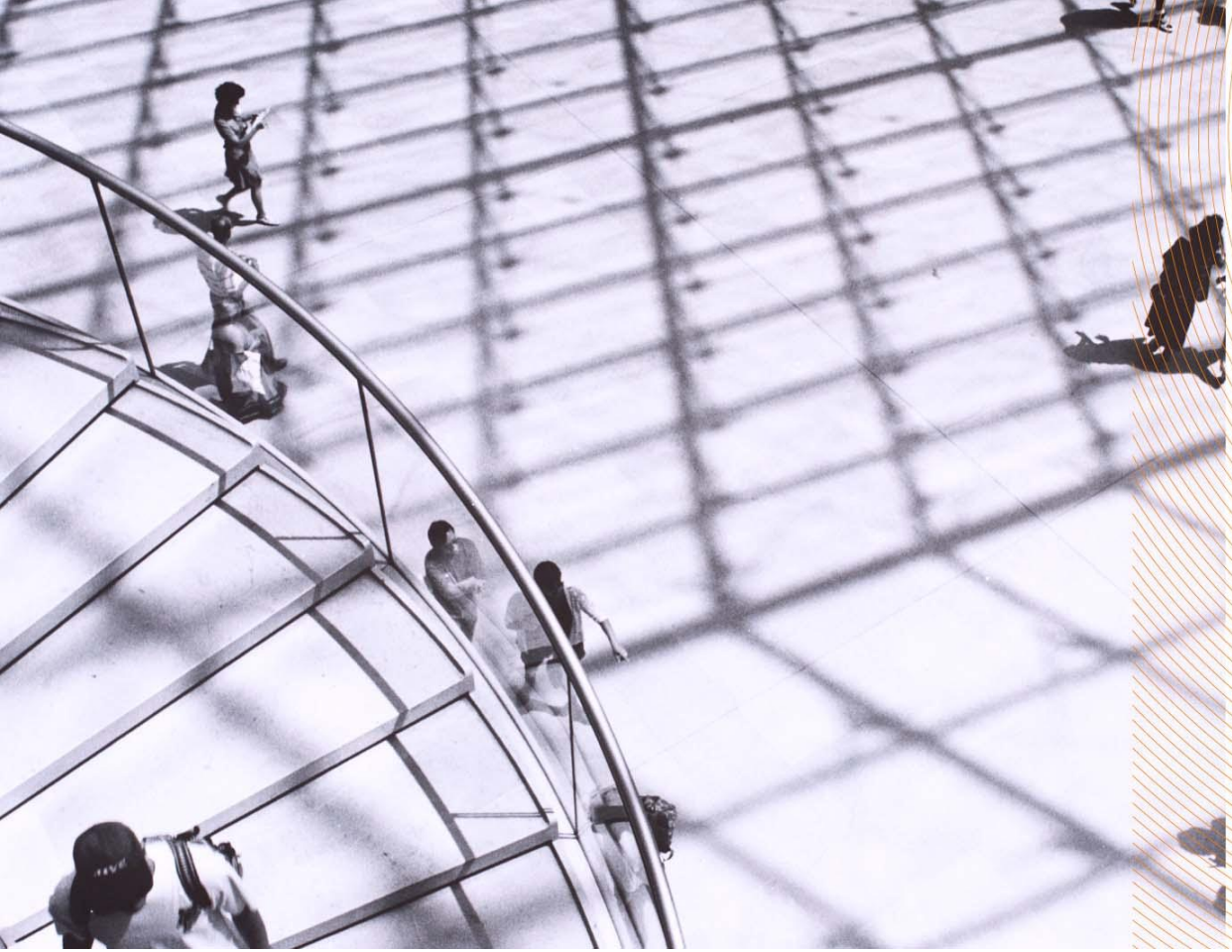


LHCONE in NetherLight

Gerben van Malenstein

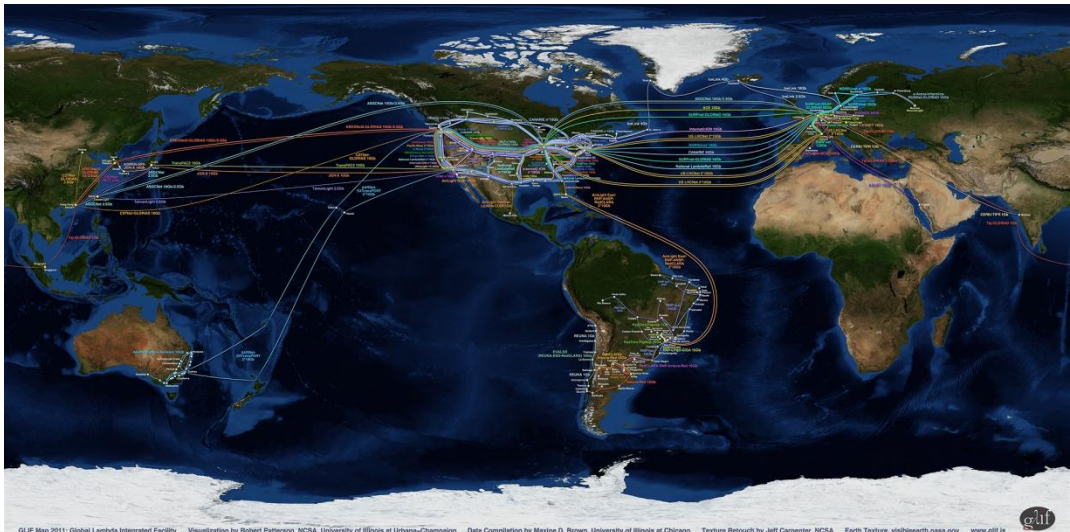
Amsterdam, the Netherlands – September 27, 2011
LHCOPN and LHCONE joint meeting

