The Second Wave of the SSD Revolution

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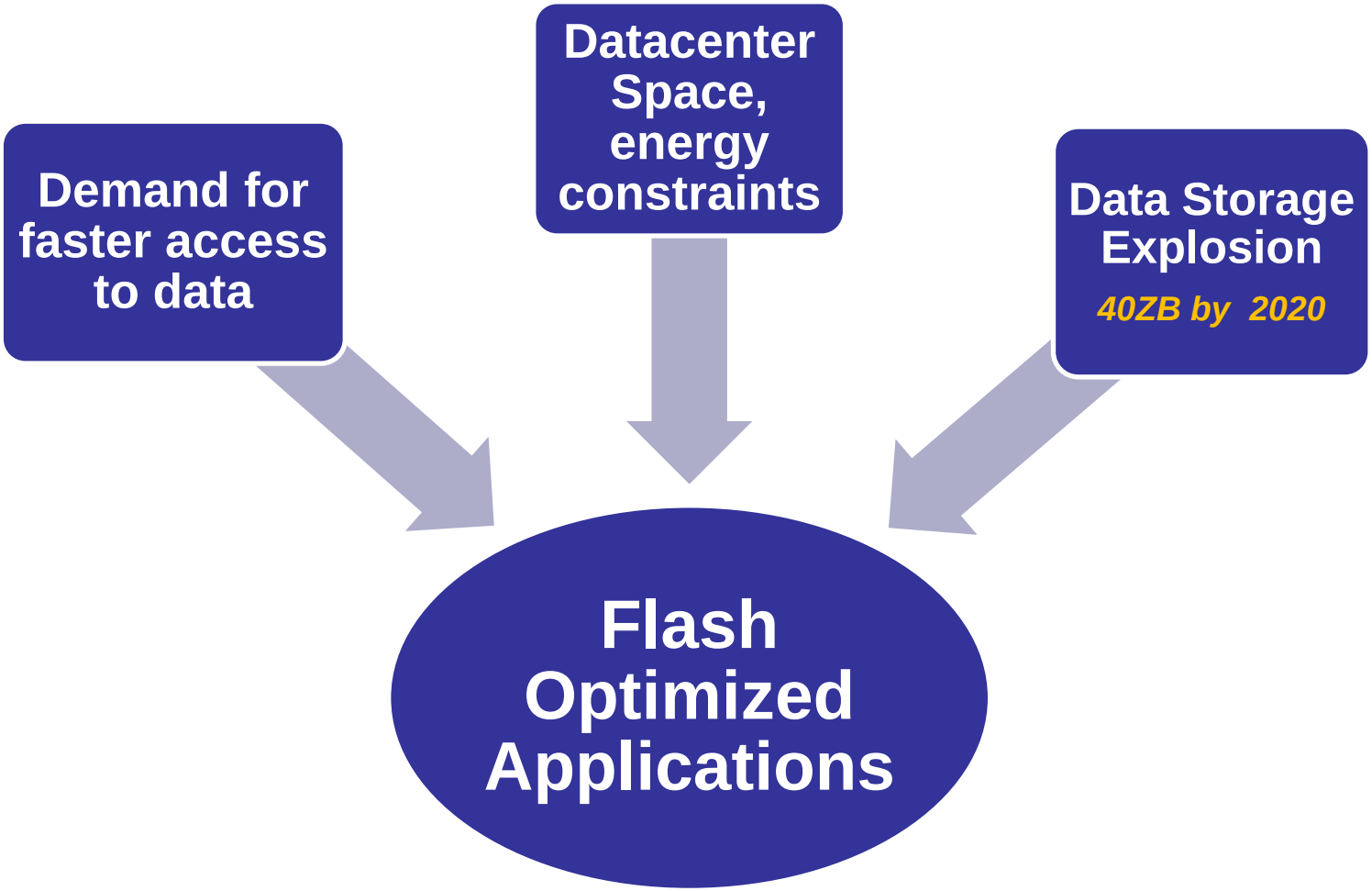
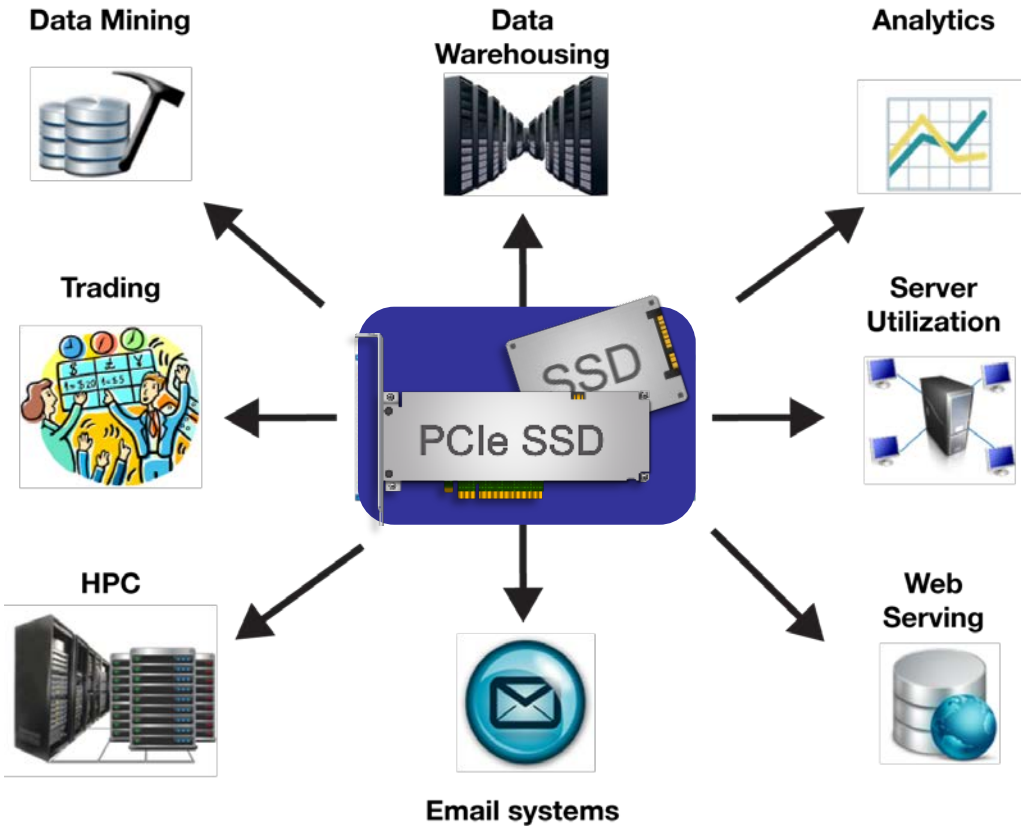
HGST
a Western Digital company

