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