GOLEs

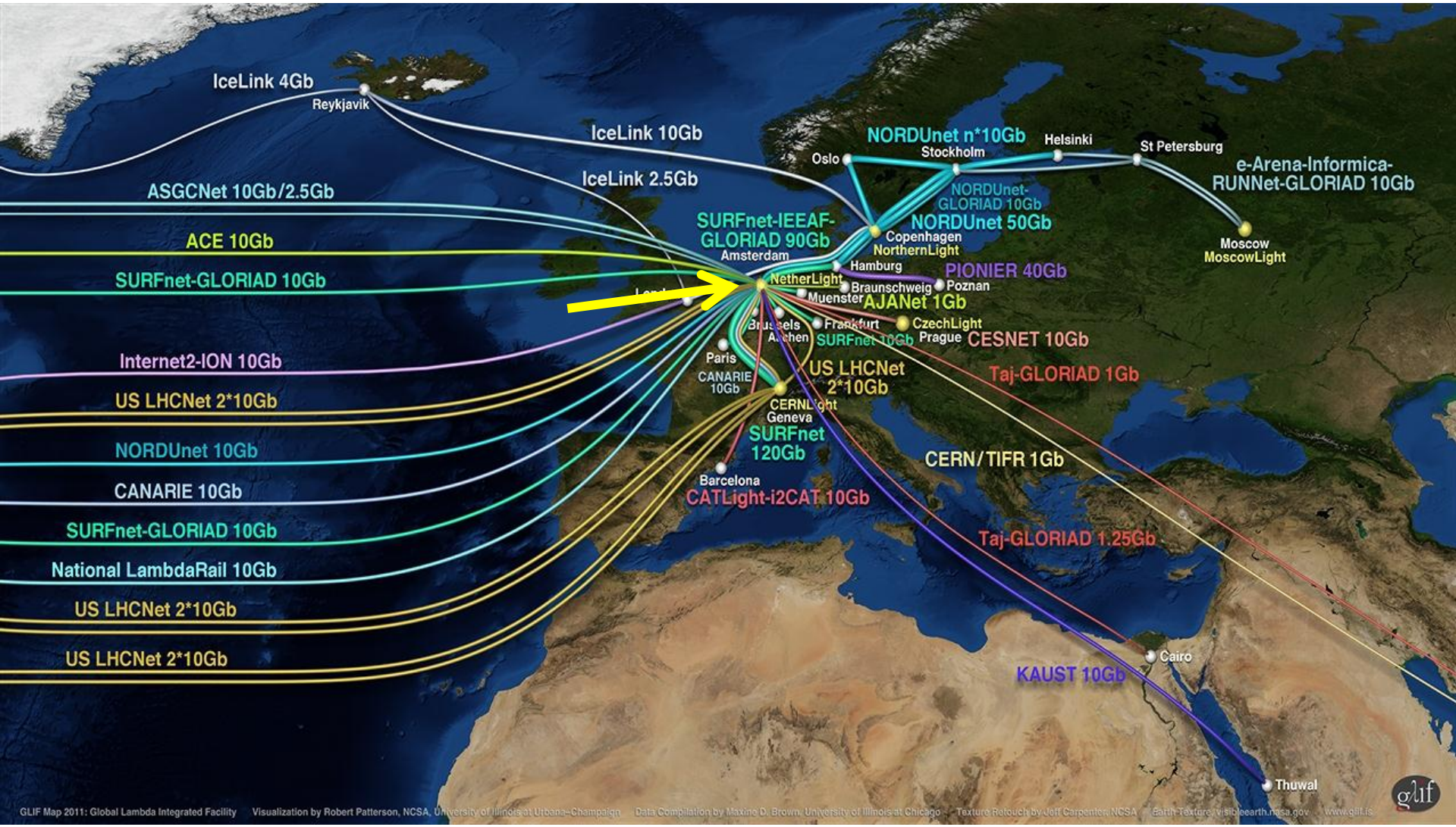
GLIF, the Global Lambda Integrated Facility, is an international virtual organization that promotes the paradigm of lambda networking. [www.glif.is]

