Data Storage
Technology Update

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HGST Elastic Storage Platforms
April 15, 2015
I have some bad news for you... and good news for me...

- You are a data hoarder, an addict in fact
- You want to keep everything
- You admit that most of what you want to keep will never be useful
- You want to be even more, not less, of a data hoarder - If only you could afford it
- But you keep data because it might be useful, sometime, maybe, but probably not
- But when you need it, you really need it
- If only you can find the important pieces
- I am here to tell you, store it all, forever!

The data storage industry thanks you...
This year’s theme - The big squeeze

• Several facets of IT infrastructure are undergoing a transformation where changes at the extremes are putting immense pressure on the things in the middle

• Transforming:
  - Business models
  - Storage Capacity
  - Enterprise Disk Arrays
  - Servers and Storage
The squeeze – Business Models
Not about technology but technology impact will be significant

- Ten companies will consume 50% of the IT infrastructure
- Herds of engineers writing custom applications for commodity H/W
- Infrastructure being sold at 1/2 of the margin it once sold at
- Revenues decline for the historical system companies
- What’s left is under margin pressure due to top 10 cost transparency

Timing | Winners | Losers | Relevance
--- | --- | --- | ---
Now | Component providers and low-cost integrators, volume purchasers | Enterprise IT providers | COTS lower cost but do-it-yourself or work with low-cost integrator
The squeeze – Storage Density

3D NAND and SMR HDD recording technologies squeeze maximum capacity at the expense of maintaining the long standing behavior software expects.

3D NAND results in significant increases in solid state storage density, reductions in cost, but with reduced durability and reliability.

SMR (shingled magnetic recording) keeps hard disk drive capacities growing - Random read, sequential write and overlapping writes are messy. When I write I might damage data written on previous track.

Performance can vary by orders of magnitude – more often.

Reliability / integrity can vary by orders of magnitude – over time.

Answer – Performance variations more tolerable than any risk of data integrity changing.

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<tbody>
<tr>
<td>2015+</td>
<td>Semiconductor Storage, HDD Suppliers</td>
<td>15K RPM Disk Drives</td>
<td>Bigger Fault Zones, Software must tolerate broader range of “normal” behavior</td>
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The squeeze – Enterprise Arrays

What if I could keep my entire working data set close to the CPU, shared, available
What if the rest of my data, including copies, were affordably accessible in milliseconds

New memory Hierarchy enablers:
• Software defined storage for tiering and high availability
• Solid state technology memory alternative
• Low latency commodity interconnects

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<td>2017+</td>
<td>Semiconductor Storage, Disk Based Cloud Storage</td>
<td>Enterprise Storage Arrays</td>
<td>Higher performance applications, lower cost total storage, industry consolidation</td>
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What if I could run my application on my disk drive?

What if I had a server with a petabyte of capacity?

What is a server and what is storage, does it matter?

Moving the application to the storage or the storage to the application, a matter of perspective

Think of it as a platform for dynamically hosting software that is very close to the data with the premise that it is easier to change the software than move the data...

What could you do with it?

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<td>Now to 2017</td>
<td>Device manufactures, low-cost integrators</td>
<td>Storage or Server only vendors, network vendors</td>
<td>Applications that can store / analyze locally, network limited environments</td>
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Hot off the presses

Announcing the HGST Active Archive System
Simplicity at Scale™ for a Broad Range of Environments

Scalability, Accessibility, Affordability and Simplicity for Rapidly Evolving Active Archive Needs and Environments
Enabling Business Transformation

Building on Proven Device Leadership to Deliver Increasing Value

Vertical Innovation Creates Superior Value to Preserve More Useful Data

Beating White Box Economics with Open APIs and Optimized Design

Giving Organizations the Agility to Harness the Power of Data
Introducing HGST Active Archive System

Complete scale-out object storage system for cloud data centers

4.7PB raw capacity per rack

Optimized for active archive workloads

Breakthrough TCO

Highest Density Improves Data Center Efficiency

Lowest Power per TB with Fast Data Access

Beats White Box Economics

Scales to Exabytes of Capacity
New Level of Purpose-Built Design for Active Archive Workloads

- Advanced Storage System Software
- Cloud-Scale Resiliency & Unlimited Scalability

- Active Archive Platform
- Highest Rack Density, Lowest Power per TB & Cloud Optimized

- Tuned Storage Enclosure
- HelioSeal™
- Helium-Filled Drives
- Highest Capacity, Proven Reliability & Lowest Power

Vertical Innovation Enables Breakthrough Value and Scalability
Other Technology Trends and Q&A

- V³, Volume, Velocity, Variety – the premise of Big Data and Analytics
- Non Volatile Memories – PCM, resistive RAM,... when?
- Public versus Private Cloud
- IoT – Another big thanks from the Storage Industry
- Disaggregated AND Converged
- What else?