



### 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

September 15, 2020 12:00-2:00 p.m. ET

This meeting was held virtually

#### **Participants**

Shawn Armstrong, University of Alaska

Joe Breen, UTEN/University of Utah

Tony Brock, Oregon State University

Rich Carlson, DOE/SC

Bobby Cates, NASA/Ames

Steve Corbató, Link Oregon

JJ Jamison, Juniper

Mark Johnson, University of North Carolina

Kevin Kranacs, NASA/GSFC – EOS

Ann Keane, NOAA

Michael Lambert, PSC/3ROX

Paul Love, NCO/NITRD

Bryan Lyles, ORNL

Howard Lu, NIH

Joe Mambretti, StarLight/MREN

Linden Mercer, NRL

Alex Moura, RNP

Ed Moynihan, Indiana University

Aruna Muppalla, NASA/GSFC

Frank Seesink, University of North Carolina

Kevin Thompson, NSF

George Uhl, NASA/GSFC

**Proceeding:** This meeting was chaired by Kevin Thompson (NSF) and Rich Carlson (DOE/SC).

#### **I. Action Items:**

- ESnet update on its operational network security use of Rapid7.
- Internet2 and ESnet updates on their respective new networks.

**II. Review of the Minutes** of the August meeting: Corrections were received before the meeting.

#### **III. Update on the Link Oregon Project – Steve Corbató**

*For reference, the slides for this talk are online at:*

<https://www.nitrd.gov/nitrdgroups/images/c/c1/JET-Steve-Corbat0-09152020.pdf>

- A. Link Oregon (LO) is a 501c3 consortium whose core is the state's four research universities (Oregon Health & Science University, Oregon State University, Portland State University, and the University of Oregon(UO)) and the state government.
- B. Statewide dark fiber network of 2,700 route mile.
- C. Supports public and non-profit organizations:
  - a. PreK-12 education.
  - b. Higher education.
  - c. State EIS, ODOT, state library and Oregon Broadband Office.
- D. LO seeks partners in the telecommunication sector that are investing in their communities and that will sell dark fiber (currently six providers are participating).

- a. It's anticipated that the existing statewide networks of its core members will migrate onto LO as it's built out.
  - b. LO has assumed the responsibility for Oregon's previous R&E network, NERO. Its two engineers have joined three others at LO.
- E. LO is partnering with campus researchers to support field science including wildfire and seismic detection (AlertWildfire and ShakeAlert at UO). Part of this support for field science is LO's installing additional add/drops (approximately every 60 miles), especially in less developed parts of the state, to support the detectors needed. These will also support and stimulate the expanded availability of broadband in Oregon's more rural areas. This enhanced availability can provide the underpinning for an envisioned Oregon Learning and Telehealth Network.
- F. LO received \$8.39M in CARES Act funding which has significantly accelerated its build out.
- G. LO offers two basic services:
  - a. Ethernet based statewide transport.
  - b. Internet transit. It is currently carrying ~250Gbps to Internet2, CENIC and the commercial internet.
- H. Link Oregon engages in local peering - NWAX (metro Portland), WIX (Eugene), SIX (Seattle).
- I. For last-mile Link Oregon is engaged in partnerships with commercial and municipal providers.
- J. With the CARES Act funding (and its end of 2020 deadline) LO expects to complete all deployments for its Rings A-E by year's end.
- K. Selected hardware:
  - a. Optronic: Fujitsu
  - b. Routers: Arista
- L. Along the coast for Phase 3 LO is initially focused on a path to the coast around Astoria, OR, then coming south to Newport, OR, (which is already connected to Corvallis OR). LO would also like to establish circuit from the Hillsboro, OR, area to the Tillamook, OR, area. This will start a series of small rings across the Coast Range. Another path to the coast is from Eugene, OR, to Florence, OR. A total of 5 routes across the Coast Range. The southwest corner of the state will be harder. LO is investigating options with its telecom partners and having discussions with CENIC as CENIC has a need to get to Crescent City, CA.
- M. LO, as part of a COVID driven consortium of the west coast states, is engaged in broadband discussion. What are the "right" up and down speeds. Washington state has set the goal of symmetric 200 megs by 2028 for residential and small business.
- N. Fixed wireless is used extensively in southeast OR by the small rural and remote school districts. The University of Oregon's wildfire detection system (AlertWildfire), developed in conjunction with the University of Nevada, Reno, uses an overlay on these fixed wireless assets. LO's extensive add/drop points will be used to connect many of these fixed wireless systems. LO is investigating using fixed wireless to reach UO's teaching telescope on Pine Mountain.

