LEADING THE INDUSTRY TRANSITION TO NVMe

INVESTOR WEBCAST

MATT KIXMOELLER
VP, PRODUCTS

PETE KIRKPATRICK
HARDWARE ARCHITECT
SMART STORAGE FOR THE DATA-DRIVEN ECONOMY

ACCELERATE DIGITAL BUSINESS

REAL-TIME ANALYTIC INSIGHTS

TRANSFORM TO CLOUD IT
EXPANDED PURE STORAGE TAM
(WITH FLASHBLADE, 2016/2017 EXPANSION)

DAS
$17.1B

SAN
$18.2B

NAS
$6.6B

STORAGE SOFTWARE
$6.9B

PETABYTE-SCALE //M70

FlashStack

1

2

3

4

5

DAS CONSOLIDATION

FLASHBLADE

SCALE-OUT FILE & OBJECT
$18.6B

PURE DIRECT TAM
~$35B
NVMe BASICS
What are NVM-Express and NVMe over Fabrics?

NVMe is a high throughput, low latency memory protocol, which runs natively over PCIe or over transport protocols such as RDMA/Ethernet (NVMe/f).

NVMe is designed to exploit the inherent parallelism of modern CPUs and SSDs, via the use of many parallel queue pairs, lockless access, and efficient commands.

The protocol has been well-standardized, and enjoys broad support from all aspects of the ecosystem.
WHY NVMe?

IT’S ALREADY IN YOUR DEVICES

IT’S FASTER AND MORE PARALLEL THAN SAS

IT’S REQUIRED TO TAKE ADVANTAGE OF TOMORROW’S ADVANCES

1 SERIAL CHANNEL

64K PARALLEL QUEUES

MASSIVELY MULTI-CORE CPUs

SUPER-DENSE SSDS

NEW MEMORY TECHNOLOGIES

HIGH-SPEED INTERCONNECTS

12Gbps

nvm EXPRESS™

SSD

25-50-100 GBE
NVMe REMOVES BOTTLENECKS
STORAGE ARRAY ARCHITECTURE
NVMe WILL BRING

**BETTER PERFORMANCE**

- ↑ Bandwidth
- ↓ Latency

**HIGHER DENSITY**

PBs in 3U

**PERFORMANCE DENSITY**

Max performance even in very small (20TB) arrays

**GREATER CONSOLIDATION**

Drive down cost with higher consolidation

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**BIGGER, FASTER, DENSER**
INEVITABLE SHIFT TO NVMe

FOLLOW THE VOLUME...

HIGHER VOLUME = LOWER COST
MORE R&D $  FASTER INNOVATION

M UNITS

NVMe

NVMe READY  SATA  FULL NVMe  SAS

HOW OTHERS MAY DO NVMe

FORKLIFT UPGRADE

“TIER 0” POSITIONING & PRICING

<table>
<thead>
<tr>
<th>Tier 0 nvm</th>
<th>$$$</th>
<th>ALL SPEED NO FEATURES</th>
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<tbody>
<tr>
<td>Tier 1</td>
<td>$$$</td>
<td>DEDUPE COMPRESSION SNAPSHOT REPLICATION ENCRYPTION</td>
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<tr>
<td>Tier 2</td>
<td>$</td>
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DEDUPE COMPRESSION SNAPSHOT REPLICATION ENCRYPTION...
NVMe ADDS EVEN MORE STRAIN TO STRUGGLING RETROFIT ARCHITECTURES

- **Thin Provisioning Virtual Allocation?**
- **Internal Virtualization No More Fixed HDD Mapping!**
- **Deduplication Non-Existent or Poorly Implemented**
- **Encryption Per Volume, Decreases Security, Increases Complexity**
- **Compression Non-Existent or Poorly Implemented**
- **Flash Performance & Software Bottlenecks**

**The Final Straw?**

**Two Decades of Retrofit Compromise**
HOW PURE WILL DO NVMe

EVERY FLASHARRAY UPGRADABLE TO NVMe

MAINSTREAM POSITIONING & PRICING

Tier 0

Tier 1

Tier 2

SAS

ONE ARCHITECTURE

ALL FEATURES

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NVMe IS JUST ANOTHER STEP ON THE EVERGREEN JOURNEY!

FA-320 128 GB
FA-420 256 GB
FA-450 512 GB
//M 1 TB
//M R2 2, 4, 8 TB
NVMe //M 15+ TB

2012 2013 2014 2015 2016 2017

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>DUAL-PORT HOT-PLUG NVMe NV-RAM DEVICES

An industry first when shipped in 2015!
Over 10,000 in service

NVMe & SAS-CAPABLE FLASH MODULE SLOTS
Built to support SAS and NVMe!

CONTROLLERS WITH MODULAR I/O
SAS & NVMe internal and external networks are upgradable

PURITY SOFTWARE OPTIMIZED FOR NVMe
Massively parallel and multi-threaded design
Global Flash Management across entire flash pool

//M DESIGNED FOR NVMe FROM DAY 1
ALREADY RUNNING IN PRODUCTION DEPLOYMENTS FOR OVER 1.5 YEARS
COMING 2H 2017...

NVMe UPGRADES FOR //M

NVMe CONTROLLERS + NVMe FLASH MODULES = FULL NVMe //M!
ADD OR CONSOLIDATE!

ORIGINAL SAS //M

ADD EMPTY SHELF

MIGRATE SAS FLASH TO SHELVES

ADD NVMe TO SAS

OR

CONSOLIDATE INTO DENSER NVMe!
NVMe-READY GUARANTEE

GUARANTEED UPGRADE PATH TO NVMe*

EVERY NEW //M IS GUARANTEED TO BE UPGRADEABLE TO NVMe in TWO WAYS:

1. CONTROLLER UPGRADE TO NVMe IN 3 YEARS INCLUDED WITH FOREVER FLASH RENEWAL

2. UPGRADE SOONER WITH UPGRADE FLEX BUNDLES (NVMe CONTROLLER INCLUDED W/ QUALIFYING CAPACITY EXPANSION)

IF WE CAN’T MAKE THE UPGRADE WORK – WE WILL GIVE CUSTOMERS A FREE REPLACEMENT FULL NVMe ARRAY!

*See Evergreen Storage Program Terms for details