



# Research and Education Networks for Humanitarian Purposes

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# Some Observations

- Research and Education institutions are often public entities that have broad missions
- We believe that many humanitarian efforts could benefit from collaborations with in-county/in-region research and education institutions
- This collaboration can be broad-based, from local students helping with projects to getting local technical support



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# More Observations

- Many humanitarian efforts have technology and communications needs
- Many humanitarian efforts are in difficult to reach places that don't have good access to telecommunications services
- Some nations have build special purpose networks that support research and education
- These networks could be leveraged



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# Research and Education Networks

- Some Terminology
  - Research and Education = R&E
  - Research and Education Networks = REN
  - National REN = NREN
- Globally, the REN connectivity is very complex and very difficult to understand
- However, this global network exists and is available for many uses

# REN Characteristics

- High bandwidth networks
  - 10 gig networks in more established regions, 10M to 1 gig in less developed areas
  - These are typically uncongested networks
- Low latency
  - Terrestrial fiber
- Open Networks with no filtering
  - Allows use of many network-based tools



# REN Ecosystem

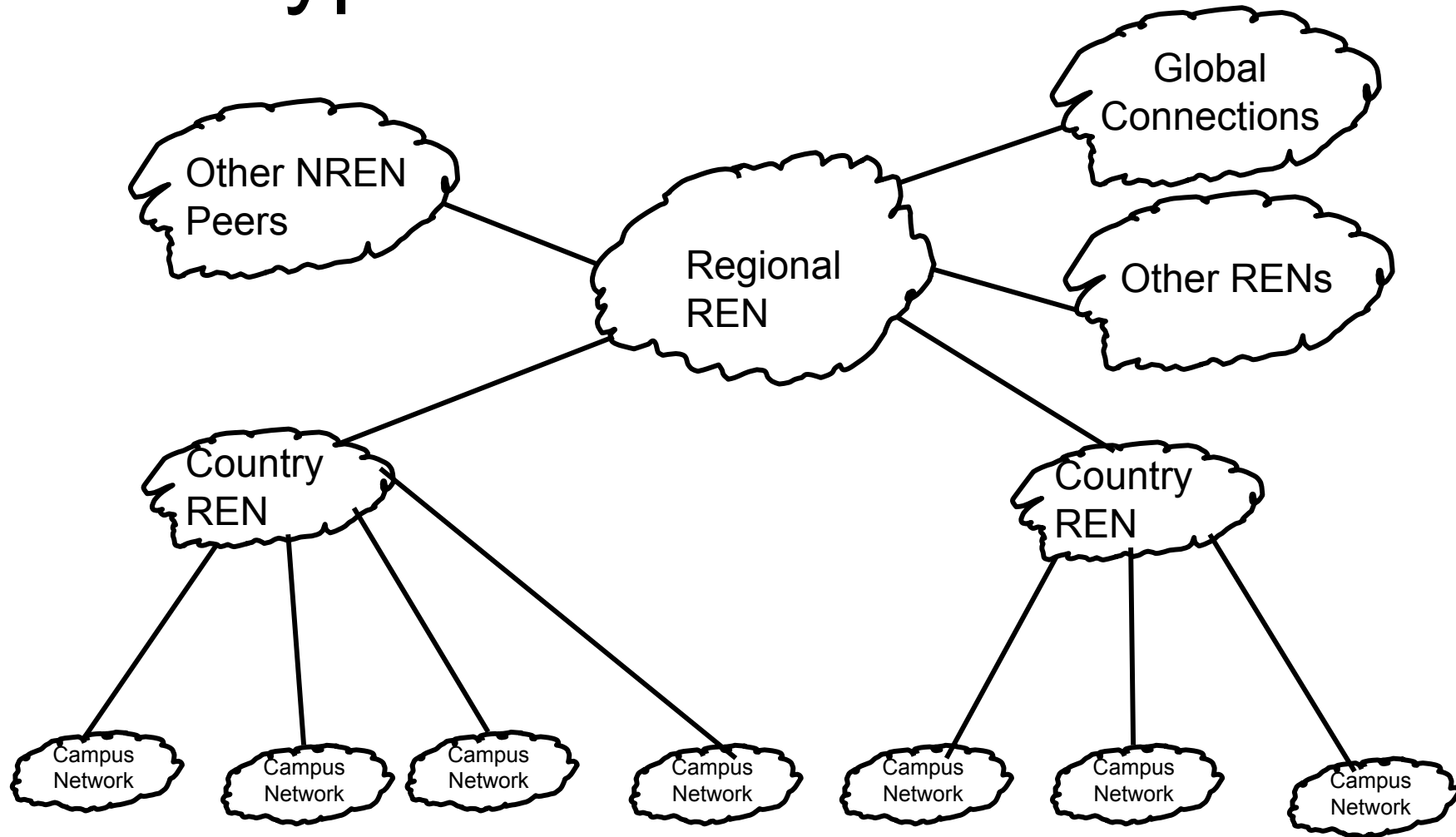
- A layered model
  - Global Connectivity
  - Regional RENs
  - National Research and Education Networks
  - All users are connected at the campus network level
- NGOs could potentially connect just as University campuses connect



