



ENERGY STAR® Large Network Equipment: Stakeholder Webinar

January 30, 2015

U.S. Environmental Protection Agency

U.S. Department of Energy

Introduction



- EPA and DOE thank all stakeholders who have participated thus far in the development of the ENERGY STAR LNE program requirements.
 - Stakeholder participation is critical to the development process
 - We look forward to further work and eventual finalization of program requirements with stakeholder input
- Roll Call

Webinar Goals



- Highlight remaining issues for LNE program development
 - Problem statements, questions to answer
 - Not intended to resolve here, but start ongoing discussion
- Outline process for working with partners to resolve
 - Timeline
- Set stage for generating, accepting solutions to these issues in future draft documents

Agenda



- Announcements
- Spec Discussion
 - Test and Report vs. Level Setting
 - Defining product family and testing configuration
 - Separation between SNE and LNE
 - Handling differences in modular vs. “semi-modular” products
 - Incorporation of fiber optic ports into scope
- Test Method Discussion
 - Snaked Traffic Topology
 - Ambient Temperature Requirement
- Timeline

Announcements



- RJ Meyers to be on temporary assignment elsewhere in EPA
 - 2/9/15 to early June 2015
 - May take additional personal time in June/July
 - LNE covered by Katharine Kaplan (Katharine.Kaplan@epa.gov) and our contracting team (primary contact: John.Clinger@icfi.com)
 - Work proceeds as normal!

Specification Discussions



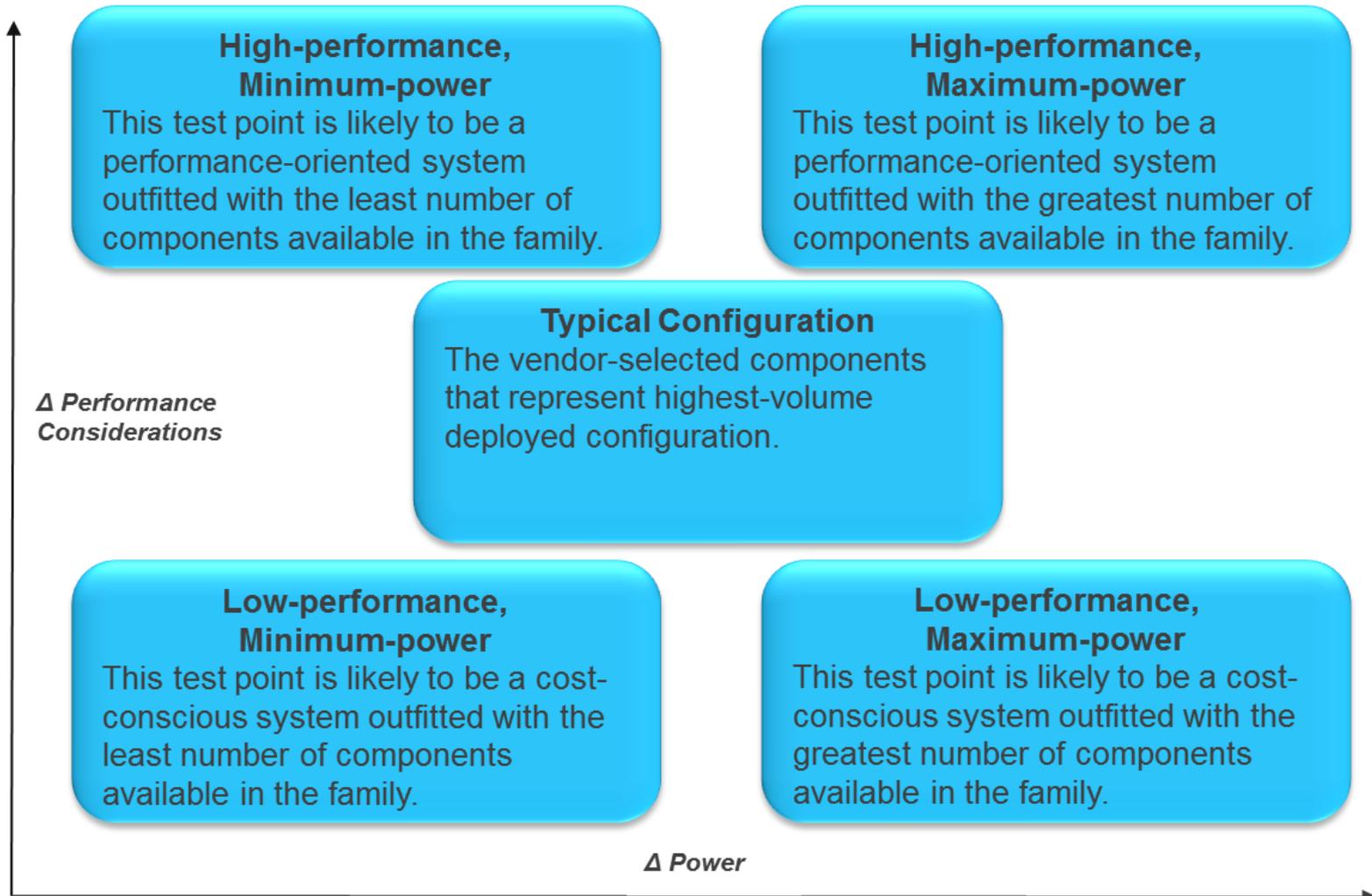
1. Test and Report vs. Level Setting
2. Defining product family and testing configuration
3. Separation between SNE and LNE
4. Handling differences in modular vs. “semi-modular” products
5. Incorporation of fiber optic ports into scope

