GÉANT2 for LHC

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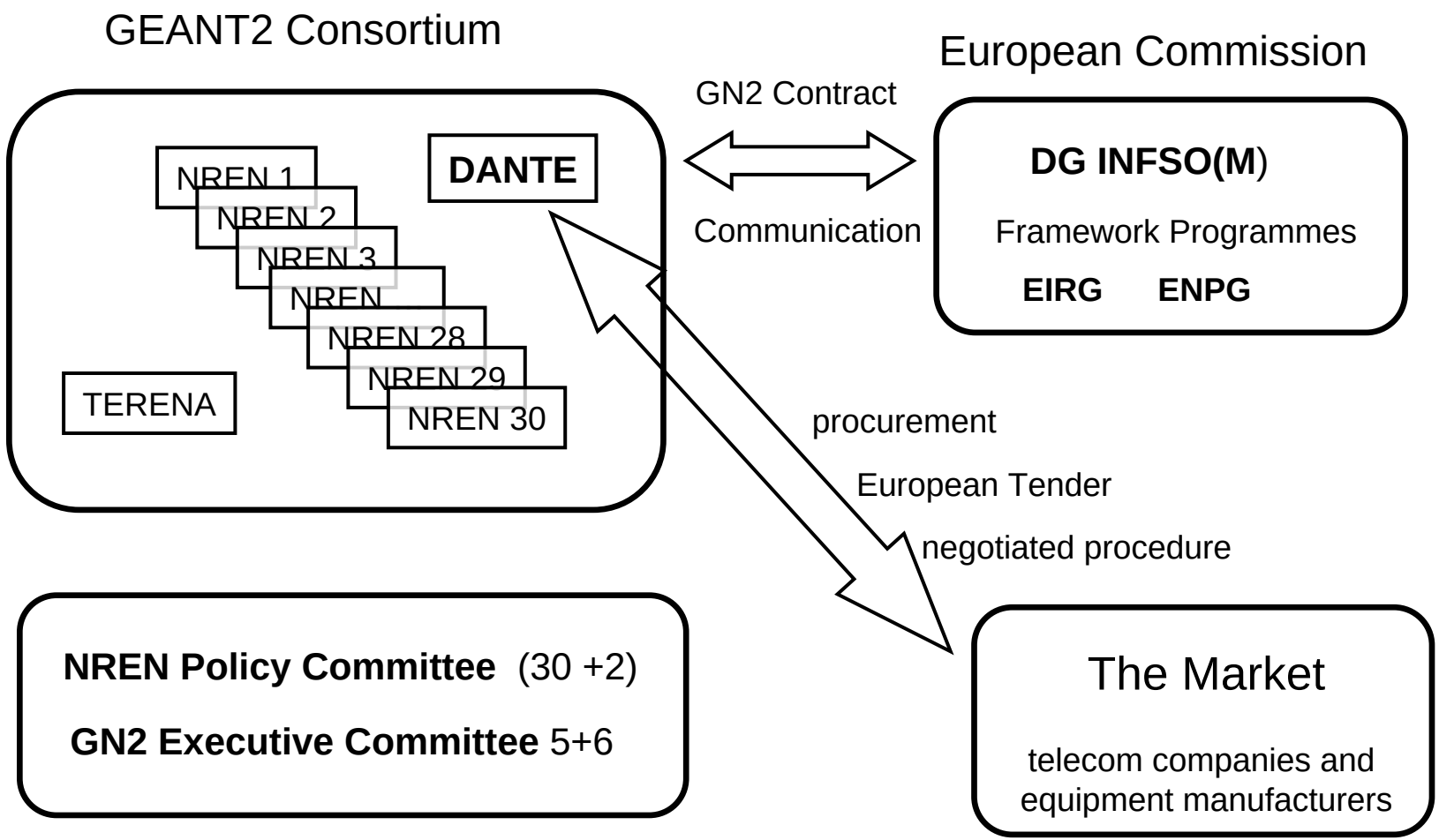
General Manager, DANTE

