

JET Meeting Minutes  
March 21, 2006

**I. Participants**

|                   |                  |                              |
|-------------------|------------------|------------------------------|
| Guy Almes         | NSF              | galmes@nsf.gov               |
| Heather Boyles    | Internet2        | heather@internet2.edu        |
| Joe Breen         | Un. Of Utah      | joe.breen@utah.edu           |
| Natasha Bulashova | Gloriad          | natasha@gloriad.org          |
| Joe Burescia      | ESnet            | joeb@es.net                  |
| Rich Carlson      | Internet2        | racarlson@anl.gov            |
| Bobby Cates       | NASA/Ames        | bcates@nsipo.nasa.gov        |
| Greg Cole         | Gloriad          | gcole@gloriad.org            |
| James Cook        | DREN             | jrcook@hpcmo.hpc.mil         |
| Steve Cotter      | Internet2        | scotter@internet2.edu        |
| Jan Eveleth       | Pac NW GigaPoP   | eveleth@cac.washington.edu   |
| Mike Gill         | NIH/NLM          | gill@nlm.nih.gov             |
| Jeff Harrison     | ARSC             | jeff.harrison@arsc.edu       |
| Russ Hobby        | Internet2        | rdhobby@internet2.edu        |
| Kevin Jones       | NASA NREN        | kjones@mail.arc.nasa.gov     |
| Joe Loiacono      | NASA/GSFC        | jloiacon@csc.com             |
| Paul Love         | NCO              | love@nitrd.gov               |
| Dan Magorian      | MAX              | magorian@maxgigapop.net      |
| Joe Mambretti     | Northwestern Un. | j-mambretti@northwestern.edu |
| Grant Miller      | NCO              | miller@nitd.gov              |
| Hal Pierson       | FAA              | hal.pierson@faa.gov          |
| Anne Richeson     | Qwest            | anne.richeson@qwest.com      |
| Ernesto Rubi      | Ampath           | ernesto@cs.fiu.edu           |
| George Seweryniak | DOE/SC           | seweryni@er.doe.gov          |
| Brent Sweeny      | Ind. Un.         | sweeny@indiana.edu           |
| Alan Verlo        | StarLight        | alan@cs.uic.edu              |
| Ken White         | NISN             | ken.white@msfc.nasa.gov      |
| Jim Williams      | TransPac         | williams@indiana.edu         |
| Charles Yun       | Internet2        | tcyun@internet2.edu          |
| Matt Zekauskas    | Internet2        | matt@internet2.edu           |

**Action Items**

1. Each JET organization should send their Points of Contact (PoCs) for IPv6 to Ron Broersma: ron@spawar.navy.mil
2. Joe Burescia will talk to AmPath about support for the HEP community connectivity to Brazil.
3. Send email to Russ Hobby if you have any thoughts and guidance on establishing a group for R&E Networks Operating as a System.
4. JET members with an interest in providing input guidance to Joint Techs Meetings

should contact Russ Hobby of Internet2

### **Proceedings**

This meeting of the JET was chaired by Paul Love of Internet2 and George Seweryniak of DOE/SC.

### **IPv6 Subcommittee Chair**

Ron Broersma of DREN has been named chair of the IPv6 Subcommittee. The subcommittee will address issues of IPv6 compliance to OMB Guidelines, IPv6 research, and implementation issues such as IPv6 security.

AI: Each JET organization should send their Points of Contact (PoCs) for IPv6 to Ron Broersma: [ron@spawar.navy.mil](mailto:ron@spawar.navy.mil)

### **Update on ONT3 Workshop**

Joe Mambretti is the US CoChair of the Optical Networking Testbed Workshop 3 (ONT3) to be held September 14-15 in coordination with the GLIF workshop in Tokyo, Japan. The Japan National Institute of Information and Communications Technology (NICT) is cosponsoring this workshop and Tomonori Aoyama of the University of Tokyo is the Japan Cochair of the workshop. NASA, Ames Research Center is hosting the Web site for the ONT3 Workshop.

