

# The SURFnet Project

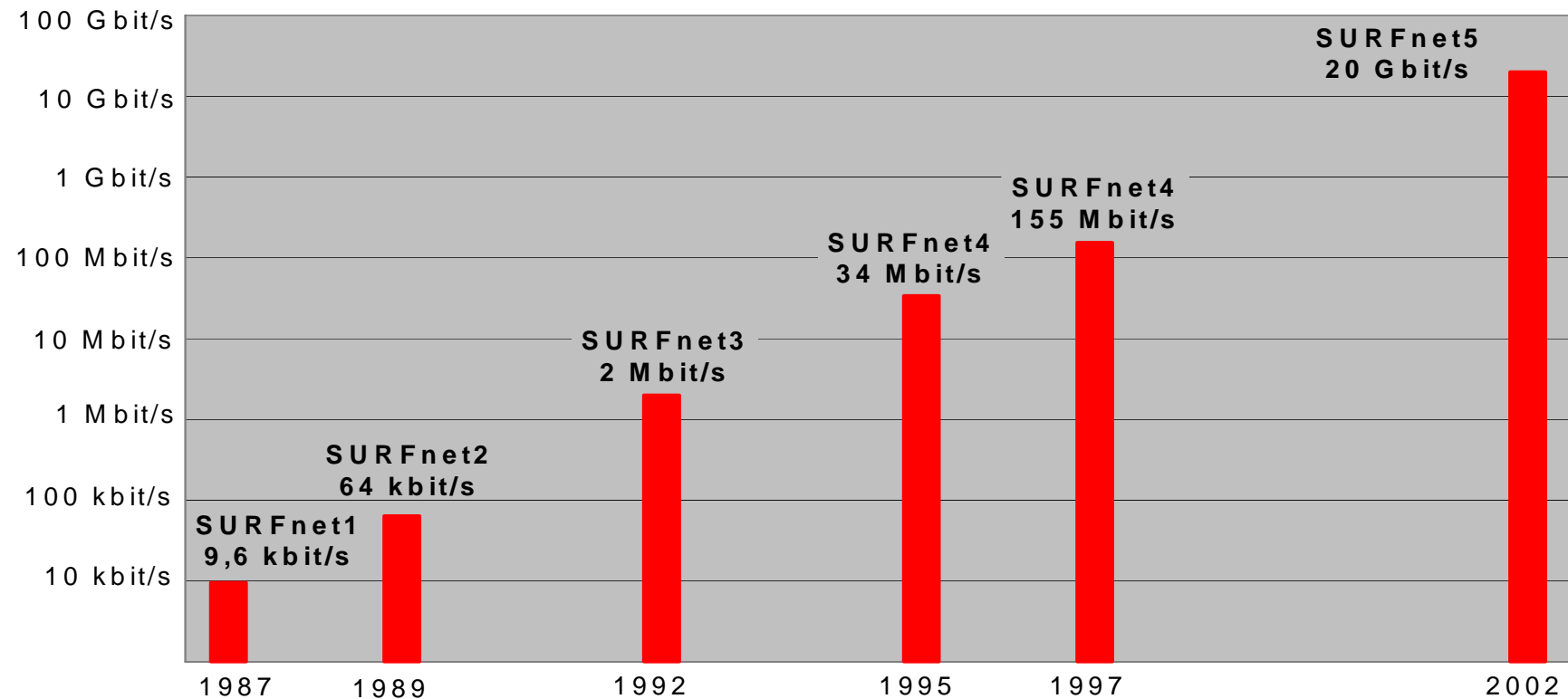
**Bram Peeters, Manager Network Services**

