



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
April 18, 2023, 12:00 – 2:00p.m. ET
This meeting was held as a virtually

Participants

Jeff Bartig, Internet2
Dale Carder, ESnet
Bobby Cates, NASA/Ames
Basil Decina, NRL
Scott Kohlert, Ciena
Paul Love, NCO/NITRD

Ralph McEldowney, DREN
Linden Mercer, NRL
Aruna Muppalla, NASA/GSFC
Kevin Thompson, NSF
Chris Tracy, ESnet

Proceeding: This meeting was chaired by Kevin Thompson (NSF) and Ralph McEldowney (DREN).

I. **Action Items:** (none pending)

II. **Review of the Minutes of the March 2023 meeting:** Received corrections were incorporated in the posted final minutes.

III. **OFCnet – Chris Tracy and Scott Kohlert**

The slides for this brief can be found at:

<https://www.nitrd.gov/coordination-areas/lsn/jet/jet-meetings-2023/>

- A. OFC is the Optical Fiber Communication Conference and Exhibition that has been held since 1975. Organized by the Optical Society of America, now called Optica. It's grown from primarily a components tradeshow to a comprehensive conference including a technical program and exhibitions with attendance in the low-mid 10k range. For scale, same order of magnitude as SC.
- B. OFCnet – what is it and where did it come from?
 - a. After the 2019 OFC Optica was challenged by the OFC long range planning committee to make the conference more relevant for networking. The result was OFCnet, planned to be grown over 2 or 3 years. OFC aimed to connect the exhibits and technical program, to showcase the networking aspects of OFC, increase the value to the exhibitors in coming to OFC and draw new exhibitors and participants. OFCnet would allow inter-booth collaborations and demos that reached outside the conference location.
 - b. The plan was for “first light” at OFC 2020. Due to some issue getting fiber into the convention center and then COVID, first light finally happened at OFC 2022

with very modest goals. OFC 2022 was held in San Diego, CA. Basically a proof of concept with a demo designed by SDSC using the external fiber with 2x800G. Some capacity was test traffic with 2x100G to UCSD/SDSC for the demo. Partners were Optica, Lumen, CENIC, Ciena, Smart City, EXFO and Viavi.

- c. Those seeing this sort of remote demo for the first time, who stopped and learned what was being done, thought it was pretty incredible. They had no idea of distributed compute and the interconnectedness of the global research community.
 - d. Questions on OFCnet 2022:
 - i. How often is the conference in San Diego and how much is reusable?
Answer: Until now it has rotated between locations. For the last 15 years or so, in California between Los Angeles, San Diego and San Francisco Bay Area. It will return to San Diego in 2024 but then moves. For 2025 and beyond folks are already working on getting the needed infrastructure in place.
- C. OFC 2023: Official Pilot Year for OFCnet
- a. Goals for 2023
 - i. Aim for some of the goals from the original three project with a jump in scale from 2022.
 - ii. Find more volunteers to design and build OFCnet.
 - iii. Expand the number of vendors asked to loan equipment.
 - iv. Greatly expand the number & location of demonstrations
 - b. To help with the expansion, OFCnet 2023 provided:
 - i. For demonstrations which didn't have a "home booth" OFCnet provided space and power.
 - ii. Expanded fiber connectivity to the outside: one pair for high bandwidth connectivity to the R&E community and two pairs for optical research demos.
 - iii. Dark fiber within the San Diego Convention Center (SDCC).
 - iv. Commodity internet for those demos that needed it. (General commodity internet was provided by Smart City for both wireless and wired connections.
 - c. Eleven organizations provided 24 OFCnet volunteers. Ten organizations provide the needed equipment.
 - d. OFCnet 2023 architecture
The architecture is shown in slide 11 of this talk's deck which is posted on the JET's web page. It is also in the Appendix at the end of these minutes.
 - i. Lumen's provided 3 pairs of dark fiber reaching from SDCC to their POP on Aero Drive in San Diego. For R&E connectivity CENIC carried it from there to UCSD/SDSC and ESnet carried it from the POP to the larger R&E community.
 - ii. Of the two pairs used for optical experiments one was used for quantum networking and the other for fiber sensing – basically using the fiber as an instrument. It acts as a sort of interferometer where you could

measure stresses on the fiber. A fiber cut, or something driving over the fiber, building intrusion, etc. can be detected.

