Information Technology Industry Council

21 November 2012

To: largenetwork@energystar.gov.
Attn: Robert Meyers, US EPA and Bryan Berringer, US DOE

Re: EPA Large Network Equipment Specification Proposal

Thank you for the opportunity to provide comments on the EPA and DOE's proposed Large Network Equipment (LNE) ENERGY STAR® specification. The Information Technology Industry Council (ITI) represents numerous high-tech electronics manufacturers in the information and communications technology (ICT) sector. Our members are global leaders in all facets of ICT innovation, from hardware to services to software and have long been leaders in sustainability. Many exceed environmental design and energy efficiency requirements, and lead the way in product stewardship efforts. As a result, the Dow Jones Sustainability Index, the Financial Times Sustainability Index, and the Global 100 have consistently recognized numerous ITI members for their concrete environmental and sustainability achievements.

We continue to support public private partnerships that recognize market leaders in energy efficiency and plan to engage with the EPA ENERGY STAR staff on the development of the LNE specification. As was learned in the development of the Server and Storage system requirements, however, enterprise data center equipment is complex with machine types and models consisting of multiple configurations. These configurations vary markedly in the number and types of components and power profiles. LNE shares this complexity with servers and storage. LNE will also exceed the complexity of small network equipment (SNE), a category where product type and end use service tend to be better defined. And, in spite of this, the SNE specification is still under development after 3-years. The range of likely LNE product types or families coupled with diverse service models, applications, specifications and end customer requirements will make it very difficult to develop workable product categories, apply available test methods and establish workable performance/power metrics.

Network equipment, like other enterprise data center equipment categories, is undergoing rapid innovation and performance/power improvement, including new network protocols and equipment power saving features which are being developed and integrated into customized business-to-business network solutions; examples include 10 GB and 40 GB connections, which are not currently addressed in the ATIS standard, but are becoming widely available in network equipment. As with storage systems, establishing representative test methods, validating their appropriateness for the covered categories and families, and collecting a representative data set will be difficult. As such, while we fully support energy efficiency in product and service design, we question if an ENERGY STAR label can provide meaningful data for this type of equipment. We respectfully encourage the EPA to consider issuing LNE efficiency guidance instead of a specification, and regardless, addressing product scope will be a first priority. If EPA chooses to continue with the LNE specification development, we encourage EPA to proceed with deliberation and care in considering product coverage and product categories/families for version 1 of the specification so that it covers a workable range of equipment, sets economically feasible testing requirements, and enables the establishment of a workable process as a foundation for future versions of the requirements.

Product Scope

ENERGY STAR should limit the scope (and title) to Ethernet switches and routers.[1] Keeping the scope to equipment with similar usage patterns should limit conflicts between efficiency ratings and the targeted application. We concur with the EPA that the network equipment domains of Wireless Access and Optical Transport be excluded from the LNE scope. We further recommend exclusion of cellular base station equipment (beyond co-located routers/switches), DSLAMs, ROADMs, cable equipment, storage network (i.e.fiber channel), high performance computer cluster interconnect solutions (i.e. InfiniBand) that are outside the Ethernet comparison, and security appliances (e.g. firewalls intrusion detection equipment) as further explained below. These equipment domains will not be practically served by the ENERGY STAR specification and labeling program. Also, as noted by the EPA at the LNE kick-off meeting, the largest portion of energy use is in switching products. We understand that the framework document is proposing that the LNE specification include all or a subset of the following products: routers, switches, security applications and access point controllers. ITI members believe the proposed scope is too broad and contains significant variance in application and energy profiles. Large variances in application and energy profiles under a common specification can lead to conflicts in efficient operation of the equipment.

Differentiate LNE from Server and Storage Requirements

To avoid duplication with existing ENERGY STAR specifications for products such as servers, it is critical that the products covered by the scope of the LNE requirements be very specifically targeted. It is particularly important to exclude network switches that are embedded in server, storage and other products covered by existing or planned ENERGY STAR requirements. These embedded switches are already being evaluated within the context of the server or storage system idle power and performance/power metrics. This is analogous to the case of servers and data center storage, where the presence of disk drives in a server do not make it subject to the storage spec, and the use of server components in a storage product do not make that subject to the server specification. It should also be noted that the server and storage specification specifically excludes products covered by other ENERGY STAR specifications.

At the other end of the spectrum, routers and switches embed hardware components that can resemble those found as components in servers. These are systems clearly dedicated to a specific set of network functions operating on system-specific software and cannot execute customer-loaded code, thus differentiating them from servers.

Security Appliances Exclusion:

EPA has asked for comments regarding inclusion of security appliances within the product scope. ITI encourages EPA to exclude security appliances from the LNE requirements for the following reasons:

1. Security appliances represent a small portion of the large network equipment market. Based on IDC data, security appliances revenue of $532 M[2] represents approximately 0.4

[1] Aligns with ATIS 0600015.03.2009

[2] http://idc-cema.com/eng/about-idc/press-center/49334-security-appliance-market-shows-healthy-growth-across-cema-region-idc-study-reveals

percent of the 2011 service provider network market revenue of $135 B[3]. In terms of number of products introduced into the market, security appliances are a miniscule percentage of the marketplace.
2. While network systems encompass tens to thousands of network devices as one moves from the access layer to the core layer, security appliances on the other hand, are only located at critical systems junctions. This is the technical reason that security appliance revenue is such a small percentage of network system revenue.
3. Security appliances analyze, rather than direct, network traffic making the performance power metrics for these products very different from those for switches and routers.
4. Security appliances perform an administrative overhead function that is voluntarily added depending on the security needs of the network users. So the degree to which this equipment is included is based mainly on the level of protection delivered and would not be based on energy efficiency criteria.

