



# GÉANT and the R&E development in Africa

Vincenzo Capone

Head of Research Engagement and Support

JET Workshop@SC17 14/11/17 (Denver-CO)

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



**To support collaboration and development amongst researchers, the dissemination of information & knowledge, and provide access to a portfolio of services and infrastructure resources:**



**Runs a membership association for Europe's National Research & Education Networks (NRENs)**  
GÉANT Association



**Coordinates and participates in EC-funded projects**

Under Horizon 2020 the financial instrument for implementing the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe's global competitiveness



**Operates a pan-European e-infrastructure**  
GÉANT network



**Manages a portfolio of services for research & education**  
EduX



**Organises and runs community events & working groups**  
TNC, task forces & special interest groups



# Membership Association

**GÉANT Association supports and represents over 40 NRENs across Europe.**

Together they support over 10,000 institutions and 50 million academic users.





## Revenue €35m

### **Bulk of Income (55%) from European NRENs subscriptions**

Consortium subscriptions 43% funded by EC

### **Direct income from EC**

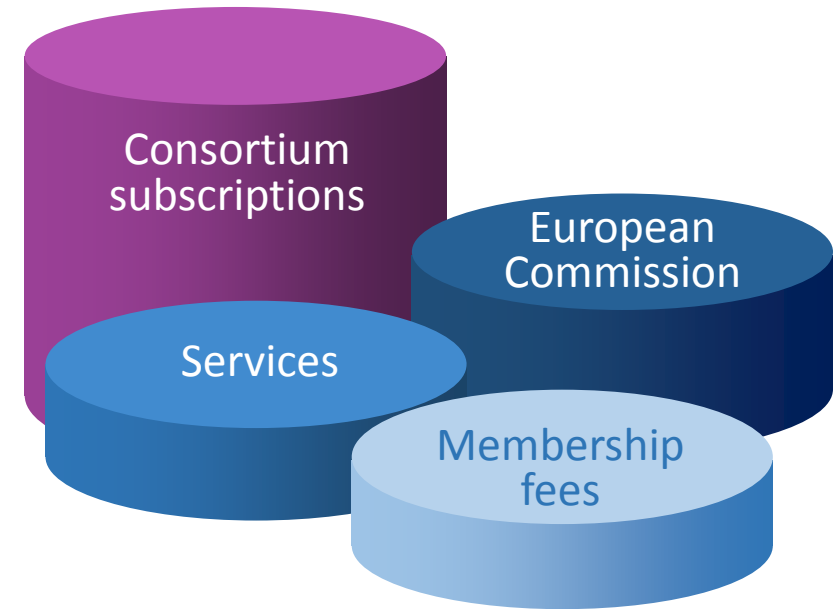
Project coordination and participation in EC projects

