



# **Europe – Asia Digital Connectivity: A research and education networks perspective**

**ASEF – Journalist's workshop  
28 January 2016**

**Jean-Luc Dorel – DG Connect**

# Europe – Asia digital connectivity

*Europe – Asia digital connectivity journey:*

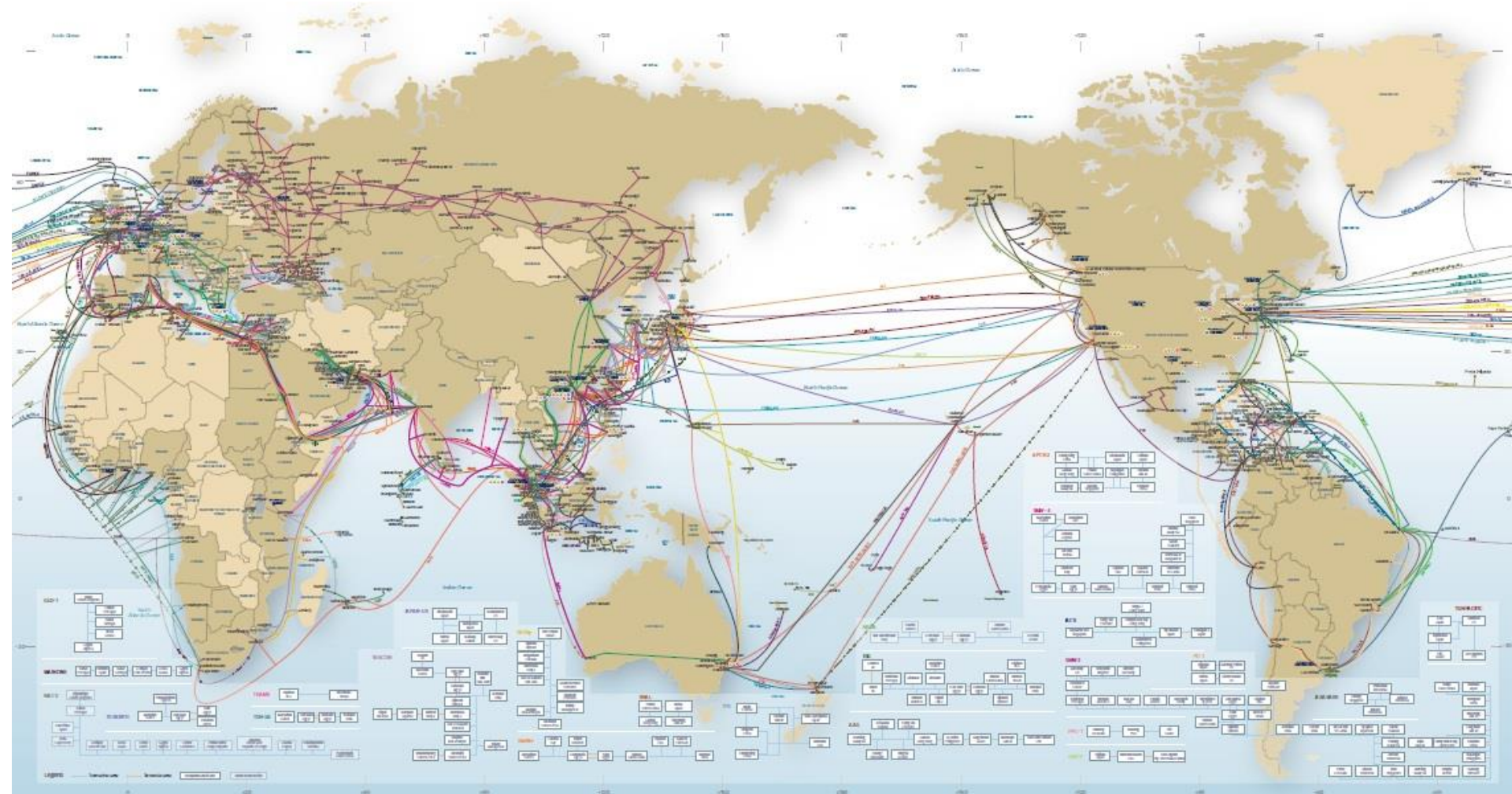
*... from cable*

*... to research and education networks*

*... to people*

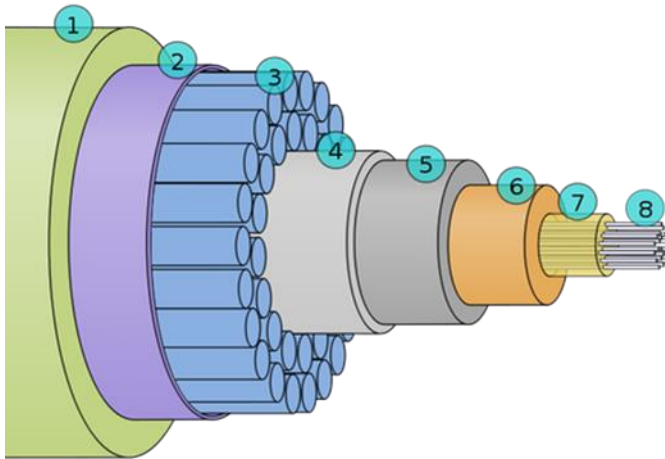


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Source: [http://mediafiles.pccwglobal.com/images/maps/Global\\_Map.jpg](http://mediafiles.pccwglobal.com/images/maps/Global_Map.jpg)

# Anatomy of an oceanic cable



1. Polyethylene
2. "Mylar" tape
3. Stranded metal (steel) wires
4. Aluminum water barrier
5. Polycarbonate
6. Copper or aluminum tube
7. Petroleum jelly
8. Optical fibers

From 1 Tbits/s to 60 Tbits/s

# Internet is built out of these cables

*22 October 1969: The first ARPANET link was established between the University of California, Los Angeles and the Stanford Research Institute at 22:30*

*1973: The first ARPANET connection outside the US was established to NOR SAR (Norway), just before the connection to University College of London (England)*

*September 1981: Internet Protocol specification (RFC791)*

*Jon Postel (USC) Editor*

*1989 Tim Berners-Lee (CERN) creates the World Wide Web*

# Research and Education networks

*Research and Education networks initiated the internet are still key players in designing, standardising, testing and deploying tomorrow's internet*

*Combined, NRENs constitutes a sizeable part of the internet (140000 km of optical fibre in Europe)*

*Supporting large science effort such as: LHC, SKA, ITER, HBP, ESO, ESA etc as well as long tail science*

*In Europe: 40 countries, 10000 institutions, 50 million Researchers and Students*

# From necessity to policy: rationale for ICT supporting science

*A wide range of policies needs evidence-based scientific support (e.g. environmental, agriculture, health, civil protection, resources management etc)*

*Science itself now strongly relies on ICT both when generating data (e.g. instruments, sensors etc) or harnessing data (e.g. simulation, correlation, mining etc)*

