

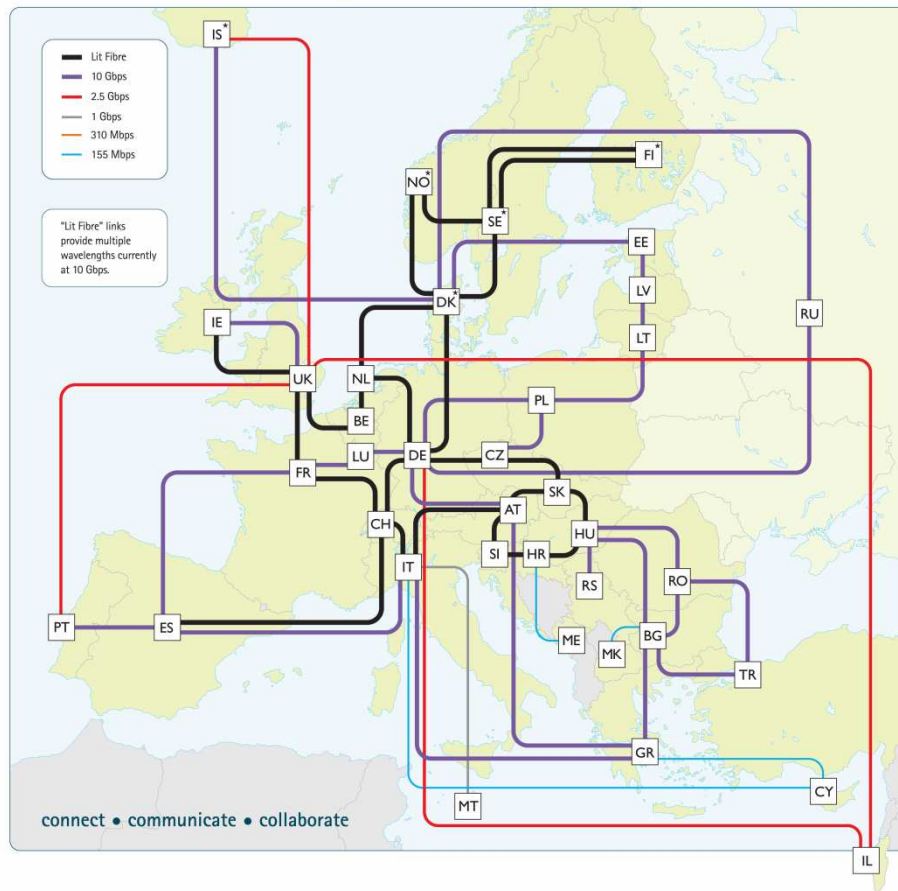
**GÉANT & RedCLARA**  
**Interconnecting the science and education  
communities of Europe and Latin America**

TICAL

Panamá

18<sup>th</sup>-19<sup>th</sup> June 2011

# The GÉANT Network



GÉANT topology – End 2010

- 7<sup>th</sup> generation of the pan-European Research and Education Network infrastructure – continuation of a success story
- Connects 40 European countries through 32 NREN Project Partners & 4 NREN Associates
- Serves over 8,000 research and education establishments across Europe
- 40 million users

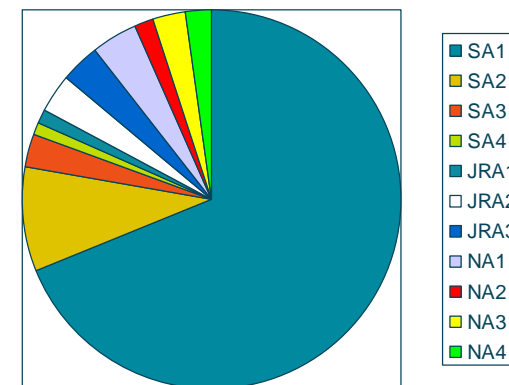
# GN3 – The GÉANT Funding Project



- Four-year project which commenced on 1 April 2009
- Partners are NRENs across Europe plus TERENA and DANTE
- Total Budget of €181M
  - €93M contributed by the EC
  - €88M contributed by the partners
  - 2/3 of the budget dedicated to the GÉANT backbone



