

NORDUnet activities and plans

LHCOPN/ONE Meeting

Taipei, TW

March 2016

About NORDUnet

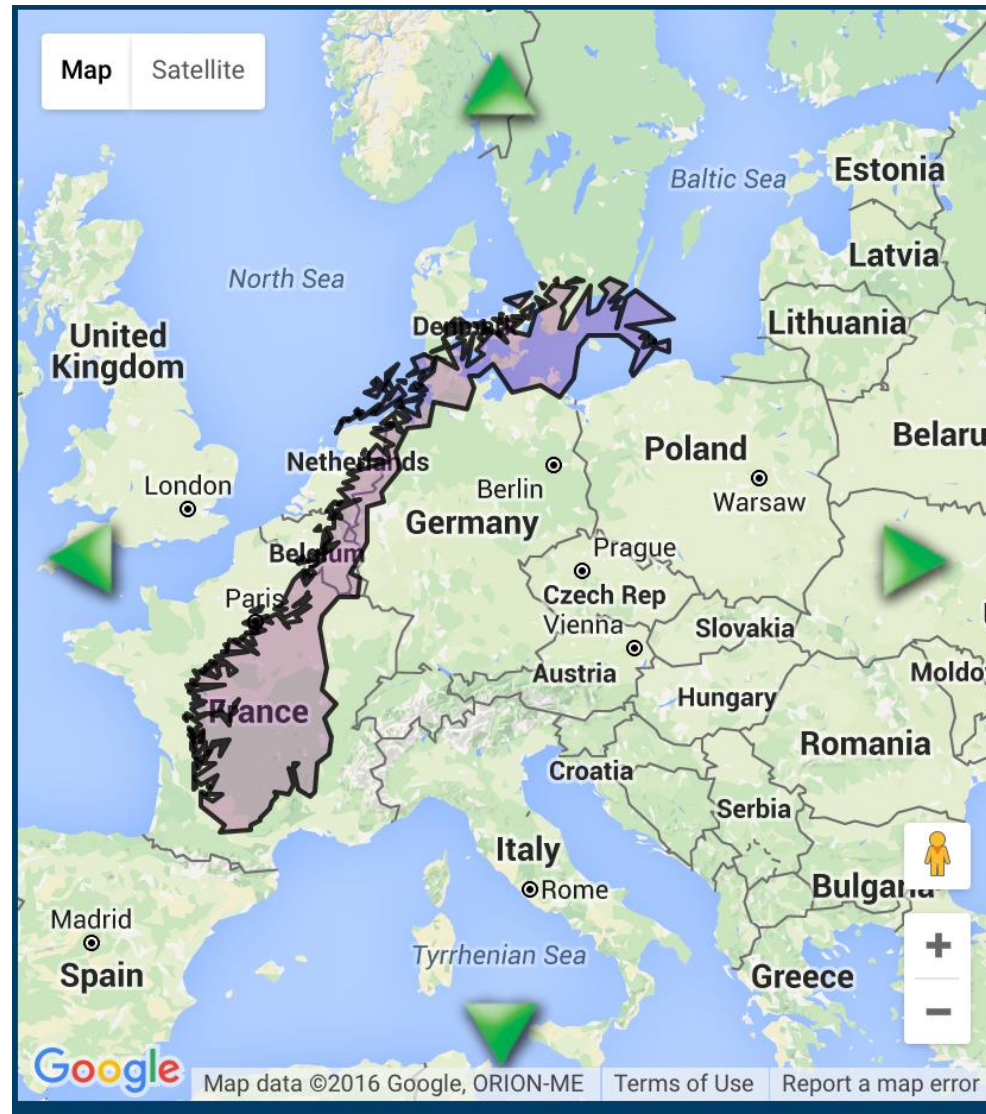


Five small countries
Three autonomous areas
6 time zones
26 mill people
9 official languages