### **Membership fees to GÉANT Association**

NRENs & commercial partners

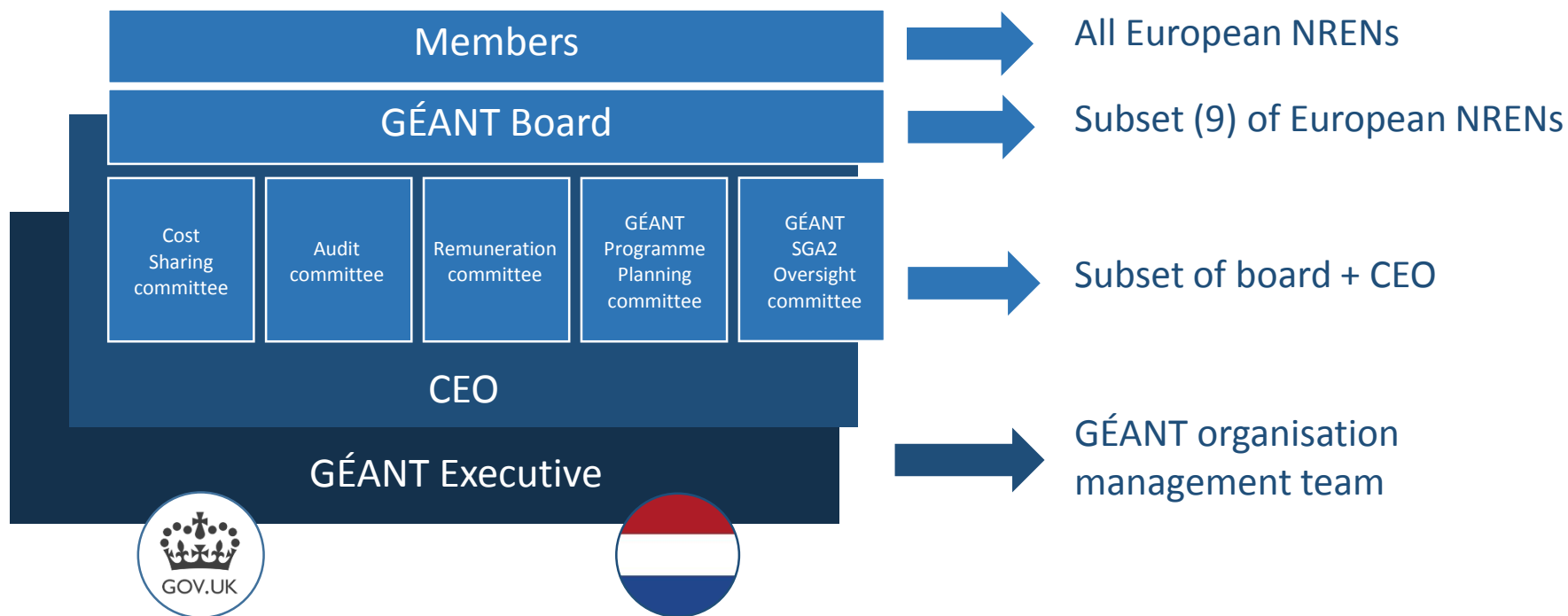
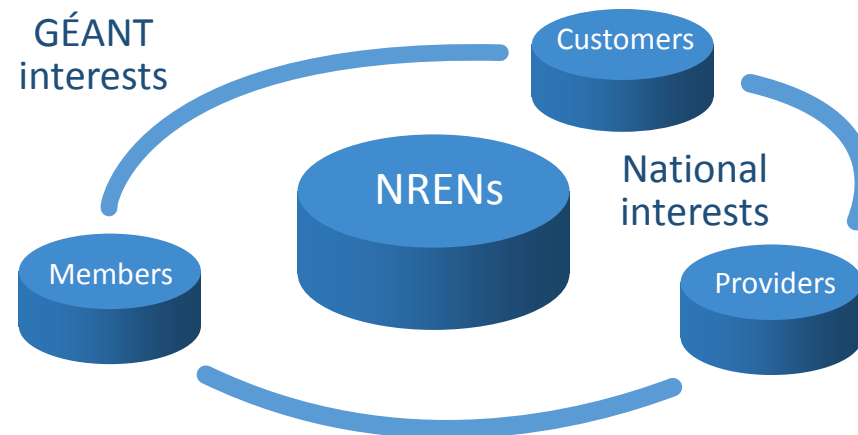
### **Revenue from providing bespoke services to R&E community**

- Consortium subscriptions based on complex cost-share model to ensure digital divide issues are catered for
- Traffic doubling every 12 months - but subscription income declining 3% annually





# Governance





# Projects

**GÉANT is a trusted European Commission (EC) partner in many global collaboration projects and initiatives through our special relationship with the European Union.**



European  
e-infrastructure  
projects



Trust & identity  
projects



Network  
projects



Collaborative  
projects



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







# Network

**The GÉANT network interconnects research, education and innovation communities worldwide, with secure, high-capacity networks.**

