ENERGY STAR®

Version 2.0 Data Center Storage
Draft 1 Specification Webinar

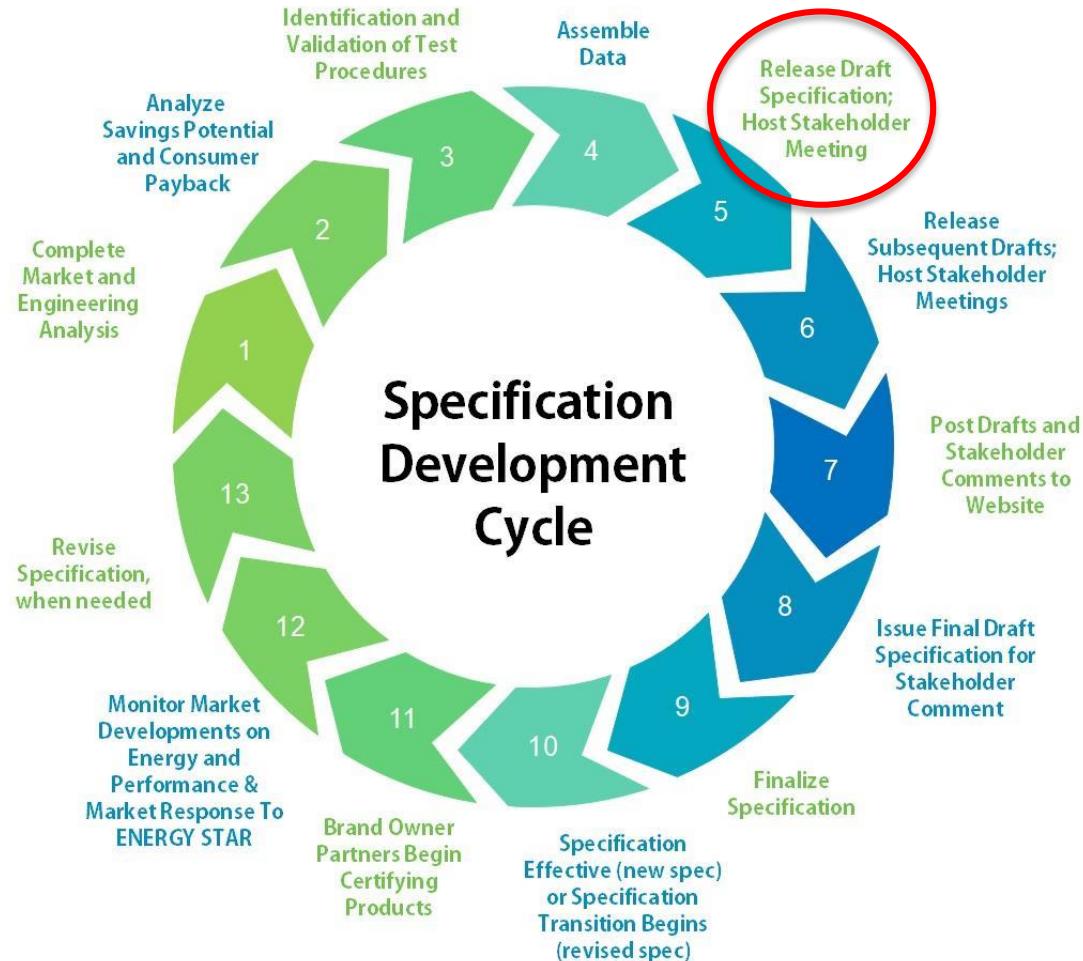U.S. Environmental Protection Agency
November 5, 2019

Introductions

- Ryan Fogle – EPA, Data Center Storage Product Lead

- John Clinger – ICF

- Al Thomason – TBWC, LLC

Review of Specification Development Cycle

Identification and Validation of Test Procedures — 3

Assemble Data — 4

Release Draft Specification; Host Stakeholder Meeting — 5

Analyze Savings Potential and Consumer Payback — 2

Release Subsequent Drafts; Host Stakeholder Meetings — 6

Complete Market and Engineering Analysis — 1

Post Drafts and Stakeholder Comments to Website — 7

Specification Development Cycle

Revise Specification, when needed — 13

Issue Final Draft Specification for Stakeholder Comment — 8

Monitor Market Developments on Energy and Performance & Market Response To ENERGY STAR — 12

Finalize Specification — 9

Brand Owner Partners Begin Certifying Products — 11

Specification Effective (new spec) or Specification Transition Begins (revised spec) — 10

Agenda

- Definitions
- Internal Power Supply Requirements
- Active State Efficiency Requirements for Block I/O Products
- COMs Requirements
- Testing Data Requirements
- Other Version 1.1 Criteria Removed in Draft 1
- Standard Performance Data Measurement & Output Requirements
- Timeline and Next Steps

Definitions

- Removed the following obsolete definitions:
  - PDUs and iPDUs
  - Automated Storage Tiering
  - Physical and Modeled Data
- Revised the Product Family definition in the following ways:
  - Clarified that the optimal configuration represents all products within the family
  - Removal of fixed and flexible certification ranges, capacity workload type, and the capacity optimization family restriction
  - Changes align with proposals in previous Discussion Guide

Internal Power Supply Requirements

- New IPS requirements align with 80Plus Gold for multi-output IPSs and 80Plus Platinum for single-output IPSs.