*Researchers push the technological and capacity limits when collaborating globally for creating new knowledge*





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# Regional Policies strongly driven by the EC

## Knowledge without Borders

GÉANT 2020 as the European Communications Commons

Report of the GÉANT Expert Group  
October 2011



### Joint Declaration

The members of National Governments, professors from Universities and Academies of Science, and practitioners of research and education ICT infrastructures from the Eastern Partnership countries, as well as representatives of key organisations from the EU Member States, jointly agree on the following declaration.

Taking note of:

- The Warsaw Declaration of the Eastern Partnership Summit – September 2011<sup>1</sup>

*18. Co-operation and policy dialogue under the Eastern Partnership on education, research, youth and culture should be further enhanced. [...] A Common Knowledge and Innovation Space linked to Smart Growth and the EU innovation agenda will be established in order to give the policy more impact and visibility.*

- The conclusions of the UNESCO/ITU Working Group on Broadband and Science – October 2011<sup>2</sup>

*Broadband connectivity facilities are basic infrastructure in a modern society, just like roads, electricity or water; it almost becomes a human right – even more so when it's used for science. E-infrastructures build on broadband to provide online services to science and education communities. Not only have these services become today indispensable, they have also transformed the scientific process by enabling the instantaneous sharing of knowledge, virtual collaborations spanning the globe, and remote access to scientific resources and instruments. E-infrastructures are today one of the main engines of scientific progress and its potential in other social and economic areas is enormous. Developing regions stand to benefit in particular because broadband networks dramatically reduce the barriers of distance and location.*