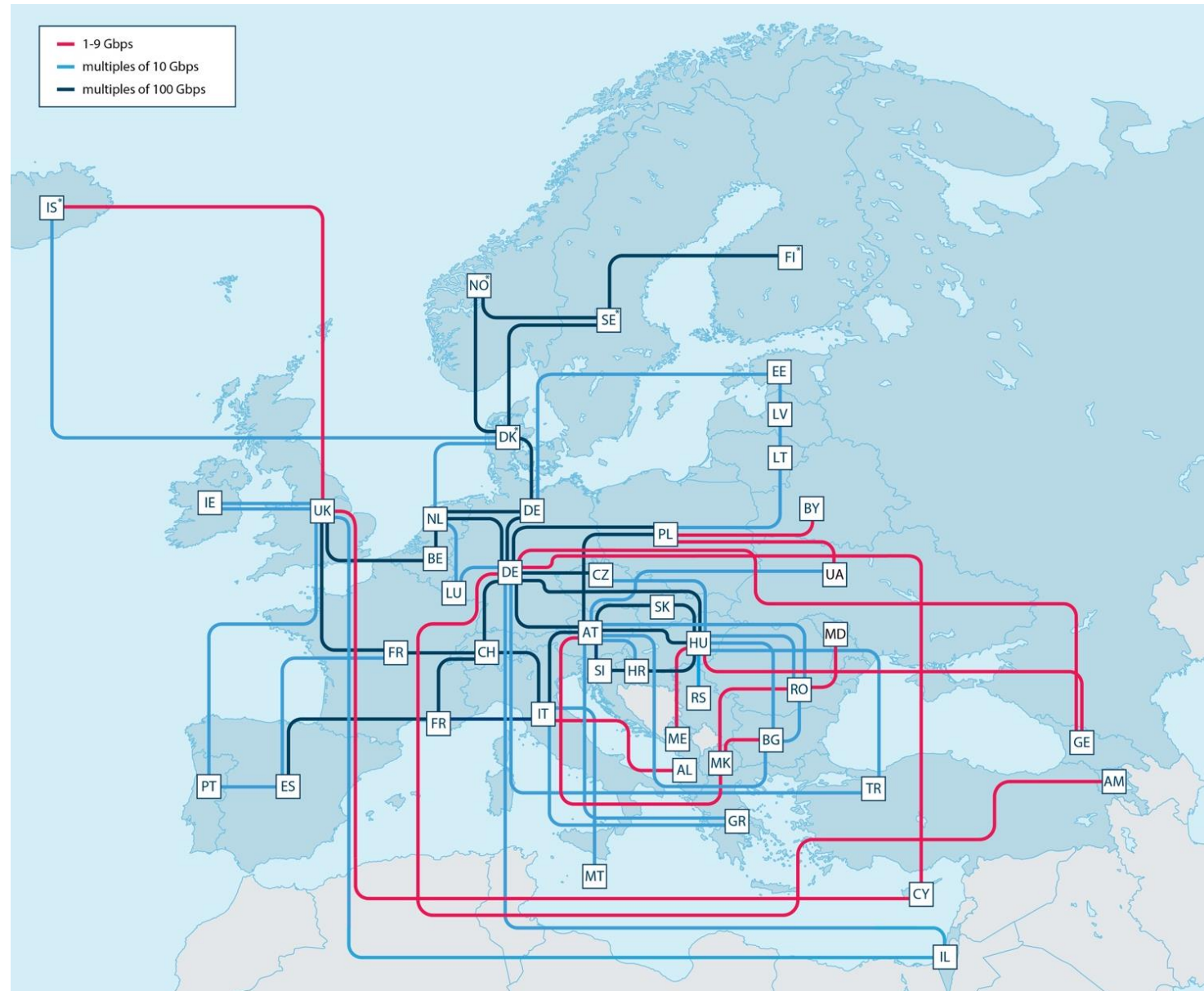
We design, plan, build and operate the large-scale, high-performance GÉANT network that connects European NRENs to each other and the rest of the world for sharing, accessing and processing the high data volumes generated by research and education communities and for testing innovative technologies and concepts.



# Network

Interconnecting Europe's NRENs over a 500Gb highly-resilient pan-European backbone. NRENs serve 50 million users at 10,000 institutions across Europe.

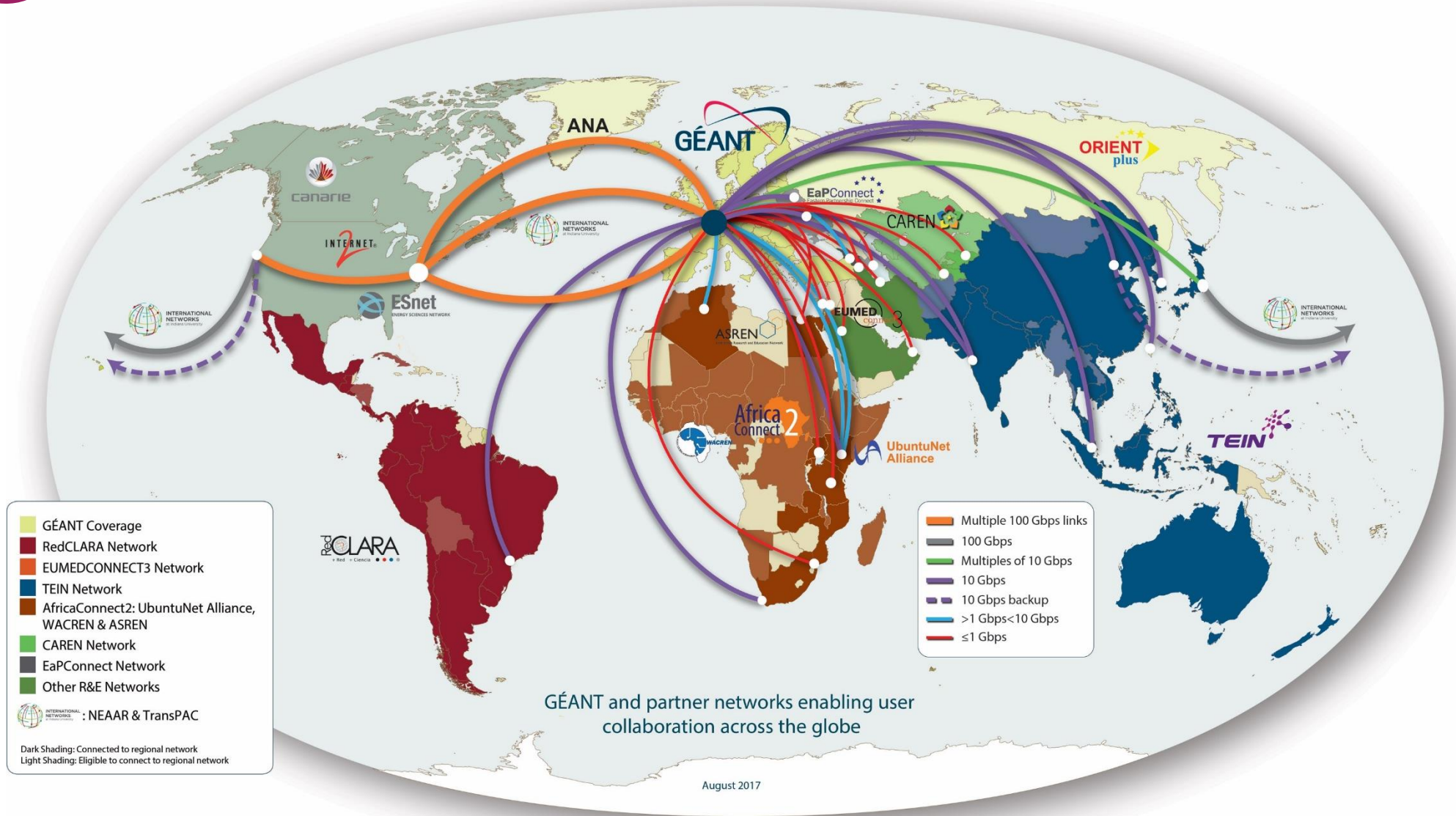
Network services: IP, Point-to-Point Services, VPN, Testbeds, performance monitoring







