



GEANT Network

From a core European infrastructure to
global connectivity

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BELIEF EUROPEAN & INDIAN RESEARCH INFRASTRUCTURES CONFERENCE

New Delhi, 14-15 December 2006



Background of EU NRENs

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- Existence from early 90s of National Research (and Education) networks
- Significant support at the national level for a coordinated action to interconnect universities and research organisations
- Willingness of national organizations to work together at the international level
- Support of the European Commission for helping a pan-European coordinated action



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GEANT-1

- Perimeter wider than EU member states (~ 30 partners)
- Initial expectation was 2.5 G wavelength: Public procurement yielded a 10 G core network
- Some global connectivity (mostly with North America) is included into the GEANT project (up to 3 x 2.5 G provided by DANTE)
- Provision of commodity Internet for small partners (with a 50% access capacity capping)
- Increased support for projects (6NET, etc...)



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GÉANT2?

- Current generation of pan-European research network infrastructure – continuation of a success story
- Project partners include the EC, 30 of Europe's national research and education networks (NRENs), DANTE and TERENA
- Connects 34 European countries and serves over 3500 research and education establishments across Europe
- Over 30 million users
- Provides extensive international connectivity to other world regions
- Funded jointly by NRENs and European Commission
- Project timescale September 2004 - August 2008





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GÉANT2?

- Access to Dark Fiber, not equal in the whole Europe
- Extensive support to large scale scientific projects (DEISA for supercomputing centers, EGEE for grid computing, LCG for high energy physics with CERN, VLBI/JIVE for radio-astronomy, etc...)
- The first international *hybrid* network: routed IP traffic combined with switched point-to-point circuits
 - End-to-end QoS provision
 - Performance monitoring
 - Security
 - Bandwidth on demand
 - Testbed facility
 - Mobility and roaming



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GÉANT2?

- Include worldwide global connectivity for research
- Allow for shared access to commodity for smaller partners
- Address as much as possible digital divide issues
- Try to access dark fiber wherever it is possible
- GEANT core: a success story which made other stories possible (EUMEDCONNECT, ALICE, TEIN, SEEREN, etc...)



