NVMe in Enterprise Storage Systems

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Flash Driving Enterprise Storage

AFA revenue is 20% of overall enterprise storage revenue

External Enterprise Storage, 2015 – 2020, Revenue ($B)

Source: IDC, March 2017
WW SSD Market Forecast, 2017-2021

Revenue ($000)

- **Enterprise SSD 2021**: 58.9%
- **Client SSD 2021**: 39.7%
- **Commercial SSD 2021**: 1.3%

- **Enterprise SSD**: $18,440.5M
- **Client SSD**: $12,435.6M
- **Commercial SSD**: $415.5M

IDC
Analyze the Future
• PCIe will grow from a 12.4% revenue share in 2016 to a 61.4% share by 2020
• In 2020 NVMe SSD revenue alone will be $9.94B
• In 2020 rack scale flash systems revenues are still expected to be well under $1B
• In 2020 total SSD revenues will be $16.19B (all interface types)
Rack Scale Flash Systems Emerging

- Webscale infrastructure built around NVMe (no SCSI)
- Internal NVMe storage, NVMe interfaces, NVMe over Fabric
- Primary positioning is as an easily scalable “SSD” that offers the efficiencies of shared storage
- All require custom drivers on the host and some include hardware customizations (for “enterprise” features like RAID, snapshots, etc.)
- Primary workload targets include real-time big data analytics and super high performance databases
- First shipments in 2016 and industry revenues under $50M in 2017

...and don’t forget Pure Storage FlashArray//X
The Importance of NVMe in Enterprise Storage

- NVMe vs SCSI advantages
- Lighter weight I/O stack optimized for memory
- Lower latencies and much higher throughput
- Supports much higher degrees of parallelism

- New workloads and data access patterns require much higher storage performance
- Real-time big data analytics need an ability to support high degrees of concurrency
- Big data exacerbates the data mobility problem

- Improved efficiencies for “at scale” computing
- Higher infrastructure densities
- NVMe interface bandwidth needed as drive sizes increase
NVMe Adoption and Drivers

PCIe or NVMe Flash

- Currently using: 48%
- Planning to use within 12 months
- Not using and no plans

Drivers to NVMe Adoption

- Better scalability to meet our performance requirements over time
- Better cost/performance ($/IOPS)
- Higher throughput or bandwidth
- Increased storage density (TB/U)
- Lower latency

N=804-Source: Micron Survey: Managing High Data Growth Survey, IDC, April, 2017
Flash Strategies To Manage Data Growth

- Higher density devices: 43%
- Flash with SAS/SATA: 42%
- Public Cloud SaaS services
- Flash with PCIe/NVMe: 39%
- Server-based storage (webscale) architectures
- Data archiving or tiering approaches
- Public Cloud IaaS based services
- Next generation HDD devices (e.g. shingle magnetic recording (SMR) devices, Ethernet drives, hybrid drives)
- In-line data reduction

N=804-Source: Micron Survey: Managing High Data Growth Survey, IDC, April, 2017
DX* Is Driving Infrastructure Strategies

Rational for IT Infrastructure Decisions

Investing in IT to support digital transformation & growth

- Contain/minimize IT operating costs as much as possible (72%)
- Use third party/outsourcing/cloud firms to supplement in-house resources wherever possible
- Proactive, broadly implemented cloud-first approach to new application deployments
- Take ad-hoc approach in which projects and activities are driven by the needs of individual teams

* Digital Transformation

Source: IDC Cloud Study 2017, N = 1007
Real-time big data analytics will increasingly become part of the digital transformation

By 2020 75% of the Fortune 2000 will have at least one real-time big data analytics app (and it will be business critical)

This will be a major driver of NVMe systems revenue
Essential Guidance

• NVMe will become the mainstream foundation technology for enterprise storage by 2020
• An increasing number of select workloads will require NVMe performance (starting now)
• There are other reasons to consider NVMe now besides just low latency
  • High throughput, storage density/rebuild times
• Established vendors are taking an incremental approach to NVMe integration…
• …but the rack scale flash architectures of the future are based on webscale designs
Thank You

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