- The conclusions of the "Policies for Development of E-Infrastructures in Eastern European Countries" conference - November 2011<sup>3</sup>

*25. Eastern Partnership participants affirmed that the development of e-infrastructure is a key policy for their countries and therefore, that this should be reflected in the multi-lateral dialogue of the Eastern Partnership, as well as in the bi-lateral one, especially in the context of the renewed interest in the partnership*



17.8, 21.12.2015

*Euro-Mediterranean Digital Economy and Internet Access Expert Working Group (DEWoG)*

### WORK PLAN 2016

Digital Economy Ministers and EU institutions gathered in Brussels on 30.9.2014, in the presence of the UfM Secretariat and development banks. They pledged closer cooperation to reap the benefits of the digital economy for Euro-Mediterranean area. They adopted a Declaration which responds to the pace of digital changes and the potential of the digital technologies for the economy and society. They welcomed the contribution that stakeholders can make to ensure that the UfM is focusing on the right issues and that it has the means to achieve results. The UfM provides a stable and pro-active political framework for cooperation. Finally, they called for the set-up of a "Digital Economy and Internet Access Expert Working Group" (DEWoG).

The present Workplan elaborates the actions indicated in the Ministerial Declaration in Work Items to be executed in 2016 unless otherwise specified.

The Workplan provides for each work item, a description and objective (what?), a methodology and/or needed resources (how?), a timing (when?) and actors (who?).

Actors are key to carry out a work item. For each work item, there are one or more organisations that have volunteered to be its "promoter". There is no rule on the profile of a promoter; it can be a private company, public administration, NGO, development bank, etc. It can be established in Europe, South Med or elsewhere. Several organisations may team-up to promote a work item. Several stakeholders may be associated to a promoter. The setting is different for each work item. Promoters may organise physical or virtual dedicated meetings and/or working subgroups.

Following its 1<sup>st</sup> meeting in Barcelona on 9-10.12.2015, the DEWoG has adopted its Workplan in accordance with its Rules of Procedures. The DEWoG intends to meet again in spring 2016 in Barcelona to finalise certain entries in the Workplan.

The topics for which action is requested or hinted in the Ministerial Declaration are:

1. Enhancing connection to GÉANT Research & Education Network
2. Approximation of telecom regulation
3. Interoperability of electronic trust services
4. Drafting a EuroMed Charter on Open Data
5. Enhancing cooperation on eHealth / mHealth
6. Approximation of other ICT policies
7. Ensuring Internet governance according to shared principles
8. Ensuring cybersecurity

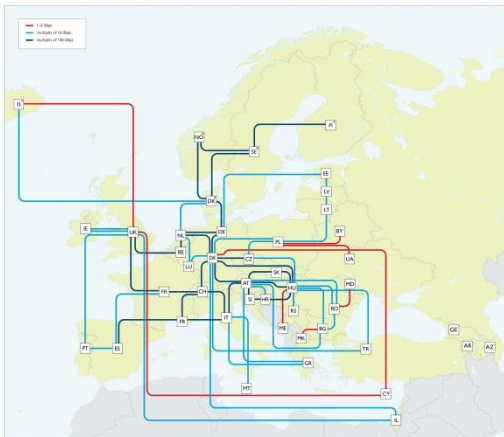


# Regional Policies



[www.geant.org](http://www.geant.org)

GÉANT's pan-European research and education network interconnects Europe's National Research and Education Networks (NRENs). Together we connect over 50 million users at 10,000 institutions across Europe.



GÉANT's pan-European network is funded by the GÉANT Project (G04-1). This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 691567. The map shows topology as at October 2015. The G04-1 partners are listed below.



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**ALICE**  
America Latina Interconectada Con Europa



