

Global Collaboration
The cornerstone of the Next Generation Global
R&E Infrastructure

APAN 44 Dalian, China - August 2017



NORDUnet - The Nordic Gateway for Research & Education

Five small countries

Three autonomous areas

6 time zones

26 mill people

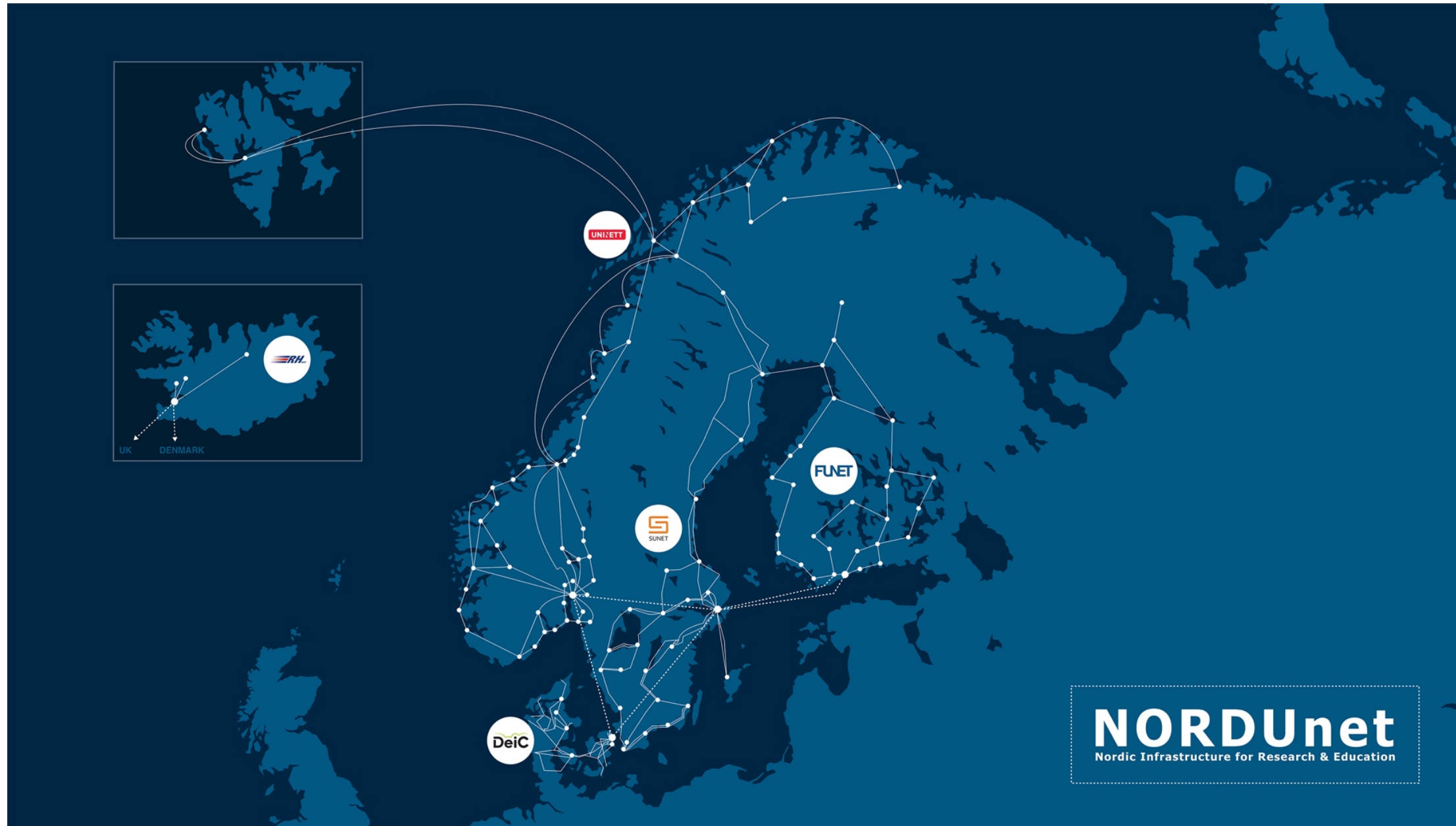
9 official languages

2,5 Mill Secondary & Tertiary Students

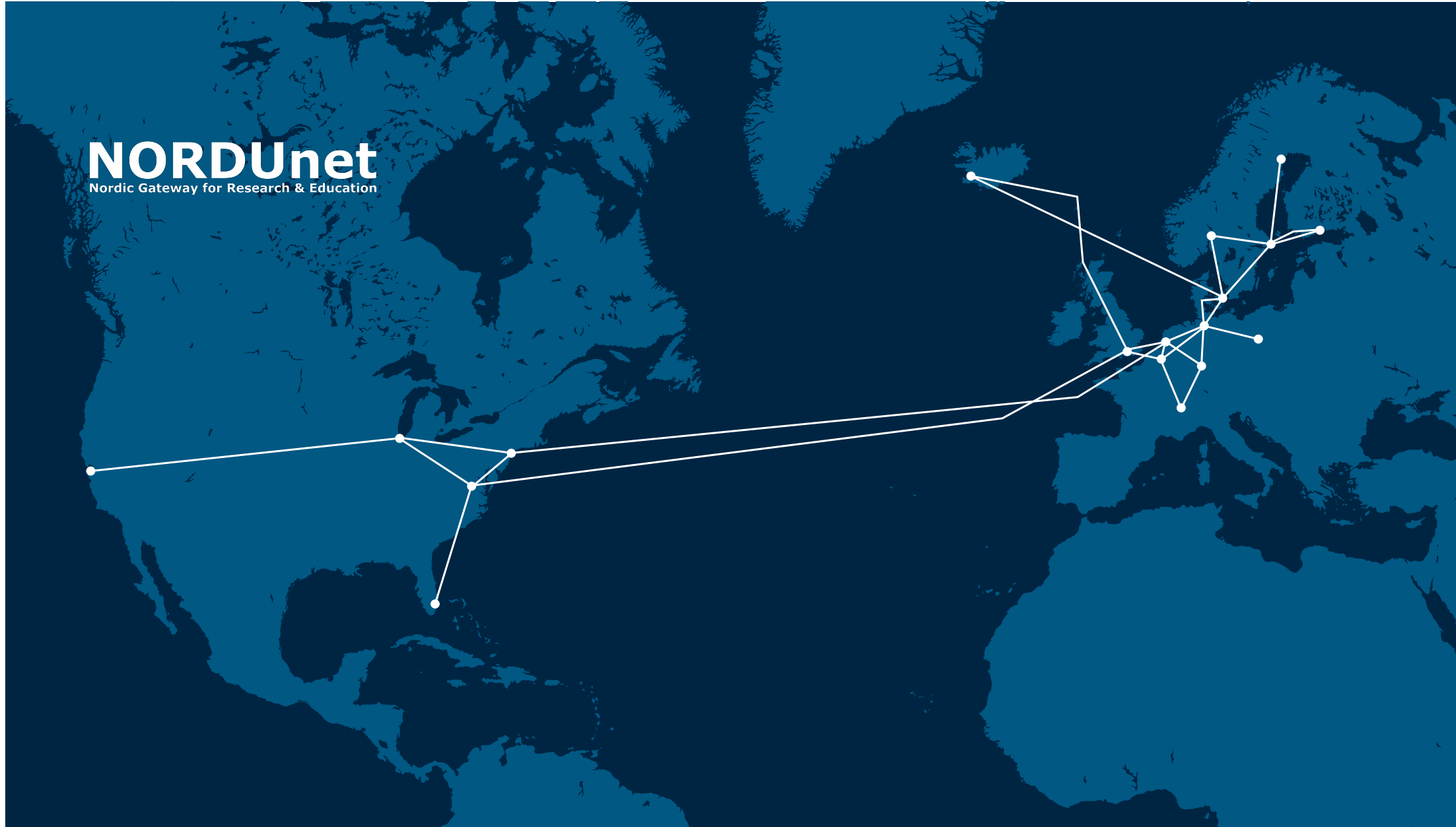
Shared history and culture

