Global Lambda Integrated Facility Technical Working Group
4th Meeting, 30 September 2005
Cal(IT)$^2$, San Diego, United States

**Attendees**

| Name | Organisation | Country |
|---|---|---|
| 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 | U. Kentucky | United States |
| Steve Corbato | Internet2 | United States |
| Steve Cotter | Internet2 | United States |
| Sergi Figuerola | i2CAT | Spain |
| 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 |
| Akira Hirano | UIC/EVL | United States |
| Hideaki Imaizumi | University of Tokyo | Japan |
| Masahiko Jinno | NTT | Japan |
| Akira Kato | WIDE Project | Japan |
| Dongkyun Kim | KISTI | South Korea |
| Scott Macdonald | e-side | Japan |
| Joe Mambretti | iCAIR/Northwestern Univ. | United States |
| 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 |
| Fay Sheu | NCHC | Taiwan |
| Matt Schmitz | Cisco | 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 |

*This meeting followed-on from the joint session of the Technical and Control Plane Working Groups earlier in the day.*

## 1. Actions from last meeting

20050213-1 Kevin Meynell to change name of mailing list to 'tech@glif.is'.
- Done.

20050213-2 Erik-Jan Bos, René Hatem, Cees de Laat, Jerry Sobieski & Linda Winkler to write their sections for the GLIF BCP by 15 March 2005.
- Ongoing.

20050213-3 Kevin Meynell to chase-up contributions and put together draft document.
- Done, but insufficient contributions.

20050213-4 Jerry Sobieski to present final document at iGRID 2005.
- Superseded.

20050213-5 René Hatem to prepare some draft definitions for discussion.
- Done.

20050213-6 Erik-Jan Bos to work on standardising service descriptions.
- Done.

20050213-7 Linda Winkler and Jerry Sobieski to put procedural information for SC'05 on the web before June 2005.
- Done.

20050213-8 Erik-Jan Bos to investigate the suitability of the semantic web for cataloguing GLIF resources by 15 April 2005.
- Done.

20050213-9 René Hatem to clarify GLIF resources by 15 April 2005.
- Done.

20050213-10 Linda Winkler to send iGRID 2005 timelines and milestones to Kevin Meynell by 6 March 2005.
- Done.

20050213-11 Kevin Meynell to put iGRID 2005 timelines and milestones on the GLIF website.
- Done.

20050213-12 Kevin Meynell to establish links to iGRID 2005 and SC'05 from the GLIF website.
- Done.

20050213-13 Cees de Laat to start discussion on definition of open and neutral optical exchanges on the mailing list.
- Ongoing.

## 2. Open Exchange Coordination

Erik-Jan said the communication between the optical exchange operators (collectively known as GOLE) needed to be improved, and he suggested to start holding regular teleconferences. These could be organised by the GLIF Secretariat on (say) a monthly basis, although a few logistical issues needed to be resolved.

There was general support for monthly teleconferences, although it was felt that a chair should be appointed to put together an agenda for each meeting. Christian commented that it was not reasonable to burden one person with this task indefinitely, and thought the chair should rotate on a quarterly basis, with each volunteer being responsible for three meetings. He offered to take the first stint as chair, which was accepted by everyone present.

The logistical issues were discussed, and it was agreed that each meeting should generally not exceed one hour. Another problem was finding convenient meeting times as participants were spread over several time zones. It was agreed the times should be determined by the chair, with the aim of minimising awkward dial-in times for as many participants as possible. Erik-Jan mentioned that he had a scheme for intercontinental meetings that he would send to the mailing list.

ACTION 20050930-1: Erik-Jan Bos to send scheme for intercontinental meetings to the mailing list.

It was agreed that the first teleconference should focus on preparations for SC'05, so it needed to be arranged before then. The GLIF Secretariat was asked to find a suitable date and set this up. The participants would be HKLight, KR-Light, MANLAN, NetherLight, NorthernLight, Pacific Northwest GigaPoP, StarLight, and T-LEX.

ACTION 20050930-2: Kevin Meynell to suggest suitable date for first GOLE teleconference, and set-up this up before 24 October 2005.

The GLIF Secretariat was also asked to set-up a mailing list for the optical exchange operators.

ACTION 20050930-3: Kevin Meynell to set-up GOLE mailing list.

## 3. Fault Management

René said that it was becoming increasing important to implement an end-to-end fault management system for GLIF. Although the majority of the constituent networks were not production oriented, there needed to be a centralised mechanism to report and track faults. For that, a standard way of reporting faults needed to be agreed, and a ticketing system implemented.

