



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 20, 2022, 12:00-2:00 p.m. ET
This meeting was held virtually

Participants

Jeff Bartig, Internet2	Padma Krishnaswamy, FCC
Andrew Gallo, CAAREN/GWU	Paul Love, NCO/NITRD
Rich Carlson, DOE/SC	Joe Mambretti, StarLight/MREN
Bobby Cates, NASA Ames	Linden Mercer, NRL
Basil Decina, NRL	Glenn Ricart, US Ignite
Jonah Keough, PNWGP/Pacific Wave	Chris Wilkinson, Internet2

Proceeding: This meeting was chaired by Rich Carlson (DOE/SC).

I. Action Items:

- Planning for the JET's tasking for 2023 – concluding discussion at the October meeting.

II. Review of the Minutes of the August 2022 meeting: Corrections were received via email and are included in the posted final version.

III. MANRS Presentation for the Joint Engineering Team – Andrew Gallo

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. MANRS grew from a 2014 gathering to improve security and resilience in the global routing system where a Routing Resilience Manifesto was produced.
- B. Composition of MANRS
 - a. MANRS is a collaborative initiative of network operators.
 - b. MANRS Participants are operators who meet the requirements of the four MANRS programs (for up to date lists see: <https://www.manrs.org/>):
 - i. Network Operators: 713 participants with 896 ASNs.
 - ii. IXPs: 104 participants.
 - iii. CDN/CSPs: 20 participants.
 - iv. Vendors: 6 participants.
 - c. MANRS Partners are organizations recognized by the MANRS Community as supporting MANRS in various ways: training, promotion, resources, etc.
- C. MANRS Governance
 - a. The establishment of MANRS and its building has been under The Internet Society (ISOC) via the MANRS Steering Committee (SC) since its inception. The SC

- includes academic institutions, RONS and vendors. ISOC has committed to supporting MANRS at least through the end of 2023.
- b. The acceptance of MANRS and its concomitant growth has made it larger than the IS staff can support.
 - c. Increasingly actions are needed: auditing, modifications to the MANRS criteria, steps to take when a participant doesn't meet the MANRS criteria, new program development, improving anti-spoofing measures, should RPKI become mandatory, what to do about ROV, etc.
 - d. Next step for MANRS governance: becomes a subsidiary of ISOC (similar to the IETF), become a self-regulating community, or something yet to be determined.
- D. To participant in MANRS a network operator must take these steps:
- a. Filtering: Only announcement to their adjacent networks the IP prefixes and AS numbers they and their customers legitimately control.
 - b. Coordination: Keep current global accessible contact information in a RIR/NIR and/or PeeringDB. This must be available to other network operators. Ideally it should be publicly available.
 - c. Global Validation: Publicly document intended routing announcements – in a RIR, RADB or a RADB mirrored IRR – for IP prefixes and ASNs originating on its networks and for networks for which the operator provides transit. There is a lot of discussion within MANRS regarding alternatives to meet this requirement.
- E. Network operators participating in MANRS should:
- a. Anti-spoofing: Enable source address validation for at least its own end users and infrastructure as well as single homed stub customer networks. This should include filtering on both ingress and egress.
 - b. Testing with the CAIDA Spoofer Software will both test for validity and add to a publicly accessible database permitting others to check the network.
- F. Developments in the MANRS Observatory
- a. The Observatory is now publishing monthly conformance scores for all participants.
 - i. Increases awareness of the network's conformance status
 - ii. Validates incident data thereby reducing false positives
 - iii. Side benefit: validate contact information
 - b. Developing alternative data sources. Moving from reliance on BGPstream to the Global Routing Intelligence Platform.
 - c. Developing the tools so that users can manage their own account.
 - d. Providing a dashboard to summarize status and data for a participant
- G. Ambassadors and Fellows
- a. MANRS Ambassadors and Fellows are way to extend MANRS outreach to the wider internet community.
 - b. Ambassadors are representatives from current MANRS participants who provide mentorship, guidance and feedback to the wider routing security community.
 - c. Fellows are emerging leaders in their communities, not necessarily from MANRS participants. They are selected from an open call to support one of three tracks: training, research and policy.

- d. Currently there are five Ambassadors and ten Fellows (training: 5, research: 3, policy: 2).
- H. New projects in MANRS research:
 - a. MANRS conformance checker: a tool to check a participant compliance with the set of required actions.
 - b. ROA historical explorer: a tool to look up a prefix and provide ROAs covering it within a certain data range
 - c. Black holing stats: “allow MANRS Participants to black hole /25 to /32 of their address space so other participants can null route in order to mitigate DDoS”.
- I. Miscellaneous
 - a. Does the routing table still represent truth? Many corner cases in the IRR.
 - b. Sessions at Internet2’s TechEX on MANRS new program for R&E operators.

