



The New Scale-Out Storage

Forum D-21: Enterprise Storage Design – Mellanox & HGST

Flash Memory Summit | July 2014

 **Mellanox**
TECHNOLOGIES
Connect. Accelerate. Outperform.™

Leading Supplier of End-to-End Interconnect Solutions

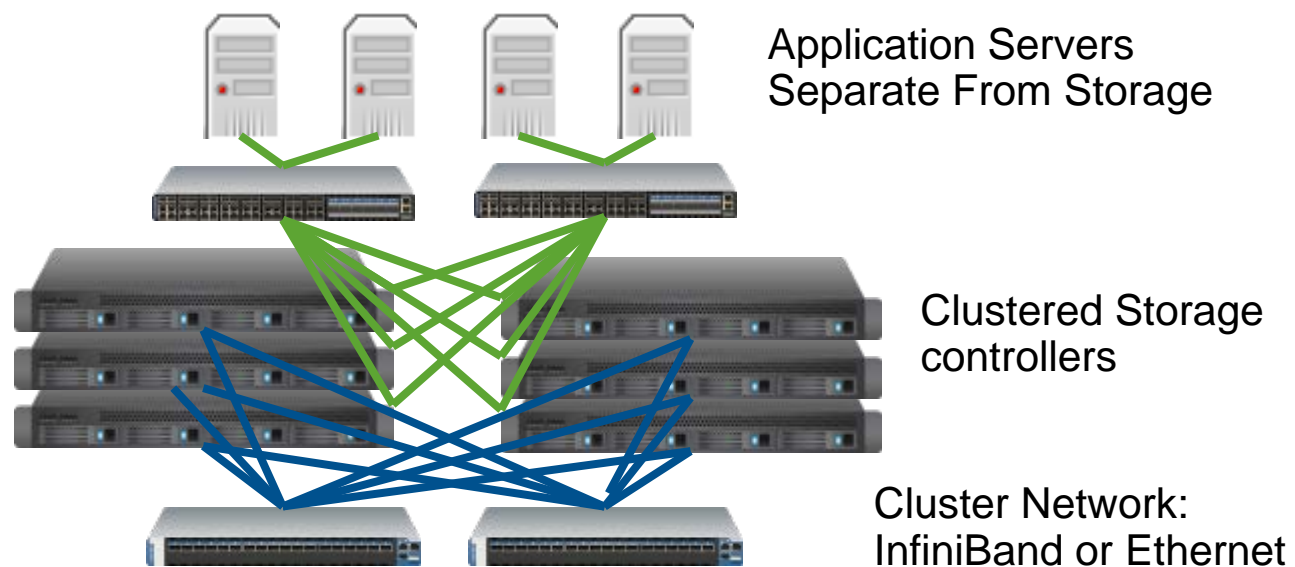


Comprehensive End-to-End InfiniBand and Ethernet Portfolio

ICs	Adapter Cards	Switches/Gateways	Host/Fabric Software	Metro / WAN	Cables/Modules

Traditional Scale-Out Storage

- Many storage controllers managed as one
- Scales well for capacity and performance
- Built-in replication and sharing
- Limitations
 - Expensive, Complex, Not software-defined
 - Always adds storage network latency