GOLE: GLIF Open Lightpath Exchange

Currently 18 GOLEs around the globe



GLIF map Europe

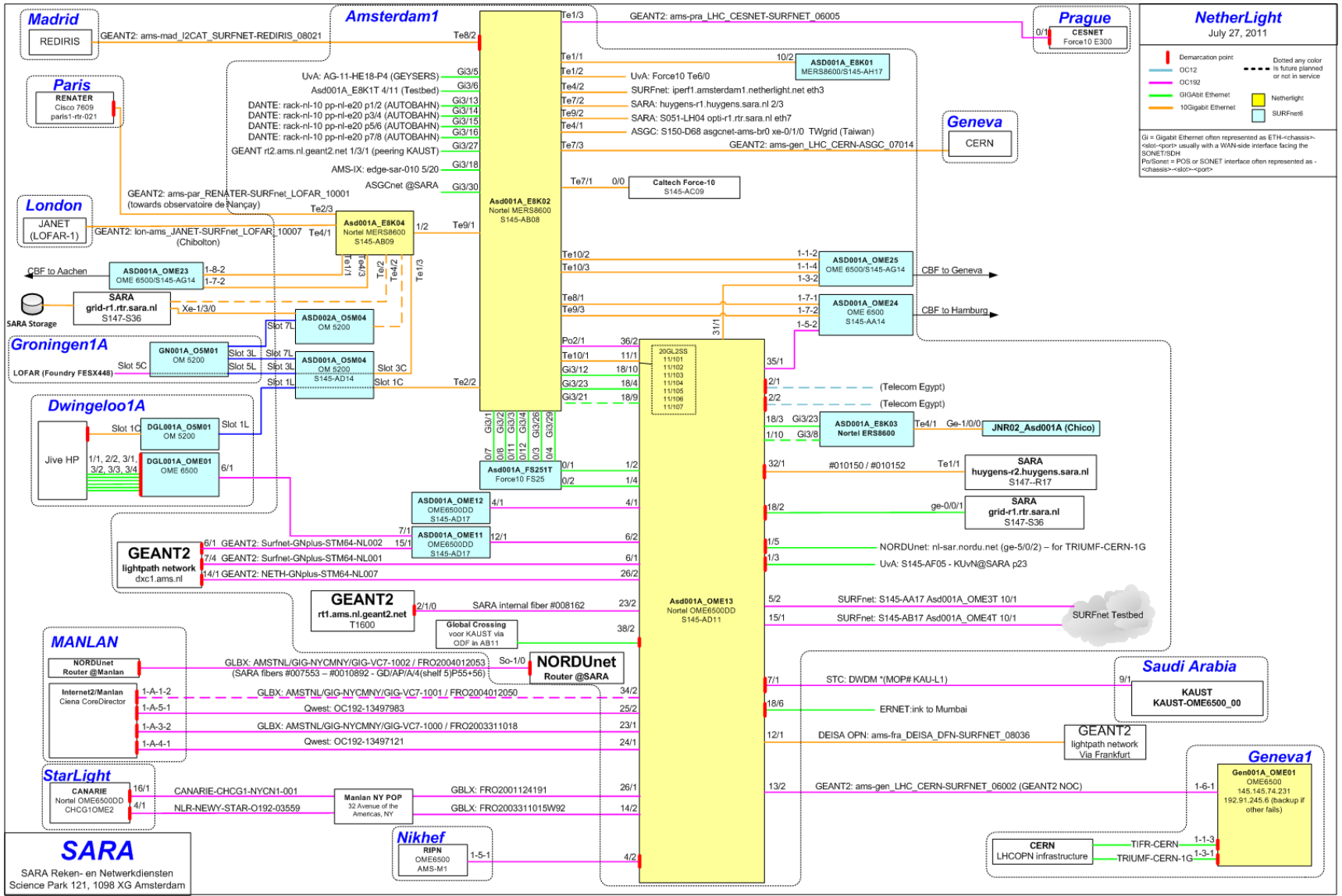


Open Exchanges

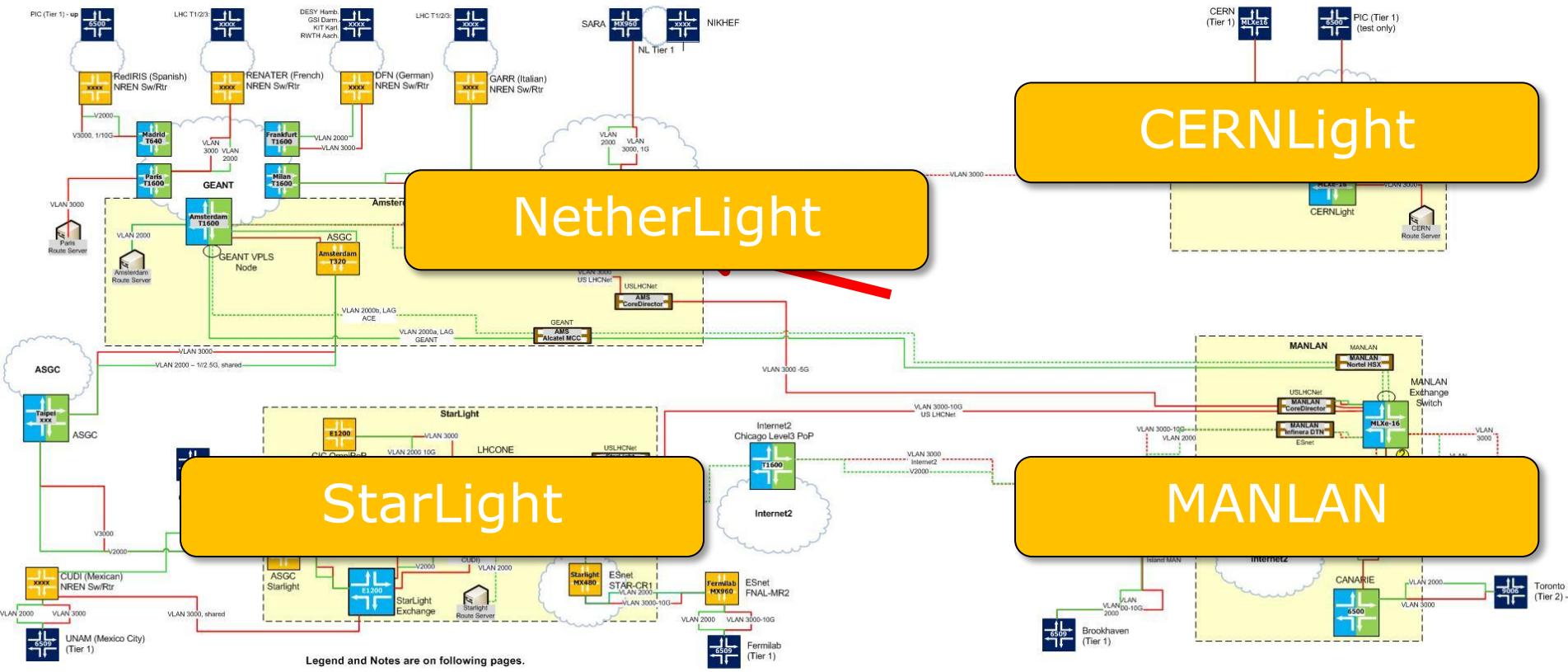
- "Policy is open" and will remain open
- Transit/interconnecting at exchange always allowed
- Anyone can bring in links
  - e.g. Cross Border Fiber
  - Links may have policies
- Open Exchanges allow for fast, innovative and independent architectures
- Open Exchanges enable heterogenous networks, tiers and end-users to cooperate (e.g. via LHCONE)

