



**SPECTRA**

# RoCE for Tape?

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# Tape Interfaces

- LTO started with SCSI
- Data centers developed SANs using fibre channel to connect everything
- Tape libraries integrated bridges to attach fibre SANs to SCSI tape drives
- LTO adopted a native fibre channel interface
- Lower cost SAS interfaces became more prevalent on storage devices
- LTO adds a SAS interface for use within a rack environment
- Data centers move away from the traditional fibre channel SAN to a high speed Ethernet backbone

# Modern Data Center Infrastructure

- Most modern data centers use a high speed Ethernet backbone.
- Ethernet has become the lowest cost and easiest to manage technology for connecting all devices in a data center.
- This has replaced historical SANs over the past decade
- Fibre channel has a much more diminished role
- One of the last pieces of technology in a modern data center that still uses fibre channel is the tape drive.

# Benefits of Ethernet over Fibre channel

- Ethernet technology roadmap has moved much faster than fibre channel
  - 400GbE backbones are becoming more standard (4x100GbE)
  - 10GbE is built into modern processors
  - 25, 40, 50, and 100 GbE are common
- Ethernet adapters are lower cost than fibre HBAs
  - Dual port 25GbE HCA sub \$350 and single port 100GbE HCA sub \$800 list prices
  - Dual port 16G fibre HBA is over \$1,000 list price
- Ethernet switches are lower cost than fibre channel switches and much more common
- Fibre channel requires personnel that know how to configure and manage the topology, unique HBAs, unique switches, and utilization of CPU on the server

# RoCE v2

- With the release of the TS1155E and TS1160E enterprise tape drives there is now a tape solution that uses a native high speed 10GbE or 25GbE interface
- RoCE – RDMA over Converged Ethernet
  - A network protocol that allows remote direct memory access (RDMA) over an Ethernet network.
  - RoCE v2 is an internet layer protocol which means that RoCE v2 packets can be routed.
- The advantages of RDMA are lower latency, lower CPU load and higher bandwidth – RoCE removes most of the CPU load and overhead that is typical of other storage protocols like iSCSI
- There are several vendors that offer RoCE on their HCAs in different levels of price and performance (10GbE, 25GbE, 50GbE, 100GbE)
- Currently there are no LTO tape drives that have a native Ethernet interface

# Take Aways

- If high speed Ethernet is used for tape the benefits are:
  - Elimination of fibre channel (HBAs, Switches, specialized knowledge)
  - Common infrastructure for the entire data center – lower cost, easier to manage
  - High speed, lower latency, low CPU overhead method of transferring data
  - Tape fits in to the modern data center architecture, not seen as behind the times
- Is RoCE the right interface for tape?
- Should the LTO consortium adopt RoCE as an interface for LTO drives or should servers and bridges be used to attach SAS drives to Ethernet backbones?
- RoCE needs more adoption to be accepted
  - Larger matrix of supported devices and versions of Operating Systems
  - Must be easier to setup and configure a system