Organisation: DIGITALEUROPE	Name: Sylvie Feindt	Date: 8 May 2015

ENTR Lot 9: Enterprise servers and data equipment: Task 4

Document comment relates to	Section in document	Page number	Topic	Comment	Proposed change
Task 4	1.1.3.2	12	Energy Considerations	Air flow is not the only but a factor to consider to lower PUE and optimize energy consumption.	Change to “Air flow and thermal environments are key considerations in optimizing PUE and lowering energy consumption. Note that most air cooled servers receive cool air in from the front and exhaust hot air through the rear. Conversely, some network systems may receive air from the sides. Coordinated air flow is a necessary consideration when optimizing the environmental conditions and reducing the energy consumption used to cool these systems”.
Task 4	1.1.3.3	13	Material Considerations	Pb is also used for dual-sided reflows, whose use vary based on the integration levels.	“Higher density board designs may require Pb based solders for dual sided reflow depending on the board design and mass of the (SMT) components.”
Task 4	1.1.3.4	14	Processor and Memory Technology	The discussion of other processor technologies, the 4th bullet under the technology section, is appropriate and lists a range of processor technologies that exist in the marketplace which are or will be modified for use in server products. It is appropriate to consider these technologies in the technology review in light of their future impact on the server market.	Remove the application specific discussion, beginning with “Sony states”… and ending with “…are simply inapplicable”, from the discussion of other, emerging server processor technologies.

Document comment relates to	Section in document	Page number	Topic	Comment	Proposed change
				However, Digital Europe does not think it is appropriate to list a single, specific server application as an exclusion. Any exclusions from the Lot 9 requirements should be based on the definitions of server hardware as laid out in the ENERGY STAR requirements and should be based on the configuration and make-up of the server hardware not on the application being run. The case can be made that mobile applications offer the same variability in workload over the day as cited in the specific example in the document. Citing one specific workload or server configuration type for exclusion in this document is inappropriate and sets a dangerous precedent.	
Task 4					
Task 4	**1.1.3.6**	**23**	**Power supply efficiency**	**Where you state efficiencies have achieved over 85% and up to 90% for the 20% and 100% load points and higher efficiencies at the 50% load point.", there needs to be a qualifier provided that clearly defines the load points at which the state efficiencies are applied or relevant.**	**Add a qualifier to the sentence "at the 20% load point." Then add an additional sentence: "Efficiencies at the 50% and 100% load points have been increased to the mid-90^{th} percentile for gold and higher power supplies."**
Task 4	**1.1.4**	**28**	**Storage devices and system elements**	**One of the most important requirements for enterprise storage products is the protection of data. The importance of this data protection function increases with the introduction of the Capacity Optimization Methods which increase the manipulation of the stored data, and the need for validation of the data, while increasing the**	**Add a reference to "data protection" in the first paragraph of section 1.1.4.** **Recommended change: "**The main performance feature of storage systems are ***data protection***, capacity, latency, connectivity

Document comment relates to	Section in document	Page number	Topic	Comment	Proposed change
				efficiency of its storage. As discussed in our comments to the draft Task document and in the current comments on the Draft Final documents these maintenance and data protection functions require continuous activities to assure data integrity.	and manageability."
Task 4	**1.2.7** **1.3.1**	**48** **49**	**Power Supply Efficiency**	**It is important to separate the requirements for single output and multi-output power supplies as they are very different technologies with different development paths. Industry currently is early in the transition to Gold level PSUs in multi-output power supplies and is much more mature in the availability of Gold with some amount of platinum in the single output power supplies. For both single output and particularly for multi-output power supplies the larger, higher output power capable supplies are slower to transition to higher efficiency levels.** **Storage systems use multi-output supplies to optimize voltage regulation conversion within the system. Managing the various voltage shifts within the power supply optimizes the conversions and can reduce the overall power system losses. As an example, consolidating the voltage shifts into the multi-output supply may decrease the power supply efficiency by 1%, but increases the overall power system efficiency by 4%.**	**Both of these sections need to include a discussion that storage systems may use single output or multi-output power supplies and that the two supplies have different efficiency characteristics due to the higher losses associated with multiple voltage adjustments in the multi-output power supply. As currently written, these two sections do not distinguish between the two types of supplies and leave the impression that similar efficiency gains can be made in single and multi- output supplies.**

Document comment relates to	Section in document	Page number	Topic	Comment	Proposed change
Task 4	**1.3.4**	**52**	**MicroServers**	**The limitation of Microservers was discussed in Digital Europe feedback to the draft documents. These new server types are advantageous for specific, small, low complexity workloads. The fabric and infrastructure compute overhead is also suited for specific workloads. Because of their design and functional capabilities, Microservers are not typically used for virtualized workloads.**	**Note that these configurations are being targeted for specific workloads and may not be suited to support the full variety of workloads identified in task 3.**
Task 4	**1.4.1**	**55**	**Best not yet available technology**	**Memristors have been investigated for many years and progress has been extremely slow. These technologies are unlikely to impact any designs for decades if at all. It is premature to consider this technology as a current option.**	**Note that Memristors have yet to prove feasibility in applicability, scalability, manufacturability, and economic feasibility and are a long term technology.**
Task 4	**3.2**	**63**	**Miniaturization**	**This section appears to state that energy efficiency improvements in servers and storage products have been largely driven by miniaturization. At one level, increased miniaturization may increase the power losses in the CPU and memory chips because of higher circuit resistance. At another level, it allows for increases in the available compute, storage, memory, or network capacity of a given device within a defined power envelope. Increased capacity, however, may not increase workload delivered per unit of energy consumed.**	**The paper needs to acknowledge that energy efficiency improvements have occurred from a variety of sources:** **1. Improved efficiency of power system components. This includes voltage regulators and power supplies.** **2. Improved management firmware and software including improved power management capabilities, hypervisors (virtualization for servers), COMs for storage systems, and other improvements.** **3. Increased workload capacity on CPU,**

Stakeholder comments form

Document comment relates to	Section in document	Page number	Topic	Comment	Proposed change
					memory, storage, and I/O which enables more work to be done per unit of energy consumed. This is the result of miniaturization and architectural innovations.