Network Services Interface

- OGF NSI standards development progress:
  - NSI Framework Doc (spr'11)
  - NSI CS v1.0draft (Aug '11) – Feed initial implementation
  - NSI CS v1.0 final (Dec '11)
  - NSI CS v2.0draft, NSI Topology v1.0draft eta summer 2012

NORDUnet
Nordic Infrastructure for Research & Education

The Automated GOLE Fabric

The GLIF Automated GOLE Pilot was initiated in 2010 to provide a global fabric of Open Lightpath Exchanges for the express purpose of maturing the dynamic provisioning software, demonstrating the value of GOLEs to emerging network service models, and to develop a set of BCP for these services.

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GLIF Automated GOLE Pilot

- Accomplishments:
  - Migrated to NSI compliant provisioning fall 2011
  - Was used to construct the initial NSI Topology
  - Developed better tools/techniques for circuit monitoring and visualization
- Activities into 2012:
  - Keep NSI/Automated GOLE operationally available
  - Get software implementations stabled
  - Robustness – incorporate alternate paths
    - Expand CPH-NYC-CHI, CPH-HAM-PSNC, DAE-TOK?
  - NSI orchestration (JRA1-T4 ?) JS-B
  - Expand participation:
    - LHCONE – “APLONE” (Application 1)
    - GLORIAD (CHI-SEA: CY12Q1, others TBD)
    - RNP, AMPATH, WIX, P-Wave, PNWG
    - GEANT/NRENs
  - Explore other WAN transport switching technologies By 2012-Q3

GLIF Automated GOLE Pilot

- Activities at Rio:
  - NSI Connection Service protocol plugfest
  - Coordinated effort among AutomatedGOLE participants and other organizations developing NSI implementations
- Accomplishments across the Fall 2011:
  - Rio NSI Plugfest – First demonstration of NSI standards and software
  - Migrated Automated GOLE fabric to NSI
  - Expanded the AutoGOLE project/fabric participation
  - Developed better tools/techniques for circuit monitoring and visualization – (demo quality☺)

2012 Joint AutoGOLE + NSI Public display

- **I2 SMM** Washington Apr 2012
- **FIA** Aalborg May 2012 (new NSI features)
- **TERENA** Reykjavik May 2012

...Summer, then:

- **NORDUnet** Conference Oslo Sep 2012
- **GLIF 2012** Chicago Oct 2012
- **SC2012** Salt Lake Nov 2012

Potential NSI enabled capabilities:

- NSI Dynamic Virtual Topology Instantiation
- Power Path Finding
- NSI Intra-Domain deployment
- NSI Firewall Traversal
- 5-minute Setup
- Low Latency Reservations
- NSI + Scalable Switching
- Application Virtualization and Orchestration

