

JET Meeting Minutes
April 9, 2014
At Internet2 Global Summit, Denver Colorado

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Action Items

1. If you want to demonstrate SDN applications at the GENI conference at UC Davis in June contact Heidi Dempsey <hdempsey@bbn.com>

Proceedings

This meeting of the JET was chaired by Kevin Thompson of the NSF.

Thanks to Brent Sweeny

Kevin Thompson, on behalf of the JET and the networking community, thanked Brent Sweeny, who is retiring very soon, for his more than 30 years support to the R&E networking community and his continual efforts to improve science networking. He will be greatly missed.

IRNC Solicitation: Kevin Thompson

A new IRNC solicitation was issued yesterday to fund international science networking for the science community. Please respond to the solicitation as appropriate.

Network Roundtable

ACE: Jennifer Schopf

The ACE links have been stable lately. Additional perfSONAR monitoring is being installed and will be demonstrated at the TERENA meeting. ACE is supporting large data flow users on the 100G testbed ANA infrastructure and monitoring it at 100G. The ACE backbone has been stable but there are complexities getting to several of the end sites.

ESnet: Brian Tierney

ESnet is testing and improving performance over the 100G ANA link. ESnet is testing LHC traffic over this link. The link will be open to others next week.

Internet2: Dale Finkelson

The Internet2 Chicago/Ashburn/McLean link is being upgraded to 2x100G. There are now over 30 AL2S nodes in the U.S.

NOAA: Dave Hartzell

NOAA is standing up a TICAP in Hawaii that will support multiple agencies. A mockup of the TICAP will be tested in Boulder prior to its installation. Most of NOAA will be behind TICAPs shortly.

NOAA is standing up new service to Alaska that they are willing to share. NOAA is working with the MAX on DWDM network procurement. They are purchasing

dark fiber and plan to install 100G capability hardware. The Denver to Salt Lake City 10G from Internet2 was just put into operation.

TransPac: Brent Sweeny

TransPac completed a Tokyo/APAN link. It is OpenFlow capable. The Japanese used this link to support a demonstration at the Atlanta GEC. A North America<>Beijing link is in-place.

US Ignite: Glenn Ricart

US Ignite is seeking applications. These will be shown at U.S. Ignite's Applications Summit, 24-27 June, in Sunnyvale CA. Were the applications are appropriate they will also be shown the GEC20 conference at UC Davis 22-24 June.

Northern Tier: Dave Farmer

Northern Tier has a wave system from Seattle to Minneapolis to Chicago. The Eastern portion, over Boreas, has upgraded to 700 G of capacity with Infinera equipment at all nodes which provides for quickly implementing additional capacity. The CIC, Big 10 universities plus the University of Chicago, have started a 5-10 year planning cycle for renewing their current IRUs which expire in 2014. They are in the initial stages of identifying points that will need connectivity both in Chicago and outside Chicago. They are considering building their own fiber.

Utah Education Network (UEN): Jim Stewart

New Utah legislation adds 60 telehealth sites and 10 staff to UEN. UEN has a 100G connection to the Internet2 backbone. They are expanding their DWDM network throughout the state. They are revising their dashboard and perfSONAR. They are considering monitoring for the Quilt network.

CAAREN: Andrew Gallo

George Washington University has formed a new regional network at 100G. GW is the only current member but they are approaching DC public schools and libraries.

U of Arizona: Dragana Vasic

The U of Arizona and Arizona State U have migrated from CENIC connectivity to a pair of 10G connections to Internet2 in Phoenix and Tucson. They have a 10G backbone, Sun Corridor, linking them and (by now) Northern Arizona U in Flagstaff.. The Tucson and Phoenix connections to Internet2 and the local universities connections to Sun Corridor are in the works to upgrade to 100G.

AARNet: David Wilde

AARNet has upgraded its service to 100G at 16 sites within Australia. Their optical networking is now 100G capable. They are working to deploy AL2S like NET+ services. One of the Sydney to west coast U.S. links is currently 40G and the second independent path link will be upgraded to 40 G soon with plans to upgrade to 100G in next year or two. AARNet is upgrading its links and installing perfSONAR in all its PoPs. Connectivity to New Zealand is being upgraded to 40G. Connectivity to Singapore

is currently problematic. They are in discussions with 3 possible submarine cable consortiums for the Perth-Singapore path.

GENI Network: Heidi Dempsey

GENI recently held a conference. Rack buildouts continue. 52 racks are planned with half completed and the others in-process. There are 10 sites with WiMAX and up to 50 LTE sites planned. GENI stitching is being deployed at more sites. Two SDN exchange sites are starting up, focused on Layer 2. One is focused on international, the other on Layer 2, 3. There are planned demonstrations at UC Davis.

Currently they deploy OpenFlow 1.0 at all GENI sites. When Internet2 upgrades OpenFlow, GENI will also.

AI: If you want to demonstrate SDN applications at the GENI conference at UC Davis contact Heidi Dempsey <hdempsey@bbn.com>

ZAMREN: Stein Mkandawsire

ZAMREN has funding from the EU. They have a link to Tanzania. There are 24 member institutions in ZAMREN. Much of their connectivity is provided by the power company at no cost. Institutions generally have 420 M connectivity over their 1 G backbone. They would like to provide Eduroam.