Traditional Scale-Out Storage

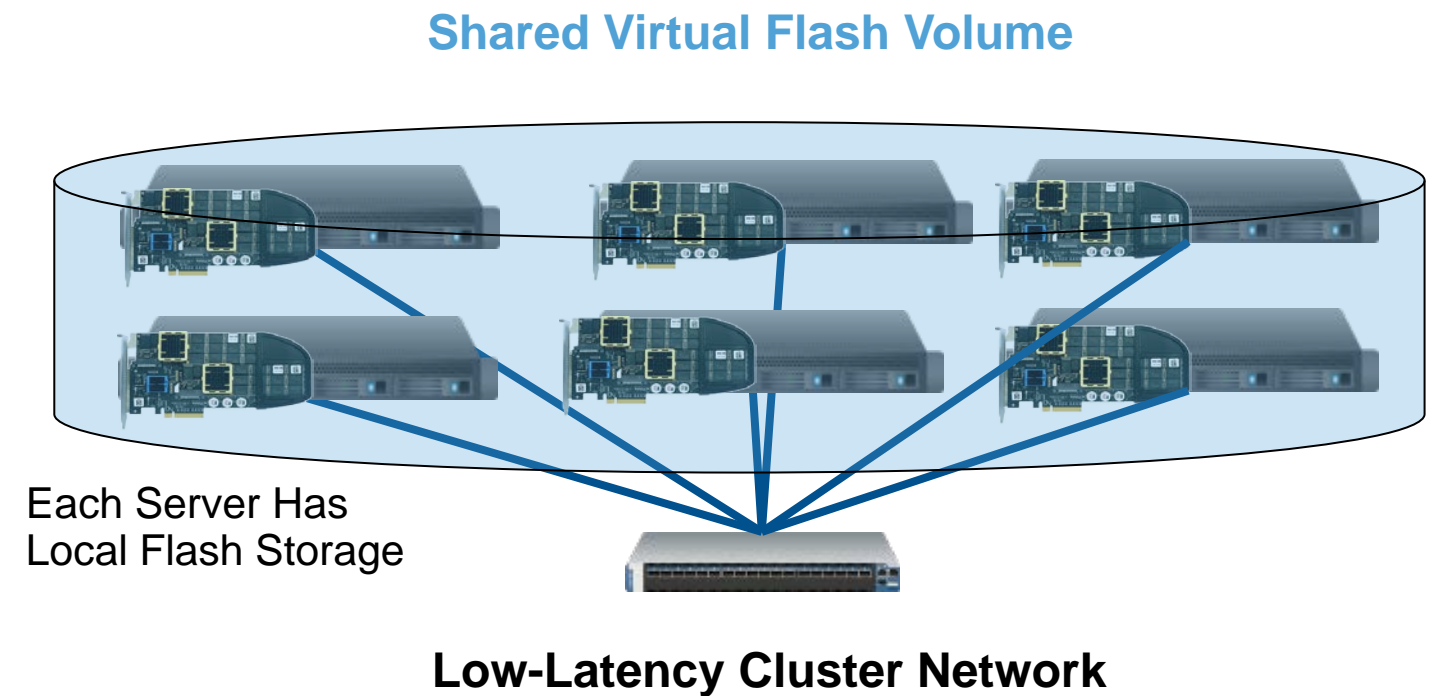
Traditional Server Flash

- Fastest, local access
- Most economical way to add flash
- Direct, local access
- Limitations: Flash captive within each server
 - Can't share; easy to strand flash performance
 - Difficult to move workloads or replicate data



A New Solution—Shared Server Flash

- Also called “Server SAN”
 - Flash in each server
 - Shared over a low-latency network
- Best of both worlds
 - Sharing, replication, distributed access
 - Data and application mobility
- Enabled by low latency networks
 - Access any server’s flash at local speeds
 - RDMA option



