

**VLE SP-3.2 and SP-3.3
or the continuing history of it
in GigaPort**

Cees de Laat

**GigaPort
EU**



SP 3.2 and 3.3

- Security and AAA
 - Here we study Authentication, Authorization and Accounting models and architectures for VL-E environments and research its security related implications and considerations.
- Optical Networking
 - Here we study optical network transport models for e-Science applications.

GigaPort Research on Networks

- Not direct mapping from sp32 and sp33 to GigaPort research lines
- GP research lines:
 - Optical networking
 - High performance routing and switching
 - Management and monitoring
 - Grid and access, reaching out to the user
 - Testing methodology
- Nowadays also TNO, TUD, TI, TUE involved

- The Advanced Internet Research group is structured around 3 topics with respect to networking. The research lines are (from “jaarplan 2005”):
 - 1) Optical networking architectures and models
 - 2) IP transport protocols, performance monitoring and measurements
 - 3) Authorization, Authentication and Accounting
- Apart from this research the groups also has organization related activities being:
 - 4) Organization, dissemination, attendance of workshops like iGrid, GLIF, SC200x, IST, OptIPuter, MCNC, Standards body activities.
 - 5) Build of prototyping environment
 - 6) Management

- Optical networking architectures and models
 - Optical Internet Exchange architecture
 - Lambda routing and assignment
- IP transport protocols, performances monitoring and measurements
 - With respect to performance
 - Monitoring and reporting
 - Traffic generation with grid infrastructure
- Authorization, Authentication and Accounting
 - Concepts
 - Proof of concepts
 - Application

Network resources: management and monitoring

Motivation:

Users and applications should be able to:

- monitor the performance of single network components,
- monitor the available resources in a single or multiple domains,
- monitor and setup dedicated light paths within an Optical Cross Connect through well defined interfaces.

Objective:

Provide access to authorized users and applications to network resources through Web Services.

Current work:

- definition of models for network components;
- definition of models for resource brokers;
- publication of available interfaces via WSDL;
- implementation of Web Services;
- integration with AAA for user authentication and authorization to use the service.

More information:

<http://vangogh0.uva.netherlight.nl/AIRWebServices/doc/NetherLightWS.htm>

Grid and network tests

Motivation:

As more and more Grids are being built and deployed we expect that in some cases network tests and measurements will have to be conducted on such infrastructures.

Objective:

- to determine if and how Grids are suitable for network tests
- to defining the requirements for the applications and the resources available through the Grid.

Current work:

- deployment of standard test tools on Grids
- evaluation of Grid tools as network test tools (i.e GridFTP)
- design of measurement infrastructure
- implementation on the DAS-2 cluster, with Globus and MPICH-G2
- ongoing analysis of test results.

More information:

<http://vangogh0.uva.netherlight.nl/GridFTP-tests/Intro.php>

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A. Lightweight users, browsing, mailing, home use