2,5 Mill Secondary & Tertiary Students

Shared history and culture

Together, the Nordics are the worlds 10th largest economy



The Nordic Gateway for Research & Education

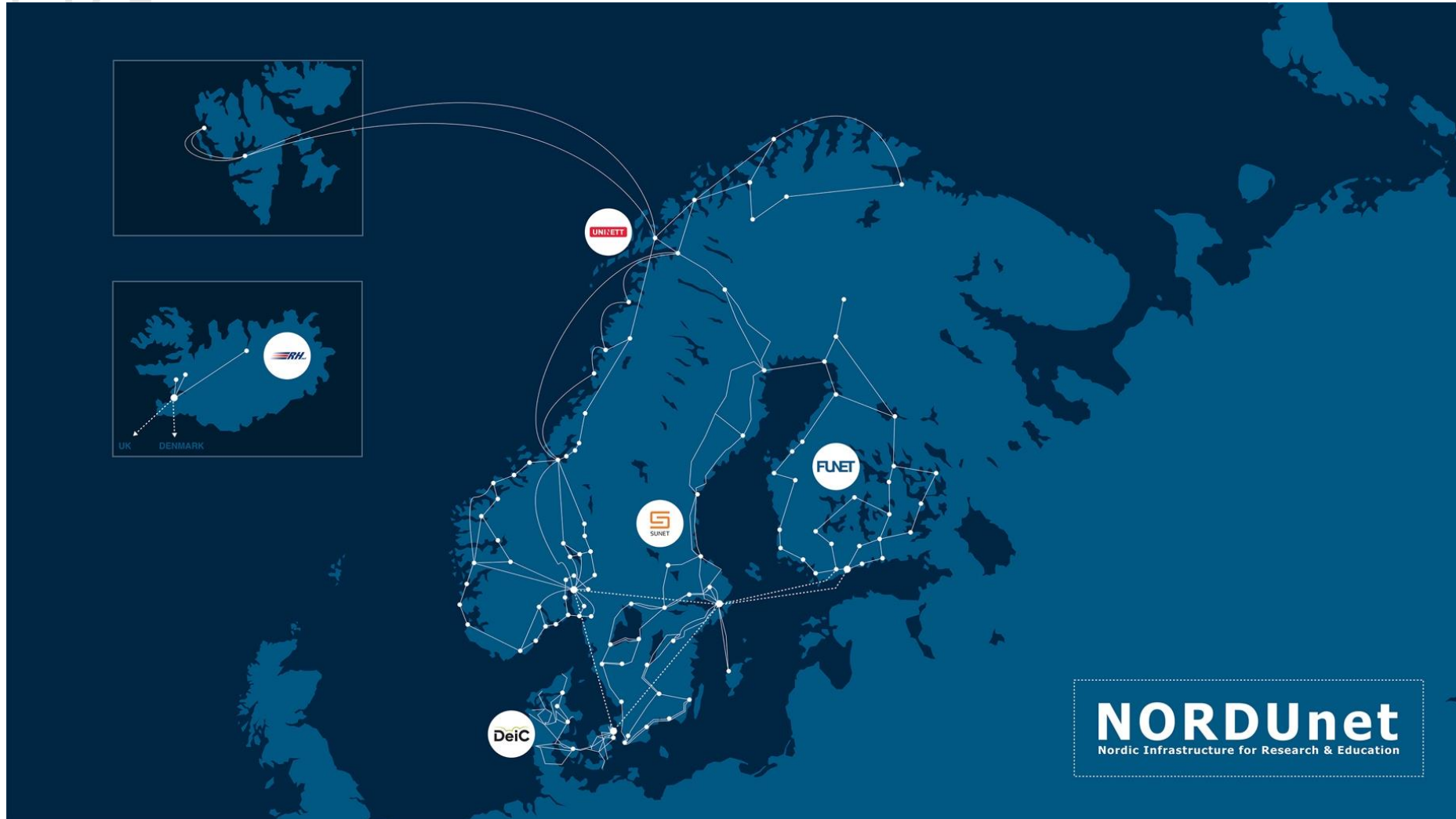
NORDUnet is the preferred Nordic collaboration platform and coordinator towards the evolving global Research & Education communities.

- NORDUnet and the Nordic NRENs are an integrated part of Global Research and Education infrastructures and communities.
- NORDUnet delivers a best-in-class network integrating the National Research and Education Networks (NRENs) of the five Nordic countries into the global research networks and the Internet.

We ensure that the Nordic researchers, educators and students have the capability to reach any user, any resource, anytime, anywhere.

- NORDUnet also delivers best-in-class services focused on the needs of the users through the Nordic NRENs.
- NORDUnet provides a collaboration platform for the Nordic NRENs.
- NORDUnet makes decisions based on input from the Nordic stakeholders and through carefully monitoring of Nordic, European and global trends and activities we ensure the best possible use of resources

Through NORDUnet the Nordic NRENs speak with a unified voice to influence the European and Global NREN community.