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# Typical REN Architecture



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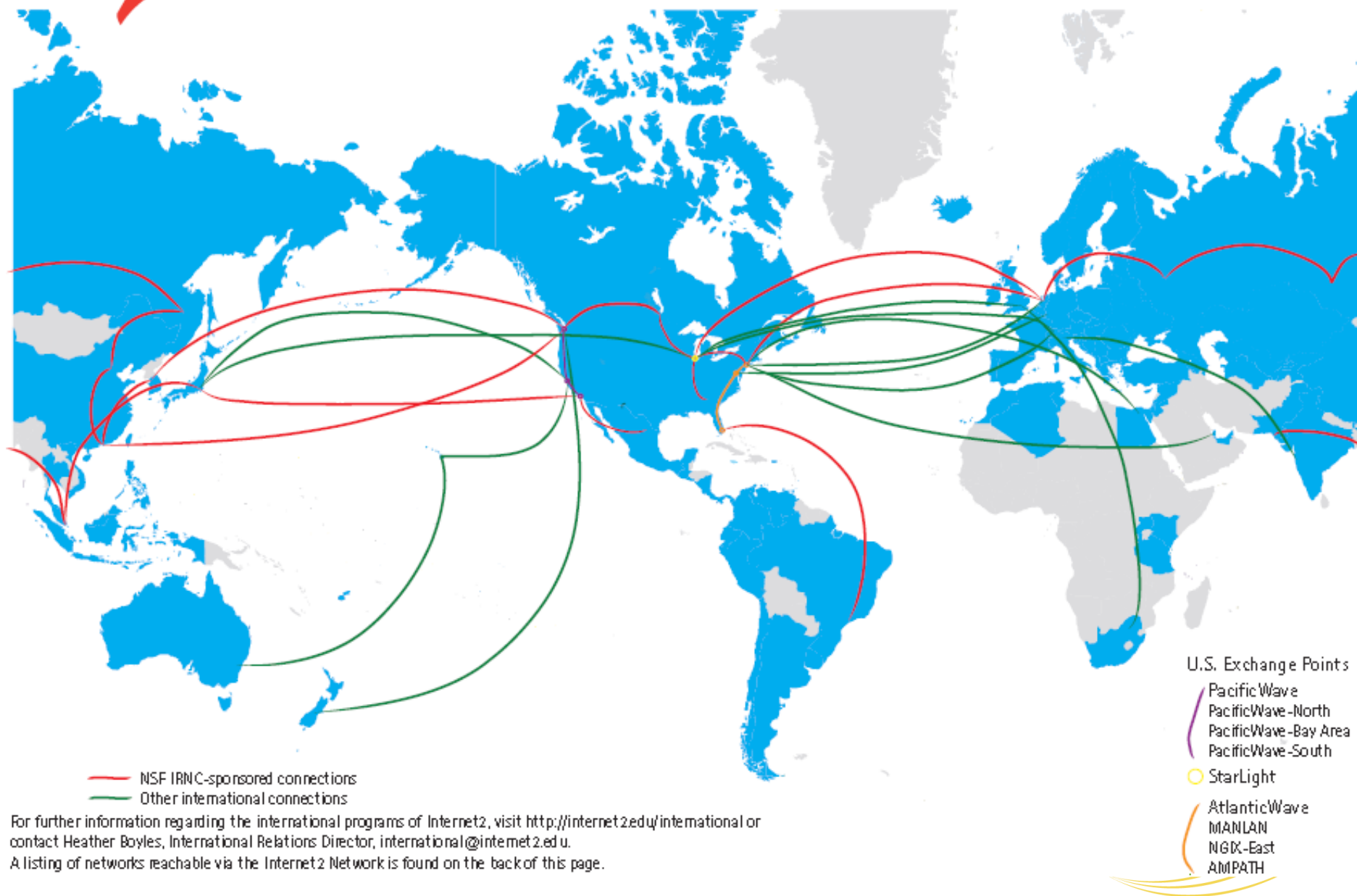