- O. LO is tracking the new, super-LEO satellite constellations just being deployed to reach locations that can't be served by any other practical means – mountainous areas in the southwest and northeast areas of the state and very remote locations in Oregon's Great Basin. These satellites may also be used to reach environmental and ecological sensors.

#### IV. Discussion of the JET's tasking on tools to help with inter-domain issues - Joe Breen, all

Work has slowed as many participants' institutions have large CARES Act projects with approaching deadlines. Many also have start of school moratoriums along with returning students.

##### A. Prototype/pilot status:

- a. The University of Michigan pilot is expanding across its backbone.
- b. Utah is migrating to a Telegraf container and expanding to collect information from all its DTNs.
- c. NCSA is just been able to rejoin (when it had to halt it was already doing all streaming telemetry). The project is anticipating expanded work at NCSA.
- d. Due to work by Andy Lake and the ESnet team, the parallel visual traceroute effort has added the capability to traverse both the ESnet and Internet2 backbones, pickup each interface, know what the interface's speed is rated at and display statistics from the interface. A good extension for inter-domain issues.
- e. Discussions resume tomorrow with Clemson on a possible pilot there.

B. A few comments on the draft Letter of Intent to Share are still anticipated.

##### C. Background on efforts lead by Eric Boyd, Joe Breen, James Deaton, Dan Doyle, Dale Finkelson and Karl Newell:

- a. The project gets basic SNMP metrics from groups around the country that are willing to share for trouble shooting and research. Metrics include link utilization, discards and errors. These are collected hop by hop as the path crosses multiple domains.
- b. Several prototypes are going along with the drafting a basic letter of intent for those wishing to participate.
- c. Tools: Telegraf container as an option for local collection. Nearly ready for production use.
- d. Tracking sheet of networks willing to share data. Please update your network's entry. See:  
[https://docs.google.com/spreadsheets/d/1pMW\\_PNVpeT42nAxa3bW4QostMxcHTXkWSPbZOpIFwE/edit#gid=0](https://docs.google.com/spreadsheets/d/1pMW_PNVpeT42nAxa3bW4QostMxcHTXkWSPbZOpIFwE/edit#gid=0)  
The spreadsheet also has an embedded link to measurement templates for campus, regional and national networks setting out what data is desired. See:  
<https://drive.google.com/drive/folders/1l-LRyri6u4AvBeY6NlvYYaINRpiByA>
- e. The Internet2 Performance Working Group Community Measurement, Metrics, and Telemetry project holds meetings on the second Tuesday for those participating or interested. If you are interested, please contact Joe:

[Joe Breen <Joe.Breen@utah.edu>](mailto:Joe.Breen@utah.edu)

- f. While NASA polices preclude EOS from sharing this data, EOS has an internal perfSONAR (pS) mesh. They are happy to open their firewalls to permit pS testing by prior arrangement. Contact George at:

["Uhl, George D." <george.d.uhl@nasa.gov>](mailto:george.d.uhl@nasa.gov)

#### V. Operational network security roundtable

- A. ESnet (Nick Buraglio via email): Prototyping our address space sinkhole is done and works as expected.

