Spectra Logic API (SLAPI)
Spectra Logic API

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Introduction/Our Environment

• **Two Complete HPSS Environments: Open and Secure Computing**
• **Open Computing:**
  • 13 Frame TS 1155 Spectra Tfinity
    • 96 TS 1155 Drives
    • > 3600 TS 1155 JD media
  • 5 Frame LTO 8 Spectra Tfinity
    • 25 LTO 8 Drives
    • > 1200 LTO 8 Media
  • 4 Library SL8500 Complex – All 10000 Slot
    • T10K-D and LTO-5 in SL8500
  • SL8500 to Tfinity repacks currently running
    • ~ 40 % of data moved
Secure Computing:

- 23 Frame TS1155 Spectra Tfinity (under construction)
  - 128 TS 1155 Drives
  - 6408 TS 1155 JD Media
- 7 Frame LTO 8 Spectra Tfinity (under construction)
  - 40 LTO 8 Drives
  - 2000 LTO 8 media
- 4 Library SL8500 Complex – All 10000 Slot
  - T10K-D and LTO-5 in SL8500
New libraries in Open Computing Facility
SLAPI - Spectra Logic API: an open source CLI to T-Finity BlueScale

LLNL DSG devops team is used to engaging with libraries programmatically outside of the main application (HPSS) to test drives, move robots/carts, query state, get logs, configure new components, etc.

This is ACSLS with the SL8500s

**Spectra T-Finity BlueScale network control access includes:**
- A webUI: not good for scripting, batching, performing parallel operations on multiple libraries
- A feature rich XML interface

SLAPI is a python wrapper utility that offers a simple CLI to the entire suite of BlueScale XML commands and more

[https://github.com/LLNL/slapi](https://github.com/LLNL/slapi)

SLAPI was used to get drive mount rates after going into full production with zoning capability turned on. Showed us we had hot spots that are necessitating more examination of HPSS::T-Finity zoning interactions.
Remote Monitoring of Libraries

- Livermore Computing uses a ‘single pane of glass’ monitoring tool.
- Not practical to have operators login to multiple vendors solutions to check for failures.
- SL8500 is monitored using an Expect script which outputs custom CSV tailored to LLNL monitoring tool.
- Tfinity Libraries are monitored using a script which calls SLAPI and outputs status in CSV format. The output is then sent to the LLNL Monitoring Tool.
Remote Monitoring of Libraries

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Current Value</th>
<th>Variable Name</th>
<th>Current Value</th>
</tr>
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<tbody>
<tr>
<td>Robotics 24 V power rails active</td>
<td>Normal</td>
<td>Robot1 State</td>
<td>Normal</td>
</tr>
<tr>
<td>Top HAX Gear1 State</td>
<td>Normal</td>
<td>Bottom HAX Gear1 State</td>
<td>Normal</td>
</tr>
<tr>
<td>Top HAX Solenoid1 State</td>
<td>Normal</td>
<td>Bottom HAX Solenoid1 State</td>
<td>Normal</td>
</tr>
<tr>
<td>Robot2 Status</td>
<td>Normal</td>
<td>Columnn 2 Top HAX Gear State</td>
<td>Normal</td>
</tr>
<tr>
<td>Column 2 Bottom HAX Gear State</td>
<td>Normal</td>
<td>Column 2 Top HAX Solenoid State</td>
<td>Normal</td>
</tr>
<tr>
<td>Column 2 Bottom HAX Solenoid State</td>
<td>Normal</td>
<td>FR4/PCM/PowerSupply1 input</td>
<td>Normal</td>
</tr>
<tr>
<td>FR4/PCM/PowerSupply2 output</td>
<td>Normal</td>
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<td>FR5/PCM/PowerSupply2 input</td>
<td>Normal</td>
</tr>
</tbody>
</table>

Acknowledged at 13:00:00 Wed, October 2

Tape Drive testing

- LLNL has scripts that test SL8500 tape drives
  - Script uses ACSLS to mount/dismount tapes
    - Data Mover Hosts then write/read/compare
    - This is all done from Data Mover host