Together, the Nordics are the worlds 10th largest economy

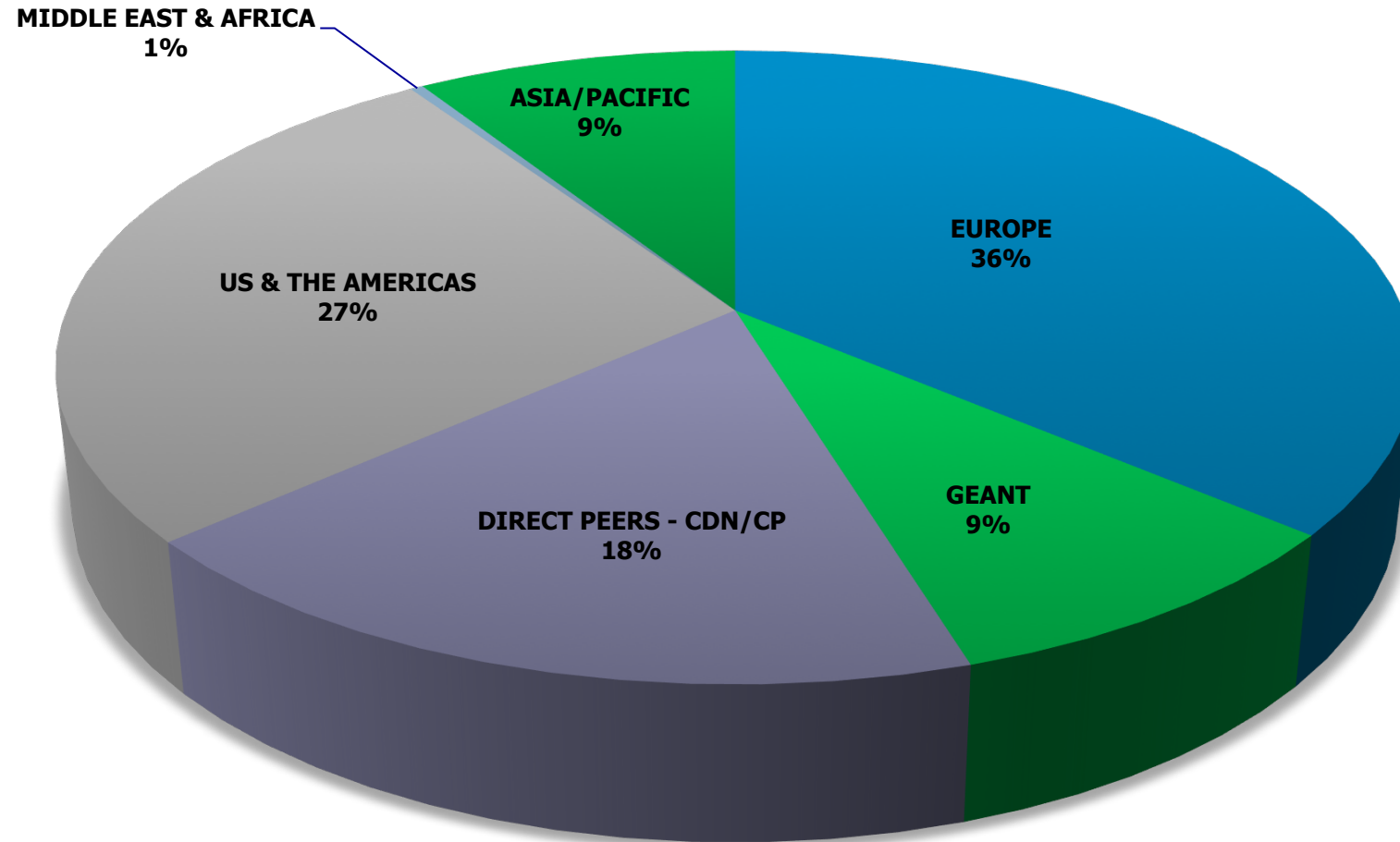
- **We ensure that the Nordic researchers, educators and students have the capability to reach:**
 - any user,
 - any resource,
 - anytime,
 - anywhere.
- **Through NORDUnet the Nordic NRENs speak with a unified voice to influence the European and Global NREN community.**
- **At NORDUnet:**
 - We “do” instead of “talk”.
 - “We say what we do, and do what we say”.



