

Version 1.0 Data Center Storage Draft 4 Specification Proposed Approach

EPA held a discussion with stakeholders on September 5, 2012 to discuss the direction of Draft 4 of the Version 1.0 ENERGY STAR Data Center Storage specification. This document summarizes the approach EPA proposes to take for the Storage specification, including some significant proposed changes in testing requirements.

Summary

Version 1.0: EPA proposes to retain the homogeneous system testing requirements as outlined in Draft 3 but will introduce a set of modifications to reduce test burden in Version 1.0. EPA will also adopt Hot Banding in this version. Draft 4 in early December, and a final document shortly thereafter.

Version 1.1: When the SNIA Emerald™ Power Efficiency Measurement is further expanded to include intelligent data placement (“auto-tiering”) and manually configured mixed drive systems testing, EPA will rapidly update the Storage specification to Version 1.1 to incorporate these changes.

Testing Burden Reduction Proposal for Version 1.0

EPA intends to move forward with the Draft 3 approach that optimal, maximum and minimum configurations shall be submitted using only homogeneous storage device configurations. EPA continues to believe that the strength of the current SNIA Emerald™ Power Efficiency Measurement specification, as well as other publically available industry benchmarks, lie in assessing homogenous storage device configurations. Further clarification on this topic can be found in the Homogenous vs. Heterogeneous ENERGY STAR Storage Testing discussion document dated August 27, 2012, and which is published [here](#). The Draft 4 specification will include additional language to eliminate any confusion on permissible configurations in Version 1.0.

EPA is proposing a set of revised approaches to reduce testing burden while maintaining adequate data collection for Version 1.0. Setting levels in Version 2.0 based on data gathered in Version 1.0 is a priority; therefore the optimal point data should drive the testing approach. EPA still intends to collect some data outside of the optimal points to understand the scaling of work/watt in ENERGY STAR qualified storage products with the goal of potential further reductions in future testing burden. The four areas of proposed revision are provided below:

1. Allow pure SSD or Storage Class Media (SCM) to be utilized in the system without physical testing.
 - EPA welcomes stakeholder physical test data on pure SSD/SCM systems to determine if they should be a separate system category in Version 2.0.
 - Storage media that do not meet the storage device definition (e.g. SSDs used for caching purposes) are not affected by this proposal.
2. Require three physical testing points (optimal point, at least 40% smaller drive count than optimal point, at least 15% larger drive count than optimal point) for only one run per system for each active workload type submitted. Testing of additional drives for the same workload type will only require physical data for the optimal point.
 - EPA believes that systems will scale in similar fashion for all HDD types in a given workload optimization, so less scaling test points are needed.
 - Stakeholders will be required to report hot banding workload results.
 - Stakeholder should select the highest volume sold HDD for the three physical testing points.

Example: A stakeholder has a system that has three different HDD options for a transaction workload optimized system. The stakeholder needs to complete three test runs for transaction workloads, one for each drive type. The stakeholder should chose the highest selling volume

HDD to do the three physical test points described above, and only submit physical test data for the optimal point of the other two drive options.

3. Only require one run of COM verification testing per system.
 - Stakeholders will choose which physical test run to demonstrate COM functionality.
 - Subsequent test runs will not need to proceed to this step after completing the active/idle portion of the test run.
 - EPA believes that COM features are a system property, and that if they are available for one storage device type, they will be available for all.
4. Rather than following the current 24 hour Ready Idle test requirements, EPA proposes that stakeholders follow the Ready Idle procedure proposed in Version 2.0 of the SNIA Emerald™ Power Efficiency Measurement specification.

Version 2.0 Emerald Specification “Hot Banding” Adoption

EPA plans to use the proposed Version 2.0 SNIA Emerald™ Power Efficiency Measurement specification currently under review as the base for testing in the Version 1.0 ENERGY STAR Data Center Storage program. EPA will make revisions in the test method and the specification to harmonize with the revised approach in the Version 2.0 Emerald specification where appropriate.

EPA would like to clarify its understanding that the Version 2.0 Emerald specification does not currently solve the lack of intelligent data placement in mixed drive configuration testing. The EPA expects that expansions or revisions to the test method guidelines and potentially the test method itself will likely be required in order to incorporate mixed drive configurations into a potential Version 1.1 ENERGY STAR Data Center Storage specification. The EPA is supportive of work directed toward developing and proofing such changes to allow for support of a Version 1.1 of the ENERGY STAR for Data Center Storage specification.

Potential Version 1.1 ENERGY STAR Data Center Storage Specification Revision

EPA recognizes that mixed drive configurations are currently sold by several stakeholders and that these systems are in significant demand from their customers. EPA is supportive of industry efforts to expand the current Emerald testing capability to incorporate intelligent data placement and manually configured mixed drive systems. Once these changes to the test method are validated and effective, EPA will move forward on a Version 1.1 revision. Testing instructions for mixed drive configurations will be added to the ENERGY STAR Data Center Storage test method, and new language in the specification will allow for mixed drive configurations to be used within the current “Systems Composed of Combinations of Optimal Configurations” approach.

A revision from Version 1.0 to 1.1 will be much faster than the Version 1.0 development process, taking no longer than a couple months to finalize.

Contacts

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