Need full Internet routing, one to many

B. Business applications, multicast, streaming, VPN's, mostly LAN

Need VPN services and full Internet routing, several to several + uplink

C. Scientific applications, distributed data processing, all sorts of grids

Need very fat pipes, limited multiple Virtual Organizations, few to few, p2p

$\Sigma C \gg 100 \text{ Gb/s}$ →

$\Sigma B \approx 30 \text{ Gb/s}$

$\Sigma A \approx 20 \text{ Gb/s}$

A

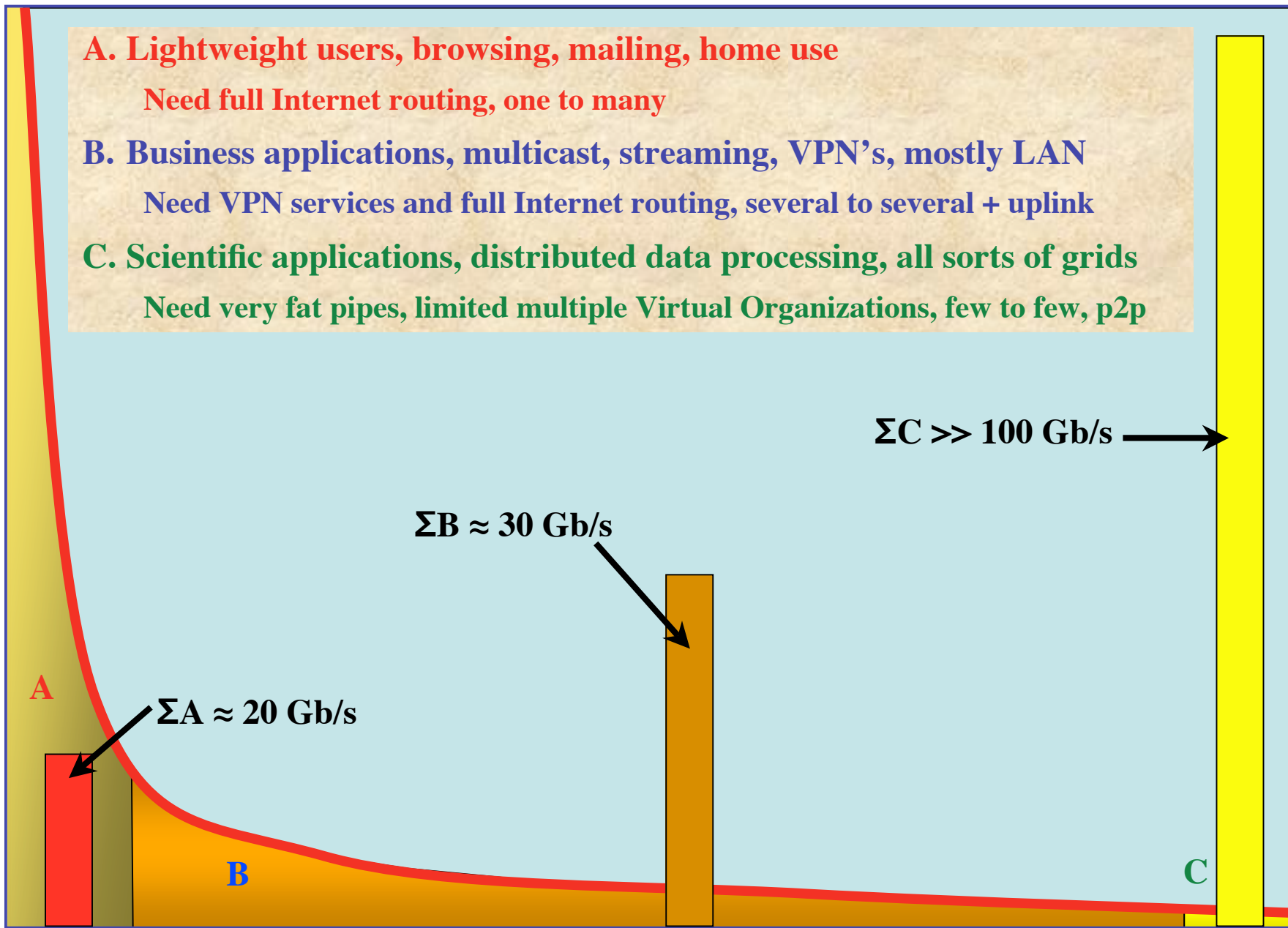
B

C

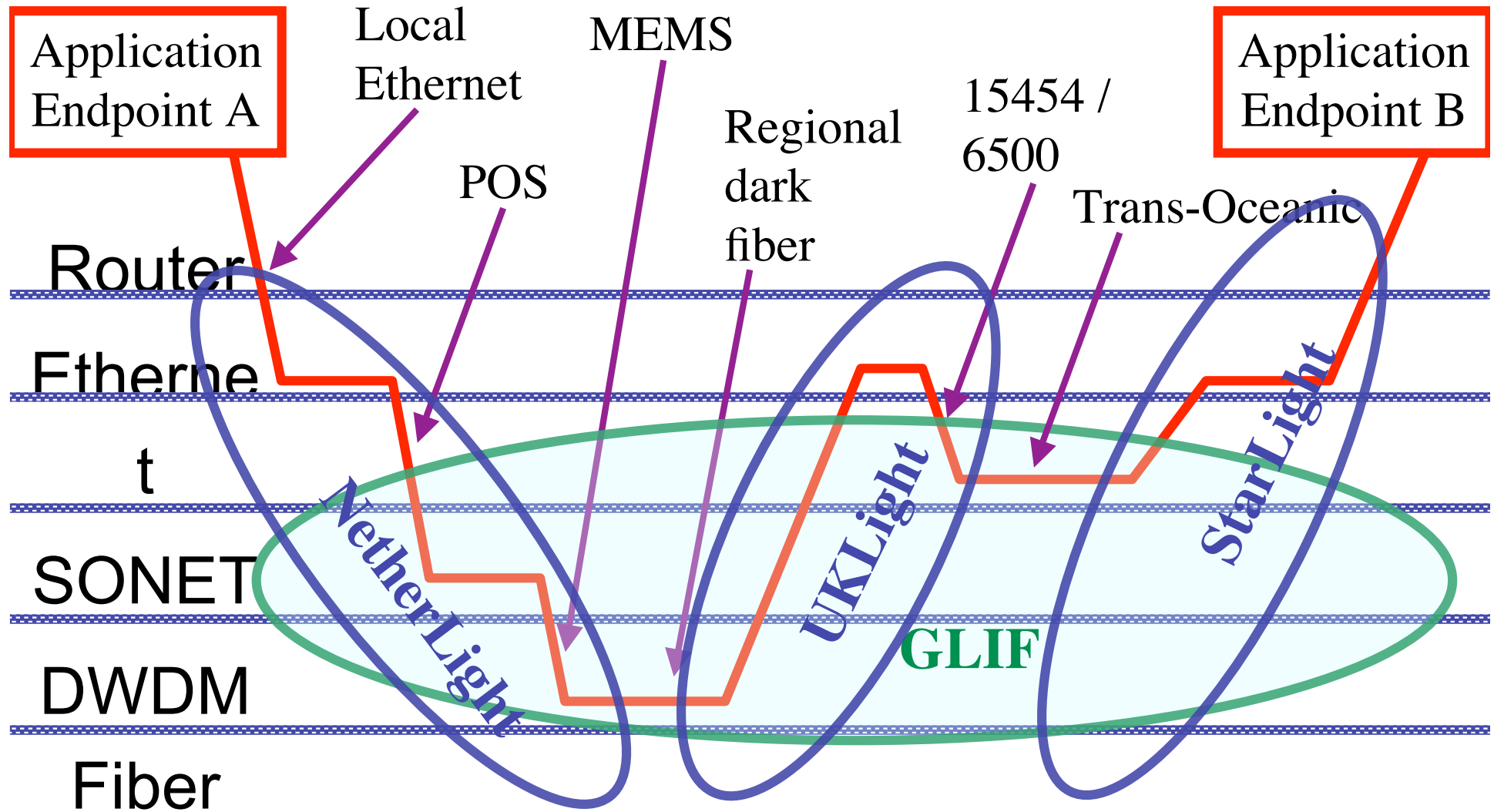
ADSL

GigE

→
BW requirements

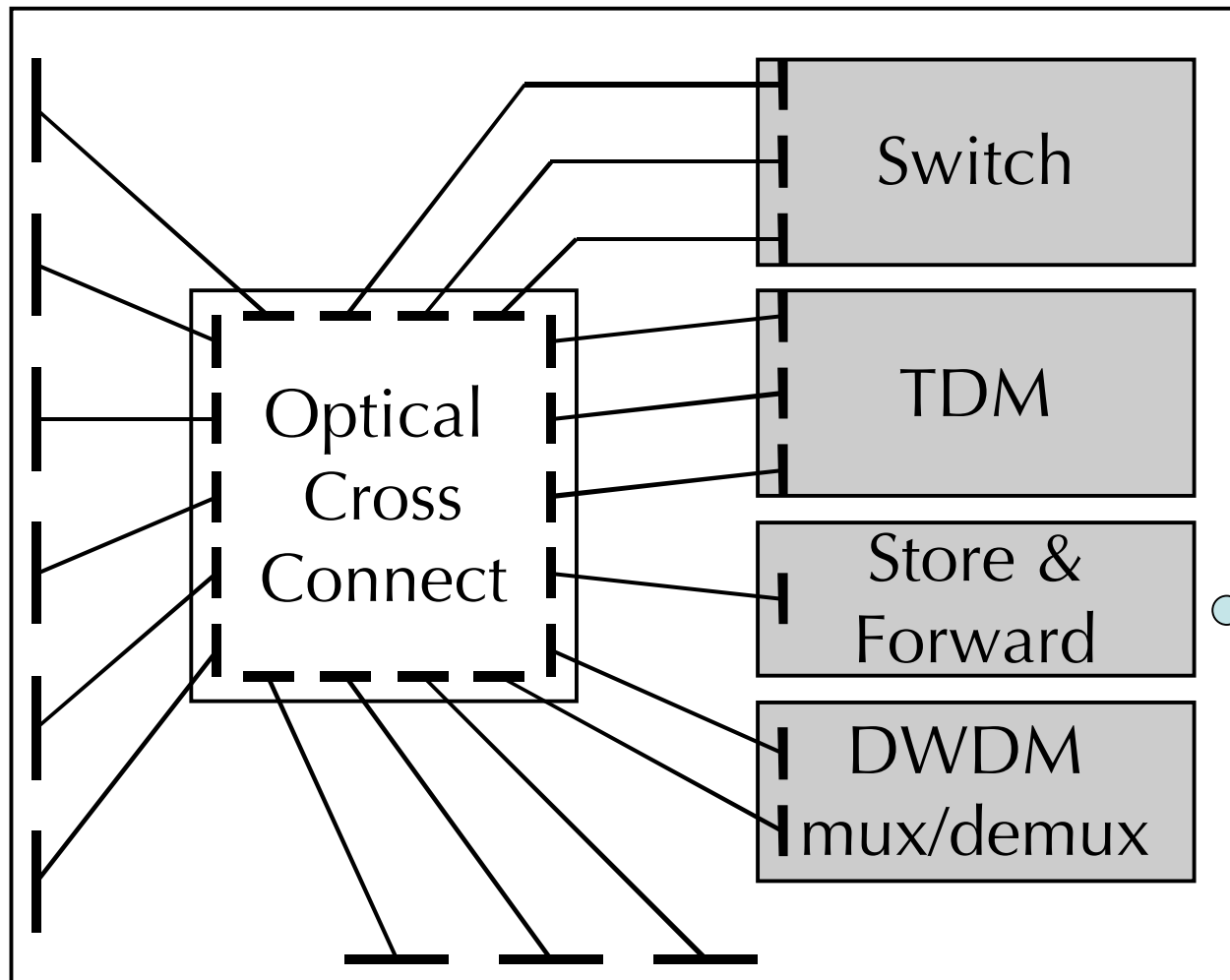


How low can you go?