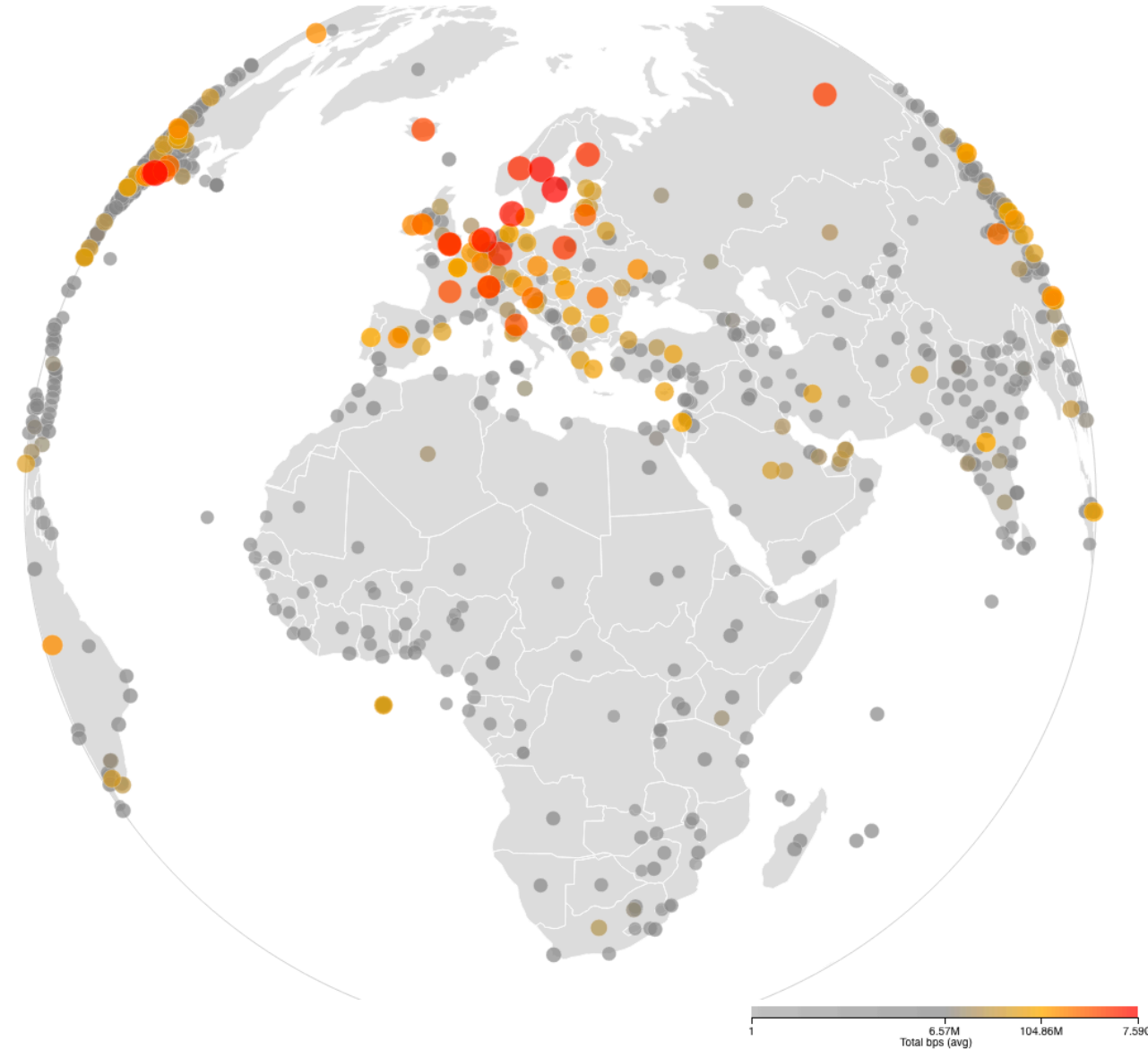
NORDUnet
Nordic Gateway for Research & Education