iii. Some 2023 demos:

1. ESnet provided long haul transport where ESnet interconnected its ROADM's directly with a third party's (Cisco) ROADMs in such a way that multiple wavelengths could be passed. Basically, any chunk of spectrum could be used and carry traffic from the show floor in San Diego across the ESnet optical backbone to SL in Chicago, IL. The demo had 2x200G at 95Gbaud un-regenerated. The use of 200G vs. 400G removed the need for regeneration on the 4,600 km path.
2. ESnet also demonstrated its High Touch (HT) project. ESnet was showing what the HT server with its FPGA hardware saw on the commodity feed in real time and discussed the finding with those who stopped at the booth.
3. ADVA had a ROADM ring on the show floor where it was showing interconnectivity between vendors at the modem level.
4. There were a total of 19 demonstrations at OFC 2023. Most in the two OFCnet provided booth, the balance scattered across the show floor showing a combination of classical and quantum networking.
5. Details of all 19 demos can be found at:
<https://www.ofcconference.org/en-us/home/exhibition-and-show-floor-programs/ofcnet/ofcnet-demonstrations/>

iv. Demonstration highlights (with thanks to Scott & Chris)

1. Many Quantum demonstrations including QKD encryption at 800 Gb/s line rate, quantum entanglement over > 50 km of external fiber, co-propagation of quantum and classical signals.
2. High Performance 400GE flows over a 9300 km WAN.
3. Distributed High Performance Compute clusters.
4. 800GE optics.
5. 400ZR/ZR+ coherent pluggable optic interop.
6. Open ROADM and Open transponder platforms.
7. High Touch line rate packet telemetry.
8. Photonic remote sensing.

v. OFCnet hosted seven different panels in Expo Theater speaking areas on the show floor. All were on topics related to what OFCnet was doing and about the demos.

vi. There was also a BoF to discuss the future of OFCnet which had a combination of academic and industry participation. Lots of ideas with more study needed on what and how to incorporate going forward.

D. What's next for OFCnet?

- a. The OFC organizer, Optica, was very happy with OFCnet in 2023 and the interest it generated for the conference with nearly double the number of demos

anticipated. All involved in OFCnet were interested in coming back for 2024. Overall it was deemed a success (with a good number of Lessons Learned for 2024).

- b. Current plans to upgrade/expand OFCnet for 2024
 - i. More volunteers needed.
 - ii. Will have a formal call for demonstrations.
 - iii. Have a new, breakable network to demonstrate diagnostic tools and troubleshooting.
 - iv. Tighter linkage with the technical program: live demos as part of technical presentations, workshops, and short courses.
- c. OFC 2024
 - i. San Diego Convention Center
 - ii. Technical Conference: March 20-24, 2024
 - iii. Exhibition: March 26-28, 2024
- d. OFCnet 2024 – If you are interested in volunteering, in any capacity, please contact chair: Marc Lyonnais; mlyonnai at cien.com.

IV. JET's tasking on tools to help with inter-domain problem resolution

- Remains on hiatus while Joe Breen is engaged with other matters.

V. Operational Security Round Table:

- A. Internet2 (Jeff Bartig): The security team at I2 is continuing to focus on RPKI. They are doing a lot of community outreach this year with the legacy address holders in the ARIN region trying to encourage them to bring their addresses under an ARIN LRSA agreement. With that they will then be able to use I2's RPKI services.

