Lambda-Grid developments

www.science.uva.nl/~delaat

Cees de Laat

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GigaPort

EU

University of Amsterdam

SARA

NCF

OSI model Advanced Internet Research group@UvA

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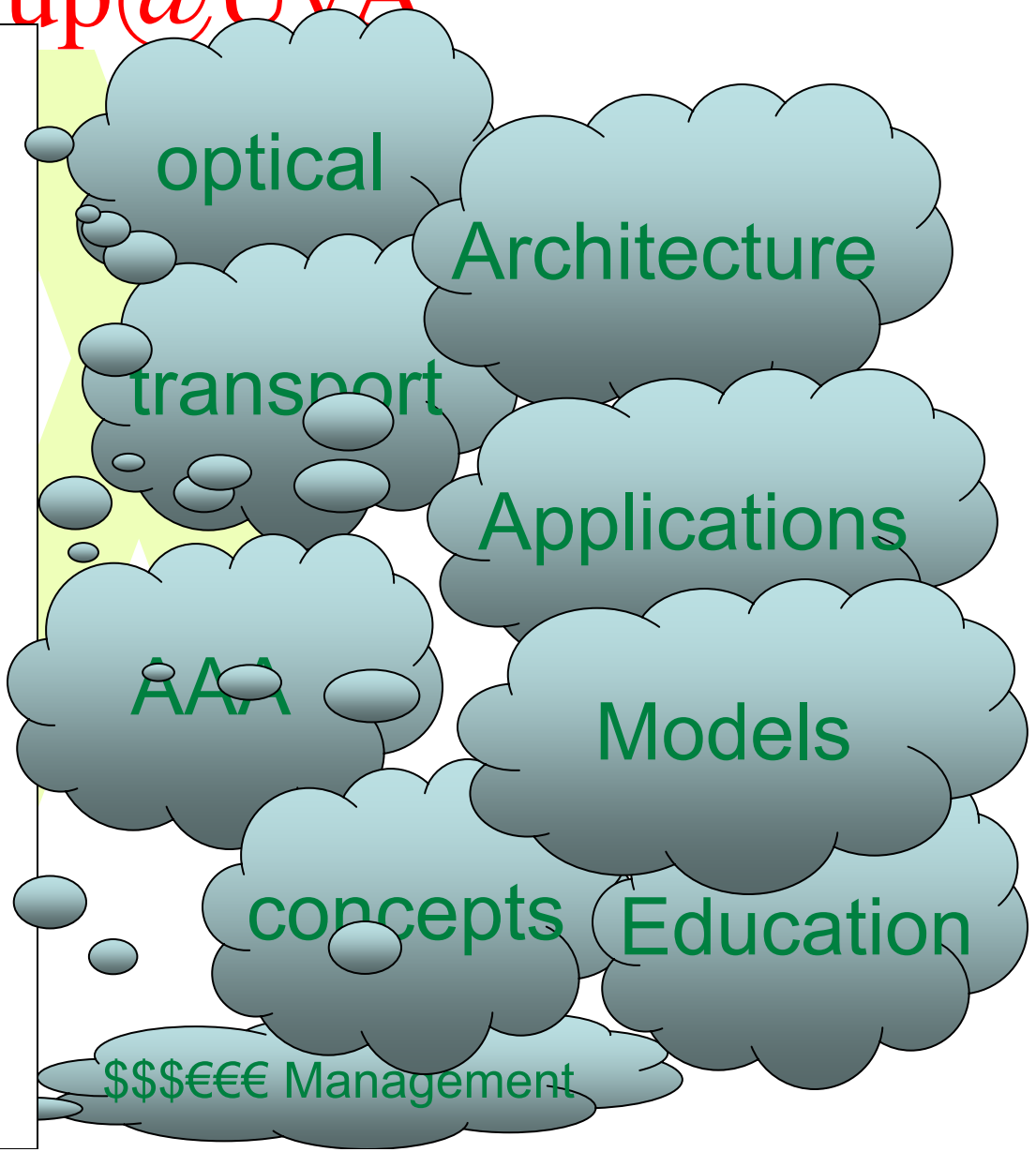