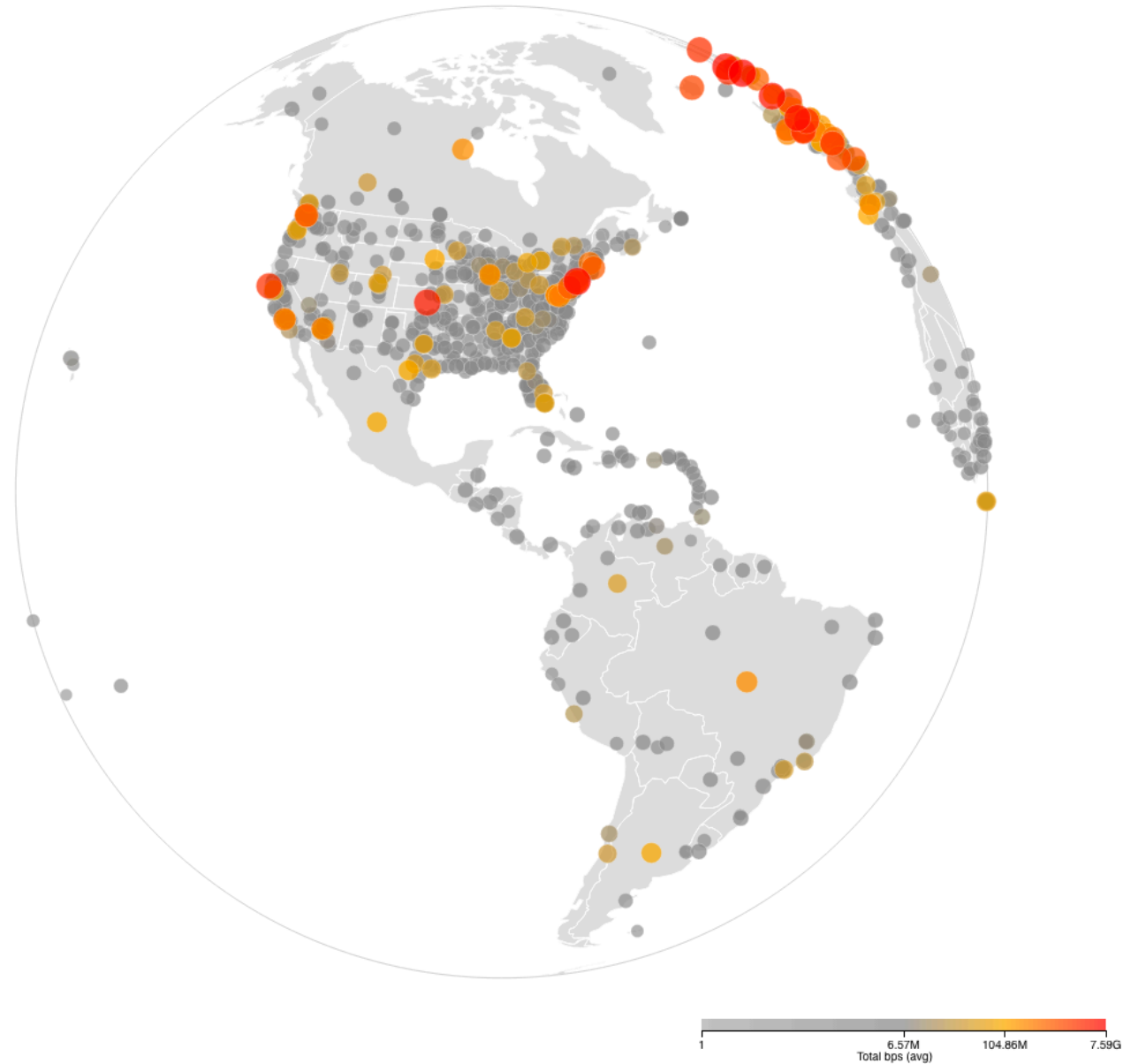
TRAFFIC DESTINATIONS



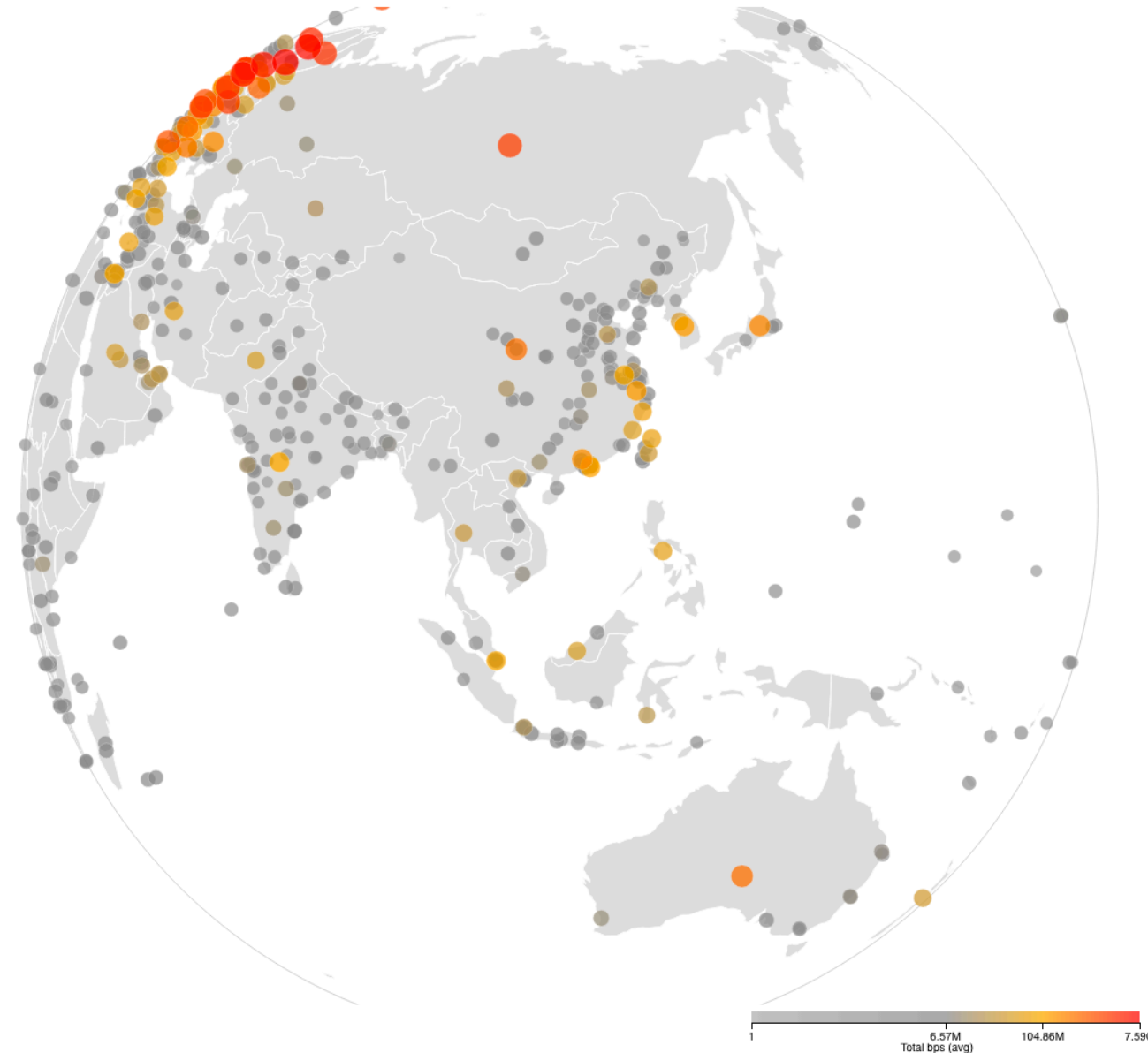
Traffic Destination in Europe, Africa & Middle East

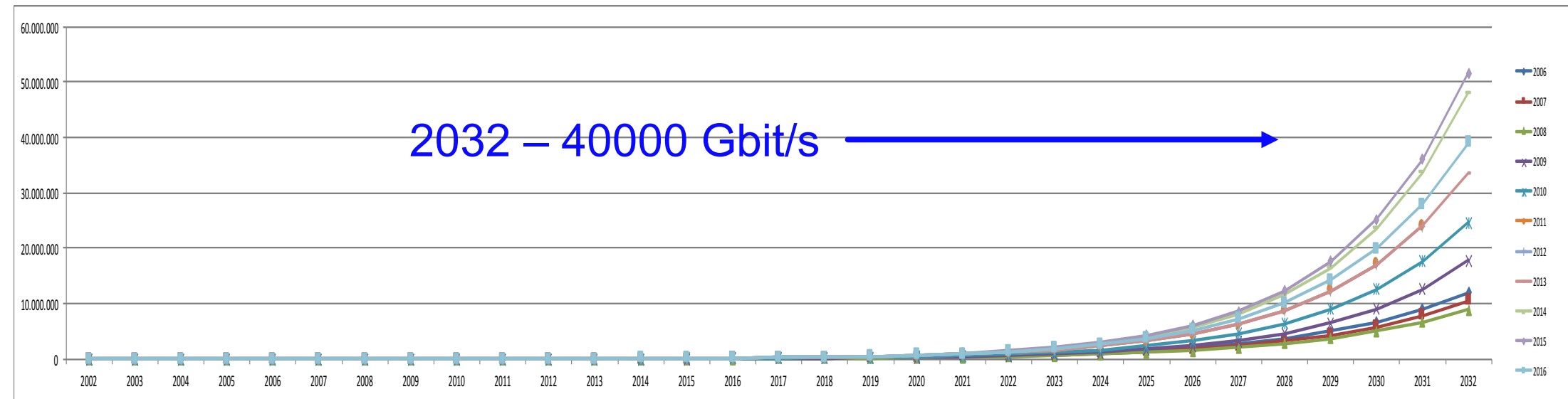
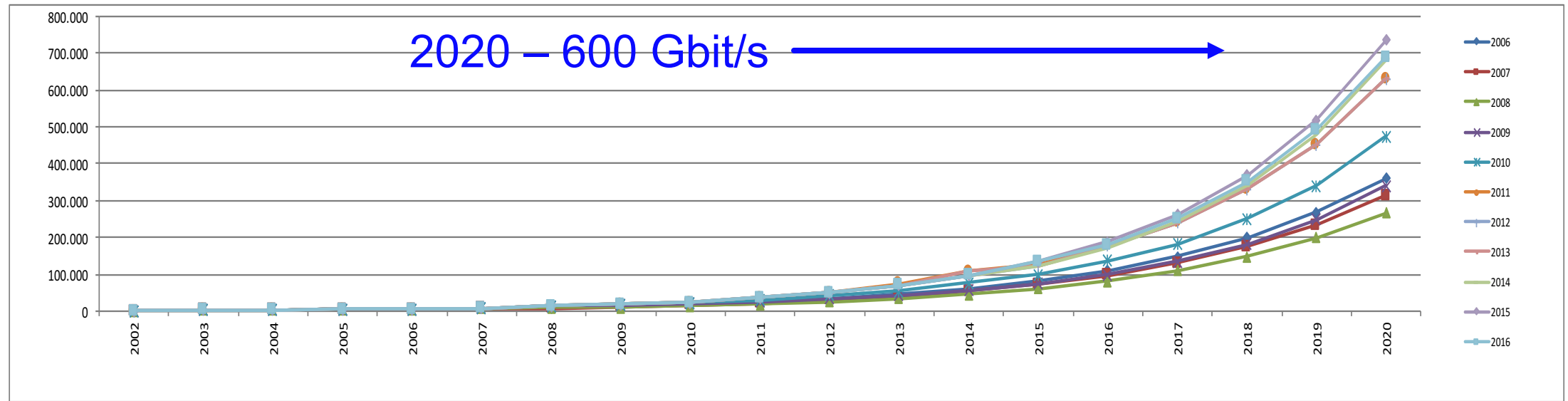


