



Storage Networking Industry Association

Response to EPA's

ENERGY STAR<sup>®</sup> Program Requirements  
for  
Computer Servers

March 14, 2008

[www.snia.org](http://www.snia.org)



## **Overview of Storage Networking Industry Association**

The Storage Networking Industry Association (SNIA) is a global consortium whose mission is to: Lead the storage industry worldwide in developing and promoting standards, technologies, and educational services to empower organizations in the management of information. The SNIA Vision is to:

- Be a trusted advisor across all business segments and the recognized authority in storage technologies in support of information management
- Be a catalyst for the development of information technologies and storage standards
- Establish a strong international presence to address the needs and requirements of the local storage and information management marketplace

The SNIA was founded in 1997. Its membership includes manufacturers, end users, and service providers numbering 400 member companies and 7,000 individuals. Within its membership, the manufacturers represented include the majority of all the companies in the industry as well as market share leaders of every important aspect of network storage. This includes storage drives, storage arrays, storage network devices, storage software, and tape libraries.

## **Overview of SNIA Green Storage Initiative**

Within the SNIA there are two dedicated committees for Green Storage, organized as the Green Storage Initiative (GSI) and the Green Storage Technical Work Group (TWG). The SNIA GSI is dedicated to advancing energy efficiency and conservation in all networked storage technologies and minimizing the environmental impact of data storage operations. The Green Storage TWG's current focus is on power and efficiency metrics, methods to measure metrics, operational metrics, and standards. SNIA Green Storage activities include, but are not limited to:

- Conduct research on power and cooling issues confronting storage administrators
- Educate the vendor and end user community about the importance of power conservation in shared storage environments
- Leverage the Storage Networking World (SNW) conference and other SNIA and partner conferences to focus attention on energy efficiency for networked storage infrastructures
- Provide input to the SNIA Green Storage TWG on requirements for green storage metrics and standards
- Provide external advocacy and support of the technical work of the SNIA Green Storage TWG
- Formulate and popularize best practices for energy efficient storage networking
- Promote storage-centric applications that reduce the storage footprint and associated power requirements
- Be the liaison between the SNIA and other public and governmental organizations with similar energy conservation interests.



- Coordinate with SNIA Regional Affiliates to maintain the international focus of all SNIA Green Storage efforts, and to provide liaison to Green Storage networking concerns worldwide.

For more information on SNIA, please visit [www.snia.org](http://www.snia.org)

For more information on SNIA Green Storage Initiative, please visit [www.snia.org/forums/green](http://www.snia.org/forums/green)

For further communications with the SNIA regarding this response, please contact:

Wayne M. Adams  
Member of SNIA Green Storage Initiative  
Chair of SNIA GSI Alliances Committee  
[Adams\\_wayne@emc.com](mailto:Adams_wayne@emc.com)  
Office: 1-508-293-6439  
Mobile: 1-508-631-8883

SNIA Postal Address is:  
500 Sansome Street, Suite 504  
San Francisco, CA 94111  
Office line for general SNIA inquiry: 1-415-402-0006



## **Executive Summary Response**

The SNIA does support the goals of the EPA ENERGY STAR Program and its objectives to manage IT equipment power more efficiently, conserve energy in the data center, and improve our environment through these improvements.

- SNIA believes there is a need for a Networked Storage Specification, separate from the ENERGY STAR Computer Server Specification. The Computer Server Specification is not easily modifiable to apply to networked storage; there are too many technical dissimilarities as well as solution configurations to meet the diversity of the end user operational requirements.
- SNIA agrees a multi-phase approach is preferred and can advance the industry over time. SNIA and the EPA will need to meet to establish content and objectives for each phase.
- The SNIA's general understanding of the Computer Server Specification, whereby Tier 1 is supportable in 2008, does not match the Storage Industry readiness and recommendations. The SNIA and EPA will need to meet to establish a timeline that leverages SNIA's timeframes for technical investigations, proposals, and conclusions.

The SNIA desires to meet in the near future to establish a closer working relationship whereby together we would develop the steps for a Network Storage Specification and its associated timeframe. Wayne M. Adams, contact information listed on the previous page, is the SNIA coordination point.



## Detailed Summary Response

The ENERGY STAR Computer Server Specification is not easily modifiable to apply to networked storage; there are too many technical dissimilarities as well as solution configurations to meet the diversity of the end user requirements. Network storage platforms are distinguishable along at least four separate vectors:

- RAS (reliability, availability, and serviceability)
- Response time (from milliseconds to days)
- Throughput (i.e. performance)
- Capacity (both in numbers of disks and disk sizes)

Each of these has power usage and other economic implications, and some are interrelated; for example, disk drives exhibiting the highest performance are typically at the low end of the available capacity curve.

