

The Lambda Grid GNEW-PANEL-2

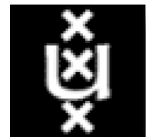
www.science.uva.nl/~deLaat

Cees de Laat

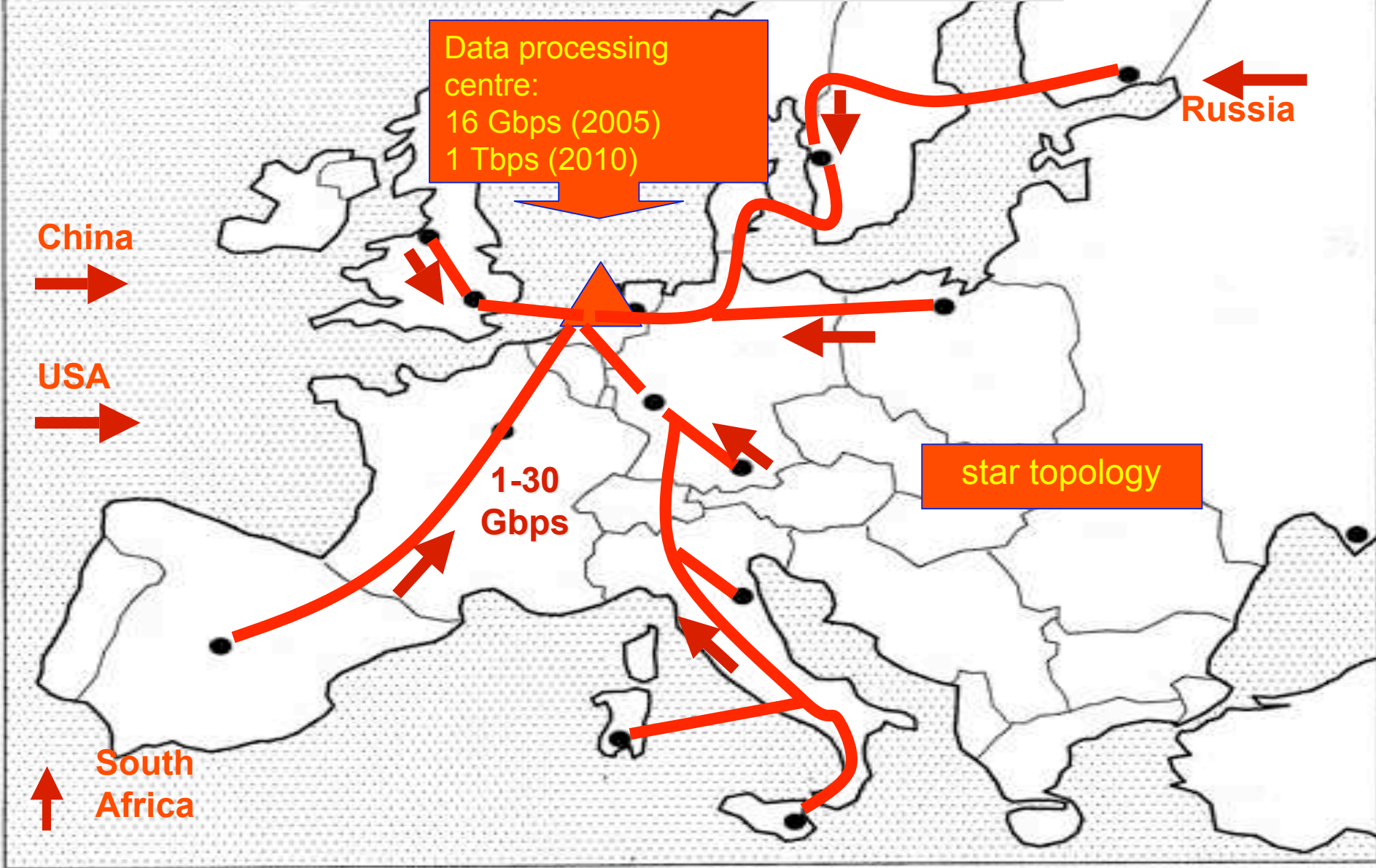
SURFnet
EU

University of Amsterdam

SARA
NIKHEF
NCF



eEVN: European VLBI Network



This slide courtesy of Richard Schilizzi <schilizzi@jive.nl>

Lambdas as part of instruments

GigaPort

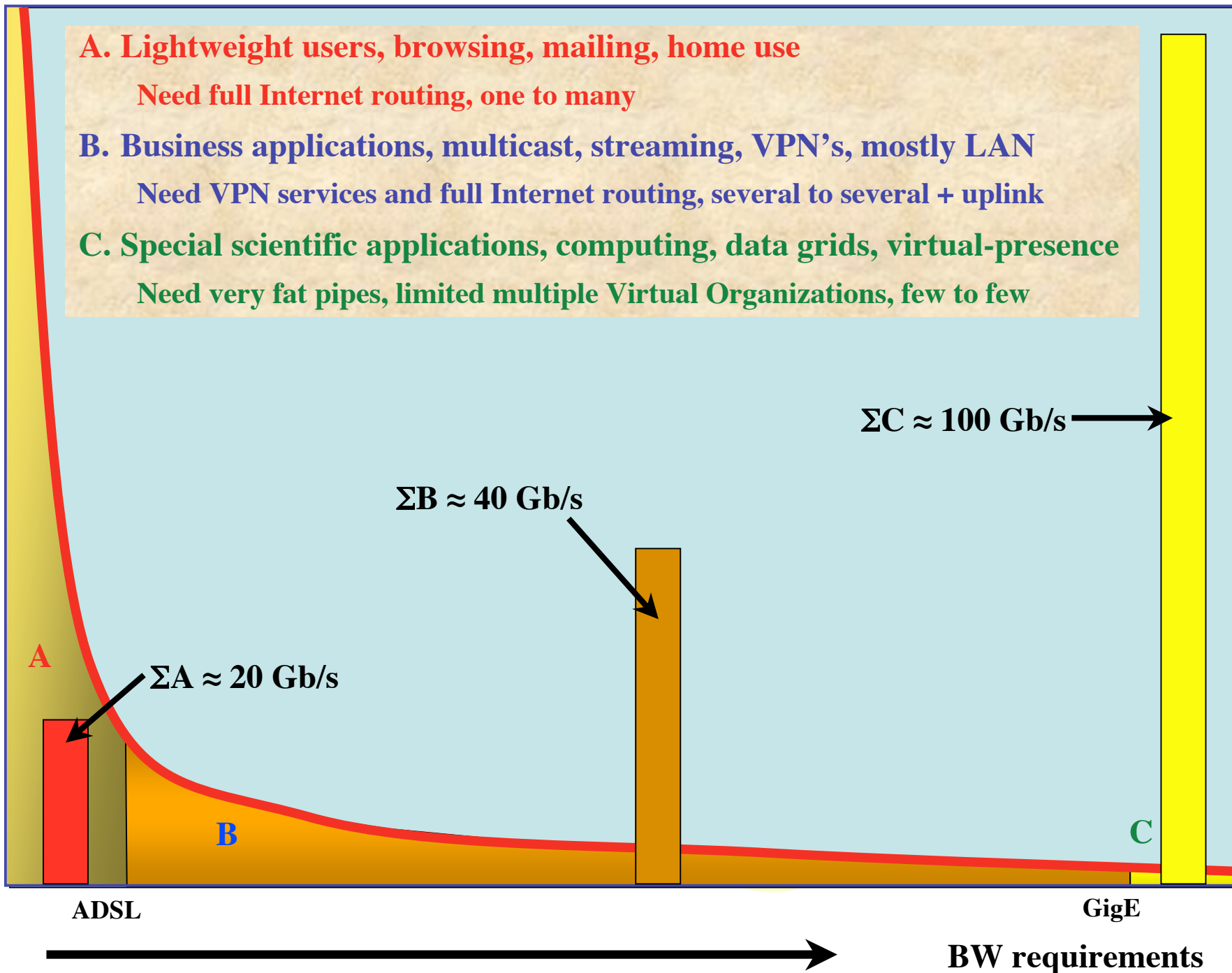


www.lofar.org

20 Tbit/s

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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. Special scientific applications, computing, data grids, virtual-presence**
Need very fat pipes, limited multiple Virtual Organizations, few to few



The Dutch Situation

- **Estimate A**

- 17 M people, 6.4 M households, 25 % penetration of 0.5 Mb/s ADSL, 40 times under-provisioning ==> 20 Gb/s