# At the heart of global R&E networking





# R&E networking in Africa



# Eastern Mediterranean - EUMEDCONNECT



[www.eumedconnect3.net](http://www.eumedconnect3.net)

## Scope

Regional network for the Mediterranean since 2004 – now in its third phase

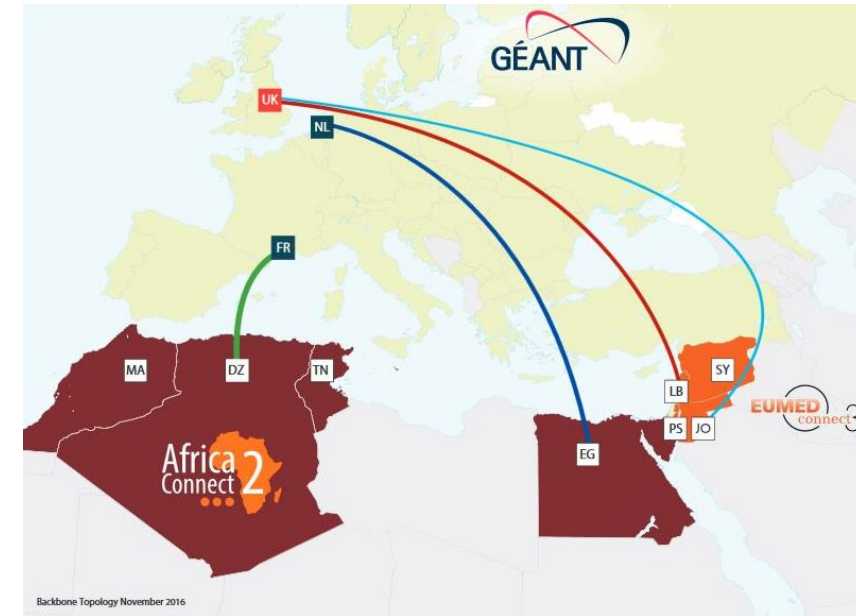
Phase 3: 2011-2014, extended until end 2019

## Partners

- Managed by **GÉANT**
- Regional partner **ASREN**   
(The Arab States Research and Education Network)
- 5 EU NRENs (**CY, ES, FR, GR, IT**)
- Beneficiaries: **Jordan, Lebanon and Palestine**

## Project update

- Lebanon connected for first time in 2016 and recently upgraded to 320Mbps, NREN being formed
- Jordan link connects SESAME to CERN via ASREN and GÉANT, NREN being re-connected
- Palestine interested in re-connection
- DG NEAR increased EC funding to 60%



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





# Africa – AfricaConnect2



[www.africaconnect2.net](http://www.africaconnect2.net)

## Scope

Connecting the R&E communities across Africa and interconnecting them with GÉANT.

