JET Meeting Minutes
January 21, 2014
Teleconference only

Participants

Mark Berman	BBN	mberman@bbn.com
Joe Breen	U of Utah	joe.breen@utah.edu
Ron Broersma	DREN	ron@spawar.navy.mil
Prasad Calyam	Un Missouri	calyamp@missouri.edu
Joan Cole	NCO	cole@nitrd.gov
Brian Court	CENIC	bac@cenic.org
Vince Dattoria	DOE/SC	vince.dattoria@science.doe.gov
Patrick Dorn	ESnet	dorn@es.net
Mark Foster	NASA/Ames	mark.foster@nasa.gov
Andy Germain	NASA/GSFC	Andrew.M.Germain@nasa.gov
Jonah Keough	PNWGP	keough@uw.edu
Dan Kilper	Un.Arizona	dkilper@optics.arizona.edu
Kevin Kranacs	NASA	kevin.m.kranacs@nasa.gov
Michael Lambert	PSC	lambert@psc.edu
Paul Love	NCO	epl@sover.net
Bryan Lyles	NSF	jlyles@nsf.gov
Joe Mambretti	NU/StarLight/MREN	j-mambretti@northwestern.edu
John McGee	RENCI	Mcgee@renci.org
Rick McGeer	US Ignite	Rick.McGeer@us-ignite.org
Grant Miller	NCO	miller@nitrd.gov
Inder Monga	ESnet	imonga@es.net
Don Preuss	NIH/NCBI	donp@nih.gov
Glenn Ricart	US Ignite	glenn.ricart@us-ignite.org
Tripti Sinha	MAX	tsinha@umd.edu
Chris Small	Un Washington	chsmall@uw.edu
George Uhl	NASA/GSFC	george.d.uhl@nasa.gov
Alan Verlo	StarLight/UIC	darkman@evl.uic.edu

Action Items

1. Contact Ron Broersma at DREN if you want to peer with DREN III. ron@spawar.navy.mil
2. Also contact Ron if you are interested in peering using jumbo frames at Equinix
3. If you have a healthcare application that could be demonstrated over US Ignite, contact Glenn Ricart: glenn.ricart@us-ignite.org

Proceedings

This meeting of the JET was chaired by Vince Dattoria of DOE.

SDN Workshop: Inder Monga, Grant Miller

The SDN workshop was held December 17-18, 2013 at the NSF. The workshop objective was to bring together Federal agency representatives with the SDN research community and commercial sector SDN developers to develop a strategic plan for developing, deploying and operating a prototype operational SDN network with interoperability between SDN domains and between Layers 1, 2, and 3. In addition workshop participants were asked to identify R&D to improve SDN capabilities and to provide a workshop report documenting recommendations needed for deployment, research, and collaboration. The report is projected to be completed by March 31, 2014.

Approximately 80 attendees participated in the workshop and the three breakout groups:

- Users, Applications and Motivation (UAM) led by chip Elliott and Ron Hutchins
- Technology and Operational Gap analysis: Inder Monga, Eric Boyd, Bill Snow leads
- Security and Policy: Roy Campbell lead

The UAM group has identified, initially findings include that the time is right for building a prototype operational SDN network based on the existing islands of SDN research. Other findings include:

- SDN should include broad distributed infrastructure needed for applications and scientific instruments
- Research and discovery with SDNs will include an array of networking, virtualization, domain research and new crosscutting research, e.g., wireless with optical interfaces.
- Early applications will include: healthcare, education, transportation, advanced manufacturing, and instrument support (e.g. LHC)
- Longer term application stores will enlarge the infrastructure to many actors
- SDN is immature and will need many iterations of design/experimentation to provide practical operational capabilities
- We need to grow the human community to support SDN

The approach for fielding the SDN network is to continue the SDN coordination group to plan, architect, and deploy the SDN network. An initial capability should be deployed ASAP building on existing SDN islands, SDN Exchanges (SDXs), software, and security. Existing applications and instruments should be the initial focus of the infrastructure deployment. We should apply existing IdM best-practices, e.g., GENI IdM, to enable the network. We should early identify needed improvements for the network and support the research needed to realize these improvements
Recommendations include:

- Federal agencies should sponsor the needed efforts to design, stand-up, and operate multi-domain SDNs as soon as possible
- Initially the SDN should support existing applications and instruments
- The network should be co-designed with U.S. industry participation
- Prototype capabilities should be fielded as soon as possible

IPv6 Workshop

A workshop to identify future research needs for IPv6 is planned for January 31. ESnet will provide an overview of the past and present of IPv6. There will be three tracks:

- Measurement tools
- How to use and improve the measurement tools
- How will improved infrastructure guide future funding for development and use of IPv6

Current registration is about 55 with room for about 25 more participants. If you wish to attend, you are requested to provide a short statement of your qualifications and interests.