GN3 Budget split



# GÉANT NRENs: Partners & Associates



## GÉANT Partners

- ACOnet Austria
- Belnet Belgium
- BREN Bulgaria
- CARNet Croatia
- CYNET Cyprus
- CESNET Czech Republic
- EENet Estonia
- RENATER France
- DFN Germany
- GRNET Greece
- NIIF Hungary
- HEAnet Ireland
- IUCC Israel
- GARR Italy
- SigmaNet Latvia
- LITNET Lithuania
- RESTENA Luxembourg
- MARNet Macedonia
- University of Malta Malta
- MREN Montenegro
- SURFnet Netherlands

- NORDUnet Nordic region (Denmark, Finland, Iceland, Norway, Sweden)
- PSNC Poland
- FCCN Portugal
- RoEduNet Romania
- AMRES Serbia
- SANET Slovakia
- ARNES Slovenia
- RedIRIS Spain
- SWITCH Switzerland
- ULAKBIM Turkey
- JANET United Kingdom

## Associate NRENs

- BASNET Belarus
- JSCC Russia
- RENAM Moldova
- URAN Ukraine

[http://www.geant.net/About\\_GEANT/Partners/pages/home.aspx](http://www.geant.net/About_GEANT/Partners/pages/home.aspx)

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# Not Just Connectivity: Services to Benefit End Users



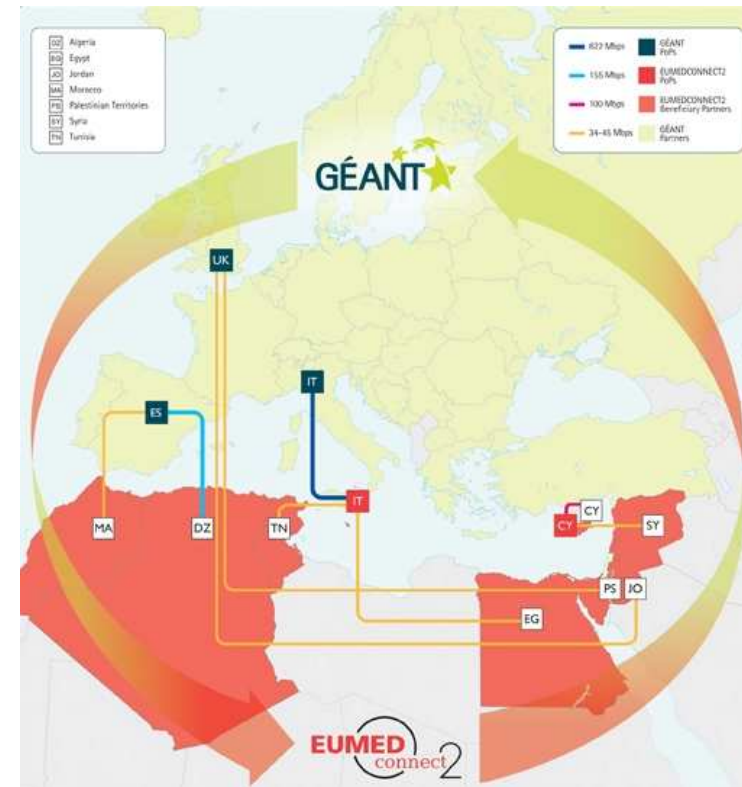
- Network monitoring **perfSONAR<sup>MDM</sup>**
- Static and bandwidth-on-demand point-to-point connectivity
- eduroam: roaming service
- eduGAIN: Federated Authentication and Authorisation Infrastructure
- educonf: European videoconferencing service



# Regional Projects EUMEDCONNECT2



- EUMEDCONNECT2 benefits seven NRENs across North Africa and the Middle East:
  - ARN (Algeria)
  - EUN (Egypt)
  - CCK (Tunisia)
  - JuNet (Jordan)
  - MARWAN (Morocco)
  - Birzeit University/Al Quds Open University (Palestinian Territories)
  - SHERN (Syria)
- Approximately 2 million users in around 700 institutions across North Africa and the Middle East.
- EC provides €4m (approx. 50%) towards the costs of EUMEDCONNECT2. Remaining funds are provided by the Mediterranean partners.
- Project continues to mid-2011.
- Arab-lead Arab States Research and Education Network (ASREN) initiative was launched in 2010
- EC has confirmed its intention to fund a further 3-year phase of EUMEDCONNECT