Traffic Destinations in The Americas

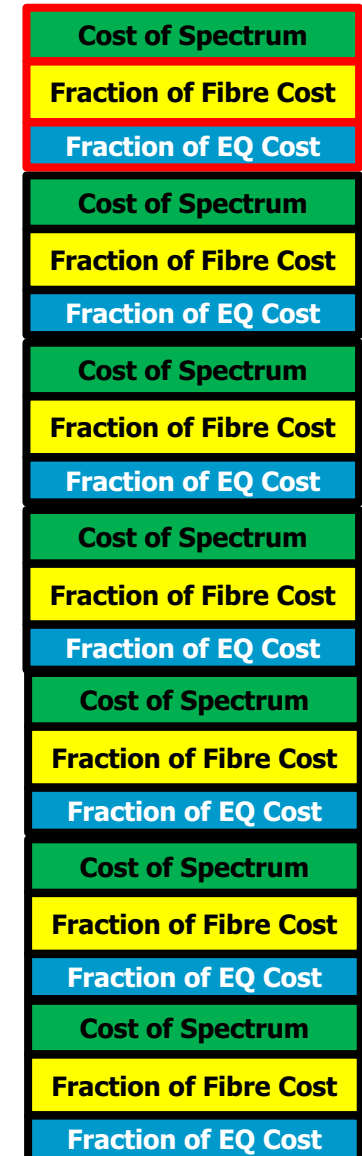
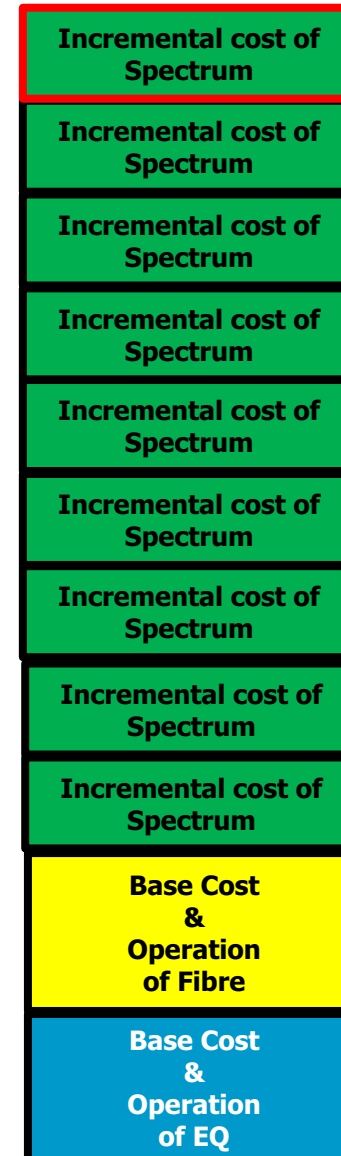