- **Estimate B**

- SURFnet has 10 Gb/s to about 12 institutes and 0.1 to 1 Gb/s to 180 customers, estimate same for industry (overestimation) ==> 20-40 Gb/s

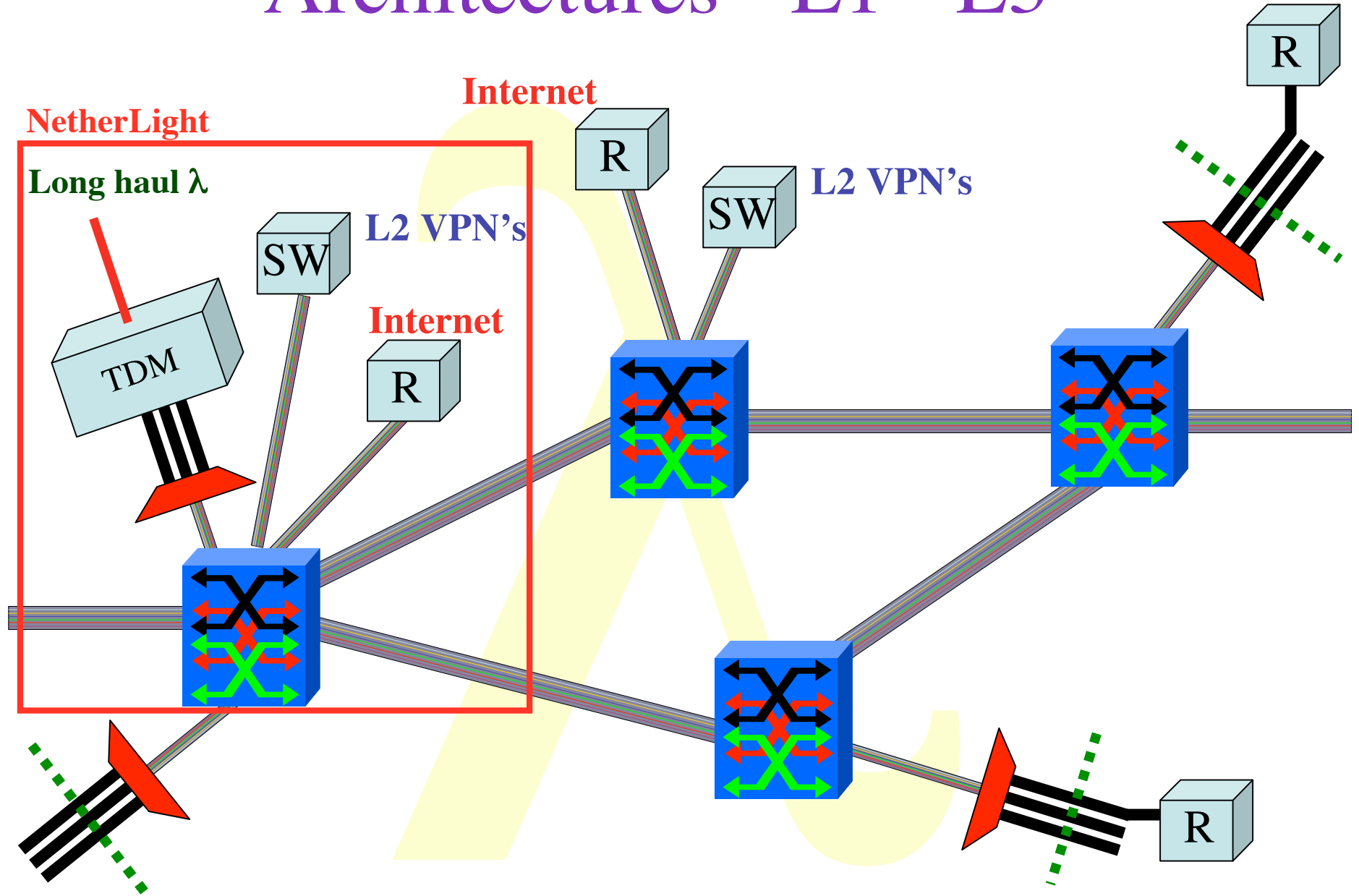
- **Estimate C**

- Leading HEF and ASTRO + rest ==> 80-120 Gb/s
- LOFAR ==> 20 TBit/s

Services

SCALE CLASS	2 Metro	20 National/ regional	200 World
A	Switching/ routing	Routing	ROUTER\$
B	Switches + E-WANPHY VPN's,	Switches + E-WANPHY (G)MPLS	ROUTER\$
C	dark fiber Optical switching	Lambda switching	Sub-lambdas, ethernet-sdh