#### VI. Networks Round Table

- B. ESnet (Nick Buraglio via mail): ESnet6:
  - a. Packet RFP: Nokia won. ESnet will be deploying SR2s at each location for both the large and smaller routers. Port configurations will differ. The NFM-P platform will be used for CPE.
  - b. ESnet expects to migrate to next-hop LDP (vs hop-by-hop) very soon. This should be largely transparent and will solve some route churn it has been seeing in a few topological scenarios.
- C. International Networks – Indiana University (Ed Moynihan): All TransPAC and NEAAR circuits are stable. Current projects are going well. Indiana University’s International Network (IUIN) group continues to work on performance/routing improvements with its partners.
  - a. IUIN’s proposals to the NSF to improve upon NEAAR and TransPAC have been funded for an additional five years.
    - i. NEAAR will procure a second 100G trans-Atlantic link. This is in addition to the current New York, NY<>London circuit. INIU will continue its partnership with the UbuntuNet Alliance in Africa. INIU will add an additional enhanced partnership with the ANA consortium and work with NORDUnet to support Artic science.
    - ii. TransPAC will maintain the existing Seattle, WA <> Tokyo 100G link. INIU will procure a new 10G link from Guam to Hong Kong or possibly a different location in southeast Asia. The exact landing is still to be determined. IUIN will also continue its existing partnerships in the region via the APR consortium.
  - b. GOREX’s move to its new location remains a work in progress due to COVID-19.
- D. NASA EOS (Kevin Kranacs): Due to COVID-19 just sustaining operations.
- E. NASA GSFC (George Uhl): No update today.
- F. NIH (Howard Lu): No update today.
- G. NOAA/N-Wave (Ann Keane): No update.
- H. NRL (Linden Mercer): NRL is determining what network centric demos it can do during the virtual SC20. Very much still a work in progress. If you’d be interested in collaborating, please contact Linden.
- I. Pacific Wave (Jonah Keough via email):
  - a. Pacific Wave (PW) received continued funding from the NSF, supporting ongoing operations and new activities including:

- i. Capacity upgrades to support 400G and higher
    - ii. An access point in Fairbanks, AK, in support of Arctic research
    - iii. An access point in Guam, incorporating GOREX.
  - b. Coordinating with partners on extensions of the Asia-Pacific Ring.
  - c. PW is finishing the upgrades to Juniper MX10k platform on the west coast.
- J. RNP (Alex Moura – in-person and via email): RNP is primarily dealing with COVID-19 and access for students. The network is operating normally.
  - a. Low income students at Brazil’s public universities will receive SIM cards funded by the government for access over participating mobile operators.
  - b. 100G upgrades for the core network continue.
  - c. As part of RNP’s “Connect the North” project a 100G circuit is being brought up this week between the states of Pará (Belém) and Amapá (Macapá). It makes use of fiber on the Tucuruí transmission line through a partnership with Telebrás.
  - d. RNP has completed its enrollment in the MANRS initiative with the registration of its 39 IP blocks.
  - e. RNP’s project to develop an automated solution to share network data for research kicked off August 1<sup>st</sup>.
  - f. The ninth RNP Forum will be held virtually this year (October 19-21).
- K. 3ROX (Michael Lambert): No updates for 3ROX, XSEDE or PSC.
- L. University of Alaska (Shawn Armstrong): No network updates.
- M. UETN/University of Utah (Joe Breen):
  - a. Hardware is arriving to upgrade all their science DMZs to 400G.
  - b. They are upgrading all their perfSONAR and DTNs to multiple 100Gs.
  - c. They are migrating the metro ring to 400G and upgrading the rest of the network to 100G rings (currently only portions are 100G).
  - d. UETN is deploying a 5G capable core to try to solve the last mile needs for K-12 students. This is both for the immediate COVID-19 issues and for the longer-term needs.

