A New Spin on SSD

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Seagate Technology
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Evolution of SSD Market Segmentation When is Good, Good Enough?

Panelists

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Elements defining a Solid State Drive (SSD)

- Block-abstracted
- Non-volatile solid state
- Mass storage sub-system
- Discrete Device (vs. chipset)
- Form factor, protocol & interface
- Non-transient (inside the box vs. externally attached)
- Not frequently removed storage (vs. USB flash drive)

SSDs will be used in many different market segments with significant different customer CTQs

Solid State Drives
A new Growth Opportunity for Storage

- The Storage ecosystem will contain HDD and SSD due to their respective value propositions
- Hybrid architectures involving solid state and rotating magnetic storage are evolving in enterprise and client
- SSDs are emerging in compute apps from the top ($/IOPS/W/$m^3$) and from the bottom ($/storage system)
- SSD enables a new tier in enterprise
- SSD enables a new segment in client

- Performance, reliability and endurance is cost of entry requirement for Compute Apps

Critical Success Factors for SSD

- Performance
  - Standards required to provide meaningful real life performance
  - System architectures must advance to fully exploit SSD
- Endurance
  - Predictive Life Modeling is needed leveraging workload classes in order to substantiate stated product life
- Reliability
  - SSD-specific Advanced Reliability & Test Technologies required
  - Optimization of controllers and flash needed to make SSD work reliable as media degrades due to litho, bits/cell & 3D advances

SSD Market Segmentation for Compute

- External Storage / Tier 0 / Application Cluster (Enterprise)
  - Typical use is mission critical storage shared by four (4) or more compute platforms
  - Highest performance and endurance requirements
  - Heaviest Workloads – typical of multiple systems
- Server DAS / Workstation DAS (Enterprise)
  - Typical use is locally attached storage shared by four (4) or less compute platforms
  - High performance and endurance requirements
  - Heavy Workloads - typical of multiple users
- Notebook & Desktop (Client)
  - Single compute platform
  - Ultra portable laptop, gaming machine, and performance workstation
  - Applications typical of *single user - productivity, content creation, vertical industry apps*
- Low Cost PC : e.g., ULCPC, NetTop, NetBook (Client)
  - Single compute platform
  - Companion PC, travel PC, child PC, corporate thin client
  - Applications heavily dependent on network access enabling limited local storage

Executive Summary / Call to action

- SSDs offer a growth opportunity, expanding the overall storage market by creating a new tier of performance and low capacity client solutions.
- Projected total compute SSD's unit volume for 2012 is ~80M (Gartner)
- Performance, reliability and endurance are essential for success
- Seagate is leading standards activities for SSD and HDD

Call to Action:

- Deliver Industry Standards for SSD Performance, Endurance & Reliability
- The JEDEC JC64.8 subcommittee, co-chaired by Seagate and Micron , has been formed to develop standards for SSD in cooperation with other subcommittees as well as with external standards organizations

=> Industry stake holders are encouraged to join the effort