The New Scale-Out Storage Is Here



■ Share the server flash

- HGST FlashMax Connect
- EMC ScaleIO
- VMware VSAN
- Dell FluidCache for SAN



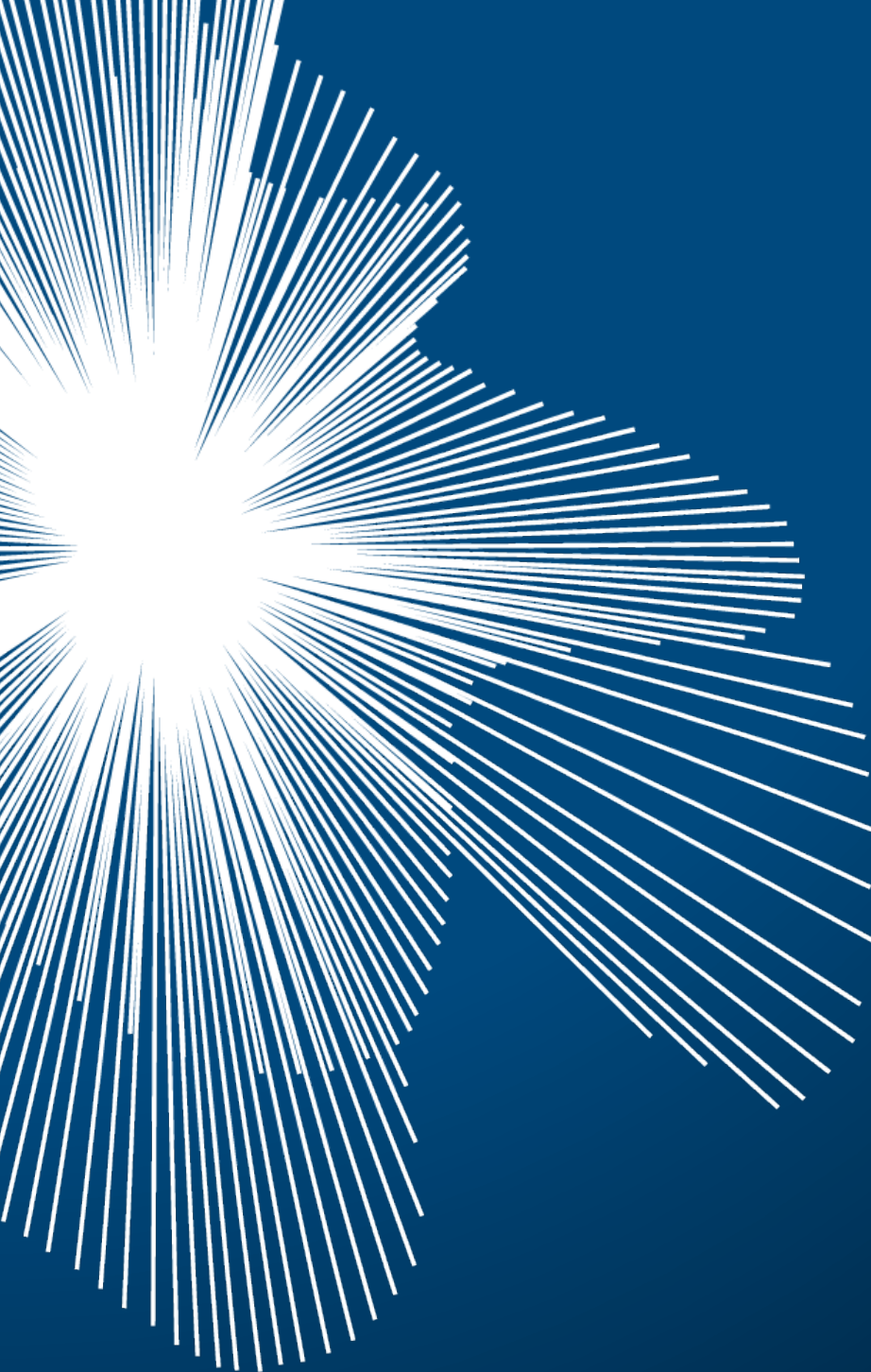
■ “Old” scale-out server storage still around

- Hadoop, Ceph, Lustre, GPFS, etc.
- Using more flash as cache or hybrid
- Also benefit from fast cluster network





Thank You



HGST

HDD, SSD, Software

August, 2014



HGST Subsidiary Profile



- Founded in 2003 through the combination of the hard drive businesses of IBM, the inventor of the hard drive, and Hitachi, Ltd (“Hitachi”)
- More than 4,200 active worldwide patents
- Acquired by Western Digital in 2012
- Headquartered in San Jose, California
- HGST develops, manufactures and markets hard drives, SSDs and storage sub-systems for consumers, OEMs and datacenters