Flash Memory
SUMMIT

Flash 3.0

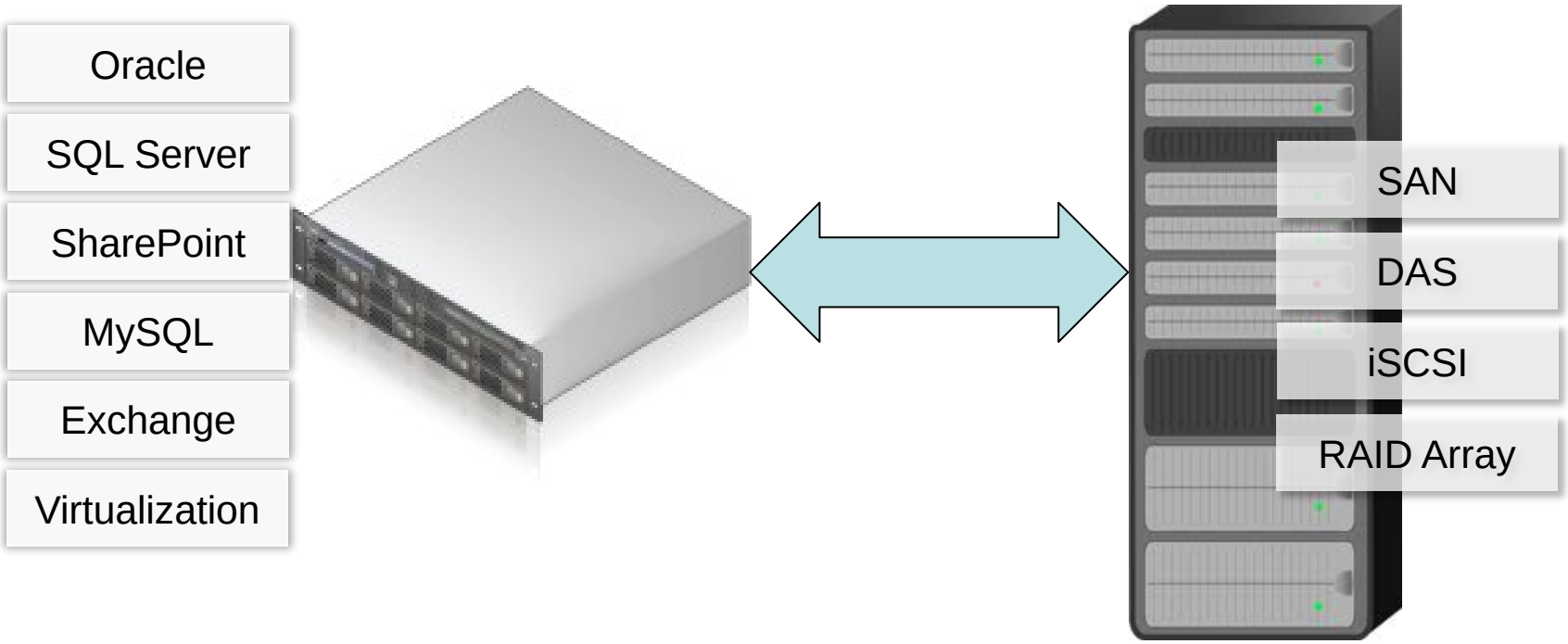

Demand for faster access to data
Datacenter Space, energy constraints
Data Storage Explosion
40ZB by 2020
Flash Optimized Applications

Growing footprint of SSDs in data center



Applications demanding more SSDs / deployment
In larger densities with scalable performance

To speed up applications today…



It's all about delivering consistent LATENCY!!

Why does latency matter?

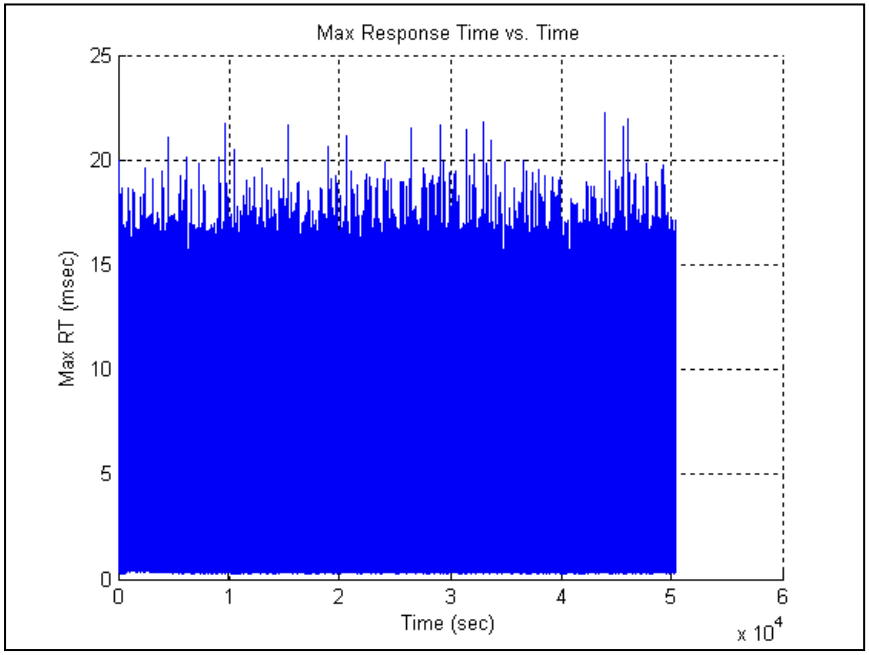
- Benchmarks have Independent IO but Applications have **Dependent** IO
- The LAST IO Matters – Application performance tracks to the response time of the LAST IO