Optical Exchange as Black Box

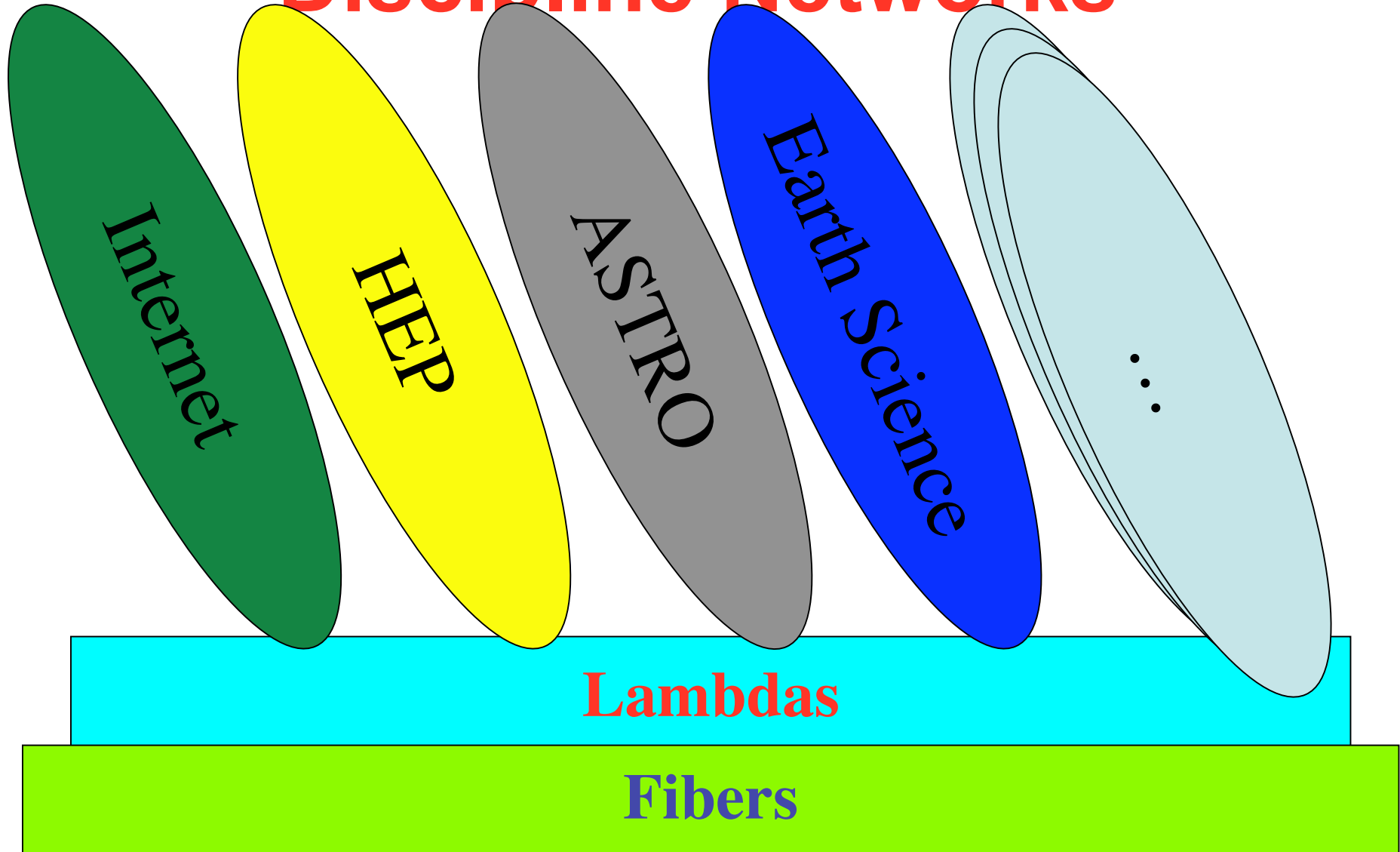
Optical Exchange



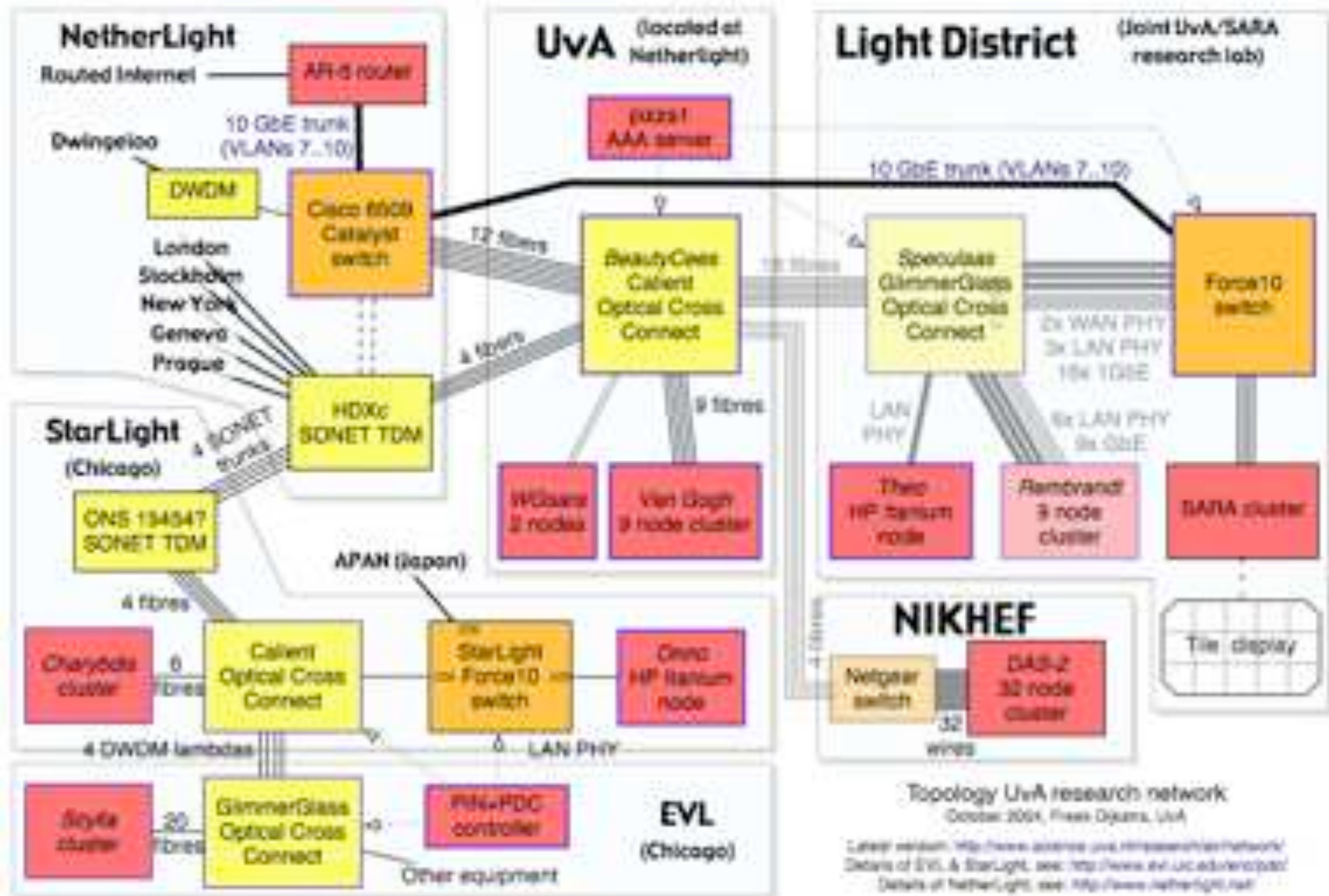
TeraByte
Email
Service

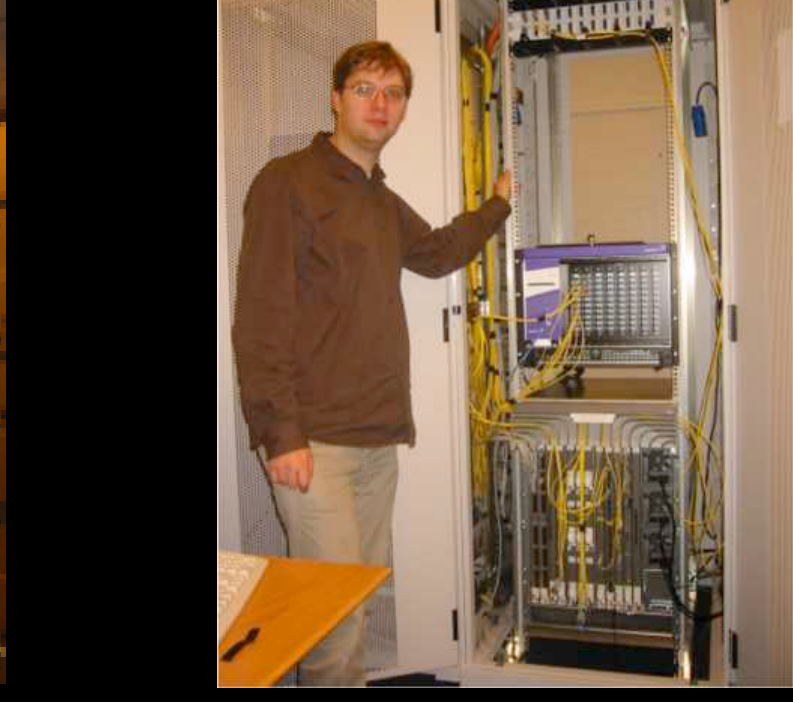
From	To	WDM (multiple λ)	Single λ, any bitstream	SONET/SDH	1 Gb/s Ethernet	LAN PHY Ethernet	WAN PHY Ethernet	VLAN tagged Ethernet	IP over Ethernet
WDM (multiple λ)		cross-connect multicast, regenerate, WDM mux	WDM demux	WDM demux*	WDM demux *	WDM demux *	WDM demux *	WDM demux *	WDM demux *
Single λ, any bitstream		cross-connect multicast, regenerate, WDM mux	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
SONET/SDH		WDM mux	cross-connect multicast, regenerate, N/A *	SONET switch, +	TDM demux *	TDM demux ⁶	SONET switch	TDM demux *	TDM demux *
1 Gb/s Ethernet		WDM mux	N/A *	TDM mux	aggregate, Ethernet conversion +	aggregate, eth. convert	aggregate, Ethernet conversion	aggregate, VLAN encap	L3 entry *
LAN PHY Ethernet		WDM mux	N/A*	TDM mux ⁶	aggregate, Ethernet conversion	aggregate, Ethernet conversion +	Ethernet conversion	aggregate, VLAN encap	L3 entry *
WAN PHY Ethernet		WDM mux	N/A *	SONET switch	aggregate, Ethernet conversion	Ethernet conversion	aggregate, Ethernet conversion +	aggregate, VLAN encap	L3 entry *
VLAN tagged Ethernet		WDM mux	N/A *	TDM mux	aggregate, VLAN decap	aggregate, VLAN decap	aggregate, VLAN decap	Aggregate, VLAN decap & encap +	N/A
IP over Ethernet		WDM mux	N/A *	TDM mux	L3 exit *	L3 exit *	L3 exit *	N/A	Store & forward, L3 entry/exit+

