

GLIF Automated GOLE TF

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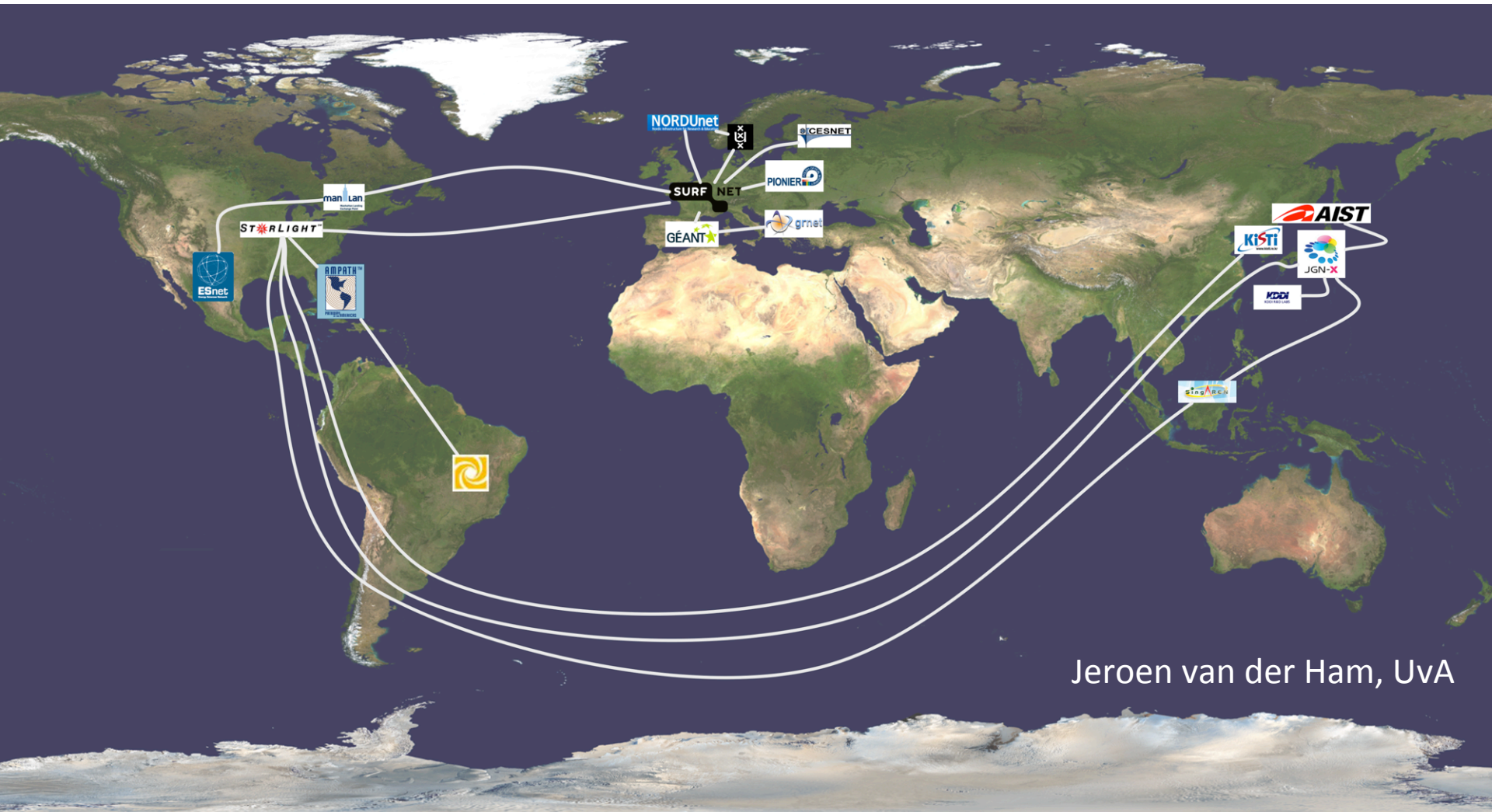
Objectives

- **Implementation of a standard: NSI**
 - Connection, discovery, topology and monitoring services
 - Interdomain BoD authentication and authorization testing
 - Performance verification possible
- **Proving and improving new services**
 - Across heterogeneous domains
 - With real users and applications

Automated GOLE Fabric



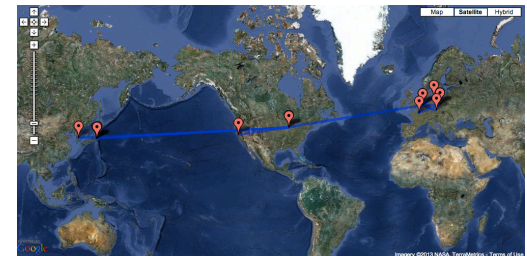
Automated GOLE Singapore



Jeroen van der Ham, UvA

Milestones 2013

- Showing simple topology exchange at TNC2013
- NSI hands-on workshop at APAN36
- GLIF Singapore / SC'13:
 - NSI-CSv2.0 interoperability
 - Topology exchange
 - Application demo