Governance and Policy

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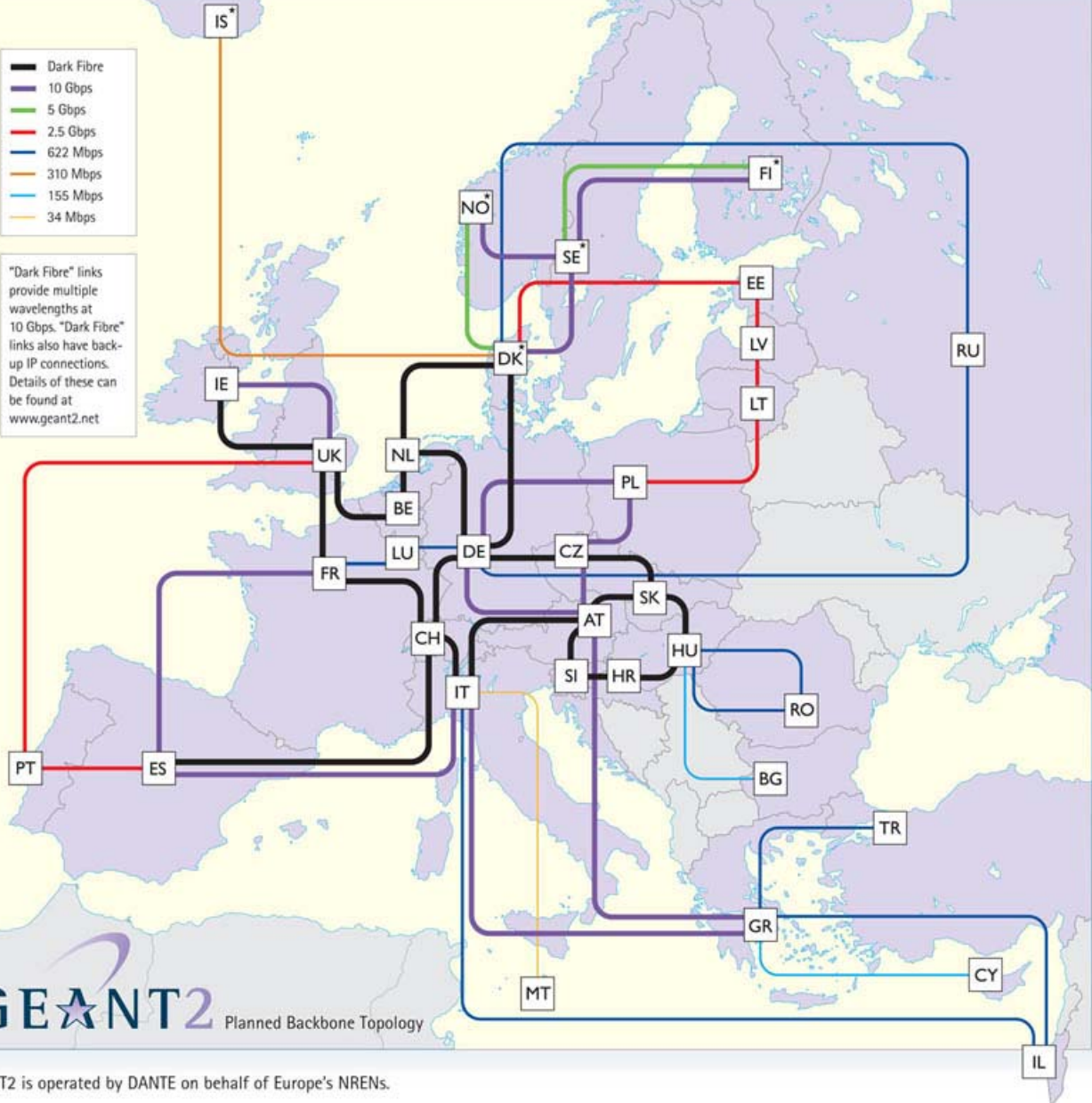
- EU-funded project is a contract between EC and all members of a consortium (NRENPC)
- Project is coordinated by DANTE (non-voting member of the consortium).
- DANTE is a non-profit company, based in UK, owned by European NRENs
- DANTE has delegation from the consortium to implement and operate the core backbone, in cooperation with all partner NRENs.



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- Dark Fibre
- 10 Gbps
- 5 Gbps
- 2.5 Gbps
- 622 Mbps
- 310 Mbps
- 155 Mbps
- 34 Mbps

"Dark Fibre" links provide multiple wavelengths at 10 Gbps. "Dark Fibre" links also have backup IP connections. Details of these can be found at www.geant2.net



GÉANT2 Topology

June 2006

GEANT2 Planned Backbone Topology

GEANT2 is operated by DANTE on behalf of Europe's NRENs.