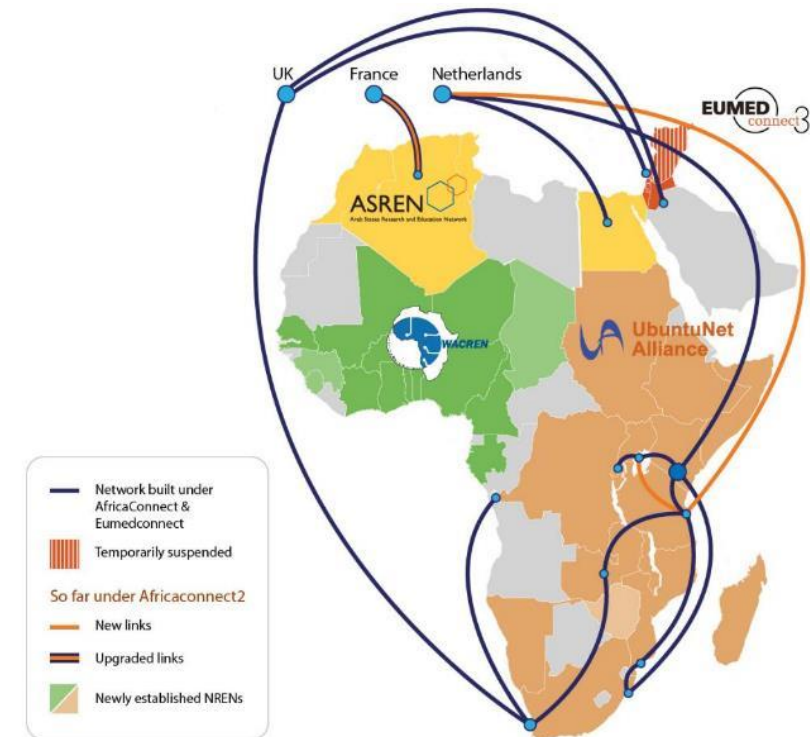
€20M EU funding for 3.5 years (from June 2015)

## Partners

- **UbuntuNet Alliance:** Eastern & Southern Africa – Cluster 1
- **WACREN:** West & Central Africa – Cluster 2
- **ASREN:** North Africa – Cluster 3
- **GÉANT:** Administrative (Clusters 1, 2) + Coordination
- EU NRENs (**CY, ES, FR, GR, IT, PT**) also supporting
- Beneficiaries: **30 African NRENs**

## Project update

- Tendering underway for Clusters 2 and 3
- Regional partners working with AfriGEOSS to support Earth observation programmes across Africa
- Regional partners participating in NSF-funded NEAAR project to improve connectivity with North America
- Planning started for project continuation beyond November 2018



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





# What is the situation in Africa

- 2011 – 2015: EU co-funded AfricaConnect project brought to life the 1<sup>st</sup> sustainable regional research and education network in Sub-Saharan Africa, interconnecting 7 NRENs and connecting the region to the rest of the world via the European regional network
- Started in 2015: AfricaConnect2 aims to build other sustainable regional networks in Africa to create a pan-African network fully connected to the global research and education network.



Southern and Eastern Africa  
DG DEVCO co-funding  
**2011-2015**

[ubuntunet-map-latest-may2015.jpg](#)



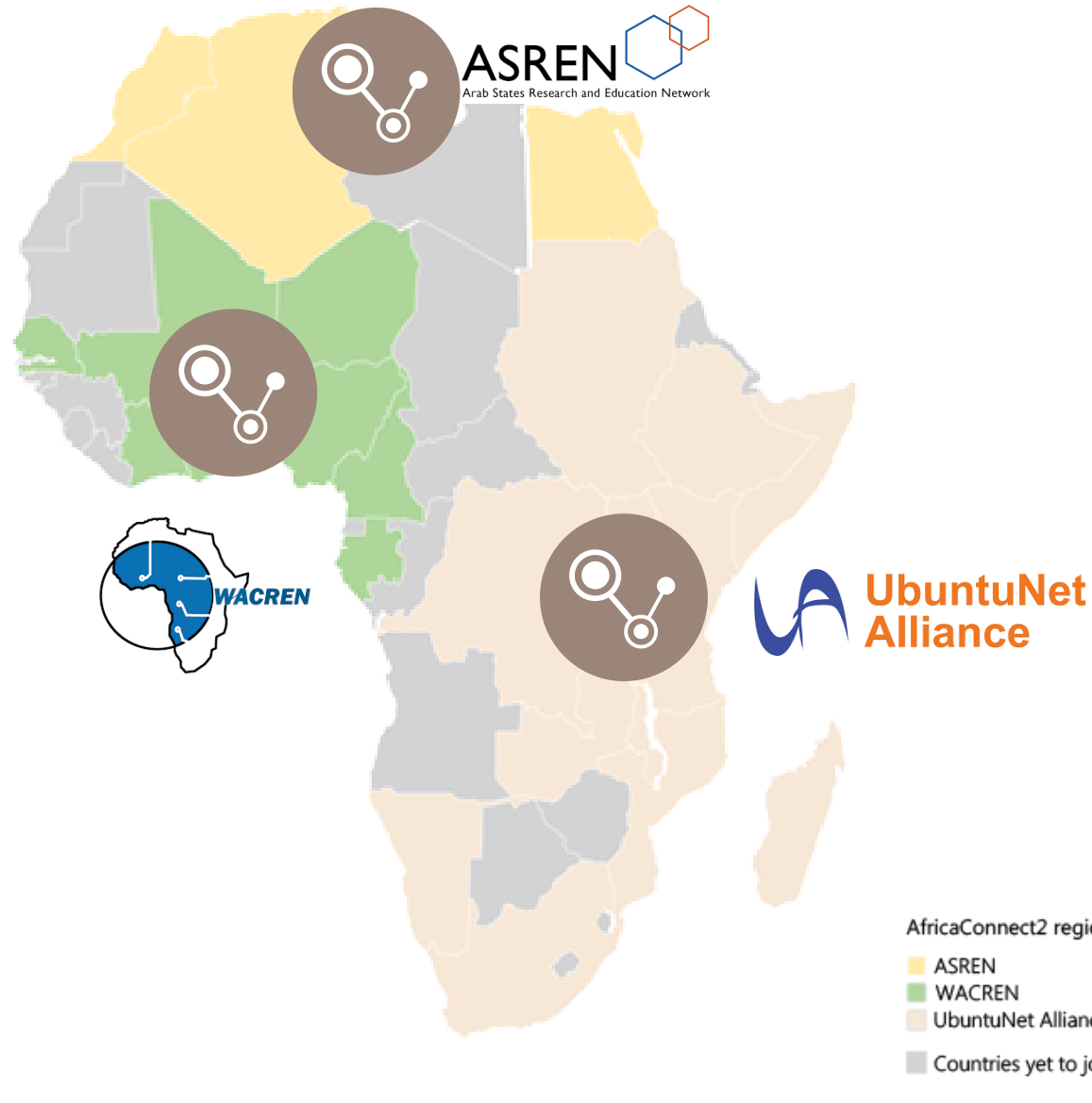
Pan-African  
DG DEVCO co-funding  
**Started in 2015**