NORDUnet
Nordic Infrastructure for Research & Education



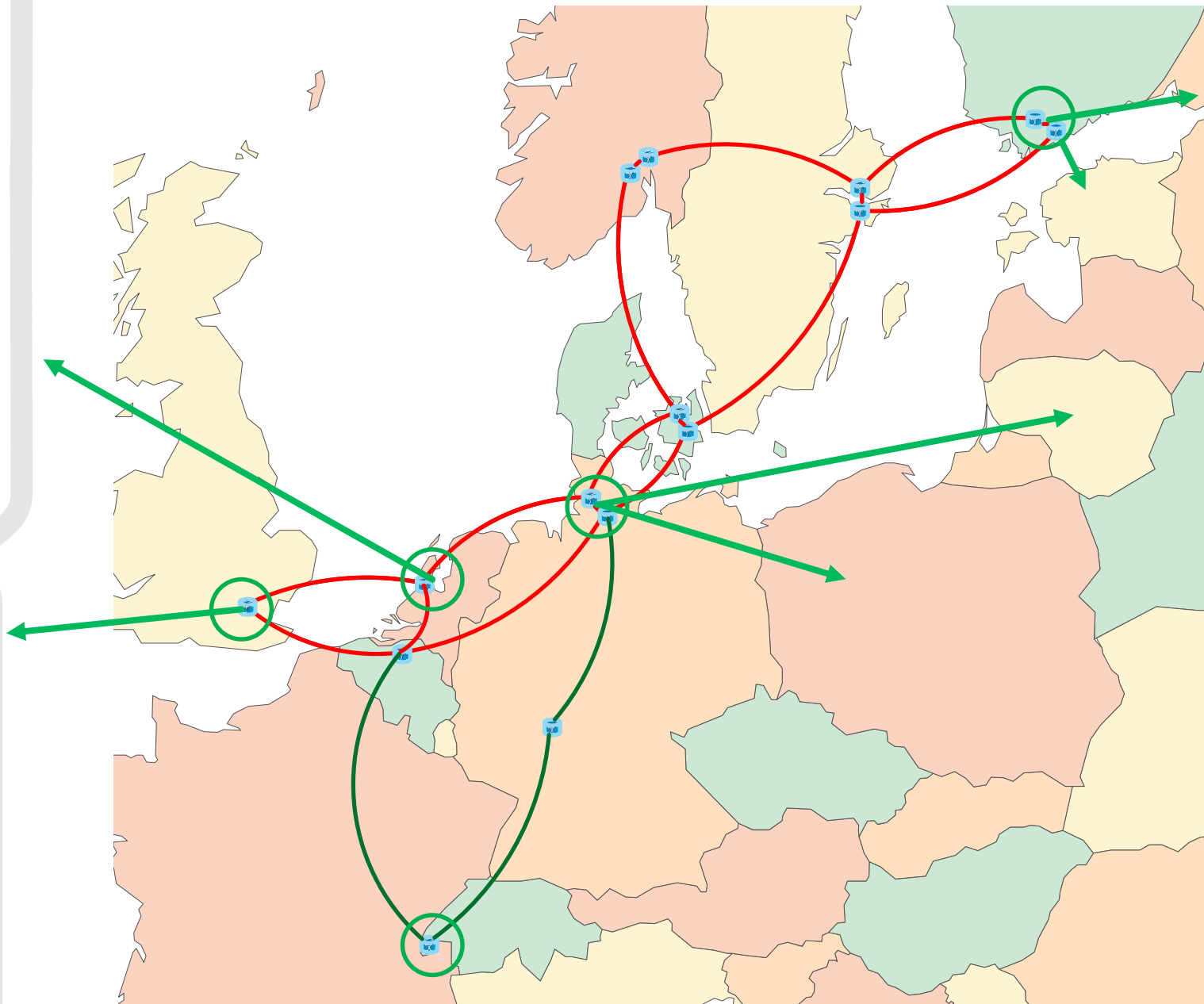
- Between 74 and 81 degrees N
- 2527 Human citizens
- 3000+ Polar Bear citizens
- Main activities:
 - Research
 - Coal Mining
 - Tourism



UNINETT took the lead to build a resilient fiber connection

<https://www.youtube.com/watch?v=pZpo6zepZWw>





Challenges ahead

NREN Challenges

- Network Requirement are increasing:
 - Impacted by location of innovation,
 - Cloud computing
 - Online learning.
- Funding for core services stagnating or diminishing.
- Request for ICT Services in addition to network connectivity.
- Definition of Research and Educational network are changing.