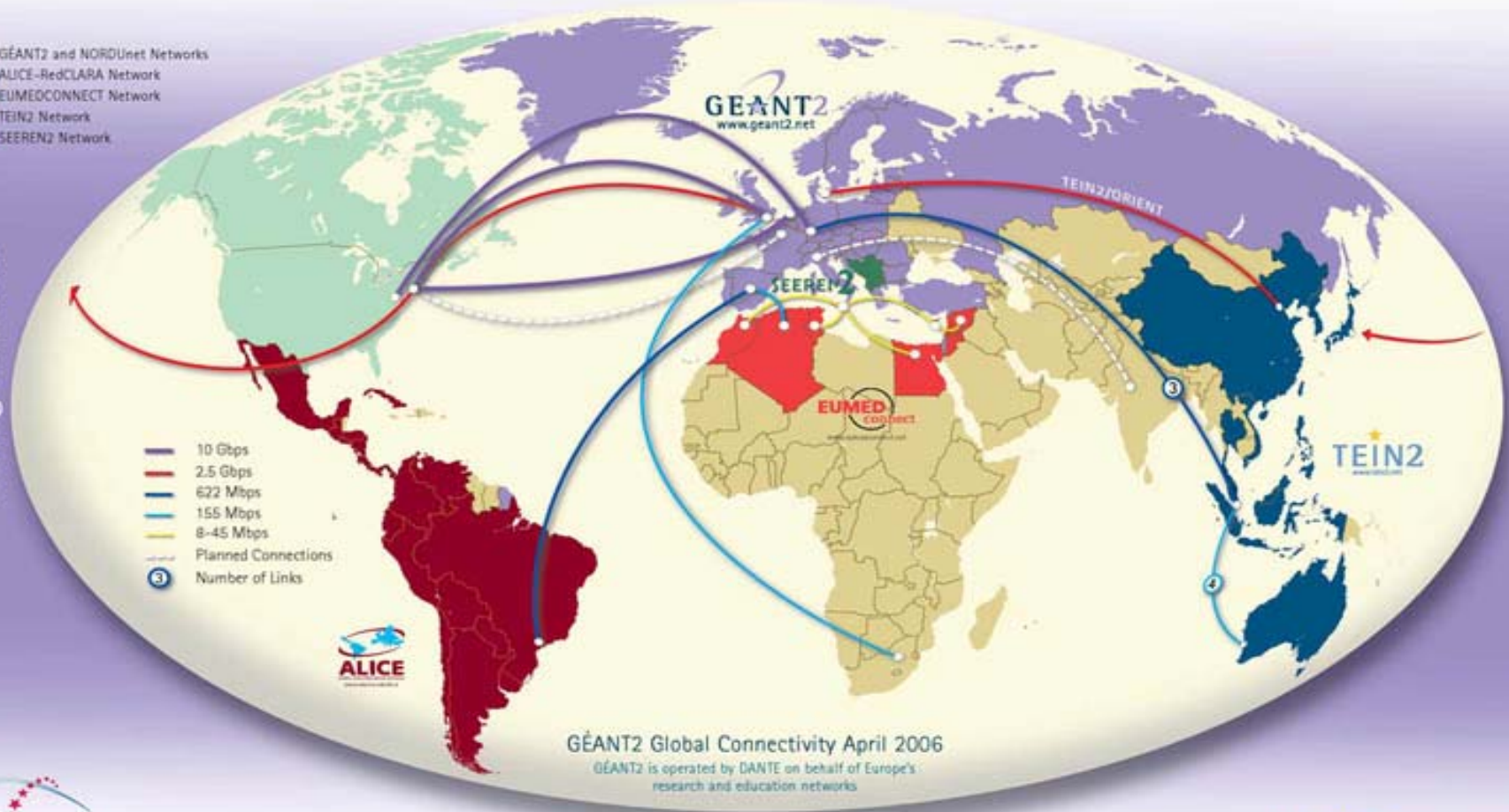


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GEANT2 At the heart of Global Research Networking

- GEANT2 and NORDUnet Networks
- ALICE-RedCLARA Network
- EUMEDCONNECT Network
- TEIN2 Network
- SEEREN2 Network

www.geant2.net



GEANT2 Global Connectivity April 2006

GEANT2 is operated by DANTE on behalf of Europe's research and education networks