Broadening Lineup of Storage Solutions



Ultrastar C15K600
World's fastest hard drive



Ultrastar He6
with HelioSeal™ technology

G-Technology
G-DOCK ev™
with Thunderbolt™



Broad Portfolio of Enterprise-class
Solid State Storage Solutions

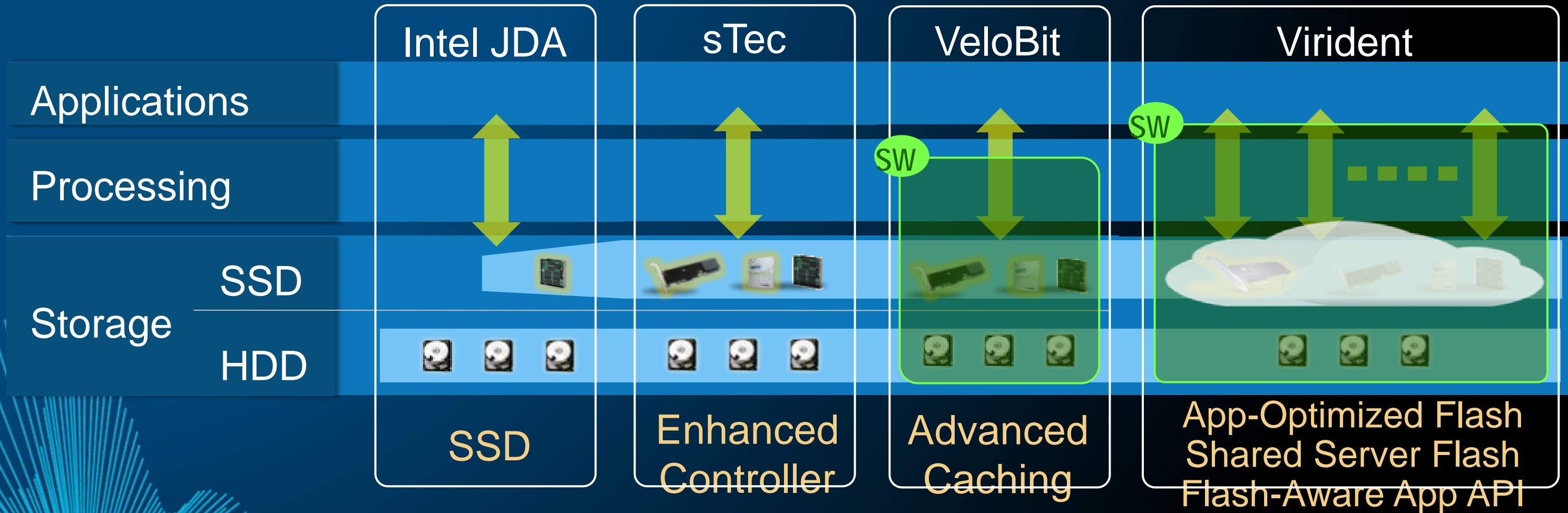


PCIe

Embedded

SAS &
SATA

Increasing Value to Customers Through Intelligent Device Strategy



ENTERPRISE HARDWARE PORTFOLIO

PCIe SSDs



SAS SSDs



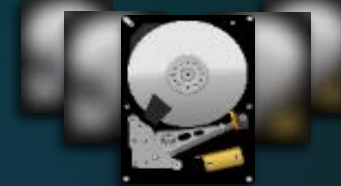
Performance



Capacity



Capacity Scale



Cold Storage



Big Data Analytics
Virtualization, VDI, VSAN
HF Trading
Databases / OLTP
Scale-out DBs

