JET Meeting Minutes
February 2, 2010
Salt Lake City
(In coordination with the Joint Techs/ESSC Meeting)

Action Items
1. Grant Miller will ask Phil Dykstra if DREN is participating in the perfSONAR testbed experiments.
2. Paul Love will put the multi-domain demonstration of perfSONAR on the next JET agenda. Phil Dykstra should be invited to discuss DREN interest.

Proceedings
      This meeting of the JET was led by Vince Dattoria of DOE and Jennifer Schopf of the NSF.

Network and Exchange Point Roundtable

DREN: Ron Boersma
      DREN is writing an RFP for a recompete of their networking contract. Their current contract expires in 18 months. They are adding many new sites. They are working on private peering with IPv6.

AI: Grant Miller will ask Phil Dykstra if DREN is participating in the perfSONAR testbed experiments.

ESnet: Steve Cotter
      ESnet has upgraded its peering points in San José and Ashburn to MX480s. A 10 G connection in Boise, Idaho became operational in November. The Northwest GigaPoP upgraded to 10 G in November. ESnet implemented DNSSec. ESnet is preparing an RFP for Long Island connectivity.
      ESnet is developing RFPs for its 100 G testbed that is scheduled to be issued over the next two months. It will include 100 G wave service and some dark fiber. An RFP for routers will be issued about 6 months later, summertime, so the wave and fiber service can be integrated together in a timely fashion with 100 G being operational late in the year. The Magellan testbed is a cloud computing testbed built over the 100 G testbed fabric. It will be implemented at 10 G with a later upgrade to 100 G.
      ESnet is participating in the perfSONAR testbed.
      ESnet update from Joint Techs:
            www.internet2.edu/presentations/jt2010feb/20100203-cotter.pdf

Internet2: Chris Robb
      Internet2 is upgrading its routers to MX960s (except in Chicago.) By mid March to late April Internet2 will have parallel 10 G layer 3 interconnects on all of its backbone. Dynamic services have been operationalized over the Internet2 ION service. Internet2 is working on hybridization of ION and IP services on the same platform with a universal hybrid port. Internet2 backbone links try to maintain 30% utilization or less (over the 10

G links, e.g., 3 Gbps). Several links are near this utilization rate and will require upgrade. Internet2 is seeing a lot of large data transfers between the West coast and Chicago.

Internet2 is participating in the perfSONAR testbed.

Internet2 update from Jt Techs:
>>>>**www.internet2.edu/presentations/jt2010feb/20100202-boyd.pdf**

National LambdaRail (NLR): Andrew Lee

NLR is working on exercises for business continuity during a disaster. NLR is completing an MOU with Internet2 for cooperation on a telepresence exchange to be located in Kansas City. There has been international interest in this capability. At Layer 2/3 NLR added a 10 G link between Framenet and Pacific Wave. VBN Framenet supported GENIE experiments in the Boston area. The Washington, DC to StarLight service was upgraded to eliminate the need for regeneration between those sites. NLR plans to upgrade the Western side (Kansas City to StarLight) to eliminate the need for regeneration on that link.

Cornell and MIT are joining NLR.

NLR will participate in perfSONAR testing.

NOAA: Jerry Jansen

NOAA is working on building the Phase I NOAA Research Network (using ARRA funds) to join the operational NOAA sites including Boulder, Denver, Chicago, Princeton, DC Metro area, Oak Ridge National Laboratory, and Asheville. In Phase II (using base NOAA funds) Seattle, Honolulu, and Miami will be added to the network. They will be using Florida LambdaRail to reach Miami and plan to implement 10 G service to the sites in Florida (including Florida International University).

NOAA plans to participate in perfSONAR testing.

NISN: Andy Germain

A NISN upgrade to 10 G is in-process. In parallel EOS is moving to 10 G. The EOS networks will participate in the perfSONAR testing.

NREN: Dave Hartzell

NREN is seeking funding for a 40 G Emerging Technologies Testbed. If funded, they will participate in the perfSONAR testing.

Operational networking, currently using NLR, is being transitioned to NASA's NISN service.

TransPac

TransPac is waiting to hear about its IRNC refunding. They will work with APAN on new TransPac capabilities if it is funded. They will participate in perfSONAR testing.

6Transit

6Transit is using 2 x 10 G for their primary circuit and backup. They have nodes in Amsterdam, ManLan, and StarLight.