Test and Report



- EPA will pursue test and report for LNE V1.0
- Intention:
 - Guarantee basic energy efficiency for users
 - Help create data for V2.0 level setting
- Note:
 - There must still be boundaries to define a product family for certification
 - Other binary requirements (e.g. PSU, EEE) will still apply
 - Will require testing using ENERGY STAR LNE test method
- Examples from other specs on following slides

Servers Product Family Example

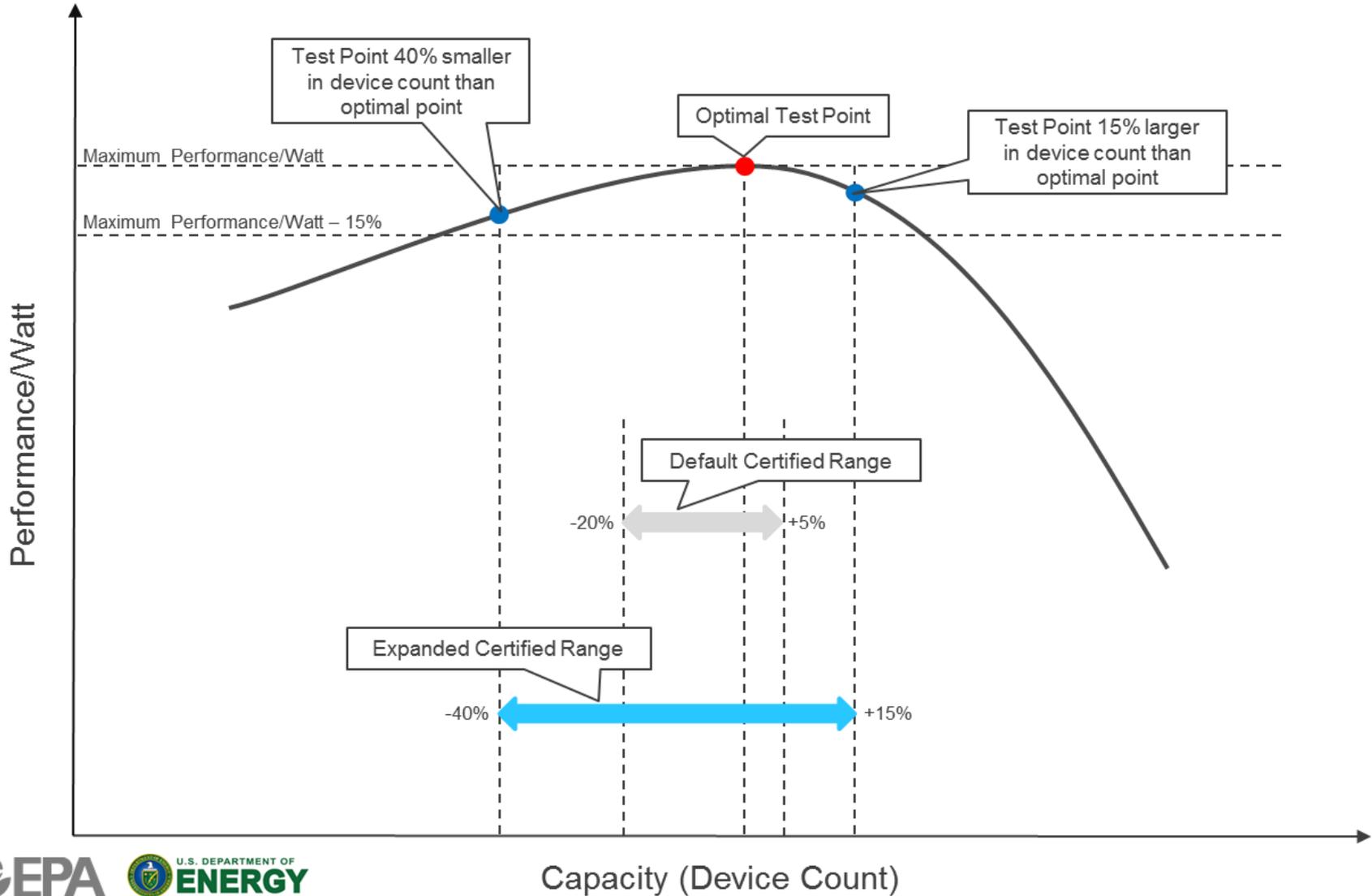


Additional Server Details



- Test and report is applicable for the following server product types:
 - 3S/4S Servers
 - Blade Servers
 - Multi-node Servers
- Blade servers are required to be tested with ½ populated chassis (with the option to also test and report fully populated chassis)
- Multi-node servers are tested with full chassis
- Blade and multi-node are tested with homogenous blades/nodes

Storage Product Family Example



Additional Storage Details



- Partners can certify systems under three workload types (can be more than one type):
 - Transaction (IOPS/W)
 - Streaming (MiBPS/W)
 - Capacity (GB/W)
- Partners identify and test the optimal system size for maximum performance/watt of that workload type, as well as points in system size both smaller and larger in device count to show scaling behavior
- Configurations within the defined floor of performance/watt for that product family are certified

Product Family



- EPA understands that LNE products will likely require their own unique solution to define product family and plans to work closely with stakeholders to determine the best path forward.
- EPA also recognizes that how a product family is defined for a fixed product may look different from how a product family is defined for more complex modular products.

Product Family - Questions



