Current Trends in Tape Archive
HPSS User Forum

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Trends in Data Center Infrastructure

- Hyper-Converged Infrastructure
  - Propelled by Cloud Computing

- Connection Topology:
  - High-Speed Ethernet Backbone

- Common connection to all devices
Trends in Data Center Data

- NAS and Object Storage
  - Extreme growth
- 80% of stored data is attached by Ethernet
- Fibre Channel is block-focused
Ethernet vs. Fibre Channel

- Both are available
- Speeds are equivalent
- Ethernet is less expensive
- Ethernet roadmap is moving faster
- Network engineers are a must but do you need to have a Fibre Channel expert?
- Often tape is the last FC system left...
Ethernet

- Up to 200GbE shipping today
  - 10GbE built into many new processors
- Many vendors of NICs and switches
- Lower cost per port and performance
Ethernet Storage Protocols

• iSCSI
  • Most common and widely used
• iSER – iSCSI Extensions for RDMA (RoCE, iWARP, Infiniband)
  • RoCE and iWARP work on an Ethernet network
• RoCE – RDMA over Converged Ethernet
  • Additional vendor support
  • Lower latency
• iWARP
  • TCP based – less configuration
RoCE v2 - RDMA over Converged Ethernet

- RoCE lowers CPU load
- Multi-Vendor support
- High speed, low latency interface
- RoCE v2 is routable using DCB switches
- Still a new protocol that is slowly being adopted
- Driven by NVMeoF and all-flash storage systems
- TS1160E enterprise tape drives now support 10GbE of 25GbE RoCE
Spectra Swarm - Ethernet to SAS

- Delivers Ethernet to SAS bridge – support for LTO-7, LTO-8, LTO-9 and future LTO and Enterprise drives
- Enables full bandwidth to up to 16 tape drives when both 40GbE ports are used to attach to host with RoCE v2
- Supports full RoCE v2 or iSCSI. Host sees tape drives as RoCE or iSCSI connections but as normal tape devices
- Allows for support of both Windows and Linux environments
Spectra Swarm

- HH LTO SAS tape drives cost roughly half as much as a TS1160E RoCE tape drive
  - HH SAS drive – 300MB/s
  - TS1160E RoCE drive – 400MB/s
- For the same price you gain the following benefits
  - Two HH SAS drives = 600MB/s
  - 2 x tape drives to mount to and read from in parallel
- Other SAS tape drive options in the future
- Spectra tape drive port failover driver coming in 2020 for Linux
Tape Drive Trends – Consolidation

• “Consolidation” or “Survival of the Fittest”? 
• Tape today 
  • TS & LTO ... and... T10000?
Data Migration Trends – ???

• Oracle’s T10000D – The “Trendsetter” You didn’t want
• 3 Approaches to Migration
  • Hard Migration
  • Soft Migration
  • Hybrid Migration
Soft Migration

Scenario 1 - Soft Migration

After migration, Oracle SL8500 is de-commissioned
Hard Migration

Migration Scenario 2 - Hard Migration

Restore ALL data from T10K tapes to disk

Server+Disk Pool

Write ALL data to tape in new Spectra library

Oracle® SL8500

Any Spectra Library
Hybrid Migration

#1 - Hard Migration
- Restore ALL data from T10K tapes to disk
- Write ALL data to tape in new Spectra library

#2 - Soft Migration
- Move T10K tapes and drives

One Oracle® SL8500 Stays in service
- Decommission the majority
- Existing NEW T10K Tapes OR Archived T10K Tapes

Server+Disk Pool

Any Spectra Library

TFinity® ExaScale T10K Partition
Outlook for Tape – A Smaller Family

Outlook for Tape – A More Tightly-Knit Family

Outlook for Tape – A Harmonious Family?
LTO Media IP Issues – Q&A with Nathan Thompson

• What I am covering is not under NDA
• Interesting questions that I am not involved in but can intelligently speculate on
• Much is public domain but not widely known

Questions?