The multi-dimensional nature of the four vectors means that a single metric is more or less guaranteed to discriminate against entire classes & segments of storage. For this reason, SNIA and the SNIA GSI are committed to developing a more comprehensive set of metrics that will allow end users to make informed decisions, balancing application and storage requirements with energy intake.

Additionally, there are methods and attributes that can apply to specific classes of networked storage. In some instances certain attributes that appear in one technology domain are vastly different in another domain. Specific to the storage domain, a given attribute or method can vary vastly across vendors. For example, the ENERGY STAR Server Specification references virtualization. Within the networked storage domain, virtualization can be a feature of the storage array or a feature in the storage network working across several storage arrays. One virtualization technique with the aim of increasing storage utilization is called thin provisioning. Thin provisioning technologies, while similar in effect to server hardware virtualization technologies—underlying hardware is used more efficiently and therefore less power is needed—are based on virtualizing storage rather than virtualizing CPU and network resources, and therefore require a slightly different treatment. Other methods exist and are of equal value to solve certain IT problems.



The SNIA is working on a networked storage industry taxonomy that embraces classes of storage, applications of storage, and features and methods that apply within one or more classes of storage.

- As described in an overview fashion in the SNIA EPA January 2008 Workshop, some ideas for storage classes include enterprise storage, mid-range storage, near online storage, and off-line storage.
  - Within these classes may be different types of storage. For example off-line storage includes tape libraries and optical juke boxes. Near online storage includes MAID (massive array of idle disks) arrays and some types of content aware storage (object storage). Other types of object storage may classify as on-line storage as well, depending on response times.
  - Within certain types of storage within the class, there could be features such as disk drive spin down, drive sleep mode, and/or idle operation mode, all of which can have varying degrees of improved power efficiency.
- Beyond the storage system itself, SNIA is reviewing all the elements of a networked storage environment, which includes the connectivity from the host computer to the storage device, and we have identified a wide range of storage specific equipment including host bus adapters, network interface cards, switches, gateways, bridges, and task specific appliances.
- SNIA will deliver a suitable taxonomy to establish the foundation for factoring in power supplies, workloads and application of the storage system, and measurement methods. Taxonomies developed to date by vendors and industry analysts have been self serving to a vendor's product and solution portfolio and market sizing – but not holistic to encompass solutions being vendor agnostic that can be further detailed with attributes that are relevant for power and efficiency measurements and classification.
- Storage solutions may include dedicated computer servers doing specialized tasks. Though their basic hardware components may coincide with Definitions in the ENERGY STAR Computer Specification, SNIA advises these devices be categorized as storage devices, whereby optionally, they'll be coupled with storage media devices and or storage protocol devices. Sometimes these kinds of devices can be generically referenced as Appliances.
- The SNIA has developed a set of vetted terminology and definitions, which can be found at <http://www.snia.org/education/dictionary/> . However, this terminology is not all inclusive nor does it reflect a taxonomy.



SNIA is not familiar the 80 Plus Power Supply program. SNIA's cursory review of 80 Plus's applicability for single unit compute server power supplies indicates it does not directly map to networked storage. SNIA needs time to further review the program to determine if elements of that program may relate to sub-components of a Storage Power System.

- Storage deployed in the data center is comprised of Power Systems orchestrating a number of power supplies and voltage levels including both 5v and 12v.
- SNIA believes several months of detailed research and measurement will be required to establish a baseline of power systems deployed in a finite number of storage classes, to set the discussion of what is and is not feasible to be measured in conjunction with a storage class with a defined set of constants for the configuration. During this timeframe a review of the Climate Saver's work would be done as well.

The Computer Server Specification makes specific references to management specifications by the DMTF. Within the storage industry, there are management specifications and protocols in wide use and SNIA believes a single mandated technology may constrain the overall objective. The SNIA will work with the EPA to define information requirements regarding "what is needed to be effectively managed." SNIA recommends that the types of technology, standards, and protocols, and how to collect information and manage network storage devices be left to the industry and marketplace to select and define.

The Computer Server Specification makes references to performance and efficiency measurements. Also a reference is made to SPEC. The SNIA GSI and Green Storage TWG will develop and deliver to the industry useful metrics aligned with the SNIA taxonomy to assist end users in making informed decisions around selection and operation of storage systems as it related to energy efficiency. SNIA may reference and or expand upon other industry storage metrics for relevant classes of SNIA's network storage taxonomy.