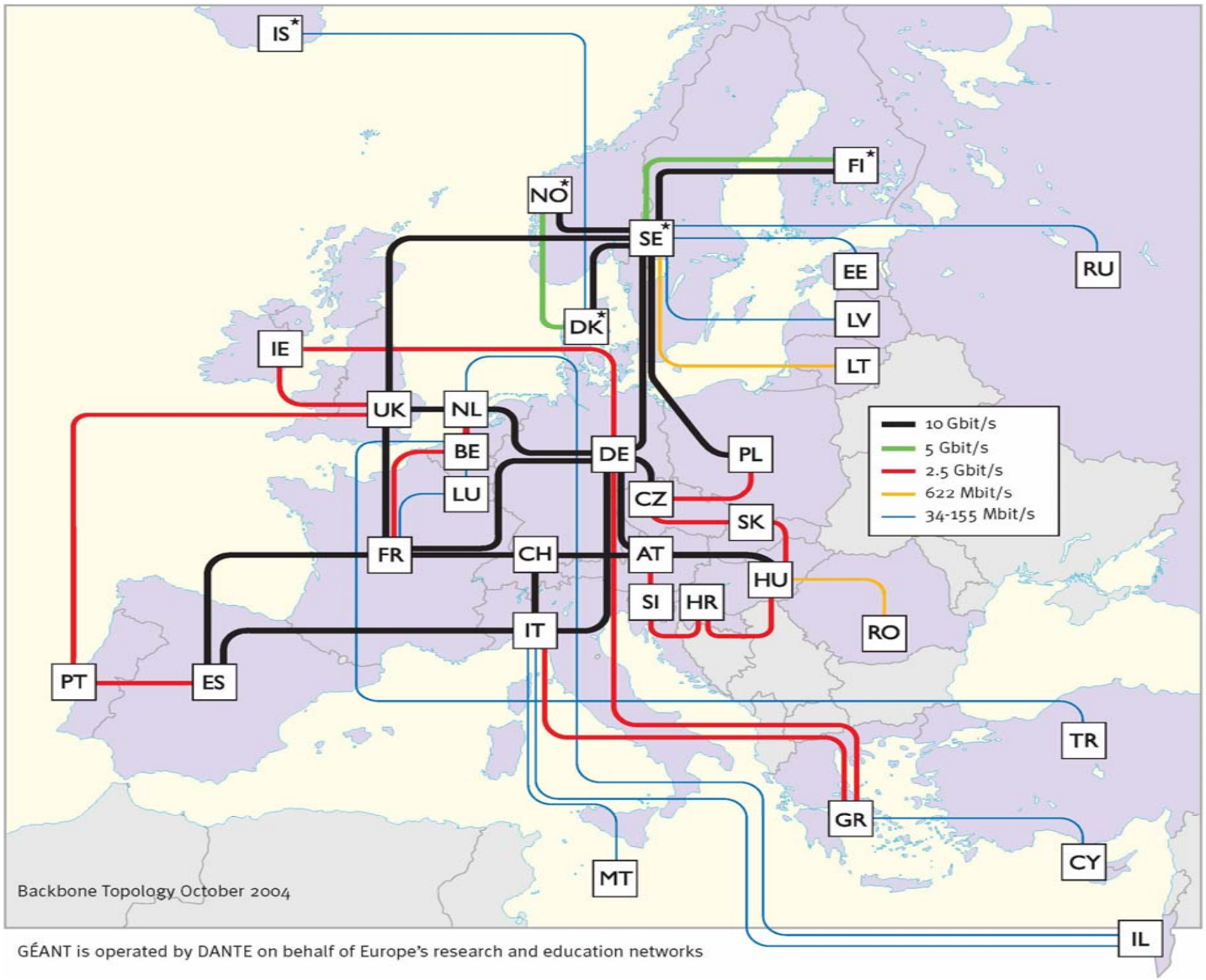
GÉANT2 Consortium

GN2 project

- **Funded from FP6, under INFSO Research Infrastructures**
  - An Integrated Infrastructure Initiative
  - Combining in a single contract, several activities essential to reinforce research infrastructures and to provide an integrated service at the European level
    - Networking activities
    - Provision of access to transnational users
    - Joint Research Activities
- **32 partners**
  - NRENs
  - DANTE, TERENA
- **Total expected budget: 179.000.000 €**
- **EC contribution requested: 93.000.000 €**
- **Duration: 4 years 1.9.2004-31.8.2008, now month 5**

