Moving Flash "Out of the Box"

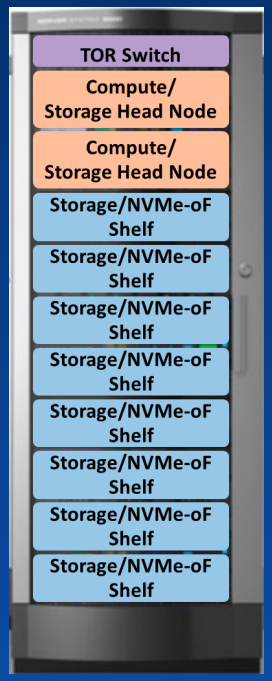
Bridging NV Memory to the Fabric

Bob Doud

Sr. Director of Marketing, Mellanox

Why Put Flash on a Network?

- Enabling NV Flash over a fabric has many benefits
  - Allows scaling compute and storage independently
  - Better data availability
    - Erasure coding across multiple storage nodes
  - Leads to better Flash utilization
    - Typically in-server storage is over-provisioned
- Benefits also apply to other advanced NV technologies such as 3D Xpoint, MRAM



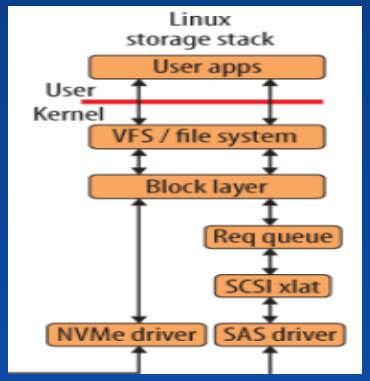
Criteria for Networked Storage

- Performance must be comparable to local in-server storage (goal <10% impact)
  - Latency
  - IOPS
  - Throughput / Bandwidth

- Should have minimal new requirements at server
  - e.g. new hardware, non-std software
  - Should support existing storage semantics (block, object, file…)

Enabling Technologies

- Higher-speed networks
  - Ethernet & InfiniBand continue to be at the forefront
  - 100Gb/s now mainstream, 200G & 400G in 2018
- RDMA (Remote Direct Memory Access)
  - Bypasses the CPU completely for data movement
  - Extremely low latency
- "Thinner" storage SW stacks
  - e.g. NVMe replacing legacy SCSI



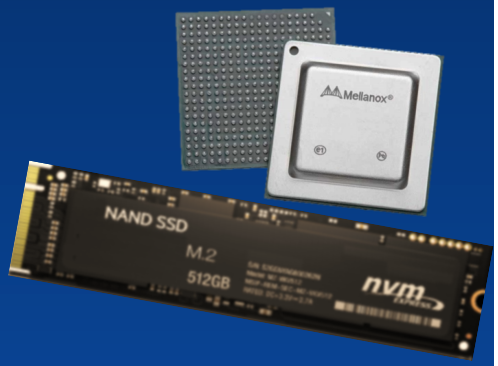
Examples of Networked Storage

- Traditional SAN architecture
  - Fibre Channel (FC) legacy overtaken by Ethernet (iSCSI, FCoE)
  - Suitable for spinning disc performance levels

- NVMe over Fabrics (NVMe-oF)
  - Rapidly ramping, beginning in 2016
  - Moves rd/wr latencies from milliseconds to 10s of microseconds

Emergent Silicon Devices

- SoCs that bridge between the network and NVMe
  - Integrated devices supporting 50G – 200Gb/s
  - PCIe, Network ports, CPU cores, switching



- Advanced feature sets
  - Security (encryption, authentication)
  - Dedupe, compression
  - Direct-to-Ethernet Flash drives
  - Controller Memory Buffer (CMB) inside the Flash

Thank You

Bob Doud
Sr. Director of Marketing, Mellanox
bdoud@mellanox.com