JET Meeting Minutes
June 17, 2014

Participants

Bob Bonneau	OSD	robert.j.bonneau.civ@mail.mil
Nick Buraglio	ESnet	buraglio@es.net
Rich Carlson	DOE/SC	Richard.carlson@science.doe.gov
Vince Dattoria	DOE/SC	vince.dattoria@science.doe.gov
Heidi Picher Dempsey	BBN/GENI	hdempsey@bbn.com
Dale Finkelson	Internet2	dmf@internet2.edu
Mark Foster	NASA/ARC	mark.foster@nasa.gov
Andrew Gallo	CAAREN	agallo@gwu.edu
Andy Germain	NASA/GSFC	Andrew.M.Germain@nasa.gov
Michael Gill	NIH	gill@nlm.nih.gov
Michael Lambert	PSC	lambert@psc.edu
Larry Landweber	GENI	larry.landweber@gmail.com
Craig Lee	Aerospace Corp	lee@aero.org
Paul Love	NCO	epl@sover.net
Bryan Lyles	NSF	jlyles@nsf.gov
Linden Mercer	NRL	linden@cmf.nrl.navy.mil
Grant Miller	NCO	miller@nitrd.gov
Michael Munson	WindStream	michael.munson@windstream.com
Amy Philipson	PNWGP	amy.pnwgp@gmail.com
George Strawn	NCO	gstrawn@nitrd.gov
Kevin Thompson	NSF	kthompso@nsf.gov
George Uhl	NASA/GSFC	george.d.uhl@nasa.gov

Action Items

Proceedings

This meeting of the JET was chaired by Bob Bonneau of OSD, Vince Dattoria of DOE, and Kevin Thompson of NSF. Larry Landweber provided a presentation on the Workshop on Prototyping and Deploying SDXs.

Workshop on Prototyping and Deploying Experimental Software Defined Exchanges (SDXs): Larry Landweber

A follow-on workshop to the December 2013 workshop on Deploying a Software Defined Networking Prototype was held June 5-6. It was focused on developing prototypes and deployment strategies for:

- Software Defined Exchanges (SDXs)
- Multi-domain Software Defined Networks (SDNs)
- Software Defined Infrastructure (SDI)

We currently anticipate national/regional deployment of SDXs. The workshop exchanged ideas for SDXs and determined next steps.

The workshop developed a glossary of terms to provide a common basis for discussion and development.

Current internet trends see a convergence of multi-tenant data centers, software defined networks, the virtualization of network functions and distributed data centers. Interdomain exchange points are critically important in effecting the needed network transformations building on FIX, CIX, NAP, NGIX, and GOLE.

There are three near-term conceptual Software Defined Exchanges (SDXs):

- Layer 3 (IP): connect AS's
- Layer 2 (Ethernet): multi domain circuits
- SDN: connect SDN islands

Advanced SDXs will provide inherent compute and storage capacity. They will connect SDI islands with GENI as an early instance incorporating storage, compute resources, networks, and instruments.

Today there are SDN islands. Next steps are to add SDX's, build a Rev 0 control plane, and run native next-generation applications and scientific instruments spanning multi-domain SDNs.

Goals of an SDX are to:

- Enable increasing complexity and sharing of global multi-domain computing/communications environments
- Provide new paradigms including SDN, SDI, distributed clouds, virtualization/slicing, big data
- Enable applications needing resources from different domains
- Declarative control of an inter-domain path end-to-end
- Security integral to the infrastructure

All SDXs require local compute and storage:

- Layer 3 SDX needs route servers, policy servers, and OpenFlow controller and BGP speakers
- Layer 2 SDX needs an NSI server: performance monitoring tools, possibly a topology server
- SDN SDX needs an OpenFlow controller, policy database, and performance monitoring

SDXs build on existing resources of GENI, AAA, experimental SDX's at MAX, SOX, and StarLight, Internet2 AL2S, OESS, Flowspace Firewall, ESnet, DYNES, science DMZ's and other resources

There are many science areas needing SDX services in astronomy, climate science, emergency management, genomics, LHC, healthcare and other science applications.