Project Structure

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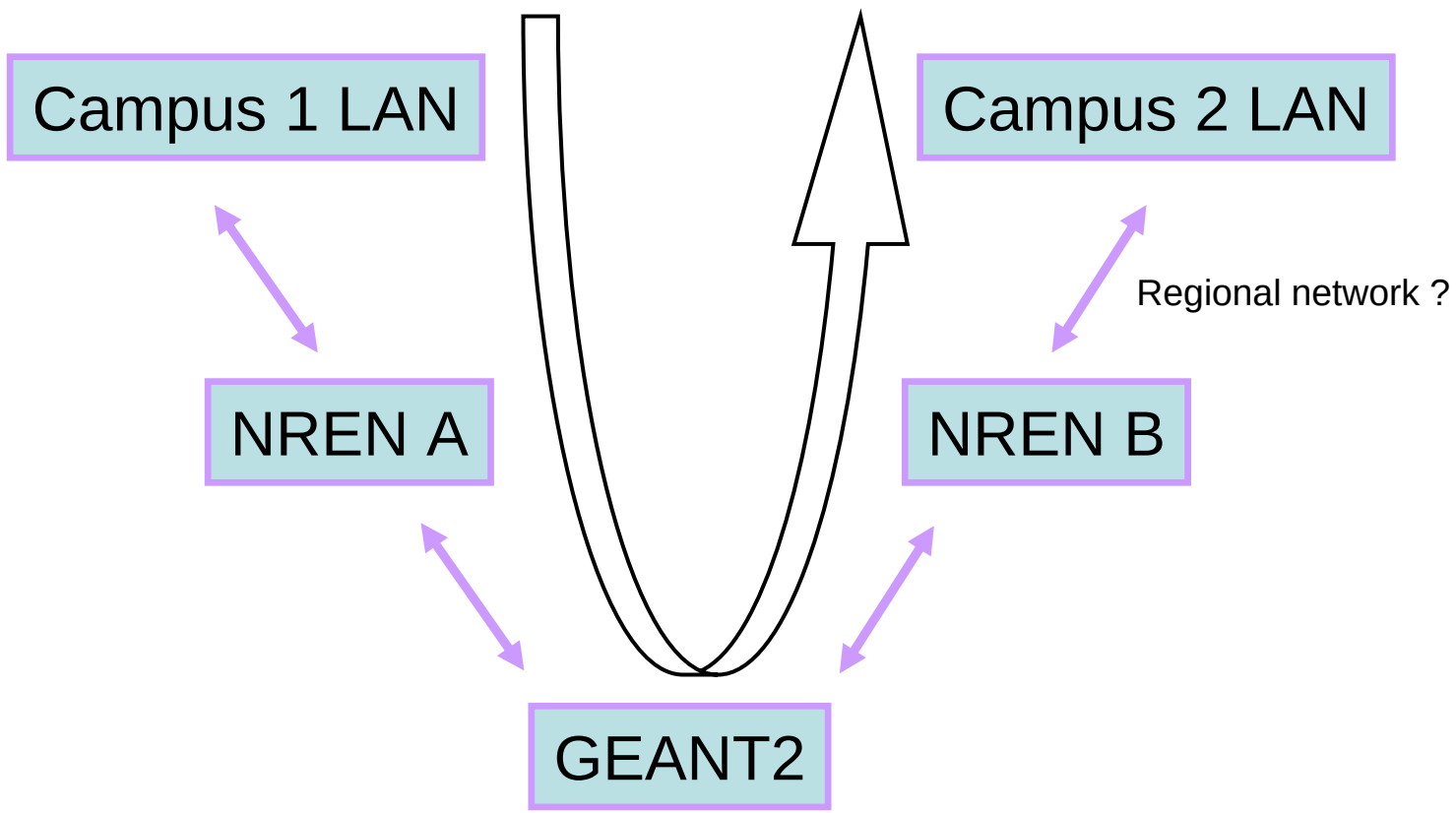
IL
10 Gbit/s
5 Gbit/s
2.5 Gbit/s
622 Mbit/s
34-155 Mbit/s
Backbone Topology October 2004
GÉANT is operated by DANTE on behalf of Europe's research and education networks