## VII. Exchange Points Round Table

- A. StarLight (Joe Mambretti):
  - a. StarLight (SL) is continuing its work with NRL & GSFC for demos during the virtual SC20.
    - i. It is anticipated that a 400G circuit will run from Washington, DC, to SL and thence to Ottawa, ON.
    - ii. Several 100G circuits will also be used for SC20 related demos.
    - iii. An SC20 workshop is tentatively planned at which results of the demos will be presented.
  - b. SL has been doing experiments with CERN on the FNAL lead project to develop a software stack combining FNAL’s Big Data Express data mover with the Rucio data manager and DOE’s SENSE data orchestrator. The results have been written up and submitted to INDIS.
  - c. SL continues to work with SURFnet on NSI using the RNP developed MACAN toolset for dynamic provisioning between the open XPs. This is migrating from

the trial/prototype stage to production among the XPs. The results to date will be presented at tomorrow's LHC network meeting.

- B. Ames (Bobby Cates): Fairly quiet.
  - a. New emergency communications facilities have been installed.
  - b. Determining what is needed for the direct connected San Jose facility to make it TIC 3.0 PEP compliant.

#### VIII. Concluding discussion of the JET's possible tasking from the LSN for CY2021

The JET initially discussed possible tasking for CY2021 at its August meeting. These suggestions were again reviewed. After discussion they were accepted. They will be submitted to the LSN for consideration during the LSN's October 13, 2020 planning retreat. For reference they are:

- A. Possible JET tasking from the LSN for CY2021
  - a. Ongoing JET tasks:
    - i. Assist in the planning of technology and application demonstrations of SDN & Big Data at SC21
    - ii. Technology tracking: perfSONAR, SDN/SDX/SDI, Science DMZs, network automation & orchestration, and segment routing
    - iii. Hold two meetings collocated with R&E networking community conferences:
      - 1. Internet2 Global Summit (18-21 April)
      - 2. SC21 (November)
    - iv. Continue to schedule meeting round tables of updates on members' networks, operational network security, exchange points and meetings of interest to the community
    - v. Continue coordinating the development of tools to monitor cross-domain workflows and automate the detection of transport issues. Additionally facilitate the sharing of measurement data between networks - anonymized as needed.
  - b. Potential JET Workshop: TBD

#### **Meetings of Interest 2020**

*Note: Meetings cancelled since the September JET have been removed from this list. Those moved to a virtual format have been updated.*

Sep 16-17	<a href="#">LHCOPN/LHCONE meeting #45</a> , virtual meeting
Sep 30 – Oct 1	<a href="#">The Quilt Fall Member Meeting</a> , virtual meeting
Oct 6-7	<a href="#">TechEXtra</a> , virtual meeting
Oct 14-15 & 23	<a href="#">ARIN 46</a> , in person cancelled, moved to a virtual meeting
Oct 19-21	<a href="#">Fórum RNP 2020</a> , virtual meeting
Oct 19-21	<a href="#">NANOG 80</a> , in person cancelled, moved to a virtual meeting
Oct 22-23	<a href="#">ESCC</a> , virtual meeting
Nov 2	<a href="#">TechEXtra: perfSONAR Day</a> , virtual meeting
Nov 9-10	<a href="#">SC20 Tutorials</a> , virtual meeting
Nov 11-13	<a href="#">SC20 Workshops</a> , virtual meeting
Nov 14-20	<a href="#">IETF 109</a> , in person cancelled, moved to a virtual meeting

Nov 16-19                    [SC20](#), in person cancelled, moved to a virtual meeting  
Jan 17-20, 2021            [PTC'21](#), Honolulu, HI

**Next JET meetings**

*Note: It is anticipated that JET meetings into CY2021 will be virtual due to COVID-19 guidelines.*

Oct 20, 2020    12-2 p.m. ET

Nov 17            12-2 p.m. ET *n.b.: Date & time tentative. Dependent on SC20 schedule.*

Dec 15            12-2 p.m. ET *n.b.: Will be held if needed.*

Jan 19, 2021    12-2 p.m. ET