# Global REN Connections

- Connect Regional or National networks together
- Tend to be longer, more expensive circuits
- Not always well coordinated
- Routing policies often inconsistent

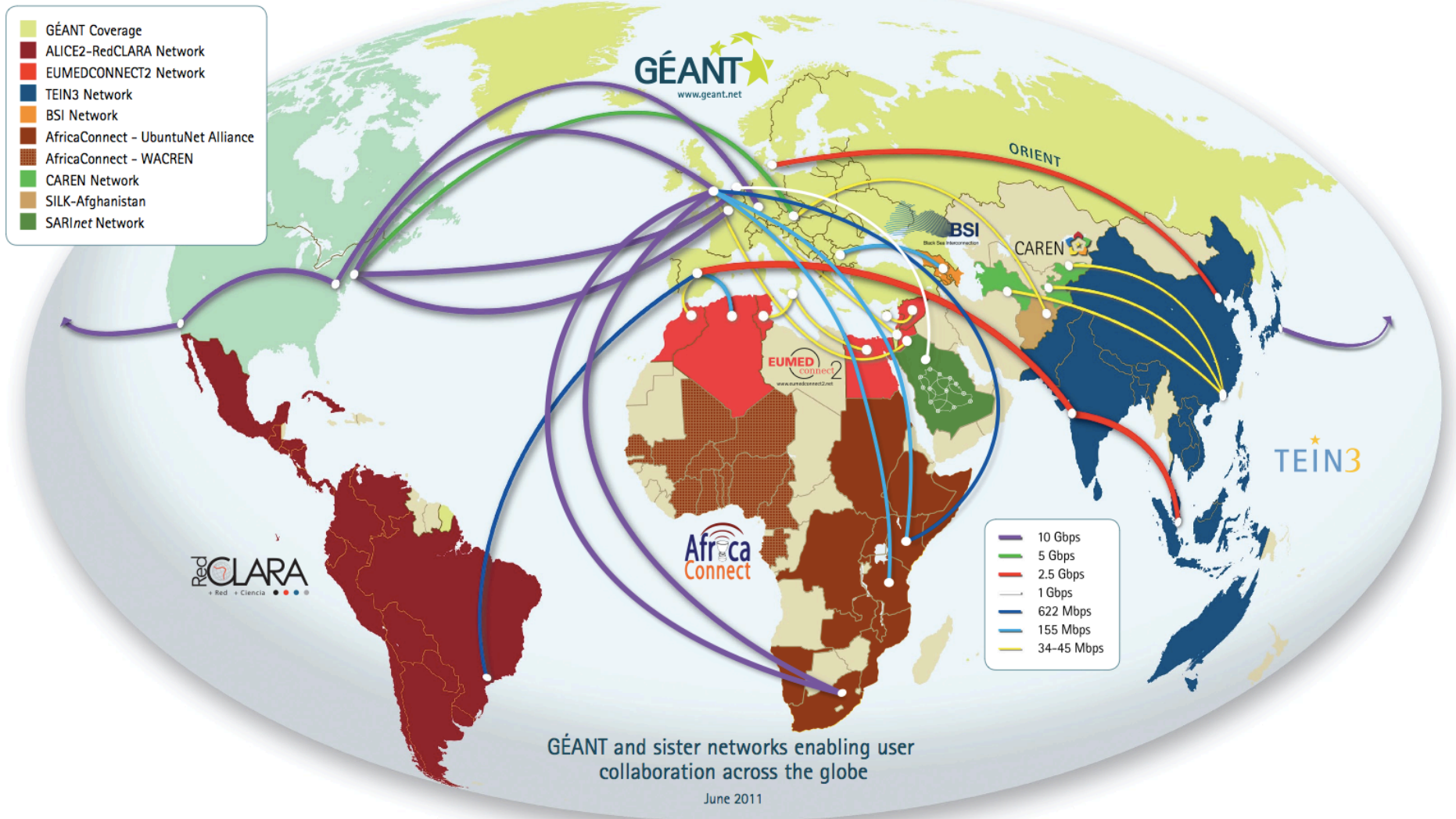






For further information regarding the international programs of Internet2, visit <http://internet2.edu/international> or contact Heather Boyles, International Relations Director, [international@internet2.edu](mailto:international@internet2.edu).  
 A listing of networks reachable via the Internet2 Network is found on the back of this page.