- How should EPA define the range of configurations within a product line to either:
 1. Highlight the most energy efficient options; or
 2. Show a representative range of options within the family to educate end-users on the differences in energy performance across those configurations?
- For products with modular port options, what is the best representation of a typical energy usage for that product?
 1. How populated should the chassis be during test?
 2. Which modules should be tested to determine the product family?

Separation of LNE and SNE



- Current separation is:
 - SNE has ≤ 11 physical network ports
 - Also covers non-enterprise Wi-Fi products
 - LNE has > 11 physical network ports
 - Does not cover products whose primary function is wireless
- Examples of non-residential products that are not covered or are covered non-ideally by either specification:
 - Enterprise access points
 - Higher end commercial switches and routers with fewer than 12 ports
 - Products that contain pluggable/modular adapters such as GBIC or SFP and have fewer than 12 ports

LNE vs. SNE - Questions



- Is there a better method to separate LNE and SNE products in the development of V1.0 of LNE and V2.0 of SNE? What other dividing options exist that are based on functionality and features that can improve the current situation?
 - Throughput
 - Maximum total link capacity
 - An undetermined combination of performance characteristics
 - Other features or functionality

Modular vs. “Semi-modular”



- EPA has previously proposed to separate fixed and modular products by whichever port type is more prevalent in the system(e.g. if fixed port count is 50%+, it is a fixed product).
- Stakeholders have noted that “semi-modular” products share similar complexities in testing and categorization that fully modular products do and should be treated accordingly.

