



Global Lambda Integrated Facility Technical & Control
Plane Working Groups Joint Session, 30 September 2005
Cal(IT)², San Diego, United States

Attendees

<u>Name</u>	<u>Organisation</u>	<u>Country</u>
Tomonori Aoyama	University of Tokyo	Japan
Bill St. Arnaud	CANARIE	Canada
Erik-Jan Bos (Co-Chair)	SURFnet	The Netherlands
Greg Cole	GLORIAD	United States
John Connolly	University of Kentucky	United States
Steve Corbato	Internet2	United States
Steve Cotter	Internet2	United States
Sergi Figuerola	i2CAT	Spain
Licia Florio	TERENA	-
David Foster	CERN	-
Pat Gary	NASA/GSFC	United States
Vikram Gazula	University of Kentucky	United States
John Graham	UKLight	United Kingdom
Eduard Grasa	i2CAT	Spain
Leon Gommans	Universiteit van Amsterdam	The Netherlands
Jan Gruntorad	CESNET	Czech Republic
Jeroen van der Ham	Universiteit van Amsterdam	The Netherlands
René Hatem (Co-Chair)	CANARIE	Canada
Michiaki Hayashi	KDDI R&D Labs	Japan
Akira Hirano	UIC/EVL	United States
Bonnie Hurst	MCNC	United States
Hideaki Imaizumi	University of Tokyo	Japan
Waturu Imajaka	NTT	Japan
Masahiko Jinno	NTT	Japan
Gigi Karmous-Edwards (Co-Chair)	MCNC	United States
Akira Kato	WIDE Project	Japan
Dongkyun Kim	KISTI	South Korea
Tomohiro Kudoh	AIST	Japan
Scott Macdonald	e-side	Japan
Joe Mambretti	iCAIR/Northwestern Univ.	United States
Jun Matsukata	NII	Japan
Steve Meacham	NSF	United States
Kevin Meynell (Secretary)	TERENA	-
Dan Nae	Caltech	United States
Naohide Nagatsu	NTT	Japan
Bram Peeters	SURFnet	The Netherlands
Ana Preston	Internet2	United States
Mark Prior	AARnet	Australia
Jan Radil	CESNET	Czech Republic
Predrag Radulovic	University of Tennessee	United States
David Richardson	Pacific Northwest GigaPoP	United States
Ann Richeson	Qwest	United States
Paul Roberts	U. Houston TLCZ	United States
Yasunori Sameshima	NTT	Japan

Richard Schneider	NASA/GSFC	United States
Fay Sheu	NCHC	Taiwan
Matt Schmitz	Cisco	United States
Jerry Sobieski	MAX/DRAGON/HOPI	United States
Hideaki Tanaka	KDDI R&D Labs	Japan
Steven Thorpe	MCNC	United States
Christian Todorov	Internet2	United States
Vasily Velikhov	RRC	Russia
Alan Verlo	StarLight/TransLight	United States
Steven Wallace	Indiana University	United States
Tom West	National LambdaRail	United States
Kennard White	Glimmerglass	United States
Garrut Yoshimi	University of Hawaii	United States
Oliver Yu	UIC/EVL	United States

1. Welcome

Erik-Jan welcomed everyone to the meeting and introduced René Hatem and Gigi Karmous-Edwards as the co-chairs of the session. The plan was for the Technical and Control Plane Working Groups to meet jointly during the morning session, then break-out into separate groups in the afternoon.

The aim of the joint session was to discuss issues of relevance to both working groups, as well as define the specific areas on which each would work. This was necessary to divide-out the work and avoid unnecessary duplication of effort.

After the various GLIF mailing lists were outlined, the question of how to subscribe to them was raised. Kevin replied this was possible from the individual working group web pages, but he would add links to the GLIF home page (<http://www.glif.is>) to make things clearer.

ACTION 20050930-1: Kevin Meynell to make clearer on GLIF website how to subscribe to mailing lists.