Current topology

http://noc.netherlight.net/netherlight.png

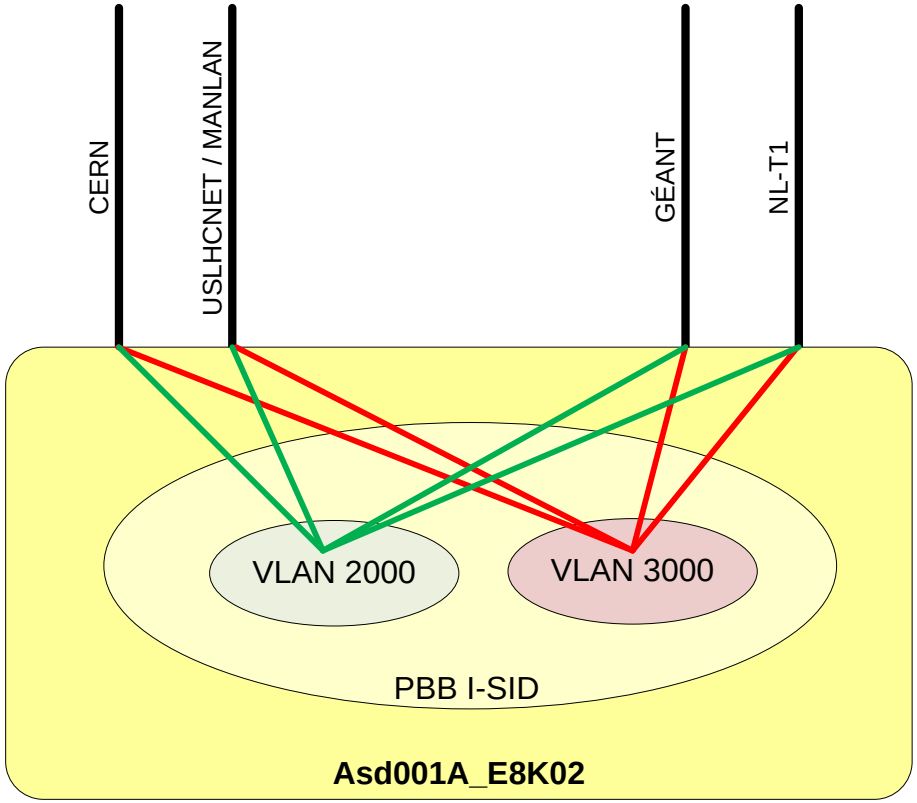


LHCONE overview



LHCONE at NetherLight

- First LHCONE VLAN, 3000, active since March 2011
- VLANs 2000 and 3000 configured
- Participating in LHCONE Architecture Group
- Connecting CERN, MANLAN via USLHCNET, GÉANT, NL-T1



2011 – Originally planned

- 40G trans-Atlantic transmission
  - SC'11?

- 100G clear channel transmission between Amsterdam and Geneva
  - Q3: Pilot
  - Q4: Aiming for production

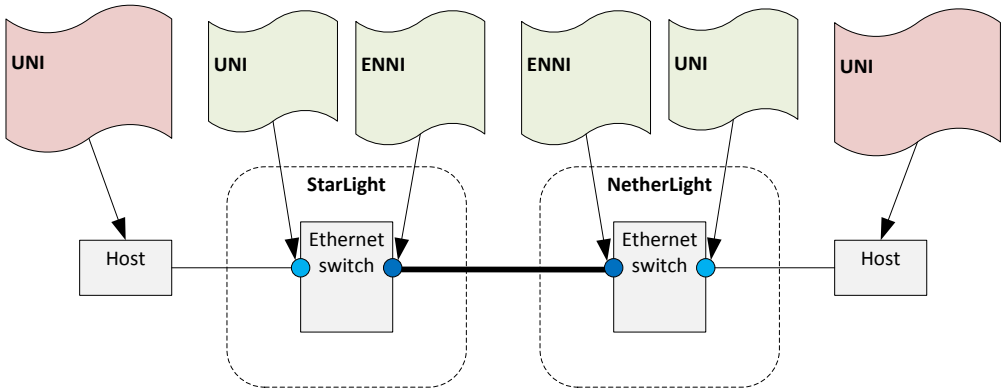
On-time

- Next Generation Ethernet available as pre-production service

On-time

- Automated GOLE
  - OGF **NSI** WG and GLIF DTOX WG progress

Automated GOLE



1

Q: **Where do I want to go?**
A: Look at all hosts and services in the Red phonebook, choose two endpoints:
pingER StarLight has URN A and VLAN 100
pingER NetherLight has URN B and VLAN 150