Three Tier Network Structure



What is new in GEANT2 ?

- **Cooperation of NRENs, JRAs**
- **Hybrid Architecture,**

  Layer 1 & 2 switching, “the light path”
- **Point to Point WL services**
- **Implementation on dark fiber, IRU asset**

  Transmission and switching equipment
- **Improved global connectivity**

Joint Research Activities

- **JRA1: Performance Measurements and Management**
  - End-to-end monitoring services
- **JRA2: Security**
  - Securing GN2 network elements and services
  - Security services
  - Coordination infrastructure
- **JRA3: New service development, BoD**
  - Bandwidth on Demand service (Extended layer-2 VLANs, Point-to-point switched layer-1 connections)
- **JRA4: Technology and service testing**
  - Distributed test bed in support for other activities and other FP6 projects
  - Technology testing
- **JRA5: Ubiquity and Roaming access to services**
  - Roaming among different networks and network technologies (like WLANs, UMTS and GPRS)
  - Inter-operable Authentication and Authorisation Infrastructures (AAI)

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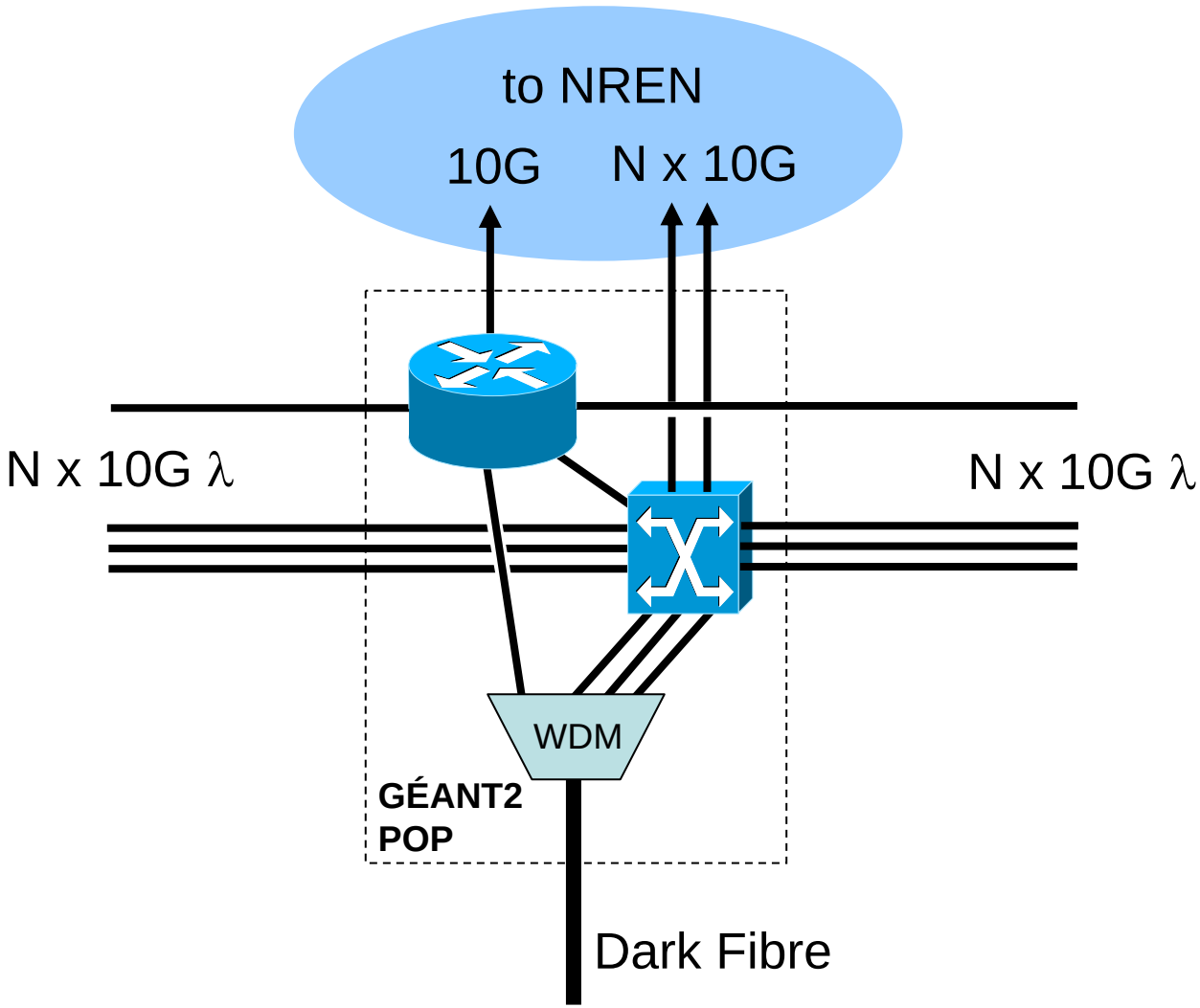
A GÉANT2 Large Hybrid POP