Overarching research areas include:

- Security
- Enable large-scale distributed infrastructure to support science
- File system/storage; SDX architecture
- Multi-domain issues: control of multi-domain SDNs and infrastructure, multi-domain controllers and inter-domain protocols,
- Federation encodings
- Static vs. on-demand federations

For the complete briefing and backup slides please see the JET Wiki at:

http://www.nitrd.gov/nitrdgroups/index.php?title=JET_Meetings_2014

Discussion among the JET members indicated that:

- There will be a meeting of SDX planners prior to the SigCom meeting on October 26, 2014.
- A GENI and Grid workshop will be held on control frameworks.
- A discussion in LSN about an interagency effort to demonstrate SDX's would be useful.
- A prototype operations SDX might be fielded in 6 months to a year with a concerted multi-agency effort
- Inder Monga and Tom Lehman are leveraging OpenGrid capabilities beyond GENI to develop SDX's.
- A quarterly meeting of SDX prototype developers is needed to promote sharing of information, resources, tools, and cooperation
- OpenStack Keystone federation is addressing federated Identity Management
- Craig Lee of Aerospace Corp identified resources from Keystone relevant to cloud implementations

Network Roundtable

CAAREN: Andrew Gallo

CAAREN is now connected to DCnet. They are supporting US UCAN programs to schools and libraries. They have received perfSONAR boxes and are installing a GENI rack.

ESnet: Nick Buraglio

ESnet is enabling their 100G research wave using Ciena technology. ESnet is carrying out strategic planning for an additional 100G augmentation of its backbone.

GENI: Heidi Dempsey

With Internet2 they are testing GENI Stitching with the FlowSpace firewall. The GENI Engineering Conference is this week in Davis, CA.

Internet2: Dale Finkelson

The Internet2 FlowSpace firewall is going forward. There is a June 24 Webinar on virtualization with AL2S nodes. They installed AL2S nodes in Tucson and 350 Cermack in Chicago. AL2S nods will also be installed in Missoula and Hartford. Internet2 Layer 3 all currently runs over AL2S. Internet2 is gradually decommissioning 10G links.

NASA: Mark Fowler

Nothing significant to report.

NIH: Mike Gill

Nothing significant to report.

Pacific Wave: Amy Philipson

Nothing significant to report.

Exchange Point Roundtable
PNWGP: Amy Philipson

Nothing significant to report.

NGIX West: Mark Fowler

The NGIX West is procuring new switches to upgrade their fabric. When the new equipment is up they will join SDN/SDX experimentation.

StarLight: Alan Verlo & Joe Mambretti

CSTnet (China) is establishing a 1 GE connection to StarLight.

StarLight had a successful SDX<=>SDX demo interconnecting the prototype SDX at StarLight with a prototype SDX at SURFnet/NetherLight for the TERENA Conference in Dublin, Ireland in May. They are preparing for the GEC 20 meeting (Davis, CA) and US Ignite event (Santa Clara, CA) this week (June 22-27).

A research partnership, including the Renaissance Computing Institute, ESnet, the ESnet 100 G Testbed, iCAIR, LBL, the StarLight facility, and the University of Amsterdam is developing a 40 Gbps national/international testbed. Currently, the initial implementation is being tested and debugged.

A Research-On-Demand OP(n) 100 Gbps testbed designed by Ciena has been implemented with sites at Hannover Maryland, StarLight, the Ciena Research Labs in Ottawa, and New York City. Ciena, iCAIR and other network research partners will be developing experiments and demonstrations on this testbed, including for the GLIF annual event in New Zealand later this year and for SC14.

iCAIR and StarLight are still discussing plans for WAN network testing between Singapore and HPC sites in the US in preparation for an SC14 demonstration.

3ROX: Michael Lambert

Nothing significant to report.

WIX/MAN LAN: Dale Finkelson

They are investigating what it will take to implement an SDX. They are supporting World Cup transmissions.

Meetings of Interest:

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
July 20-25	IETF90, Toronto, Canada
September 14-15	CANS, New York, NY
September 15-16	LHCOPN & LHCONE, Ann Arbor, MI
29 September – 1 October	14th Annual Global LambdaGrid Workshop, Queenstown, New Zealand

October 6-8	NANOG62, Baltimore, MD
October 26-30	2014 Technology Exchange, Indianapolis, IN
November 9-14	IETF91, Honolulu, HI
November 16-21	SC14, New Orleans, LA

Next JET Meetings:

July 15	11:00-2:00 eastern, NSF
August 19	11:00-2:00 eastern, NSF