

SC25 Network Research Exhibition: Demonstration Publishable 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. As in previous years, we aim to accomplish a number of NRE demonstrations in the StarLight booth and other SC25 booths that will capitalize on all of the resources SC25's SCinet brings.

Goals

A primary goal is to deploy coherent pluggables (including but certainly not limited to 400G and hopefully 800G) hosted in data center switches and use these to build Tbps network connections from remote data centers in Chicago and DC directly into data center switches in our SC25 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.

Impacts

The expected outcome of this NRE is a first-hand practical understanding of architectural and technical issues and tradeoffs 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 NRI103s1.

Here are some details:

- Primary locations: JBBDT at MAX in McLean, VA; StarLight at NW, Chicago, IL; SC25 in St. Louis, MO; (perhaps including ESnet TB Berkeley, CA)
- Direct 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

Notes for diagram below:

- The Coherent Pluggable SCinet WAN Circuits we were able to plan are WC13A and WC13B which are 400G connections between StarLight in Chicago and Booth 3131 at SC25 in St. Louis.
- WC13A will have a Cisco 400G switch at each end of the link with Cisco Coherent Pluggable transceivers.
- WC13B will have a Ciena 400G switch at the StarLight, Chicago end of the link and an Arista switch at the SC25 Booth 3131 end of the link. The transceivers at both ends will be Ciena Coherent Pluggable transceivers.