“Semi-modular” - Questions



- How should EPA address a product that has a large majority of fixed ports, but also a subset of modular ports, in terms of testing configuration and product family classification?
- Are there any negative consequences of testing a “semi-modular” product under the full-port variable load energy efficiency test in the ENERGY STAR LNE Test Method?
- Are there any other special considerations needed for “semi-modular” products?

Fiber Optic Ports



- Fiber optic ports are not currently covered within the definition of physical network port
 - Fiber optic connection products not in scope
- EPA would like to include products which require fiber optic connections within scope of Version 1.0, and will look to work with stakeholders to address any complications that arise in doing so.

Fiber Optic Ports - Questions



- Given that the test method can already address fiber optic ports sufficiently, are there any other concerns about including them into scope, particularly with regard to product family?
 - Should products that support both copper and fiber optic ports fall within the same product family?
 - Are there any special considerations for ports that support both copper and fiber?

Test Method Discussions



1. Snaked Traffic Topology
2. Ambient Temperature Requirement

Snaked Traffic Topology



Draft 2 Test Method

Each port on the UUT shall be connected to a port on the test equipment

- This requirement may cause testing to be expensive or impossible for products with many ports.
- DOE aims to modify this requirement to reduce the burden for testing such products.

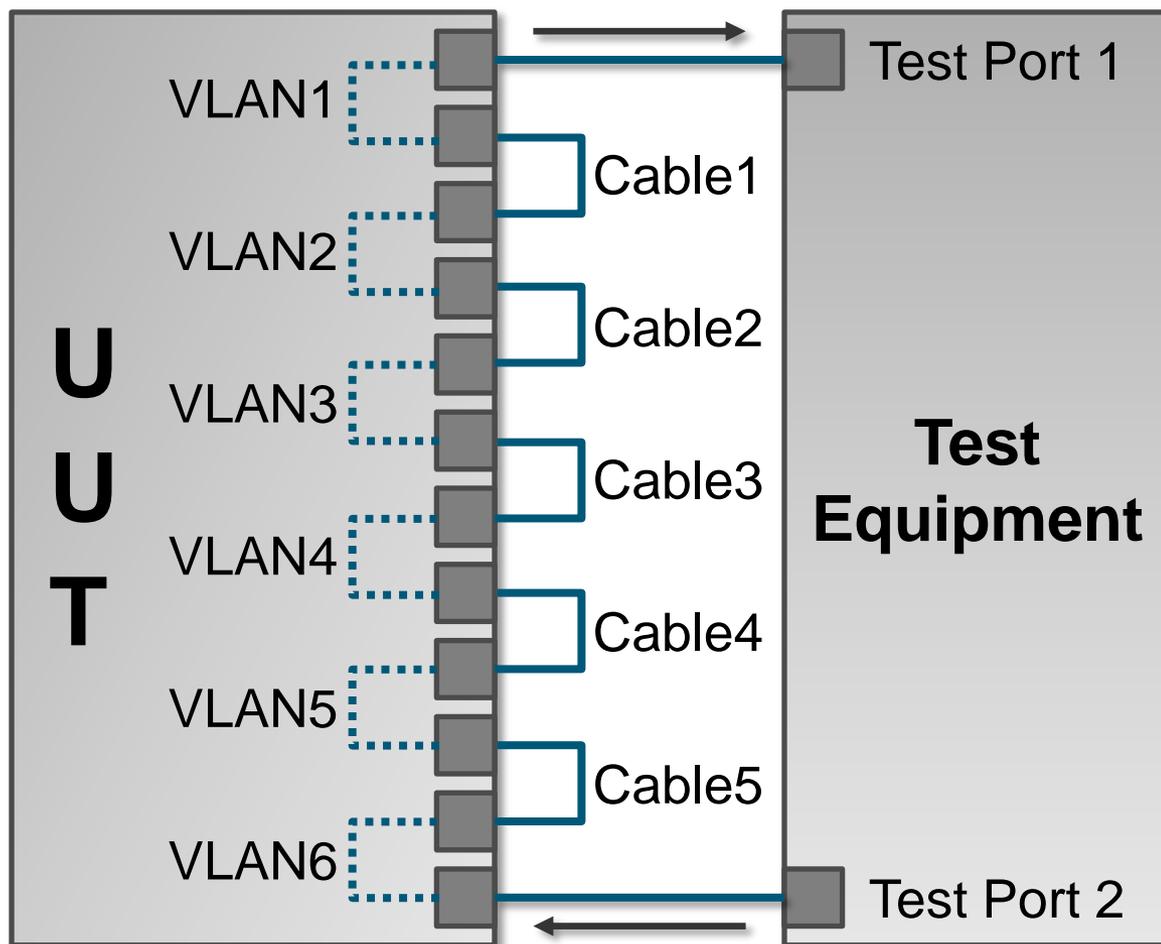
Snaked Traffic Topology



ATIS-0600015.03.2013

- Start with base configuration
 - Populate all system slots with function modules
 - Test the complete system, and then remove one module
 - The power for each module is the difference between the complete system, and with the module removed
 - Snaked traffic can be used “for base chassis power measurements that are not throughput related”
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- How can the throughput test be performed using the snaked traffic topology?

Snaked Traffic Topology



- Reduces test equipment port requirement to 2
- Requires $N/2$ VLANs (or VRF)
- May not provide same results as standard test
- Max # of VLANs may still limit be a limitation

Snaked Traffic Topology



DOE Requests Comments and Feedback:

