A New Spin on SSD

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Today’s presentation may include predictions, estimates or other information that might be considered forward-looking. While these forward-looking statements represent our current judgment on what the future holds, they are subject to risks and uncertainties that could cause actual results to differ materially. Throughout today’s discussion, we will attempt to present some important factors relating to our business that may affect our predictions. Please review our current SEC filings for a more complete discussion of our risk factors.
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