2. Division of tasks between Working Groups

There was a discussion about the appropriate division of tasks between the Technical and Control Plane Working Groups. René suggested that the Technical Working Group should focus on compiling information about GLIF resources, as it was necessary to find out what was available where. It should also investigate automating those lower-level tasks that currently required manual intervention. Allied to this was the need to develop common service definitions, although this should be done in conjunction with the Control Plane Working Group.

David R asked whether the proposed common service definition would be more of an informal agreement, or whether it would be closer to an API. Gigi replied that Jerry Sobieski planned to cover this in his presentation during the separate Control Plane Working Group session.

Joe suggested there first needed to be a standardisation of terms within the GLIF community, otherwise there was the potential for confusion. René replied this had already been discussed several times, but there had been very little progress on the issue. Whilst the issue had raised in many meetings over the past four years, there had been very little discussion on the mailing lists where it was easier to thrash-out such issues. However, in order to try and progress the issue, the GLIF Secretariat was asked to start collecting terms and definitions for a glossary.

ACTION 20050930-2: Licia Florio to collect terms and definitions for glossary.

Matt added his observation that many issues were common to both the Technical and Control Plane Working Groups, and it was important they worked closely together. Erik-Jan replied this was one of the reasons for having a joint session, and the plan was to continue this in future.

3. GLIF Resources

There were updates from several optical exchanges about their current resources (see <http://www.glif.is/meetings/2005/tech/bos-resources.pdf>).

Erik-Jan reported that NetherLight had 4 x 10 Gbps links to MANLAN, 2 x 10 Gbps to both StarLight and CERN, 1 x 10 Gbps to CESNET, GÉANT and UKLight, 1 x 2.5 Gbps to NORDUnet, and multiple 10 Gbps to SURFnet. Connected exchanges generally assumed bilateral control over the links, although Internet2/DANTE controlled one of the MANLAN links.

John reported that UKLight had 10 Gbps connections to both StarLight and NetherLight. The extended development network within the UK was based around four C-PoPs in London, Leeds, Reading and Warrington connected via 10 Gbps links. There were ongoing 10 Gbps connections from the C-PoPs to various institutions.

Lars reported that NorthernLight was a star network based around a hub in Stockholm, with OC-48 connectivity to Copenhagen, Oslo, Helsinki and NetherLight in Amsterdam. It is based on Cisco ONS-15445s that provide 2 x 1 GE links between any two cities. It will also be connected to GÉANT2 by December 2005, and will be upgraded to n x 10 GE by June 2006.

David F reported that CERN had 2 x 10 Gbps links to SURFnet, and 10 GB links to both StarLight and MANLAN.

Christian reported that MANLAN had five 10 GE links to Abilene, ESnet, GÉANT, NYSERNET and SINET. There were also five 1 GE links to CA*net, SURFnet, Egypt and Qatar. Further OC-192 links existed to Abilene, CA*Net (x2), GÉANT, SURFnet (x2), and a CANARIE relay to Amsterdam.

René reported that CANARIE-StarLight had seven OC-192 links to Toronto (x2), Amsterdam, Winnipeg, Vancouver, F10, and the GLIF HDXc node. A further two OC-192 links would shortly connect IRNC and Force10 (2nd connection). There was also an OC-48 link to TWAREN via the GLIF node.

René reported that the CANARIE-Pacific Northwest GigaPoP had five OC-192 links to Calgary, Vancouver (x2), Victoria, and the GLIF HDXc node. A further two OC-192 links would shortly connect Busan (South Korea) and IEEAF Tokyo. There were onward 1 GE connections from the GLIF node to Pacific Wave and KREONET.

Akira reported that T-LEX had OC-192 and OC-12 links to the Pacific Northwest GigaPoP. There were also 1 GE links to APAN, ASCC (Taiwan), Data Reservoir, JGN2, WIDE, and the University of Tokyo. A further OC-192 to IEEAF was planned in the future.