Evolutionary Pressure:

NRENs have to evolve from a research network connectivity provider to encompass:

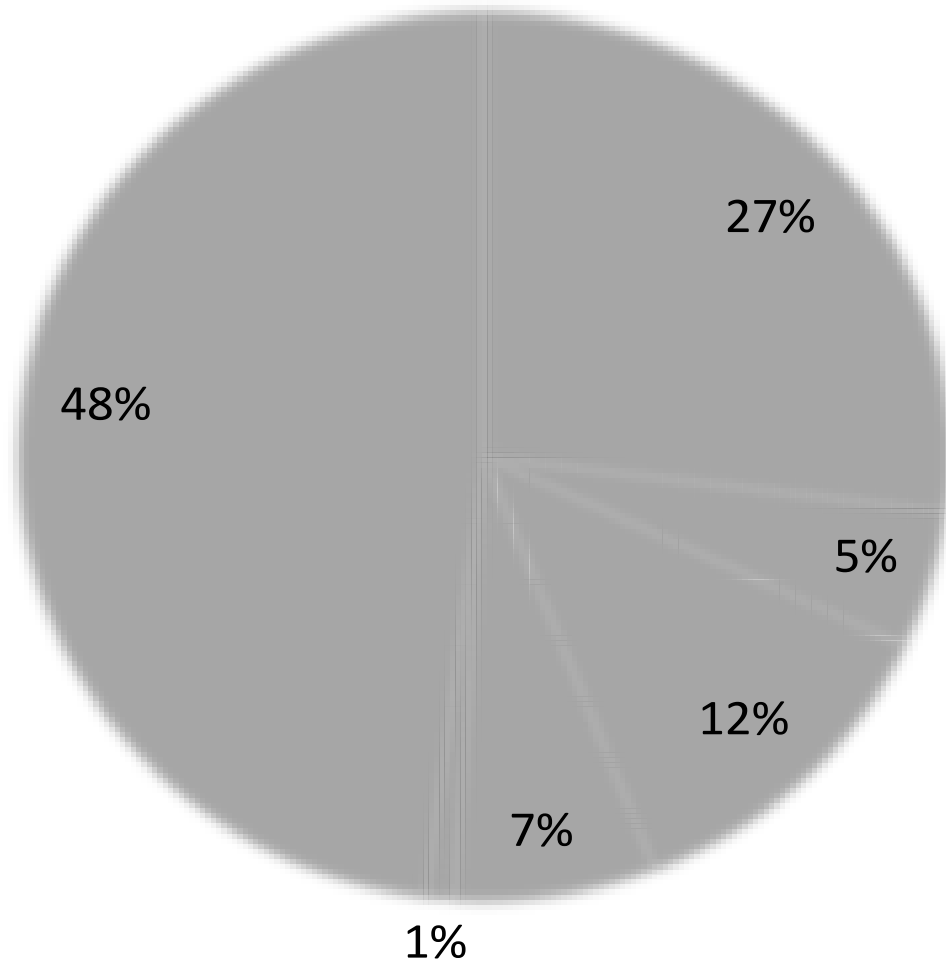
- Carrier Class Connectivity infrastructure
- Media Services
- Collaboration Services
- ICT System Services
- ICT and Cloud System Integration
- Identity federation integration