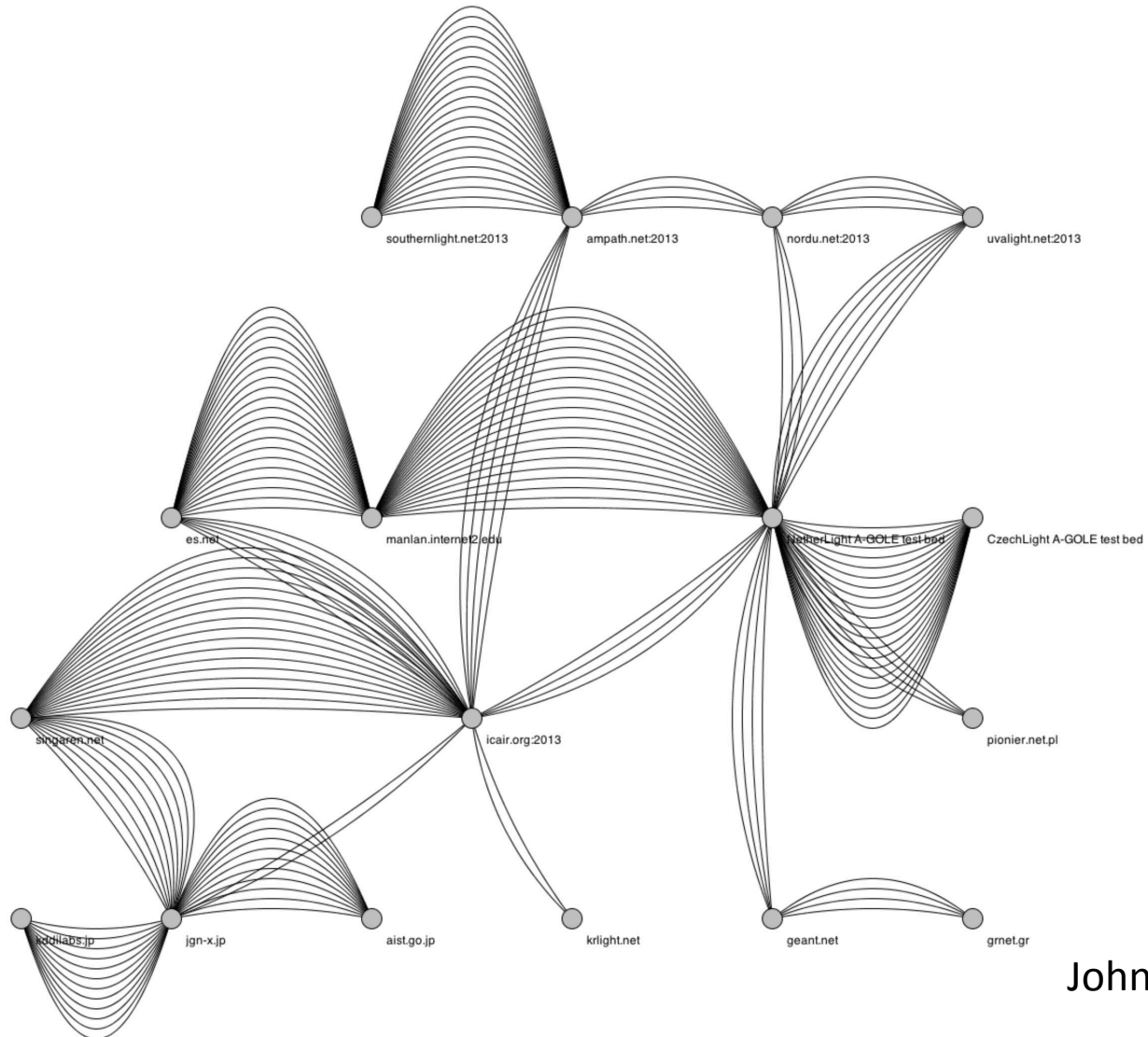
GLIF Singapore demo

- **NSI Connection Service v2.0**
- **Updated topologies, NML**
 - With URLs per domain
 - Some are generated automatically
 - Topology exchange not fully dynamic yet
- **G-lambda Aggregator & SURFnet/ESnet Aggregator**
- **Visualizations: 'Timeline' and 'Automated Earth'**

Lessons learned 1

- Updating different controllers to a new version of NSI shouldn't be done every time over and over again
- Topologies very hard to update and verify
 - Needs automation
(note: data plane often mismatches control plane)
 - Needs agreed upon operational procedures

Topology



Lessons learned 2

- Only implementing a protocol in the real world (NSI-CS v2.0 and NML + NML NSI extensions) shows what it lacks
 - Authentication/authorization infrastructure for end users
 - Real-time resource availability for efficient path finding

Next steps 1

- Bringing into production what has been built so far
 - NSIv2-CS
 - (Preferably automatic) Topology
with mismatching topology feedback
 - Adding domains using operational procedures
- Implementing the other NSI framework components
 - Topology service, Monitoring service, Discovery service
 - Service definitions

Next steps 2

- Switching service: E-LAN functionality
- SDN and multi-layer
 - OpenFlow for controlling AutoGOLE switching equipment
 - Multi-layer (SDN-T)?



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