Discipline Networks



LightHouse

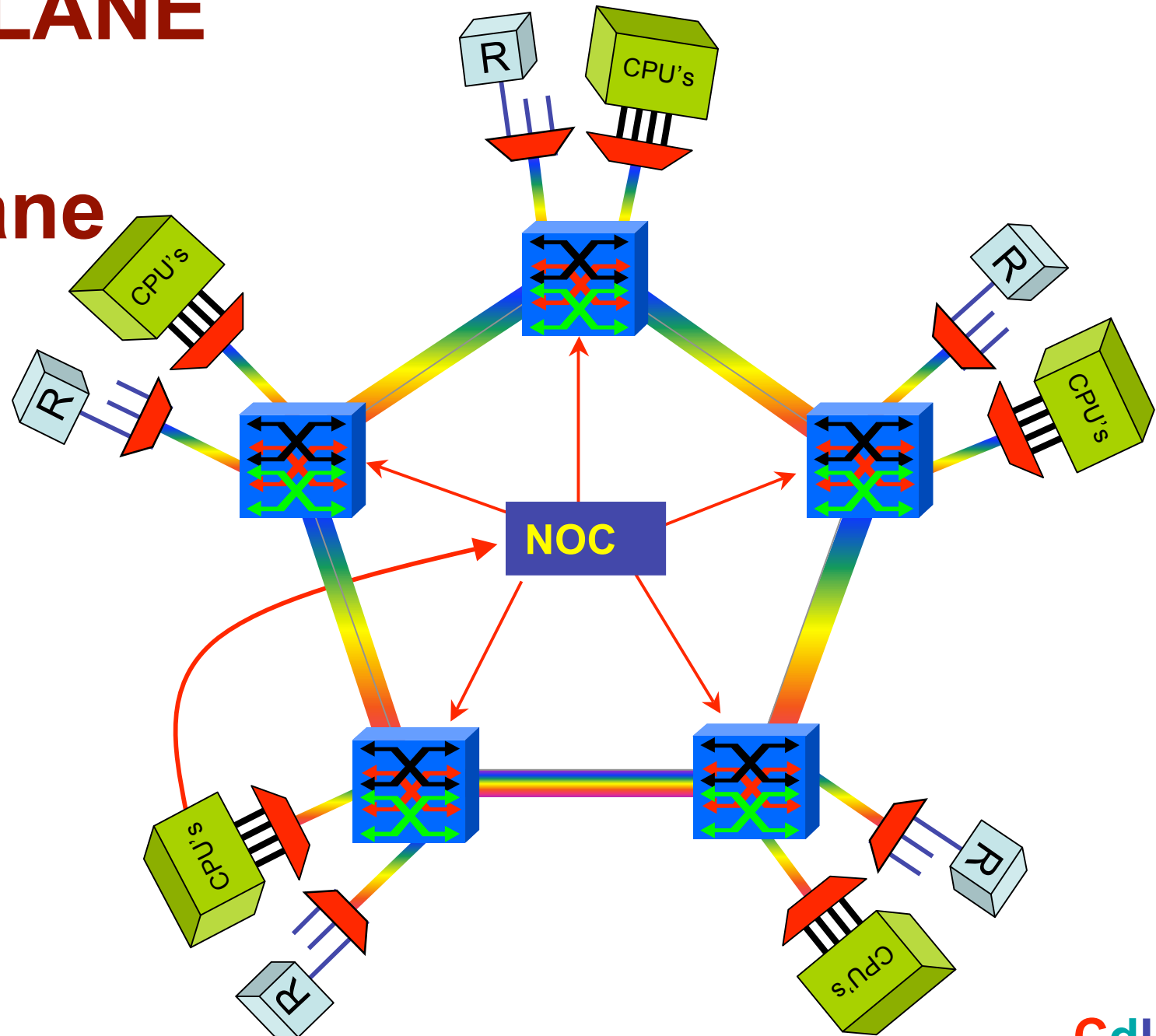




STARPLANE

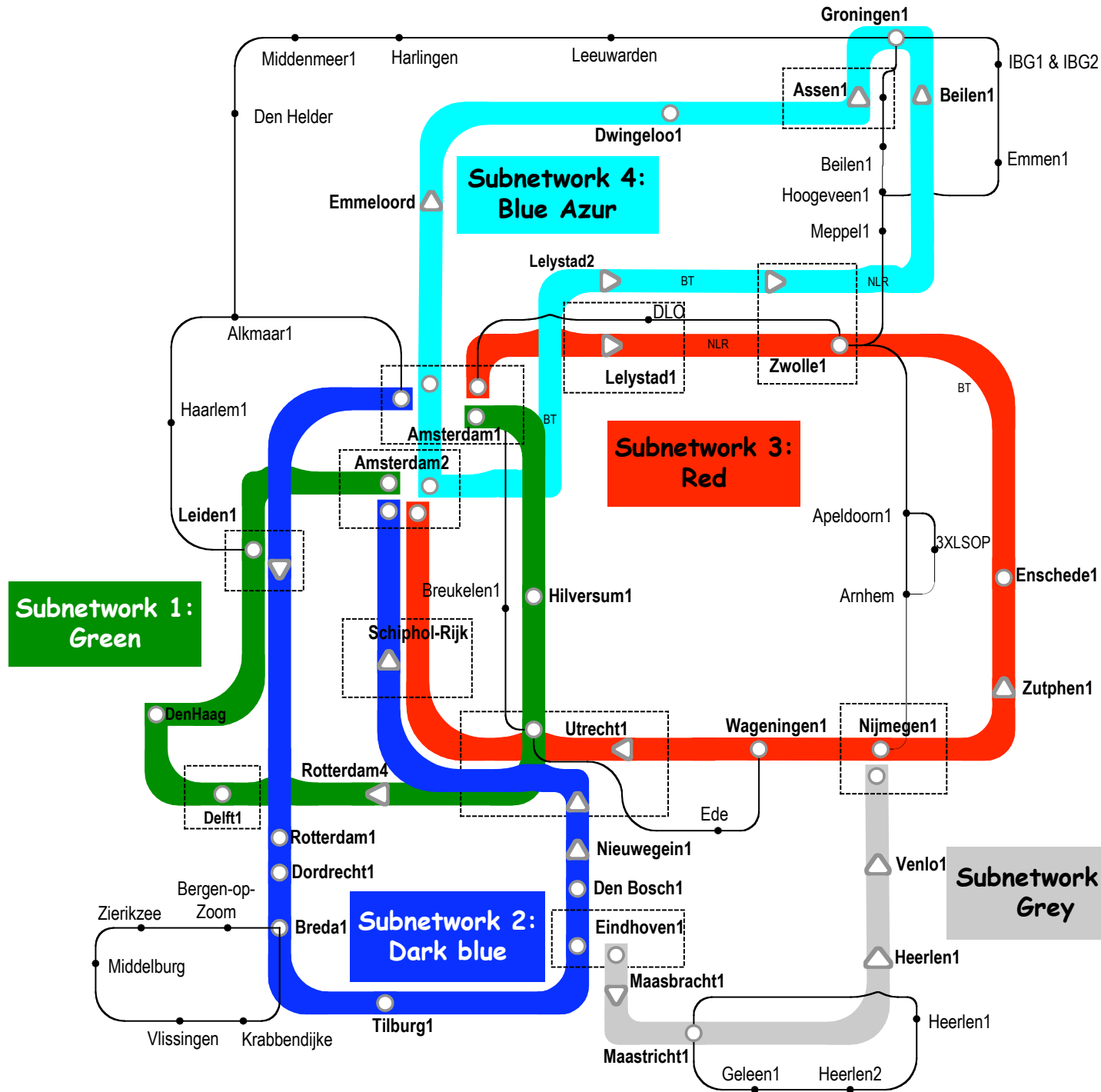
