



**2nd eVLBI Workshop  
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## **Advanced Networking For Projects**

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# Traditional Networking



- **Tape Technology nearing EOL**
  - One supplier left
  - \$1200 per tape
  - Drives no longer available
- **Expensive logistics**
- **Effectively limits bit rates**
  - Hence limits resolution
- **Slow turn around time**
  - Real-time measurement not possible
  - Inflexible duty cycles

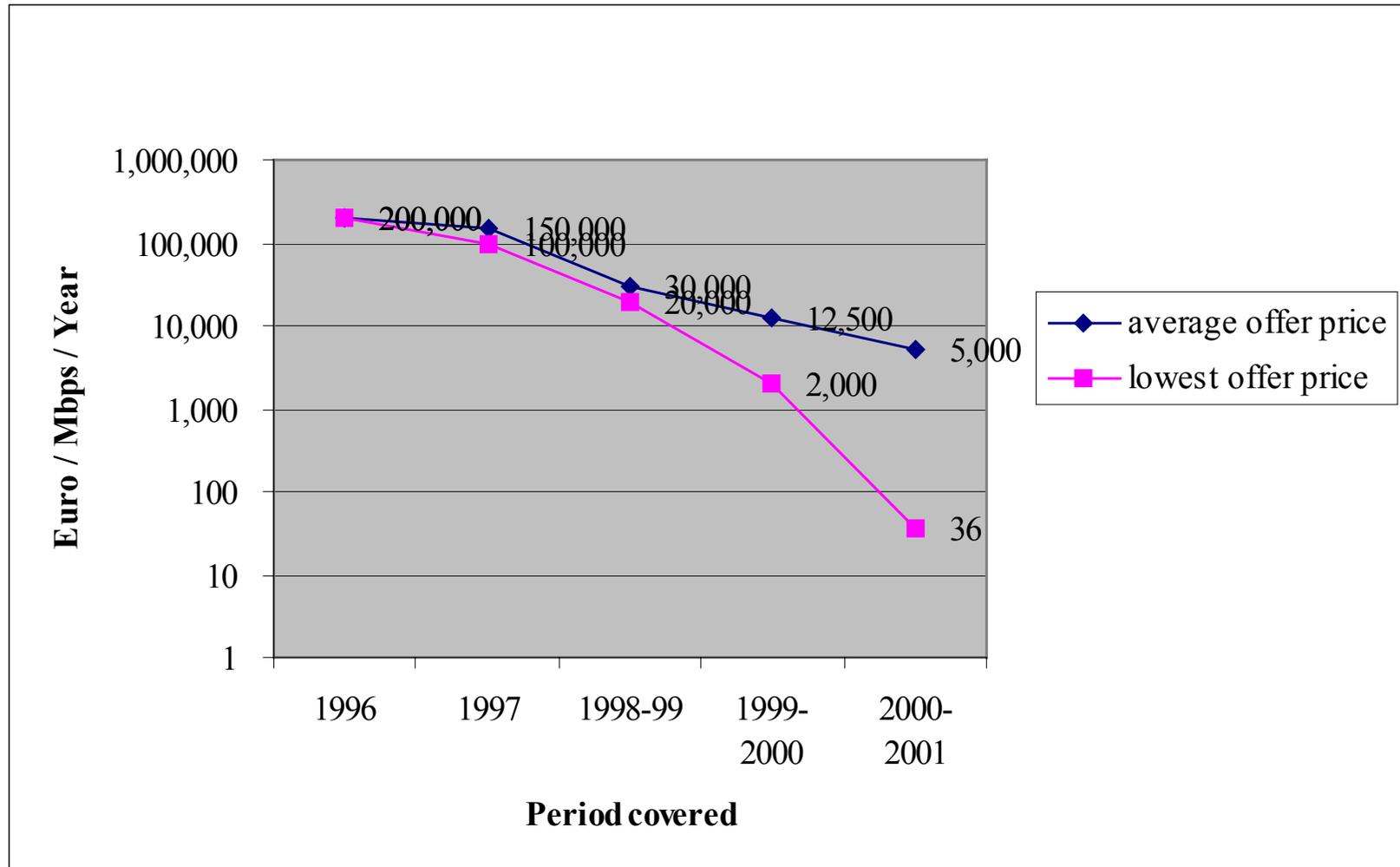




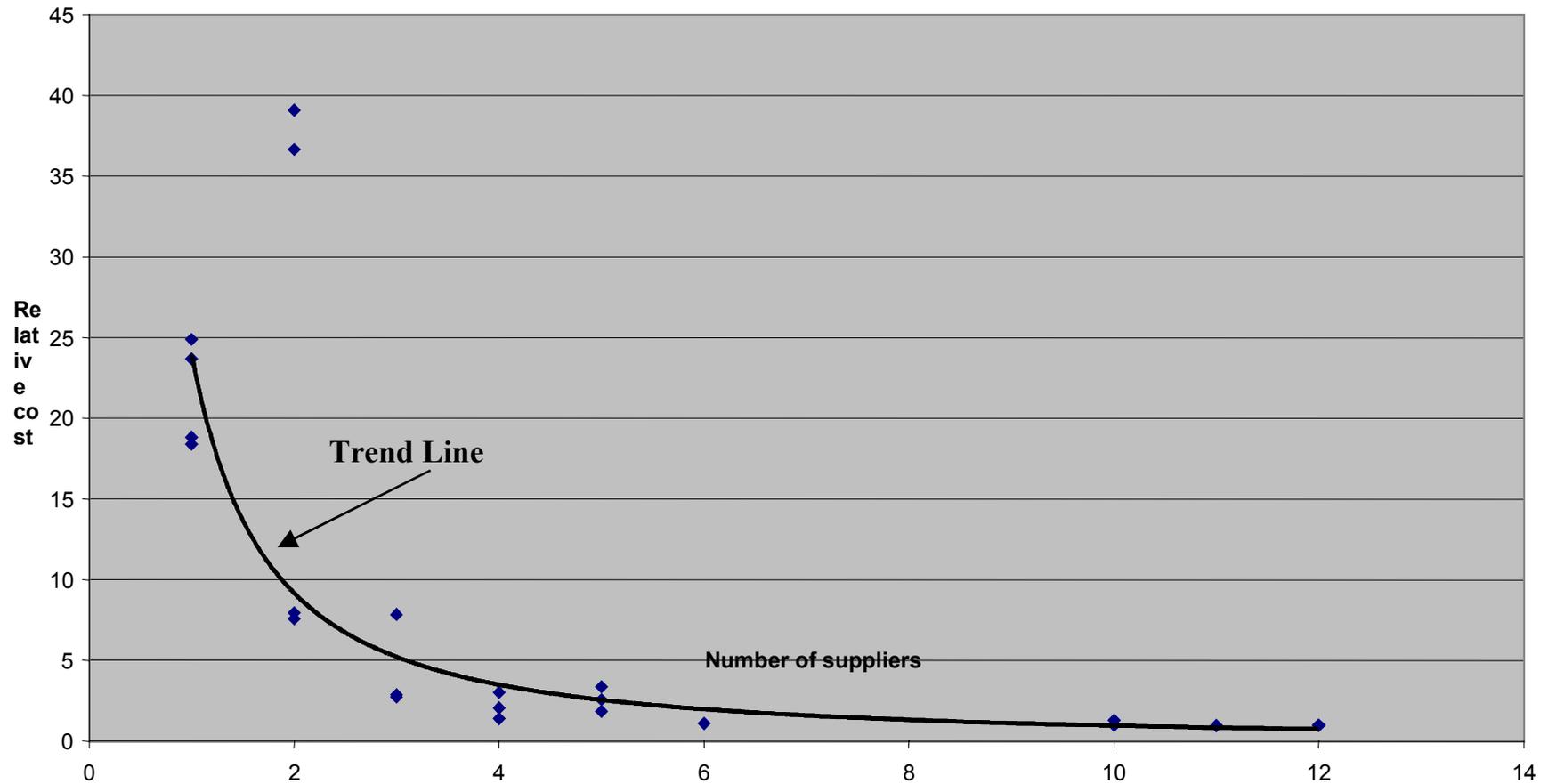
**Table 1            Technology Available 1991-2002**

Period	Most performant Data Link technology available	Technology available in pan-European network	Technology available in United States network
1991 - 1995	34/45 Mbps PDH	2 Mbps PDH	45 Mbps PDH
1996 - 1997	155 Mbps SDH	45 Mbps PDH	155 Mbps SDH
1997 - 2000	622 Mbps SDH	155 Mbps SDH	622 Mbps SDH
2000 +	10 Gbps DWDM	10 Gbps DWDM	2.5 Gbps DWDM