**ICFA Workshop, Cracow, Poland**

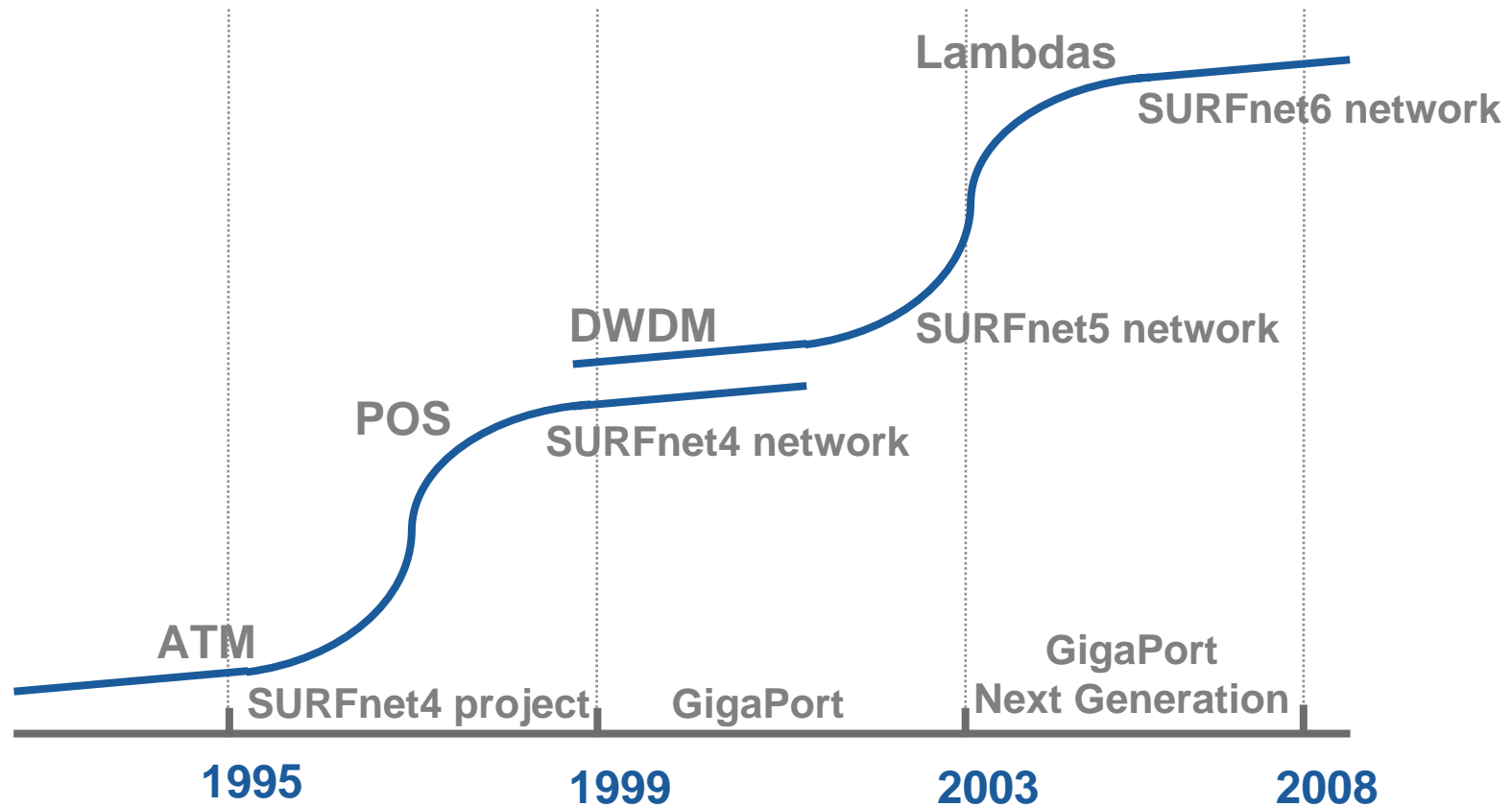
**10<sup>th</sup> October 2006**



# History of SURFnet infrastructure

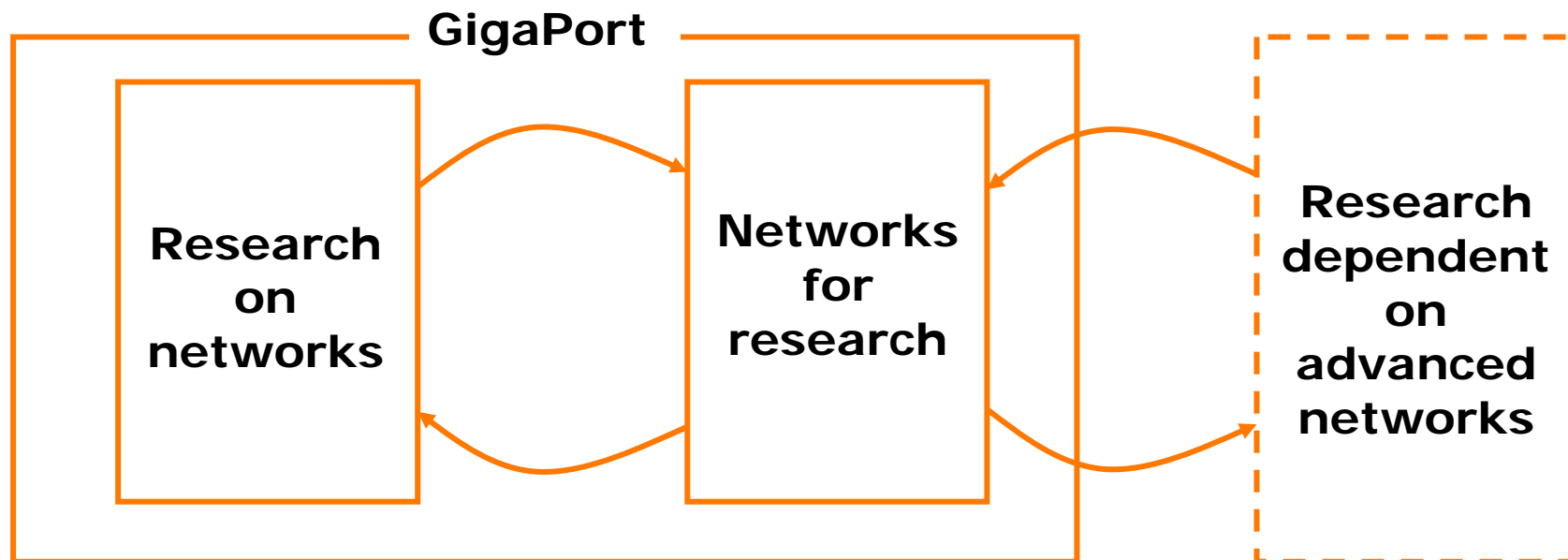


# Paradigm shift



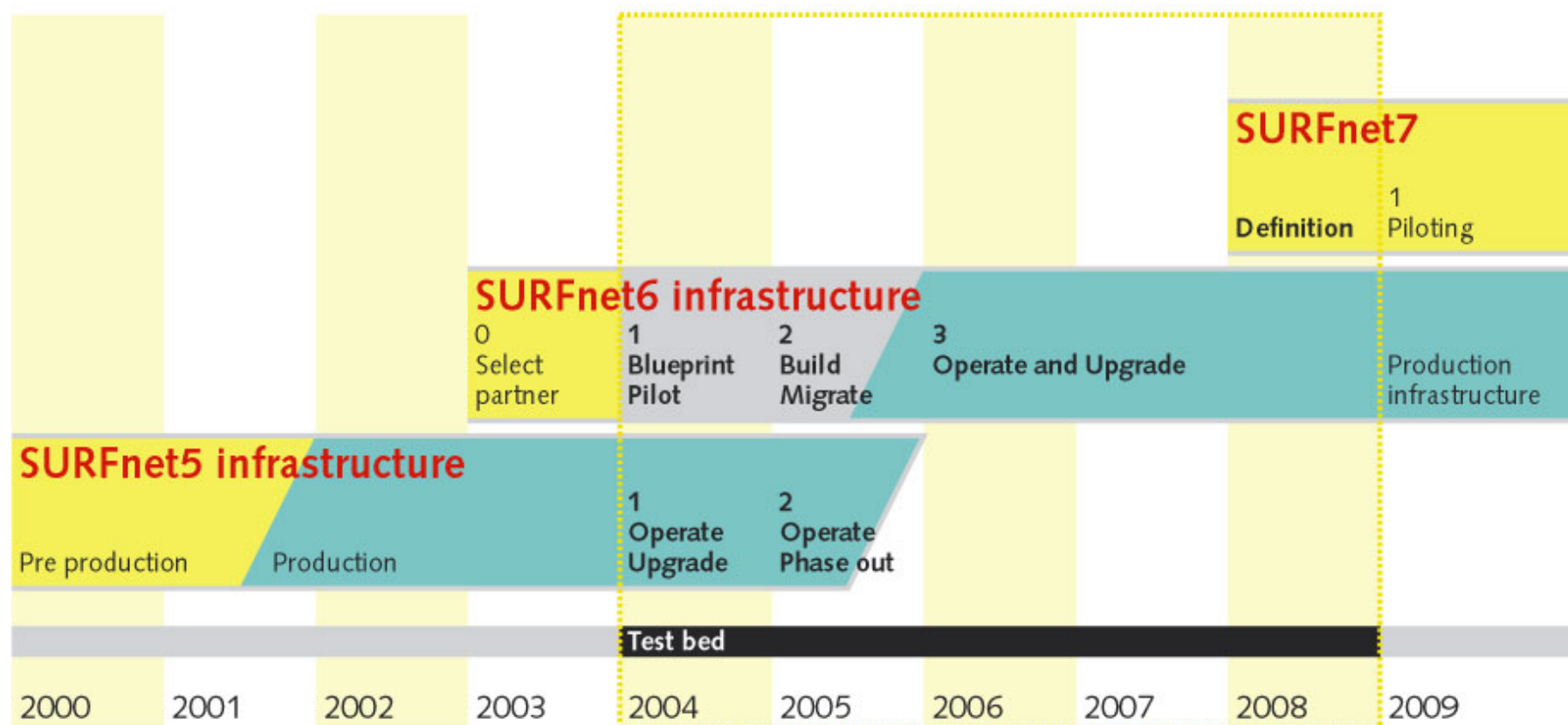
**Next generation is not a simple extrapolation of current networks**

