

NetherLight GOLE Update

Gerben van Malenstein

Rio de Janeiro, Brazil – September 13, 2011 11th Annual Global LambdaGrid Workshop





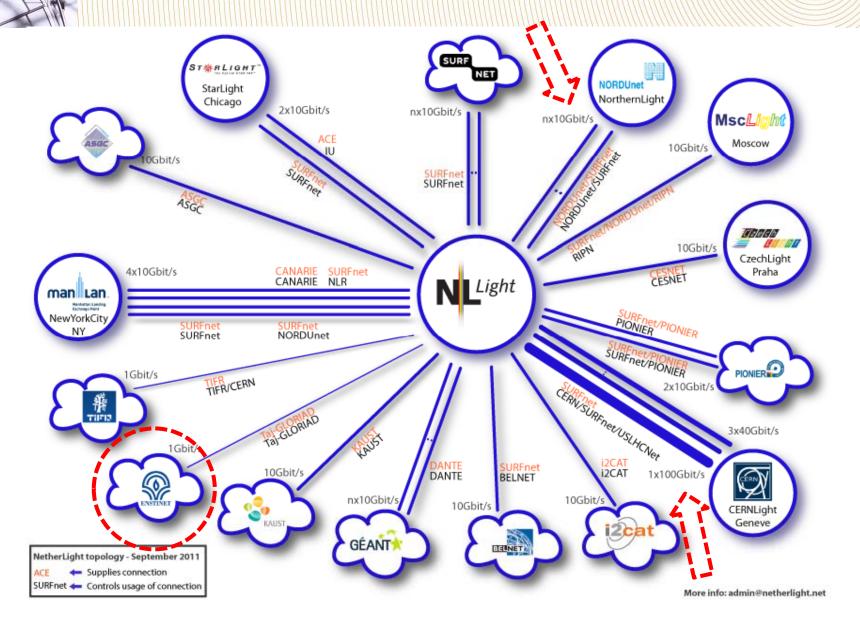
GLIF map Europe



IceLink 4Gb Reykjavik	
IceLink 4Gb Reykjavik	IceLink 10Gb
ASGCNet 10Gb/2.5Gb	IceLink 2.5Gb NORDUnet- GLORIAD 10Gb RUNNet-GLORIAD 10Gb
ACE 10Gb	SURFnet-IEEAF- GLORIAD 90Gb Amsterdam
SURFnet-GLORIAD 10Gb	NetherLight Braunschweig Poznan MuensterAJANet 1Gb
	Auchen SURFnet meb Prague CESNET 10Gb
US LHCNet 2*10Gb	Paris CANARIE 10Gb CEDUCICE 10Gb CEDUCICE CANARIE 10Gb CEDUCICE CANARIE 10Gb CEDUCICE CANARIE 10Gb CEDUCICE CANARIE 10Gb CEDUCICE CANARIE 10Gb CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDUCICE CEDU
NORDUnet 10Gb	CERNLoht Geneva SURFnet
CANARIE 10Gb	120Gb CERN/TIFR 1Gb Barcelona CATLight i20AT 10Ch
SURFnet-GLORIAD 10Gb	CATLight-i2CAT 10Gb Taj-GLORIAD 1.25Gb
National LambdaRail 10Gb	
US LHCNet 2*10Gb	
US LHCNet 2*10Gb	KAUST 10GD
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GLIF Map 2011: Global Lambda Integrated Facility Visualization by Robert Patterson, NCSA, Unversity of linner at	Uterna-Ghampaign Data Compilation by Maxine D. Brown. University of Illinois at Chicago , Texture Reference by Jeff Carpenter/NCSA Earth-Texture/Visibleearth.resa.gov XXXXV.glif.is