# Evolution of Market Competitiveness : International Intra-European Connectivity



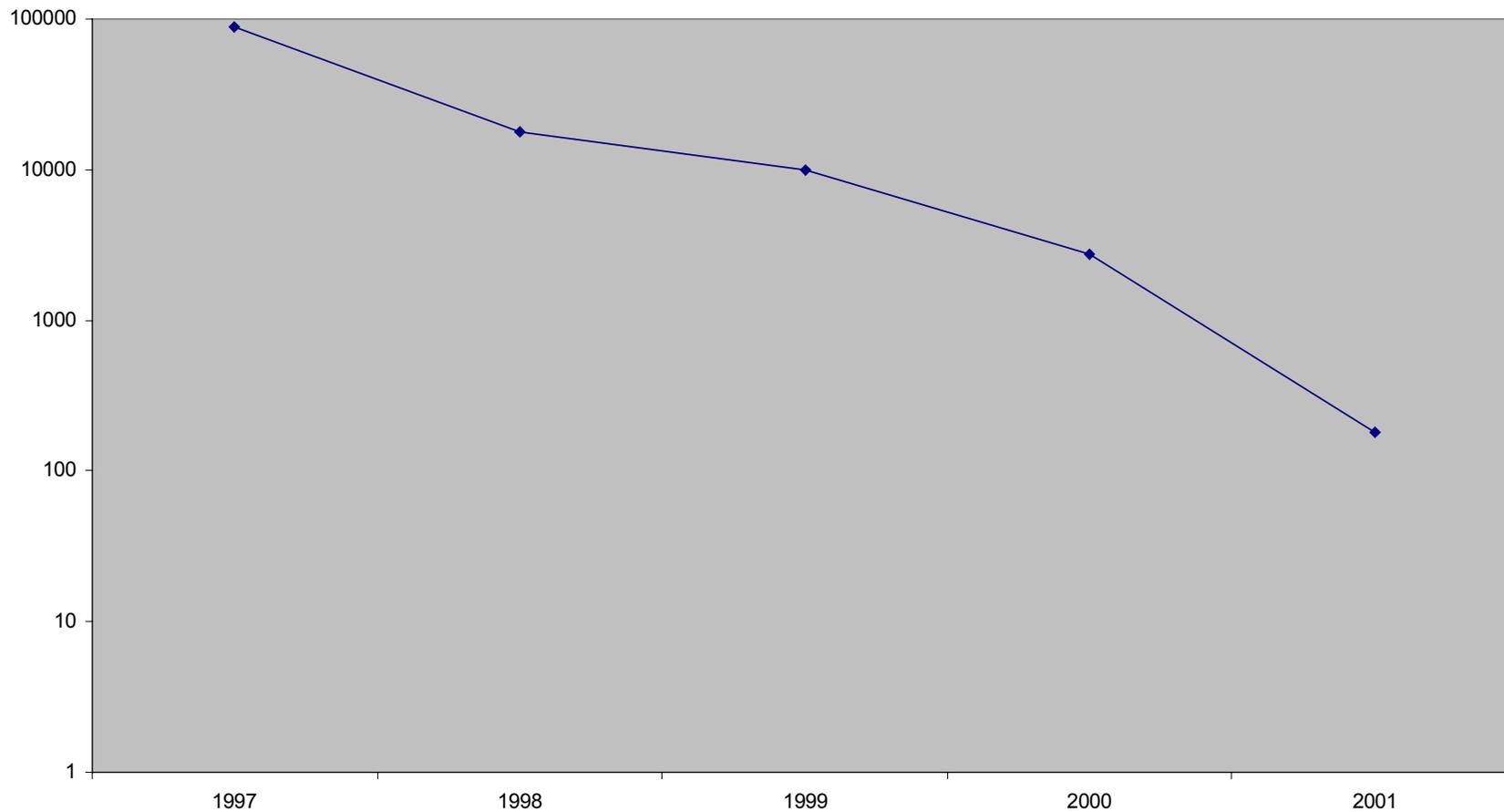
# Relative Cost of Connectivity Compared with Number of Suppliers