  – Aligns with ENERGY STAR Version 3.0 Computer Server Specification and feedback received in response to Discussion Guide

Version 1.1

Table 1: Efficiency Requirements for PSUs

PSU Type	Rated Output Power	20% Load	50% Load	100% Load
Redundant and Non-Redundant Capable PSU	All Output Levels	85%	89%	85%

Version 2.0

Table 1: Efficiency Requirements for PSUs

Power Supply Type	Rated Output Power	20% Load	50% Load	100% Load
Multi-output (Ac-Dc)	All Output Levels	90%	92%	89%
Single-output (Ac-Dc)	All Output Levels	90%	94%	91%

Active State Efficiency Requirements for Block I/O Products

- Proposing require to differentiate both transaction and streaming optimized block I/O products

  - EPA investigated separate requirements by Online category but found it did not provide sufficient additional differentiation

  - Not enough data to set File I/O requirements

  - Allow 30-40% of products to meet requirements in most product bins, higher than normal due to limited data set and relatively few unique models available. Exceptions include:

    - Online 2 transaction bin has abnormally high pass rate due to high prevalence of SSD only products

    - Online 3 streaming which has very little data and shows unexplainable deviation from consistent streaming data points in the Online 2 and Online 4 streaming categories

Active State Efficiency Requirements for Block I/O Products

- EPA has also provided guidance that only one of the two sequential requirements must be met for streaming optimized products, as an insufficient number of streaming products excelled in both workloads.

Table 3: Active State Requirements for Block I/O Storage Products

Workload Type	Specific Workload Test	Minimum Performance/Watt Ratio	Applicable Units of Ratio
Transaction	Hot Band	20.0	IOPS/watt
Streaming	Sequential Read	4.0	MiBS/watt
	Sequential Write	4.0	MiBS/watt

COMs Requirements

- COMs list has remained the same as Version 1.1
- The number of COMs that must be made available has been increased in each of the categories, understanding that many products will be claiming thin provisioning

Version 1.1

Table 4: COM Requirements for Online 2, 3, and 4 Systems

Storage Product Category	Minimum number of COMs required to be made available
Online 2	0
Online 3	1
Online 4	1

Version 2.0

Table 5: COM Requirements for Online 2, 3, and 4 Systems

Storage Product Category	Minimum number of COMs required to be made available
Online 2	1
Online 3	2
Online 4	3

Test Data Requirements

- EPA has made the following revisions and simplifications:

    – Clarified that all optimal configurations shall use either manufacturer selected combination of spinning HDDs to maximize work/watt metric OR the most efficient SSD option offered for the product if the product is not sold with HDDs

    – Removed guidance on fixed and flexible certification ranges as they no longer exist

    – Removed guidance related to submissions which rely on modeled data for certification, as that option has been removed in Draft 1 due to lack of use in Version 1.0/1.1.

Other Version 1.1 Criteria Removed in Draft 1

- In line with the proposed deletions in the discussion guide, EPA has removed the following Version 1.1 content from the tail end of the specification document:

  – Obsolete references to minimum and maximum configurations

  – Requirement to submit response time measurement for all tested configurations

  – The Storage Product Family Variation Allowances

Standard Performance Data Measurement & Output Requirements

- EPA is proposing that all Online 3 and 4 products shall provide both input power and air inlet temperature measurements

  – Air inlet temperature reporting was optional in Version 1.1

- EPA is also proposing that iPDUs can no longer be used to satisfy the Data Elements requirement in this section, and that the measurement must reported by embedded components within the storage product.

Timeline and Next Steps

- EPA expects Draft 2 will likely release in early Q1 of 2020

    – Will consider going to Final Draft, depending on comments received.

- EPA will attend the SNIA Annual Members Symposium.

- EPA expects the final specification to be published no later than Q2 of 2020 with an effective date nine months after finalization

Any Final Questions?

Discussion Guide Comment Deadline

- Send written feedback to storage@energystar.gov

- **Please include any additional data EPA should consider for its data set with the Draft 1 comments.**

Comment Deadline
Friday, November 29, 2019

Thank You!

- Questions on specification development:

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