Update on 2nd NSF perfSONAR Workshop: Prasad Calym

This workshop will run from 7:45AM (breakfast) on Thur, 20 Feb, through 1PM on Fri (box lunch 12-1.) The workshop's objectives are:

- Bring together perfSONAR stakeholders
  - Researchers, developers, deployers, industry
  - Build upon the success of the 1st Workshop in 2010
  - Capitalize on the increasing deployments, inherent flexible multi-domain nature of the perfSONAR protocols and infrastructure
- Organize targeted tutorials, talks and discussions
  - ESnet/Internet2 Talk - perfSONAR Past and Present
  - Invited Guest (long) talks – provide visionary and strategic advice
  - Latest advances (short talks) from invited speakers - within breakouts
  - Demos during one of the coffee breaks
  - Foster discussions to identify gaps that exist for solving prominent issues in:
    - Instrumentation and Measurement
    - Measurement Data Analysis and Visualization
    - Applications Integration and Deployment
    - Other Theme(s)?
- Generate Workshop Report (ACM Digital Library archival-ready) to guide:
  - Identification of gaps that require research
  - Future community actions
  - NSF funding priorities
  - Future workshops on related topics

. Chairs are Martin Swany and Prasad Calyam. Fourteen presentations have been submitted with an additional 42 individuals wishing to attend and participate. Of these, 40 are from the US, 16 international. Travel grants are available for a max of 25. The PC is identifying additional speakers/participants to be invited.

The workshop has these goals for its discussion: re-assessment of the community needs, learn the latest community consensus on potential research and development focus areas, and develop recommendations to address the prominent open issues and operational requirements. Themes for discussion that have been developed so far:

- Network measurement tools development and calibration
- Algorithms and Techniques for Automated Network Troubleshooting

- Architectures for Federated Measurement Collection, Analysis and Sharing
- Measurement Federation related Standards-development Efforts
- Monitoring of Software Defined, and Overlay Networks
- Measurement of Cloud and Grid Application Environments
- Security and Policy Considerations for Federated Measurements
- Case Studies of End-to-End Network/System Performance Troubleshooting
- Applications Integration and Deployment (e.g., network support use cases in Science DMZ, Cloud/HPC and BigData)

Others may be developed before the workshop.

Scaling Terabit Networks Workshop: Dan Kilper

The workshop had 38 participants with expertise in optical networks, data I/P networks, optical and electronic devices, optical transmission, applications, computer systems, and data centers. Key note speakers included:

- Chandra Sethumadhaven: Components and Systems Enabling Next Generation Optical Transmission and Networking
- Bikash Koley: Packet Optical 2.0: Scale, Program, Optimize
- Craig Partridge: One Data Networking Person's View of the Future

There were three breakout groups:

- Key trends, obstacles, and opportunities
- Metrics, targets and capabilities
- Research priorities and requirements

Workshop highlights included:

- Optics is penetrating to the edge: home and data centers
- Metro, aggregation, mobile backhaul, and data center networks are different from long haul
- New applications and services demand new architectures: big data, cloud computing, big science
- Data centers are a new frontier for optical systems: large east-west traffic loads
- Need end-to-end control planes and virtualization
- Proliferation of mobile networks
- Optical systems are reaching the Shannon limits in fiber
- Increasing parallelism in optical networks
- Electronics and optics are coming together: embedded optics, optics on a chip, optics to the chip

Twenty five research areas were identified. The top research areas include:

- Programmable optical networks with intelligent control planes
- Clean slate optical network architectures
- New optical network architectures for data centers and cloud computing
- Optical network architectures across layers
- Application aware optical network architectures

Grand Challenge areas:

- Programmable, virtualized, and intelligent optical networks for the future internet

- Cross-layer optical network architectures
- Clean slate architectures and component technologies
- Collaborative, multi-user test-beds for optical terabit scale experiments

Network Roundtable
DREN: Ron Broersma

DREN III is being implemented to about 400 customers at 140 sites with CenturyLink as the contractor. It is about 50% completed with the balance expected to be fielded soon. There have been some issues with DREN's bandwidth needs by some last mile providers. Customers are being connected to DREN III using jumbo frames, dual stack IPv4/IPv6, and multiple VLANs. The need to do BGP has been the biggest issue with customers. Neither v6 nor jumbo frames have been a problem with customers. All peering is being moved to DREN III. The Equinixs do not, in general, do Jumbo Frames making the peering difficult. DREN Supercomputer centers will be liked at 10 Gbps. DREN is considering implementing a 10G ring throughout Hawaii as part of its TIC upgrade. There is a Hawaii Internet Consortium (HIC) meeting January 22-23, 2014.