Conclusion: Applications require consistent latency

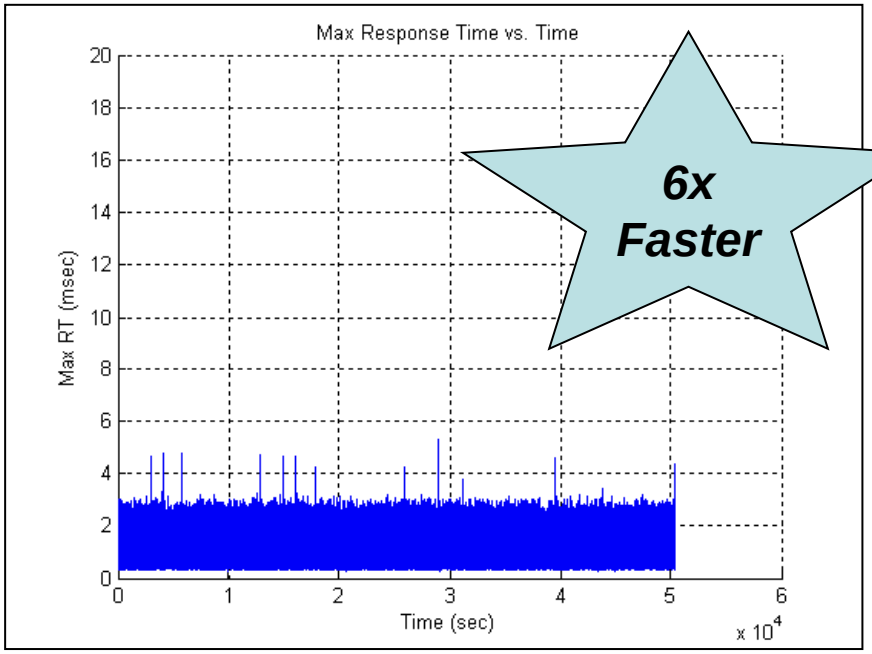
Delivering on Consistent Latency

- New Ultrastar 12Gb/s SAS SSD Family!!!

Released July 2014



High Latency Spikes cause application slow down



Consistent Latency profile – enabled consistent logging => Faster Application run time

