



### 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  
February 21, 2023, 12:00 – 2:00p.m. ET  
This meeting was held as a virtually

#### Participants

Jeff Bartig, Internet2	Ralph McEldowney, DREN
Bobby Cates, NASA Ames	Linden Mercer, NRL
Dale Carder, ESnet	Edward Moynihan, Indiana University
James Deaton, GPN	Aruna Muppalla, NASA/GSFC
Basil Decina, NRL	Glenn Ricart, US Ignite
Jonah Keough, Pacific Wave/PNWGP	Jennifer Schopf, TACC
Scott Kohlert, SCinet/CIENA	Michael Sinatra, ESnet
Michael Lambert, PSC/3ROX/ACCESS	Kevin Thompson, NSF
Paul Love, NCO/NITRD	Jim Williams, Indiana University

**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 January 2023 meeting:** Two corrections were incorporated in the posted final minutes.

III. **Introduction of the JET's new co-chair, Ralph McEldowney, from DOD's HPCMO/DREN.**

#### IV. **SC23 SCinet Preview: Scott Kohlert**

Scott's slide deck can be found at:

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

- A. Planning is just getting started for much of SCinet for this coming November in Denver, CO. The exceptions are its architecture and wide area circuits. (The saying, which turns out to be true, is 1+ year to design, 2+ weeks to build, not quite a week to operate and less than 2 days to tear down, pack up and ship off.) SCinet is comprised of two networks.
  - a. A production network supporting all the wired and wireless connectivity for attendees, public and meeting spaces, and exhibitors.
  - b. A research network supporting the Networked Research Exhibition (NRE) and SCinet's Experimental network projects (XNET).

- B. A quick recap of SC22 held last November in Dallas, TX:
  - a. The numbers:
    - i. Approximately 10,500 in-person attendees with another 1,300 virtual
    - ii. 361 exhibitors and over 200 technical sessions, workshops and BOFs
    - iii. 735 volunteers for all of SC22. 175 of which were part of SCinet
    - iv. Over 35 miles of fiber optic cable was installed
    - v. Over 450 wireless APs deployed. Wi-Fi 6E used for the first time
    - vi. Over \$70M of hardware, software and services loaned to support SCinet and the conference
    - vii. Total WAN capacity into SC was 5.01T.
    - viii. 29 NRE experiments on the show floor. Some were just on the show floor, but most used the WAN capabilities.
  - b. This year 400G connections both on the show floor and WAN predominated. With the predominance of 400G circuits, while SC22 had the largest capacity of any SC, there were fewer WAN circuits to SC.
  - c. One of key pieces of hardware was an optical switch. SCinet has used one for several years and they greatly facilitate and simplify circuit testing.
- C. SCinet – what do those 175 people do?
  - a. They're divided into 14 teams with diverse skill broken out as: Architecture, Communications, Contributor Relations and Logistics, DevOps, Wireless and Edge, Networked Research Exhibition (NRE), Experimental Networks (XNET), Fiber, Help Desk, Network Security, Power, Routing, Volunteer Services (Students) and WAN Transport.
  - b. There is also a WINS (Women in Networking at SC) team. It accepts submissions from women in IT to participate in SCinet. Those selected are provided travel & lodging to participate in SCinet on one of the 14 teams as fits their interest.
- D. IPv6 at SC22
  - a. The first time the wireless network supported IPv6. This was dual stack.
  - b. IPv6 peerings with Arelion (one of the providers of commodity connectivity), LEARN, ESnet and Internet2's R&E and I2PX services.
  - c. OSX, Android and iPhone just worked and defaulted to IPv6 when it was available.
  - d. Some Windows devices had issues – usually they couldn't do stateless autoconfig - hit or miss. DHCPv6 was turned up to solve.
  - e. There weren't any complaints about connectivity during the conference.
  - f. IPv6 connections ranged between 35-55% of all connections.
  - g. Applications still handle IPv4 and IPv6 differently:
    - i. Some wait for IPv6 to fail before falling back to IPv4
    - ii. Some use RFC8305 ("Happy Eyeballs") and send queries to IPv4 and IPv6 concurrently.
  - h. When turning up IPv6 a site needs to ensure that that IPv6 and IPv4 have symmetrical firewall rules.
  - i. LOTS of IPv6 DNS queries sent with no responses!