1. How do you test products with a large number of ports (i.e., modular switches)?
2. Do other methods exist to implement snaked traffic other than VLANs (e.g., VRF)?
3. Would it be technically feasible to create a “hybrid” snaked topology that creates a compromise between number of VLANs and number of test equipment ports?

Ambient Temperature Requirement



Draft 2 Test Method

Ambient temperature shall be
 $27^{\circ}\text{C} \pm 1^{\circ}\text{C}$

- Temperature requirement narrowed from Draft 1 to improve test repeatability (i.e., fan power)
- Stakeholders commented that such a narrow requirement would be difficult to achieve without an expensive “thermal test chamber”

Ambient Temperature Requirement



ATIS-0600015.2013

- Ambient temperature shall be $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$
- Fan power must be representative of 27°C at sea level using one of the following options:
 1. Test in a thermally controlled environment $>27^{\circ}\text{C}$
 2. If fans are configurable, configure a fixed fan speed representative of operating at 27°C
 3. If fans are not configurable, apply a power adjustment due to fan speed change

Ambient Temperature Requirement



Issues with the 2nd Option:

- It may be difficult to verify that the fixed fan speed chosen is truly representative of UUT operation at 27°C

DOE Requests Comments and Feedback:

1. How is the fixed fan speed determined?
2. Are different fan speeds configured for each utilization level in the variable load test?

Ambient Temperature Requirement



Issues with the 3rd Option:

- It may be difficult to verify that the applied power offset provides an overall power measurement indicative of UUT operation at 27°C

DOE Requests Comments and Feedback:

1. How is the power adjustment calculated?
2. Is there a way to verify that the applied power adjustment is accurate?

Additional comments?



Schedule



- ENERGY STAR team, stakeholders develop solutions
- Planned check-in meetings on progress
 - Start monthly, move to biweekly if needed
- One-on-one calls also an option for specific issues
- Timeline (exact dates TBD):
 - Late Feb: Meeting
 - Late March: Meeting
 - Late April: Meeting
 - Early May: Draft 2 spec release
 - Late May: Draft 2 webinar

Contact Information



Please send any additional comments to largenetwork@energystar.gov or contact:

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Thank you for participating!

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