# Regional Projects

## CAREN

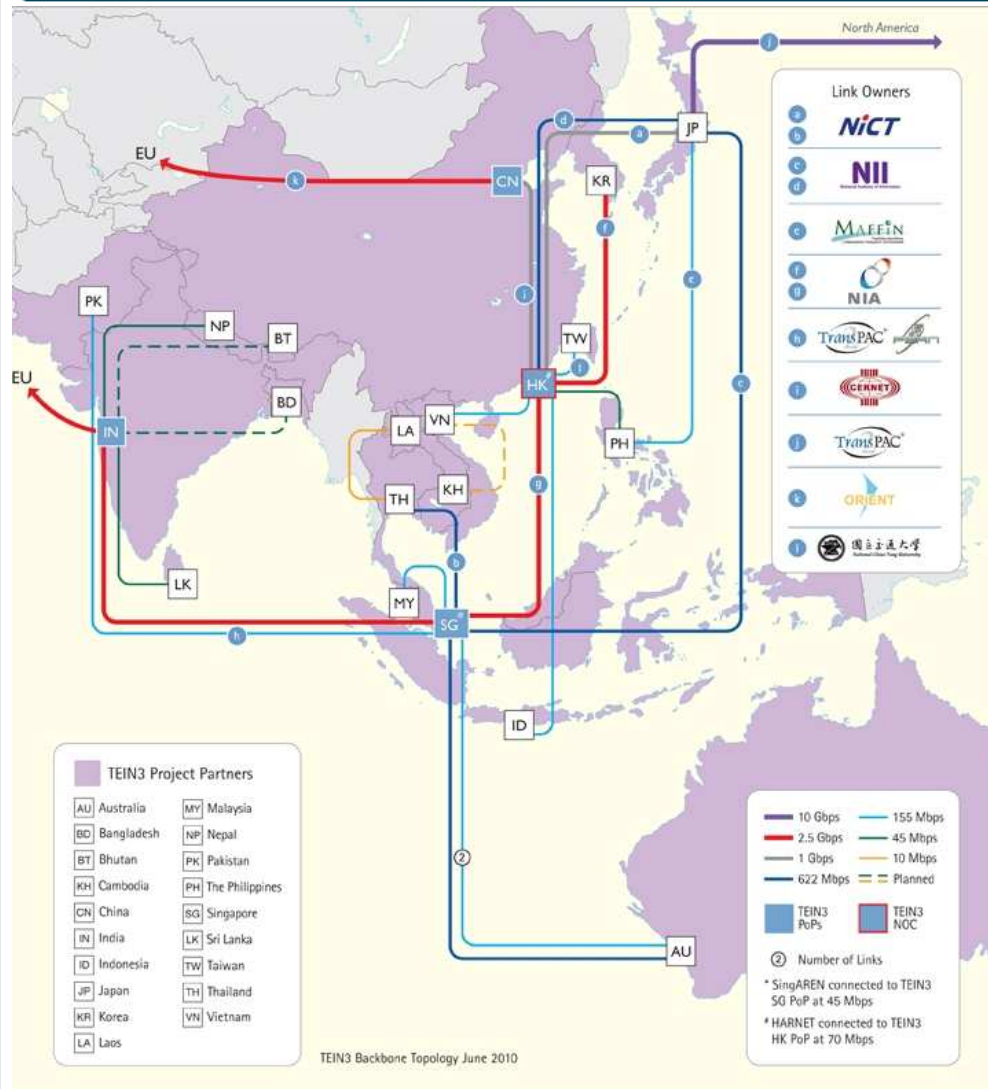


- Central Asia Research and Education Network
- Launched in 2009, currently interconnecting Kyrgyzstan, Turkmenistan and Tajikistan (Kazakhstan and Uzbekistan also eligible to join)
- Replaces low-capacity satellite with fibre optic connectivity (interconnection to GÉANT via TEIN3)
- Serves half a million users at over 500 institutions
- CAREN receives 80% (€5m) of its €6.25m budget from the EC
- Supports applications very relevant to the region, such as seismology, textile research etc.





