agency or Department specifies otherwise) prior to the applicable effective date for a new or a significant revision to a product category, specification, or criterion, taking into account the timing requirements of the manufacturing, product marketing, and distribution process for the specific product addressed."

The server specification certainly falls into the new or significant revision of a product category and timing requirements of the manufacturing and distribution process are impacted by this change when coupled with the Federal Acquisition Rules, as currently written.

The draft 4 document identifies potentially three additional revisions for this standard that would occur by October 2010. Dell's concern is that revising this standard three more times within the cycle time for developing a family of servers and within the silicon architecture development cycle time for those servers is excessive.

Idle mode measurements without performance context will drive servers to the lowest configuration for delivering the Energy Star limits. The current single socket limits result in a single component source for the industry. The challenge will be data center managers trading off more, lower configuration Energy Star servers against fewer higher performance servers as documented in the Green Grid Members Meeting Presentation in February. Dell's concern is in data centers containing hundreds to thousands of servers is that a higher percentage of lower configuration Energy Star servers will translate to higher energy consumption. Contrary to the EPA's report to Congress about desired direction of energy consumption.

Reducing the environmental impact of materials such as data sheets should be prioritized and a focus on providing paperless deliverables, such as soft copy or web delivery should be embraced. For the purpose of efficiency, cost and maintaining the greenest of standards with this new set of server requirements, it is Dell's position that

all Energy Star related marketing or technical materials be distributed in electronic format.

As an observation there are more notes in the Draft 4 document than standard. This observation speaks to the complexity of the subject.   We propose that EPA consider adopting a technology roadmap improvement approach. This roadmap would provide focus or targets for improvement, and would allow for Energy Star desired features to be included in feature sets identified for implementation by server development teams. A roadmap approach would allow for less churn and cost when implementing the Energy Star requirements.   Several technologies or approaches have been proposed for Tier 2. Specifically noted are Energy Efficient Ethernet and Net Power Loss.

As a practical perspective we recognize net power loss is an effort to quantify right sizing a power supply to the server. In general Dell does not disagree with right sizing power supplies to the load. What Dell is challenged with is explaining these requirements or approaches to customers of Energy Star systems. Right sizing the power supply to the load is an option, for example a PSU not larger than 120% of the maximum Energy Star configuration power should be considered.

With respect to the Energy Efficient Ethernet. While this standard may release this year, Dell has requested silicon availability from our industry partners in the Tier 2 timeframe or technology roadmaps with components that implements this standard. None have been identified in that timeframe. To reasonably expect to meet the October 2010 implementation timeframe the silicon and technology would need to be available now.

With respect to power supply power factor correction under low load conditions; Dell questions specifying PFC under 100 watts. In the server draft 4 document PFC is specified down to 50 watts. Referencing another Energy Star standard that deals with single output power supplies; it is not a requirement for an EPS (Also a Single Output Power Supply) in the Energy Star EPS specification. See attached.

> In addition to the Active Mode efficiency requirements found above, power supplies with greater than or equal to 100 watts *input* power must have a true power factor of 0.9 or greater at 100% of rated load when tested at 115 volts @ 60Hz.

Processors, sockets and processor sockets have been identified within the draft 4 document.   Clarity is needed; sockets may be installed with single or multiple processors, or cores. The idle mode limits from the standard do not allow for flexibility of configuration of cores; and will reward single core socket servers over multi core socket servers, without regard to improved performance or compute delivery requirements of the data center.

Significant investment by manufacturers in time and effort is required to deliver minimum, typical and maximum values. Dell observes that maximum power consumption is not always aligned with maximum configuration or maximum

performance, and is influenced by application (benchmark tool), BIOS, operating systems or hypervisor settings, and component suppliers.

Dell requests language is inserted to power monitoring section to explicitly state that "accuracy requirements are limited to system operating conditions".

Dell supports revealing standardized data measurements. The system for collecting and reviewing the data is also important. Language that supports an understanding that the operating system reports processor utilization and that a system may report power consumption and air temperature; however latency in workload and network loading may delay the availability of revealed information.

Thank you for the opportunity to comment.

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