# EC investment

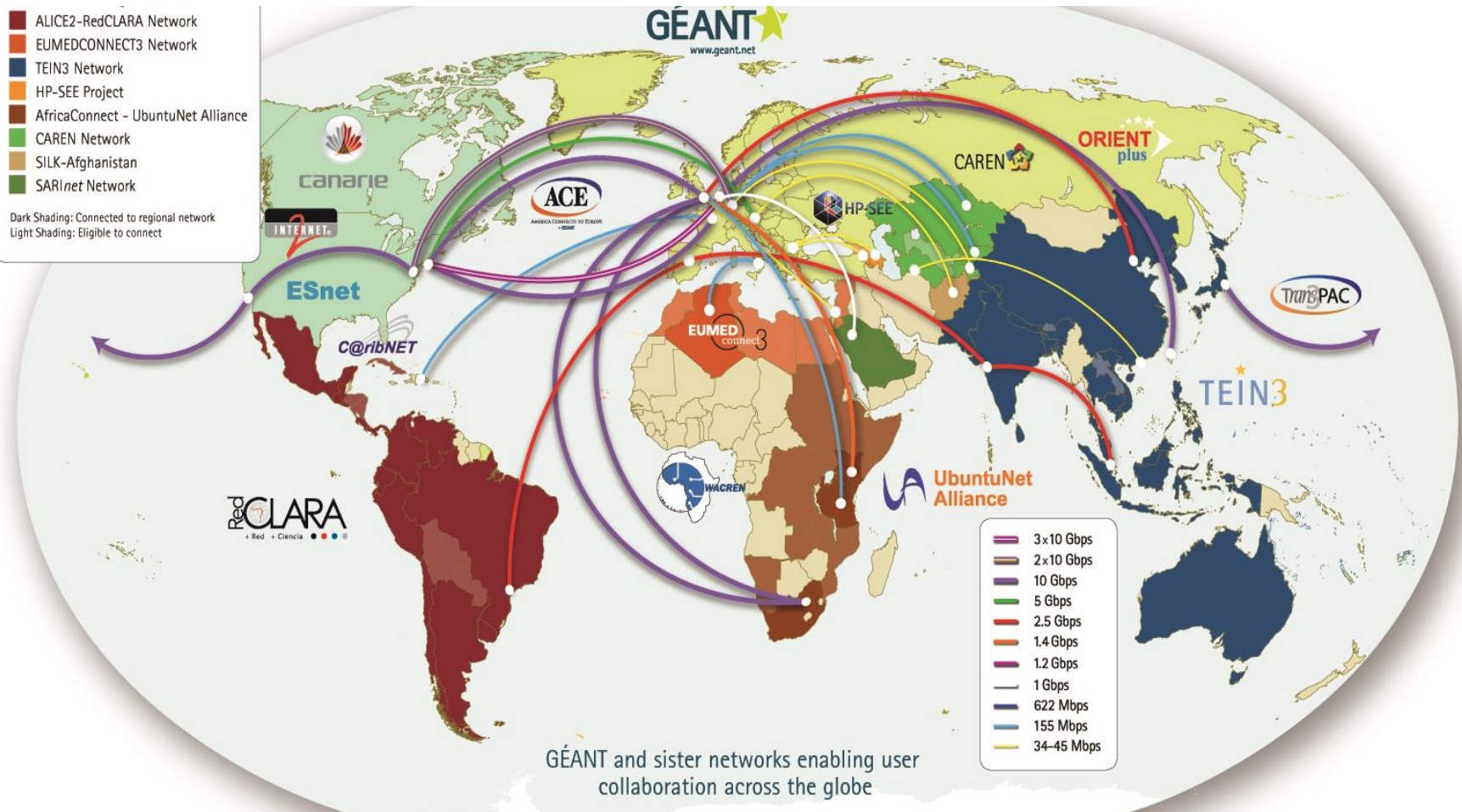
Program name	Period	Region	EC funding (total)	Capacity to Géant
CAREN 1, 2	2009-2015	Central Asia	2.8 (3.2)	34 to 155 Mbps
TEIN 2, 3, 4	2003-2016	South East Asia	29 (46.5)	2.5 Gbps
EUMEDCONNECT 1, 2, 3	2001-2016	Mediterranean countries	17.3 (28.9)	622 Mbps
Africaconnect	2011-2015	Sub-Saharan Africa	12 (15)	10 Gbits/s
Alice 1, 2	2003-2014	South America	26 (34.5)	2.5 Gbits/s
Caribnet	2012-	Caribbean	10 (via Woldbank) (10)	155 Mbits/s
EAPConnect	2015-	Eastern Parternship	13 (13.5)	10 Gbits/s



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- ALICE2-RedCLARA Network
- EUMEDCONNECT3 Network
- TEIN3 Network
- HP-SEE Project
- AfricaConnect - UbuntuNet Alliance
- CAREN Network
- SILK-Afghanistan
- SARInet Network