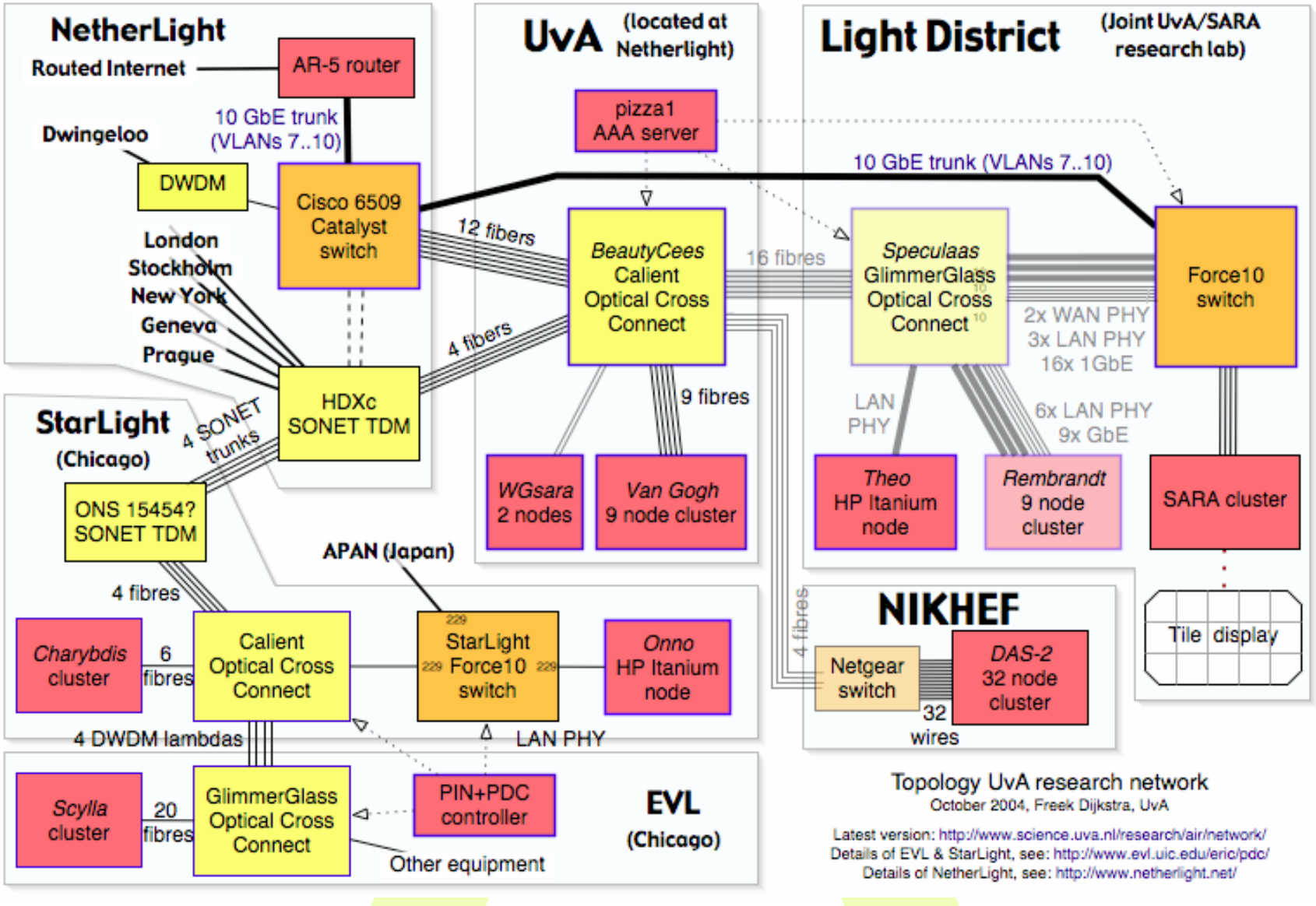
Research topics

- Optical networking architectures and models for usage
- Transport protocols for massive amounts of data
- Authorization of complex resources in multiple domains
- Embedding in Grid environments

Research on Networks in GP

- **Optical Networking:** What innovation in architectural models, components, control and light path provisioning are needed to integrate dynamically configurable optical transport networks and traditional IP networks to a generic data transport platform that provides end-to-end IP connectivity as well as light path (lambda and sub-lambda) services?
- **High performance routing and switching:** What developments need to be made in the Internet Protocol Suite to support data intensive applications, and scale the routing and addressing capabilities to meet the demands of the research and higher education communities in the forthcoming 5 years?
- **Management and monitoring:** What management and monitoring models on the dynamic hybrid network infrastructure are suited to provide the necessary high level information to support network planning, network security and network management?
- **Grids and access; reaching out to the user:** What new models, interfaces and protocols are capable of empowering the (grid) user to access, and the provider to offer, the network and grid resources in a uniform manner as tools for scientific research?
- **Testing methodology:** What are efficient and effective methods and setups to test the capabilities and performance of the new building blocks and their interworking, needed for a correct functioning of a next generation network?

OpenLight


NetherLight
Routed Internet
AR-5 router
10 GbE trunk (VLANs 7..10)
Dwingeloo
DWDM
Cisco 6509 Catalyst switch
London
Stockholm
New York
Geneva
Prague
HDXc SONET TDM
12 fibers
4 fibers
UvA (located at Netherlight)
pizza1 AAA server
BeautyCees Calient Optical Cross Connect
9 fibres
WGsara 2 nodes
Van Gogh 9 node cluster
Light District (Joint UvA/SARA research lab)
10 GbE trunk (VLANs 7..10)
16 fibres
Speculaas GlimmerGlass Optical Cross Connect
2x WAN PHY
3x LAN PHY
16x 1GbE
Force10 switch
LAN PHY
6x LAN PHY
9x GbE
Theo HP Itanium node
Rembrandt 9 node cluster
SARA cluster
Tile display
StarLight (Chicago)
4 SONET trunks
ONS 15454? SONET TDM
APAN (Japan)
4 fibres
Charybdis cluster
6 fibres
Calient Optical Cross Connect
StarLight Force10 switch
Onno HP Itanium node
4 DWDM lambdas
LAN PHY
NIKHEF
4 fibres
Netgear switch
DAS-2 32 node cluster
32 wires
Scylla cluster
20 fibres
GlimmerGlass Optical Cross Connect
PIN+PDC controller
Other equipment
EVL (Chicago)
Topology UvA research network
October 2004, Freek Dijkstra, UvA
Latest version: http://www.science.uva.nl/research/air/network/
Details of EVL & StarLight, see: http://www.evl.uic.edu/eric/pdc/
Details of NetherLight, see: http://www.netherlight.net/

Optical Exchange as Black Box