# GigaPort project overview





# Timelines SURFnet6



## SURFnet's Partners: Industry partner builds the network

The logo for Nortel, featuring the word "NORTEL" in a bold, blue, sans-serif font. The letter "O" is stylized with a circular graphic element.

- Leader of the consortium
- Optical equipment
- Ethernet equipment
- Network management equipment

The logo for Avici Systems, featuring the word "AVICI" in a large, bold, black, sans-serif font. The letter "A" is stylized with a red graphic element. Below "AVICI" is the word "SYSTEMS" in a smaller, black, sans-serif font.

- Routing equipment

The logo for Telindus, featuring the word "TELINDUS" in a bold, red, sans-serif font.

- Installation services
- Maintenance services

## SURFnet's Partners: NOC Alliance manages the network

The logo for TELINDUS, featuring the word "TELINDUS" in a bold, red, sans-serif font.

- Leader of NOC Alliance
- Provides 7x24 hrs capability



- Member of NOC Alliance
- Expert group

## SURFnet Helpdesk:

The logo for Radboud Universiteit Nijmegen, featuring the text "Radboud Universiteit Nijmegen" in a white, sans-serif font.

- First point of contact for all trouble 7x24 hrs

## Status SURFnet6

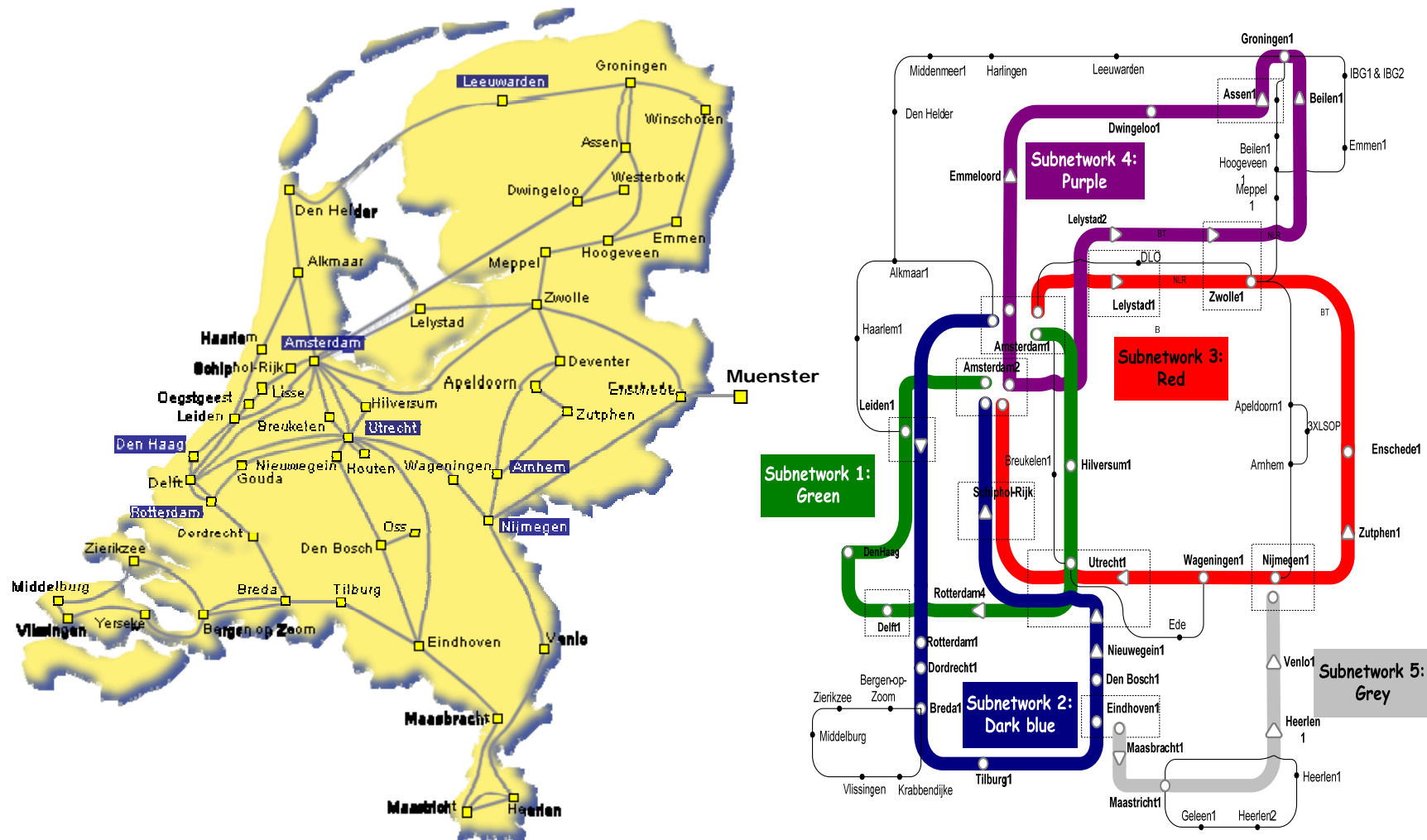
- Network ready at end of 2005,
  - carrying all SURFnet traffic mid December 2005
- SURFnet6 NOC operational
- Transition finalized mid June 2006:
  - 180 organizations
  - 370 ports
  - External connections
- SURFnet5 decommissioned and auctioned last summer



