



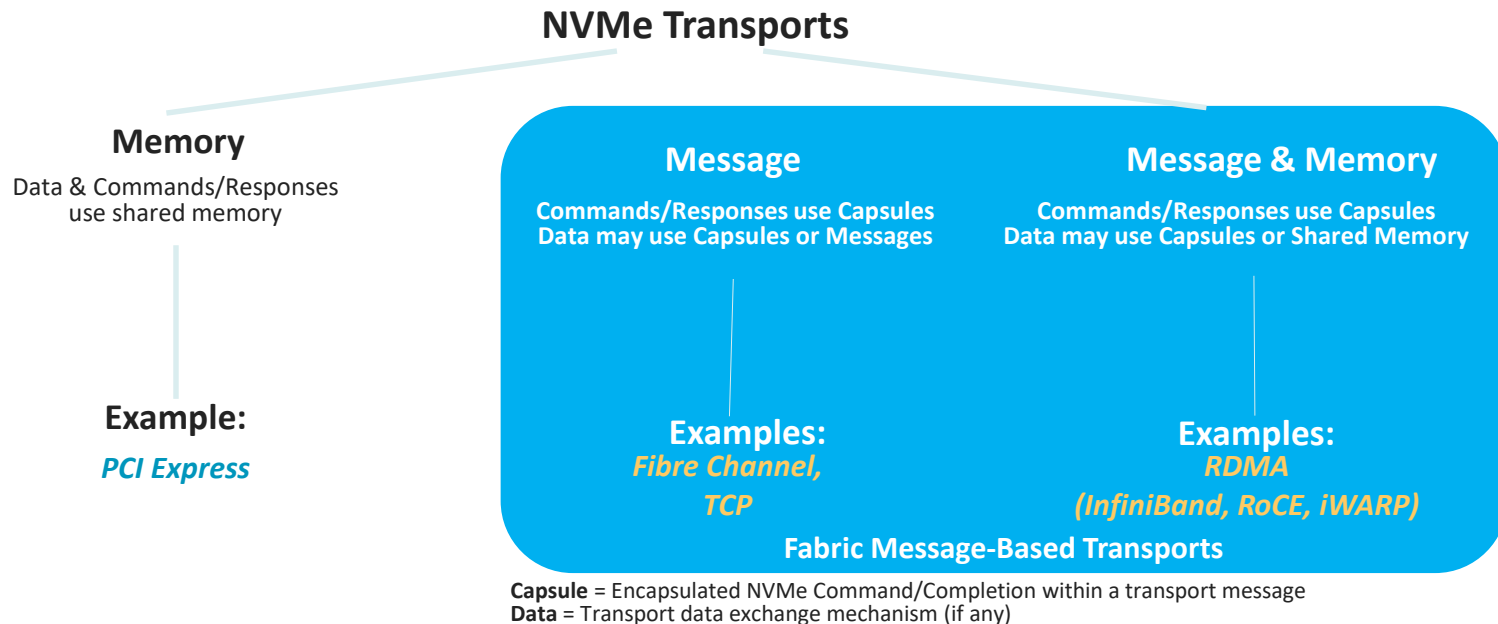
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NVMe-oF-302-1: Benefits and Use Cases for NVMe-oF

Steve McQuerry, Senior TME
PureStorage



NVMe Transports





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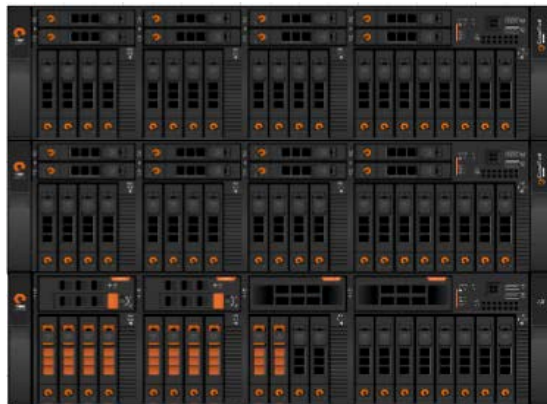
NVMe on Arrays