AI: Contact Ron Broersma at DREN if you want to peer with DREN III.
ron@spawar.navy.mil
AI: Also contact Ron if you are interested in peering using jumbo frames at Equinix.

ESnet: Patrick Dorn

The Advanced North Atlantic (ANA) 100G network came up error-free at SC13 and it is in operation currently. LHCONE will be doing testing over this link. They will use it beginning in 2-3 weeks when it is not in use for other purposes. ESnet upgraded their connectivity to Equinix, Ashburne so it is now dual-homed. Circuits to Argonne and Fermi Lab were moved to Chicago Express.

GENI: Mark Berman

GENI is deploying 48 GENI Racks. 20 are now on the GENI portal. They implement programmable computational and network resources deploying OpenFlow and ION connectivity across several sites. In the next few months, 50 sites should be operating. GEC at Georgia Tech will be operating in a couple of months. The experimenter will be using switching at layer 2 across multiple GENI sites, built on top of ION. The will also be implementing AL2S stitching. A GENI Engineering Conference (GEC) in March will be featuring stitching. GENI is initiating a training offensive to train users on GENI. They are targeting graduate students and researchers for a multi-day camp. They also will hold TA tutorials to set up and diagnose GENI uses. They expect 15-20 attendees for both these classes.

NASA Ames: Mark Foster

NISN is reengineering their backbone for shared use between mission needs and other uses.

NIH: Don Preuss

The NIH 100G connection to Internet2 is up and in use. NIH is completing testing with the University of Chicago. The NIH campus infrastructure is being upgraded to 100G, 40G and 10G. This connectivity will extend to Montgomery County, Northern Virginia, Baltimore and North Carolina. It will also connect the CDC Indian Health Service.

NLR: Brian Court

NLR is in maintenance mode currently. There are discussions between the NLR R&E community and the network owner on how to go forward.

NOAA: Paul Love

NOAA is expanding its sites with TIC support. They have 4 TICAP locations in CONUS.

Pacific Wave: Jonah Keough

AARnet is upgrading to 40G and will connect to Hawaii.

US Ignite: Glenn Ricart

US Ignite is holding a June 26 applications summit in Silicon Valley. HP has loaned Rick McGeer to US Ignite to be their Chief Scientist.

AI: If you have a healthcare application that could be demonstrated over US Ignite, contact Glenn Ricart: glenn.ricart@us-ignite.org

Exchange Points:

PNWGP: Jonah Keough

PNWGP is upgrading for 40 & 100G connections

NASA Ames: Mark Foster

Extensions to the PAX at Palo Alto and Sunnyvale are being implemented. NASA is discussing with ESnet and CENIC how to stand-up 100G services for prototyping and testing.

StarLight: Alan Verlo

StarLight supported demonstrations for CineGrid at UCSD. . They streamed HD from Czechoslovakia to UCSD through StarLight. They also demonstrated streaming 4K from Brazil to UCSD. StarLight is continuing rearchitecting for LHCONE. As a follow-on to the SC13 100G demonstrations, StarLight is continuing to develop those applications for demonstration at SC14.

MREN: Joe Mambretti

LHCONE point to point prototype service is being developed and will be transitioned to functioning at StarLight. Continuing applications development is taking place for large scale computational genomics in coordination with Don Preuss. An Astral Physics demonstration will be held at UCSD in March. An SDX prototype is being developed along with Georgia Tech for demonstration in March.

Meetings of Interest:

January 22-23	Hawaii Internet Consortium, Kauai, HA
January 29-30	Operating Innovative Networks Workshop, Marina del Rey, CA
January 31	An ESnet workshop to identify future research needs for IPv6
February 10-12	NANOG60, Atlanta, GA
February 20-21	2nd NSF Workshop on perfSONAR-based Multi-domain Performance Measurement and Monitoring, Arlington, VA (invitation only)
February 25-26	ESSC Meeting at SLAC, Menlo Park, CA
February 27-28	Operating Innovative Networks Workshop, Berkeley, CA
March 17-19	GEC19, Atlanta, GA
March 19-20	GLIF Techs, Atlanta, GA
April 6-10	Internet2 Global Summit, Denver, CO
April 15-16	ARIN33, Chicago, IL
May 19-22	TNC2014, Dublin, Ireland
June 2-4	NANOG61, Bellevue, WA
June 22-24	GEC20, Davis, CA
June 24-27	US Ignite Applications Summit, Silicon Valley

Next JET Meetings:

February 18:	11:00-2:00, NSF, Room II-415
March 18:	11:00-2:00, NSF, Room II-415
April 8	11:45AM-1:15PM MST, Sheraton Denver Downtown, Denver, CO *nb:* This is collocated with the Internet2 Global Summit