OARnet: Aaron Wise

OARnet is upgrading its 10G routers to MX480s and expanding its 10G coverage to the rest of Ohio. It is doing commodity v6 peering with Qwest. OARnet K-12 traffic is increasing. Public Broadcasting Service (PBS) is using OARnet to transmit video using IP throughout the state.

South Carolina networking: Jim Pepin

South Carolina Light Rail connects three universities in South Carolina. CLight is getting dark fiber from Charlotte to Atlanta. Clemson and Oak Ridge are implementing a wavelength. There is a broadband proposal to tie together 100 anchor sites at 2-4 year institutions at 10-50 Mbps each, initially with 1 Gbps. Hospitals and healthcare facilities would be added to this core set of sites. USC and Clemson are doing disaster recovery backup at no cost to either party.

Pacific Northwest GigaPoP: David Sinn

Pacific Wave is planning to add a third wave.

Ames Research Center: Dave Hartzell

An XSF7000 switch is being implemented to support 10, 40, and 100 G services Ames is implementing perfSONAR infrastructure.

StarLight: Alan Verlo

StarLight recently supported demonstrations for CineGrid. StarLight will be supporting GENIE. StarLight supports perfSONAR infrastructure.

MANLAN

MANLAN is implementing 10 G service to NorduNet. They are switching out Nortel gear to a Ciena CoreDirector. MANLAN is implementing perfSONAR infrastructure

CIC OmniPoP: Dave Farmer

The CIC OmniPoP is now at StarLight and at 600 West Chicago in the Internet2 suite. CIC plans to implement perfSONAR infrastructure.

AmPath: Ernesto Rubi

AmPath is working with the University of the West Indies to connect their Jamaica and Barbados campuses to AmPath. Connectivity is also being put in place to the University of the Virgin Islands. Puerto Rico is using AmPath for Haiti disaster assessment. Upgrades in service are underway in Brazil and Chile, particularly for astronomy support. AmPath is implementing telepresence. They proposed deploying perfSONAR infrastructure in their IRNC proposal.

Upcoming Meetings of Interest

NLR and Internet2 agreed this week to hold a joint planning session on the next generation Internet sometime over the next few months.

March 9-11: Multicast Workshop at Univ. of Connecticut
July 10-11: Network Performance at OSU (next Joint Techs)
July 14-16: IPv6 Workshop at OSU (next Joint Techs)

ITU Plans for Country Registries: Dave Farmer
        The ITU is considering creating country registries. This would provide
competition on where to obtain IP addresses. Discussion pointed out that the ITU
previously proposed similar capabilities and each country would get one vote which
would politicize assigning IP addresses.
        ARIN is also interested in furthering country registries if there is any interest.
Contact: **jcurran@arin.net**

perfSONAR Workshops: Eric Boyd
        Funding from NSF and DOE, Office of Science, starting in 2004, has
underwritten research to develop the perfSONAR infrastructure. There is now a
significant interest in deploying the infrastructure. A workshop this coming summer was
proposed to NSF to provide a community-wide forum to guide and shape perfSONAR
infrastructure going forward. It would bridge the gap between researchers and network
operators. Emphasis is on providing data and information to network operators while
enabling them to maintain their autonomy.   An executive committee has been set up to
guide the development of the workshop including perfSONAR developers, Federal
agency representatives, and network operators.

Interdomain Demonstration of perfSONAR
        The JET was tasked by the LSN to carry out a three domain demonstration of
perfSONAR. This should be discussed at the next JET meeting.

AI: Paul Love will put the multi-domain demonstration of perfSONAR on the next JET
agenda. Phil Dykstra should be invited to discuss DREN interest.

ARIN Update: Richard Jimmerson
        IANA now has 24/8s left. This pool of remaining IPv4 address space is projected
to be exhausted by the end of 2011. After the IANA pool is exhausted, the regional pools
may have up to one year of additional space available. Some /10s are reserved for small
organizations.
        Registrations for IPv6 address space are increasing exponentially but are still
small.
        ARIN update from Jt Techs:
                www.internet2.edu/presentations/jt2010feb/20100202-jimmerson.pdf

International Networking Update: Ana Preston
        Ana Preston of Internet2 arranged a series of discussions of international
networking.