VI. Network roundtable

- A. DREN (Ralph McEldowmey):
 - a. For DREN 4 180 sites have been tested with 150 transitioned. These are approximately 80% and 70% respectively of the total sites to be migrated.
 - b. All of DREN's cloud connections have been moved from old DREN III network to DREN 4.
 - c. With the mid-June deadline for DREN III's turn down DREN is focused on avoiding any breaks in service. It's working with the providers of both DREN III (Lumen) and DREN 4 (Verizon) on creative solutions where needed.
- B. ESnet (Dale Carder):
 - a. ESnet is evaluating higher density 400G platforms in anticipation of mid-life upgrades for some key routes.
 - b. ESnet's first trans-Atlantic 400G circuit is now up. The other two are scheduled for delivery this fall.
- C. Internet2 (Jeff Bartig): Internet2's (I2) first post-COVID, in-person members meeting, Community Exchange, is coming in 3 weeks – 8-11 May – in Atlanta, GA. Most of the architecture team from Network Services will be there.

- D. NRL (Linden Mercer):
 - a. Thinking about SC23.
 - b. Nothing else to report today.

VII. Exchange Points Round Table

- A. MAN LAN & WIX (Jeff Bartig): Internet2 (I2) is making progress on deploying new devices at both locations. They currently use Juniper QFX 10002s. I2 is planning on replacing those with Arista platforms that will be capable of 400G. Right now I2 is focused on the automation side and getting services ready in NSO to facilitate a smooth migration after the Aristas are deployed.
- B. Ames (Bobby Cates): USGS is now connected to NOAA's N-Wave.
- C. StarLight (Joe Mambretti via email):
 - a. StarLight (SL) is participating this week in several meetings in Europe, including CESNET's annual meeting and the LHCOPN/LHCONE networking workshop.
 - b. SL is also participating in the 11th meeting of the Special Interest Group on Next Generation Networking, whose theme this year is "Large science experiments and networking futures". Speakers will represent several large science communities, including those presenting their future vision and requirements. Other networking experts from the NREN community will present current and future network capabilities. The workshop will conclude with a discussion group to try and map requirements and capabilities, with a goal of enabling scientists and network engineers to be better informed about the future.
 - c. For SC23 SL continues to plan for NREs and discuss networking requirements with the SCinet WAN group.
 - d. SL will participate in the FABRIC/FAB workshop at TACC next week.
 - e. SL will also participate in the Chameleon User Meeting at the University of Chicago the following week.

Meetings of Interest 2022-2023

Note: Meetings whose format has changed have been updated.

Apr 16-19	ARIN 51 , Tampa, FL
Apr 20	HPC Summit , virtual
May 8-11	Internet2 Community Exchange , Atlanta, GA
Jun 5-9	TNC23 , Tirana, Albania
Jun 12-14	NANOG 88 , Seattle, WA
Jul 22-28	IETF 117 , San Francisco, CA
Aug 21-25	APAN56 , Colombo, Sri Lanka
Sep 18-21	Internet2 Technology Exchange , Minneapolis, MN
Sep 25-28	The Quilt Fall Meeting , Columbus, OH
Oct 8-9	GRP workshop at IEEE eScience , Limassol, Cyprus
Oct 16-18	NANOG 89 , San Diego, CA
Oct 16-18	ESnet Confab23 , Washington, DC
Oct 19-20	ARIN 52 , San Diego, CA
Oct 19-20	ESCC , Washington, DC

Nov 4-10 [IETF 118](#), Prague, Czech Republic
Nov 12-17 [SC23](#), Denver, CO
Dec 12-14 [AINTEC](#), Hanoi, Vietnam

Next JET meetings

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

May 9, 2023 11:45AM - 1:00PM ET, hybrid

Note: This meeting is collocated with Internet2's Community Exchange in the Westin Peachtree Plaza, 210 Peachtree St NW, Atlanta, GA 30303

Jun 20, 2023 12-2 p.m. ET

Jul 18, 2023 12-2 p.m. ET

Appendix: OFCnet 2023 Architecture