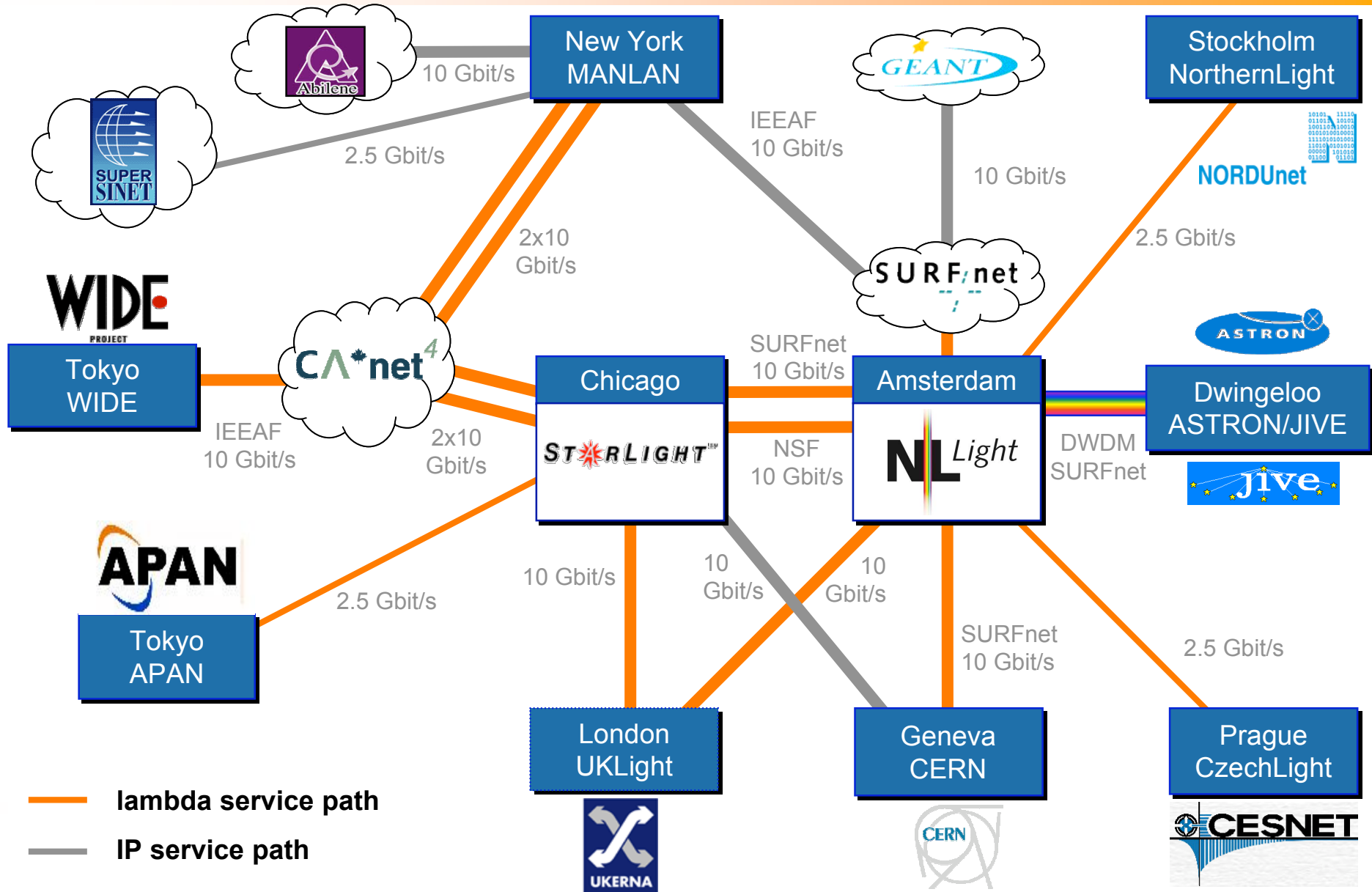
Architectures - L1 - L3



- Optical Internet exchange point in Amsterdam
- Built and operated by SURFnet
- Experiments with light path provisioning in a multi domain environment
- <http://www.netherlight.net/>