Dark Shading: Connected to regional network  
Light Shading: Eligible to connect



GÉANT and sister networks enabling user collaboration across the globe

# Europe-China

*From rotating funding (orientplus) to shared investment:*

- **10 years contract**
- **10 Gbits/s**
- **Fully protected**

*Part of a greater agreement with USA for backup-ing in case of failure*

# Regional Networks Update – CAREN

- 2 phases since 2009 connecting Kazakhstan, Kyrgyzstan, Tajikistan and Turkmenistan, ended August 2015
- NRENs temporarily using commercial ISP services

3<sup>rd</sup> phase (CAREN3), subject to 2+ financing commitments from CA governments

- Tajikistan and Kyrgyzstan now signed up
- EC/GÉANT CAREN 3 contract being finalised
  - 4 year project
  - Upto 10M Euro EC funding
  - Initially KRENA and TARENA will be connected
  - Other CA NRENs are interested to re-join





## Trans-Eurasia Information Network4 (TEIN4)

*The Trans-Eurasia Information Network (TEIN) was launched at the Asia-Europe Meeting Summit (ASEM 3) in Seoul in October 2000.*

*TEIN4 is co-financed for an amount of €8 million by the EC and €8 million by project partners.*

*Project duration is April 2012 to April 2016*

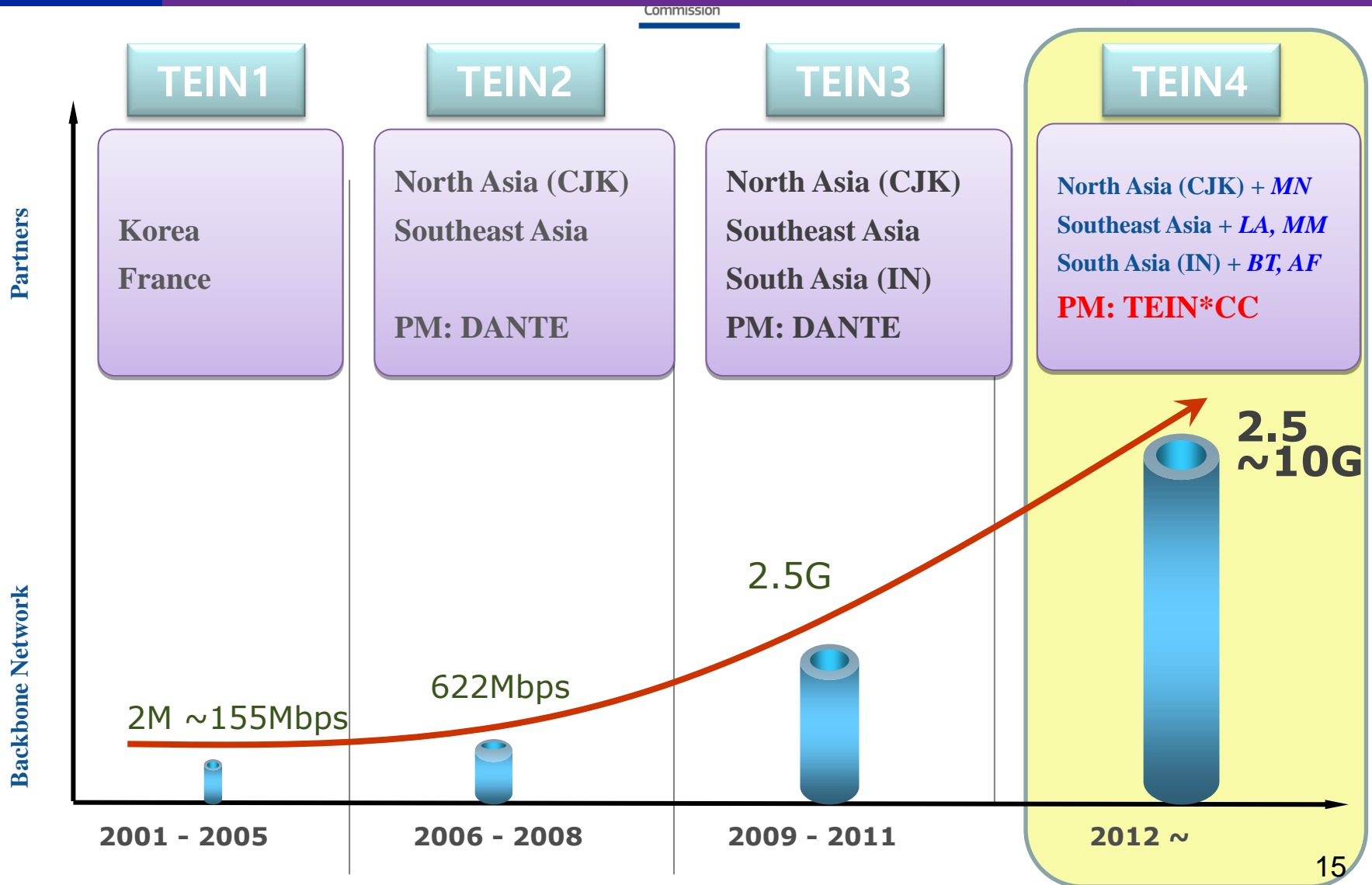
*Day-to-day operations are managed by TEIN\*CC (Seoul).*