Security appliances should be excluded from the LNE requirements due to their small market share and specialized feature requirements for the network.

Storage Networks Exclusion:
While not explicitly discussed in the EPA LNE framework document, ITI recommends that EPA exclude stand-alone switches that move data between servers and storage devices. These switches typically are based on fiber channel technology.

Categorization of Network Equipment:
The industry views network switches and routers to operate in two distinct environments and in three layers. EPA should consider categorizing the routers, switches, and access point controllers within this hierarchy and using these categories to set testing requirements and metrics.

Two Operating Environments:

1. Enterprise class: These are the network devices that connect individual users (workstations, laptops, etc.) to the network. They will be found in office buildings and other environments where individual devices proliferate and are in use. Note that in this case the use of the term “Enterprise” is distinct and different from its use in describing Enterprise storage or server systems in that it represents systems outside of the data center. These network devices historically have had side to side airflow as they are located in individual setting or small closets.
2. Data Center class: These are the network devices that route traffic from the individual data center components – servers and storage systems – to the internet or broader network. These are Ethernet switches. These switches typically have back to front air flow as they are configured for placement in a data center.

Three Operating Layers:

a. Access Layer: This type of switch collects network traffic from individual devices – servers and storage systems in the data center or workstations, laptops, and controllers in the enterprise setting – and routes the traffic to internet switches and routers. These systems typically support a large number of “user” ports and a smaller number of “network” ports. Access system network equipment can be fixed or modular.

[3] http://itcandor.net/2012/04/25/networks-q212%EF%BB%BF%EF%BB%BF/

b. Aggregation Layer: This is a type of router that collects network traffic from the access switches, aggregates the traffic and sends it to core routers, which may be inside or outside a corporate firewall. Aggregation layer routers manage switch to router traffic and can be modular or fixed.
c. Core Layer: These are the routers that move traffic around the internet. They manage router to router traffic. These routers are primarily modular systems.

Fixed versus Modular Installations
We support the proposal to focus on fixed configuration (rack-mount) versus blades, modular, etc installations. The wide variability in modular designs will make it very difficult to measure and compare products against uniform criteria. Drawing on our collective experience with both servers and storage systems, it is reasonable to begin with devices whose configurability is highly contained. As our understanding of realizable energy efficiency is better comprehended, we could consider expanding the product scope.

Definition of idle
- Idle equipment must be able to immediately transition to full traffic; equipment that takes tens of seconds or longer to resume full speed provides substantially less functional performance than customers require.
- Idle vs. Sleep expectations must be explicitly defined as these can significantly impact efficient operations and QOS.

Test Measurements
- Test measurements should reflect the end users experience, however, as previously stated it will be difficult to develop test method models that can account for the myriad of variables as well as the pace of technology shifts. For example, testing requirement considerations will need to highlight and accommodate the various environments including the full range of -48VDC and 220/240VAC in addition to 115VAC. As an example for larger scale AC equipment > 1500W there should exist the option of testing at either 208 V (3Φ) or 230V (1Φ). Additionally, any power delivered by Power over Ethernet (PoE) should be subtracted from the gross power consumed by the system, and how this is measured needs to be clearly defined.
- To advocate power management, the net benefits of EEE (802.3az) should be reflected in the power measurements (e.g. by means of the test routines and testing points)

General Considerations
- We recommend that the product scope by limited to enterprise data center class. Mixing systems with different usage (and energy profiles) may impede productivity and/or efficiency in other systems and environments. Detailed definitions of such products within scope are critical.
- EPA should work with industry groups to define efficiency or specifically identify and consider all of the productivity attributes.
- EPA should recognize and consider downstream impacts on other systems reliant on this class of networking equipment. There can be unintended consequences associated with the proposals (e.g. resume-from-sleep latency may cause network congestion and lower the utilization levels of the servers).
- We encourage using ATIS methods as a reference for specification details and testing requirements.

In summary, ITI encourages EPA to consult closely with industry stakeholders on defining those products that should be in and out of scope. As with the storage and server version 1 requirements, EPA should carefully select the right subset of LNE considering market share, system complexity and cost of testing, and data collection constraints. Selection of an appropriate subset of LNE will enable the EPA and the industry to collect the needed product data, validate the product categories, and gain program and testing experience that will enable EPA to chart a logical, cost-effective approach for the program over time. As such, we respectfully recommend that the EPA work with industry to develop Guidance on energy efficient design.

We would be pleased to discuss any of these comments in greater detail, and look forward to on-going collaboration.

Sincerely,

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About ITI
The Information Technology Industry Council (ITI) is the premier voice, advocate, and thought leader for the information and communications technology (ICT) industry. ITI is widely recognized as the high-tech sector's most effective advocacy organization in Washington, D.C. and in various foreign capitals around the world. For additional information, please visit www.itic.org.