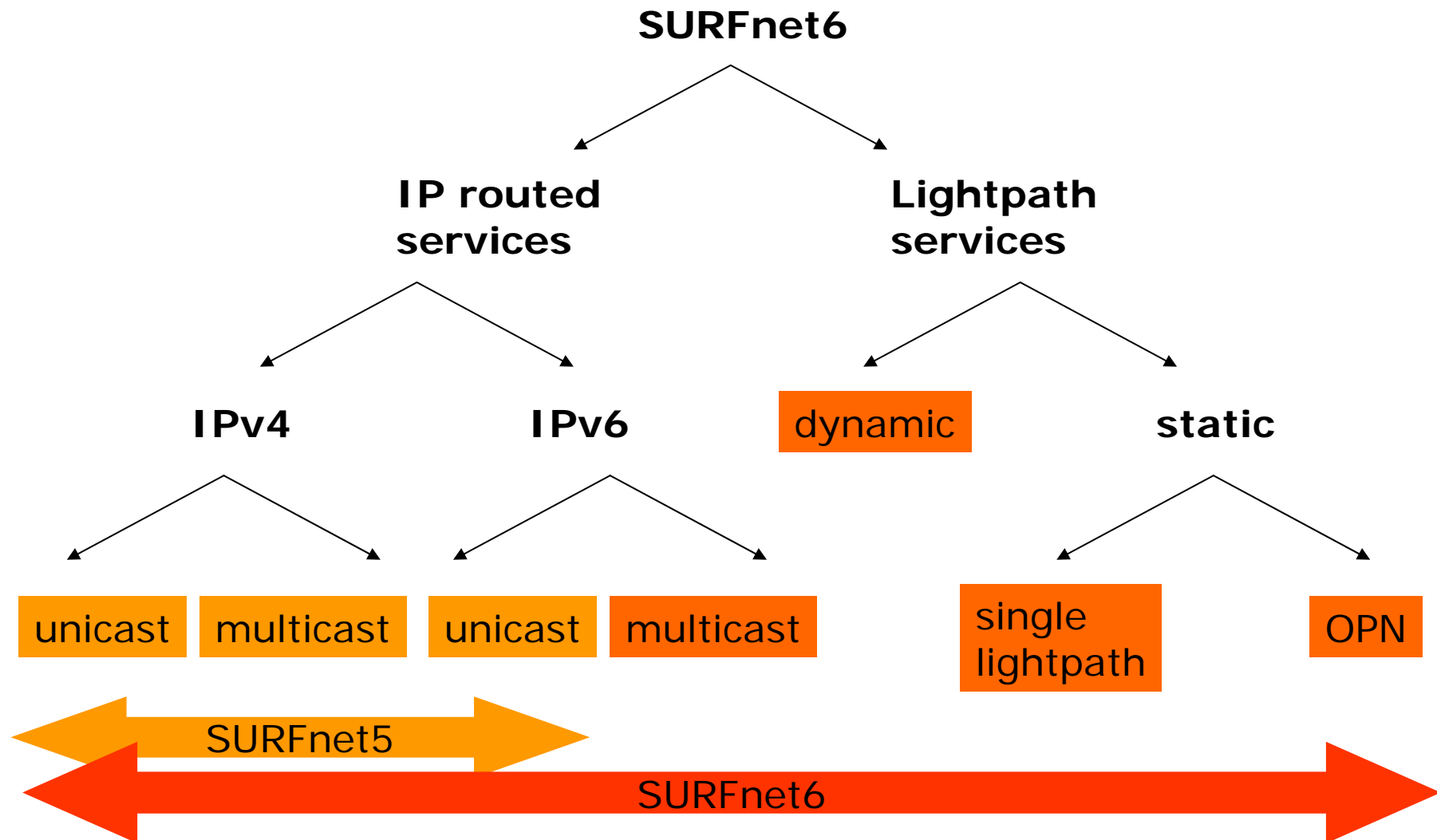
# SURFnet6 overview

- The first nation-wide hybrid optical and packet switching infrastructure
- Based on 6000+ km of SURFnet-owned managed dark fiber, all the way to the customers premises
- SURFnet6 delivers all SURFnet5 services (native IPv4 and IPv6) plus Lightpath Provisioning:
  - Over a single transmission infrastructure
  - Managed via a single control planeHence, in an economically sound way

