SC26 Network Research Exhibition: Preliminary Abstract

Coherent Pluggable Enterprise Bandwidth

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Abstract

This demonstration will aim to deliver multiples of the bandwidth that was available to NRE demonstrations in previous years. The focus is exploring and exploiting the multiplied bandwidth newly available to enterprise networks through the breakout availability of Tbps coherent communications channels that can ride open optical line systems straight through to the enterprise data center network. These coherent channels are able to bypass the cost and complexity of intermediate networks and land dramatic network bandwidth directly in the data center and direct access to spectrum services provides other important value to certain missions.

Goals

A primary goal is to deploy coherent pluggables (including 400G, 800G and hopefully >800G) hosted in data center switches and use these to build Tbps network connections from remote data centers in Chicago and VA/DC directly into data center switches in our SC26 booth. We aim to explore more affordable optical transceiver options for 800G that can be supported by many switch vendors as well as larger line rate options being delivered today by optical networking vendors who previously delivered long haul DWDM capabilities exclusively in optical networking gear. We expect to have 800G switches this year.

Impacts

The expected outcome of this NRE is continue building a first-hand practical understanding of architectural and technical issues, tradeoffs and unique value involved in these new technology options for network bandwidth. We expect to demonstrate an affordable streamlined coherent pluggable approach to data center bandwidth that reduces cost and leverages the powerful Optical Line System investments already made by many organizations.

Resources

For this set of demonstration goals, we will need to cooperate and collaborate with SCinet WAN folks, research networks providing open optical line systems (OLS) such as Internet2 and ESnet, and vendors providing coherent pluggable technologies. Initial network submission NRI103.

Here are some details:

- Primary locations: JBDT at MAX in McLean, VA; StarLight at NWU, Chicago, IL; SC26 in Chicago, IL
- Optical connections from research network OLS
- Multiple paths between locations to support the needs of a number of NREs which will exploit the increased bandwidth.
- Engaging with vendors to augment and expand

Involved Parties

- StarLight, Joe Mambretti, Jim Chen
- CENI (Marc Lyonnais, Scott Kohlert)
- SCinet WAN
- Internet2, ESnet, ESnet Testbed
- Naval Research Laboratory (NRL)
- Network equipment vendors (Cisco, Arista, Ciena) and other collaborators

JBDT SC26 WAN (NW iCAIR, NRL)

- Primary locations:
  JBDT at MAX in McLean, VA;
  StarLight at NW, Chicago, IL
  SC26 in Chicago, IL
  ESnet TB in Berkeley, CA
  CENIC DTN in LA, CA
  UCSD in SD, CA
- Bandwidth to support multi-Tbps application flows
- Multiple paths between locations to allow more concurrent activities and network control/restoration test/demos (multiple – time shared – with full restoration options)
- 800G Gen5 data transfer systems established at StarLight, Mclean, Berkeley by iCAIR, NRL, NASA (adding new Gen5 NVMe systems)
- Negotiating Gen6 early access systems
- Expecting 800G switches
- Engaging with multiple vendors to augment and expand