DWDM

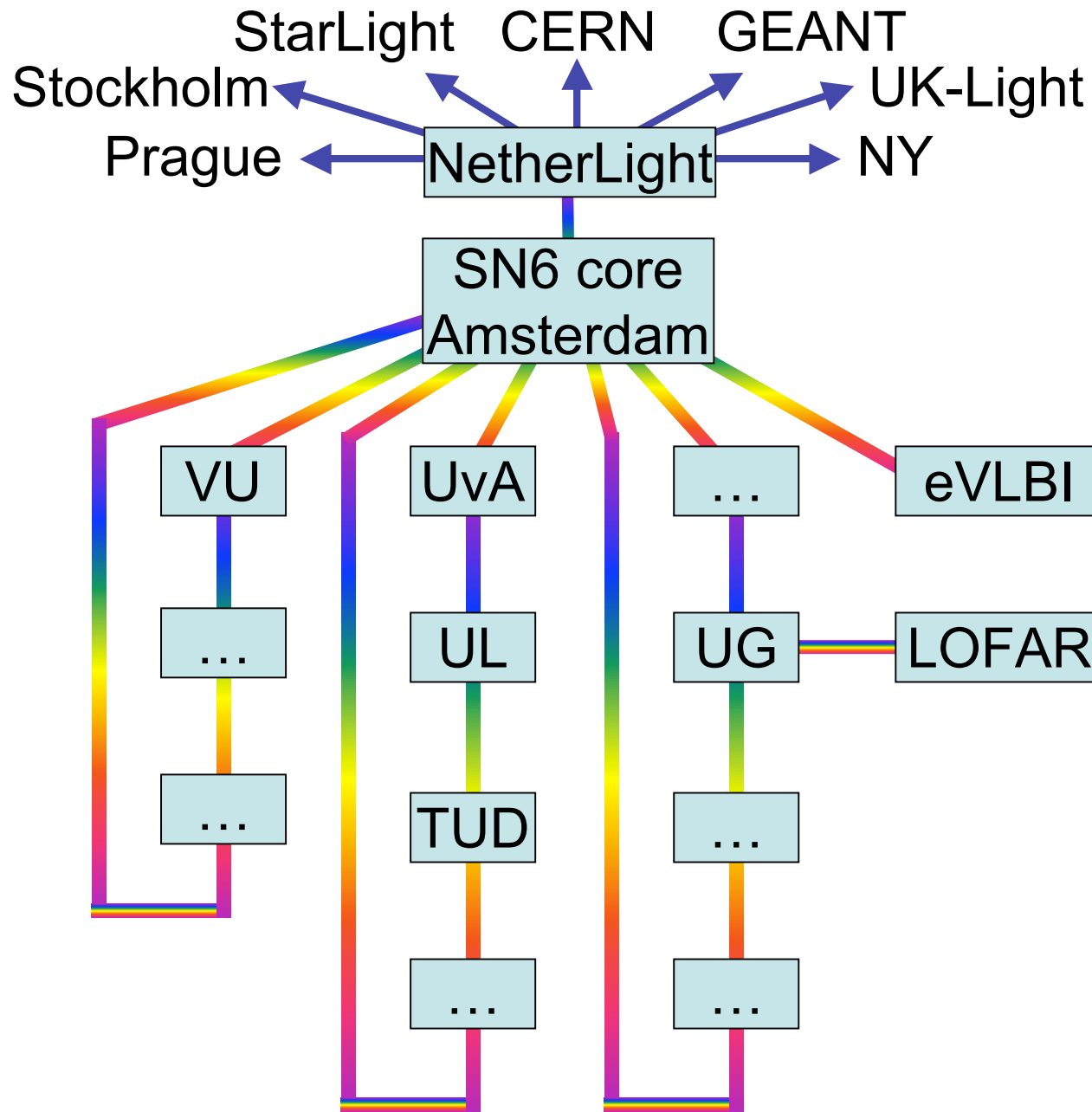
backplane

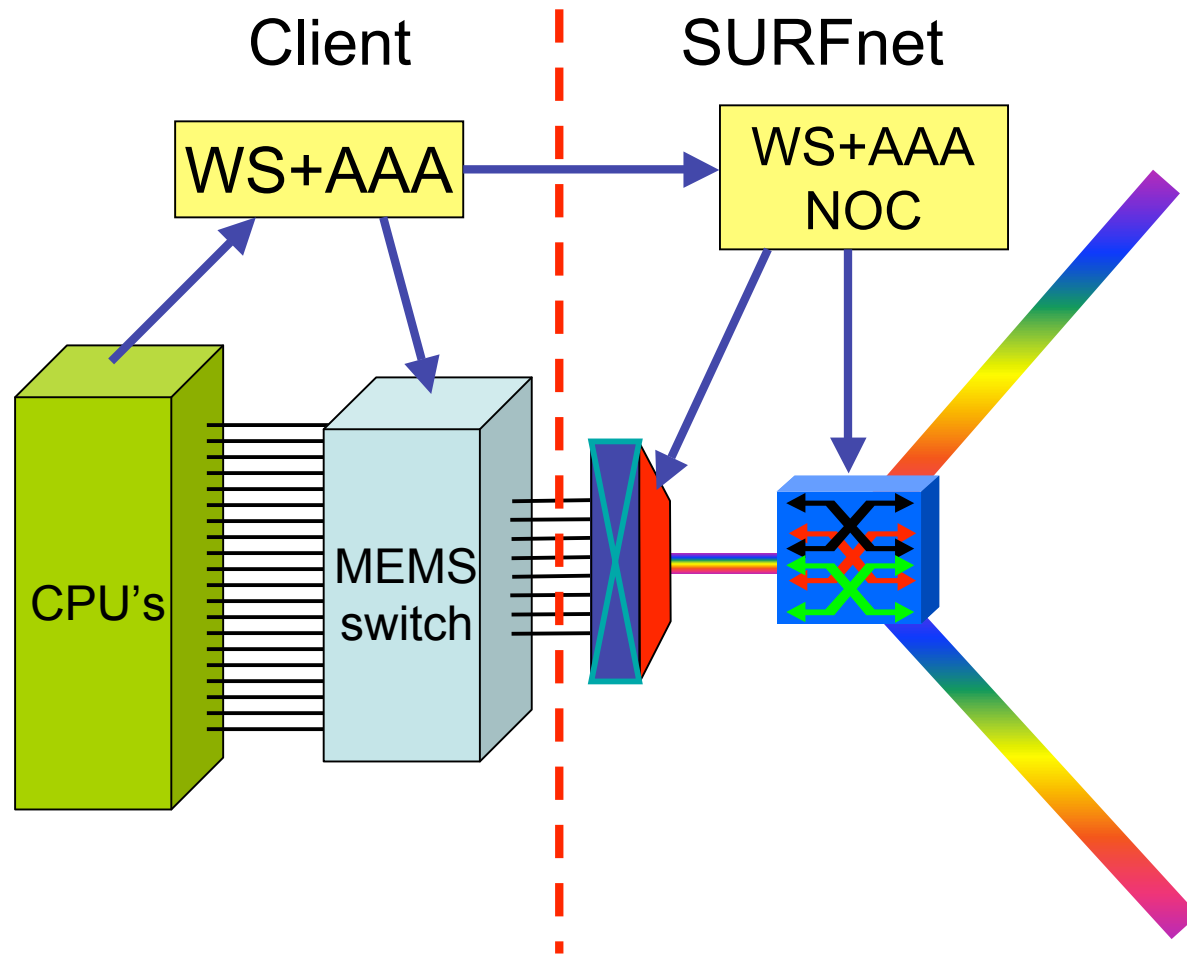


UvA-VLE