Opportunities for Next Generation SSDs

Looking Forward…

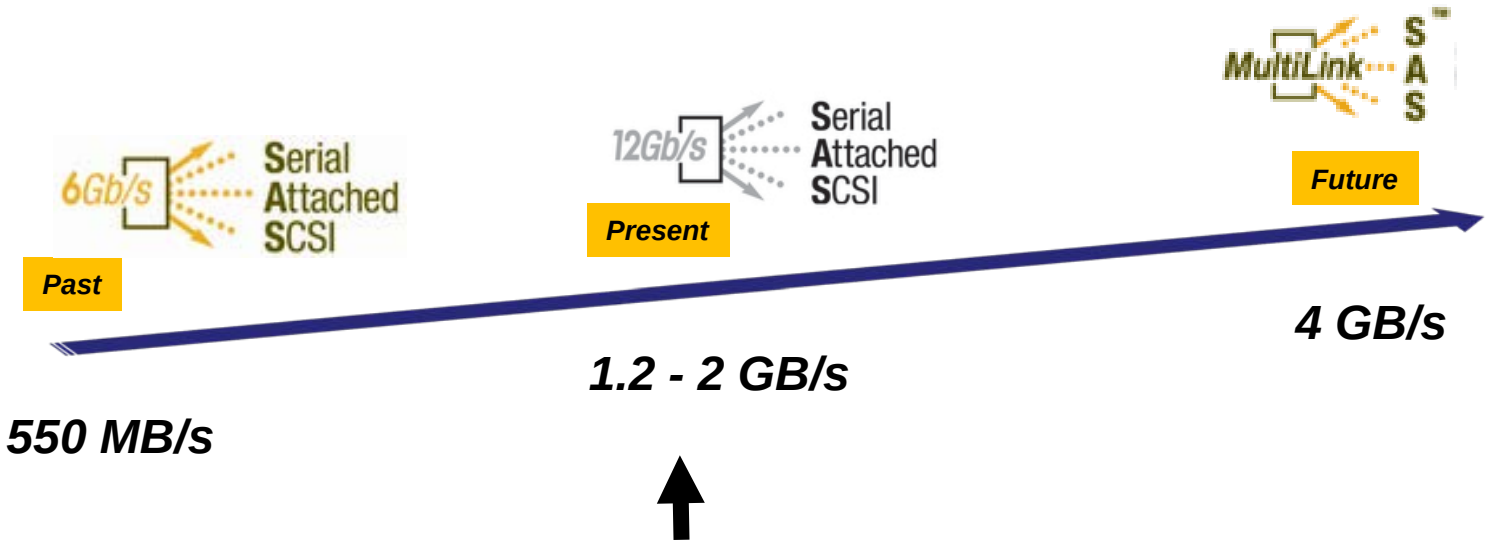
Field Reality

- Migration to smaller flash geometries drives larger SSD capacities
- Data centers deploying larger and larger capacity SSDs driven by storage demands and cost savings achieved via consolidation

Challenge: Require SSDs to deliver on the IO/GB promise as SSD capacities scale up

