# HGST: Market Creator to Market Leader

Gaetano Pastore Enterprise Sales EMEA gaetano.pastore@hgst.com +4915122674411

HGST's Transformation: <u>http://www.youtube.com/watch?v=ehiyhn0jliE</u>

**JUKU** unplugged Milano 19 March 2014



© 2013 HGST, INC. ALL RIGHTS RESERVED.

# Growth of the Digital Universe, 2010-2020



Mobility, Social Networking, Big Data, and Cloud Applications are Driving Data Explosion











## **HGST Subsidiary Profile**

#### STRATEGIC ACQUISITONS







### STRATEGIC INVESTMENTS





#### OUR TOP PC AND STORAGE OEMs RANKED US





# **Datacenter Problem: Timely Access to Data**

0

- Data growth 55% CAGR but data access (IO performance) lagging
- Low utilization of resources
- SAN build outs, disk array sprawl not scaling
- Storage expenditure increasing % of IT spend





#### High Capital and Operational Costs



# Customer: It takes over 6 full racks of 15k rpm Hard Drives to achieve the same IOPS as 1 FlashMAX II card



OpEx Savings: Lower Space, Power & Cooling Costs

 (15,545 watts vs 25 watts and \$19,380/year for colocation power)

 CapEx Savings: Lower Replacement Costs (\$998,550 for 6 racks of disks)

 Significantly lower latency with PCIe-attached vs. numerous network hops and overhead of SAN or NAS



### Speeding up Enterprise Applications!!!





#### **Global Insurance Provider, 150,000 mailboxes**

Reclaimed floor space while boosting search and attachment speeds.





# Combining different technologies



# HGST's View on Storage Tiering









### **Best Price/Performance**

Save time and money whileenabling fast application performance

#### Traditional HDD



#### **~**\$USD14,000

■3U Server x1

600GB 15K HDD x16

3U 16 Bay Storage Chassis x1

#### PCIe/SSD Cache



3U Server x1, PCIe x1 2TB 7.2K HDD x5

EnhancelO Software

\$USD7,000

#### =50% reduction in storage costs

-4x improvement in performance



## HGST Portfolio



# **HGST Intelligent Performance Storage**





# SAS Performance Storage

	s800- Series	Ultrastar SSD800xx / SSD1000xx
System Integration	6Gb/s SAS, 1.8" and 2.5"	12Gb/s SAS, 2.5"
Performance	Better	Best
Top Capacity	2.5 <sup></sup> ": 2TB, 1.8": 400GB	1TB
Enterprise Reliability	End-to-End Data Path Protection, Pow Loss Protection, Parity Protection	ver End-to-End Data Path Protection, Power Loss Protection, Parity Protection
Software & Tools	SDM Device Manager, EnhanceIO Caching SW	EnhanceIO Caching SW



# PCIe Performance Storage

	s1100- Series C	ident FlashMAX II & FlashMAX onnect Software Suite
System Integration	PCIe 2.0 x4, HH-HL Card; Open Source Linux (various), Windows (various), Solaris 11, VMWare ESX 4.0, ESXi 4.1, ESXi 5.x	PCIe 2.0 x8, HH-HL Card; Linux (various), Windows (various), VMWare ESXi 5.x
Performance	Better	Best
Top Capacity	1.6TB (high performance) 2TB (max capacity)	2.2TB (high performance) 4.8TB (max capacity)
Software & Tools	SDM Device Manager, EnhanceIO Caching SW	Virident vFAS Software Technology, Virident FlashMAX Connect Software Suite (HA, Shared Access, Caching)
Random Write Endurance	Up to 68 PBW	Up to 33 PBW



#### FlashMAX Product Lineup – CQ4 2013

Product Category	Standard	Performance	Capacity
Capacity (Usable GB)	550, 1100	1100, 2200	4800
Form Factor	HHHL	HHHL	HHHL
Connection	PCIe Gen2x8	PCIe Gen2x8	PCIe Gen2x8
Read Bandwidth (64KB random)	1.6GB/s	2.7GB/s	2.6GB/s
Write Bandwidth (64KB sequential)	550MB/s	1GB/s	900MB/s
Random Read IOPS (512)	630,000	1,130,000	850,000
Random Read IOPS (4KB)	175,000	340,000	270,000
Sustained Random Write IOPS (4KB)	50,000	110,000	45,000
Sustained 25% write, 75% read IOPS (4KB)	110,000	220,000	120,000
Read Latency (4KB random)	76us	76us	78us
Write Latency (512B sequential)	16us	18us	18us
Endurance (Drive Writes/Day for 5 Years)	8	8	3.5