UvA-MM
VU
ULeiden
TUDelft

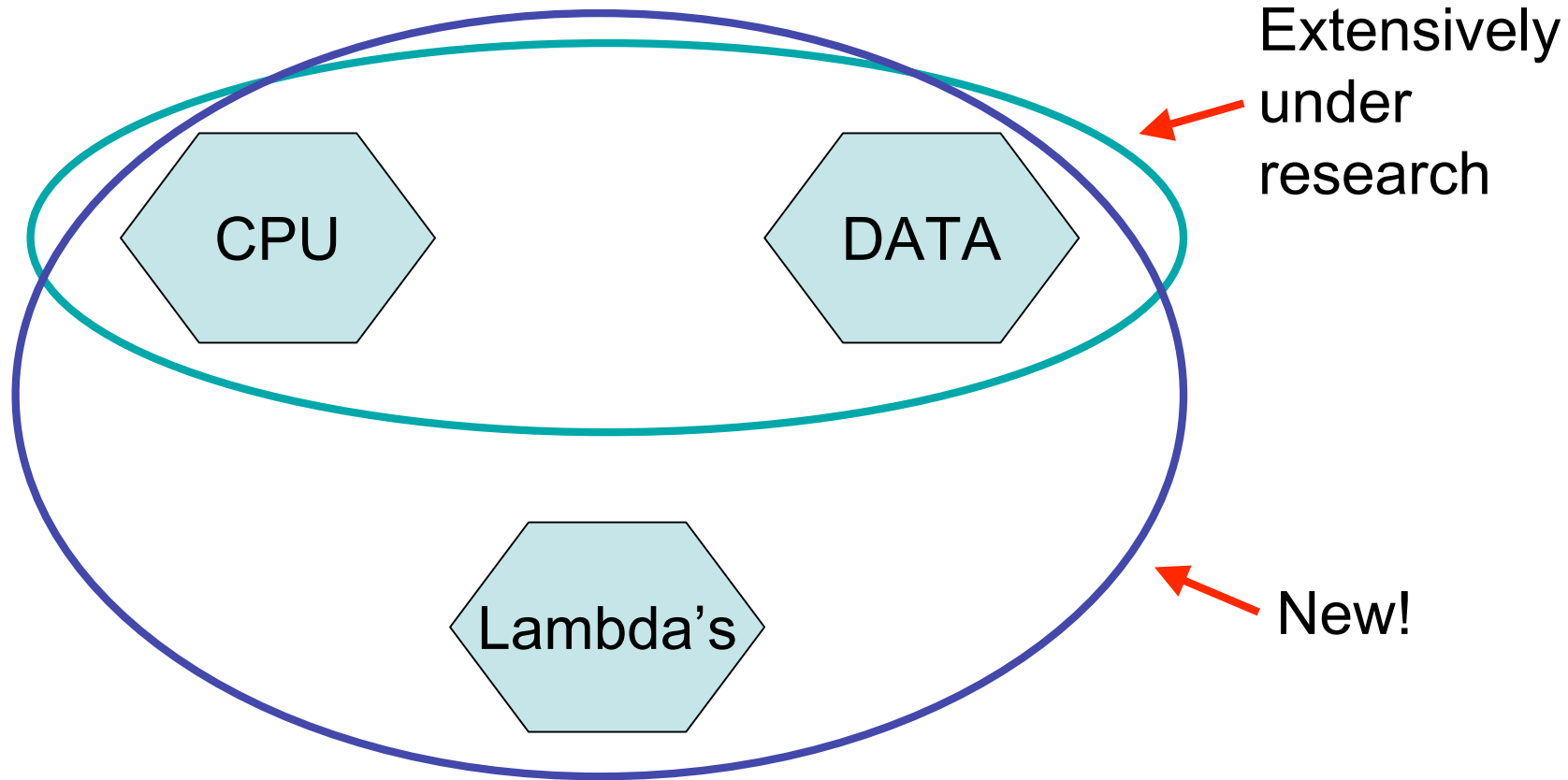
Common Photonic Layer (CPL) in SURFnet 6







