



Joint Engineering Team (JET) Meeting Minutes

National Coordination Office for Networking and Information Technology R&D (NCO/NITRD)
490 L'Enfant Plaza SW, Suite 8001, Washington, DC 20024

May 17, 2022, 12:00-2:00 p.m. ET

This meeting was held virtually

Participants

Shawn Armstrong, University of Alaska
Nick Buraglio, ESnet
Bobby Cates, NASA Ames
Steve Corbató, Link Oregon
Basil Decina, NRL
Jonah Keough, PNWGP/Pacific Wave
Bill Fink, NASA/GSFC
Pat Guenther, US Ignite

Michael Lambert, PSC/3ROX
Paul Love, NCO/NITRD
Joe Mambretti, StarLight/MREN
Linden Mercer, NRL
Aruna Muppalla, NASA/GSFC
Mark Mutz, NOAA
Glenn Ricart, US Ignite
Kevin Thompson, NSF

Proceeding: This meeting was chaired by Kevin Thompson (NSF).

I. Action Items:

- Final updates from Internet2 and ESnet on their respective new networks.

II. Review of the Minutes of the April 2022 meeting: One correction was received via email and incorporated into the posted minutes.

III. An Update from Link Oregon– Steve Corbató

The slides for this talk are posted on the JET's web page:

<https://www.nitrd.gov/coordination-areas/lsn/jet/jet-meetings-2022/>

A. Link Oregon (LOR) basics:

- a. LOR supports both education (K-12 and higher education), state government, Tribes, libraries, healthcare and non-profits.
- b. Its primary services are internet transit and Ethernet transport.
- c. LOR is a non-profit focused on its member's needs.
- d. It uses dark fiber wherever it can.
- e. LOR's primary ring – Portland, OR; Eugene, OR; and Boise, ID – is a bonded pair of 100GbE circuits.
 - i. LOR is collocated with IRON in Boise and connects to Internet2 there. No services are offered in Idaho.

B. Phase 3 plans:

- a. Build multiple rings to connect the northern and central coastal regions with several segments across the Coast Range for resiliency.

- b. Connect additional communities in eastern Oregon.
 - c. Add critical resiliency for southern Oregon with California (CENIC) or Nevada (NevadaNet). The potential collaboration would be a \$3.25B project. Possible corridors (west to east) are along US 101 (coast), I-5, US 395, US 97 and US 95. This resiliency project may be covered by the federal government's support for enhanced broadband.
- C. Usage of Low Earth Orbit satellites
- a. Given Oregon's geography & demographics there are locations where high capacity terrestrial connective will not be affordable for many years.
 - i. One is the Mist Elementary School. It was scheduled to receive e-rate fiber. The provider couldn't deliver the service. With the issues of remote learning due to COVID the school needed more than the DSL it had. SpaceX's Starlink stepped in to fill the gap. The school is between Portland and the coast, a former logging and agriculture community. LEO user's antenna need a pretty clear view of the sky (down to about 25° above the horizon – the school's athletic fields provided it.
 - ii. A second is the Pine Mountain Observatory which is a teaching astronomy site outside Bend, OR. Very remote, very low population density. The site has power and 3 mbps connectivity – not even enough for remote control of the teaching telescopes. Initially SpaceX said there were too few people in their cell (22 mile hexagon) so a very large fee to light it up. As the year progress the observatory was able to connect for the standard institutional rate.
 - b. As a note. SpaceX/Starlink is very much focused on selling to end users. No government sales division, no organizational contracts. And no reselling by a customer.
 - c. Q&A/Comments re: Starlink.
 - i. Nick Buraglio: ESnet is working on getting direct peering with Starlink with the initial one at Pacific Wave. Starlink is in a lot of exchanges and its peering group is very big on community peering. A very good chance if you're in a POP Starlink is in it'll peer with you.
 - ii. ESnet is bringing up a lot of 5G nodes that are off the beaten path to support remote sensors. No reasonable way to backhaul them so ESnet is working with Starlink to use it as the backhaul.
 - iii. Steve: What a great driver for distributed science. A researcher can focus on the science – and no longer needs to think about the connectivity to upload the data.
- D. Statewide eduroam project:
- LOR is seeking to become an eduroam Support Organization (SO). This will let LOR sign an agreement and pay one fee that will cover all of the K-12, museums and libraries in Oregon. As an SO LOR would provide Tier 1 support along with managing the needed contracts and invoices for its members. LOR has been selected for the 2022 cohort of eduroam's on-ramp program. In the first year LOR will be able to support five school districts.