John agreed that a ticketing system should be developed, but he thought existing practices should first be documented as part of the BCP document. René therefore said he would circulate the CA*net4 Fault Management Guide as a starting point.

ACTION 20050930-4: René Hatem to circulate CA*net4 Fault Management Guide on the mailing list.

## 4. Resource Scheduling

Erik-Jan said this agenda item was related to the GLIF repository discussed during the joint session of the Technical and Control Plane Working Groups, although that was a longer-term activity. In the meantime, it was important to collect as much contact, resource and policy information from the GLIF operators as possible. This would be made available on the GLIF website to help facilitate coordination.

ACTION 20050930-5: Erik-Jan Bos to develop GLIF resource template.

ACTION 20050930-6: GLIF operators to send contact, resource and policy information to the mailing list.

## 5. Developments in Transcontinental Ethernet

John Graham gave a presentation on the use of Ethernet in the wide-area (see http://www.glif.is/meetings/2005/tech/graham-ethernet-over-sonet.pdf). This considered Ethernet over MPLS tunnels and L2TPv3, as well as over circuit-switched WANs (via ATM, POS and LAPS). In particular, the new ANSI and ITU-T standards for GFP (Generic Framing Procedure) with VCAT (Virtual Concatenation) and LCAS (Link Capacity Adjustment) were examined.

GFP defines mapping for many types of service onto SONET/SDH or OTN, including Ethernet, IP, Gigabit Ethernet, Fibre Channel and DVB (Digital Video Broadcasting). It offers excellent bandwidth utilisation, and efficency tailored to suit different client types. It has simple delineation and robust error control, and as well as being extensible.

The rationale behind GFP was that the cell overhead in traditional ATM networks takes 10% of the bandwidth, and its adaptation functions are overly complex. Similarly, Packet-over-SONET (POS) requires all frames to be converted to PPP over HDLC, byte stuffing causes non-deterministic bandwidth inflation, and QoS is hard to monitor or guarantee. By constrast, GFP overs minimal overhead, it can transport client PDUs (Protocol Data Units) in native format, frames from multiple protocols can be easily aggregated into shared bandwidth channels, and the low-latency capabilities are useful for DVB and SAN (Storage Area Networking).

There are two modes of GFP: GFP-F which maps each client frame onto a single GFP frame, and GFP-T which allows mapping of multiple client frames onto 64B/65B code blocks for transport within a single GFP frame. GFP-F offers higher bandwidth efficiency, but the downside is higher latency, the need for more buffering, and the need to calculate core header fields. By contrast, GFP-T supports many protocols and offers low latency, but it is less bandwidth efficient and requires more processing logic.

IEEE 802.3ae is the specification for 10 Gbps Ethernet over optical fibre (i.e. there is no copper interface). This offers a 802.3 MAC and frame format, although jumbo frames are not included in the standard. It is full duplex only, does not support shared media, and there is no CSMA/CD).

It is planned to implement these technologies on the UKLight's Ciena CoreDirector and MetroDirector switches. This should simplify the connections with other optical networks, and in particular remove the need for a Cisco ONS 15454 between UKLight and the Nortel HDXc at NetherLight.

Erik-Jan asked John whether his presentation could be turned into a wider tutorial on Ethernet in the wide-area as people had found it very informative. John replied that he would be willing to update it and make it available on the web.

## 6. Best Current Practice in GLIF

Erik-Jan reported that progress on the GLIF BCP document had been disappointing. A table of contents had been agreed at the previous meeting, but contributions had only been received from John Graham and René Hatem.

It was agreed that in order to progress this, perhaps just two or three people with sufficient time should volunteer to write some text. In anticipation of this, the table of contents should once again be circulated to ensure that it was still relevant.

ACTION 20050930-7: Kevin Meynell to re-circulate BCP table-of-contents.

## 7. Next Meeting

It had earlier been agreed that the next meetings of both the Technical and Control Plane Working Groups would be held in early-2006, in conjunction with an existing event.

*It was subsequently decided 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 Erik-Jan Bos to send scheme for intercontinental meetings to the mailing list.

20050930-2 Kevin Meynell to suggest suitable date for first GOLE teleconference, and set-up this up before 24 October 2005.

20050930-3 Kevin Meynell to set-up GOLE mailing list.

20050930-4 René Hatem to circulate CA*net4 Fault Management Guide on the mailing list.

20050930-5 Erik-Jan Bos to develop GLIF resource template.

20050930-6 GLIF operators to send contact, resource and policy information to the mailing list.

20050930-7 Kevin Meynell to re-circulate BCP table-of-contents.