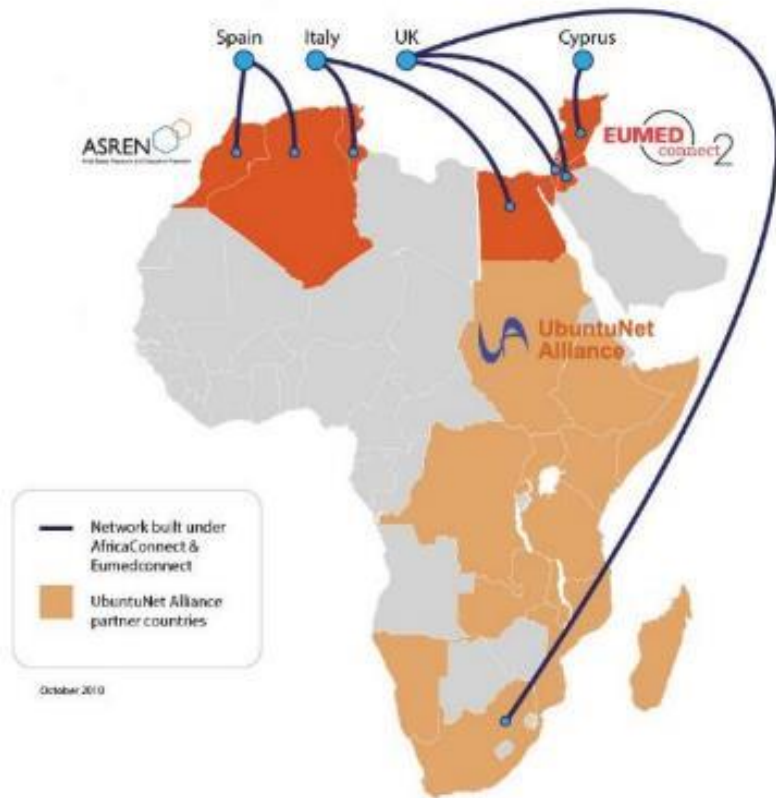
# What are the African regional partners involved?

- The regional approach allows to adapt to the size of the continent (nearly 3 times Europe) and its existing regional specificities (regulations, political integration, language, stage of NREN development, etc.) in order to facilitate the building of a viable pan-African network.
- The AfricaConnect2 project is self-inclusive, i.e. all interested and ready countries are invited to participate to expand the network.
- Interconnections will take place either via international routes and/or direct routes depending on costs and funding.