Big Data Analytics
VSAN
HF Trading
Databases / OLTP
Indexing

Databases / OLTP
Content Serving
Business Intelligence
Cloud Gaming
HPC

Cloud Storage
Virtualized Servers
VSAN
Cloud Computing
Storage Arrays
Social Networks
Long-Tail Content
Big Data Storage

Long-Tail Content
Video on Demand
Cloud Storage
Big Data Storage
Replicas
Mail Servers
Surveillance

Archives
Regulatory & Compliance
Surveillance
Medical Records

Hot

Warm

Cold

ENTERPRISE SOFTWARE PORTFOLIO

Device Manager



Discover
Monitor
Manage
Report

HGST SSDs

For Standalone
Windows,
Linux, & Solaris

Profiler



Capacity
Planning
Optimize Flash
Usage
Caching
Analysis

Any Application
For Standalone
Windows &
Linux

ServerCache



Application
Acceleration
Read Caching
& Writeback
Caching
Any SSD

For Standalone
Windows &
Linux

vHA



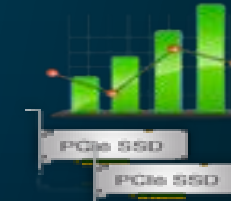
Synchronous
Replication
Fail-Over
Low Latency
Infiniband
FlashMAX PCIe
Linux

vShare



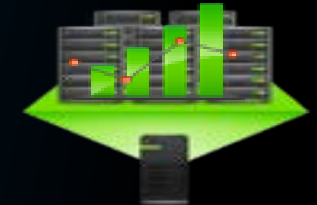
Shared Flash
Low Latency
High
Performance
FlashMAX PCIe
Linux
Oracle RAC

ClusterCache



Clustered
Server Caching
FlashMAX PCIe
Enhanced SSD
Endurance
Ultimate
Performance
Linux

ShareCache



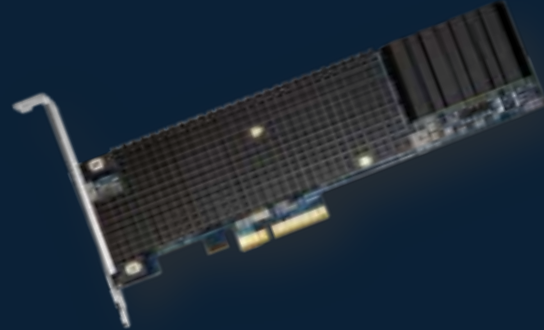
Shared
Clustered
Cache
Oracle RAC
FlashMAX PCIe
Linux

Our software combines server-side shared SSDs with the data center storage hierarchy

PCIe Performance Storage

HGST offers two complementary PCIe product lines addressing different customer needs

s1100-Series



Virident FlashMAX II & FlashMAX Connect 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

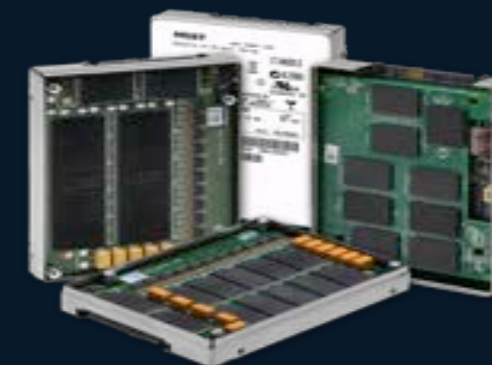
SAS Performance Storage

HGST offers two complementary SAS product lines addressing different customer needs