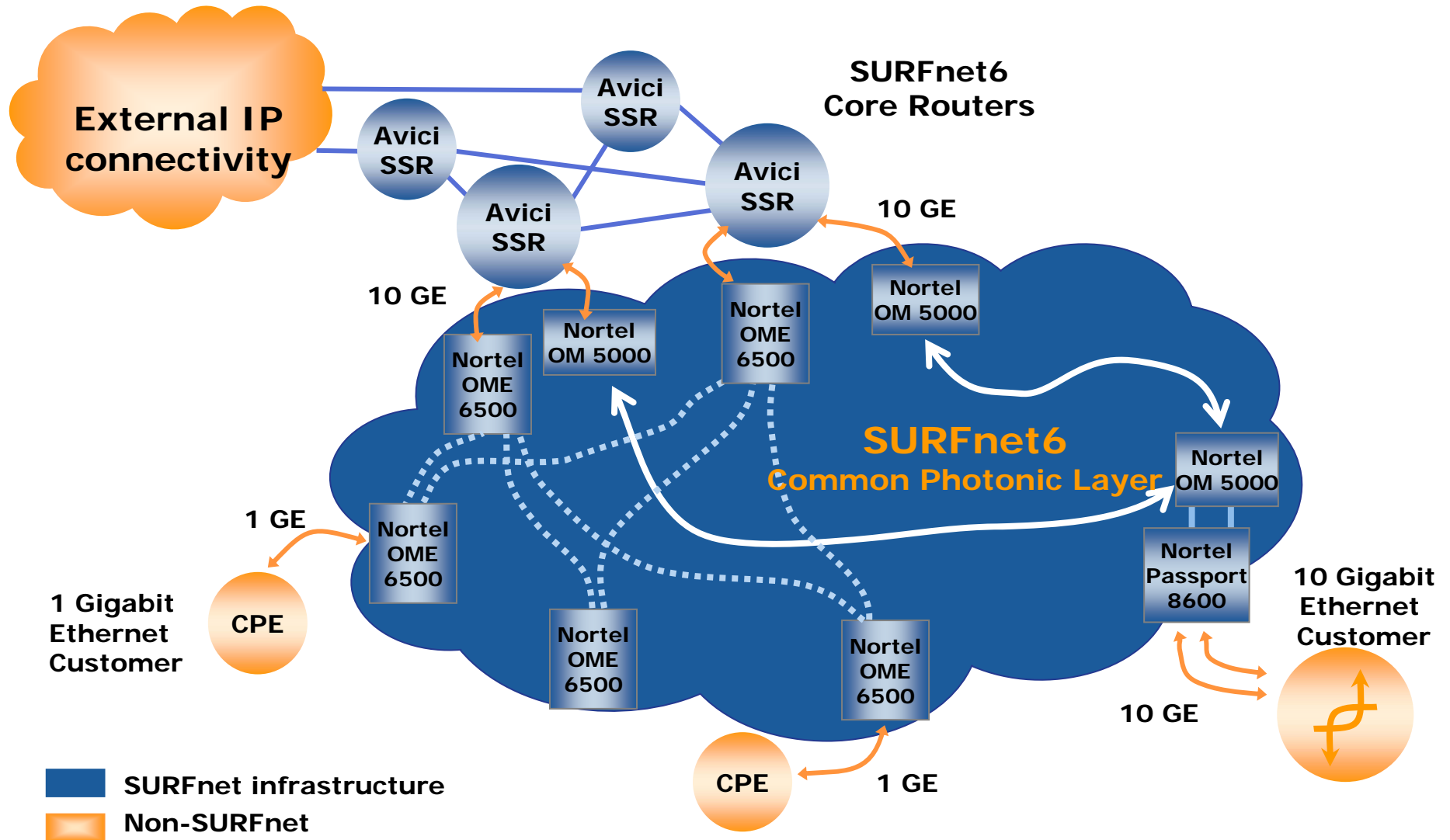
# SURFnet6 - DWDM on dark fiber



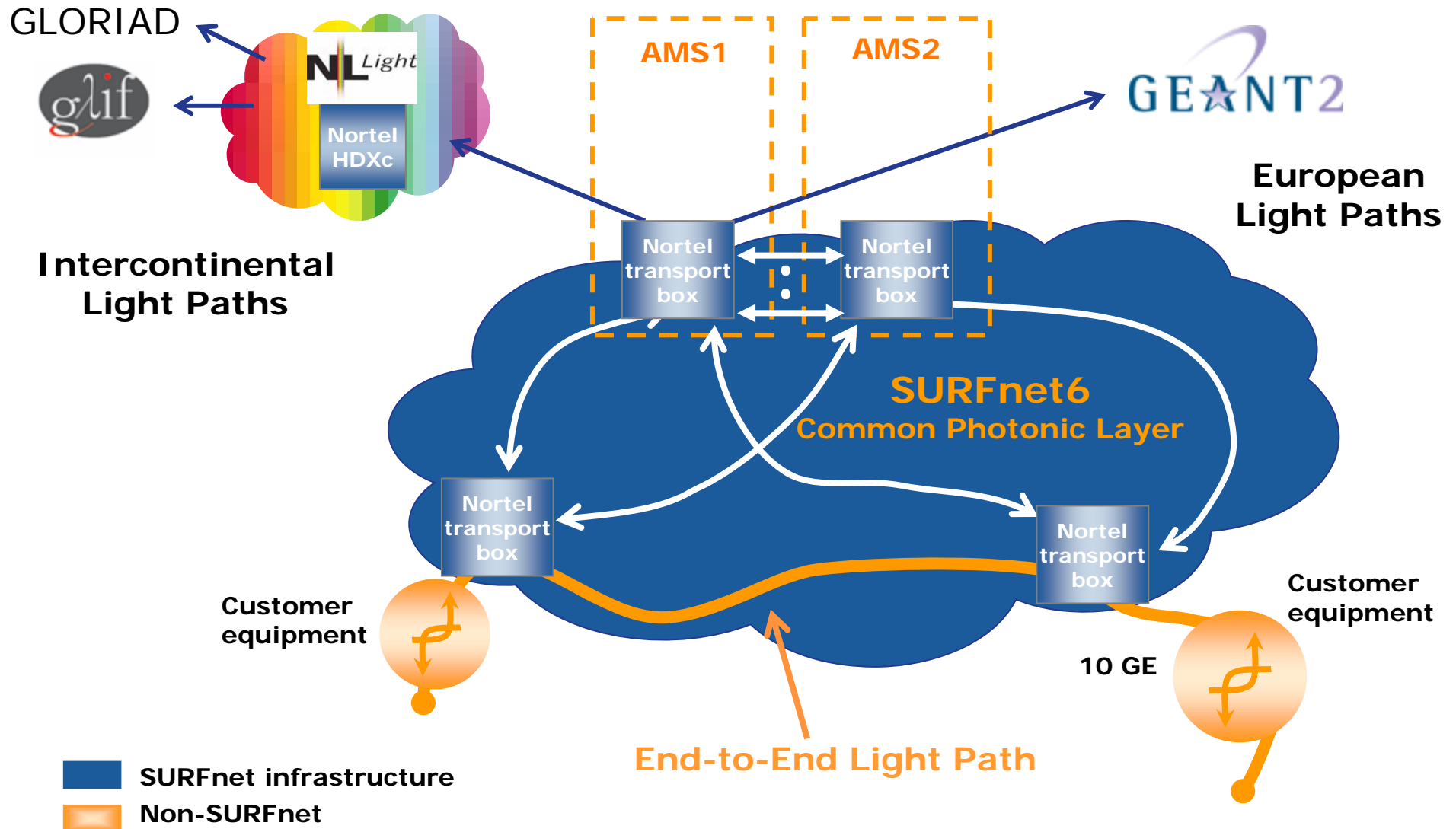
# Services on SURFnet6



# SURFnet6: IP network implementation



## SURFnet6: Light Path Provisioning implementation

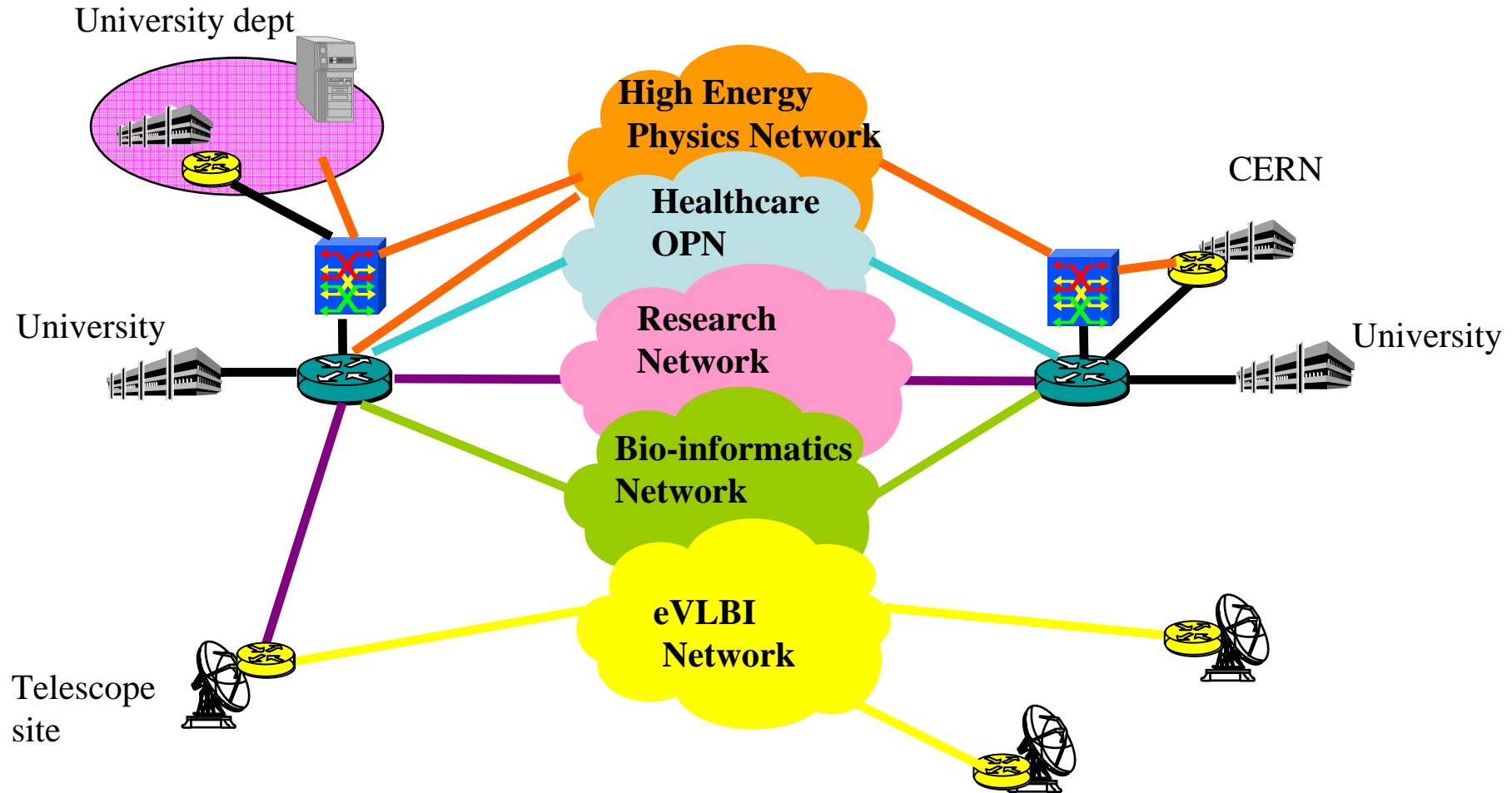


# Lightpaths

- A lightpath is an end-to-end transmission path with fixed characteristics
  - Fixed bandwidth → reliable
  - Dedicated, logically separated → secure
  - High-speed (up to 10 Gbit/s)
  - We build them on L1 → economical
- Lightpaths are the building blocks for Optical Private Networks (OPNs) and scientific instruments