NORDUnet Service Matrix November 2015

Nordic Gateway for Research & Education

NORDUnet Service Matrix	Research Network Connectivity	Global IP transit / Peering	OPN Lambda	Community Peering	Cross Border Fibre Coordination	Central NOC	End User NOC	GN4 Project Coordination	Project Hosting & Coordination	Software Development	AAI Community Services	Equipment Hosting	Virtual Server Hosting	Adobe Connect	Kaltura	VCONF MCU Service	WEB based Vconf Service	MCU Gateway Services	EU project Coordination	Spam Filtering Service	Community Communication	Commercial Cloud Services	Procurement Service	Conference Video Production	Conference Streaming	Conference WIFI	Box Proxy	HSM	CERT
	2005																												
FORSKNINGSNETTET																													
FUNET																													
Rhnet																													
SUNET																													
UNINETT																													
WAYF																													
NeIC																													
GEANT 3																													
RUNNET																													
NCM																													
NORDUnet																													
2015																													
DeIC (Forskingsnett)																													
FUNET																													
Rhnet																													
SUNET																													
UNINETT																													
WAYF																													
NeIC																													
GEANT Project																													
RUNNET																													
NCM																													
GEANT Ass,																													
Surfnet																													
Pionier																													
OTHER NREN																													
Other Users																													
NORDUnet																													





CDN's

GÉANT

US?

APAC?

Middle-east? + Africa?

EUROPE?

- University to University ?
- University to Internet ?
- University to Google / Youtube ?
- University to Cloud Providers ?
- Cloud Provider to Cloud Provider ?
- What About Dormitories ?
- Where do ideas and innovation flourish ?

We made it simple - Our task is to ensure :

That researchers, educators and students have the capability to reach Any user, Any resource, Anytime, Anywhere.

- Cloud Solutions
- MOOCs
- Online Course Material (Video)
- Online Video material in general
- Video Conferencing
- Large Scale Projects

Danish Weather Service

An example of HPC effect on Capacity Requirement



The more volatile weather on the Danish horizon has prompted the Danish national weather forecaster DMI to invest in a new super computer that is about ten times more powerful than those it operates today.

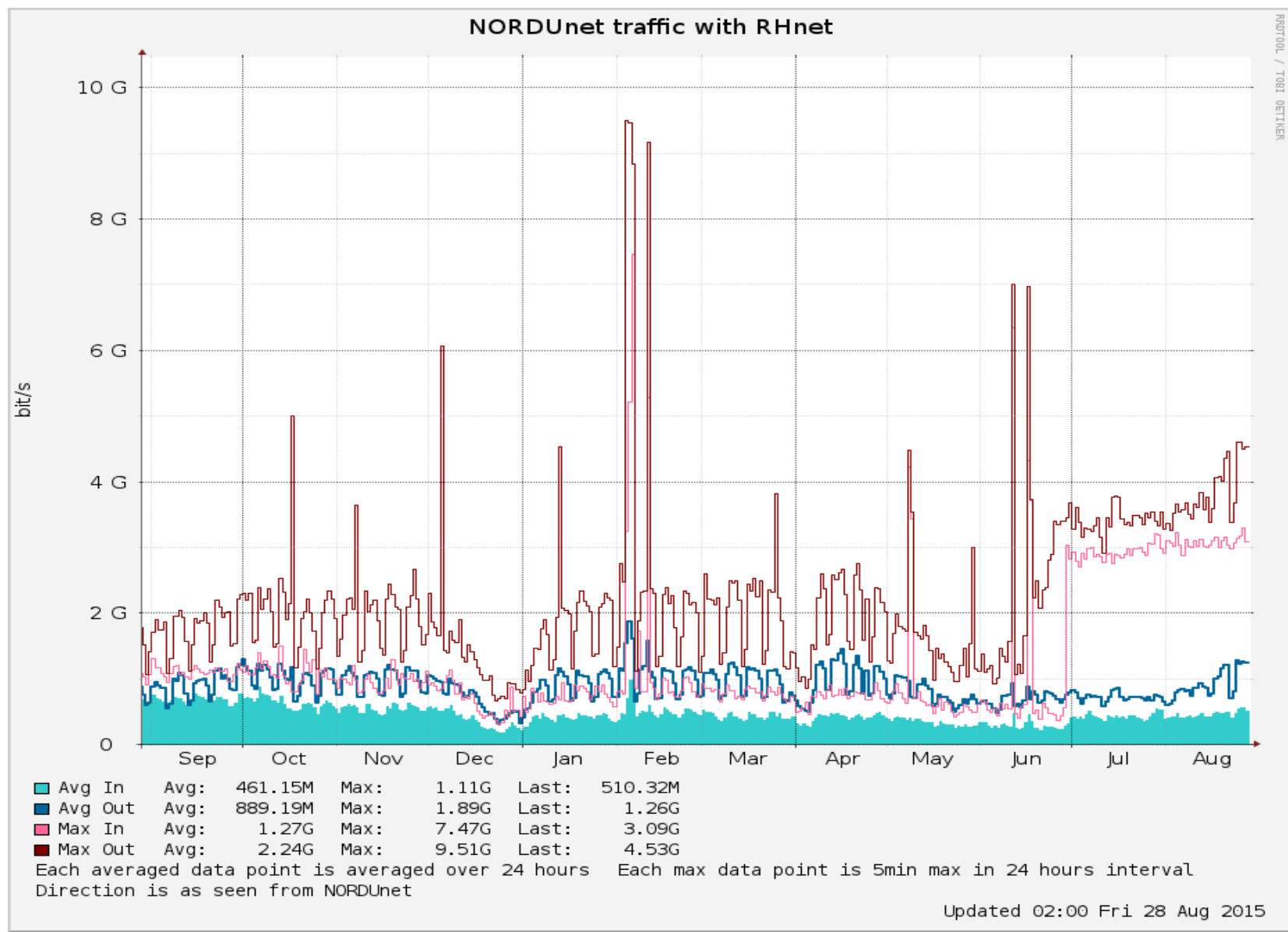
The super computer will be moved from its location on Lyngbyvej in Copenhagen to Iceland, where it will run on affordable green energy.