2

Request interdomain pathfinding,
based on GOLE Topology URN's matching Red Phonebook URN's:
From URN A at VLAN 100 at StarLight to URN B at VLAN 150 at NetherLight
Result: success, requested path has been setup (in this case, with retagging somewhere)

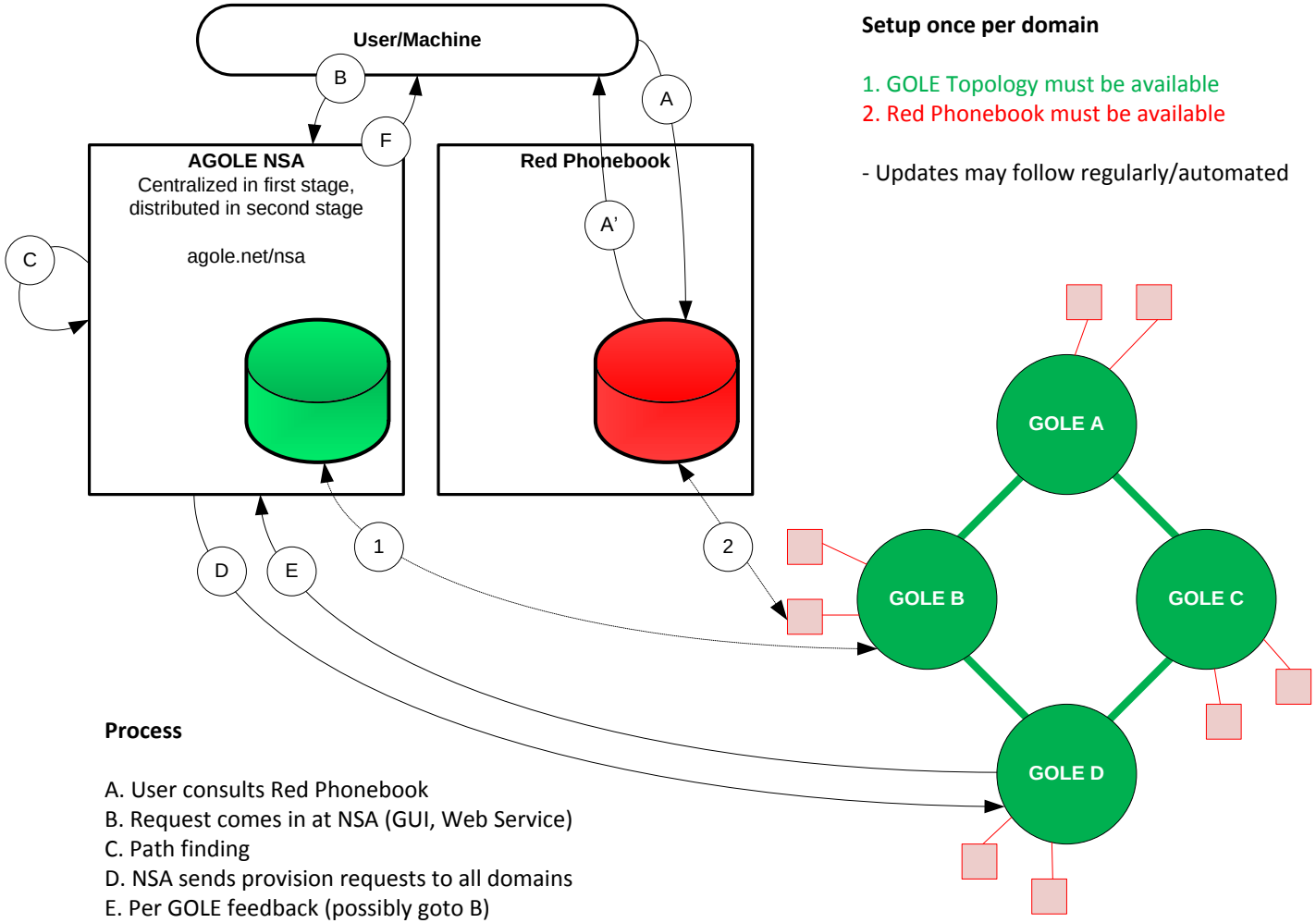
3

Host address configuration by Bonjour
Bonjour consists of ZeroConf for IP address configuration + multicast DNS for advertising and finding host's services