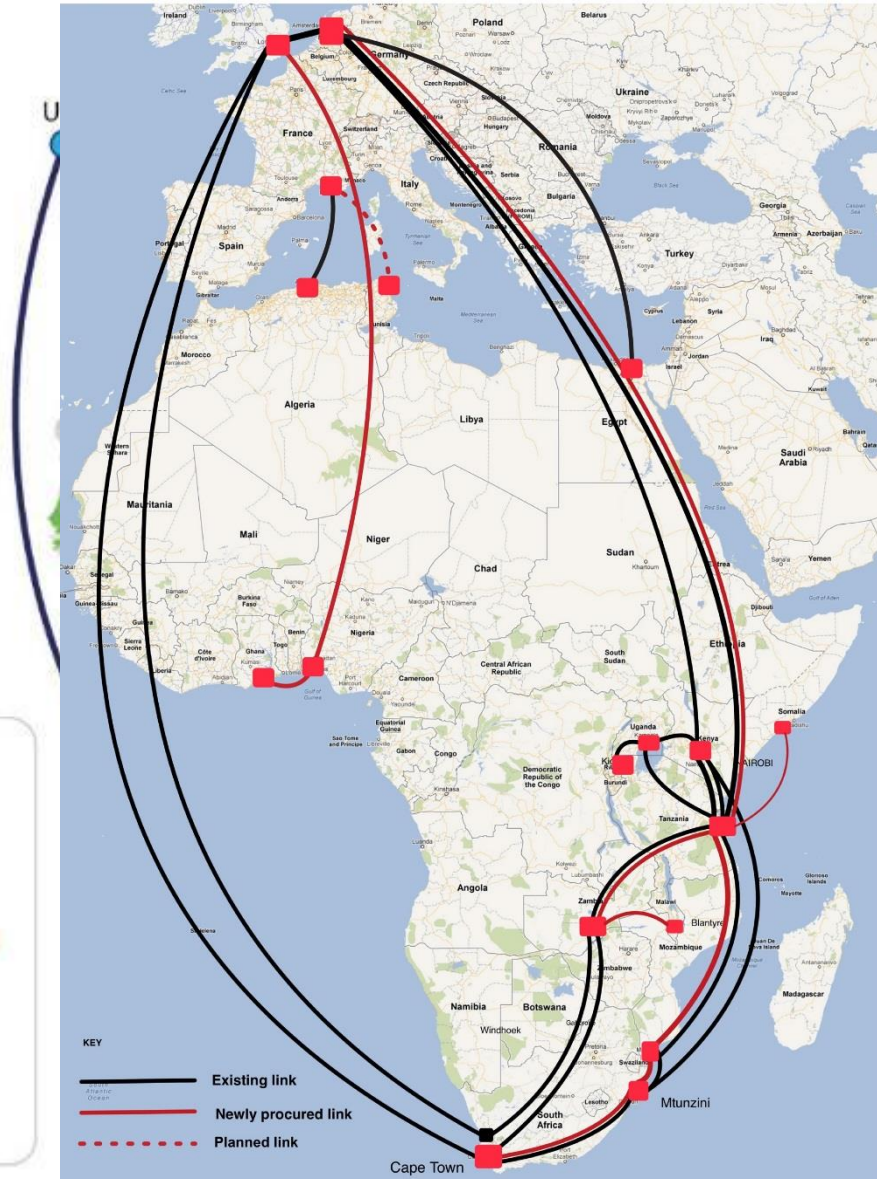
# A pan-African research and education network in the making



October 2010



October 2016



\*Northern African NRENs  
once part of the EU-funded  
EumedConnect project  
now contribute to  
AfricaConnect2



# Africa still has low Internet penetration rates



# Connecting African research and education communities

Connected Countries (NRENs)	Institutions (Higher Ed & Research)
<b>ASREN North Africa</b>	<b>154</b>
Algeria (ARN)	124
Egypt (EUN)	30
<b>Ubuntunet Alliance</b>	<b>513</b>
Kenya (KENET)	180
South Africa (TENET)	86
Mozambique (MoRENnet)	83
Uganda (RENU)	42
Zambia (ZAMREN)	75
Tanzania (TERNET)	27
Rwanda (RwEdNet)	20
<b>WACREN</b> <i>Network under construction</i>	n/a
<b>TOTAL 2016</b>	<b>667</b>

- Out of 33 existing African NRENs, 9 are connecting over 650 institutions to the global research and education network:
  - training, developing and retaining local talents
  - helping to connect remote users
  - allowing international researchers and students to gain valuable input from their colleagues in Africa

All three regional networks are still being developed or consolidated



# Enabling scientists to feed the world



- Challenge: Agriculture is a key driver of Sub-Saharan economy and at the heart of the food security challenge. One difficulty is identifying soils that are suitable for agriculture.
- Solution: Use the AfricaConnect network to access, process and modelize satellite maps to identify soil properties and classify lands.
- Benefit: Provide input to sustainable land management in Zambia.





# Bringing knowledge to students in remote areas

e | Virtual University  
of Uganda



- 1st online-only university in Sub-Saharan Africa
- Enabled and supported by Research and Education Network for Uganda, RENU
- Created in 2011
- 4 diploma and master programmes in key subjects (Public Health, ICT for Development, International Development, and Business Administration)
- Students from Uganda, Tanzania, South Africa, Burundi, and other African & European countries.

