



GLIF Automated GOLE Pilot Project

The GLIF (Global Lambda Integrated Facility) is an international community of R&E network service providers and research teams promoting advanced concepts in optical and photonic network services. The GLIF Automated GOLE Pilot leverages infrastructure resources of its participating organizations to provide test bed facilities to support user controlled network services, particularly connection oriented services for the scientific research community.

organization i.e., policy free cross-connect capability.

The **Automated GOLE Pilot** (hereafter called the Pilot) is a project initiated by the GLIF community to create an infrastructure of multiple GOLEs that allow automated user agents to request VLAN connections from a terminus at any one of the GOLEs, across the multi-domain GOLE fabric, to another edge terminus likewise attached to some other GOLE. The entire process is performed by automated agents within the application and within the networks, communicating to realize the end-to-end connection. Participating Automated-GOLEs (A-GOLEs) are Ethernet-switching nodes that have control software that re-configures the GOLE switches along a selected path to establish a dedicated VLAN between the two end points. This VLAN can be reserved in advance for a specified time, and is provisioned with dedicated capacity and performance characteristics guaranteed between the two end points.



The GLIF encourages and supports the establishment of GOLEs (GLIF Open Lightpath Exchanges) around the world and the partner contribution of high capacity transport links to interconnect the GOLEs. This distributed pool of switching and transport resources provides a global “expressway” for emerging hybrid services, allowing connections to be established across the world via the GOLE switching fabric. GOLEs provide “open” peering policies unmediated by the host

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The Pilot has two phases: the initial implementation phase, which was completed by the end of 2010, and the use and evolution phase, which will run for another year.

The Pilot is an experimental project. As Phase Two begins, the project hopes to attract applications interested in taking advantage of the available network capacity and performance, and which are willing to explore the use of hybrid (connection oriented) services within their application environment. The GOLE operators participating in the Pilot will assist the user community in attaching the user/application facilities to the regional GOLE, and advising the application developer(s) on how best to integrate the capabilities into the application. Any costs associated with this participation will be the responsibility of the user.

For network resource providers, the Pilot will develop a base of best common practices for engineering, configuring, and operating such hybrid and globally distributed service environments.

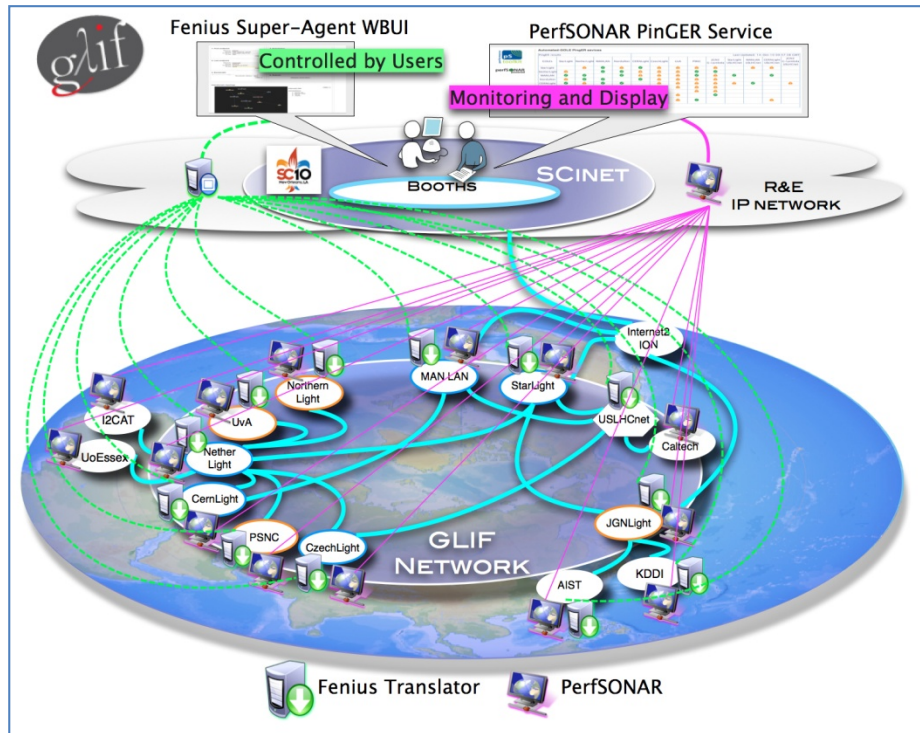
For users (broadly construed), the Pilot provides the ability to demonstrate book ahead and QoS based connection services, to test software that uses dynamically allocated connections (such as the EAGER project), and to exercise applications that need significant bandwidth between networks, possibly on different continents. Note that as a Pilot it is not (yet) for production projects.

The Automated GOLE service environment will evolve during the year long Pilot period to incorporate emerging standards and to apply lessons learned in the OA&M of these services. But the basic functional capabilities will be held steady as much as possible in order to facilitate application integration.

The A-GOLE connection provides transport of basic Ethernet frames across the GOLE fabric. This is currently accomplished by provisioning VLANs in the switching nodes along a path between the end

points. Connections across the Pilot infrastructure are free for the duration of the pilot.

The A-GOLE control plane currently uses the open source FENIUS software (developed by ESnet) to translate between a diverse set of provisioning packages such as DCN/OSCARS, Argia/UCLP, G-lambda, and DRAC. The project will inform and incorporate the OGF NSI (Network Services Interface) Working Group standards as they are finalized and released.



The participating A-GOLE Pilot operators and networks attached to GOLES are:

- NORDUnet (Nordics)
- NetherLight (NL)
- PSNC (PL)
- CERNLight (CH)
- CzechLight (CZ)
- University of Amsterdam (NL)
- University of Essex (UK)
- i2CAT (ES)
- StarLight (US)
- Internet2 ION - MANLAN exchange (US)
- ESnet (US)
- CalTech (US)
- USLHCnet (US, CH)
- CANARIE (CA)
- G-Lambda project (JP)
- JGN2Plus (JP)
- KDDI (JP)

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