4

Client-Server interaction

Automated GOLE



Setup once per domain

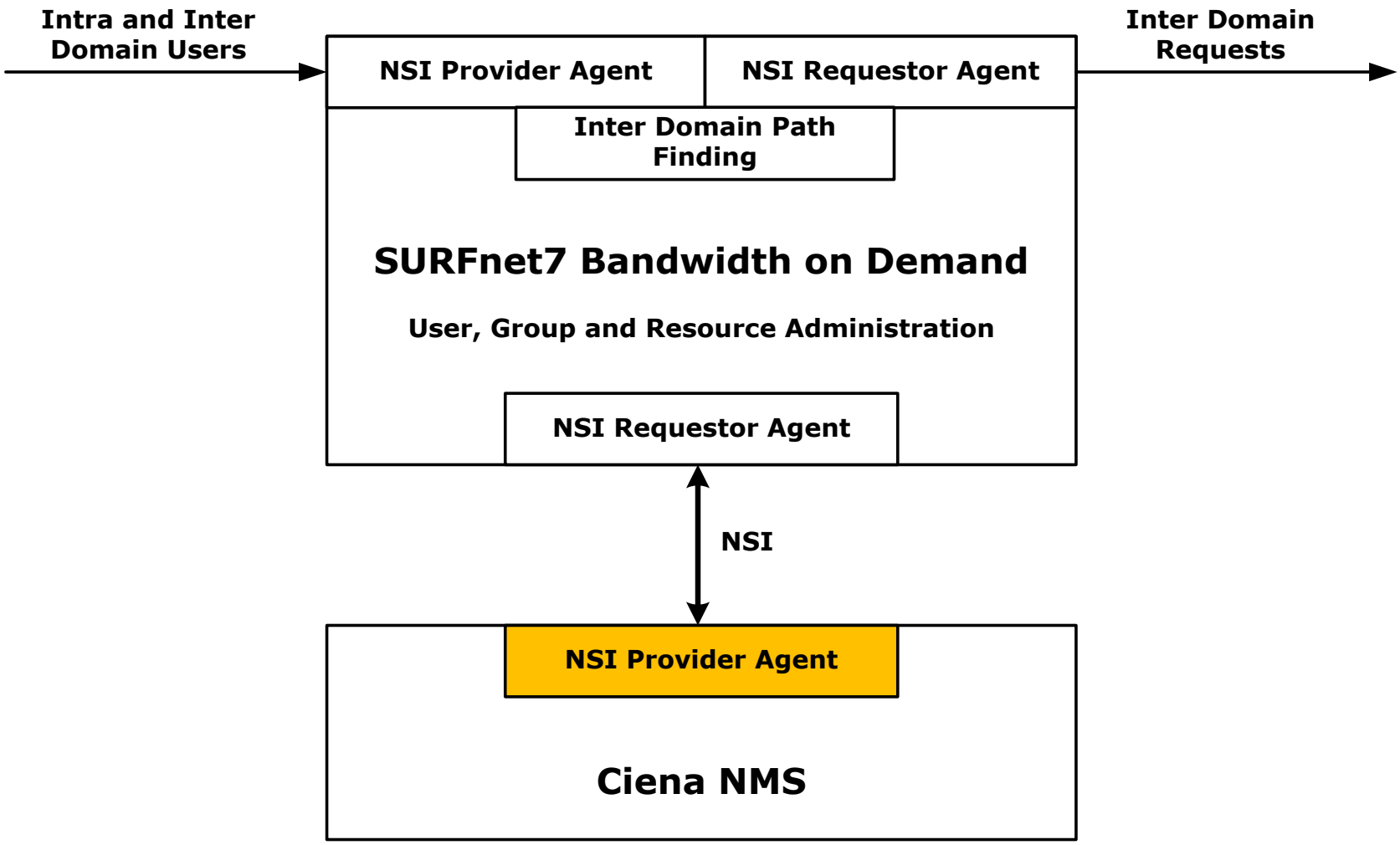
1. GOLE Topology must be available
2. Red Phonebook must be available

- Updates may follow regularly/automated

Process

A. User consults Red Phonebook
B. Request comes in at NSA (GUI, Web Service)
C. Path finding
D. NSA sends provision requests to all domains
E. Per GOLE feedback (possibly goto B)
F. Feedback to user

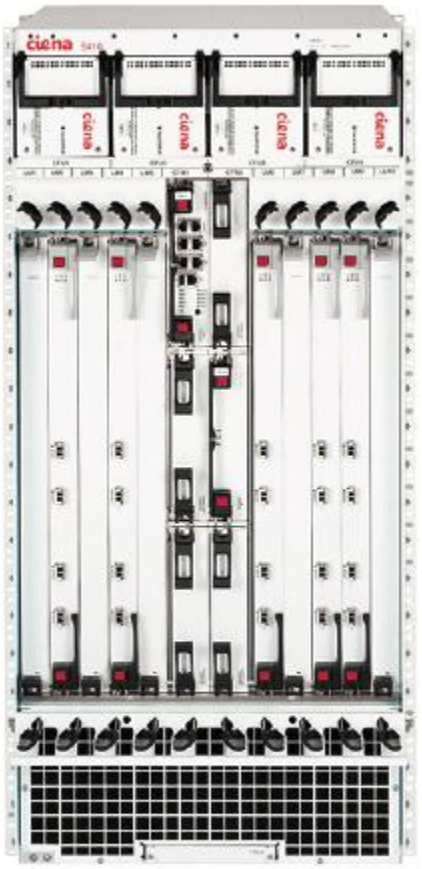
Ciena to implement NSI into production NMS!



2011 New!

- New website: http://www.netherlight.net
- Paper on Open Exchanges
  - http://www.surfnet.nl/nl/Thema/netherlight/Documents/INT-11-5-Role_of_open_exchanges_in_research_networking.pdf
- SURFnet7 network equipment vendor
  - Contract signed July 7, 2011
- 40G ULH Geneva – Copenhagen
- 100GE interoperability testing with CERN and AMS-IX