IV. Operational Security Round Table: No updates were given.

V. Network roundtable

- A. CAAREN (Andrew Gallo): Nothing significant.
- B. Internet2 (Chris Wilkinson): Internet2 is rolling out some software stability updates.
- C. NRL (Linden Mercer): NRL continues to ramp up for SC22 in Dallas.
- D. Pacific Wave (Jonah Keough): The requested bandwidth for demos at SC22 may exceed the capacity at Seattle. Pacific Wave is working to sequence demos so that all can be run.
- E. US Ignite (Glenn Ricart): See Section VII below.

VI. Exchange Points Round Table

- A. PNWGP (Jonah Keough): No update.
- B. Ames (Bobby Cates): No update.
- C. StarLight (Joe Mambretti):
 - a. Upcoming workshops that StarLight (SL) is engaged in:
 - i. FABRIC’s Knit 5, 20-22 September in Chicago, IL.
 - ii. 3rd Global Research Platform (10-11 October) and Americas’ Research Platform (11 October), both in Salt Lake City, UT, as part of IEEE’s conference on eScience.
 - b. SL is expecting 25 demos at SC, many from NRE participants. Many thanks to the SCinet WAN team.
 - c. Current bandwidth expectations are 1Tb SL<>SC22 and SL<>McLean with 800G McLean<>SC22 and 500G for demos across the Pacific.
- D. MAN LAN/WIX (Chris Wilkinson): Internet2 is proceeding with upgrades/installs at WIX, MAN LAN and the Boston Exchange with hardware capable of 400G. Estimated timeline is six months due to supply chain issues.

VII. Lessons Learned from US Ignite on connecting the unconnected – Glenn Ricart

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

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

(With thanks to Glenn – many of the following bullets are from his slides)

- A. Project Overcome was an NSF award with additional funding from the Schmidt Futures fund to “accelerate delivery of broadband services to the unserved/underserved.
- B. Project Overcome: Seven sites were selected around the country, both rural and urban, which used a variety of technologies (CBRS, mmWave, hot spots, fiber, fixed wireless and RF over fiber) as proofs-of-concept. The goal was to inform the national broadband strategy for connectivity and adoption. The project also built a professional community of practice across academic, municipal and infrastructure partners. It documented each and created playbooks.
- C. Overall observations
 - a. Need for rural solutions where fiber investment is cost prohibitive
 - b. Need for investment in dense urban public housing
 - c. Community driven muni-wireless and wired gaining in popularity
 - d. Youth workforce training efforts to support adoption and technology transfer
 - e. Neutral host or open-access efforts reduce costs, but ecosystem management is new
 - f. Municipally enabled leverage of existing infrastructure
 - g. Federal lifeline services are not meeting needs
 - h. Tradeoffs between urgent needs for solutions and longer term benefits
- D. What can your agency (and you) do? Offer your expertise to:
 - a. State broadband office.
 - b. Local government in your community.
 - c. Community non-commercial partners.
 - d. Underserved anchor institutions (libraries, schools, healthcare, public safety).
- E. Does your community have a local IXP?
 - a. Support your community network exchange point
 - i. Digital Town Square
 - ii. Support it - Volunteer!
 - iii. Donate equipment AND expertise
 - b. Create one if your area doesn't have one
 - i. Keeps local community traffic local (and low latency)
 - ii. Keeps local resources online during emergencies when the upstream maybe disrupted
 - iii. Reduces need for upstream bandwidth so lowers costs
 - iv. Attracts caches and edge computing
 - v. Reduces latency and improves bandwidth to cloud services
- F. Do you have access to a tall building?
 - a. Allow the roof to be accessed and used:
 - i. mmWave point-to-point feeds to neighborhoods
 - ii. Mesh networking feeds
 - iii. Provide service to nearby residential facilities

