JET Meeting Minutes
August 15, 2017
National Science Foundation
Stafford II, Room 525

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Action items
Finalize JET Tasking

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

Presentation: Internet2 Update by John Moore (jmoore@internet2.edu) (slide presentation available)
Internet2 connector community (most regional networks, campuses)
- Since Jan 2016- Ongoing conversation establishing guiding principles
  - Community investment – how we work together and out of the box thinking
  - Target for capital investment – need to take advantage of new technology and to have broad conversation –not just dive into normal refresh
  - New CEO- reemphasize and find better ways to fulfill research support missions
  - Workforce impact – overarching issues; training, recruiting and working more closely together from process perspective
  - Community project – first step, not firm plan. Welcome input

<u>Key principles from community input</u>**:** leading to next step of coordinated community experimentation
- Ecosystem – work in integrated fashion (campuses, regionals, NRENs, etc)
- Experimentation – opportunity to experiment and work through challenges with organizations with a shared goal (Continuous development process)
- Focus on end user experience- enhance end to end experience

<u>Architectural constructs</u>
- Hollow core – to provide simple and drive down cost to make scaling up feasible
- Flexible edge - integrate storage into programmable network
  - Flexible; looking for commonality between edge services that we end up deploying
    - E.g.: Traditional backbone connector edge; campus connector edge
  - Need to cover whole range: discipline research, testbeds and academic enterprise needs.

<u>Developing an action plan</u>: Focus on community collaboration
- Current state of technology- Core technologies
  - Examine current state of packet optical; lab testing, candidate technologies/products, broader testing with POCs around country with different connectors/campuses
    - goal: analyze capabilities in 2 years. Findings will be shared with community
  - Develop model of deeper collaboration within ecosystem: End-to-end service delivery
    - What does it mean to do end to end service that crosses several boundaries?
  - Technology evaluation phase 2 -Edge
    - Discuss how community wants to experiment with edge piece

<u>Straw man</u>
Partnering: community members who are currently engaged or planning on exploring new technology
End to end service delivery: drive these with use cases that benefit research community

<u>References</u>:
Tempe meeting- http://bit.ly/2uxZduj; Call for Papers – http://bit.ly/2uxQRCU
RECINNS Summary report – http://bit.ly/2uw9jQu

SC17 AmLight update: Jeronimo Bezarra (AmLight topology for SC17 available)
Referencing topology for AmLight network:
- NSF IRNC project to connect S. America to N. America
- 2 x 100G links; installing another 100 G link as part of the OpenWave project
- POP in Brazil, Chile
- State University of Sao Paulo (UNESP)-
  - LHC project and have clusters, collaborations with LHC, Caltech; also sending/receiving data from Fermilab
  - Only one user connected to 100 G
  - Ongoing project to extend to the university
- Brown/orange switches are the test devices. Idea is to have blue and brown devices to be part of OpenFlow testbed
- Century Link: 3x 100G links from Miami to Denver; goal to have data sent from Brazil, Miami and Chile to SC17 booth.
- <u>UNESP</u> – first time for booth in SC17; connected to Caltech.

- Main theme-Programmability
  - Agreement with University of Sao Paulo;
    - We will provide them with slices. They have SDN application and OpenFlow controller and they will provide provisioning. All switches and lanes will be available for 1 researchers to enable their experimentation.

GOAL: 3 x 100G hosts in Brazil to send and receive traffic
-Miami 2x 100G
-10G hosts in Chile (no user ports/hosts available yet for LSST project)

Discussion
LSST demo: Will not use LSST application. Will send STD data to show new capability in Chile.
Circuits to Europe or Africa are an ongoing project. No direct connectivity at this point. Latin American collaboration network goes through AmLight.

JET Roundtables
Networks
ESnet: Nick Buraglio
- Progress on transatlantic processes
- Working on bringing up another additional 100G peering TransAtlantic using the NEAAR circuit, so diversity will be added over that path.
- Preparing ESnet process review
- Ongoing work on security platform (pilot core flow)

Indiana University: Ed Moynihan
- NEAAR transatlantic 100G and TransPAC 100G are stable
- Waiting on colleagues in Africa and Europe to put in 10G from W. Africa to connect in to support applications in W. Africa and S.E. Africa
- Will be at APAN meeting and Unbuntu net alliance meeting

NRL: Linden Mercer
- Preparations for SC17 are falling into place.
- Interested in leveraging connection to Ciena testbed

3ROX: Michael Lambert
- No updates.

U.S. Ignite: Glenn Ricart
- RFP out to add additional smartgigabyte communities.
- NSF will fund 2 communities that add diversity and synergy to STC ecosystem

AmLight: Jeronimo Bezarra
- Express side spectrum -close to operational in September; will be fully operational in December.
- Have full information needed to start RFP process, start with at least 200 G channels. Estimated to have in place by February/March 2018.