Multilink SAS

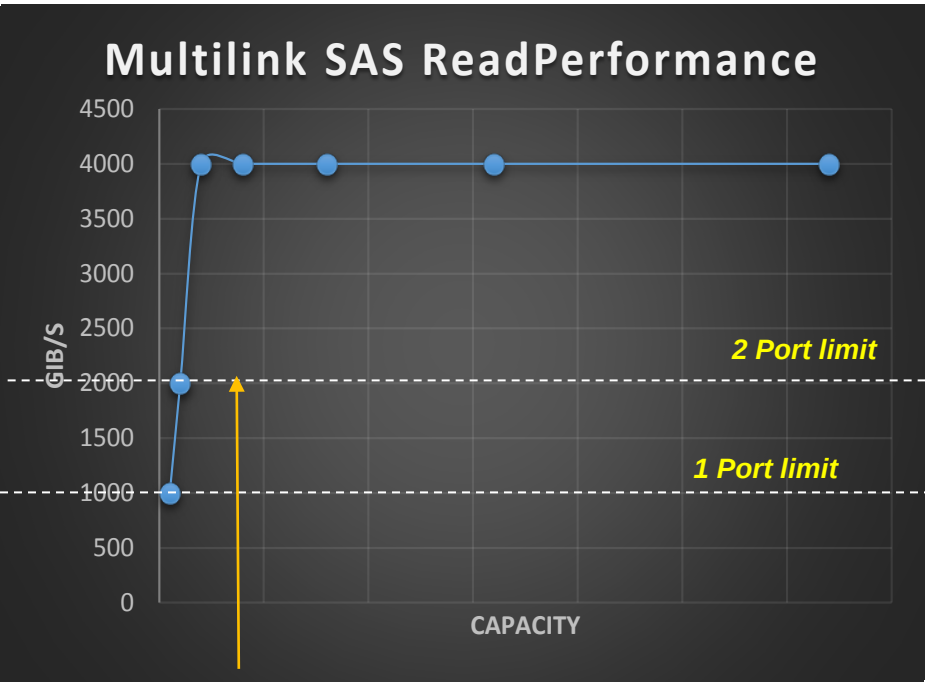
4 lane SAS 12Gbps connectivity to host



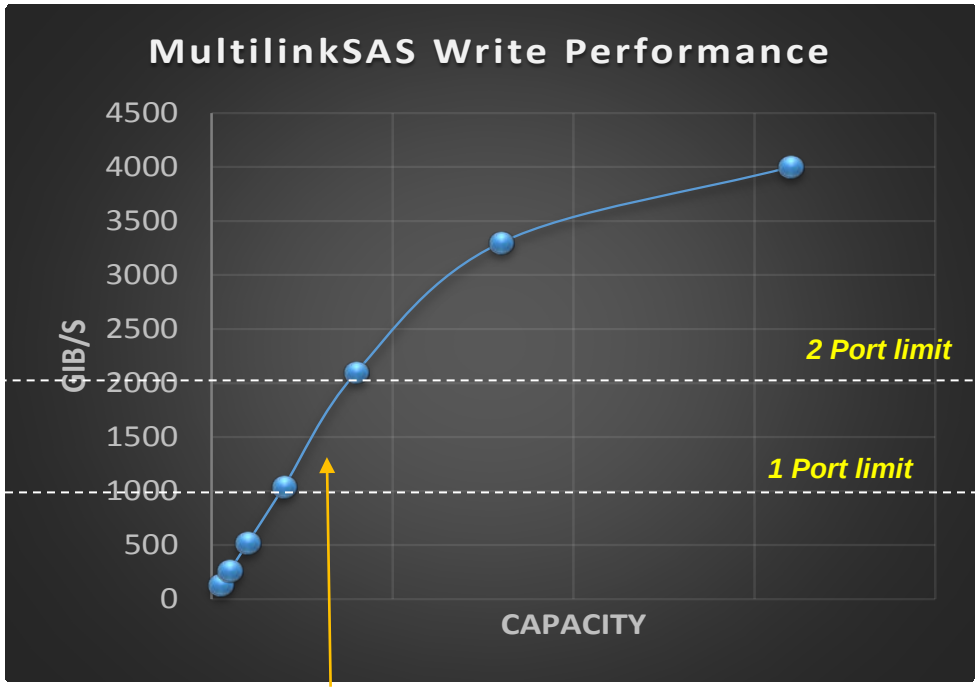
Why Multilink SAS?

- >4GB/s bandwidth delivered over SAS
- 4x performance improvement
- Delivered in industry standard 2.5’’ SFF

Unleash Higher Performance as Capacity Scales*



Capacity in 2014

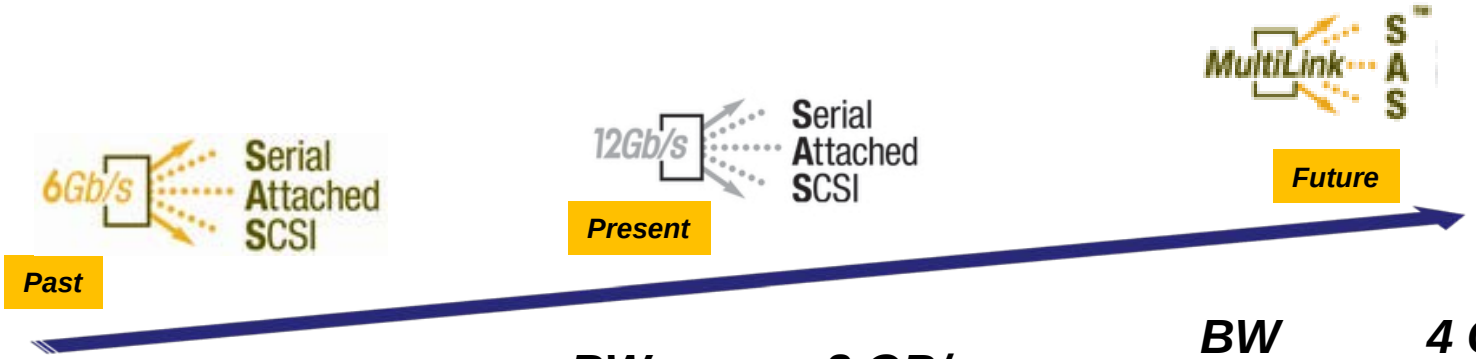


Capacity in 2014

*Unconstrained write performance

Multilink SAS

4 port SAS 12Gbps connectivity to host



BW: 550 MB/s
Avg Cap 400GB

IO /GB 1.3

BW >2 GB/s
Avg Cap 1.6TB

IO /GB 1.3

BW 4 GB/s
Avg Cap 3.2TB

IO /GB 1.3

Multilink SAS: Space, Power & TCO Savings

40TB capacity storage delivering 30GB/s performance

24x 1.6TB 12Gb SAS SSDs

Enclosure	***2U***
Capacity:	***38TB,***
Power:	***264W***

8x 6.4TB Multilink SAS SSDs

Enclosure	***1U***
Capacity:	***51TB,***
Power:	***140W***

~ 50% space and power savings using Multilink SAS SSDs

Summary

- Flash driving optimizations in the data path in applications.. Leading to latency sensitivity
- Delivering consistent latency is key to improving application performance
- Next Gen SSDs need to deliver on the IO/GB promise as capacities scale up to keep up with data center application demands
- Multilink SAS delivers scalable performance with capacity while reducing space and power needs by ~50%