# Regional Projects TEIN3



- 13 beneficiary partners (**BD, BT, KH, IN, ID, LA, MY, NP, PK, PH, LK, TH, VN**)
- 6 non-beneficiary partners (**AU, CN, JP, KR, SG, TW**)
- 45M+ connected users
- 4 network hubs
- 21.4M Euro EC funding TEIN2/3 + significant contributions from non-beneficiary partners and TransPAC2
- The TEIN\* Cooperation Center is being established to take responsibility for a 4<sup>th</sup> phase of the TEIN programme from 2012

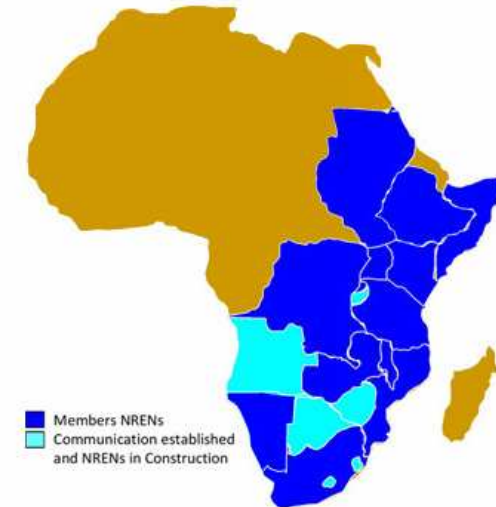


# Regional Projects

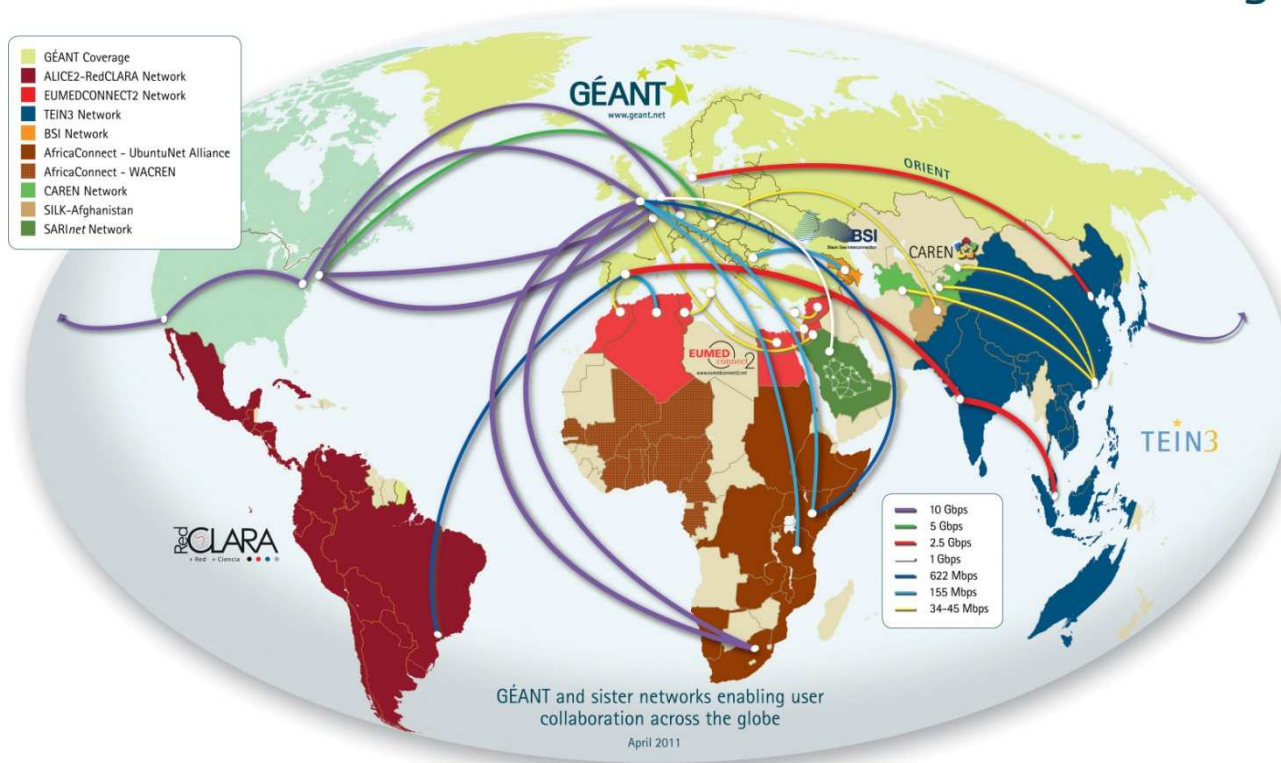
## AfricaConnect



- 4-year project divided in Planning/Procurement Phase and Operational Phase
  - Started in May 2011
  - Planning and Procurement (up to 12 months)
  - Operational Phase (months 13-48)
- Total Budget of 15 M Euro (divided in 80:20) for AfricaConnect
- Partners:
  - UbuntuNet Alliance
  - UbuntuNet Alliance member NRENs
  - WACREN and Association of African Universities
  - DFN, GARR, FCCN, HEANET, JANET, SURFnet
  - DANTE as the Coordinating Partner



## GÉANT At the Heart of Global Research Networking



# Global Connectivity – NRENs



## Americas

- CANARIE Canada
- CEDIA Ecuador
- CoNARE Costa Rica
- CUDI Mexico
- ESN Net USA
- INNOVA|RED Argentina
- Internet2 USA
- NISN (NASA) USA
- NLR USA
- RAAP Peru
- RAGIE Guatemala
- RAICES El Salvador
- RAU2 Uruguay
- REACCIUN2 Venezuela
- RedCyT Panama
- RENATA Colombia
- REUNA Chile
- RNP Brazil
- USLHCNet USA

## Middle East & Africa

- ANKABUT United Arab Emirates
- ARN Algeria
- Birzeit University/ Palestinian Territories
- Al Quds Open University
- EUN Egypt
- JuNet Jordan
- KENET Kenya
- MARWAN Morocco
- Qatar Foundation Qatar
- CCK Tunisia
- SARInet Saudi Arabia
- SHERN Syria
- TENET South Africa
- TERNET Tanzania

## Asia & Oceania

- AARNet Australia
- AfRENA Afghanistan
- AM NREN Armenia
- AzRENA Azerbaijan
- CERNET China
- CSTNET China

## Asia & Oceania (cont.)

- GRENA Georgia
- INHERENT/ITB Indonesia