Rasmus Helveg Petersen, the climate and energy minister:

"With more calculation power, DMI's meteorologists will have a better handle on the uncertainties in the prognoses," "Among other things, this will mean more precise weather predictions and more exact warnings."

The benefits of placing the computer in Iceland is that power on the island is produced via water power and geothermal energy, and is thus 100 percent CO2 neutral.

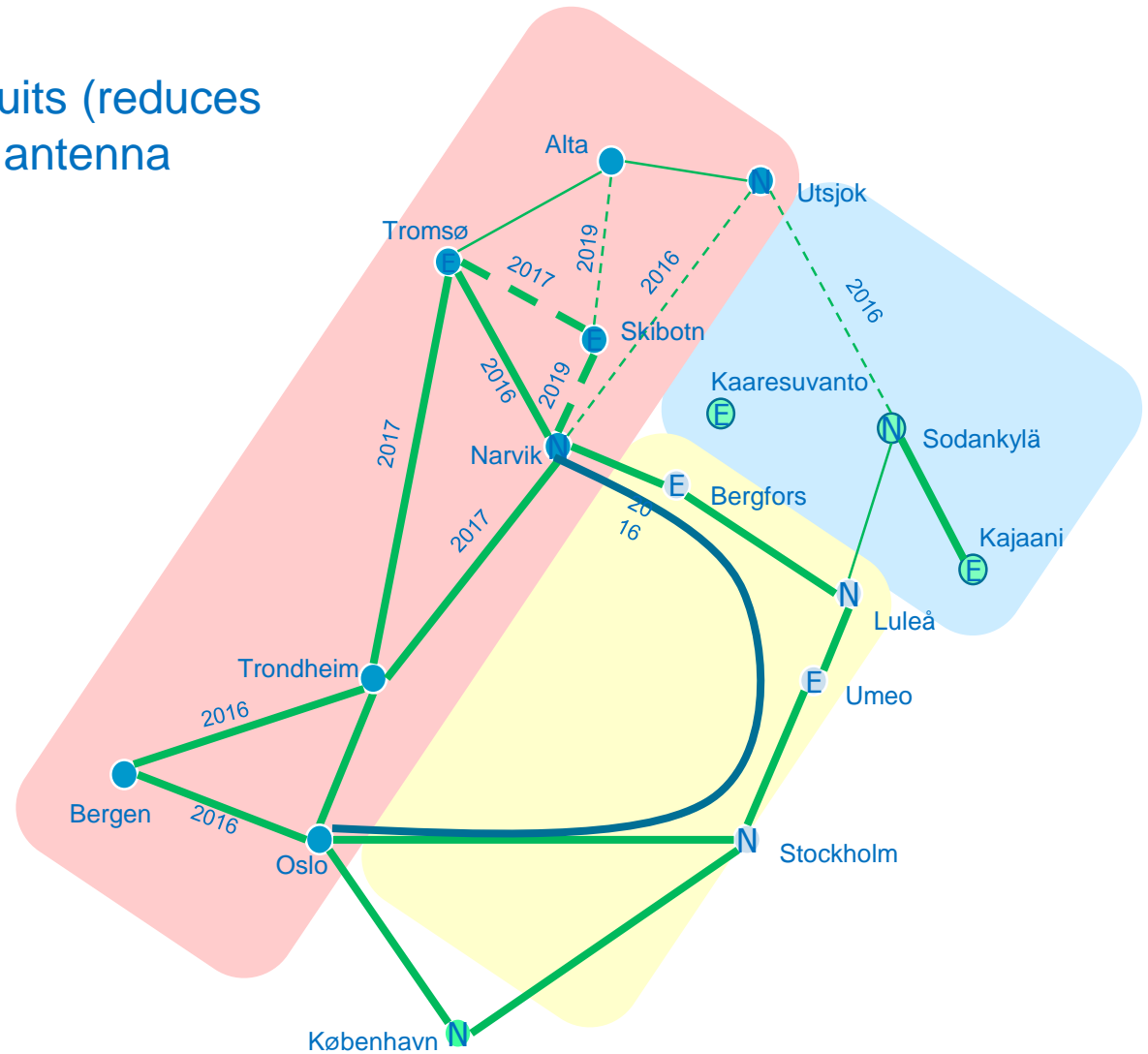
The computer is also cheaper to cool due to the generally cool weather in Iceland, and the move saves 440 MWh per year. DMI tends to invest in a new super computer every six years because a continuous increase in calculation power will benefit the Danes in terms of more precise weather prediction models. The super computers cost around 7 million €.