- G. Do you own fiber or IRUs?
 - a. Trade lambdas for access to other delivery assets – other fiber, towers, etc.
 - b. Help expand the fiber edge for community networks
 - c. Work with departments of transportation to bury fiber whenever a road is repaved.
- H. Do you have expertise in wireless? (Especially if you are an amateur radio enthusiasts)
 - a. Setup wireless feeds to nearby under/unserved homes, anchor institutions or small businesses.
 - b. Use 2.5 MHz WiFi for best penetration as 5 GHz and CBRS have limited building penetration - especially into a brick building.
 - c. Use outdoor CPE – but power may be an issue.
 - d. Municipal permits can be an issue.
- I. Connectivity is not enough – Equipment will also be needed
 - a. Channel surplus equipment – computers, tablets, printers, WiFi base stations – to under- and un-served populations just receiving connectivity
 - i. Universities
 - ii. Local industries
 - iii. Local government
 - iv. National labs
 - b. Equipment is an ongoing issue – not a one-time event.
- J. Train the unserved in how to use the Internet:
 - a. Working from home.
 - b. Searching for a new job.
 - c. Education – children and continuing education.
 - d. Searching for health information online and telehealth.
 - e. Connecting to the community.
- K. Build community internet resilience – prepare for emergency internet communications capabilities for quick deployment (ex: forest fire knocking out the backhaul to a local area).
- L. Reference publications
 - a. Project Overcome report:
 - [Project OVERCOME: Innovative Connectivity Solutions in Seven Communities](#)
 - b. Playbooks:
 - [Public Private Partnerships: A Case Study from Yonkers, NY](#)
 - [Community CBRS Networks What you Need To Know](#)

VIII. Continued discussion of the JET’s potential tasking for CY2023

For reference, v 1 of the JET’s potential CY2023 tasking is in the Appendix at the bottom of these minutes.

Also for reference, the administration’s current priorities are at:

<https://www.whitehouse.gov/wp-content/uploads/2022/07/M-22-15.pdf>

- A. As a note from the meeting before last, no items from last year’s tasking were suggested for removal. The “Ongoing” tasks in the tentative tasking list in the appendix are a combination of the “Ongoing” and “New” from a year ago, with dates brought current.

- B. Continued discussion (during this meeting and in subsequent email):
- a. How the JET can be more inclusive of and help to MSIs and un-/under-served institutions?
 - b. Should the JET work to include CSPs and commercial network providers? (Way back the vBNS and CenturyLink participated.) Could yield a richer exchange. While commercial providers probably cannot share what their plans are for the next 2 or 3 years then may well be able to talk in broader terms about items 4-5 years out.
 - c. Are there ways agencies can share resources?

Meetings of Interest 2022-2023

Note: Meetings whose format has changed have been updated.

Sep 20-22	The Quilt Fall Meeting , Minneapolis, MN
Sep 20-22	KNIT 5: A FABRIC Community Workshop , Chicago, IL
Oct 10-11	3rd Global Research Platform Workshop , Salt Lake City, UT
Oct 11	Americas' 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
Nov 15	IPv6 & IPv6-only BoF at SC , Dallas, TX
Dec 5-8	Internet2 Technology Exchange , Denver, CO
<u>2023</u>	
Jan 15-18	PTC'23 , Honolulu, HI
Jan 25-26	HIC, Maui, HI
Feb 13-15	NANOG 88 , Atlanta, GA
Feb 13-17	APAN55 , Nepal
Feb 27-Mar 2	Supercomputing Asia 2023 , Singapore
Mar 7-9	The Quilt Winter Meeting , virtual
Mar 25-31	IETF 116 , Yokohama, Japan
May 8-11	Internet2 Community Exchange , Atlanta, GA

Next JET meetings

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

Oct 18, 2022	12-2 p.m. ET
Nov 16, 2022	10:30 a.m. – 12 p.m. CT, Room A309-310, Kay Bailey Hutchison Convention Center Dallas, 650 S Griffin St, Dallas, TX. <i>n.b.:</i> This is conjunction with SC22 and will be held in person with remote access.
Dec 20, 2022	12-2 PM ET, virtual (<i>n.b.:</i> Held only if needed)

Appendix: v1.0 of the Potential JET Tasking for CY2023

Ongoing JET Tasks

- Assist in the planning of technology and application demonstrations of SDN & Big Data at SC23.
- Technology tracking: perfSONAR, SDN/SDX/SDI, Science DMZs, network automation & orchestration, and Segment Routing.
- Hold two meetings collocated with R&E networking community conferences:
 - Internet2 Community Exchange (8-11 May)
 - SC23 (November - tentatively 12-17)
- Continue to schedule meeting round tables of updates on members' networks, operational network security, exchange points and meetings of interest to the community
- 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.
- Encourage participation from diverse communities, including those from disadvantaged and underrepresented groups. This has the goal of creating awareness and opportunities for equity of access, inclusion and the benefits of science and technology to a diverse communities. This would be done by a combination suggested contacts from the JET's participants, by utilizing NITRD's Minority Serving Institutions (MSIs) data base and the Women in IT Networking at SC (WINS) participants.
- Encourage and support JET participants to use their networking knowledge to provide expertise to projects connecting the unconnected in the communities they serve and to enhance the connections of those who are under-served. This will help provide opportunities for inclusion and equality of access to the benefits of science & technology.
- Track members' steps on transitioning to IPv6-only over the next 3 years (end of FY2025).

Potential JET Workshop: TBD