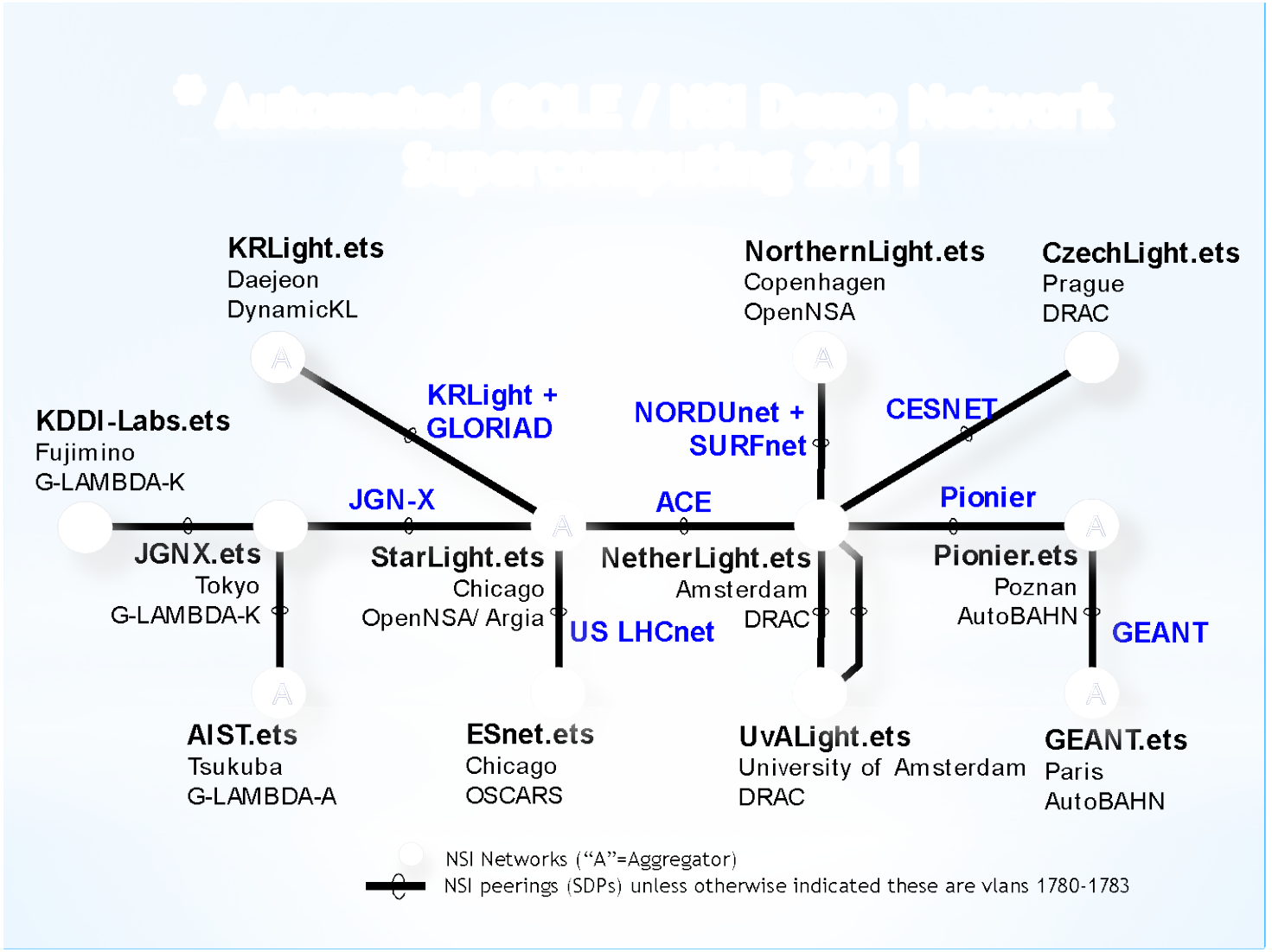
Workshop

- New technical services require education and training…
  - NSI Network Engineering
    - Operational/Production planning for NRENs and Campus service deployment
  - NSI Software development
    - How do “users” take advantage of these NSI?
- Schedule … estimated early March, CPH.