International light path network 1Q2004



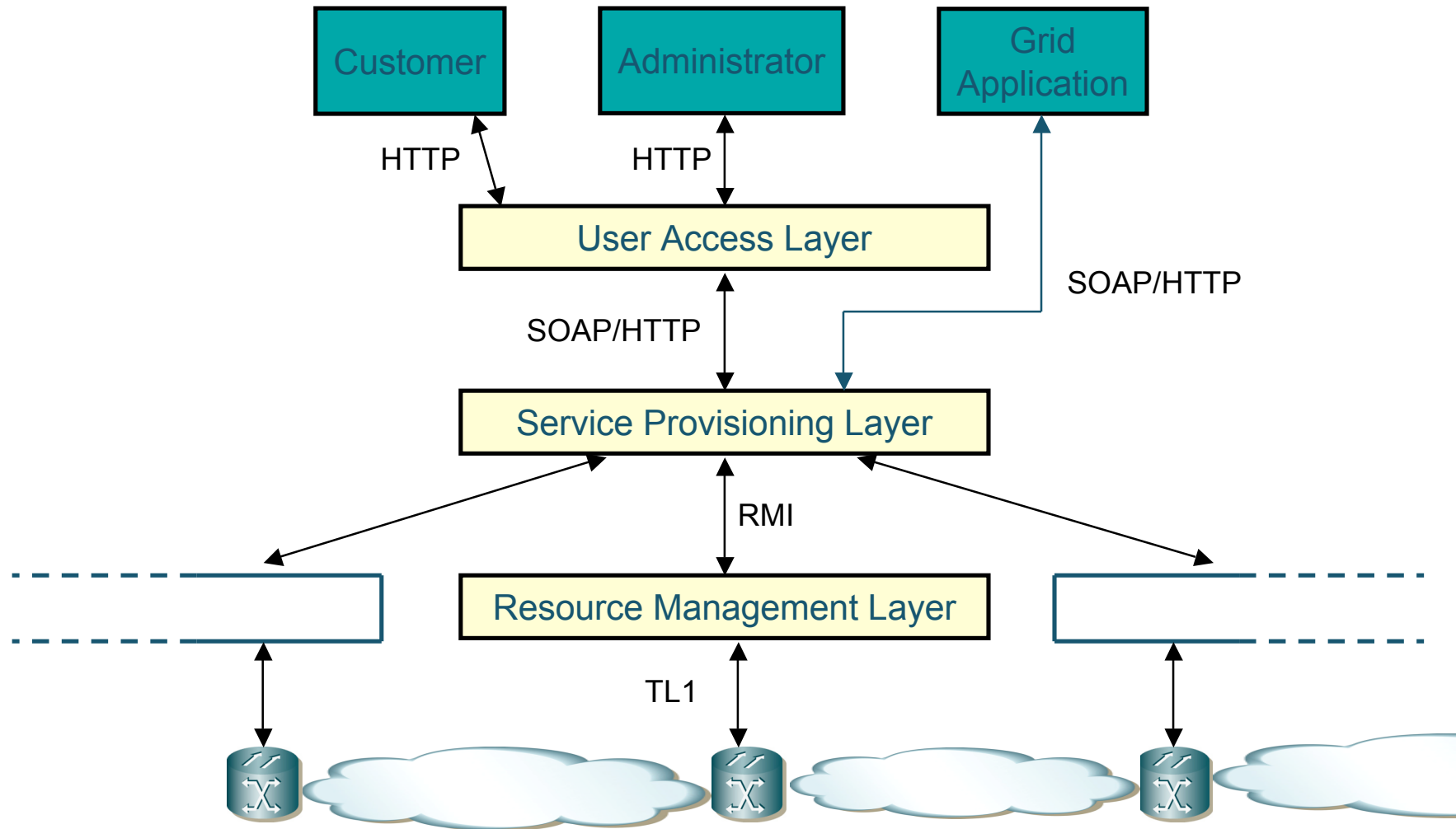
Lambda workshop

- **Amsterdam - Terena**
 - Concepts
 - Initial testbed (SURFnet Lambda to StarLight)
- **Amsterdam - iGrid2002**
 - Rechecking concepts models
 - Initial experiences and measurements
 - Expansion of Lambda testbed
- **Reykjavik - NORDUnet**
 - Towards persistent demonstrations and applications
- **Next one in UK sept 3th 2004 (tentative)**