# GÉANT At the Heart of Global Research Networking



## Asia-Pacific Backbone Topology



As of August 30th 2010

# Regional REN Connections

- Connects RENs of individual countries within a geographic region
- Regional RENs of Interest
  - South and Central America
  - South Asia
  - Caribbean
  - Africa
  - Nothing yet in Pacific Islands (with minor exceptions)



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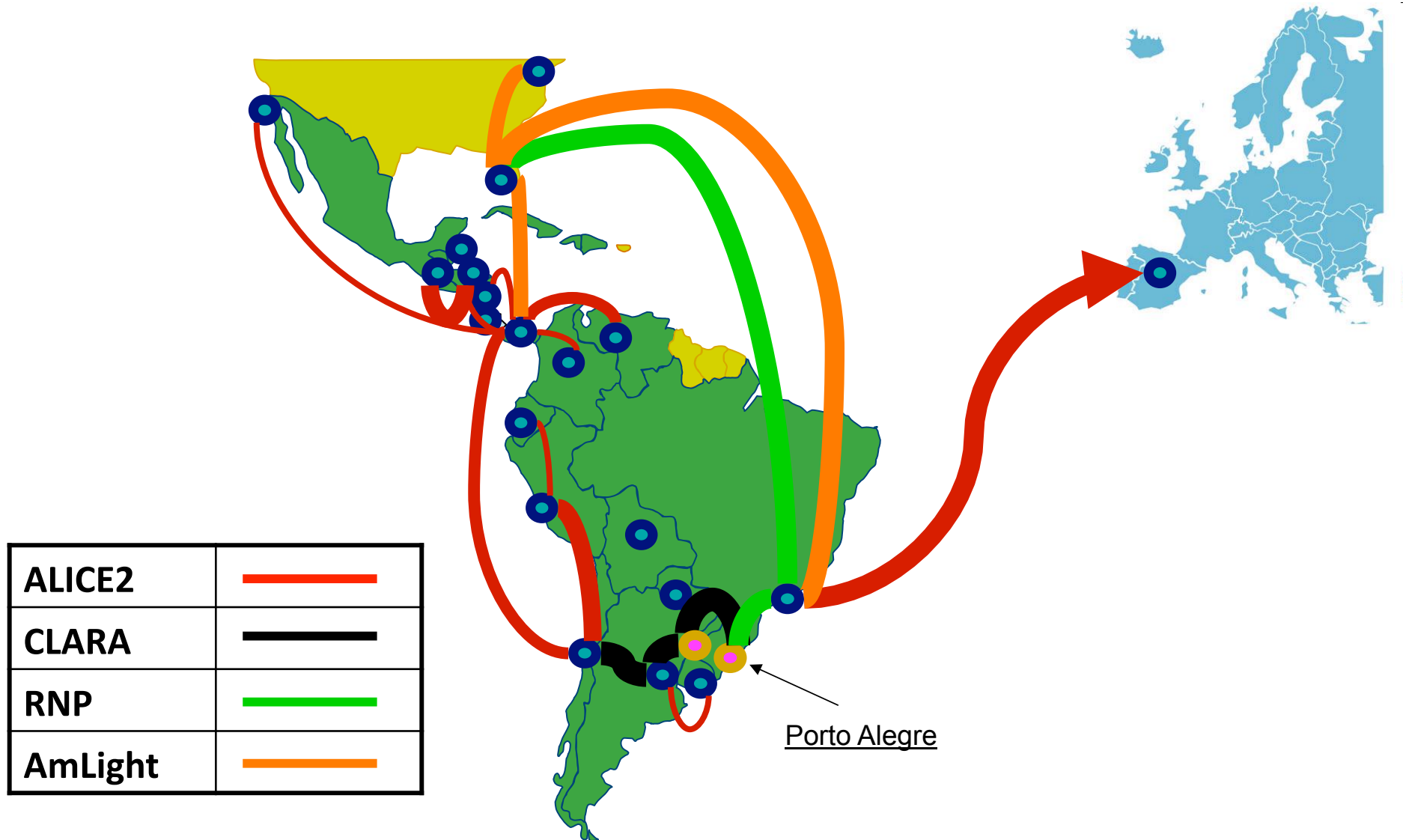
# Regional REN Connections