*TEIN4 is a unique Research and Education (R&E) collaboration which provides dedicated large bandwidth, high quality Internet international connectivity between 23 R&E communities in the Asia Pacific region, the EU and globally.*





# TEIN Evolution





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Connecting  
Asia and Europe's  
Research and Education  
Communities

www.tein.asia

**TEIN Project Partners**

AF	Indonesia	NZ	New Zealand
AU	Japan	PK	Pakistan
BD	Korea	PH	Philippines
BT	Laos	SG	Singapore
CB	Myanmar	SL	Sri Lanka
CN	Mongolia	TH	Thailand
HK	Malaysia	TW	Taiwan
IN	Nepal	VN	Vietnam

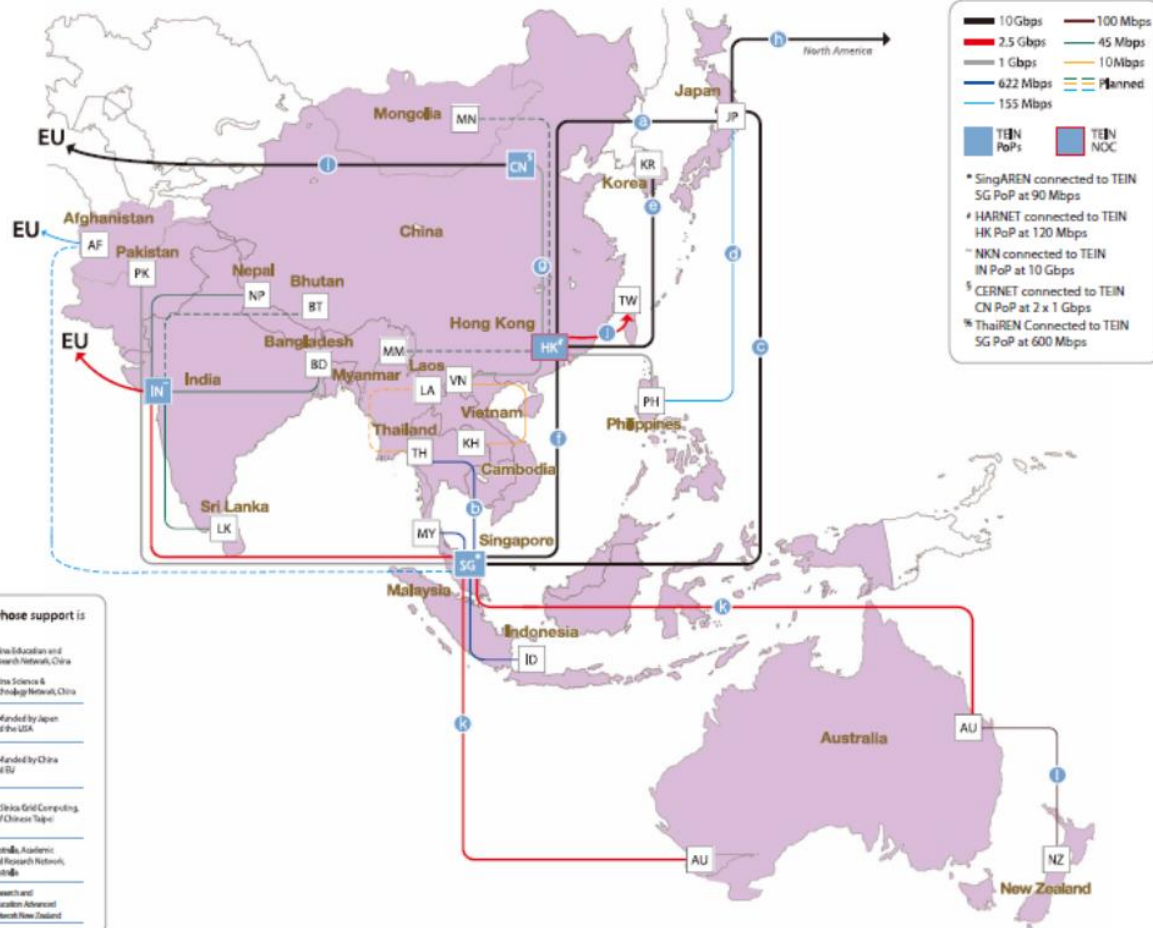
The following links are fully financed by the link owners whose support is gratefully acknowledged.