- JGN2plus/NICT Japan
- HARNET Hong Kong
- KOREN/NIA Korea
- KRENA-AKNET Kyrgyzstan
- KREONET2 Korea
- LEARN Sri Lanka
- LERNET Laos
- MAFFIN Japan
- MYREN Malaysia
- NKN India
- NREN Nepal
- PERN2 Pakistan
- PREGINET Philippines
- SINET3/NII Japan
- SingAREN Singapore
- TANET/NCTU Taiwan
- TARENA Tajikistan
- ThaiREN/ThaiSARN Thailand
- ThaiREN/UniNet Thailand
- TuRENA Turkmenistan
- VINAREN Vietnam

61 NRENs reached outside Europe via the major regional R&E infrastructures

# GÉANT Global Connectivity Website



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## NETWORK

### Network Topology

### Network Operations

### Global Connectivity

[World Regions](#)

[Users and Applications](#)

### Research and Education Networks

### Environmental Impact

## Global Connectivity: World Regions

### Americas

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[Latin America](#)

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[North Africa and Middle East](#)

[Sub-Saharan Africa](#)

[South Caucasus](#)

### Asia

[Central Asia](#)

[Asia-Pacific](#)



## Latin America

- [RedCLARA - the Latin American Research and Education Network](#)
- [European ALICE2 Funding for Latin America](#)
- [The Latin American NRENs connected to RedCLARA](#)



### RedCLARA - the Latin American Research and Education Network

The pan-Latin American research and education network, RedCLARA, currently interconnects 13 Latin American National Research and Education Networks (NRENs) and provides a 622-Mbps transatlantic link between Sao Paulo (Brazil) and Madrid (Spain) to the GÉANT network in Europe. The capacity of this interconnection is expected to increase in the autumn of 2010.

RedCLARA is managed and operated by the RedCLARA non-profit organisation which was originally established in December 2004 as CLARA (Latin American Cooperation of Advanced Networks).

[Click here](#) to view the current RedCLARA topology on the RedCLARA website.