As Seen From The GLIF

GEANT2 will be a distributed optical exchange

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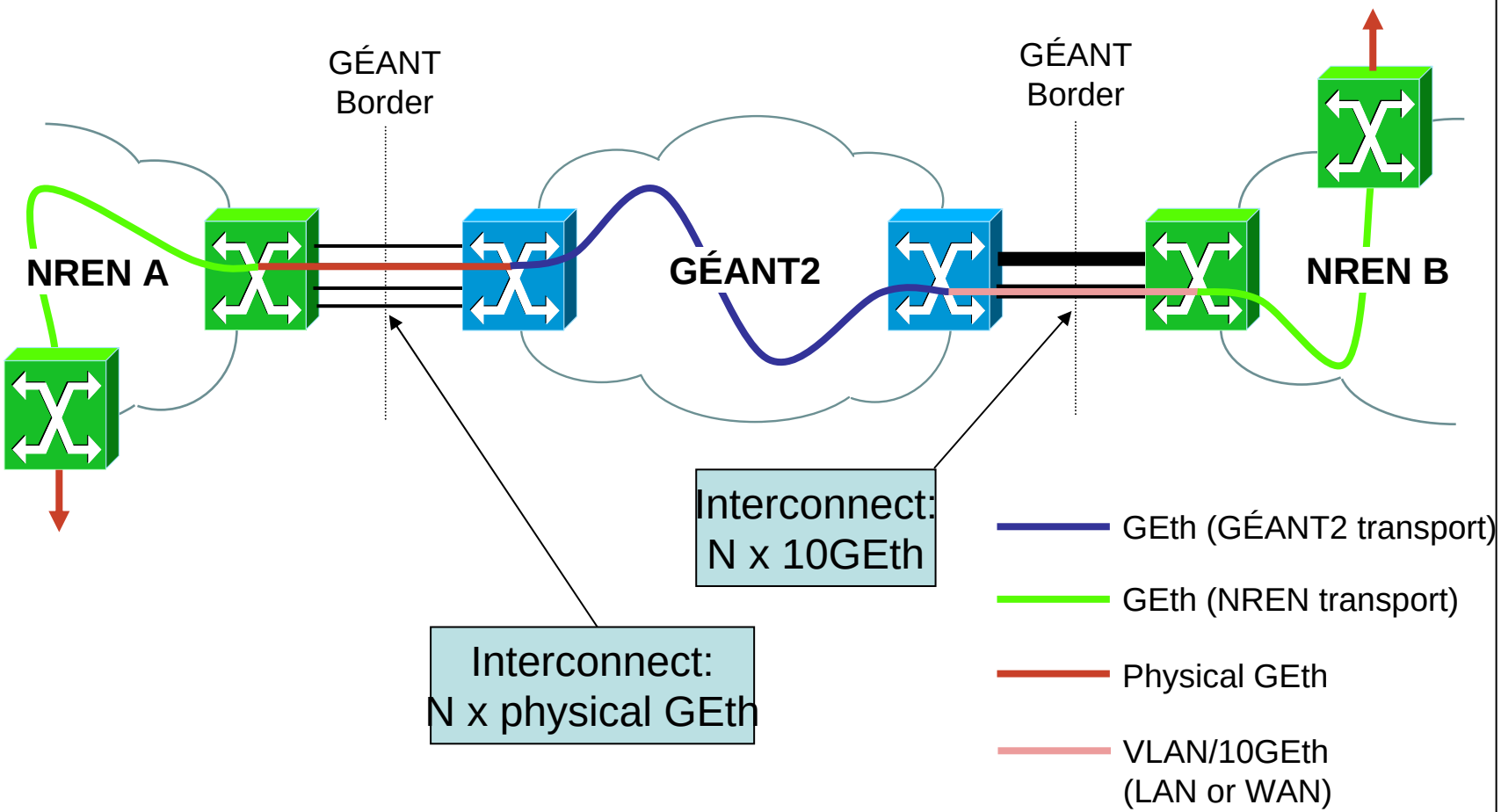
Scenario 3: P2P GEth