a	National Institute of Information and Communications, Japan	g	China Education and Research Network, China
b	National Institute of Information and Communications, Japan	h	funded by Japan and the USA
c	National Institute of Informatics, Japan	i	co-funded by China and EU
d	Ministry of Agriculture, Forestry and Fisheries Research Network, Japan	j	Academia Sinica Grid Computing, Republic of Chinese Taipei
e	National Information Society Agency, South Korea	k	Austris Academic and Research Network, Austria
f	National Information Society Agency, South Korea	l	Research and Education Advanced Network New Zealand

As of July 2015



TEIN is co-funded by the European Commission through the Directorate-General for Development and Cooperation-EuropeAid



- \* SingAREN connected to TEIN SG PoP at 90 Mbps
- † HARNET connected to TEIN HK PoP at 120 Mbps
- ‡ NKN connected to TEIN IN PoP at 10 Gbps
- § CERNET connected to TEIN CN PoP at 2 x 1 Gbps
- ¶ ThaiREN Connected to TEIN SG PoP at 600 Mbps

This map has been produced with the financial assistance of the European Union. The contents of this document are the sole responsibility of TEINCC and can under no circumstances be regarded as reflecting the position of the European Union.

# TEIN Partners

## ❑ Beneficiary (16 countries / economies)

- ❖ **Bangladesh** : University Grants Commission (UGC)
- ❖ **Bhutan** : Department of Information Technology and Telecom (DIT&T)
- ❖ **Cambodia** : Institute of Technology of Cambodia (ITC)
- ❖ **India** : National Knowledge Network (NKN)
- ❖ **Indonesia** : Institut Teknologi Bandung (ITB)/INHERENT
- ❖ **Laos** : Lao Education and Research Network (LERNet)
- ❖ **Malaysia** : Malaysian Research and Education Network (MYREN)
- ❖ **Nepal** : Nepal Research and Education Network (NREN)
- ❖ **Pakistan** : Pakistan Education and Research Network (PERN)
- ❖ **Philippines** : Advanced Science and Technology Institute (ASTI)
- ❖ **Sri Lanka** : Lanka Education and Research Network (LEARN)
- ❖ **Thailand** : Thailand Research Education Network Association (ThaiREN)
- ❖ **Vietnam** : National Agency for Science and Technology Information (NASATI)
- ❖ **Afghanistan (AfgREN), Mongolia (ErdemNET), Myanmar (mmREN)**

## ❑ Non-Beneficiary (7 countries / economies)

- ❖ **Australia** : Australia, Academic and Research Network (AARNet)
- ❖ **China** : China Education and Research Network (CERNET),  
China Science & Technology Network (CSTNet)
- ❖ **Hong Kong** : Hong Kong Academic and Research Network (HARNet)
- ❖ **Japan** : National Institute of Information and Communications (NICT),  
National Institute of Informatics (NII),  
Ministry of Agriculture, Forestry and Fisheries Research Network (MAFFIN)
- ❖ **Korea** : National Information Society Agency (NIA)
- ❖ **Singapore** : Singapore Advanced Research & Education Network (SingAREN)
- ❖ **New Zealand (REANNZ)**