NetherLight connectivity

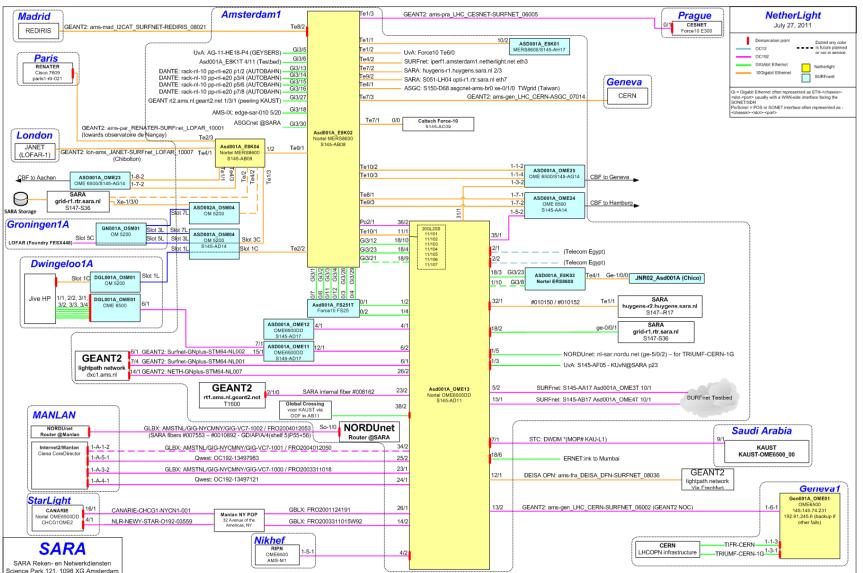






Current topology









2011 – Originally planned

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



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



 Next Generation Ethernet available as pre-production service



- Automated GOLE
 - OGF NSI WG and GLIF DTOX WG progress
 - Next GLIF meeting: let's demonstrate!

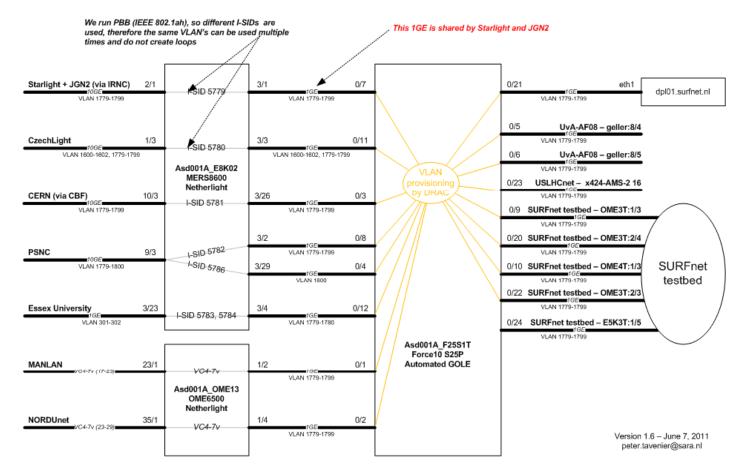


Automated GOLE and OpenDRAC

SURF

NET

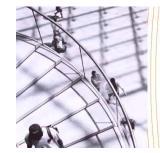
- Force 10 4810 (48x10GbE) switch
 - NEXPReS (e-VLBI) as application, 4Gb/s x 3 radio telescopes



Automated GOLE topology at Netherlight

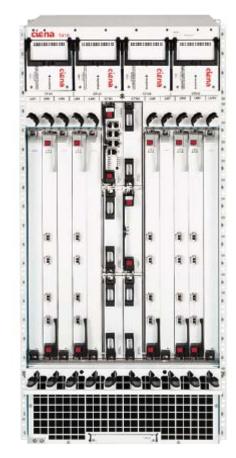


- New website: http://www.netherlight.net
- Paper on Open Exchanges
 - http://www.surfnet.nl/nl/Thema/netherlight/Documents/INT-11-5-Role_of_open_exchanges_in_research_networking.pdf
- SURFnet7 network equipment vendor selected
- LHCONE
- 40G ULH Geneva Copenhagen
- 100GE interoperability testing with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





