

JET Meeting Minutes
November 16, 2016
SC16, Salt Lake City Salt Palace, Ballroom C

Participants

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Action Items

Proceedings

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

JETNet Roundtable

ESnet: Pat Dorn, Inder Monga

ESnet completed their recent round of hiring. The new employees include Dale Carter, Paul Eifel and 2 new hires at NERSC. ESnet6 is in the R&D phase. They are exploring different architectures. There will be an internal technical review at the end of January to review and cull the architecture options.

ESnet is supporting the VA to enable connectivity of the VA data centers to Oak Ridge. A VA connection at 10 G to an ESnet PoP in DC will be implemented soon. ESnet turned up a 100G link to SOX. Vanderbilt University was moved onto this link. A 100G link to LEARN is to be completed imminently. An audit is being done in Chicago for the 2nd redundant link to OmniPoP at 100G.

Inder Monga reported that ESnet is focused on new architecture options for ESnet including packet optical, optical switching, OTN,... ESnet is identifying the scientific flows they will need to support in the future. ESnet is implementing an SDN testbed on 2nd generation devices using multiple switches on the pieces of hardware and orchestrations software. They seek to implement a high-level platform to support services across providers.

Internet2: Matt Zekauskas

Four Internet2 nodes have been moved off of Brocade equipment to Juniper. There is one remaining Brocade switch at Columbia University in Missouri. The nodes are being converted from OpenFlow to running both MPLS and OpenFlow now, converting to just MPLS next year.

MANLAN: Matt Zekauskas:

Nothing to report

WIX: Matt Zekauskas:

Nothing to report

NASA: Andy Germain

NASA TICs are more complete and NASA is inspecting NASA connections to the rest of the world. Interior and exterior networks have symmetric routing. Tuning the network has reduced RSVP time from 90 ms to 20 ms. NASA TICs are located at Goddard, Ames, Marshall and Huntsville.

NASA is now connected at 100G to McLean and College Park.

NOAA: Matt Smith

The NOAA TICAP infrastructure is being completed for the five NOAA TIC sites in Dallas, DC, Hawaii, Seattle, and Denver. Hawaii has been completed. When the TICAPS have been completed, NOAA will begin discussions with other agencies about sharing the Hawaii and DC TICAPs (community TICAPs).

NOAA has transitioned its connectivity to 5 sites in California that had been connected via T1s. They are now using higher bandwidths at lower costs. Sunnyvale is now 2 x 10G with one of the links going to Seattle. They are now using band-switched Ethernet services. Pt Reyes will be completed this calendar year. The TIC Einstein 3A has tunnels to CenturyLink and NOAA expects to be 3A compliant by December 16, 2016. Some customers had fail-over problems on E3A- they didn't fail open.

Indiana U: Predras Radulovic

TransPac4 now has a 100G link between Seattle and Tokyo with PacificWave. It went into production in January and is running smoothly. Two demonstrations at SC16 are running over I; an 8K video at 25G and a 200G data transfer.

ACE: The Europe/US 3x100G connectivity is discontinued in 3 months. MIRR will replace it with 100G US/Europe connectivity. US and African networks also partner on this link. A diverse path 100G link also links the US and Europe.

REANNZ: Jamie Curtis

REANNZ just hired a new CIO and product development manager. The new CIO is Nicole Ferguson. The Waiki cable is starting to be manufactured. The Hawaii end will be operational in 2018. It will provide transit between Sydney and Seattle with a spur to Auckland. REANNZ is doing a Brocade MX network refresh, top-to-bottom, by the end of this CY. A managed firewall service is being provided for clients. The entire network is MPLS, Layer 1, 2, and 3. REANNZ connects all 8 New Zealand universities plus Crown laboratories and Polytechnic Institutes.

Exchange Points

StarLight: Joe Mambretti

See Joe Mambretti's discussion of the SC16 demonstrations below. StarLight has 8 x 100G links to SC16.

SC16 Demonstrations:

Joe Mambretti demonstrated software defined services (SDS) for high performance large-scale science data streams across 100G WANs. The networks are transitioning from legacy networking to full-service networking and extreme-scale capacity networking was demonstrated in the both, which had 2.2 Tbps of networks. The demonstrations showed high degrees of customization, programmability, network virtualization, distributed processes, and platforms as a service. Users are moving to SDN services orchestration. GENI provided much of the basis for the SDN and services development. The demonstrations utilized future cyberinfrastructure developed with NSF funding with large-scale multi-functional architecture supporting a wide range of services (including 5G) designed by, for, and with researchers. iGENI provided international functionality. StarLight supported 2 SDXs, one with connectivity to the University of Ghent. Multiple 100G links at StarLight, NRC, and NASA provided the 2.2 Tbps to the SC16 booth. ESnet helped provision VLANs on many of the links.

The SC16 booth supported 42 sets of 100G demonstrations including 1 Tbps flows on the show floor to the Cal Tech booth. PetaTrans using StarLight, Canarie, PacificWave, ESnet/ANA, ESnet/MAX, and ExoGENI provided Petascale sciences data transfer internationally and it is a persistent network (beyond SC16).

Bill Fink and Paul Lang of NASA/Goddard demonstrated 200Gbps data flows. Many flavors of DTNs were demonstrated with varying degrees of storage and buffers.

Compute Canada demonstrated Science DMZs to Canadian universities. Canarie/Ciena demonstrated 90 Gbps over a 100G link.

NSF IRNC funding supported AMIS, a sophisticated measurement capability that measured flows from Canada and Sao Paulo.

The demonstrations included:

- FermiLab new data file transfer developed by Wen Chi Lee providing 100s of times greater capacity than GridFTP.
- OpenFlow topology exchanges with Taiwan
- Korea: 100G SDN wide area network from Daejong to SC16
- Dynamic circuits (Japan to SC16)
- DTN to DTN over 8000 miles (Singaren over PacWave to GRPnet)

- Bioinformatics international data transfers for precision medicine
- Pacific Research Platform tying together California universities using SDX/SDN
- Linden Mercer (NRL) demonstrated DTN as a data processing node over the wide area with associated data processing. 4K x 60 from California to Salt Lake City to Washington DC for processing and back to Salt Lake City – a total distance of 11,500 miles
- Bill Fink (NASA) demonstrated 24 NVME drives to move 182 Gbps disk to disk, one at NASA Goddard through the MAX and StarLight to the SC16 show floor.
- DREN demonstrated 40G transfers cross-country

For the complete briefing please see the JET Website at:

https://www.nitrd.gov/nitrdgroups/index.php?title=JET_Meetings_2016#November_2016

Meetings of Interest:

November 22-23	CANARIE National Summit 2016 , Montreal, QC
December 12	GENI NICE 2016 , Irving, CA
January 15-18, 2017	PTC'17 , Honolulu, HI
January 25-26	HIC , Honolulu, HI
February 6-8, 2017	NANOG69 , Washington, DC
March 26-31	IETF 98 , Chicago, IL
April 2-5	ARIN 39 , New Orleans, LA
April 23-26	Internet2 Global Summit , Washington, DC
May 29 – June 2	TNC17 , Linz, Austria
June 5-7	NANOG70 , Bellevue, WA

Next JET Meetings:

December 20	12-2 EST, NSF <i>nb: Due to the December holiday, held only if needed</i>
January 17, 2017	12-2 EST, NSF