Traffic Destinations in Asia & Pacific





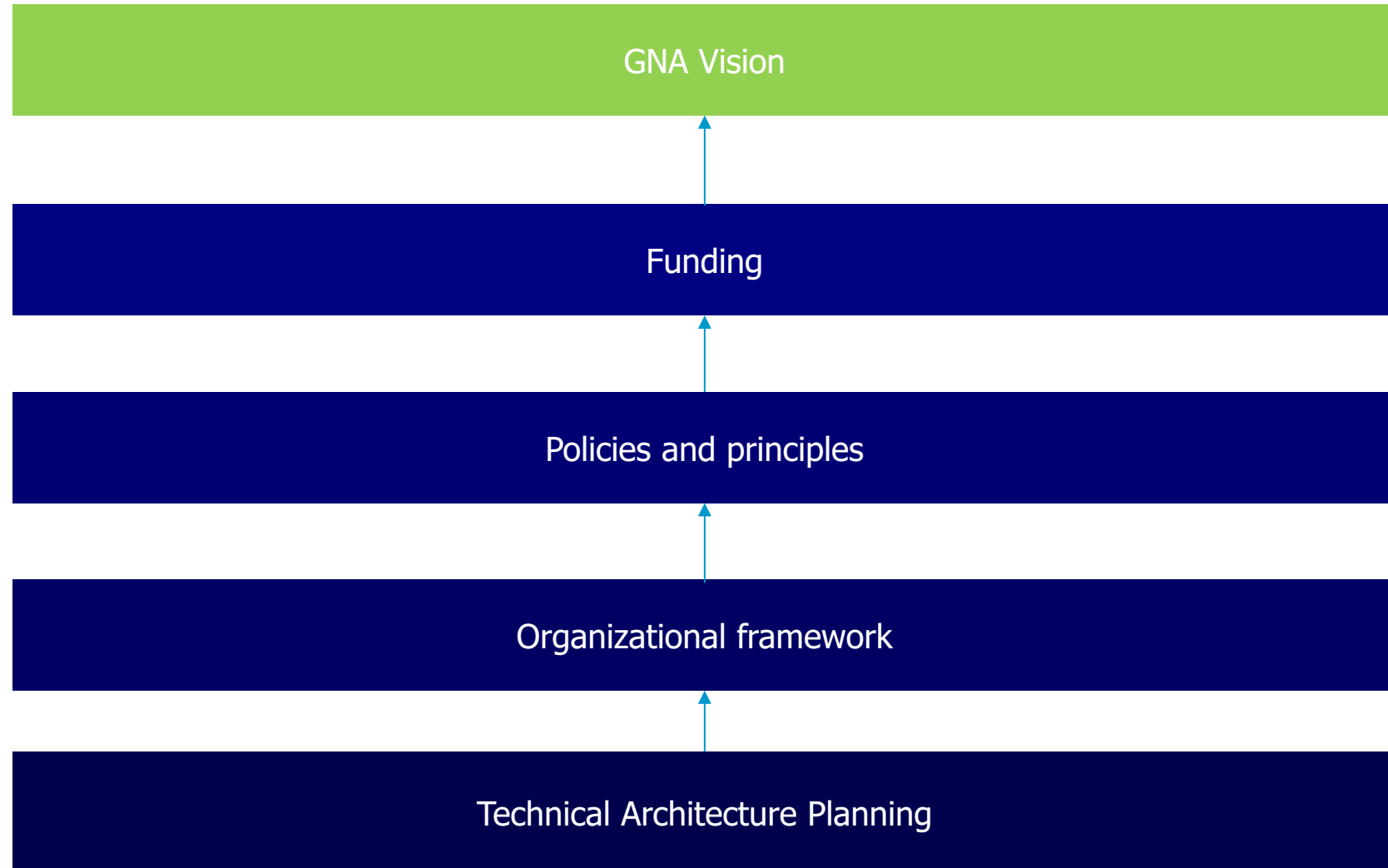
- **Technical Considerations:**
 - Fibre Routing Design
 - Equipment Compatibility
 - Federated Operation
- **Policy Considerations:**
 - Funding Models
 - Who carries Base cost
 - What is the cost of Spectrum
 - NREN Versus Commercial Pricing
 - Organizational Cross subsidy
 - Trust in Partners
 - Operation Models
 - Maturity of Organizations



Global Network Architecture



An inclusive Blueprint for a Global
R&E Network Interconnect



The GNA Vision:

Globally Connecting Science, Research & Education - Assuring that bandwidth and services in support of research and education between continents is equivalent to that within continents.

The GNA Mission:

- Creating an inclusive “architecture” to increase collaboration and resource sharing between the global R&E community maximizing utilization of funds
- Developing an strategic blueprint that R&E Networks can use to align their investments in intercontinental circuits



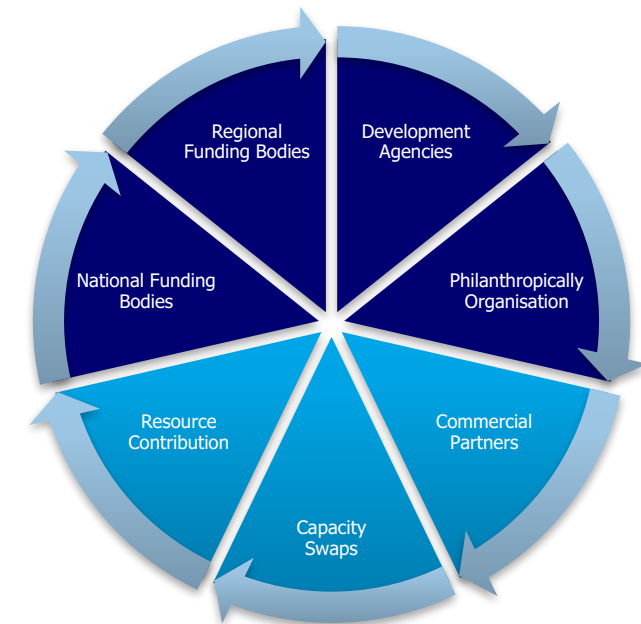
Funding the GNA encompasses:

1. Contributions:

- National and Regional Network contributes capacity/links/GXPs in accordance with the GNA Technical Architecture
- Capacity Swaps
- Commercial Partners

2. Funding for Expanding existing Footprint:

- National and Regional Funding Bodies
- Development Agencies
- Philantropical organisations



- **Participation:**
 - Contribute Resources
 - Contribute to and Comply with GNA Architecture Documents
 - Adhere to Policies & Practices
- **Restrictions**
 - State your limitations – AUP
- **Fair use**
 - Usage and contributions by GNA partners must reflect a fair and equal use principle
 - GNA is a common endeavour where partners contribute the resources in a way that benefits the common good
- **Behaviour**
 - The GNA collaboration is based on trust and open discussion between partners
 - Members work towards the common goal and should strengthen national, regional and international reach by continuous discussion and engagement between all relevant partners



The GNA Framework is an open forum that includes:

