Breaking Down the Barriers to PCIe SSD Adoption

Derek Dicker, VP, Performance Solutions Group
Non-Volatile Memory
Changes Everything
The Ripple Effect of NVM

Compute
- CPU Interconnect Evolution (e.g. PCIe Gen3, NVMe)

Storage Control/Management
- Higher Performance Controllers, RAID Stack and Driver Tuning

Expansion
- Low-Latency Focus, Buffering Features

Media
- SAS/SATA SSDs

CAPACITY TIER

SAS & SATA
The Ripple Effect of NVM
THE EMERGENCE OF THE PERFORMANCE TIER

PERFORMANCE TIER
PCIe

CAPACITY TIER
SAS & SATA

Compute
Storage Control/Management
Expansion
Media

PCIe SSDs

PMC
Software Defined Flash

n. ˈsôftˌwe(ə)r –diˈfinəd–flaSH /

An enterprise class flash solution that uses standard hardware with all the important storage and management functions performed in intelligent firmware and software to maximize the value of the flash in its environment.
SDF Ecosystem
PMC SDF Controller Momentum
SOLID PROGRESS SINCE WE LAST MET

- 40+ Unique SKUs
- 5 of 6 NAND Manufacturers Used
- SLC, MLC, eMLC and TLC
- Add-In Card, 2.5”, and Custom Form Factors
- Enterprise SSD, Hyperscale SSD, and All Flash Array SSD
... And The Momentum Continues...
Announcing the Next Generation SDF Controller
Flashtec™ NVMe2032

- **Best-in-Class Performance**: 1M IOPs!
- **Support for Large Capacity** (> 20TB)
- **LDPC ECC Capabilities for Next Generation NAND**
  - Adaptive LDPC Support (1Y and beyond)
- **SDF-optimized Flash Interface**
  - Programmable interface allows for custom micro-commands to the NAND
  - Support for Toggle DDR 3.0, ONFI 4.0
  - Flexible architecture allows customers to differentiate their products
The Ripple Effect of NVM

PERFORMANCE TIER
- PCIe
- PCIe Switches
- PCIe SSDs

CAPACITY TIER
- SAS & SATA

Components:
- Compute
- Storage Control/Management
- Expansion
- Media
Today’s PCIe Switches

• Lack Scalability
• Lack Robustness and Resiliency (PCIe ≠ SAS)
• Lack Programmability
• Lack Choice

...Until Now...
“Before”

use case: 40 SSD all Flash Array
“After”
use case: 40 SSD all Flash Array

60%
Lower Power

75%
Fewer Devices

And the Ability to
Add Value through Firmware
Swichtec PSX Storage Switches
THE INDUSTRY’S FIRST SOFTWARE DEFINED STORAGE SWITCH

• **PCIe Resiliency**
  - Error containment to prevent system crashes and blue-screening, hot-, surprise-plug
  - Extensive diagnostics and debug

• **Flexible Port Bifurcation and Low Power**
  - Flexible x2/4/8/16 port bifurcation
  - Up to 60% lower power than other solutions

• **Highest Port and NTB Density**
  - Up to 48 ports, 48 NTBs and 24 Virtual Switch Partitions

• **Programmable Storage Switch**
  - PCIe Switch programmability
  - Integrated enclosure management processor
Software Defined Switching

n. /ˈsôft,we(ə)r–diˈfined–switch′ng /

A switching solution that uses standard hardware with all the important storage and management functions performed in intelligent firmware and software to maximize the value of the switch in its environment.
The Ripple Effect of NVM

PERFORMANCE TIER

- PCIe

CAPACITY TIER

- SAS & SATA

Tiering of Data

- Compute
- Storage Control/Management
- Expansion
- Media
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