- E. IPv6 for SC23
  - a. SCinet’s goal is to run its management net as IPv6-only.
  - b. IPv6 clients will be built into the SCinet architecture for wired and wireless.
  - c. More extensive monitoring of what’s working and what isn’t.
- F. Plans for XNET for this year – a revival
  - a. Pick up the SCinet focus on IPv6 in the infrastructure.
  - b. There will be 5G on the show floor.
  - c. Integration/investigation of low earth orbit (LEO) satellite communications.
  - d. The SCinet NOC will add a FABRIC node.
  - e. Quantum networking.
  - f. Most likely there will be additions to this list after SCinet holds its March planning meeting in early March.
- G. Plans for NRE in 2023
  - a. Focus will remain on research related to networking.
  - b. For 2023 submissions may also be related to research that isn’t networking research. For these a heavy reliance on HPC and R&E networks will be required. This small change is hoped welcome new participation and topics.
  - c. The “SCinet Theater” will return. This will give NRE participants a scheduled place to talk about their experiments. Hopefully, their work will reach a broader audience.
  - d. The call for 2023 NRE submissions can be found here:  
<https://sc23.supercomputing.org/scinet/network-research-exhibition/>
- H. Interested in being part of SCinet?
  - a. It’s an all-volunteer group – funding comes from a member’s home institution.
  - b. Participation entails work during the year leading to a 2-3 week commitment to being onsite (Denver, CO for SC23). Roughly the last week of Oct and then 6-17 November.
  - c. Participating gives an opportunity to work on a lot of great gear, sometimes what a volunteer has worked on before, sometimes something brand new.
  - d. Several teams still have room including WAN.
  - e. If you have questions or are interested, contact Hans Addleman at [addlema @ iu.edu](mailto:addlema@iu.edu) or Scott at [skohlert @ ciena.com](mailto:skohlert@ciena.com).
- I. Discussion:
  - a. With the focus on IPv6 and IPv6-only, has there been much “oh, that’s great” or pushback from the vendors?  
 Answer: Prospective vendors are just being contacted. For the most part positive feedback. Some pushback as well.
  - b. Given what DREN and ESnet have found in building IPv6-only management networks will you be doing lab testing to make sure the gear really can handle IPv6-only?  
 Answer: That’ll be critical to making sure there aren’t surprises in Denver.
  - c. As you work on the IPv6-only management network will you give feedback to R&E community on what’s worked and what hasn’t?  
 Answer: Very much. The SCinet chair has said this from the start.

## V. JET's tasking on tools to help with inter-domain problem resolution – James Deaton

- Pretty much still on hiatus while Joe Breen is engaged with other matters. Some improvements have been made to pipeline processes for gathering data.
- From Jennifer Schopf: A shout out for James moving to Internet2 as its new Vice President for Network Services.

VI. **Operational Security Round Table:** A reminder that on 16 March Internet2 will be turning on Route Origin Validation. Steve Wallace from Internet2 gave a brief at the January 2023 JET. The meeting's minutes can be found at:

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

## VII. Network roundtable

### A. DREN (Ralph McEldowmey):

- a. DREN's main focus is continuing the transition from DREN III to the Verizon provided DREN 4. Of over 200 sites DREN has tested 140 and transitioned about 80. The deadline for completing the transition is mid-June.
- b. The Hawaiian community of federal sites with significant networking needs, the Hawaiian Intranet Consortium, just concluded a successful annual meeting – its first since 2020. During the meeting there was a requirements discussion for FY23 and beyond.

### B. ESnet (Dale Carder and Michael Sinatra):

- a. Nothing major. With the completed transition to ESnet 6, ESnet is making changes to the core to take advantage of the new Nokia platform.

Discussion: The Lunch and Learn on ESnet's measurement and analysis package, Stardust, given on 17 February, was given accolades by attendees. A recording of it can be found at:

<https://youtu.be/UsPDuFEfVR4>

The slides can be found at:

<https://www.es.net/science-engagement/ci-engineering-lunch-and-learn-series/>

- b. ESnet is planning to move more and more data into Stardust to make use of its visualization capabilities. Hopefully the national lab complex will be able to see who is querying for what data & services. There was additional discussion on Stardust & NetSage, the desirability of open source and Stardust's being a derivative of NetSage.

### C. GPN (James Deaton):

- a. GPN is active in a number of projects at new peering points.
- b. GPN is very close to turning up a 400G connection with ESnet.

### D. Indiana University/International Networks: (Ed Moynihan):

- a. Indiana University/International Networks (IU/IN) is ramping up for a busy 2023. As was mentioned, a member of the team, Hans Alderman, is chair of SCinet. If anybody has questions on SCinet and SC23 please contact Hans or the international networking team at [addelema@iu.edu](mailto:addelema@iu.edu).

- b. On the Atlantic side:
  - i. All links are stable
  - ii. IU/IN signed a new engineering agreement with the ANA consortium last December
  - iii. IU/IN is now working with the consortium on engineering coordination on the current links. Planning for the expected upgrades coming in the next few years is being discussed
  - iv. IU/IN is working with partners to upgrade its trans-Atlantic links to 400G.
- c. There's a new group within the GNA-G focused on engineering advancements which is partially coming out of the ANA discussions and discussions within APOnet to ensure there is proper coordination across these systems.
- d. On the Pacific side:
  - i. The link to Tokyo is stable
  - ii. IU/IN was at TPC and TPRE with many partners. IU/IN is investigating upgrading to 400G – pricing and timing
  - iii. The Guam<>Singapore link is now stable after some issues in the fall
  - iv. IU/IN will be attending SupercomputingAsia next week and APAN's meeting in Nepal.
- e. UbuntuNet Alliance: At its meeting the end of last year in Botswana it was clear that the new leadership, while still looking to settle its strategic focus, is going forward. IU/IN is working with the Alliance on what assistance it can provide. There have been some calls recently using NetSage to look at traffic between some of the Alliance's NRENs with the US and how those flows might be improved. IU/IN is continuing to provide training on the use of NetSage. There's an effort between IU/IN, Internet2, NSRC and FIU to better coordinate their activities with its partners in Africa which is starting to show results.
- E. FLR (Chris Griffin via email): FLR is testing Ciena 400G transponders in the lab.
- F. GSFC (Aruna Muppalla): No update today.
- G. NRL (Linden Mercer): Nothing to report today.
- H. Pacific Wave: (Jonah Keough): A couple of interesting things:
  - a. The Optical Fiber Communications (OFC) conference has signed a longer-term agreement with the San Diego Convention Center. Working through CENIC Pacific Wave (PW) has run dark fiber into the convention center. OFC has also created OFCnet to facilitate demos in the same way that SCinet does at SCs. OFC is featuring some R&E community activities in relation to the layer 1 and layer 2 technologies at OFC.
  - b. PW deployed route servers at all of its exchange points. A couple of participants are peering with the route servers. PW is inviting other participants to join to increase the exchange security. PW is enforcing some MANRS' practices through the servers.
  - c. PW is planning for the upcoming APAN meeting. APAN will be participating in a MANRS workshop where PW will be providing instruction.