GEANT: Roberto Sabatino
        GEANT is the pan-European network. GN3 is an EC-funded project cofunding

the development and services of the GEANT network. There is a network development program also that is developing backbone services, multidomain service, and user-oriented services. The GN3 program is developing 100 Gbps service (not yet waves), performance management, and IPv6. 100 Gbps trunks are projected to be needed by the end of 2011. An RFI is being developed now anticipating summertime procurement and a roll-out in 2011. This will be a backbone network between routers. It was noted that GEANT currently has 14 10G waves on their Germany<>Switzerland path.

Hardware will include Juniper T1600 and M120. Alcatel MCC 1678 equipment will provide circuit service. Alcatel LM1626 for DWDM has demonstrated 40 Gbps. An RFI is being prepared for 100 Gbps IP connectivity.

GEANT has Washington, DC to Frankfurt 10 Gbps service with both ESnet and Internet2. In addition a New York to Amsterdam 10 Gbps service is in-place. A 5 Gbps New York to Vienna service is in-place to ESnet.

APAN: Yasnichi Kitamura

India, Sri Lanka and Nepal have joined APAN.

Korea DCN service started yesterday to KOREN. Japan and Korea are on the inter-domain DCN. Other participants include Thailand (ThaiREN, UniNet, ThaiSARN).

TEIN3 held a perfSONAR hands-on workshop. VINAREN started perfSONAR infrastructure last June.

The Chinese Academy of Science has a 2.5 G perfSONAR box.

Latin America: Michael Stanton

RedCLARA, Alice2 is funded with 18 M Euros over 4 years (to 8/2012) to implement service.
-    REDCLARA2 includes service from Mexico through South America to all countries except Bolivia, Cuba, Honduras, Nicaragua, and Paraguay.
-    Backbone service was upgraded to 622 Mbps between Sao Paulo, Santiago, Panama City and Miami.
-    Other links are generally 155 Mbps
-    Links to Europe are 622 Mbps. A 1 G link to Miami is in-place.
-    Access bandwidth to Brazil is 1.450 Gbps. Other country access links are slower.

There are plans to extend service to Bolivia, Paraguay, and Nicaragua. Cross border fiber is being implemented in Chile/Argentina and Argentina/Brazil.

A link for Sao Paulo to Miami was 2.5 Gbps and was upgraded in 2009 to 20 Gbps: 5 G protected, 15 G unprotected. The protected circuit is used for RedCLARA2 and commodity networking. The 15 G unprotected service is used for science collaboration. In 3rd Q 2010 RNP service will expand to 15 cities in Brazil, most with 10 G service with some 2.5 and 1.0 G links. RNP plans to launch a pilot dynamic circuit service. RNP is implementing perfSONAR infrastructure and seeks to cooperate with U.S. networks.

Argentina: RETINA

Innova/RED is the primary R&E network in Argentina. It is building a new network to connect major institutions in Argentina. Increased connectivity to Chile is being developed. High speed FTP data transfers from Chile astronomical sites to the

U.S. will be supported. VLANs connect observatories in Chile to Santiago to Sao Paulo to Miami. This path is limited at 45 Mbps.

Africa: Kevin Chenge

New undersea connectivity was developed in 2009 via the SEACOM, TEAMS, and EASSY cables. SEACOM covers East Africa (Tanzania, Uganda, Kenya,) to London with a link in Mumbai. The path to Europe currently goes through Mumbai. Backup service is still provided by satellite.

The TEAMS cable from Kenya to Fujairah, UAE, is more expensive than SEACOM. RENU (Uganda) is seeking 10 G undersea cable connectivity. TERNET in Tanzania is expected to be active soon through SEACOM (Dar es Salam). KENET (Kenya) has connectivity to London through SEACOM. Local campus networks in Kenya need to upgrade to accommodate this new speed.

UbuntuNet Alliance

UbuntuNet Alliance is a regional association of African NRENs particularly Eastern Africa with connectivity to the U.S. It includes KENET.
South Africa has 10 Mb connectivity. KENET has 155 Mb connectivity on SEACOM and 500 Mb total connectivity. TENET contracted to host the South African NOC. TENET and KENET peer with GEANT.

For more information on African connectivity contact: **kchege@kenet.or.ke**

Next JET Meetings
March 16, 2010, 11:00-2:00: NSF, Room 1150
April 20, 11:00-2:00: NSF, Room 1150