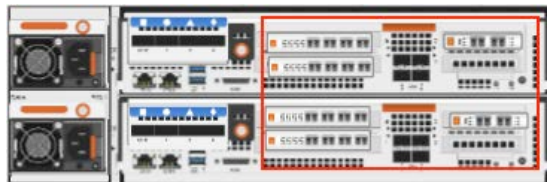
Chassis PCIe



Shelf NVMe/RoCE



NVMe Backend
PCIe/NVMe-oF



NVMe Frontend
NVMe-oF



Backend NVMe transport examples

- PCIe
 - Good for connectivity within a chassis, outside of the chassis it has challenges (hardware, scale, operations)
- NVMe/RoCE
 - Uses same transport model as PCIe (direct memory) and mitigates challenges
 - Pure Storage has been shipping NVMe/RoCE on the backend as DirectFlash Shelf to scale capacity since 2018



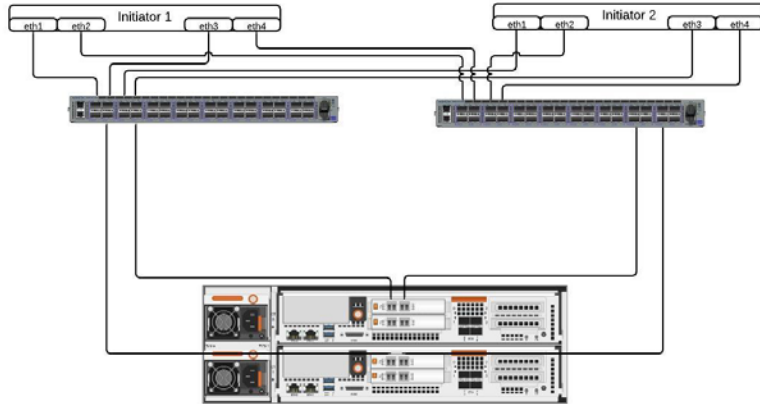
Frontend NVMe transport examples

- NVMe/RoCE
 - Leverages Ethernet. Use cases include front end and back end deployments. Customer applications tend to be disaggregated POD designs
- NVMe/FC
 - Mature Fabric easy path to adoption for customers who want to leverage existing FC operations model
- NVMe/TCP
 - Generic Ethernet connectivity. Use cases include designs that leverage data network and storage network

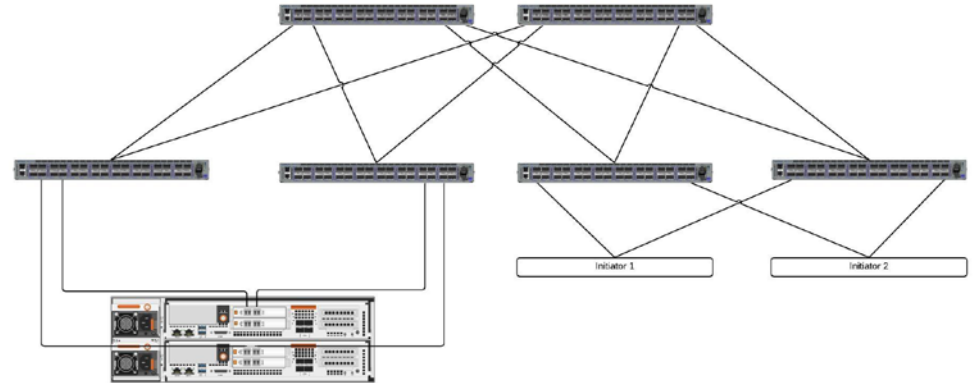


Frontend NVMe Ethernet topologies

Single Hop



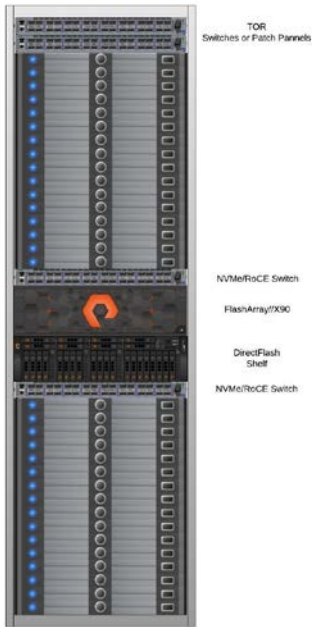
Spine Leaf





Disaggregated Designs

Rack Design



POD Design





Customer/Market Observations

- The OS ecosystem for NVMe-oF is still developing
- Many Fibre Channel customers are looking to adopt NVMe/FC on existing infrastructure
- Some customers are looking to move to an all Ethernet data center fabric
- NVMe/RoCE is works well in disaggregated rack and pod deployment scenarios
- NVMe/TCP is gaining mindshare and poised to be very popular in less deterministic Ethernet environments



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Q & A