<http://www.geant.net/Network/GlobalConnectivity/>

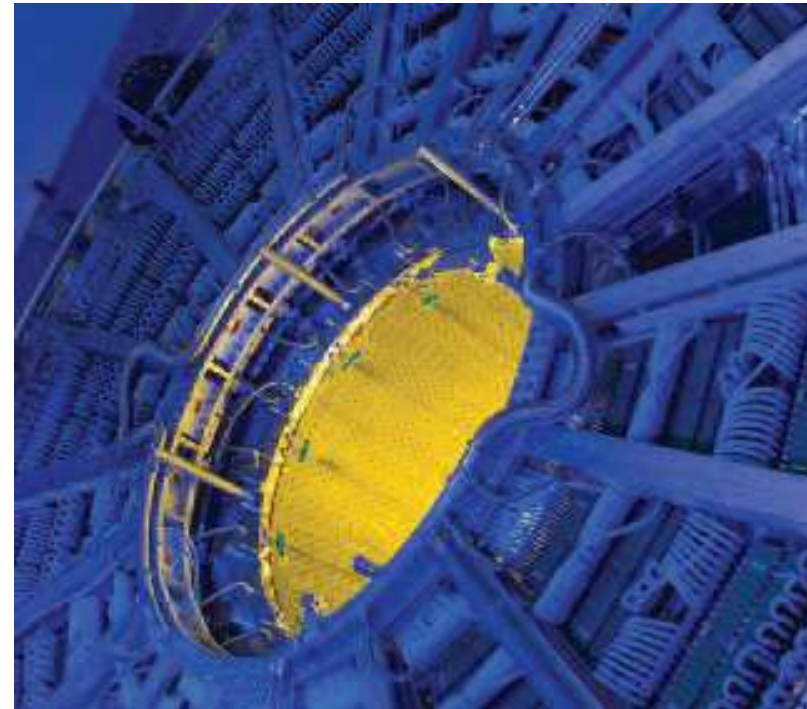
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# Who uses GÉANT and its Global Links? Big Science



Astronomy

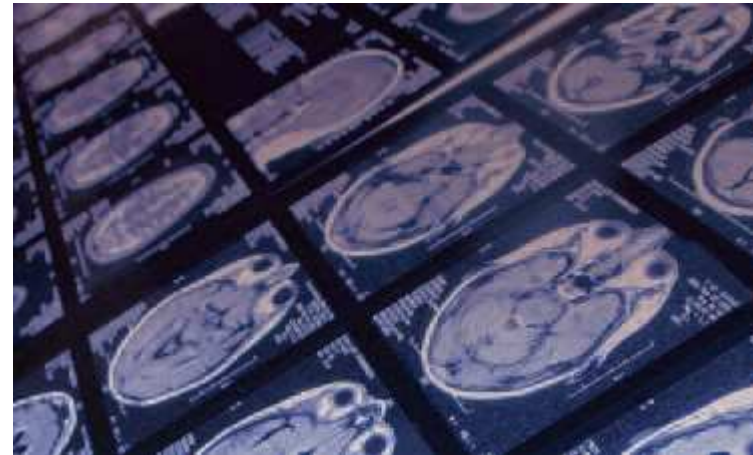


Large Hadron Collider

# Who uses GÉANT and its Global Links? e-health



Treating epilepsy



Research for the early diagnosis  
of neuro-degenerative diseases



# Who uses GÉANT and its Global Links? e-learning



- Universities in Europe link up with academic institutions in Jordan and Palestine to improve and foster higher education in the Middle East by means of distance learning



- Schools link up by videoconference to enable joint project work, cultural exchanges, etc.

# Who uses GÉANT and its Global Links? Disaster Warning and Crisis Support



Wildfire management



Typhoon forecasting

- Tsunami early-warning system
- Post-earthquake relief efforts

# Who uses GÉANT and its Global Links? Arts & Humanities



Digital recreation of lost instruments:

- Epigonion & barbiton – Ancient Greece
- Quena de hueso - Nasca culture (southern Peru)
- Tambor – Gentilar culture (northern Chile)

Music and dance  
performances  
created from  
volcano seismic data



# Latin America and Europe: Research and Education Collaborations



- R&E network connectivity can help collaboration by supporting:
  - Data transfer
  - Distributed data storage
  - Grid computing
  - Videoconferencing
  - Remote instrumentation



- FP7-funded projects involving Latin American and European participants
- RedCLARA & GÉANT connectivity can help these and other collaborations achieve their goals



Thank you for your attention!

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