Exchange Points
MAX: Dave Dillar
Met with Ciena last week and working on co-collaborations to get connections into Ciena testbed and 100G to StarLight. Would like to have it up and operational for SC17. Will be setting up a call with Ciena to move forward with this collaboration.

StarLight: Joe Mambretti
- Ciena testbed – 100G testbed from Hanover MD to StarLight exchange to Ottawa to NY to ANA. Potential new capability - to extend from Baltimore to Mclean, VA where connects with NRL and NASA Goddard Space Flight Center and to other sites, e.g., Hopkins.
- Expecting new 100G from new Montreal Open Exchange that will come into StarLight. Also will connect with ANA 300.
- GLIF workshop, Sydney Australia - Preparing for demonstrations with various partners at GLIF's annual meeting. Will be showcasing MEICAN tools: toolset overlay to network service interface API which connects the control systems.
- Working on integrating with SDXs (e.g IRNC at StarLight; CENIC to implement at the L.A. SDX)
- dynamic provisioning through NSI (through AutoGOLE)
- petascale science data transfers
- CIENA will provision 100G from Seattle to Sydney, should be finalized by next week
- Working on demonstration project related to need by airlines (KLM Air France). When airplane lands, sends data by disk for analysis currently; can't send over networks. Developing protoype to show possible real time service: transfer data and maintenance while plane is on the ground. Have DTN at KLM research lab with 100G to NetherLight; will provision VLAN to ANA 300 to Montreal Exchange to StarLight to Sydney.

SC17- 30 demonstrations planned
- Working with SCInet to provision 10x 100 G from StarLlight to booth at SC17.
- Working with Linden Mercer and Bill Fink to do 400 G from Washington D.C. to booth. And 200G from Washington D.C. to StarLight. Working with Harvey Newman (Caltech) for fabric on showfloor. Each booth should have 300 Tb minimum and will be connected with Tb.
- Ethernet Alliance: promising 400 G NIC to showcase this year.

August 7 -8 2017 National Research Platform Workshop– Bozeman, MT (MT State Uuyniversity)
Developed from CC programs – Cyberinfrastructures for science on campuses (Campus science DMZ)
Regional science DMZs funded to connect "islands" of campus cyberinfrastructure (e.g.,MREN; StarLight)
Moving away from networks to a distributed environment; science enabled by distributed sliceable resources

NASA: Bobby Cates
Finished tunnel to GovCloud. Tunnel to AWS will be completed in September.
Tomorrow, will be meeting with Amazon and DHS to review TIC-compliance AWS connectivity.

LSN updates: Joyce Lee
Andrew Lee, Associate Director of International Networks, Indiana University, provided updates for TransPAC, NetSage, and NEAAR.
LSN- sponsored Operationalizing SDN workshop will be held at Internet2's Washington D.C. office on September 18-20. Planning is ongoing; will provide updates.

JET Continuing Tasks FY18
Need 2-3 proposed topics to be finalized at September 2017 meeting
- **Task 1:** Identify future directions for networking. What is needed to support distributed science community and network design? Could include different technologies (TICS, Einstein3- see July 17 suggestions below)
    - Subtasks-Host speakers from the industry, academia, research, distributed computing, InCommon for background information. (e.g., Ken Klingenstein, Director of Internet2 Middleware)
- **Task 2**: Data issues. For example, evaluate how streaming data will fit into our infrastructure.

Discussion
- Future directions for networking:
    - Need a uniform view of authorization process; not optimal if have to log into every provider to set up network.
    - Need to include InCommon when discussing access to distributed resources owned across a federation.
    - Obtain different perspectives to find out current state of affairs, so JET will understand future needs and how networks can support that infrastructure.
    - Open stack is widely used across multiple cloud providers – provide control, management and data plane to individual customers and give self-service tools.
    - GENI is a pioneer in tenant networking; each individual research group is a tenant with a private network within the distributed GENI environment; Chameleon cloud (600 tenant networks given tools for private networking)

JET FY18 Workshop Discussion
- Is there a need for a workshop vs. information gathering, with a possible workshop at end of FY18 or in FY19?
- Concern raised with JET being explicitly tasked with a DTN workshop if community dialogue is occurring in multiple events in FY18. May be too specific.
- Internet 2 and ESnet will be conducting OIN workshops.

Meetings of Interest
Sept. 18-20	LSN Workshop on Operationalizing SDN, Washington, D.C.	
Sept. 25-27	GLIF, Sydney, Australia	
Oct. 2-4	NANOG71, San Jose, CA	
Oct. 2-5	ESCC, NSF PIs, & Quilt, Albuquerque, NM	
Oct. 5-6	ARIN 40, San Jose, CA	
Oct. 15-18	Internet2 Technology Exchange, San Francisco, CA	
Oct. 23-26	CANS2017, Kunshan, China	
Nov. 12-17	SC17, Denver, CO	

Next JET Meetings:
October 17, 12-2 p.m. (Eastern)
Nov 14, 1:30-3:30p.m. (Mountain) Room 507, Colorado Convention Center, Denver, CO