

## **JET Meeting Minutes**

### **March 17, 2015**

#### **Participants**

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#### **Action Items**

#### **Proceedings**

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

#### **Network Roundtable**

##### **ESnet: Nick Buraglio**

ESnet is continuing to connect universities for LHCONE; for Tier1 the University of Chicago and Cal Tech; for Tier2 University of Nebraska and the University of Wisconsin/Madison. The connectivity is largely 100G via connectors, regionals, AL2S, and others.

##### **NASA networking: Bill Fink**

NASA is working on its corporate route symmetry project, building out an external ring and an internal ring pursuant to implementing the NASA TIC which is planned for April.

#### **Exchange Points Roundtable**

##### **Ames:**

The 10G links to PAX are now in operation.

##### **3ROX: Michael Lambert**

University of Pittsburgh is turning up a 100G link to 3 ROX soon. 3ROX has a signed agreement with The National Energy Technology Laboratory, a DOE Office of Fossil Energy facility, for regional connectivity. Tail circuits are coming on at 1G to Morgantown, WV, and Pittsburgh. The low connectivity is primarily a cost issue. A connection to Albany, OR, will be MPLS using Internet2 and AL2S is being considered for this circuit.

#### **StarLight: Joe Mambretti**

StarLight is preparing for demonstrations at GEC22, March 23-25 in Arlington, Virginia and George Washington University for the demonstrations. Demonstrations are being held jointly with GENI, U.S. Ignite, OGF, and GLIF. Tuesday and Wednesday will provide special demonstrations for the 'White House, Congress, and the media.

One demonstration will provide a bio-informatics exchange to move large bio-informatics data sets around the world using dynamic provisioning. Some of the files will be used to develop heat maps (a visualization product) for precision medicine. In total, there will be about 50 demonstrations at GWU and the Crystal City Marriott SDX demonstrations will be largely over Layer 2; other demonstrations will use Layer 3.

#### **NIH Networking: Don Preuss**

NIH is revising its networking. Current capability is 10G at the core. Each NIH institute has a different mission with different networking requirements. Current issues are high latency and slow-speed campus transfers using a mix of heterogeneous technologies with non-standard topologies that do not readily enable high performance computing. The goals of the current upgrade are to provide state-of-the-art speeds, scalable, agile, and flexible networking designed to support the NIH science missions (currently genomics is driving increased networking needs). The new capabilities are planned to provide 100G dedicated paths supporting 1TB transfer in 11 minutes. All routing is over Layer 3 transport networks using MPLS for dynamic, high-speed transport. The MPLS tunnels Layer 2 services over Layer 3 to provide low-latency high speed paths providing guaranteed bandwidth. DWDM over optical fiber provides transport to local DC sites. The current 100G backbone service is scalable to multiple 100G links.

Most of Phase 1 implementation is complete providing 100G to major NIH buildings. Testing is currently ongoing. Phase 2 will connect lower priority NIH buildings. There are 100G links to both Internet2 (AL2S) and the MAX which provide high-speed links to cloud providers. Users are being moved to these new network resources. A science DMZ is distributed over multiple load-balanced servers. The high speed science traffic bypasses the NIH TICs and goes through the science DMZ. In the DC area NIH TICs are geo-split between Bethesda and Ashburn. Two other NIH TICs are located in Atlanta and Albuquerque.

The upgraded networking is currently providing high performance, flexible connectivity supporting high performance computing access to remote users and applications.

The full briefing details may be accessed on the JET Website at: [https://www.nitrd.gov/nitrdgroups/index.php?title=JET\\_Meetings\\_2015](https://www.nitrd.gov/nitrdgroups/index.php?title=JET_Meetings_2015) under the March 2015 JET meeting.

### **100G Firewall: High End SRX and Services Offload: JJ Jamison**

Juniper has developed SRX series Services Offload for the high end in a single device supporting security and networking. It provides a separate data plane and a control plane. The SRX 5400 provides 100G firewall services; the 5800 supports 320G firewall services for large packets. For elephant flows of 100Gbps/40Gbps, large data flows hit the science DMZ which routes the flows through the SRX which routes through the R&E WAN to the Area Border Router with 10G/40G/100G links to the enterprise Border Firewall. Security services are offloaded from SPU to IOC.

NASA Goddard (Bill Fink and Paul Lang) provided a test setup at 100Gbps for testing the SRX 5600. A single 40G IPv4 flow provided 37Gbps throughput 4 x 40G IPv4 flows in 2 directions provided 122.6 Gbps limited by NG/IOC throughput.

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### **NOAA Multicast Proof of Concept: Michael Laufer**

NOAA needs to distribute Satellite Terabyte Environmental Products. They are exploring multicast to enhance delivery. They have been exploring multicast for delivering EUMETSAT data. National Environmental Satellite, Data, and Information Service (NESDIS) distributes satellite data to the National Weather Service sites domestically and also to multiple international partner sites. They plan to use Internet2 and other NREN partners for export of the data. LEO and GEO orbit satellites provide 50 GB/day of data. New satellites will provide 3-5 TB/day for each satellite. NOAA is creating a multicast proof of concept using the public domain where available. They are identifying the hardware needed, obtaining the multicast addresses in Internet2 and testing internally and externally. There are lots of data products and lots of data in each product. Often, if a user wants a subset of the data, say for Europe, that subset of data is created and sent out. With multicast all data is sent to all recipients all the time with no subsets needing to be created and individually sent. Internet2 traffic goes through the TICs using UDP connectionless networking. Multicast is provided to only approved users. The data could be encrypted. Once you have set up for a few users, the multicast is easily expanded to 100s of users. Data can be distributed in 10 minutes.

Next steps include using canned data sets for evaluating multicast packages, identifying acceptable solutions, testing multicast internally, then expanding to include international partners. Then the same steps would be taken for live data sets.

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### **Meetings of Interest:**

March 22-27	<a href="#">IETF92</a> , Dallas, TX
March 23-27	<a href="#">GEC22/US Ignite/GENI Developers Day/OGF/GLIF Techs</a> , Arlington, VA, & Washington, DC
March 24-25	<a href="#">ESCC</a> , Berkeley, CA
March 31 - April 2	<a href="#">International OpenFlow/SDN Testbeds</a> , North Miami, FL
April 26-30	<a href="#">Internet2 Global Summit</a> , Washington, DC

June 1-3	<a href="#">NANOG64</a> , San Francisco, CA
June 15-18	<a href="#">TNC2015</a> , Porto, Portugal
June 15-18	<a href="#">GEC23</a> , Urbana Champaign, IL
July 14-16	<a href="#">SDI next steps planning and coordination</a> , Berkeley, CA
July 19-24	<a href="#">IETF93</a> , Prague, Czech Republic
August 10-14	<a href="#">APAN40</a> , Kuala Lumpur, Malaysia
September 21-23	CANS2015, Chengdu, China
October 4-7	<a href="#">Technology Exchange</a> , Cleveland, OH

**Next JET Meetings:**

April 29	7-9PM, Renaissance Washington DC Downtown Hotel, 999 Ninth Street NW, Washington, DC, Meeting Room 2 nb: This meeting will held during and is collocated with Internet2's Global Summit.
May 19	11:00-2:00, NSF
June 16	11:00-2:00, NSF