Dongkyun reported that KRLight had 2 x 10 GE links to KREONET, and OC-192 links to both Hong Kong (HKLIGHT) and Seattle (Pacific Northwest GigaPoP). This provided onward connections to Beijing, Novosibirsk, Moscow and Amsterdam.

? reported that UltraLight was comprised of six PoPs in Chicago (StarLight), Geneva (CERN), Los Angeles (CENIC), New York (MANLAN), Seattle (National LambdaRail), and Sunnyvale (National LambdaRail) interconnected by 10 Gbps links. There were also external connections to CANARIE, NetherLight and UKLight.

David R reported that the Pacific Northwest GigaPoP and Pacific Wave had an OC-192 to Tokyo provided by IEEAF, an SX-Transport OC-192 to Hawaii and Sydney provided by AARnet, and a permanent 10 GE to Sunnyvale and Los Angeles with CENIC. They also had five temporary 10 GE and OC-192s between Seattle and San Diego for iGrid 2005. There were plans to add optical and SONET/GFP-F switching in Seattle and Los Angeles during 2006.

Erik-Jan suggested that it would be useful to list the various GLIF resources on the GLIF website. Kevin said he would put a page together from the presentations, but hopefully this information could be extended.

ACTION 20050930-3: Kevin Meynell to list GLIF resources on GLIF website.

4. GLIF Repository

Erik-Jan said that a more standardised system of representing GLIF resources was required. As existing networks grew and others appeared, it would be increasingly difficult to coordinate all the lightpaths, interfaces, exchange points, policies and administrative information in the current ad-hoc fashion. Although the aim was to initially focus on the lower-level services, a coordinated repository of information could also be useful for the control plane levels as well.

At the present time, there appeared to be three main approaches to implementing network resource repositories. GLORIAD had used a monolithic database approach for their purposes, whilst NLR had adapted the DNS to store network information. The third, but thus far more theoretical approach, was to utilise semantic web technology to create a distributed database of network information that could be maintained by each organisation. The merits of each of these approaches needed to be examined to determine whether a common standardised system could be agreed upon.

4.1 Using RDF to describe networks

Jeroen gave a presentation about how the Resource Description Framework (RDF) could be used to describe GLIF facilities (see <http://www.glif.is/meetings/2005/tech/vdham-rdf.pdf>). Network descriptions were necessary to provide an overview of resources, make path discovery easier, and to undertake simple problem detection, but at the present time, GLIF resources were coordinated through an ad-hoc system of scribbled diagrams and telephone/e-mail communication. Such descriptions needed to be readable by both humans and computers, and semantic web techniques offered this possibility.

The semantic web is an extension of the current web in which information is given well-defined meaning, with RDF being a lightweight ontological framework for undertaking this. It describes things using triplets consisting of subject (the thing being described), predicate (a property of the thing being described) and object (the value of the property) elements. A unique terminology is achieved using namespaces based on Dublin Core which are both human and machine readable.

A Network Description Language (NDL) based on RDF has been devised by UvA. This allows resource description files to be created, which can then be queried using an SQL-like language such as SPARQL. Such descriptions can also point to other network descriptions, allowing a complete picture of resources to be built-up. Another way of querying remote information is to issue SPARQL queries via HTTP or SOAP.

With respect to GLIF, each organisation can create a NDL description of their network, which could be validated and published via a portal which users would use to find paths and resources. This information could also be linked to geographical references (e.g. Google Earth) to provide mapping functionality, as well as administrative and policy information.

The next step is to develop tools that automatically generate and update descriptions. In addition, the portal should be developed to link these descriptions together to provide a comprehensive overview of GLIF resources. NDL could also be extended to support higher-level protocols, as well as security and filtering.

Jerry asked how quickly information was updated using this system. Jeroen replied that institutions published this information themselves, and it could be updated in real-time. It was therefore faster than a monolithic database approach.

