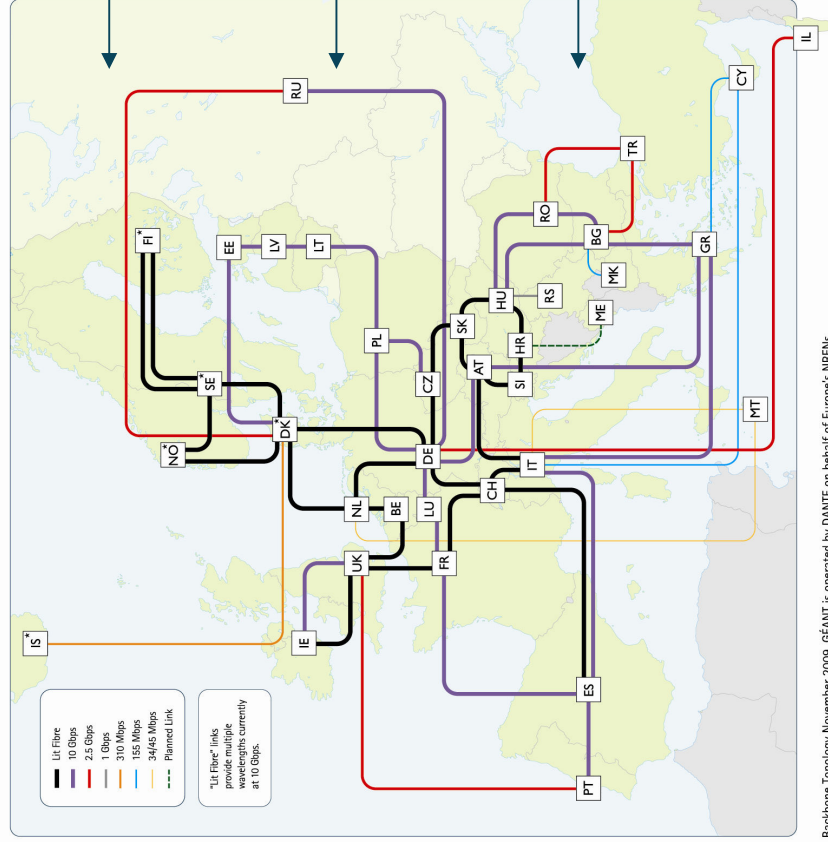




## The Future Internet – a GÉANT Perspective

Dai Davies – DANTE  
Towards a Future Internet Public Private Partnership  
2<sup>nd</sup> Usage Area Workshop  
Brussels, 21 & 22 June 2010

# The pan-European infrastructure



Backbone Topology November 2009. GÉANT is operated by DANTE on behalf of Europe's NRENs.

AT	Austria	CZ	Czech Republic	FI	Finland*	IE	Ireland	LU	Luxembourg	NL	Netherlands	RO	Romania	SI	Slovenia
BE	Belgium	DE	Germany	FR	France	LV	Latvia	NO	Norway*	PL	Poland	RS	Serbia	SK	Slovakia
BG	Bulgaria	DK	Denmark*	GR	Greece	ME	Montenegro	RU	Russia	PT	Portugal	RS	Russia	TR	Turkey
CH	Switzerland	EE	Estonia	HR	Croatia	MK	FYR, Macedonia	UK	Sweden**	BE	Sweden**	BE	Sweden**	UK	United Kingdom
CY	Cyprus	ES	Spain	HU	Hungary	MT	Malta								

\*Connections between these countries are part of NORDUnet (the Nordic regional network)

Hybrid network

Multi-Domain Environment

Developing:

-Advanced monitoring

-Bandwidth on Demand

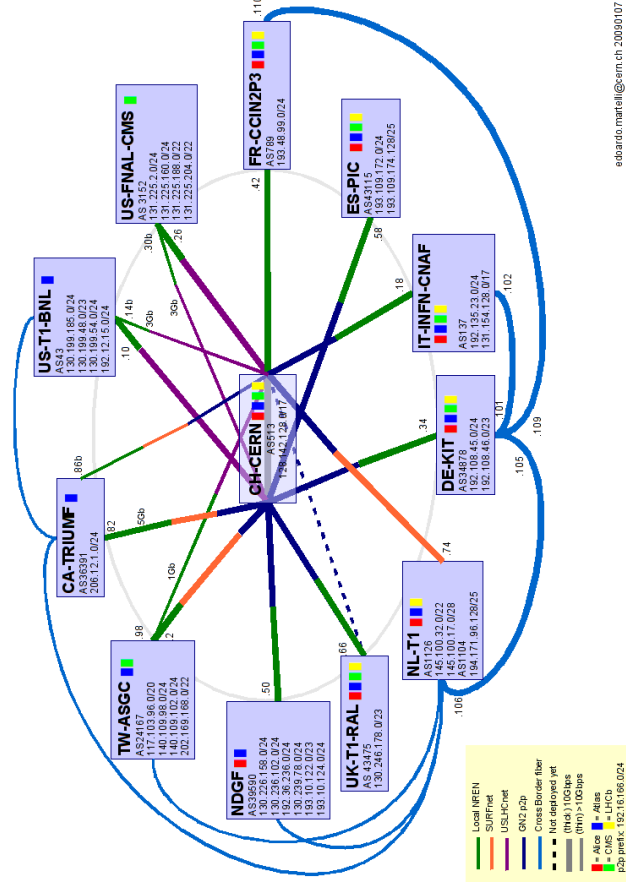
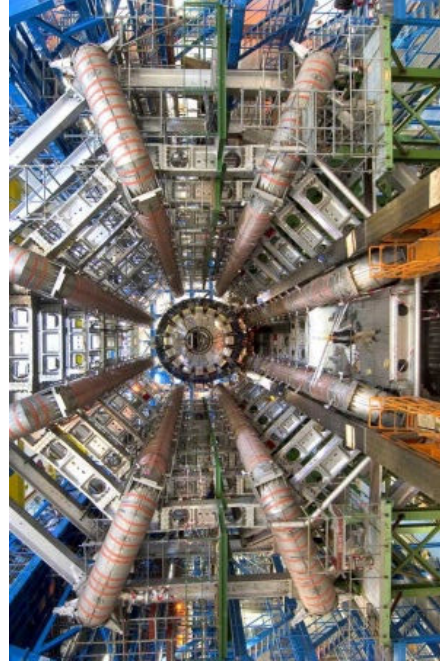
-Virtualisation

connect • communicate • collaborate

# GÉANT Lambdas form the LHC Optical Private Network



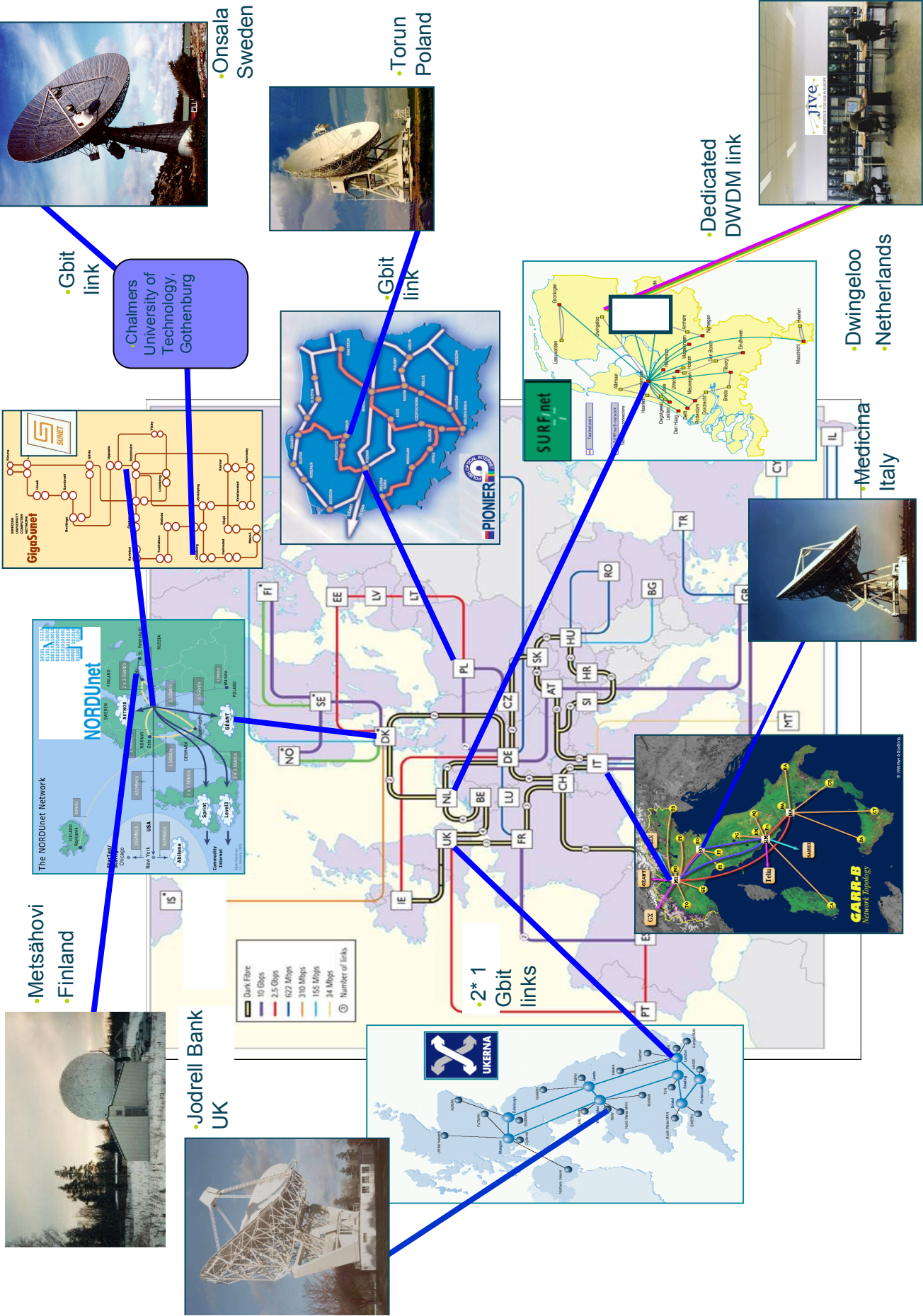
- 10 Gigabit Lambdas form a dual star on 2 routers at CERN.
- Connect National data centres to CERN
- DANTE advised on architecture & resiliency
- Have backup links
- LHC operate the OPN
- Use Routed IP for other international traffic