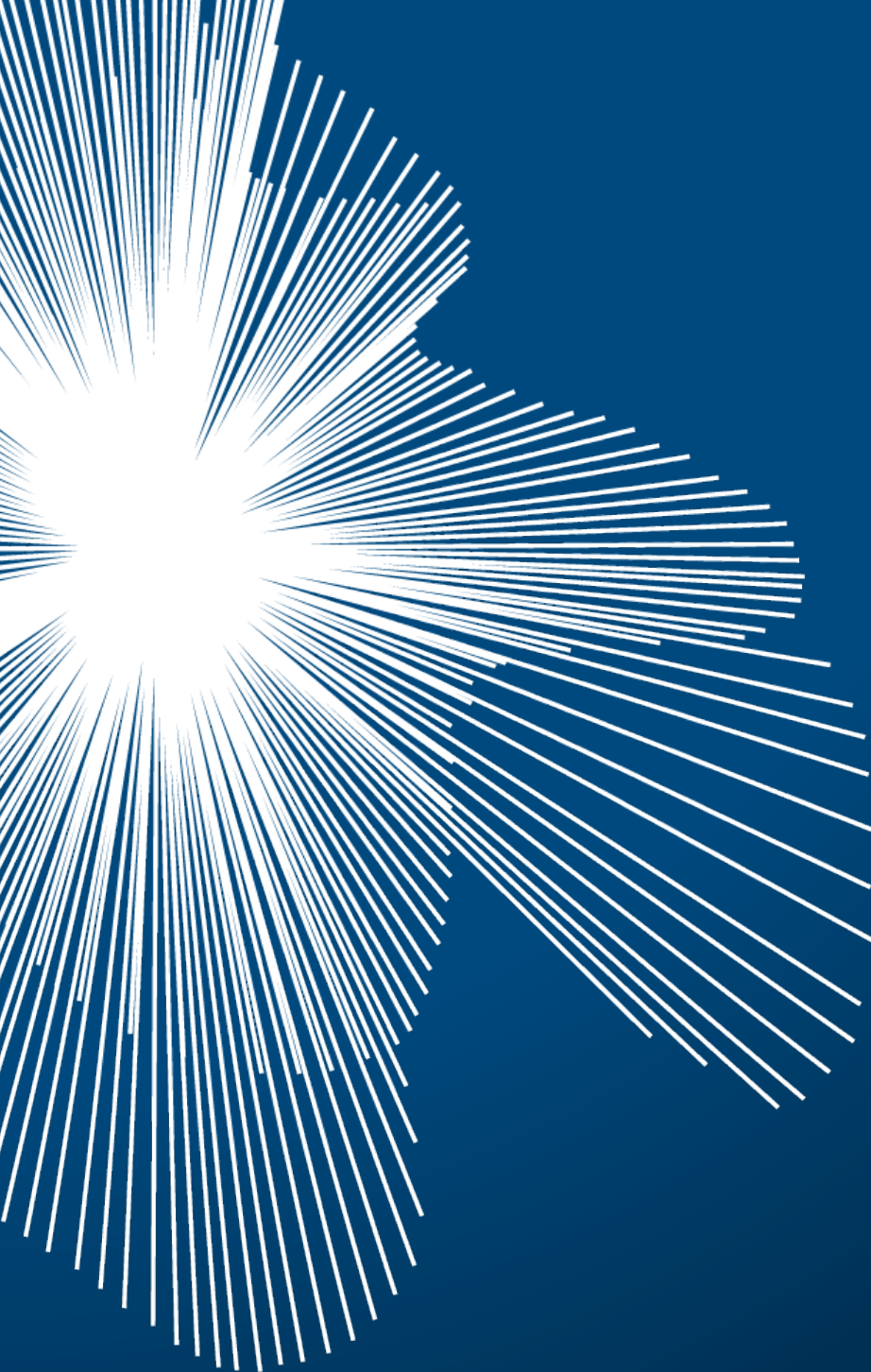
**s800-
Series**



**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": 2TB, 1.8": 400GB	1TB
Enterprise Reliability	End-to-End Data Path Protection, Power Loss Protection, Parity Protection	End-to-End Data Path Protection, Power Loss Protection, Parity Protection
Software & Tools	SDM Device Manager, EnhanceIO Caching SW	EnhanceIO Caching SW



Thank You