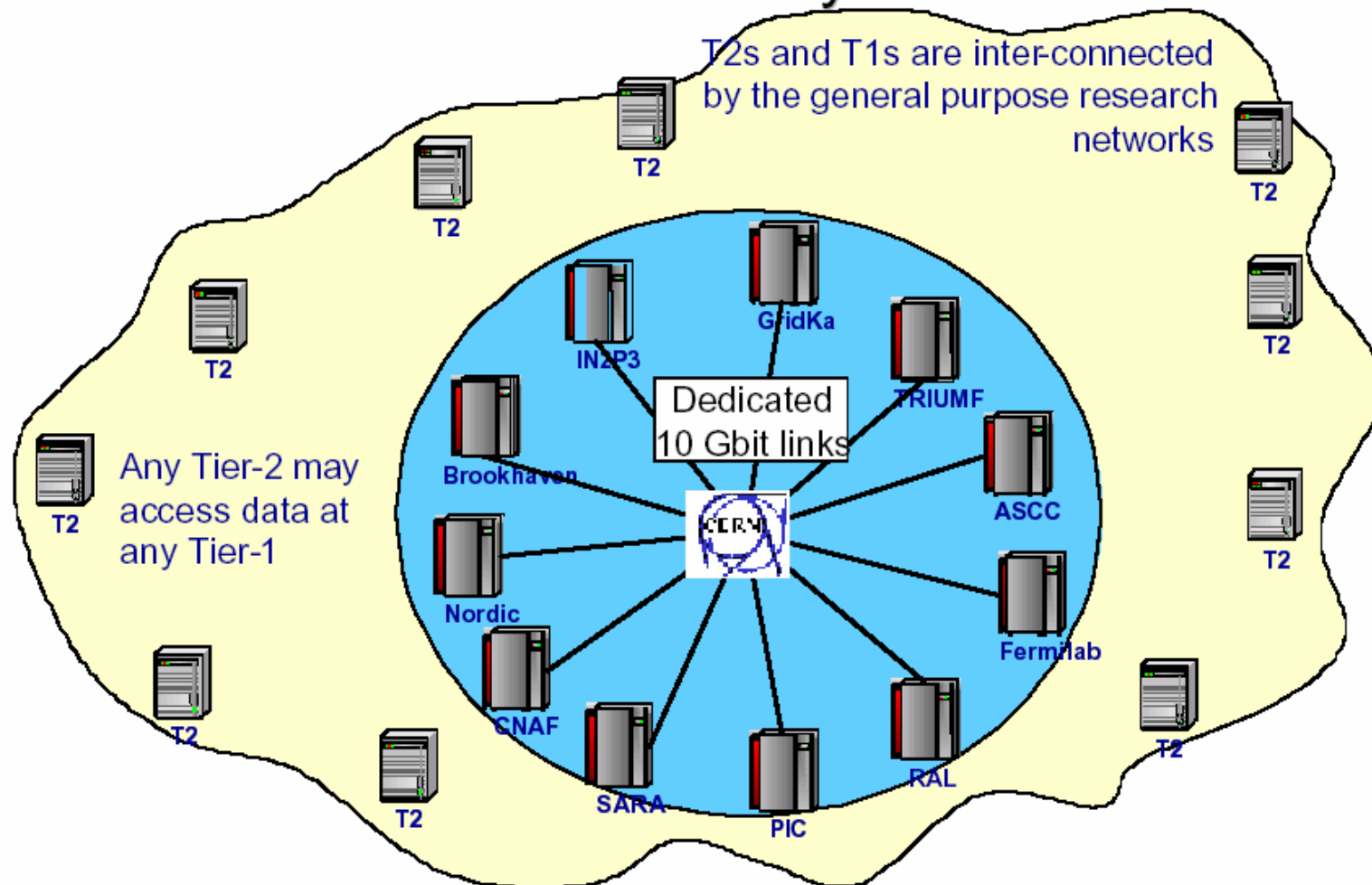
# Application specific OPNs



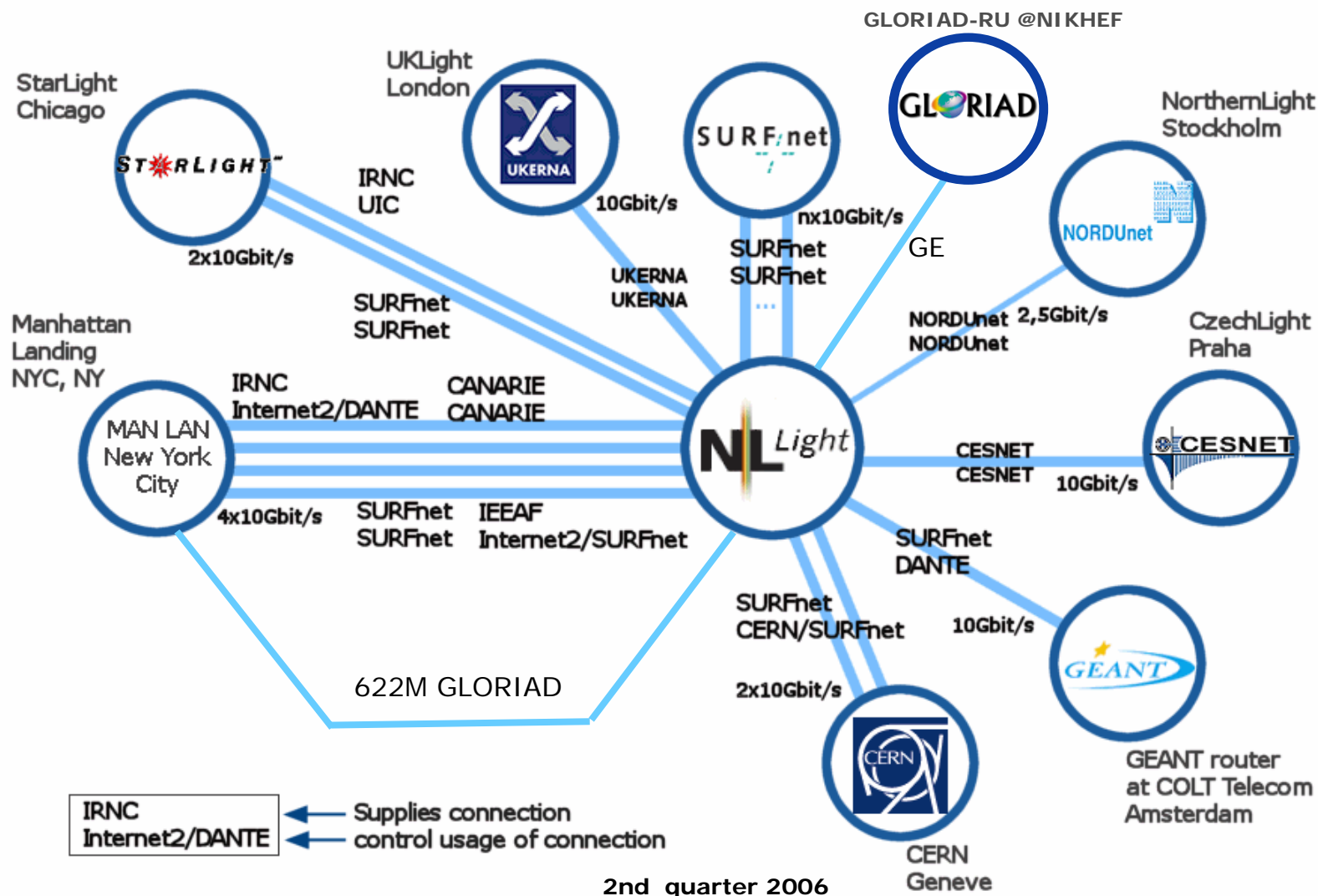
Original slide from Bill St. Arnaud (CANARIE)

# LHC high-level network architecture

## T0/T1/T2 Interconnectivity



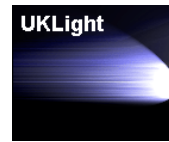
# NetherLight – Lightpath connections to the Netherlands