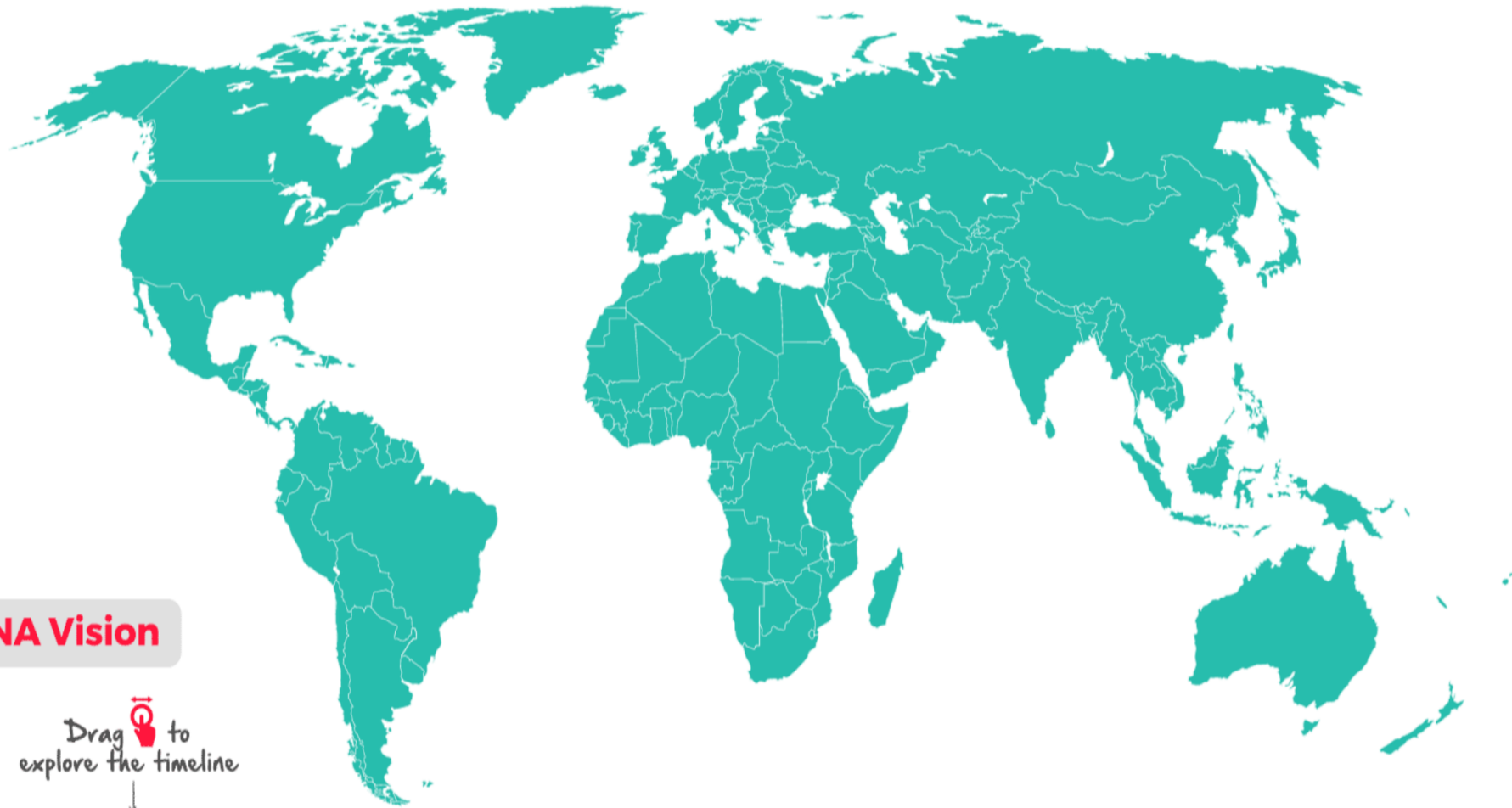
1. GNA Technical Working Group (TWG)
 - An open forum where all GNA interested partners can contribute and to the GNA framework with:
 - Provisioning structure
 - Technical Standards
 - Operational Paradigms
2. GNA Strategy & Policy Working Group (SPWG)
 - An open forum where all GNA interested partners can contribute to the GNA framework within:
 - Strategy & Vision
 - Funding
 - Policies
 - Procedures
 - Behaviour

GNA Framework

Technical

Policy &
Strategy

- The GNA concept has achieved near-universal buy-in
- The 'Proof of Concept' project (ANA) has proved successful and stable
- Consortia are developing (similar to ANA) in other regions
- The number of Global Exchange Points continues to grow
- Formal announcement of the GNA Phase One implementation @ I2 Global Summit 2017.

