Status and Concerns from

HEPnet Canada

Canadian T2s

LHC Networking Workshop at CERN

2014-02-10

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Quick Overview

ATLAS Tier 1 at TRIUMF with 10% of ATLAS Data 8400 km from CERN in a straight line, 175 ms RTT

4 ATLAS Tier 2s at University of Victoria, Simon Fraser University, University of Toronto, and McGill University
NLR Shutdown Removes this path Feb 17th
LHCONE + Canada Internal LHC Network

Network Diagram:
- TRIUMF
- BCNET
- SFU
- Uvic
- ORION
- UoT
- McGill
- CERN
- PacWave
- Starlight
- MANLAN
- ESNet VRF
- Internet2 VRF
- GEANT VRF
- LHCONE VRF (10G)
- CANARIE IP Network

Connections:
- Dedicated 1G
- (10G)
- (Shared 10G)
- (Shared 10G)
- (Shared 10G)
Canadian Sites: happy so far

• All sites feel well served by the R&E Networking community.

• In 2012 we moved from using point-to-point circuits to connect TRIUMF - Canadian Tier2s to using the LHCONE within Canada.
  • immediately boosted path utilization and increased performance
  • prevented East coast T2s from communicating with each other via TRIUMF 4000 km away.
  • 2013 CANARIE provisioned a second, dedicated 10G circuit for LHCONE in Canada
  • Additional 10G to TRIUMF LHCONE being added now.
Concerns for the Future: TRIUMF Backup

• Today backup is provided by a 1G circuit on a separate path from primary 10G.
• 1G no longer a workable capacity
• 10G backup fail over path is expense Vancouver to Geneva
• TRIUMF LHCONE capacity continue to grow
• **Can we use LHCONE as backup?**

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Last month primary 10G was down 9 times, totalling 11h 38m on backup path.
Networking for Infrastructure-as-a-Service

ATLAS Cloud Operations already running on ~15 IaaS Cloud around the world

Effort from personnel at many sites

No specialized networking available at these sites, and the number of sites is sure to grow

I/O already limits the types of jobs we can run at these sites.

How do we deliver the LHCONE to IaaS sites on demand?
Grab Bag of collected concerns

• How soon will 100G be the requirement to be a ‘first class’ site. Some T2s already there.

• If a point-to-point service evolves will it be practical to implement for T2s where human resources are thin on the ground?

• People are interested in the P2P discussions, but are having a hard time following the discussions on the mailing lists.

• CANARIE and Regional networks would like to know what they need to prepare for if P2P functionality becomes a requirement for sites.
Grab Bag continued

Leslie Groer Canada Tier 2 Sites Coordinator:

“A concern I have that is not always reflected in any explicit resource planning from the experiments is what the network capability needs to be for a T2 site. This is not just pure bandwidth but the peer-to-peer performance on individual and aggregate file transfers (which is what really matters) to all the other sites. The T2D requirements from ATLAS a few years ago were somewhat ad-hoc and there were never any specifications we could have used in planning the various facilities. We have projections that go out a few years for CPU and storage; there should be similar projections for network requirements and performance.”
Summary

- Canadian sites have been well served thus far by R&E Networking community
- LHCONE L3VPN been very beneficial to sites within Canada, especially internally
- Backup over long distance for T1 is expensive, looking for better solutions
- How can we deliver specialized LHC networking to IaaS sites?
- Better specifications of Tier 2 to disk-to-disk transfer performance
Backup Slides
Software Defined Network Testbed

- HEPnet has established a SDN testbed to explore capabilities offered by SDN in particular OpenFlow.

- Dedicated switch hardware and network put in place and paid for by BCNET, CANARIE and Cybera.

- Goal is also to help Canadian R&E networking community gain familiarity with SDN.

- Came online mid October.
SC13 SDN Demo


• Link Layer Multipath Switching

• [http://supercomputing.uvic.ca](http://supercomputing.uvic.ca)