# Enabling scientists to tackle climate change



## African Earth Observation Group

- Challenge: ensure scientists, regulators and technology work together to tackle climate change.
- Solution:   supported by 
- Benefit: speed up global research on climate change (incl. water management and food security) by allowing pan-African and international exchange of earth observation data.





## Land preservation in Morocco

- Challenge: Agadir protected UNESCO Biosphere Reserve plays a key part in Morocco's fruit and vegetables export BUT the land is very vulnerable to man-made and climatic changes.
- Solution: Moroccan and French researchers have used the Eumedconnect network to download, process and analyse satellite images to produce thematic maps of the area.
- Benefit: Monitor land cover, water resources or the progress of natural hazards, which could have socio-economic impact on the region.



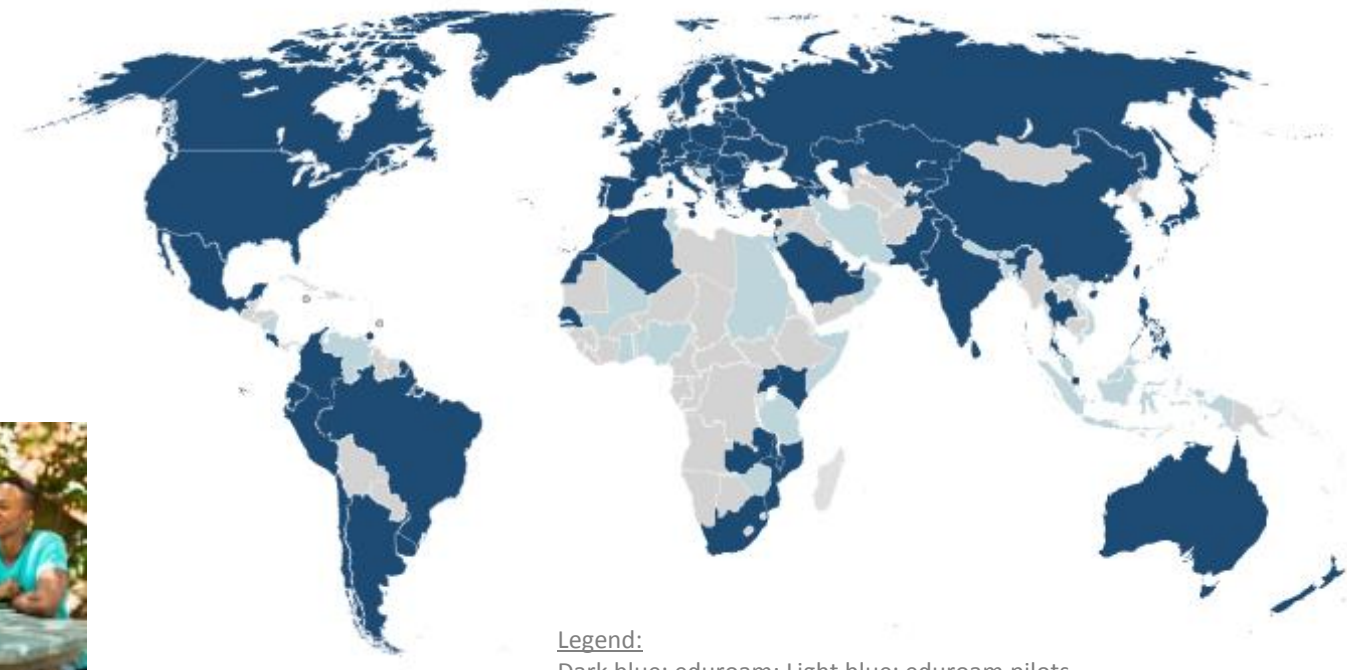
# Linking Students To The Global Community



- Free secure wifi provided by NRENs between campuses.
- A global network of users across 80 countries. Over 2 billion international authentications and counting

## eduroam in Africa

- 6 African NRENs have deployed eduroam
- 9 are conducting pilots
- Kenyatta university connects **70 000 students** thanks to eduroam
- In Zambia, **over 40 000** can access digital resources on and off-campus thanks to eduroam



Legend:

Dark blue: eduroam; Light blue: eduroam pilots







# Thank you

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



© GEANT Limited on behalf of the GN4 Phase 2 project (GN4-2).  
The research leading to these results has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 731122 (GN4-2).



*"Any opinions, findings, conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the Networking and Information Technology Research and Development Program."*

The Networking and Information Technology Research and Development  
(NITRD) Program

**Mailing Address:** NCO/NITRD, 2415 Eisenhower Avenue, Alexandria, VA 22314

**Physical Address:** 490 L'Enfant Plaza SW, Suite 8001, Washington, DC 20024, USA Tel: 202-459-9674,  
Fax: 202-459-9673, Email: [nco@nitrd.gov](mailto:nco@nitrd.gov), Website: <https://www.nitrd.gov>