eduardo.mattell@cern.ch 20090107

connect • communicate • collaborate

# European e-VLBI 1 Gigabit Topology



## perfSONAR MDM Moving on from “Ping and Traceroute”



- perfSONAR MDM (multi-domain monitoring) is a GÉANT service
- Uses globally recognised network performance monitoring protocol
- Enables connections to be monitored in real time, providing visibility and aiding optimum use of the available bandwidth
- Ensures data can always get through – any source of congestion can be quickly and easily identified and addressed – *before* problems arise and data distribution is interrupted
- Historical information can show trends, identify areas for improvement and provide post-mortem examination of faults
- Utilised on the LHC Optical Private Network

# perfSONAR

- A GÉANT tool to support multidomain dynamic circuit service delivery
- Automated Bandwidth Allocation across Heterogeneous Networks
- Business layer for coordinated inter-domain provisioning
  - *More than just network resource provisioning*
- Overcomes the challenges of coordinating physically, organisationally and technically disjointed networks for efficient delivery to the user

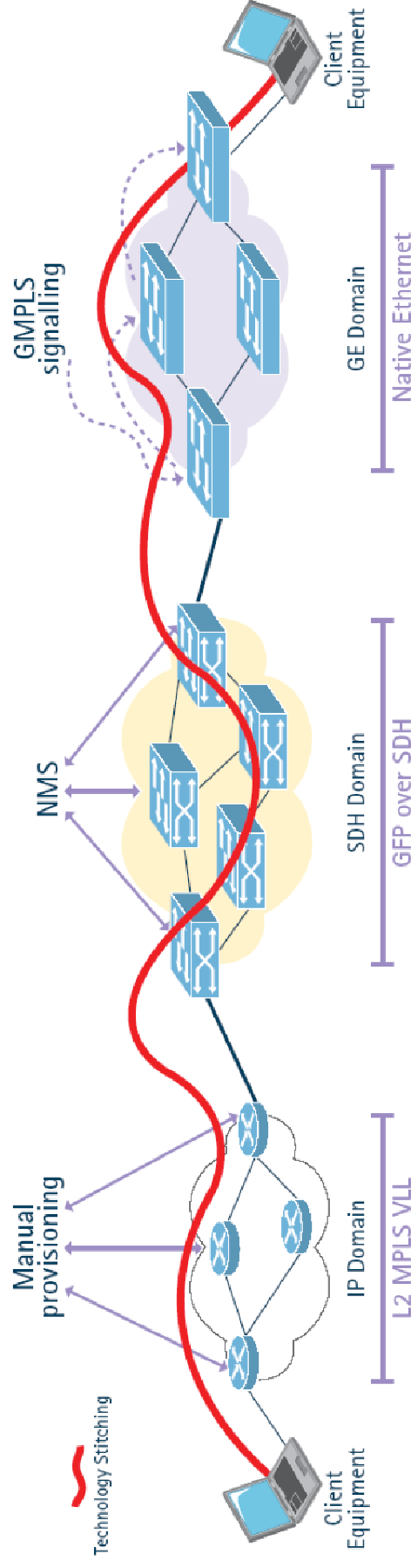


Image via Afrodite Sevasti