- I. 3ROX (Michael Lambert):
  - a. Nothing today for PSC or 3ROX.
  - b. ACCESS: The migration to a layer 3 VPN called CONNETnet from XSEDEnet has started.
- J. US Ignite (Glenn Ricart):
  - a. US Ignite (USI) is working to have all of its Smart Cities install a connection to their Quilt members.
  - b. USI is trying to insure that the Smart Cities have a city owned fiber infrastructure. As part of this USI is working intensely with Albuquerque, NM, and Columbus, OH, to make sure they have an Open Radio Access Network (ORAN) standard to minimize their needing to change antennas in the future. And not just for millimeter waves, but all waves for wireless. USI believes that wireless will have “a coming out” in the near future. With a city owned fiber infrastructure the city can control where the fiber<>wireless interconnects are and thereby minimize antennas blight. The goal is to also ensure there is bandwidth for the expected wireless growth. Wireless bandwidth has been growing about 40% per year over the last decade making it a strategic asset for cities.

#### VIII. Exchange Points Round Table

- A. NASA Ames (Bobby Cates): Nothing new today.
- B. PNWGP (Jonah Keough): No update today.
- C. StarLight (Joe Mambretti via email):
  - a. The StarLight International/National Communications Exchange Facility community participated in the National Research Platform (NRP) Workshop at the University of California San Diego (8-10 February).
  - b. The StarLight community organized a session at the workshop on the Global Research Platform (GRP) and participated in meetings on synergies between the NRP and GRP.
  - c. The StarLight community is organizing a GRP workshop co-located with the Supercomputing Asia Conference in Singapore (27 February – 2 March 2) and will participate in meetings at the conference on large scale distributed environments for global science.
  - d. The StarLight community is also supporting the development of demonstrations that will be staged at the OFC Conference in San Diego (6-9 March). The demonstrations are focused on 400G WAN services for data intensive science between StarLight and OFC in San Diego and co-propagation techniques for quantum networking services.
  - e. The community is also organizing a Global Research Platform Workshop that will be co-located with the IEEE International Conference on eScience. The workshop will be 8-9 October.

## **Meetings of Interest 2022-2023**

*Note: Meetings whose format has changed have been updated.*

Feb 27-Mar 2	<a href="#">Supercomputing Asia 2023</a> , Singapore
Mar 5-9	<a href="#">OFC</a> , San Diego, CA
Mar 7-9	<a href="#">The Quilt Winter Meeting</a> , virtual
Mar 25-31	<a href="#">IETF 116</a> , Yokohama, Japan
Apr 16-19	<a href="#">ARIN 51</a> , Tampa, FL
May 8-11	<a href="#">Internet2 Community Exchange</a> , Atlanta, GA
Jun 5-9	<a href="#">TNC23</a> , Tirana, Albania
Jun 12-14	<a href="#">NANOG 88</a> , Seattle, WA
Jul 22-28	<a href="#">IETF 117</a> , San Francisco, CA
Aug 21-25	<a href="#">APAN56</a> , Colombo, Sri Lanka
Sep 18-21	<a href="#">Internet2 Technology Exchange</a> , Minneapolis, MN
Sep 25-28	<a href="#">The Quilt Fall Meeting</a> , Columbus, OH
Oct 8-9	GRP workshop at <a href="#">IEEE eScience</a> , Limassol, Cyprus
Oct 16-18	<a href="#">NANOG 89</a> , San Diego, CA
Oct 19-20	<a href="#">ARIN 52</a> , San Diego, CA
Nov 4-10	<a href="#">IETF 118</a> , Prague, Czech Republic
Nov 12-17	<a href="#">SC23</a> , Denver, CO

## **Next JET meetings**

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

Mar 21, 2023	12-2 p.m. ET
Apr 18, 2023	12-2 p.m. ET
May 16, 2023	12-2 PM ET, virtual

Note: This date may change and the meeting become hybrid, collocated with Internet2's Community Exchange, 8-11 May, in Atlanta, GA