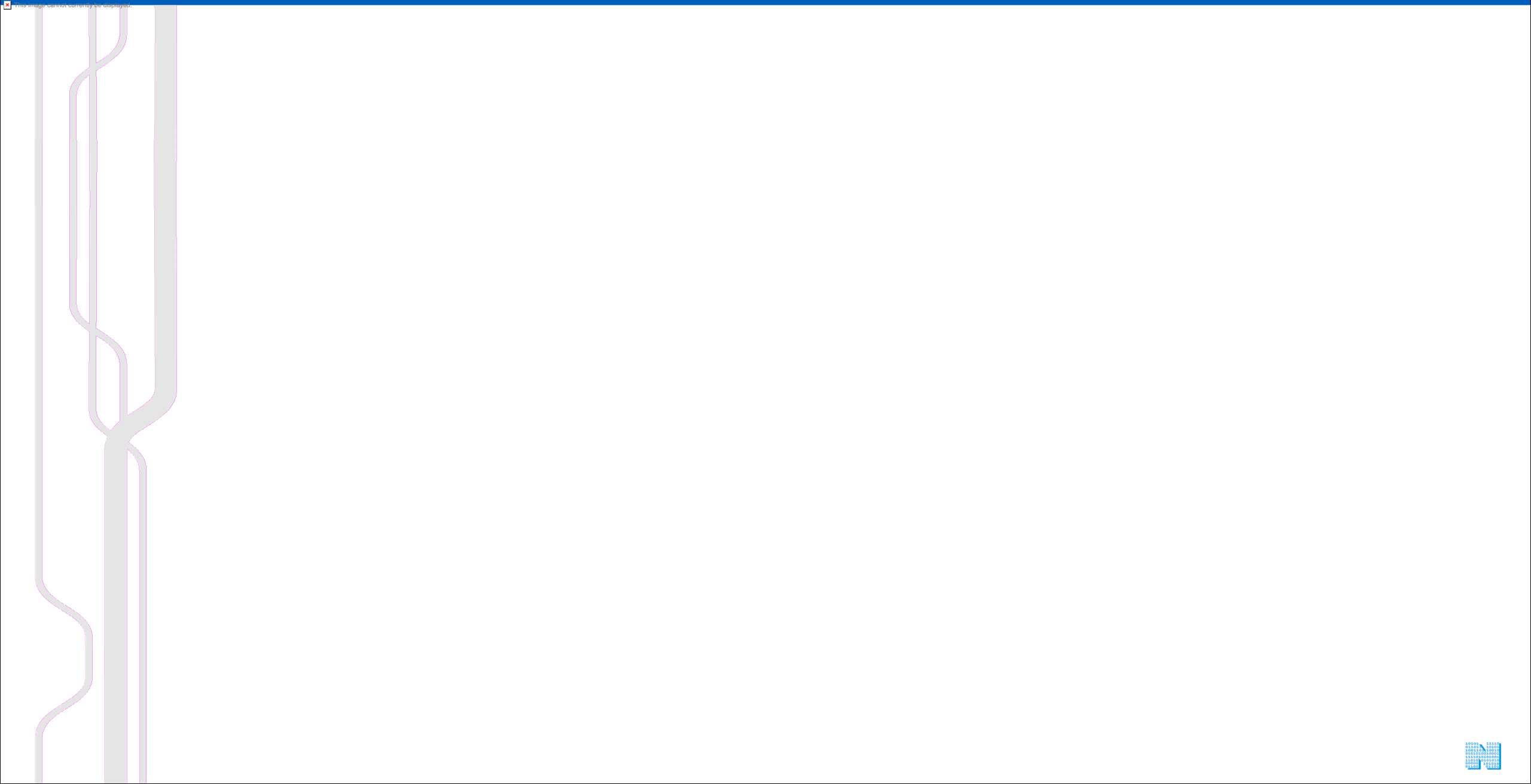


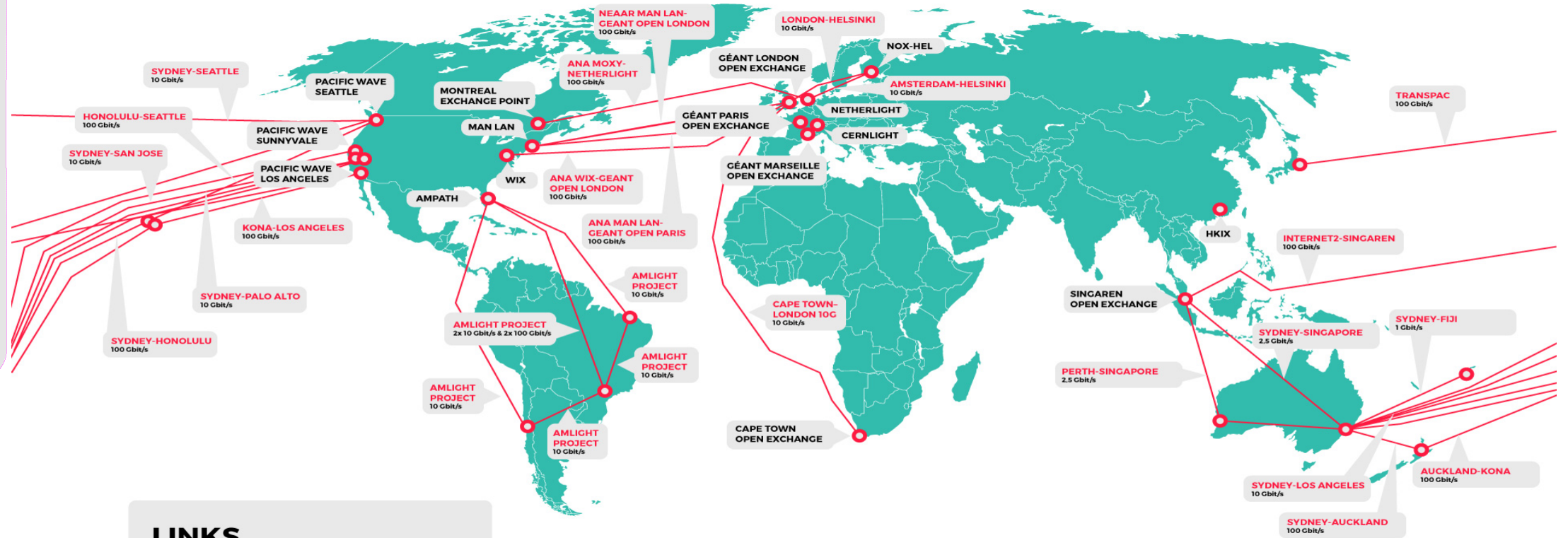
The GNA Vision

Drag  to explore the timeline

TIMELINE







**LINKS
IN THE GNA PHASE I**

APAC
AARNet
SingaREN

EMEA:
GÉANT
NORDUnet
SANReN (and TENET)
SURFnet

AMERICAS
Internet2
ESNet
CENIC/PacWave
AMPATH/AmLight
NEAAR
TransPac



In the field

WITH RESEARCH & EDUCATION NETWORKS

ALL STORIES

CATEGORIES ▾

R&E NETWORKS ▾

REGIONS ▾

SORT BY DATE ▾



How this radio astronomer looks back in time

  RADIO ASTRONOMY

Steven Tingay is passionate about designing and building radio telescopes in outback Western Australia and using them to look at the first stars and galaxies.

The first Chilean Virtual Observatory fires up

  RADIO ASTRONOMY

The first Chilean Virtual Observatory (ChiVO) (launched April 2015) is an astro-informatic platform for the administration and analysis of massive data coming from the observatories built across the country. Its implementation will provide advanced computing tools and research algorithms to the Chilean astronomical community. "This project is a major contribution for Chilean astronomers because besides being an excellent tool for exploring the huge quantity of astronomical data that will be generated in our country in the coming years, it opens new opportunities of interdisciplinary research." – Diego Mardones, an astronomer at Universidad de Chile-



Improving the resilience of Raki's crop

  FOOD SECURITY

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[READ MORE »](#)



Leading the way with virtual language and cultural exchanges



Exploring the universe with the world's largest telescope

  RADIO ASTRONOMY

The Square Kilometre Array (SKA) project is an international effort to build the world's largest radio telescope, with a square kilometre (one million square metres) of collecting area. The scale of the SKA represents a huge leap forward in engineering, telescope design and research & development towards building and delivering a unique instrument.

[READ MORE »](#)



Joining forces to combat dengue fever

  HEALTH

"This project is a major contribution for Chilean astronomers because besides being an excellent tool for exploring the huge quantity of astronomical data that will be generated in our country in the coming years, it opens new opportunities of interdisciplinary research." – Diego Mardones, an astronomer at Universidad de Chile-



Leading the way with virtual language and cultural exchanges

ERNET, AARNET EDUCATION

First graders at St Mary's School in Armidale, Australia meet every fortnight with students at St Mary's School in New Delhi India to share information about their daily lives...

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Joining forces to combat dengue fever

SINGAREN HEALTH

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[READ MORE »](#)



Treating and stopping the spread of Ebola virus.

UBUNTUNET HEALTH

Dr Leslie Lobel (left) oversees drawing of blood from an Ebola survivor for his research. Work being done globally is of unprecedented scope and underscores just how much the community of cooperation fostered by R&E networking does to leverage all the resources available...

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What does climate data modeling reveal?

ESNET SURFNET JANET INTERNET2 GEANT CANARIE CLIMATE SCIENCE

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Beaming the world into the classroom

UBUNTUNET EDUCATION

Learning just got a whole lot more interesting for Fred and his friends when his school connected to the UbuntuNet infrastructure and laptops and tablets were handed out. The students gave Mathletics and Code Academy a test drive and are eager to complete what they started in tomorrow's class.



Our first virtual excursion



In the field
WITH RESEARCH & EDUCATION NETWORKS

<http://www.inthefieldstories.net>

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