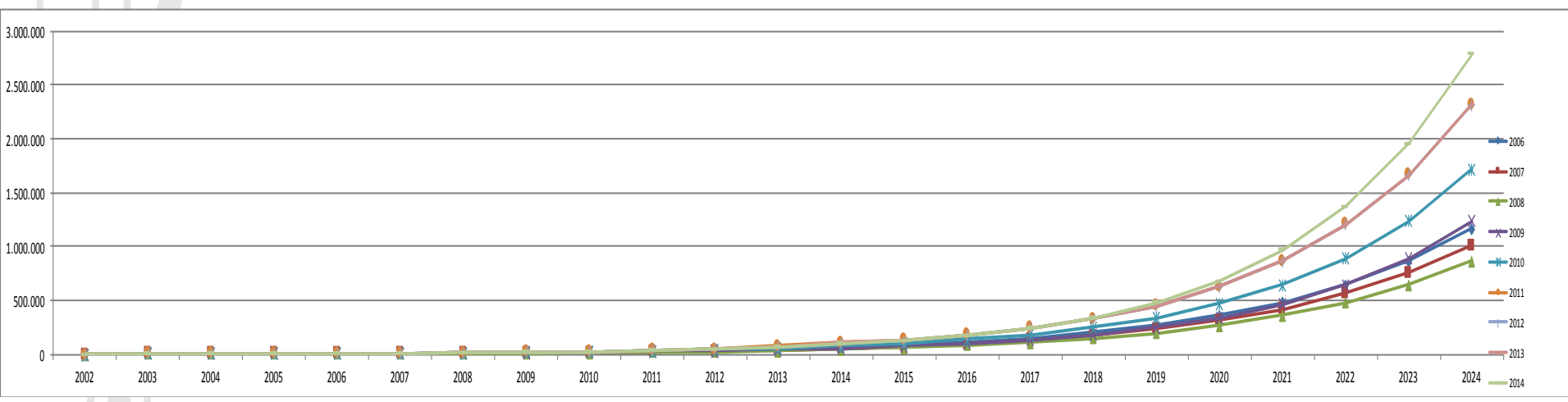
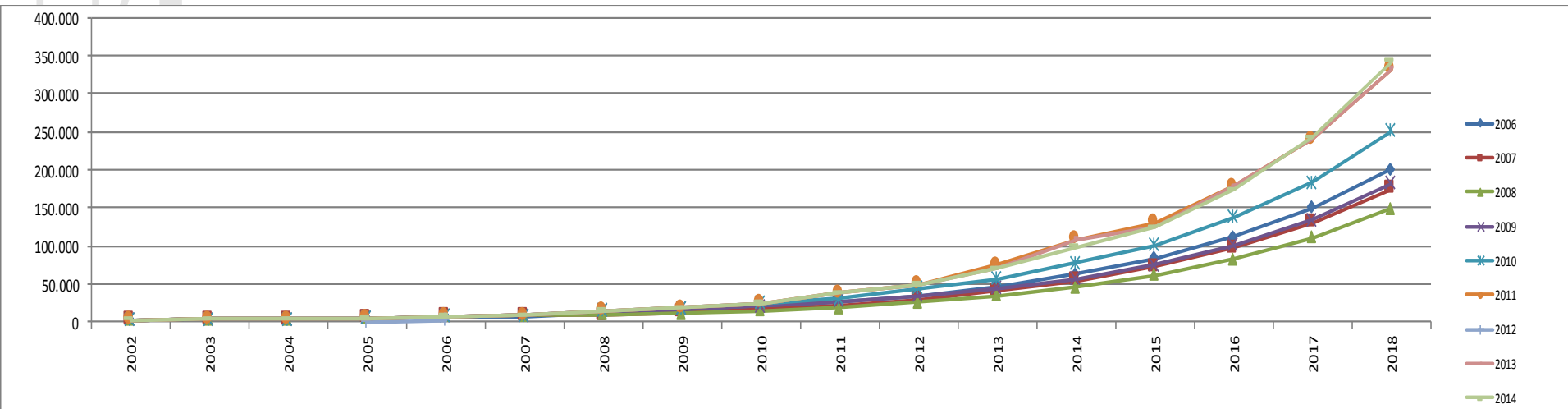