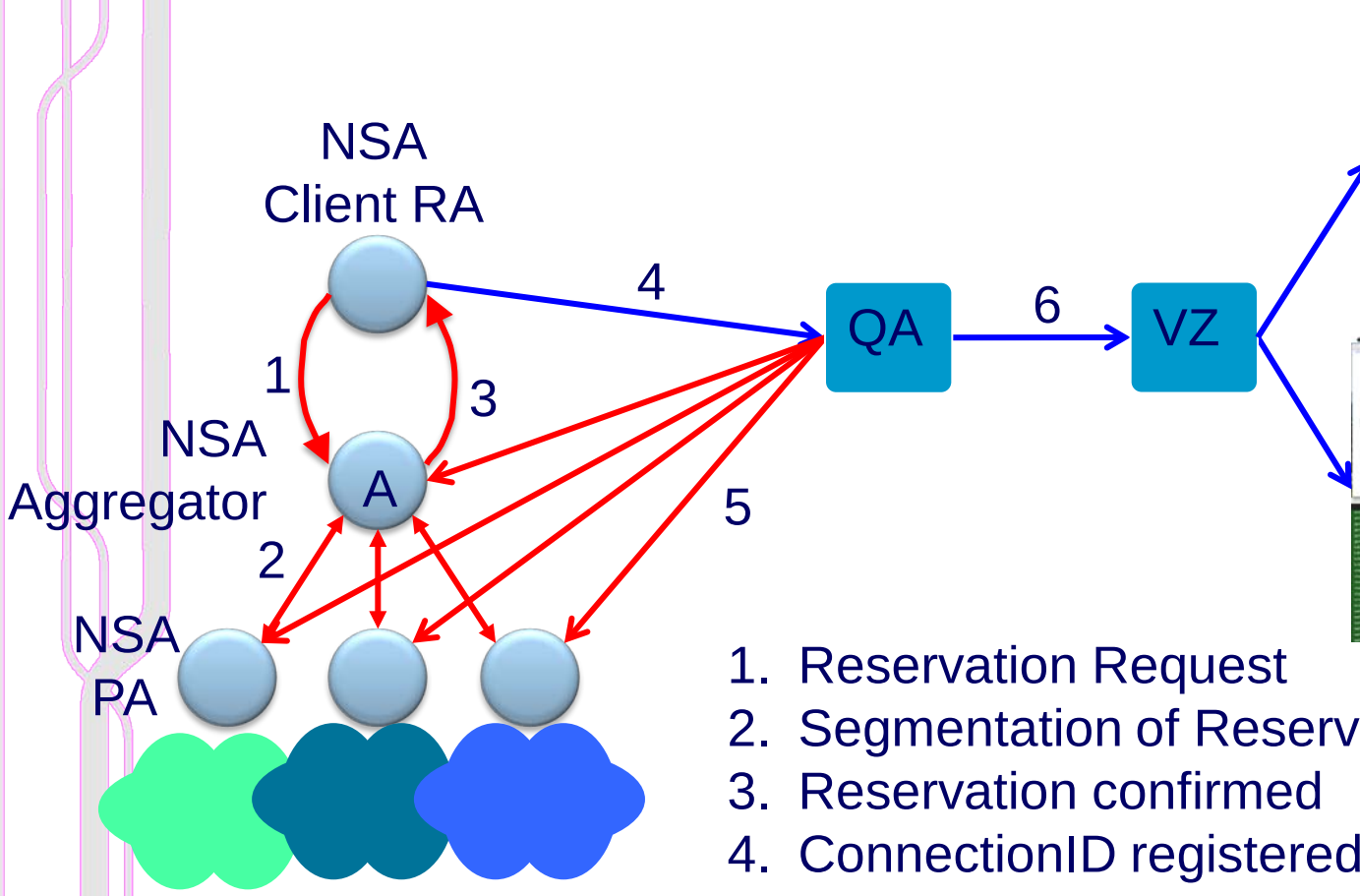
NSI Software Implementations:

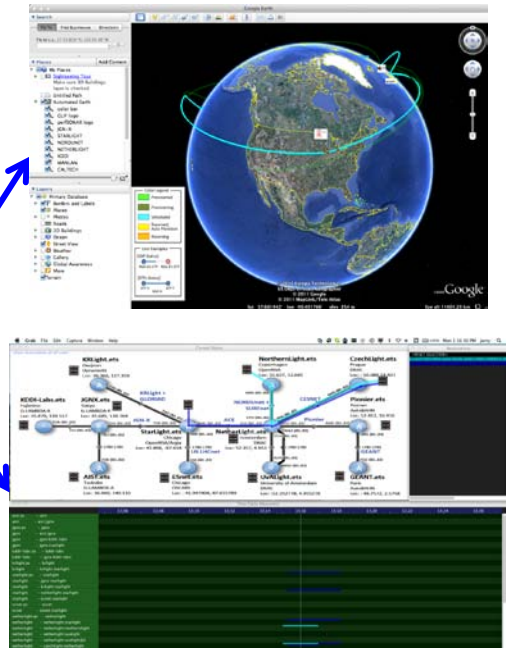
- ***OpenNSA*** – NORDUnet (Copenhagen, DK)
- ***DRAC*** – SURFnet (Amsterdam, NL)
- ***AutoBAHN*** – GEANT (Poznan, PL)
- ***G-LAMBDA-A*** - AIST (Tsukuba, JP)
- ***G-LAMBDA***-K – KDDI Labs (Fujimino, JP)
- ***DynamicKL*** – KISTI (Daejeon, KR)
- ***OSCARS*** – ESnet (Berkeley, US)