(GÉANT borders: physical GEth – physical 10GEth)



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  DWDM Transmission equipment
- Improve global connectivity

Dark Fiber

- 3 regions in GÉANT2
  - Dark fiber lit by GÉANT2
  - Leased wavelength services
  - SDH services
- Procurement
  - Connectivity
  - DWDM 10G Transmission & Switching Equipment, NOC Services
  - Careful Break Even Analysis

11 Tier1 Sites

- CNAF
- PIC
- IN2P3
- RAL
- FZK
- NIKEF
- SNIC

BNL

FNAL

TRIUMF

ASCC

European Topology and Capacity Planning

- Ongoing procurement
- CERN/LHC is an important component in GEANT2's capacity plan
- Mid 2005 DF for most European T1s
- Initially about three wavelengths per route in the DF area
- Awarding of contracts 2Q05

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GEANT Global Connectivity

Transatlantic Connectivity

Before end 2005

- **4*10 GB between US and GÉANT2**
  - 2 Internet2 circuits from NY to London & Amsterdam
  - 2 GEANT2 circuits to Washington and/or NY
- **10 GB from CA*net to Europe**

They will be used for IP production and light-path experimentation & production

Close co-ordination between European and North American networks

Wavelengths from the landing sites to Geneva and to the North American Tier1's

Co-ordination between GEANT2 and CERN/LHC

- How do we get to formulating an MoU
- Homework to be done on both sides

- CERN to compile consistent capacity plan
- GEANT2 to present a homogeneous picture of a dependable network service to CERN/LHC/LCG

Homework for CERN/LHC/LCG

- Compile required capacity per T0/T1 route as function of time
- Add safety margins in a separate step
- Analogous for T1/T1 traffic
- List of T2 sites
- …

Homework for T1 NRENs in GEANT2

- Complete list of network domains for all routes to Tier1 sites
- Time table of availability of links
- Operational procedures, NOC
- SLAs and monitoring of SLAs
- Cost model

Thank You Questions?