

26 July 2013

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

Re: EPA Large Network Equipment (LNE) ENERGY STAR Framework Proposal – ITI amended comments

Thank you for the opportunity to provide comments on the EPA's ENERGY STAR Large Network Equipment (LNE) Framework Specification; June 2013. We also appreciate the inclusion of select recommendations from ITI's January 2013 submission.

Background

Large network equipment is an integral part of a larger ICT macro system. ITI fully supports the desired policy objective of reducing total network energy consumption; however, as we noted in our prior comment submission, a holistic approach to energy management is essential. Failing to recognize equipment functional requirements to address specific workload or application requirements, for example, could inadvertently reduce energy in one isolated portion of a system, but actually increase overall network system energy consumption.

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 products and solutions. Allowing for meaningful product differentiation, establishing representative test methods, validating their appropriateness for the covered categories and families, and collecting a representative data set will be challenging.

For these reasons, we believe the most meaningful way to initially affect environmental performance in the area of LNE is to focus on improvements to power supplies. We recommend that EPA use LNE Version 1 to collect data on network products to enable the development of an appropriate categorization framework and metrics system for Version 2.

Product Scope and Taxonomy

Given the complexity of these products, we believe the proposed product scope is too broad. Once again, improving the efficiency of power supplies would have the greatest net environmental benefit, however if the EPA finds it necessary to continue with a broader LNE specification, fixed switches, routers and configurations are a logical place to start. To make meaningful comparisons between products and smart energy efficiency product choices, modular products with variable configurations would require a high degree of product differentiation which correspondingly also requires a lot of data points. It simply isn't manageable at this stage.

The EPA framework proposal differentiates products based on port count and chassis type. For an accurate like-to-like product comparison, many additional factors need to be considered such as port type, speed, system compatibility and capability (upload, download, core system communication). When highly configurable modular designs are added, the number of possible permutations expands exponentially.

We recommend use of existing product taxonomies, such as ATIS, whenever feasible. For example, the ATIS standard for routers and Ethernet Switches (ATIS-0600015.03.2013) defines Classes for Routers and Switches (Tables A1 and A2 in Annex A) based on different

parameters like Route Scale, Service Scale, Port Configuration, Typical features set, Number of Downlink ports, Uplink count & type,...

This classification should be used as a reference; note that the new ETSI standard for Routers and Switches mentions this ATIS classification; 'In light of the router different application scenarios, it can be classified into core routers, service routers, broadband access routers, and aggregation routers (Core, Edge, access routers in ATIS 0600015.03.2009 [1] classification).

ITI Responses to EPA's Specific Questions:

Definitions

Questions for Discussion:

1. Are there alternate definitions for the terms above that should be reviewed and considered by EPA?

We recommend further classification of the devices. It should be clear that features and configurations, such as upload, download and core system communication, affect energy profiles. As such, the EE design approaches vary depending on the configuration of the networking equipment or networked equipment (i.e. edge device).

2. Are there any LNE product types not addressed above that should be added to the list of products under consideration for Version 1.0 LNE specification? Are there any products that should be explicitly excluded?

Security, health, and safety monitoring systems and associated network infrastructure should be explicitly excluded. For example, networking and networked infrastructure devices connected to monitoring or security appliance must also be excluded. This will ensure that systems can capture events detected by the appliance. Therefore, acceptable modes of system power management may be limited.

3. Are there any product characteristics not included above that EPA should be aware of, beyond modular vs. fixed or managed vs. unmanaged? What impact do these categories have on product capabilities and energy consumption?

There are hundreds of different categories of networking devices, each with a different energy consumption profile. We recommend use of ATIS TEER tests to identify the different characteristics. A grouping of "like" systems may become very difficult given hardware and software configuration differences.

Energy Efficiency Criteria and Test Procedure

Questions for Discussion:

1. Are there features not listed above that provide substantial energy savings? What are the energy and performance impacts of these features as they currently exist? What about in the near future?

We encourage the EPA to consider a performance based approach to energy management, defining a limited number of common product characteristics such as power

supplies. Performance data, as defined in ATIS test procedures, should be documented; thereby, allowing system designers to select and configure the most efficient solution.

New networking technologies are continuously being developed to efficiently handle increased traffic. Each change will have an incremental affect on overall network performance and energy efficiency. The EPA should comprehend a holistic approach to understand downstream affects and applicability of power saving features. Due to the customization and network dependencies of the equipment, comparisons may only be limited to common features such as power supplies.

2. Are the savings from the more efficient Power over Ethernet (PoE) large enough to include in this specification? Should PoE mid-span devices be considered to be network equipment or external power supplies?

PoE specifications vary primarily by maximum power capabilities to support the targeted end device load and the cabling distance. Variances in the specifications and the resulting efficiency are predominantly driven by load and cable length. The actual unit under test's (i.e. large networking equipment) efficiency is dominated by its own power conversion at the power supply unit (PSU).

Since the power efficiency of PoE is dominated by the efficiency of the PSU in the source system, we recommend that a PSU efficiency criterion such as 80-Plus would be sufficient to comprehend the efficiency of the PoE conversion. Do note, however, that when PoE is deployed power levels are elevated making low load efficiency levels less significant. There are improvements in energy efficiency that could be achieved if both the source and load devices use intelligent power negotiation (as enabled by Link-Level Discovery Protocol – LLDP), such implementation should be encouraged.

Mid-span devices may have more than simply power supplies, so the additional electronics to boost or repeat the signal will be additional energy consumption beyond the power supply conversion.

Information and Management Requirements

Questions for Discussion:

1. What aspects of the Standard Information Reporting or Data Measurement and Output requirements in other ENERGY STAR data center specifications (servers, UPS, storage) are relevant to LNE devices? Do any existing LNE standards approximate the ENERGY STAR requirements described above?

LNE systems should follow reporting characteristics outlined in ATIS. The performance measurements and resulting power levels are different than these other data center equipment types. The most common is the power conversion and thermal conditions.

The following questions may need subsequent review to ensure what information is generally provided across all these systems. Some may be configuration dependent.

2. What are typical performance data measurement, reporting, and output capabilities of LNE devices? What industry trends address reporting capabilities?
3. What information should be displayed in the product finder tool on the ENERGY STAR web site?
4. Do LNE products have the ability to measure and self-report operations characteristics in an open, accessible format when interfacing with a third-party management software?
5. How is utilization defined for LNE products? What utilization information would be helpful to managers for procuring LNE equipment?

Recommendation Summary

Initially focus Version 1 on improvements to power supplies. Additionally, use LNE Version 1 to collect data on fixed switches and routers utilizing existing product taxonomies such as ATIS-0600015.03.2013. This will enable development of an appropriate categorization framework and metrics system for Version 2.

We would be pleased to discuss any elements in greater detail.

Sincerely,



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About ITI

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