Multi-Domain High-bandwidth SDN

Booth #3315
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ExoGENI Deployment Worldwide
Connectivity and Collaborations
The ExoGENI Rack

- VPN Gateway - Juniper SRX100
- Management Switch - Dell Force10 S55
- OpenFlow Switch - Dell Force10 S4810P
- Head Node - Dell R620
- Compute Nodes - 8 x Dell R620
- Storage Node - Dell R720
ExoGENI extended
ANA-200G: 100G Production Ring across North Atlantic for R&E

Open Exchange Points & Links
- MAN LAN
- WIX
- NetherLight
- GEANT Open London
- Internet2
- TGN-Atlantic South
- NORDUnet/SURFnet
- Hibernia Atlantic

ANA-100G Production Network: A 100 Gbit/s production quality ring across the North Atlantic for Research and Education. Collaborators: Internet2, NORDUnet, CANARIE and SURFnet.

Figure by Erik-Jan Bos (NORDunet)
Ciena Environment for Network Innovation (CENI)

Key 2015 Objectives:

- Develop 8700 for EXO GENI applications.
- Complete, international acceptance testing†
- Set up Additional C-GENI rack in Baltimore
- Key Events: GENI conf. Washington, Vectors, SC15, Austin
- Explore role of reliable, secure Carrier Ethernet
- Optical GENI to up GENI capacity
- SDX Switch project w/ University of Amsterdam

Key Enablers

- Vehicle to allow Ciena to participate in external cutting edge research on next generation virtualized cloud resources & networking
- 8700 takes GENI beyond OpenFlow
- Runs on Ciena’s research on demand network between Hanover, Ottawa, Chicago & Europe
- †Grad Students being trained on C-GENI
- Ciena’s high performance networking product

CENI Ottawa System Specifications

- 8700 4 Slot with 560G of L2 Capacity
  - 4x40G (2 PSLM-200-2)
  - 2x100G (1 PSLM-200-2)
  - 20x10GE (1 PSLM-200-20)
- 10 Dell Servers
  - 180 Physical Cores -> approx. 330 Virtual Core Machines
  - Running Linux RedHAT 6.0
  - Up to ~ 80 VMs (using 4 Cores each.)
  - 608 GB of Physical RAM -> approx. 1.2TB VRAM
  - 6 TB of HD-> more than 12TB Virtual Disk Capacity
- 100GE Upload Capacity, first of its kind for GENI
- 20GE in Management Ethernets ports (approx 48 ports) via 5142 and 5150)
- All DC powered (approx. 100A)
- 175 Public IP addresses on CANARIE Network

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Server Rack Live, from Ciena R&D Ottawa Canada
High bandwidth slices