The ONT3 Workshop will continue, in the international forum, the objectives of the ONT2 Workshop to foster the use of end-to-end dynamic optical networking in operational networks. The focus is on Layer 1, lightpath-based (lambda) services, optical communications and services. It will not address Layer 3 or other networking services such as wireless or satellite networking. Topics to be addressed by the workshop include:

- Future research plans (5-15 year horizon)
- Basic research and experimentation
- Early prototypes (2-3 year horizon)
- Pre-production implementations
- Production implementations
- International services, facilities, exchange points, and technologies

### **Next Generation Open Communications Exchanges**

Joe Mambretti presented the current status of open exchanges. Next generation digital communications facilities are emerging as open multi-service exchanges. These facilities allow for peering at any OSI Layer, including L1. Peering can be autonomous. Open exchanges provide services not available from carriers including:

- Optical layer peering
- Grid services
- New protocol services
- Experimental services

New developments in optical networking protocols and services will enable open exchanges. The developments include common service definitions, policy-based access, signaling protocols, and control methods. The open exchanges provide:

- Interdomain services enabled by multi-domain control planes for Layers 1 and 2.
- Layer 2 hierarchical services
- Edge processes including application enabled dynamic topology provisioning at Layer 1.
- Web Services Resource Framework (WSRF)
- Support for User Controlled Light Path (UCLP) V2, Optical Dynamic Intelligent Network (ODIN), DRAGON, PIN, and other services
- Interfaces to EU services and applications
- Reconfigurable Optical Add Drop Multiplexors (ROADMs) will be deployed in Ca\*net4 by the second quarter.

Open exchanges are being introduced worldwide and include:

- StarLight (Chicago)
- Pacific Northwest GigaPoP (Seattle)
- NetherLight (Amsterdam)
- CA\*net4 (Canada)
- UKLight (London)
- NorthernLight (Stockholm)
- CzechLight (Prague)
- T-LEX (Tokyo)
- Etc.

National LambdaRail (NLR) is a key resource supporting open exchanges. The Global Lambda International Facility (GLIF) is a consortium of international organizations. It is defining open exchange points and GLIF Open Lightpath Exchanges (GOLES): See [www.glif.is](http://www.glif.is)

## **JETnet Roundtable**

### **Abilene**

Abilene has established Sponsored Educational Group Participants (SEGPs) for Alaska and Florida. Abilene has implemented IPv6 and multicast. They used to advertise all routes and sites but now advertise only participant routes and sites. Abilene has IPv6 transit from Global Crossing at 10 Gbps. This has shortened many paths and improved performance.

Abilene has implemented peering in Sunnyvale, California. They have an OC12 link from the Qwest PoP to Ames Research Center. Abilene migrated to fiber from ESnet at 10 Gbps. Next month an additional fiber is expected to provide an alternative path for this connectivity.

TENANT, a South African network now connects to the MANLAN in New York City.

### **ESnet**

ESnet just held its Layman review. The review validated the design and plans for the next generation of the ESnet core networking. They recommended increased R&D on useable technology. ESnet brought up 2 10 Gbps circuits on Long Island.

## **Gloriad**

Gloriad is a US/Russian project to connect at Layers 1 and 2. Korea has joined the project. Dr. Kim of Korea will be working with Gloriad for two years. Kees Negers is chairing a governance committee. The first 10 Gbps segment of Gloriad is operational and UCLP enabled. North American transit is provided by Canarie, which is providing a full wavelength. In October 05 an open exchange point in Hong Kong became operational. An STM 16 link from Hong Kong to the US is being installed. Beijing/Hong Kong/US connectivity will be 1 GigE. Amsterdam to Moscow will be OC12. Gloriad is using a BRO box in Chicago for security. They have implemented AMP measurement monitoring. Gloriad uses a distributed NOC. Gloriad has NSF funding to investigate mobile routing.

## **DREN**

DREN is completing an MOU with NISN for network connectivity from Poker Flats, Alaska to Goddard Space Flight Center (GSFC). DREN is in discussions with NLR and the PNW GigaPoP for implementing peering for IP service.