- E. Broadband
 - a. Due to CARES Act funds that have helped with LOR's expansion into southern and eastern Oregon LOR has developed relationships with some state legislators who look to LOR as a neutral source of information relate to broadband.
 - b. The American Rescue Plan Act set aside \$10B for broadband and the Infrastructure Investment and Jobs Act another \$65B.
 - c. The broadband program is now very comparable to Rural Electrification. That started in the 1930's but it was not just a Depression Era program. After a pause for WWII it went into the 1950s before completion. The new push for providing broadband will continue for several years, not be a quick program as the BTOP effort was a decade ago.
- F. Preparing for the coming years of broadband investments
 - a. Set ambitious targets statewide (with thanks to Steve):
 - i. Establish progressive broadband thresholds → 100 Mbps up & down
 - ii. Develop long-term broadband mapping capability
 - iii. Maximize availability & adoption
 - iv. Integrate sustainability & accountability
 - v. Open access for predominantly publicly funded network assets
 - vi. Workforce development.
 - b. Develop strategic regional approaches (with thanks to Steve):
 - i. Leverage Broadband Action Teams (BATs)
 - ii. Develop rich, accurate mapping data
 - iii. Fiber first designs as they are the most future-proof investment, but integrate fixed wireless and LEO satellite where needed
 - iv. Consider public private partnerships
 - v. Invest in more Internet exchanges (hardened locations, fiber interconnection)
 - vi. Identify middle-mile fiber gaps and resiliency risks.
 - c. LOR is working with economic development districts which it's found are very effective, good at writing grants, and know how to get things done.
- G. LOR is working with Oregon Tribal leaders to convene a series of Tribal Broadband Summits with leaders, IT staff, representatives from state and federal agencies, and experts from higher education. The summits:
 - a. Identify through discussion practical strategies to identify roadblocks and successes.
 - b. Develop initiatives to build sustainable broadband infrastructure which will be led by the Tribes. NTIA administers a Tribal broadband connectivity program.
 - c. Help to establish trusted partnerships by developing a community of practice. This leads to advancing digital equity and access for the Tribal communities.
 - d. Have led to an Oregon Tribal Broadband Bootcamp will be held at the University of Oregon in August.

IV. Discussion of the JET's tasking on tools to help with inter-domain issues – Joe Breen (via email)

This is a community project to collect shared data from all who are willing to share.

The related, live map is at: <https://www.globalresearchmap.org/>

- The project continues to make progress with the data it has.

V. Operational network security roundtable: No updates were received.

VI. Network roundtable

A. ESnet (Nick Buraglio):

- ESnet is continuing the ESnet6 brownfield upgrades – replaces routers at sites, bring in the out-of-band management solution, etc.
- ESnet has a robust IPv6-only trial running in its data center area. It is getting more ESnet staff comfortable operating a network without any IPv4 and gaining a fair amount of operational experience that can be shared back with the ESnet community.

B. NASA/GSFC (Bill Fink): No update today.

C. NRL (Linden Mercer): NRL is working with its collaborators at StarLight (SL) and NASA/GSFC and engaging with SCinet's WAN team on the needed wide area circuits to support planned SC demonstrations. This is especially the case between SL and Joint Big Data Testbed space in McLean, VA. NRL is also working with the ESnet Testbed team for connectivity between SL and Berkeley, CA.

D. Pacific Wave (Jonah Keough):

- Pacific Wave (PW) has completed its west coast backbone upgrade and has migrated sites to the new Ciena gear.
- PW continues work on route serves with some of its partners.
- PW is continuing work on its IGROK servers for improved monitoring. It has the initial three nodes up collecting data and providing some internal traffic flow analysis. PW is evaluating additional locations.

E. PSC/3ROC/XSEDE (Michael Lambert): 3ROX's Fabric node is on order with an indeterminate delivery date. 3ROX is working out how to supply the precise time signals for the node given the usual issues of antennas in a data center.

F. University of Alaska (Shawn Armstrong): Nothing for this month. Hopefully next month we will be able to give an update of the plans for the new Intra- and inter-state WAN circuits for the university.

G. US Ignite (Glenn Ricart): No report today.

VII. Exchange Points Round Table

A. PNWGP (Jonah Keough): No update today.

B. Ames (Bobby Cates):

- Ames continues to work with DREN on its transition to Verizon circuits for the new DREN 4.

- b. Ames is also continuing to work on the transition of USGS to Moffett Field. The new tower for USGS has been installed and USGS's wireless network at Moffett is being rolled out.
- C. StarLight (Joe Mambretti):
 - a. StarLight (SL) continues working with Singapore and KAUST to bring up an open exchange based on NSI giving an AutoGOLE. These will take advantage of the 2x100G circuits that KAUST has to both Singapore and NetherLight in Amsterdam. It will complete an AutoGOLE global ring. Both KAUST and Singapore are considering doing SC showcases.
 - b. As NRL mentioned, SL is working with it and NASA/GSFC for circuits to support the Joint Big Data Testbed facility at McLean, VA. A 1.2 Tb ring has been requested between SL, McLean and SC (Dallas, TX).
 - c. SL is developing several Network Research Exhibit demonstrations for SC, many of which will use the requested ring. Many will focus on 400G switching, edge servers and NICs.

Meetings of Interest 2022

Note: Meetings whose format has changed have been updated.

Jun 6-8	NANOG 85 , Montréal, QC, Canada, hybrid
Jun 13-17	TNC22 , Trieste, Italy, primarily in-person with a basic remote option
Jul 10-14	PEARC22 , Boston, MA
Jul 23-29	IETF 114 , Philadelphia, PA
Aug 22-26	APAN54 , Jinan, China, primarily virtual with possibly limited local attendance
Sep 19-21	National Science Foundation Campus Cyberinfrastructure PI Workshop , Minneapolis, MN
Sep 20-22	The Quilt Fall Meeting , Minneapolis, MN
Oct 10-11	Global Research Platform Workshop , Salt Lake City, UT
Oct 11-14	ESnet Annual User Meeting , Berkeley, CA
Oct 17-19	NANOG 86 , Hollywood, CA
Oct 20-21	ARIN 50 , Hollywood, CA
Nov 5-11	IETF 115 , London, UK
Nov 13-18	SC22 , Dallas, TX
Dec 5-8	Internet2 Technology Exchange , Denver, CO
<u>2023</u>	
Feb, dates TBA	APAN55 , Nepal

Next JET meetings

Note: It is anticipated that JET meetings will remain virtual for the foreseeable future

Jun 21, 2022	12-2 p.m. ET
Jul 19, 2022	12-2 p.m. ET
Aug 16, 2022	12-2 p.m. ET