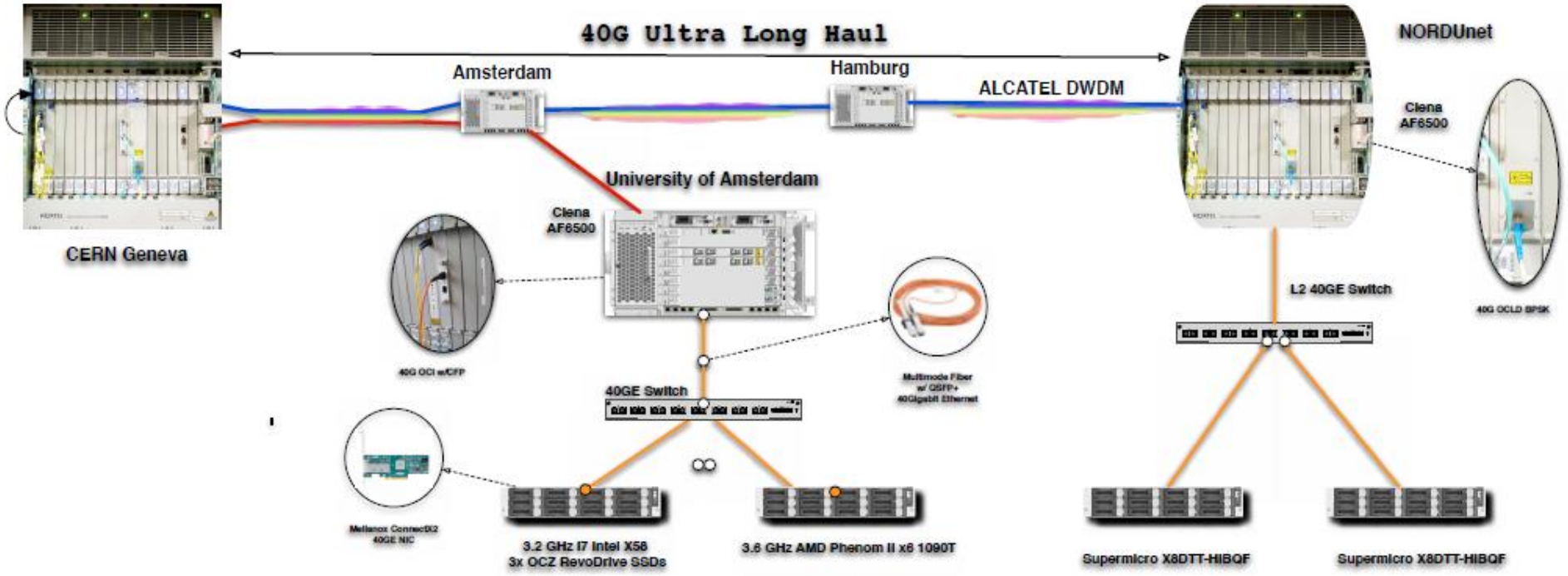
SURFnet7 vendor: Ciena



5410 chassis, front view

- Next Generation Ethernet based on
  - PBB-TE in addition to existing protocols
  - Ciena 5410
    - As successor of the Nortel MERS8600
    - Now: 10 slots x 4 ports x 10GbE
    - Future: 10 slots x 10 ports x 10GbE and beyond 10GbE
- In line with SURFnet7 developments
- Coming to NetherLight by the end of 2011/beginning of 2012

40G ULH demonstration



System and Network Engineering Research Group, Universiteit van Amsterdam

http://science.uva.nl/research/sne

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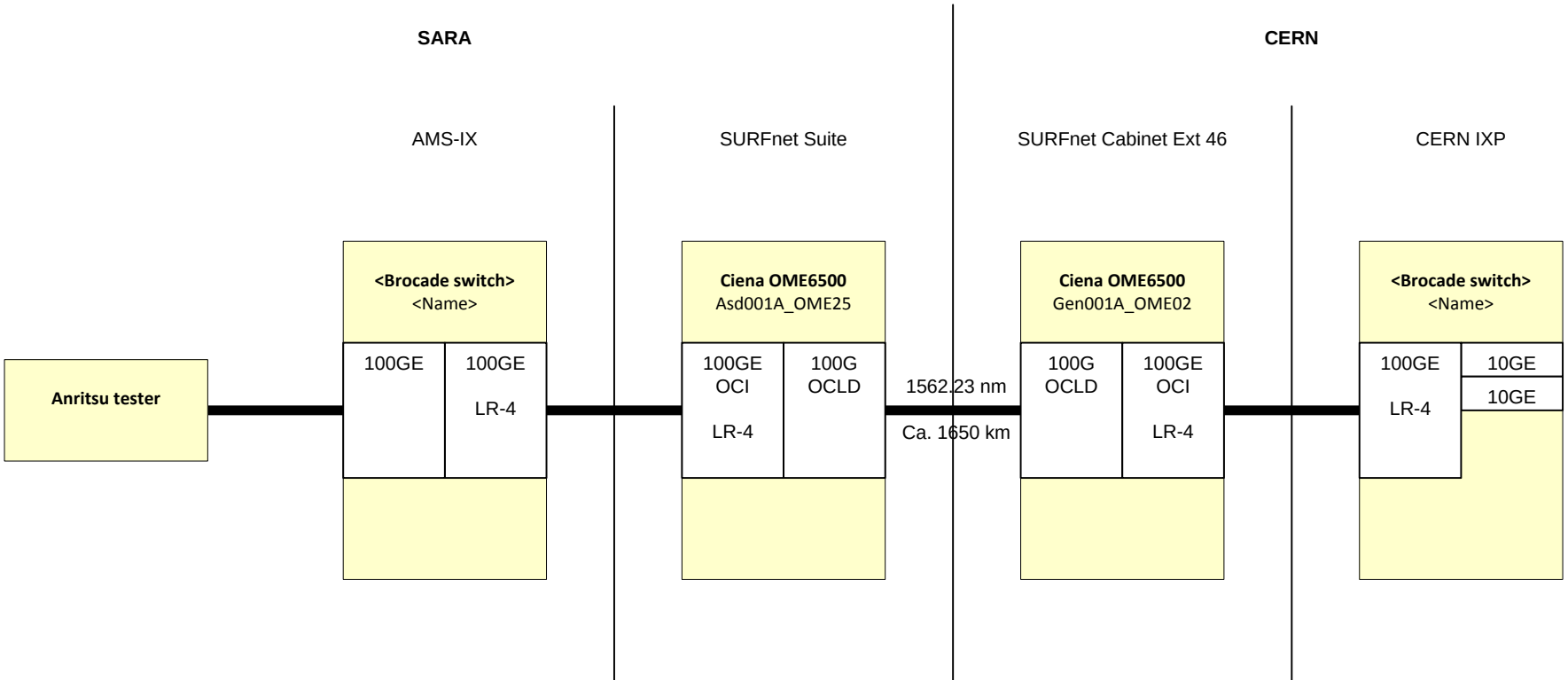
100GE demonstration

