Global Lambda Integrated Facility Technical & Control Plane Working Groups Joint Session, 11 September 2006 Akihabara Convention Hall, Tokyo, Japan

A total of 73 persons attended the session chaired by Erik-Jan Bos (SURFnet), René Hatem (CANARIE) & Gigi Karmous-Edwards (MCNC). The scribe was Kevin Meynell (TERENA)

1. Introduction

René Hatem (CANARIE) welcomed everyone to the meeting and introduced Erik-Jan Bos (SURFnet) and Gigi Karmous-Edwards (MCNC) as the co-chairs of the session. He outlined the objectives of the Technical and Control Plane Working Groups; the former focusing on provisioning global lightpaths today, with the latter looking at how to provision them in future. However, it was stressed that there was much overlap between their respective activities, which was why it was felt useful to hold a joint session to discuss activities of common interest.

René also reminded participants that the working groups were the place to solicit opinions about broader topics, to discuss developments, encourage pilot projects, and promote adoption of useful tools. They offered a useful forum to present ideas and to obtain peer feedback.

2. Approval of minutes

The minutes of the previous joint session on 8 February 2006 in Albuquerque, USA were approved.

3. Actions from last meeting

20060208-1   GLIF Secretariat to add service definitions to GOLE information.
             - Possibly superseded by NDL work.

20060208-2   GLIF Secretariat to investigate how to link GOLE diagrams to each other.
             - Superseded by NDL work.

4. Network Description Language update

Jeroen van der Ham (University of Amsterdam) gave an update on the Network Description Language (see http://www.glif.is/meetings/2006/joint-session/vdham-ndl.pdf). This aimed to describe network resources in terms of location, device type, interfaces and link capabilities using a XML-based schema. These descriptions could then be compiled together to provide a global overview of networks and their relationships. Although primarily developed with GLIF resources in mind, NDL could also be extended to other types of network.

A NDL generator had been developed to simplify the creation of resource descriptions, with users simply needing to enter their information into a web form (see

http://trafficlight.uva.netherlight.nl/JointDemo/GLIF.html). An NDL validator was also available that was able to check syntax and content of existing descriptions (see http://www.w3.org/RDF/Validator/).

As resource descriptions could include geospatial coordinates, this allowed topological maps to be easily generated. A NDL visualisation tool was therefore being developed that could not only generate diagrammatic topologies, but also allowed resources to be accurately plotted on geographical maps. This required some more work, but a basic implementation was already available.

Resource descriptions had already been produced for the NetherLight GOLE, but it would be useful if other GOLEs could add their information as well. This was a fairly simple process using the NDL generator, and just required the resulting description to be published on a website.

The next steps were to add support for network abstraction and multi-layer networks to NDL, as well as develop a path-finding mechanism. They would also be working with the DRAGON and PHOSPHORUS projects to further improve the network visualisation capabilities.

John Graham (ULCC) asked whether it was possible to use NDL to depict link usage between exchange points. Jeroen replied that NDL was more useful for static information, but could be adapted for link usage. Andree Toonk would expand on this during his presentation.

Victor Reijs (HEAnet) asked whether it was possible to describe a connection traversing a GOLE. Jeroen replied this was unfortunately not currently possible.

René asked whether there was any way of distinguishing between (say) 10 GE and OC-192 connections. Jeroen replied there was a property within the schema to differentiate between link layers.

Mauro Campanella (INFN-GARR) commented that abstracting the presentation of networks was important as this was needed for path finding and stitching. Jeroen replied that he had been working to improve the support for abstraction, but this was a difficult problem and there were different ideas about how to achieve this.

5. **Practical demonstration of Network Descriptions**

Andree Toonk (SARA) gave a presentation on how Network Description Language could be used for practical applications (see http://www.glif.is/meetings/2006/joint-session/toonk-practicalndl.pdf). SARA operated the NOC for both NetherLight and SURFnet6 and was currently working on using NDL for visualisation, path finding, monitoring/fault isolation, and reporting of resources. To this end, they had developed a Perl library for reading NDL files that could be used by other Perl programs, such as those available for monitoring and reporting (see https://noc.sara.nl/nrg/ndl/index.html).

They were able to demonstrate a reservation system for SURFnet6 lightpaths, report on the SDH capacity of the SURFnet6 network, and provide an overview of the status of the NetherLight lightpaths. The challenge with SURFnet6 was that it comprised a dense SDH network where it was difficult to find protected paths manually. However, NDL

allowed descriptions of the network to be automatically generated by retrieving information from the switches (using the TL1 toolkit – see Ronald van der Pol's presentation in the Technical Working Group meeting), and linking this to an SQL database with timeslot information.

NDL also made it easier to trace faults in lightpaths connecting through NetherLight. Topology information could be linked to an SQL database with alarm information, which could then highlight where the problems existed on a web interface. The plan was to provide a SOAP-based web interface so that every GOLE could advertise the status of their lightpaths, and allow an up-to-date overview of the whole GLIF network to be generated.

? asked how dynamic lambda provision was accommodated. Andree replied this currently had to be dealt with manually, but there were plans to automate this as well.

6. **UCLPv2**

Sergi Figuerola (i2cat) and Mathieu Lemay (Inocybe Technologies) gave a presentation about UCLPv2 (see http://www.glif.is/meetings/2006/joint-session/figuerola-uclpv2.pdf). User controlled lightpaths are those that allow users to undertake their own configuration and management. By giving them control of physical networks, they are able to manage virtual routers, switches, server nodes and build their own topology. In essence, they are similar to peer-to-peer overlay networks, but in fact at a lower level of abstraction.

UCLPv2 is a virtual network management tool that uses web services. It is possible to choose which resources (networks, instruments and sensors) to virtualise, whilst allowing them to be grouped together and allocated to dedicated users as Articulated Private Networks (APNs). Using the service interface, APN owners can establish cross-connections, change bandwidth and lease their resources. Network resources can also be easily integrated with applications.

APNs allow several parallel application specific networks to be created from a single physical network. This should make management easier, and with the addition of BPEL, provides a means to add policy checks and accounting mechanisms. APN workflow scripts can undertake pre-defined operations on lightpaths, interfaces and instruments in order to create custom APNs on-the-fly. Researchers can therefore define multiple APN configurations for use as and when different topologies are required.

There are three defined levels of users with UCLPv2. The Physical Admin (usually a network operator) is responsible for provisioning the network and creating resources (e.g. lightpaths) for APNs to use. The APN Admin (e.g. network administrator) receives the resource lists and is responsible for creating APN configurations for the users, or for sub-leasing resources to other APN Admins. Finally, the Users (e.g. researchers) are able to invoke the defined APN configurations.

In order to facilitate creation of APNs, a GUI-based application is available. In addition, the IEEE 1451-compliant GRIM toolkit (Grid Resource for Instruments Mode) that integrates with UCLPv2 has been developed for controlling Grid resources.

Further developments planned for UCLP include an improved web interface, routing work scripts enabling end-to-end connections, policy work scripts allowing special

policies to be enforced on APNs, along with billing and accounting capabilities. Support for Lambda and Ethernet switching, (G)MPLS, and Layer 3 virtual routing is also under development. Another step will be the introduction of the ULCPv2 Enterprise edition as many networks are reluctant to use anything in a production network that is not commercially supported.

Gigi asked how UCLPv2 differed from OpenView-type software. Mathieu replied that it allowed users to be given access to specific resources, which made it useful for condominium switches.

Kees Neggers (SURFnet) asked whether the 10 Gbps link from NetherLight to i2cat was now active. Sergi replied that it was.