Storage Area Networking at LTU

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Lawrence Tech

- Medium sized Technical University
- 4 Colleges / 50 degree programs at associates, bachelors, masters and doctoral levels
- 4,148 Students
- 113 Full-Time Faculty / Full Time Staff
- 330 Adjuncts / Part Time Staff
IT Staffing

- 22 Full time Professionals in IT Service Delivery
- 6 Full Time in Instructional Technology
- 20 Student Workers
- 6 x 12 Coverage (Help Desk and Main Computer Lab)
Supports entire university for all voice, video and data.

Current server farm is 27 Intel systems (Windows & Linux), 7 Alpha systems (O-VMS and Tru64) and Intel blade system with 10 nodes
Current SAN Implementations

- User share system (3-MPC 2620s, Qlogix SAN Switch, DataFrame 410 (2 Tbyte))
- SCT Banner SAN (2-Compaq ES-40s, 2-Compaq SAN switches (Brocades), Compaq MA-5000 array (900 Gbyte))
- Blackboard SAN (4-Cubix blades, Clariion 4500 disk array (500 Gbyte), direct connected w/fibre)
Future Plans

- Adding pair of DataFrames 440 (4 Tbyte) this spring (iSCSI configuration over private Gbit)
- Convert to backup-to-disk using another iSCSI DataFrame disk array (4 Tbyte or larger)
- Re-task current DataFrame 410 to Blackboard to support new online initiatives
- Likely to re-task the Clariion over to another project when new Blackboard system is acquired
Future Core Storage Configuration

Support for Student Computing and Research

Sized to Student Population for Share Spaces

Taubman Student Services Center

Edward Donley Computer Center

HP 9315 Core Router

StorageTek Tape Library
2xLTO 1 2xLTO 2

DataFrame 440

Gigabit Router

DataFrame 440

2520
2520
1510
2520
2520

4 Tbyte

2 Tbyte

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LTU Current SANs

Problems Solved

- User Share SAN
  - Simplifies user administration
  - Very high reliability through RAID and multiple FC paths

- Banner SAN
  - Connects to high reliability cluster configuration
  - Allows PRODUCTION system to work with TEST

- Blackboard SAN
  - Associates web server with database machine
  - Larger storage space than blade would have allowed
Problems Created

- BACKUP, BACKUP, BACKUP!!!
  - 3.4 Tbyte takes a while to backup even with fast equipment (We use StorageTek L40 with 2-LTO1 and 2-LTO2 drives). Current backups just barely fit in window, even with snapshot technology to separate backup from system.

- Some compatibility issues when “self integrating” systems from multiple vendors

- Growth is somewhat problematic in FC arrays
iSCSI Expectations

- Allow for smoother rearrangement of storage facilities
- Open storage farm to other areas of campus
- Use as a mechanism to build additional disaster recovery / business continuity capabilities
Lessons Learned

- Backup is key
  - Must be enough “tape time” to meet backup window requirements
  - It is MUCH easier to work with a single vendor when connecting storage arrays to servers. We had several “adventures” in locating drivers that worked in the server, supported that level of the HBA card and actually talked to the disk array

- Acquire the management software tools available from the array manufacturer and learn to use them
Thank you