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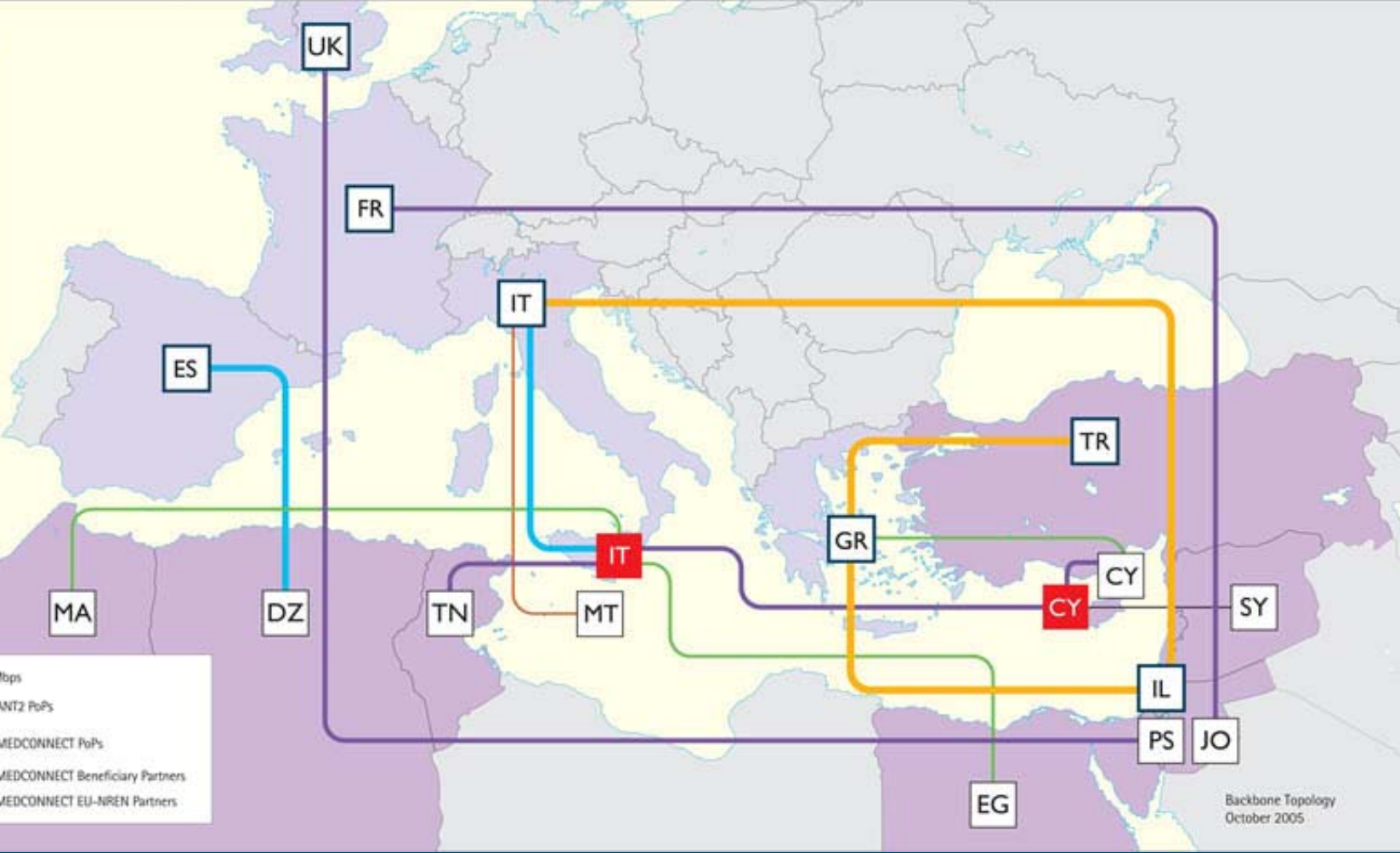
EUMEDCONNECT Topology October 2005



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- CY Cyprus
- DZ Algeria
- EG Egypt
- ES Spain
- FR France
- GR Greece
- IL Israel
- IT Italy
- JD Jordan
- MA Morocco
- MT Malta
- PS Palestinian Territories
- SY Syria
- TN Tunisia
- TR Turkey
- UK United Kingdom

- 622 Mbps
- 155 Mbps
- 45 Mbps
- 34 Mbps
- 20 Mbps
- 8 Mbps
- GÉANT2 PoPs
- EUMEDCONNECT PoPs
- EUMEDCONNECT Beneficiary Partners
- EUMEDCONNECT EU-NREN Partners