4.2 GLORIAD Database Approach

Greg Cole gave a presentation about GLOCIS (see ?).

Cees commented that it was important to ensure network information was up-to-date, and asked whether there was a web interface where this information could be entered. Greg replied this was planned, but had not yet been implemented.

Cees also asked whether there were plans to extend the system and incorporate other types of information. Greg replied they wanted to use the system for at least six partner countries.

Gigi asked whether the mapping components would be released. Greg replied they planned to release the source code shortly.

4.3 Mapping US Regional Networks

Steven gave a presentation on using the DNS to map GLIF resources (see <http://www.glif.is/meetings/2005/tech/wallace-dns.pdf>). He had estimated that 55% of optical networking resources in the US were outside of National LambdaRail, and so an organised system of coordination was becoming increasingly important. The Quilt had been established as an informal organisation for purchasing bandwidth, knowledge exchange, and sharing of test equipment, but it did not have a good overview of regional network resources. In March 2005, it was therefore agreed this should be mapped, initially using hand-collected data. However, this was felt to be somewhat cumbersome, so ways of automating the process were investigated.

The DNS was chosen as the mechanism for this, as it was a well-known and widely-established distributed database that offered user-defined record types. The domain 'network-map.net' was therefore registered, and a record structure was defined. A virtual cartographer program was also developed that was able to query the DNS and make maps on demand.

Steven was interested in extending the system and asked who would be willing to maintain their own zone files. His lab would be willing to continue to host 'network-map.net', populate zone files for the existing US RONS (Regional Optical Networks), and make the virtual cartographer software available.

Cees thought the system would make too heavy use of the DNS, and neither was it designed for this purpose. Too much information would need to be included, and it would not be sufficiently real-time. However, it might be possible to utilise SRV records to point to locations where resource information could be found.

John asked what DNS offered that something like LDAP did not. Steven replied the DNS offered a much more simple delegation mechanism.

A quick show of hands revealed that there did not seem to be a great deal of support for utilising the DNS in this manner. Nevertheless, it was felt the experiences of the working system could be used to help refine the data model. Furthermore, there was interest in utilising the virtual mapper.

Summary

Erik-Jan concluded that the different approaches served particular purposes and were not essentially in competition with each another. In many respects, the various activities could be complementary to each other if the community could devote some effort to combining them. There was generally a lot of support for the RDF model, whilst GLORIAD had developed some very nice mapping capabilities. At the same time, the DNS could be used to point to where network resource information could be found.

It was agreed that a sub-working group comprising Erik-Jan Bos, Greg Cole, Freek Dijkstra, Lars Fischer, Jeroen van der Ham and Steven Wallace should be established to investigate how the various approaches could be combined. The GLIF Secretariat was asked to set-up a mailing list to facilitate this.

ACTION 20050930-4: Kevin Meynell to set-up mailing list for repository sub-working group.

5. Next meetings

The 6th Annual Global Lambda Workshop would be held on 11-14 September 2006 in Tokyo, Japan. It was anticipated this would include meetings of both the Technical and Control Plane Working Groups.

It was also agreed that interim meetings of both working groups should be held in early-2006. The working group chairs in conjunction with the GLIF Secretariat would investigate suitable dates and venues for this.

ACTION 20050930-5: Technical and Control Plane Working Group Chairs to investigate suitable dates and venues for interim meetings.

It was subsequently agreed that the interim working group meetings would be co-located with the Internet2 Joint Techs Workshop in Albuquerque, USA; probably on 8-9 February 2006.

Open Actions

20050930-1 Kevin Meynell to make clearer on GLIF website, how to subscribe to mailing lists.

20050930-2 Licia Florio to collect terms and definitions for glossary.

20050930-3 Kevin Meynell to list GLIF resources on GLIF website.

20050930-4 Kevin Meynell to set-up mailing list for repository sub-working group.

20050930-5 Technical and Control Plane Working Group Chairs to investigate suitable dates and venues for interim meetings.