- Drive Test scripts are being rewritten to support Spectra Tfinity

- Load/Unload Script is run on SCSI Media changer host
  - Search for test tapes
  - Mount/Dismount test tape

- Actual test script is run on Data Mover host

- XML interface is being enhanced by Spectra to support tape moves
Security Audit

- LLNL has requirements for monthly tape cartridge audits
- Every tape must be counted
- SL8500 has this feature
- Spectra added a background audit to the XML interface. BlueScale12.8.01-20190510F
- Audit pulls every terapack in the library and scans each tape barcode
- Audit runs in the background so that mounts/dismounts can continue.
- Ex:
  - Slapi –server myServer securityaudit start
Security Audit

- **Collect Inventories**
  - Slapi –server myServer inventoryall - Collects tapes in drives
  - Slapi –server myServer physinventoryall - Collects all other tapes

- **Start Audit**
  - Slapi –server myServer securityaudit start - Start the physical audit

- **Monitor Audit for completion and/or problems**
  - Slapi –server myServer securityaudit monitor – Also watch System messages
  - 2019-10-07 11:45:56.759763 :: OK :: Security audit is 73 percent complete.
  - 2019-10-07 11:46:01.836036 :: OK :: Security audit is not running.

- **After Audit is complete, rerun inventory**
  - Slapi –server myServer inventoryall
  - Slapi –server myServer physinventoryall
Security Audit

- Find the filenames, then retrieve them
  - Slapi –server myServer getsecurityauditlognames - This gives you a list of filenames
  - Slapi –server myServer getsecurityauditlogfile securityAudit -
  - Slapi –server myServer getsecurityauditlogfile securityAuditInterim

- Look at results
  - > ------ Summary ------
  - > Audited 119 tapes in 20 magazines
  - > Unexpected magazines: 0
  - > Missing magazines: 0
  - > Moved magazines: 0
  - > Unexpected tapes: 0
  - > Missing tapes: 0
  - > Moved tapes: 0
Log Collection

- Every trouble ticket requires log collection
- Log Collection using USB drives is slow, requires traveling between buildings
- Log collection via Web GUI is cumbersome
- Log Collection via XML interface using SLAPI is easier, faster.
- Usually done in 3 steps:
  - Request ASL generation
  - List ASL files
  - Retrieve ASL(s) you want
Library Firmware Update

• SLAPI allows us to use XML interface to update library firmware

• Remote update saves us time, don’t have to travel between buildings

• USB Drives are a problem in our environment
  • We really try to avoid using USB drives, XML interface solves this issue

• Library Updates are not very fast
  • HPSS downtime or Library downtime is something we work hard to minimize
  • Library lost progression status of upgrade. Spectra working on this.
  • Staging of upgrade does not reduce duration of upgrade.
  • Slow performance when uploading code to LCM.
Library Firmware Update

- Upload package to memory card
  slapi --server servername package upload /path/to/BlueScaleX.Y.Z-XXXXXXXXF.hps

- List packages on the memory card
  slapi --server servername package list

- Stage the update
  slapi --server servername package stage BlueScaleX.Y.Z-XXXXXXXXF

- Actually perform update
  slapi --server servername package update BlueScaleX.Y.Z-XXXXXXXXF

- Show the status
  slapi --server servername package progress
  slapi --server servername package display BlueScaleX.Y.Z-XXXXXXXXF
Issues

• General Performance Issues
  • Convert from Canbus to Etherlib transfers where appropriate
• LCM Hangs
  • LCM would hang, need to be reset
  • Spectra thinks they have a root cause
• Tape Moves can only be initiated from SCSI Media Changer (RIM)
  • Spectra is adding a feature to XML to support tape moves
  • This will simplify our Drive Test code
• Adding Drives to a Partition is cumbersome
  • Partition definition is monolithic
  • We have to place PVR in operator mode to add drives
• Bad Shelf
  • Caused camera to fail to find shelf flag, tried for 12 hours to load same Terapack
  • Spectra analyzed logs and replaced shelf
• Spectra is working hard to solve these issues.