All FlashMAX II devices work with FlashMAX Connect for caching, high-availability and sharing



#### FlashMAX Connect Suite



High Speed Network



**Data Protection: vHA** enables highperformance synchronous mirroring  $\bigcirc$ 

Data Management: vCache enables construction of transparent block cache devices



Storage Management: vShare enables iSCSI-like access to *Flash* aware partitions of a remote PCIe SSD



Performance: All capabilities of the software with IOPs and latencies of direct-attached PCIe Flash



### What is Profiler?

Identify potential performance improvements





Free Utility That Helps Uncover SSD Opportunities



#### vHA – Low Latency Synchronous Replication



- High performance sync replication optimized for PCIe SSDs
  - Low-latency RDMA-capable networks
  - Full and incremental sync capabilities
- Integration with Cluster managers to enable automatic failover



#### vShare – High Speed Storage Sharing Building Block



- High performance remote data access optimized for PCIe SSDs
- Low-latency RDMA-capable networks
- In essence, creates a high speed storage network

- Allows for consolidation of flash devices in a central high capacity server
- Ability to share flash devices across multiple servers
- vShare + vHA = Virtual High Performance shared storage



#### vCache – Flash-aware Integrated Block Cache

#### **Oracle, SQL Server, ESXi implementations**

Flash-aware block caching module with multiple modes: Write-through, Write-around, Write-back Flexible sharing of Flash capacity among multiple caches Thin provisioned, resizable at run time Flash-aware means higher performance and higher endurance **Co-exists with existing backend storage and IT storage** management policies Leverage across all applications and hypervisors





#### **HGST The Leader in Hard Drive Technology**





Broadest range of products

Define the performance standard

World's leading storage systems and device manufacturers rely on HGST HDDs

Mobile & Laptop

**Drives** 

- ✓Mobile & Laptop
- ✓Consumer electronics products
- ✓Enterprise servers and storage arrays

**Reliable. High-Performing. Ready for Business.** 





# REDUCING CLOUD DATA CENTER TCO with Ultrastar® He<sup>6</sup>

World's First 6TB 3.5-inch Helium Drive







- Reductions in both CAPEX & OPEX
- Cooler, lower-power HDDs reduce power & cooling costs
- Fewer, denser servers = less networking infrastructure, less space, less power, less cooling
- Lower complexity, less maintenance

The above TCO's are estimates only. Individual TCO may vary

Costs include TOR and aggregator costs & power into "rack cost"; "Server cost" is the customer cost of a complete 2U-12 server without HDDs. TCO savings vary based on PUE, cost of power, server type/density



### Not all the SSDs are the same

#### Performance. Endurance. Reliability.



2013 HGST, INC. ALL RIGHTS RESERVED.

# Enterprise SSD Technology

HGST SSD products are based on advanced, in-house controller technology





### **Delivering Consistent Performance over Time**



Competition's Enterprise SSD shows degraded performance as drive ages

HGST delivers consistent
 SSD performance from
 Day 1 to Year 5



# **Industry Best Endurance**



# CellCare enabled sTec SSDs last 2-13x longer in the field compared to other MLC or eMLC based SSDs

\*Under 100% random 4KB workloads



### S.A.F.E.<sup>™</sup> – Improves reliability of SSDs

- S.A.F.E. (Secure Array of Flash Elements) ensures that all data at rest on the SSD is secure and can be recovered from any flash media failures, including failure of a flash chip.
  - It's like having RAID recovery inside the SSD
- S.A.F.E. (Secure Array of Flash Elements) adds parity inside the SSDs internal channels to flash and allows data to be rebuilt in case of data corruption





# THANK YOU

Milano 19 March 2014



© 2013 HGST, INC. ALL RIGHTS RESERVED.