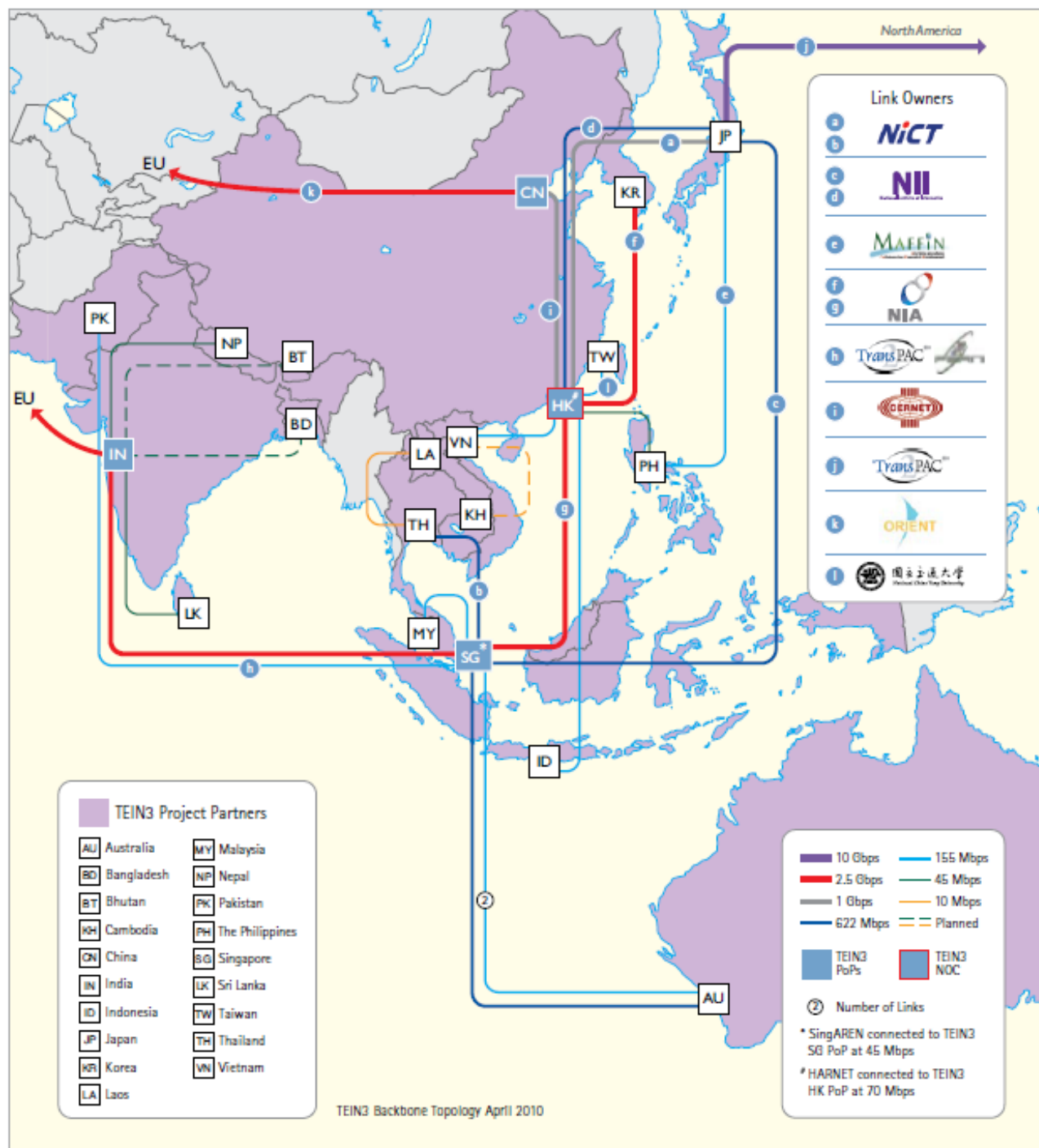
- Most regional networks have funding from European Union
  - EUMedConnect
  - TEIN/TEIN2/TEIN3
  - GEANT
  - ALICE/ALICE2 – RedCLARA
  - AfricaConnect/Ubuntunet