# Global Lambda Integrated Facility

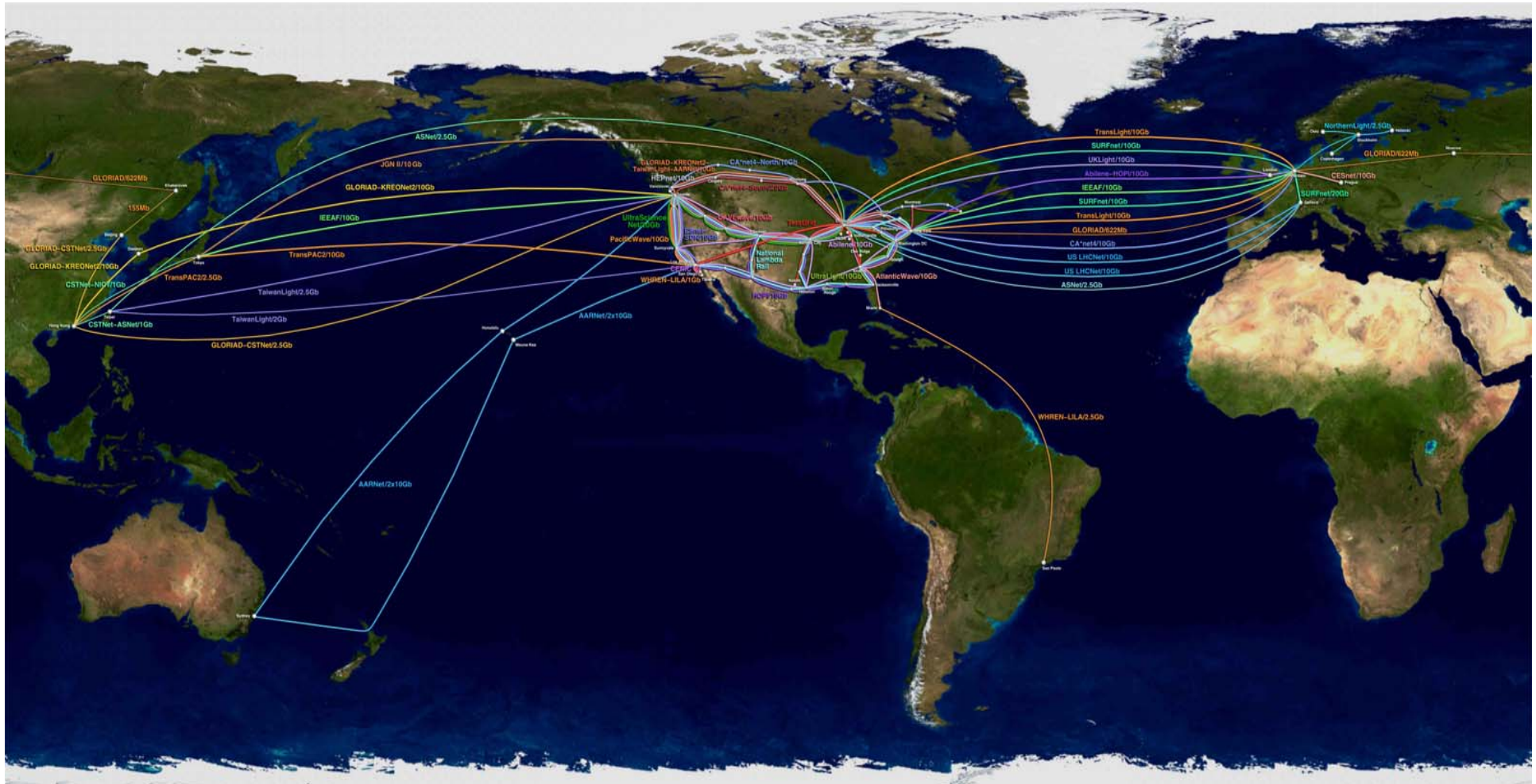
- **GLIF** was founded at the 3<sup>rd</sup> Lambda Workshop, August 2003 in Reykjavik
- GLIF is a collaborative initiative among worldwide NRENs, consortia and institutions with lambdas
- GLIF is a world-scale Lambda-based Laboratory for application and middleware development
- GLIF vision:  
To build a new grid-computing paradigm, in which the central architectural element is optical networks, not computers, to support this decade's most demanding e-science applications.

# GLIF Participants





# World Map – August 2005

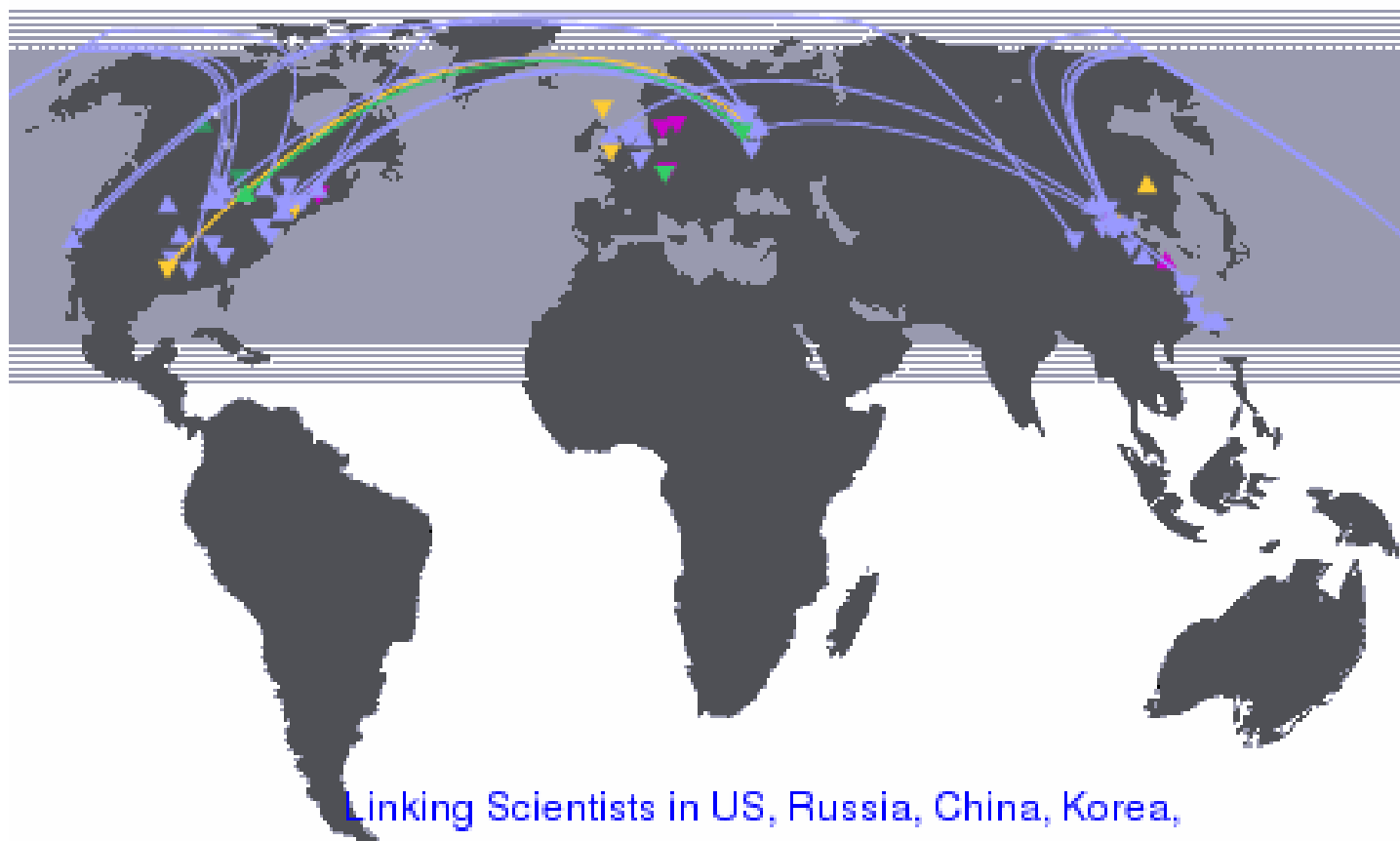


Visualization courtesy of Bob Patterson, NCSA/University of Illinois at Urbana-Champaign.  
Data compilation by Maxine Brown, University of Illinois at Chicago. Earth texture from NASA.



## GLORIAD

Global Ring Network for Advanced Applications Development



Linking Scientists in US, Russia, China, Korea,  
Canada and the Netherlands with  
High-Performance Network Services

# Thank you

<http://www.surfnet.nl/>

<http://www.gigaport.nl/>

<http://www.glif.is/>

<http://www.netherlight.net/>