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ALICE Topology

April 2006



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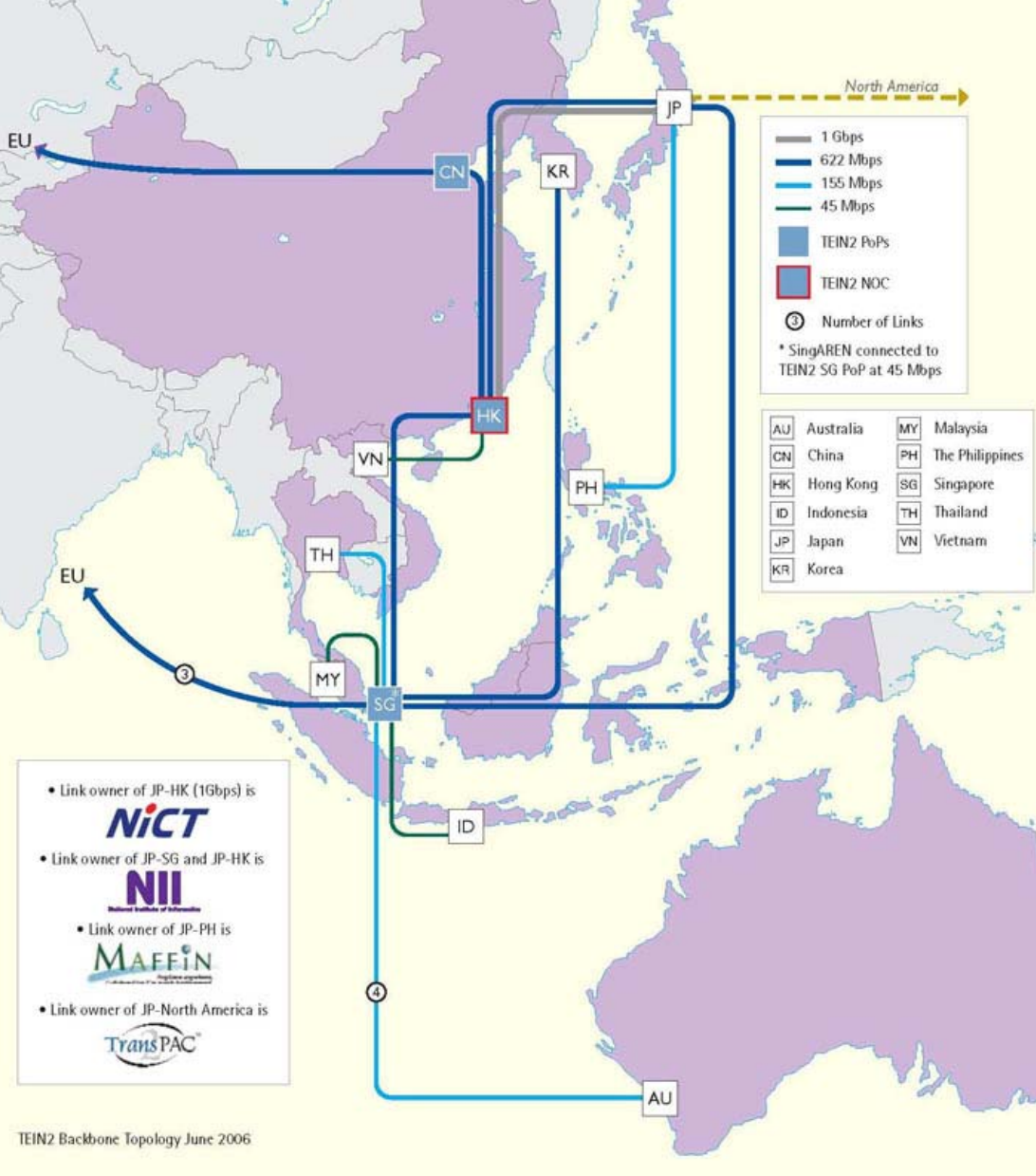




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TEIN2 Topology

June 2006



- Link owner of JP-HK (1Gbps) is **NICT**
- Link owner of JP-SG and JP-HK is **NII**
- Link owner of JP-PH is **MAFFIN**
- Link owner of JP-North America is **TransPAC**

TEIN2 Backbone Topology June 2006



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Other regional set-up

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- South East Europe
- Caucasasia and Central Asia (Silk project)



Per country connectivity

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- South Africa
- India
- Ukraina
- Belarus
- Moldova
- Etc...



CONCLUDING REMARKS

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- Bandwidth is not an issue anymore in Western Europe (but it has been so for many years)
- Infrastructure is not all: Services and usages are more important, but possible only when infra is there!
- Governance and policy are key ingredients for the success
- Managing a 30 partner consortium is not easy, but success is rewarding



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CONCLUDING REMARKS

- Current European landscape is still complicated with several overlapping organisations (Consortium, TERENA, DANTE, etc...) but it is working!
- Political support of NRENs is required at the national level first
- Sustainability of the building blocks HAS BEEN, IS and WILL CONTINUE TO BE a real issue for NRENs and their organisations

Questions???



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For More Information

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- www.geant2.net
- For latest news and factsheets <http://www.geant2.net/media>
- For research activities <http://www.geant2.net/research>