The NSI Demo at SC2011



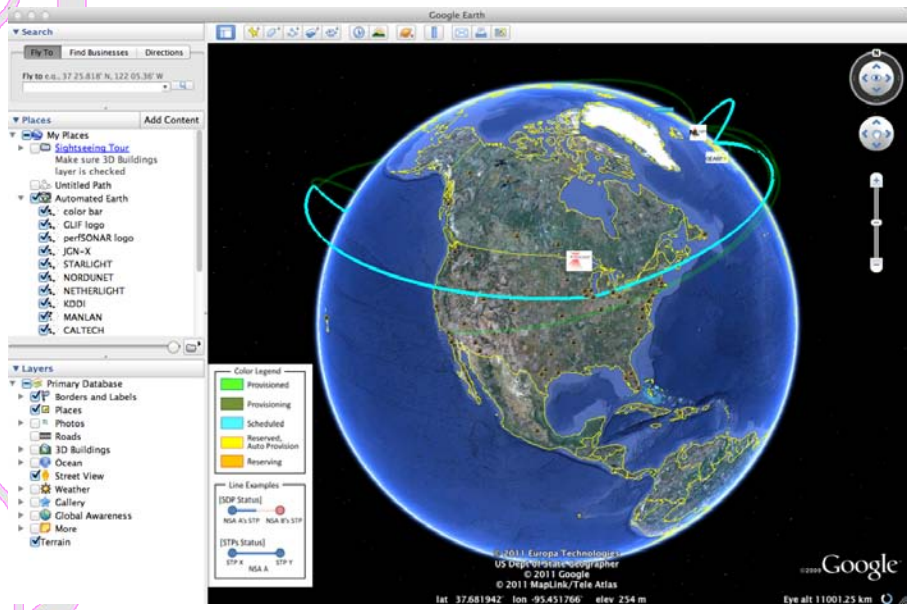
Initial Monitoring & Visualization



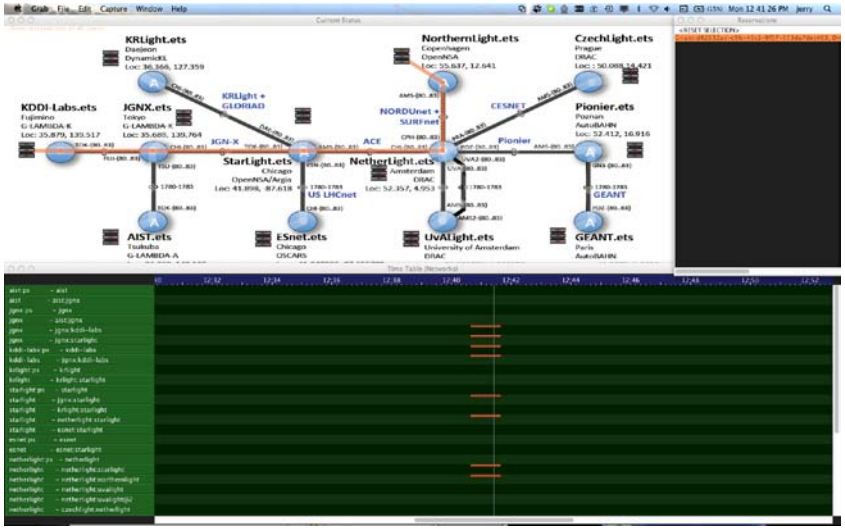


1. Reservation Request
2. Segmentation of Reservation to children
3. Reservation confirmed
4. ConnectionID registered with Query Agent
5. Query Agent walks tree to discover Path and Polls for state (10 sec interval)
6. Path and state info sent to vizualization app.
7. Viz app renders realtime image

Initial monitoring & visualization



"Automated Earth" viz
(Takatoshi Ikeda, KDDI-Labs)



"NSI Monitor" viz
(Tomohiro Kudoh, AIST)

Watch it Live!

- **Visualization**
- AIST Java status monitor: http://163.220.30.174:8070/monitor.jnlp
- KDDI Labs Google earth plugin: http://kote-ps-1.ps.jgn-x.jp/ps/autoearth-nsi/
- KDDI Labs Google earth kml: http://kote-ps-1.ps.jgn-x.jp/ps/autoearth-nsiAutoMAP.kml

NSI Development & Road Map

- **OGF NSI-CS version 1.0 is in final draft now**
- Demos:
  - Sep 2011: First NSI CS Interop Plugfest – GLIF 2011 Rio de Janeiro, BR
  - Oct 2011: First NSI Transport Provisioning Future Internet Assembly 2011 Poznan, PL
  - **Nov 2011: Global NSI + AutoGOLE Demonstration Supercomputing 2011 Seattle, US**
- Futures:
  - NSI Topology – dynamic distributed topology exchange. Required to automated the local maintenance of local topology and to enable scalable global pathfinding.
  - NSI Performance Verification – An architecture for automated service verification and fault localization/remediation
  - Common Service Definitions – Enabling interoperable transport services

Rio was a major milestone

…for both NSI and the AutoGOLE .