SURFnet7 vendor: Ciena



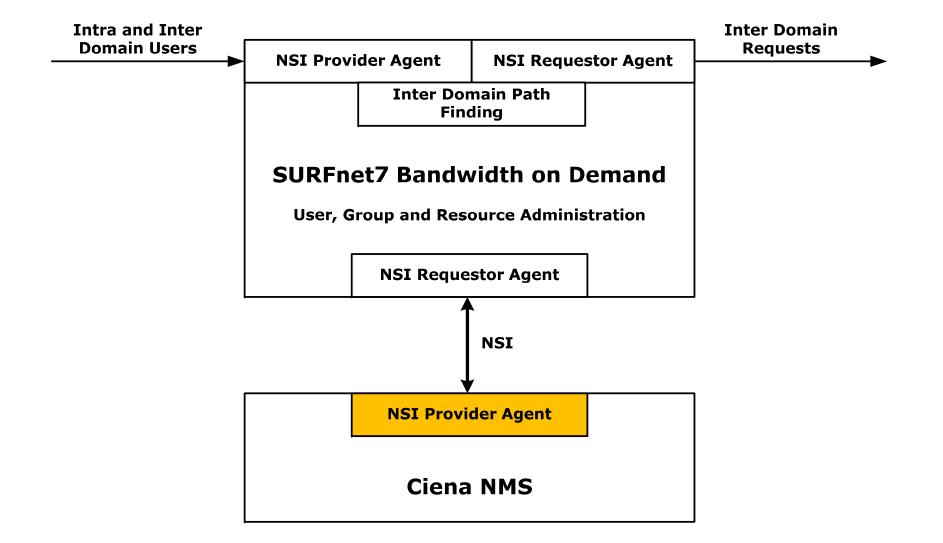
- Next Generation Ethernet based on
 - PBB-TE in addition to existing protocols
 - Ciena 5410
 - As successor of the Nortel MERS8600
 - Now: 10 slots x 4 ports x 10GbE
 - Future: 10 slots x 10 ports x 10GbE and beyond 10GbE
- In line with SURFnet7 developments
- Coming to NetherLight by the end of 2011/beginning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