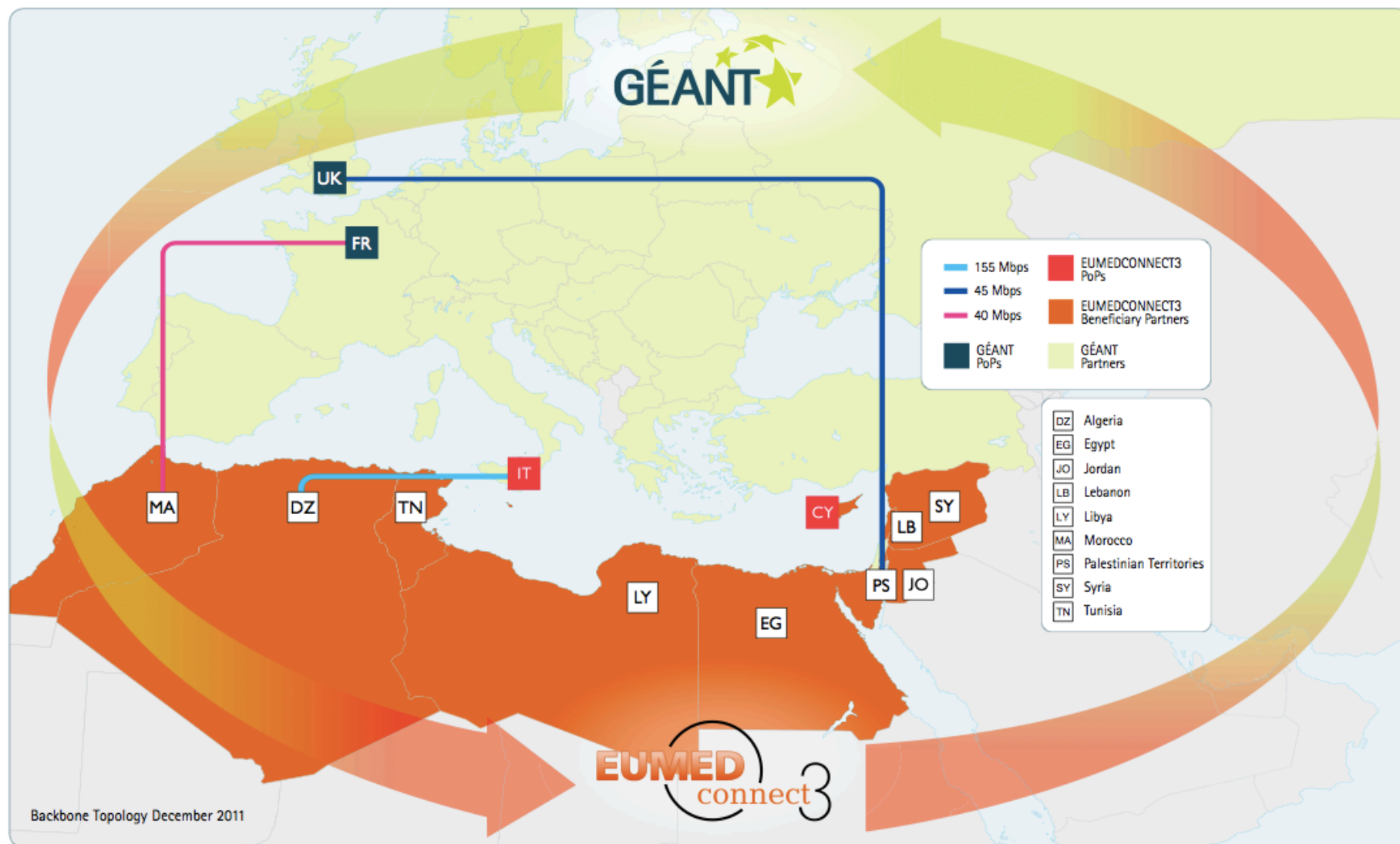
# RedCLARA March 2011







# The Research and Education Network for the Mediterranean

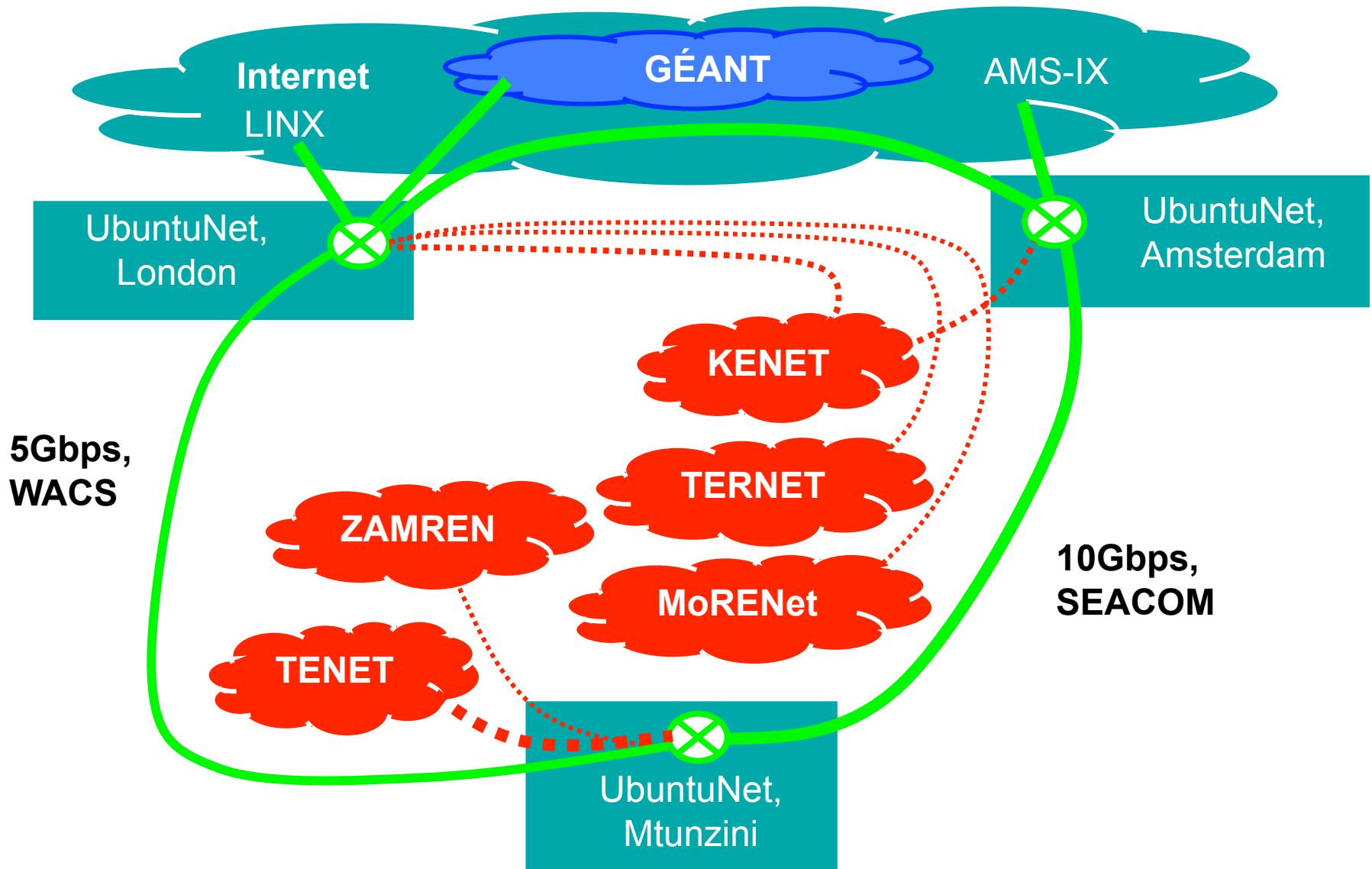


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# UbuntuNet



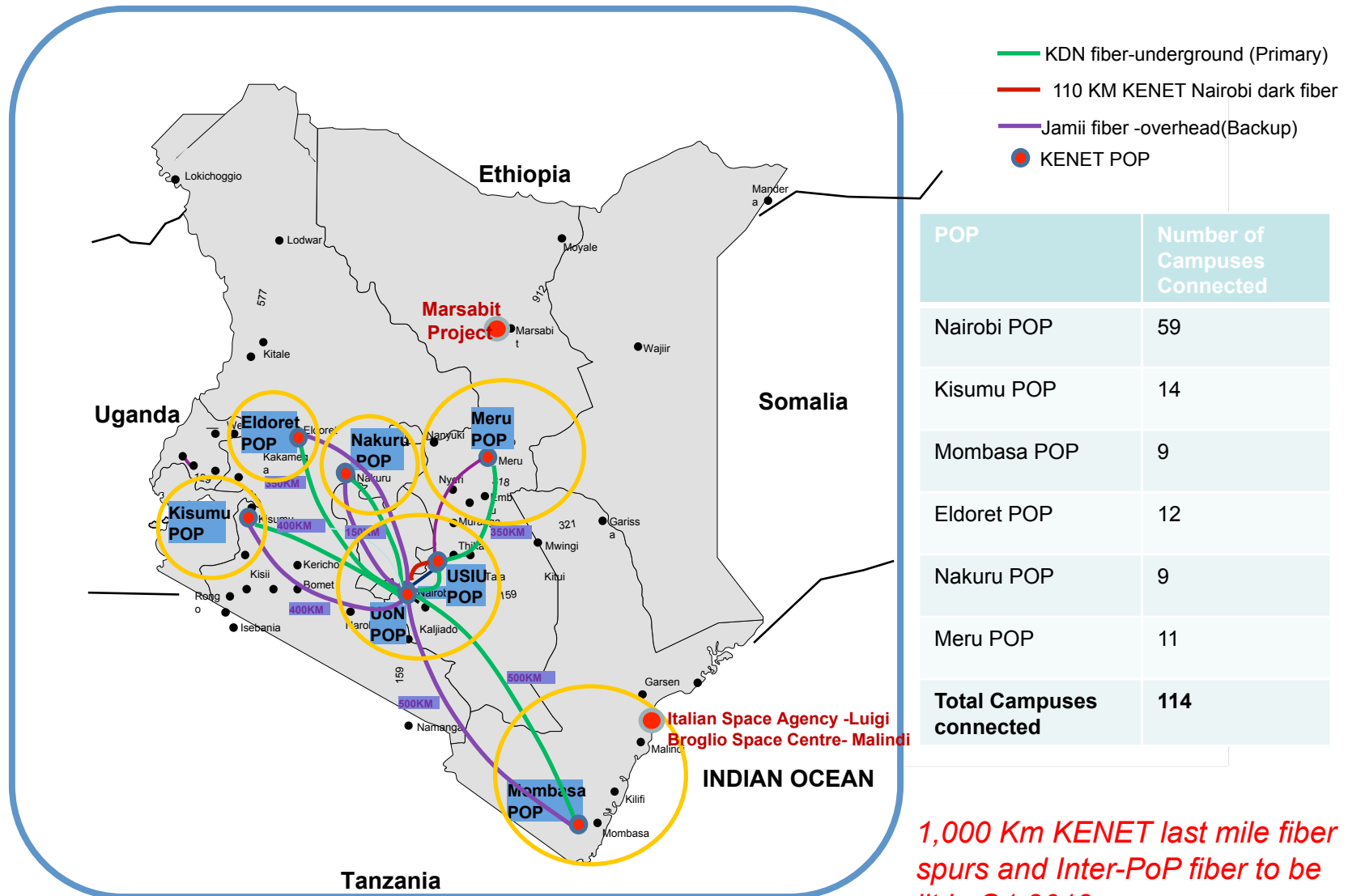
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# National RENs (NRENs)

- National Research and Education networks provide service within a single country
- Often, focused on Universities and government funded research institutes
- As they mature, they frequently expand their focus to provide services to a broader base, including NGOs and other services for the public good

# Kenya NREN: KENET



# Kenya Medical Research Institute

- State funded institute
- 11 centers throughout the country
- Does basic research
- Also, has education outreach and public health mission, primarily through the 11 centers
- In 2011, KENET connected two of the center sites
- One in Nairobi and one in Kisumu (500 km west of Nairobi) with low capacity links
- This link is being used for telemedicine, remote diagnosis, educational, and research purposes



# Kenya Medical Research Institute



July 29<sup>th</sup>, 2011







# Local Services Without Travel



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# Closing Thoughts

- If you are working in a region, make contact with local Universities
- See if there are opportunities for collaboration
- See if you can leverage the NREN (if one exists)



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# Thanks

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