ENERGY STAR®
Data Center Storage
Version 1.0

Stakeholder Webinar
Supplementary Data Set Development

23 February 2011
Agenda

• Recap EPA Announcement re: Secondary Data
• Opportunity for Discussion & Comments from Industry
• Review Timeline & Next Steps
Objective

- Augment current data set (17 products, 42 data points) with a 2\textsuperscript{nd} round of tests, using a consistent test method.

<table>
<thead>
<tr>
<th># Systems (# Configs)</th>
<th>Online</th>
<th>Near-online</th>
<th>Removable Media Library</th>
<th>Virtual Media Library</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 2</td>
<td>--</td>
<td>--</td>
<td>1 (2)</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Group 3</td>
<td>5 (7)</td>
<td>--</td>
<td>2 (10)</td>
<td>--</td>
</tr>
<tr>
<td>Group 4</td>
<td>5 (19)</td>
<td>1 (1)</td>
<td>1 (1)</td>
<td>--</td>
</tr>
</tbody>
</table>
Taxonomy of Interest

- Online Systems
  - SNIA Taxonomy Categories 2, 3, 4
- Removable Media Libraries
  - SNIA Taxonomy Categories 2, 3, 4
Single-Variable Changes

• Further understand relationship between hardware/software configuration and energy performance in both active and idle states.

• Narrow focus to key variables from Round 1:
  • Hard Disk Drive (HDD) selection (e.g., capacity vs. performance)
  • Reliability-Availability-Serviceability (RAS) features (e.g., single vs. redundant controllers, RAID level)
  • Small Form Factor (SFF) and Solid State Disk (SSD) drive technologies
  • Software features ON/OFF
  • Other variables as resources permit
Areas of Interest

• Variation Across Taxonomy Categories
  • Assess performance of Online Group 2, Removable Media Library Group 2, or Removable Media Library Group 4 systems, for which no data has been submitted to date.
  • Compare Online Group 3 & 4 systems, Removable Media Group 2, 3, and 4 systems.

• Effect of Drive Quantity
  • Change HDD quantity versus a fixed number of controllers on an otherwise equivalent system.
  • Preferably vary drive quantity in multiples of 2 (e.g., test with N, 2N, and 4N, 8N drives).
Areas of Interest

• Effect of Drive Technology
  • Drive speed (e.g., 7200 vs. 15k RPM) and Small Form Factor (SFF) / Solid State Drives (SSD) versus traditional drive technologies on an otherwise equivalent system.

• Effect of RAS Features (hardware or software)
  • RAS features vs. lack of RAS features on an otherwise equivalent system.

• Isolation of Controller vs. Drawer PSUs
  • Measure loading of individual power supplies (or groups of power supplies) within a system.
Product Family Approaches

• Continue to pursue a meaningful Product Family definition to ensure program integrity with minimal test burden

• Use data to validate one of the following possibilities:
  • **Book-ending**: Test ‘smallest’ and ‘largest’ configuration (based on one or more key variables) as boundaries for ENERGY STAR qualification
  • **N and xN**: Test a given configuration with N and 2N (or xN) of a key variable, then extrapolate qualification to smaller or larger configurations
Simulation Data

• EPA will consider simulated (modeled) data to reduce test burden:
  • Simulators must be robust and capable of identifying meaningful differences in energy performance
  • If simulated data is provided, all tested systems should be run through the simulator to assess simulator accuracy
Discussion

Questions?
Timeline

• PSU data may still be submitted for consideration
• Additional test or simulator data received by **April 22, 2011** will be considered by EPA
• Data will be analyzed and results in late April. EPA will make anonymous data available to stakeholders for concurrent analysis
• The 2\textsuperscript{nd} draft product specification will be distributed for comment in May
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