# Intercontinental Connectivity Price Evolution Europe-USA Route



Intercontinental Connectivity in Euros/MBps/year





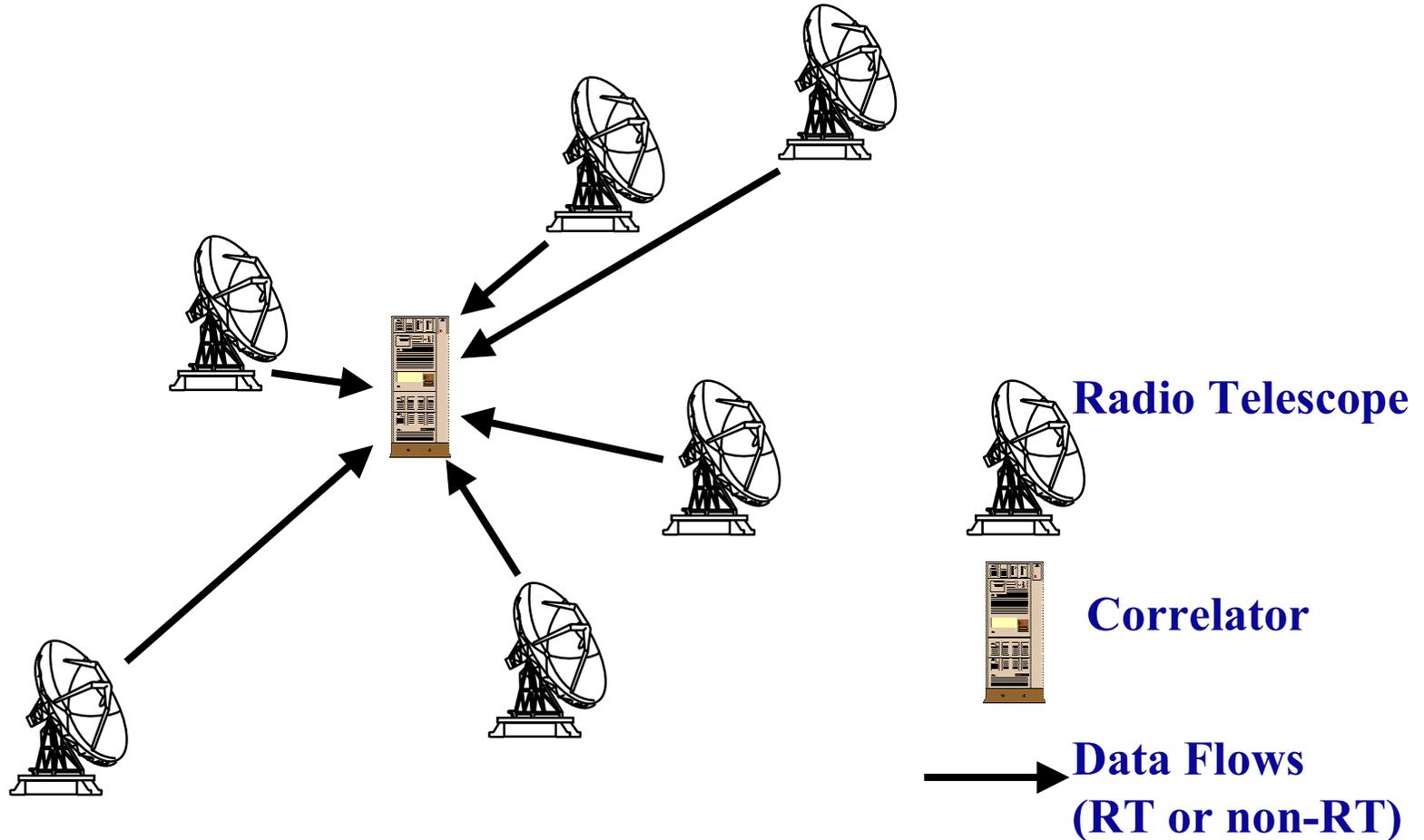
# **GÉANT Facts and Figures**

- **European Capacity 146 Gbps**
- **Global Connectivity 7.5 Gbps**
- **Europe Capacity 2003**
  - **140 Gbps Wavelength**
  - **6 Gbps SDH**
- **European Cost**
  - **14 M Euro Wavelength**
  - **16 M Euro SDH**

