Things Are Happening in Solid State Storage!
CQ3 ’15 NAND Summary, Exabytes

Total NAND: ~22 Exabytes
CQ3 '15 SSD Summary, Units

Total SSDs: 26 million

Client SSDs: 23 million

Enterprise SSDs: 3 million
SSD Capacity Shipped: CQ3 ‘15

Client SSDs: ~5 Billion GB

Enterprise SSDs: ~2 Billion GB
Enterprise PCIe by Form Factor

- AIC SSD
- M.2 PCIe SSD
- U.2 (2.5", SFF-8639)
OEM System Vendors

- Existing solutions
- Supplier base
- Pricing tiers
- Qualification cycles
- Selling to end markets customers
- Higher performance with PCIe requires higher power
- Pricing tiers for each interface continue to exist
- Of all SSD suppliers – are there any not ready, or willing to give up SATA revenue if PCIe solution not ready?
  - Margin considerations
  - Controller strategy
  - Interface & protocol expertise for pre and post sales support?
- Use client volumes as scale to move to enterprise
Hyperscale / Datacenter

- Consuming own IT (not selling hardware to multiple customers)
- Willingness to change technologies
- Shorter qualification cycles
- Less custom firmware (but not generic FW)
- Different mentality on FRUs
- Looser specifications (vs. system OEMs)
  - Think 4K/512e vs. 512n
  - “Disposable”
  - Not tied to new product introductions to customer base – fast adoption
- Lowest price and highest capacity point is king
- Of all SSD suppliers – are there any not ready, or willing to give up SATA revenue if PCIe solution not ready?
  - Margin considerations
  - Controller strategy
  - Interface and protocol expertise for pre and post sales support?
Channel

- Slow to change technologies
- Relies on reference designs and compatibility lists
- Lowest pricing and inventory rules (think SATA and pre builds)
HDD & SSD Exabytes

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Total HDD Exabytes</th>
<th>Total SSD Exabytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CQ3 '15</td>
<td>130</td>
<td>15</td>
</tr>
<tr>
<td>CQ4 '15</td>
<td>140</td>
<td>25</td>
</tr>
<tr>
<td>CQ1 '16</td>
<td>150</td>
<td>35</td>
</tr>
<tr>
<td>CQ2 '16</td>
<td>160</td>
<td>45</td>
</tr>
<tr>
<td>CQ3 '16</td>
<td>170</td>
<td>55</td>
</tr>
</tbody>
</table>
Performance HDD v Enterprise SSD

- HDD Annual Average
- HDD Quarterly Average/year

<table>
<thead>
<tr>
<th>Year</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2011</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2012</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2013</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2014</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2015</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Legend:
- Performance Enterprise HDD
- Enterprise SSD (all interfaces)
- HDD Quarterly Average/year
Thank You!

Mark Geenen – mark@trendfocus.com
John Kim – jkim@trendfocus.com
John Chen – johnchen@trendfocus.com
Don Jeanette – don@trendfocus.com
Tim Luehmann – tim.luehmann@trendfocus.com

Twitter
@TRENDFOCUS

Facebook
TRENDFOCUS Inc.

Linked in
TRENDFOCUS Inc.