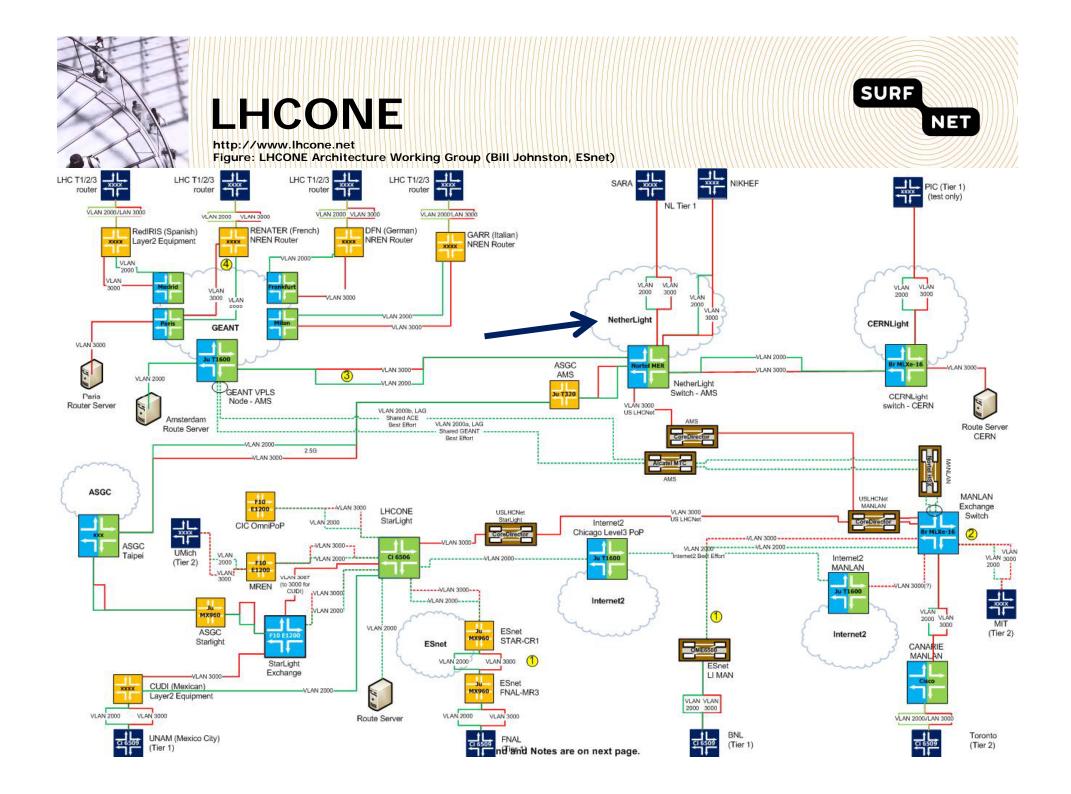
5410 chassis, front view

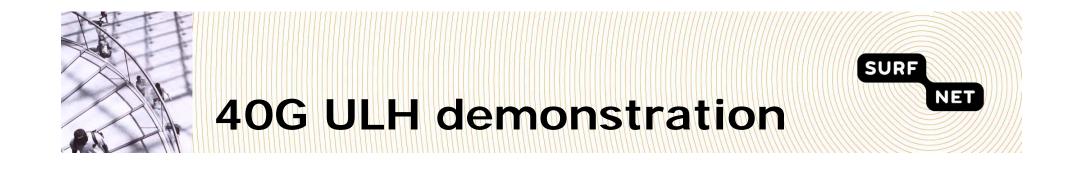


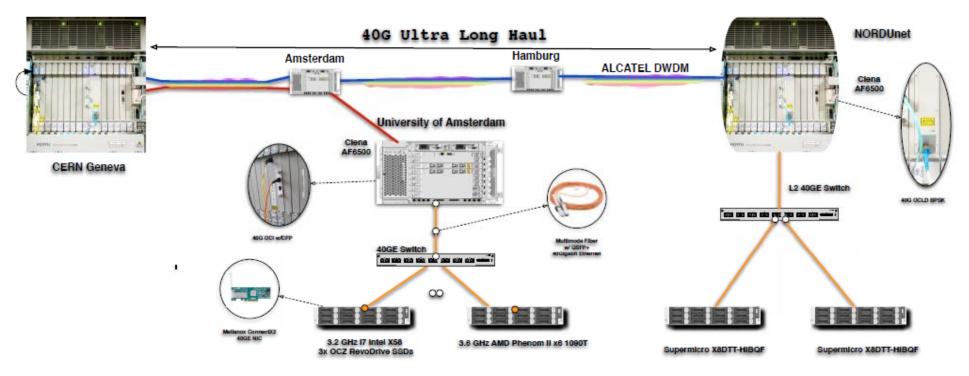
Ciena to implement NSI into production NMS!











System and Network Engineering Research Group, Universiteit van Amsterdam

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



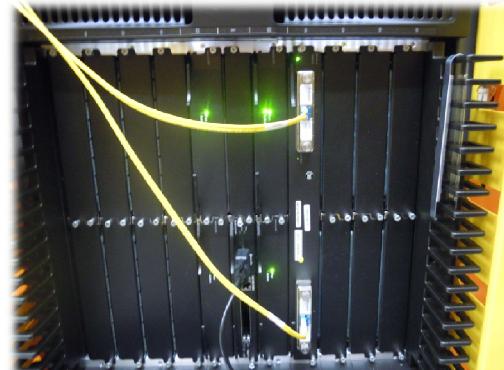
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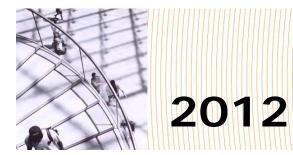




100GE demonstration

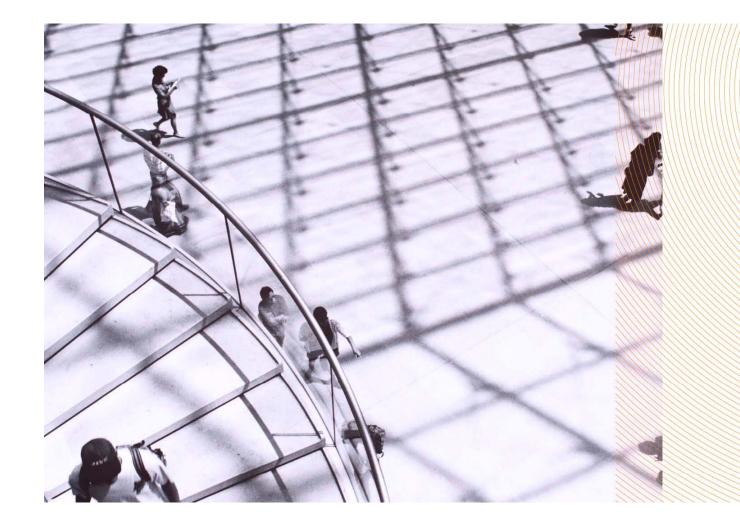
- In collaboration with CERN and AMS-IX
 - On the new Ciena 100G wavelength Ams-Gen
 - Using Brocade 100GE interfaces (LR-4)
 - http://www.ams-ix.net/deployment-of-100gbps-ethernetinterconnection-from-amsterdam-to-geneva-by-ams-ix-cern-andsurfnet/







- Taking NetherLight to the next level
 - Replacing switches with Ciena 5410 Ethernet platform
 - Back-up location
 - Offering extended measurement and management information
- Connecting commercial service-suppliers to NetherLight
 - E.g. storage-providers, other networks, ...
 - Green data centers abroad
- Fee per port per 2013
 - Cost-based (not for profit)
 - **Port-based** (not 'crossconnect'/service-based)





Thank you!

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