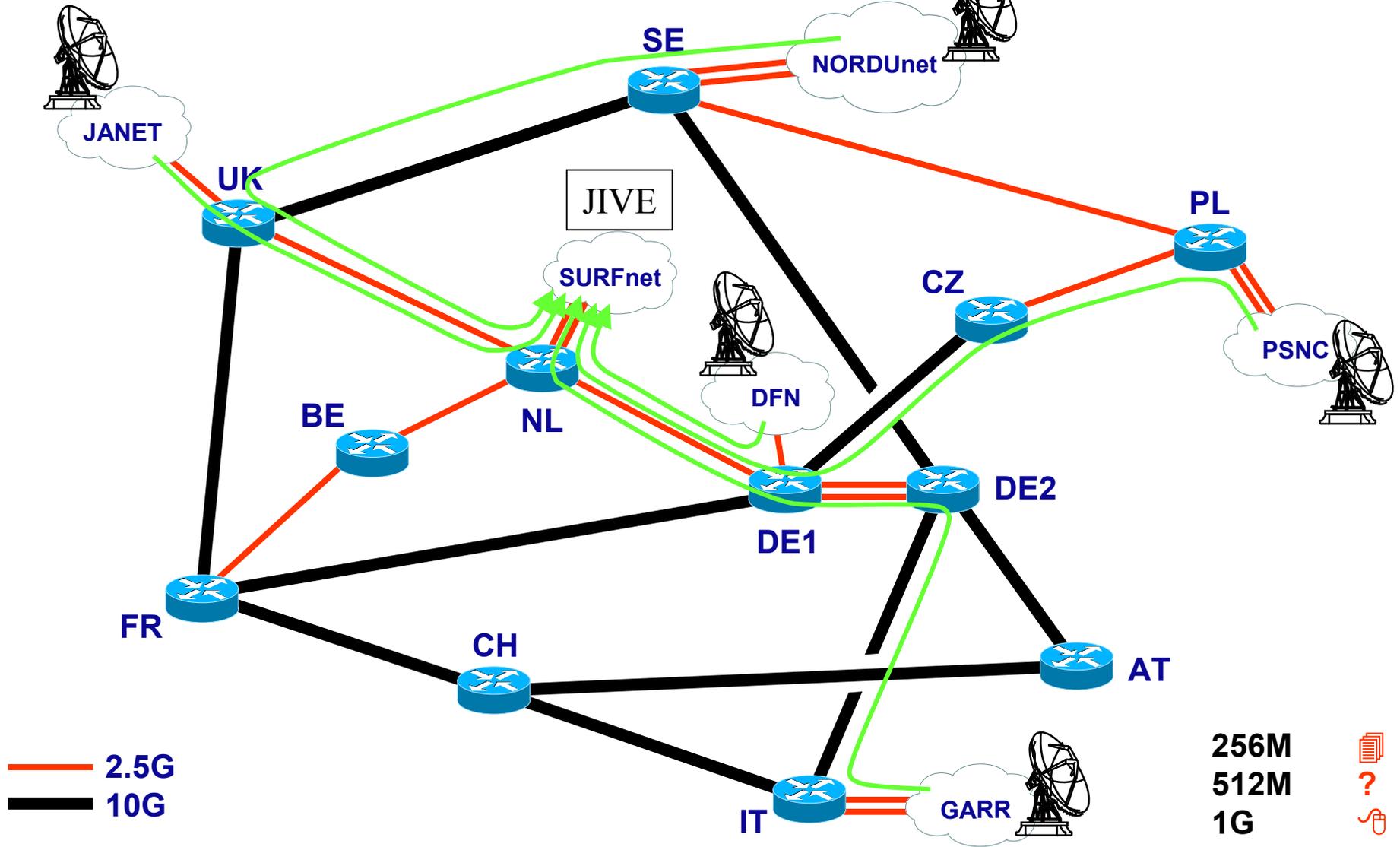
## **Are Projects Different?**

- **Very Large Bandwidth**
- **Limited Set of Locations**
- **Specific (well articulated?) Needs**

# Support for European VLBI



# EVN Traffic Flows over GÉANT



## Project Issues

- **Local Access**
- **Economics**
- **Technology**
- **Security**

# Le Fils de GÉANT

- **Switching versus Routing**
- **Transmission Trends**
  - **Speed**
  - **Technology**
  - **D.I.Y.**
- **Control and Resource Management**

# Is Speed Everything?

- **40 Gbps Technology Cost**
- **Multiple 2.5 Gbps**
- **Interfacing Costs**
  - **Routers**
  - **Switches**