FRGP: Marla Meehl

NCAR is working with NOAA Boulder through FRGP for access and connectivity to reach NOAA radar data near the Denver airport and in Cheyenne, WY, using cellular and wireless connectivity. With their connection to the NCAR-Wyoming Supercomputer Center in Cheyenne they are working with the state of Wyoming to reach out to schools in the state. They are implementing an increase to 20G connectivity to ESnet.

Pacific Wave: Jonah Keough

Pacific Wave has a new 100G connection to Seattle. They are close to adding San Luis Obispo in California as an add/drop site.

U of Oregon: Scott Gening

The U of Oregon is seeking to implement a 100G link to Internet2. They are working on a secondary PoP in Eugene.

Brazil: Ari Frago

RNP is upgrading its link to New York to 10G. The backbone network in Brazil is at 10G among 4 sites and 2.5 G at 10 sites. Connections are up to 622 Mbps among the 27 PoPs. The Ipe network is now deployed in all 26 Brazilian states plus the Federal district. The Telemedicine University Network is improving connectivity among health institutions and university hospitals. There are connections to RedCLARA at 155 M which provides connectivity worldwide. RNP also maintains its own 155 M international link.

Brazil: Michael Stanton

Brazil, RNP has had stable international connections for the past 2 years. An experimental capability at 100G, called OpenWave, funded by the NSF and Brazil, is being studied and is scheduled for deployment by the end of this year. A RedCLARA link from Brazil to Madrid at 2.5 G is being replaced by a 5 G link from Brazil to London. A new cable between Forteleza to Lisbon is being studied among 3 partners (Brazil, Spanish telecom and an equity finance group)

OARnet: Paul Schopis

The World Bank has funded a link to Bangladesh. OARnet is continuing collaboration with 3ROX for 100G connectivity to Internet2. They have completed the build to Hillsboro, MI, to reach OmniPoP in Chicago. It's a 40 G link today. Cincinnati will have a 2nd link to Internet2 this summer at 100G.

ARE-ON: David Merrifield

Arkansas is implementing 100G optical alien wave testing over ARE-ON current links. Some of their IRUs are only 10 years. They were also hit by the turn-down of NLR and have replaced their NLR circuit.

DANTE: Mark Johnston

GEANT Open is now live. It creates a virtual network for all services.

3ROX: Michael Lambert

3ROX is upgrading to 100G. They are working with West Virginia to implement improved connectivity for West Virginia sites. The connection to ESnet has been reestablished using AL2S links.

KENET: Eric Sifuna

Kenya has connectivity to 35 institutions at 1G. They plan to connect 144 institutions including the World Bank. The Kenya government in cooperation with DSL in Germany is rolling out Eduroam.

Exchange Points**MAX: Dave Diller**

MAX is in the midst of a refresh with upgrading their routers to MX960s. They currently have a parallel 100G DWDM platform and are considering upgrading that. They have tested 400G and 800G on their optical network. The 400 G was tested over 400 km with a couple of repeats in the middle.

Pacific Northwest GigaPoP: Jonah Keough

The Pacific Northwest GigaPoP is upgrading its equipment to MXs – ETA is September. They are implementing 10G connectivity to CSC.

MAN LAN & WIX: Dale Finkelson

MAN LAN now has a 100G connection to CANARIE. There is a full perfSONAR node at MAN LAN and the WIX now. This may be used as a test point by others.

Singapore: Dale Finkelson

Internet2's Singapore IX is operated for Internet2 by SingAREN. It provides colocation space for members with international campuses, giving them similar services to an Internet2 domestic IX. Duke University has moved a full rack into Singapore. Bob Johnson from Duke has details about this capability.

Research network activities with commercial cloud providers

Internet2 is working through Net+ to implement cloud services at Layer 3 to Amazon. They are looking at possible AL2S connections, services, and rack space in Chicago. Net+ is also working with Azure for services to schools.

The U of Pune, China and Poznan are setting up a cloud infrastructure.

CENIC and the NW GigaPoP are using services with Amazon and Pacific Wave.

The Australian AWS is negotiating for services in Australia and Seattle. AARNet users will also be offered high performance services.

Review of Topics for Focused Technical Workshops

Review of the previously proposed topics for Focused Technical Services identified current interest in:

- 400G and 800G optical networking
- Software Defined Networking: Operational environment and challenges
- Cache Defined Networking
- Review of the JET Big Data task
- International OpenFlow testbed
- GENI control frameworks
- Research Testbeds Cooperation: Both U.S. and international
- TICRail: Organized around the problem space rather than the solution space.

Joint JET Internet2 meetings

Discussion identified that the JET participants would prefer to meet in the evenings (rather than over lunch) at joint meetings with Internet2.

Meetings of Interest:

April 9-11	PRAGMA26 , Tainan, Taiwan
April 15-16	ARIN33 , Chicago, IL
May 19-22	TNC2014 , Dublin, Ireland
May 28-29	LHC meeting, Rome, Italy
June 2-4	NANOG61 , Bellevue, WA
June 22-24	GEC20 , Davis, CA
June 24-27	US Ignite Applications Summit , Sunnyvale, CA
July 14-16	Focused Technical Workshop: High Performance Networking for International Climate Science , Boulder, CO

30 September – 1 October [14th Annual Global LambdaGrid Workshop](#),
Queenstown, NZ
October 6-8 [NANOG62](#), Baltimore, MD
October 26-30 [Internet2 Technology Exchange](#), Indianapolis, IN

Next JET Meetings:

May 20: 11:00-2:00, NSF, Room TBD

June 17: 11:00-2:00, NSF, Room TBD