Commission



# From networks to people



ICT in the  
developing  
world

*ICT as a factor for reducing  
poverty*

*ICT and Health  
e-learning*

*Issues are of global nature*

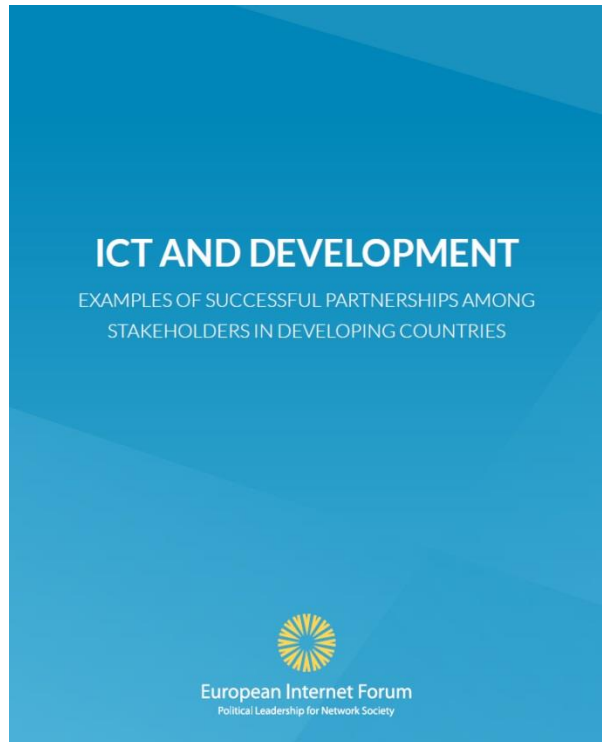
*Brain drain*

*Digital Dividend*

STUDY

Science and Technology Options Assessment

# From networks to people

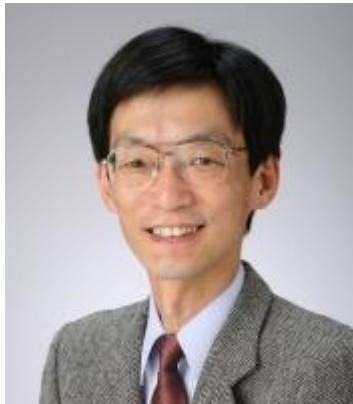


# R&E applications enabled by CAREN

- *Telemedicine*
- *Distance learning*
- *Solar energy research*
- *Disaster risk management (Earthquake Model for Central Asia)*
- *Regional monitoring network on water resource management*
- *Geohazard potential of retreating glaciers*



# Tele-medicine cluster



**Shuji Shimizu, MD, PhD**  
Telemedicine Development Center of Asia  
Kyushu University Hospital  
3-1-1 Maidashi, Higashi-ku  
Fukuoka 812-8582, Japan

## Aims



1. To provide good technical training for local engineers in hospitals, including Internet management and audio-visual handling. We should provide better QoS for healthcare providers.
2. To organize an annual workshop where team of medical and engineering people get together to share information of programs, medical needs, technical limitations, trouble shootings, and to make plans for the next year.
3. To invite smaller hospitals in rural and remote areas in each country to provide the benefits of telemedicine to more healthcare providers.
4. To increase the number of leading hospitals which can organize the programs and can educate other hospitals in their own country.
5. To create attractive programs to be performed in daily basis, in addition to organizing showcases to demonstrate cutting edge technology in key international medical congresses.
6. To expand our activities to new countries such as Myanmar and Mongolia in southeastern Asia, as well as in CAREN, RedClara, and African countries.
7. To keep the system improved constantly with developing technology.
8. To promote medical standardization ultimately to provide patients with better healthcare.

# Other TEIN Clusters

## *E-learning*

*Strong potential for TEIN research & education clusters in the areas of water management, climate change monitoring, natural disaster management and food security*

*TEIN\*CC attended The Lower Mekong Initiative Workshop in the Network-enabled Collaboration series on "Cyberinfrastructure and Water Resources in the Lower Mekong Region"*

*Many water resources related researchers from Thailand, Vietnam, Laos, Cambodia, and Myanmar.*

# Next steps

## *IT tools coordination*

*Global network architecture*

*Identity management*

*Cloud access*

## *Investments*

*National infrastructure in coordination with regional/global efforts*

*Regional investments*

*Removing obstacles for cross-border investments*