## **NREN**

NREN has implemented Gigabit networking to GSFC using NLR. They are now testing traffic on this link

## **Arctic Region Supercomputer Center (ARSC)**

ARSC is cooperating with DREN on an OC112 link that is supporting connectivity to Poker Flats

## **Network Performance Measurement**

Matt Zekauskas presented the status of the JET Measurement subcommittee. Members include Phil Dykstra and James Cook of DREN. They are cooperating on measurement of IPv4 and IPv6 performance measurement. They have identified technical issues for IPv6 routes and are troubleshooting those issues. The subcommittee is looking to provide substantial performance data by the next JET meeting.

## **GENI Town Hall Meeting**

The NSF GENI program held a town hall meeting recently that got together researchers and networkers to explore the preliminary designs for a new networking architecture infrastructure. The objective was to generate new ideas for architectures and to assure that an infrastructure would be useable. Breakout groups dealt with:

- Distributed systems and applications
- Real-time operational issues
- Wireless and sensor networks
- Facility design
- Security
- International cooperation

Materials from the Town Hall meeting will be on the CRA Web site.

## **NGIXs**

### **NGIX-East**

Dan Magorian indicated that NGIX-East is working with GEANT2 to implement a 10 Gig link. NGIX-East is installing a switch to support lightpath activities. Equinex in Ashburn is peering at NGIX-East using Qwest IPv6 transit. NGIX-East is providing lambda transport for NISN and ESnet transport to Jlab.

### **StarLight**

Georgia Tech connectivity using UltraScience Net is now operational. The University of Chicago and the TREK Center now have 10 Gig links. StarLight supported KRISTI in Korea for a demonstration to their science minister. NREN peering is being discontinued. StarLight is working with GLIF to develop a management plan. They are also supporting the OptiPuter project.

### **Pacific NorthWest GigaPoP**

Pacific Wave (PacWave) is considering approaches for implementing IPv6 multicast. They would like to know of anyone who would like to use IPv6 multicast. NLR, Los Angeles, and Sunnyvale are now connected to PacWave for peering. ESnet is working on how to make services operational and available on an open basis. PacWave is supporting the University of Tokyo on IPv4 and IPv6 Land Speed Records using a 10 Gbps circuit over 40,000 Km.

### **AmPath**

AmPath has a new 454 installation in Santiago, Chile. They will be implementing a Sao Paulo to Santiago link soon. They are working on AmPath/Brazil connectivity to serve the High Energy Physics community in Sao Paulo and Rio.

AI: Joe Burescia will talk to AmPath about support for the HEP community connectivity to Brazil.

### **MANLAN**

TENNET in South Africa has implemented their second link to MANLAN. MANLAN is implementing an OC192 from New York to London to support the HOPI testbed and cooperation on applications over HOPI. MANLAN and NGIX-East are discussing a 10 Gig link.

### **Meetings of Interest**

April 24, Internet2 members meeting

July 17, Joint Techs meeting in Madison, Wisconsin

May-June: IPv4 multicast meeting in Ann Arbor

April 23-25 Gloriad meeting

April 6-7 Network Performance workshop in New York City

June 19-21: Qwest emerging technology meeting

July 24-25: LSN workshop at the NSF, Washington, DC

## **Research and Engineering Networks Operating as a System**

Russ Hobby expressed interest in generating a group to discuss R&E networks operating as a system. This would include optical networking transparency, route flow fusion, how to coordinate problems when they arise, visibility of end-to-end issues, connectivity of Supercomputer Centers, and working with end users over the longer term to assure their operational needs are met.

Discussion identified that JET had an interest in such a subgroup. Mary Anne Scott and Dan Hitchcock should be involved. Tier 2 HEP sites should be addressed. Many do not realize they are directly involved in future network issues.

AI: Send email to Russ Hobby if you have any thoughts and guidance on establishing a group for R&E Networks Operating as a System.

Russ Hobby sought JET input to the Joint Techs Meetings to help define issues of interest and meeting agendas.

AI: JET members with an interest in providing input guidance to Joint Techs Meetings should contact Russ Hobby of Internet2

### **Next JET Meetings**

April 18, 11AM-2PM, NSF Rm 1150, NSF

May 16, 11AM-2PM, NSF Rm 1150, NSF

June at the Madison, Wisconsin Joint Techs Meeting