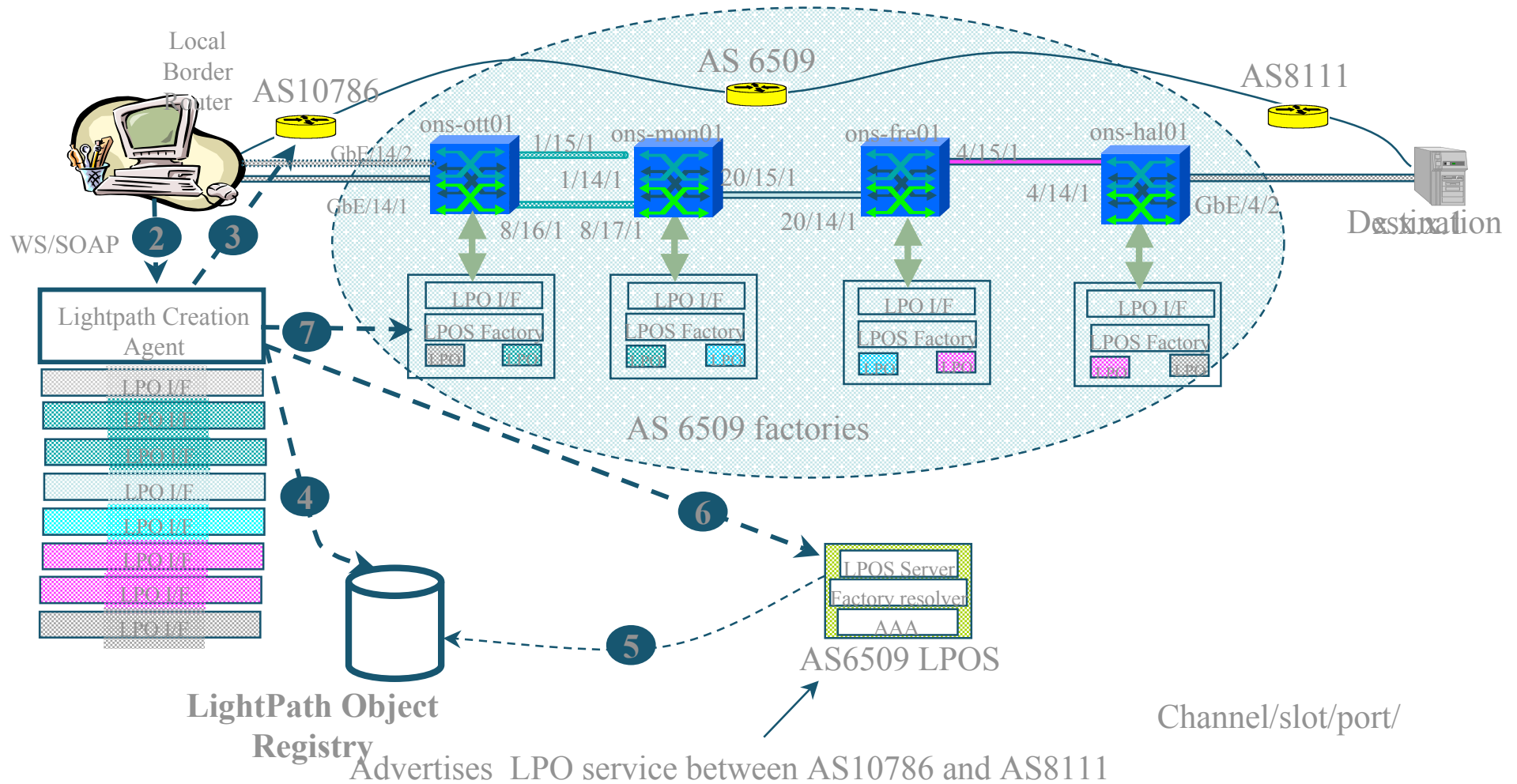


3th Lambda workshop @ NORDUnet 2003

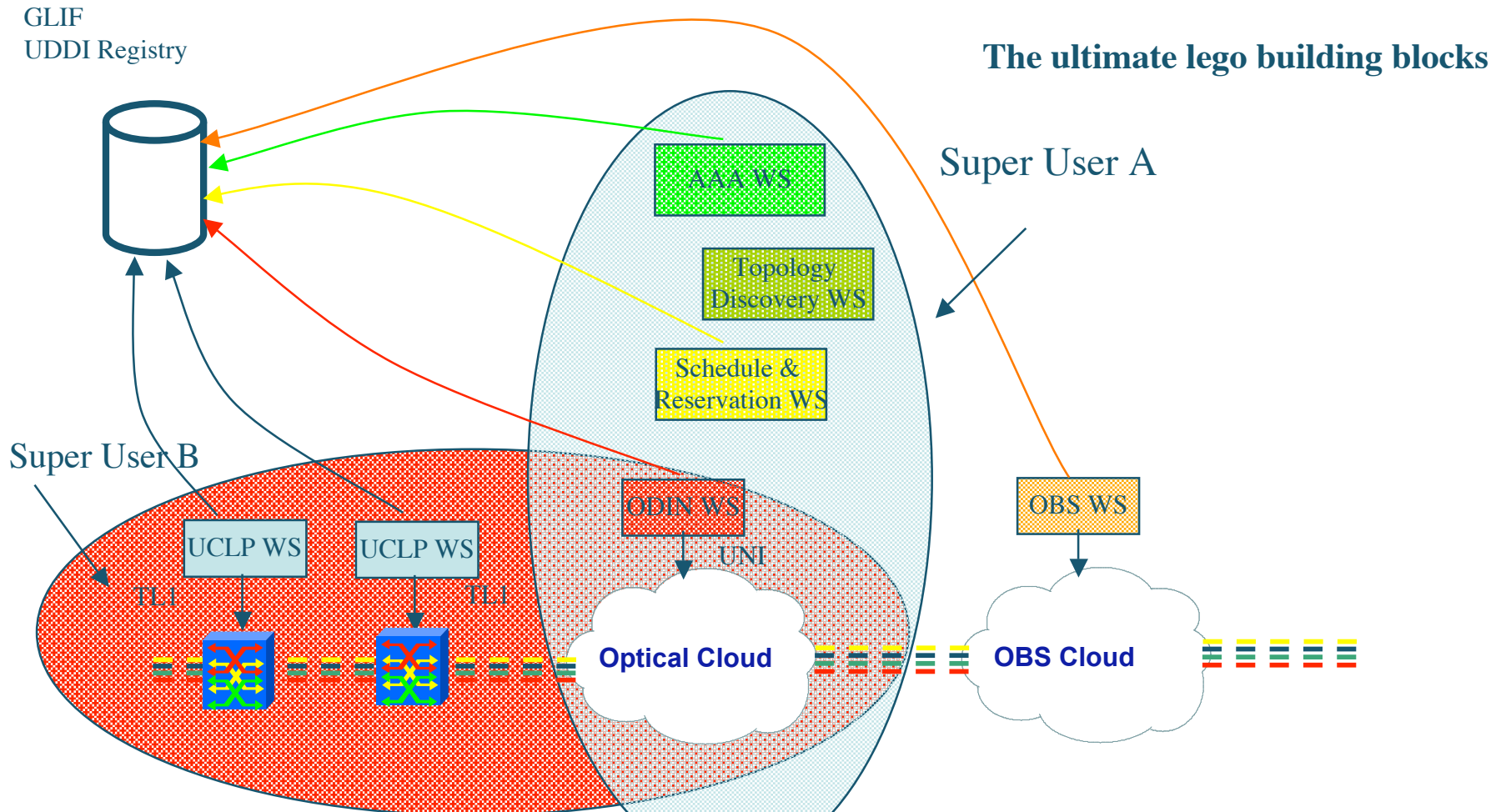
High-Level Architecture



Example – Server to server



Coordination with Optiputer, OBS and others



The END

Thanks to

Kees Neggers, Tom DeFanti, Joel Mambretti, Bill St. Arnaud, Larry Smarr

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Bert Andree, Martijn de Munnik, Antony Antony, Rob Meijer, Yuri Demchenko.



Partially complete list:

- Caas
- Chase
- Cess
- Kess
- Case

NWO/NCF



SU R F / net