GRID-Colocation problem space

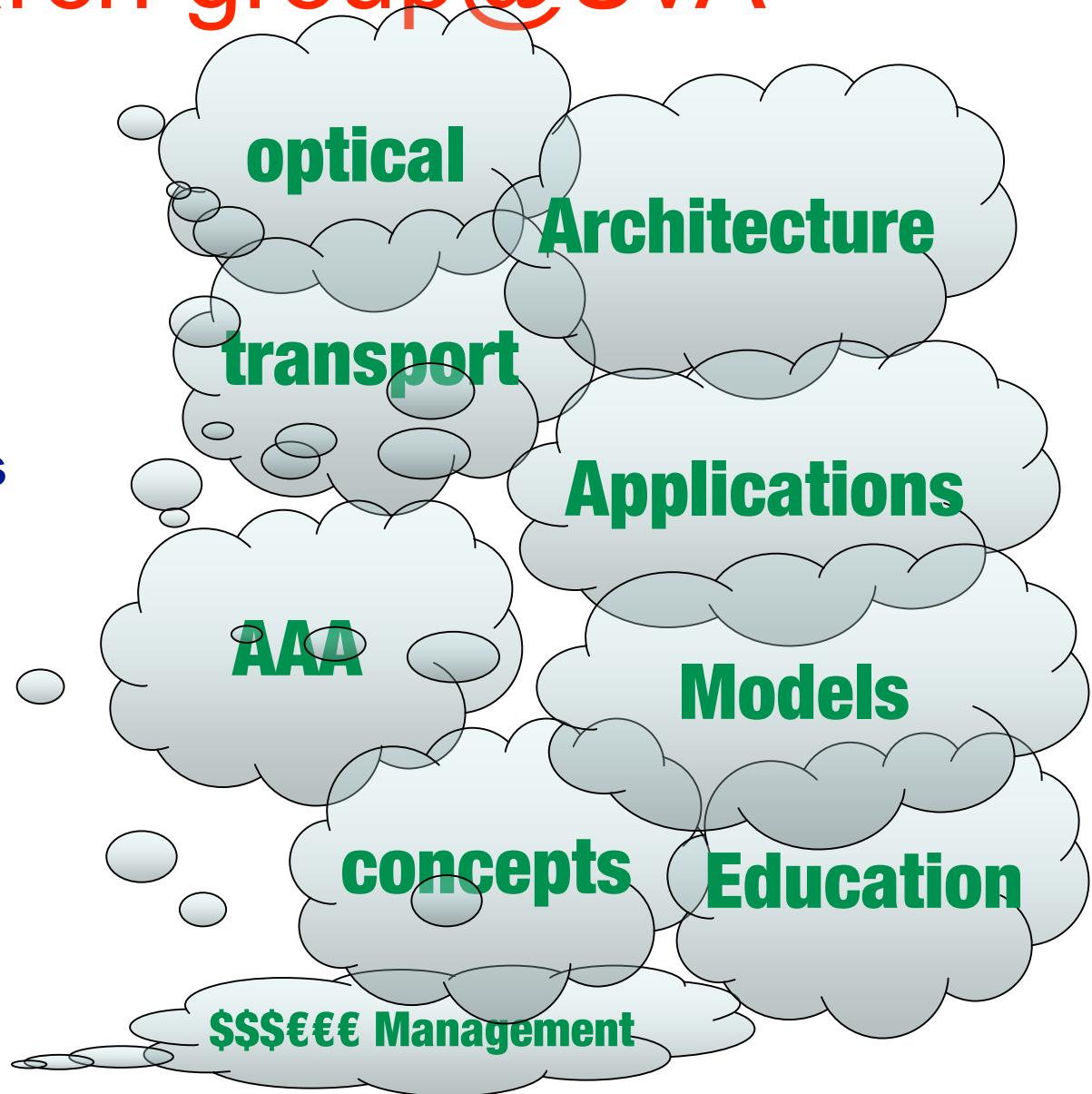


Achievements

- **GLIF organization**
- **Articles and drafts on optical network architecture and control models for GLIF**
- **LightHouse rapid prototyping environment**
- **Grid based network test environment**
- **WebServices prototype on NE's**
- **WS for resource reservation**
- **Rate limiting tests**
- **AAA toolkit online**
- **SC2004 multi domain Lambda provisioning**
- **Token based networking concepts**
- **For articles/talks see: www.science.uva.nl/~delaat**

OSI model Advanced Internet Research group@UvA

- Freek Dijkstra
- Hans Blom
- Bert Andree
- Paola Grosso
- Jeroen van der Ham
- Martijn Steenbakkers
- Bas van Oudenaarde
- Fred Wan
- Arie Taal
- Yuri Demchenko
- Leon Gommans
- Rob Meijer
- Karst Koymans
- Cees de Laat



The END

RESERVED

Case
Delaat

3/12/2003
9:00 AM - 3:00 PM
Wednesday

GigaPort

NWO/NCF



SU RF/net

Partially complete list:

Caas
Chase
Cess
Kess
Case