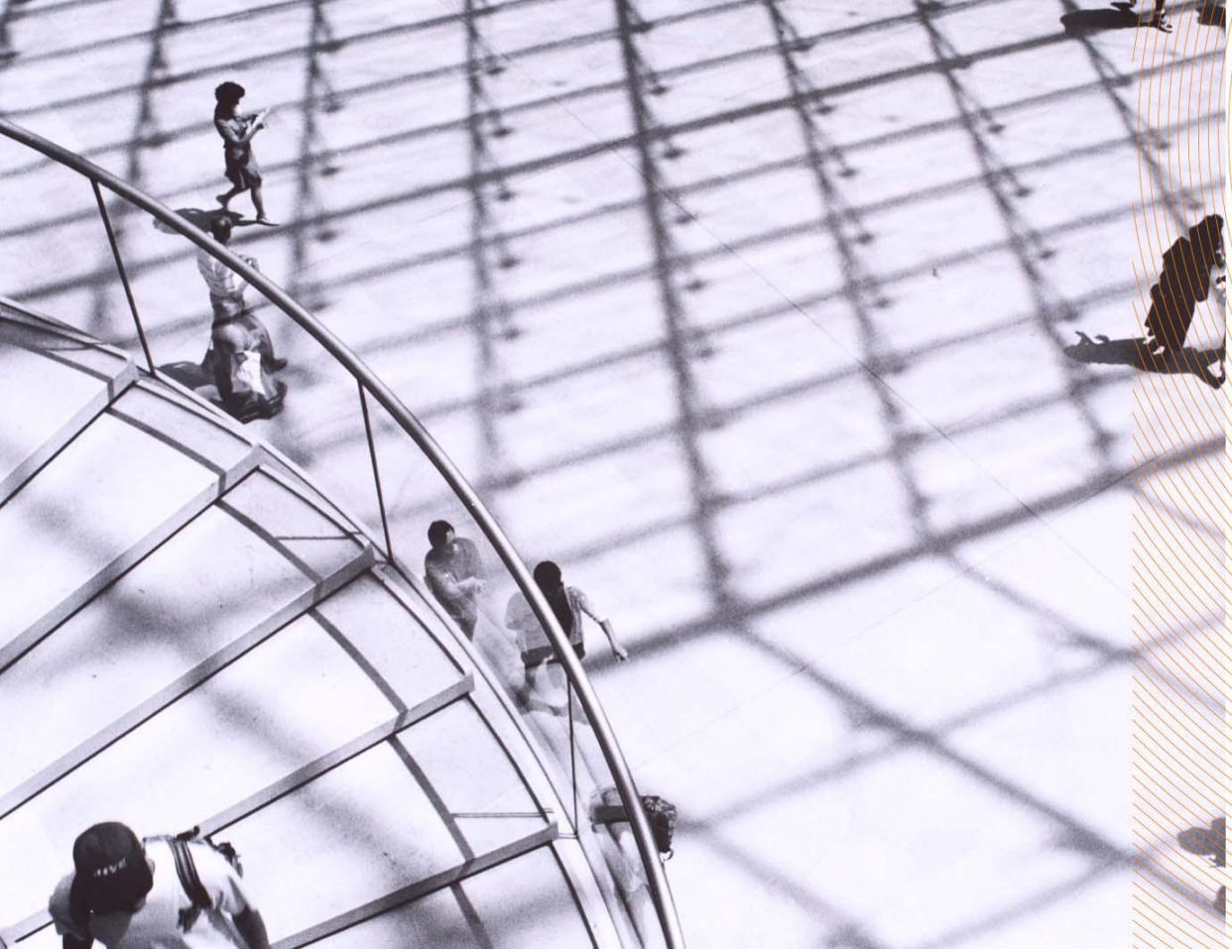
- In collaboration with CERN and AMS-IX
  - Ciena 100G wavelength Amsterdam – Geneva
  - http://www.ams-ix.net/deployment-of-100gbps-ethernet-interconnection-from-amsterdam-to-geneva-by-ams-ix-cern-and-surfnet/



2012

- Taking NetherLight to the next level
  - Replacing switches with Ciena 5410 Ethernet platform
  - Offering extended measurement and management information

- Shared VLAN works, but not scalable forever:
  - Proceed with **dynamic lightpaths** testing phase for LHCONE!



Thank you!

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