RRORTOOL / TOBI OETIKER

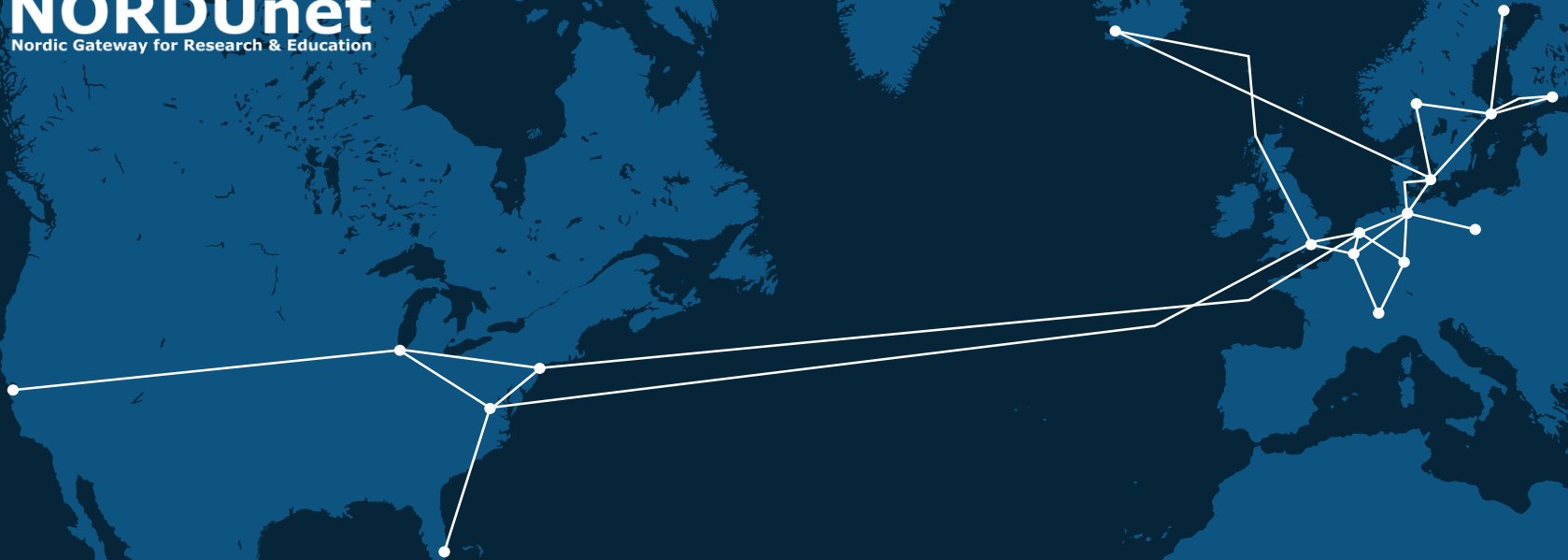


Interested in 400 Gbps circuits (reduces need from compression on antenna sites).

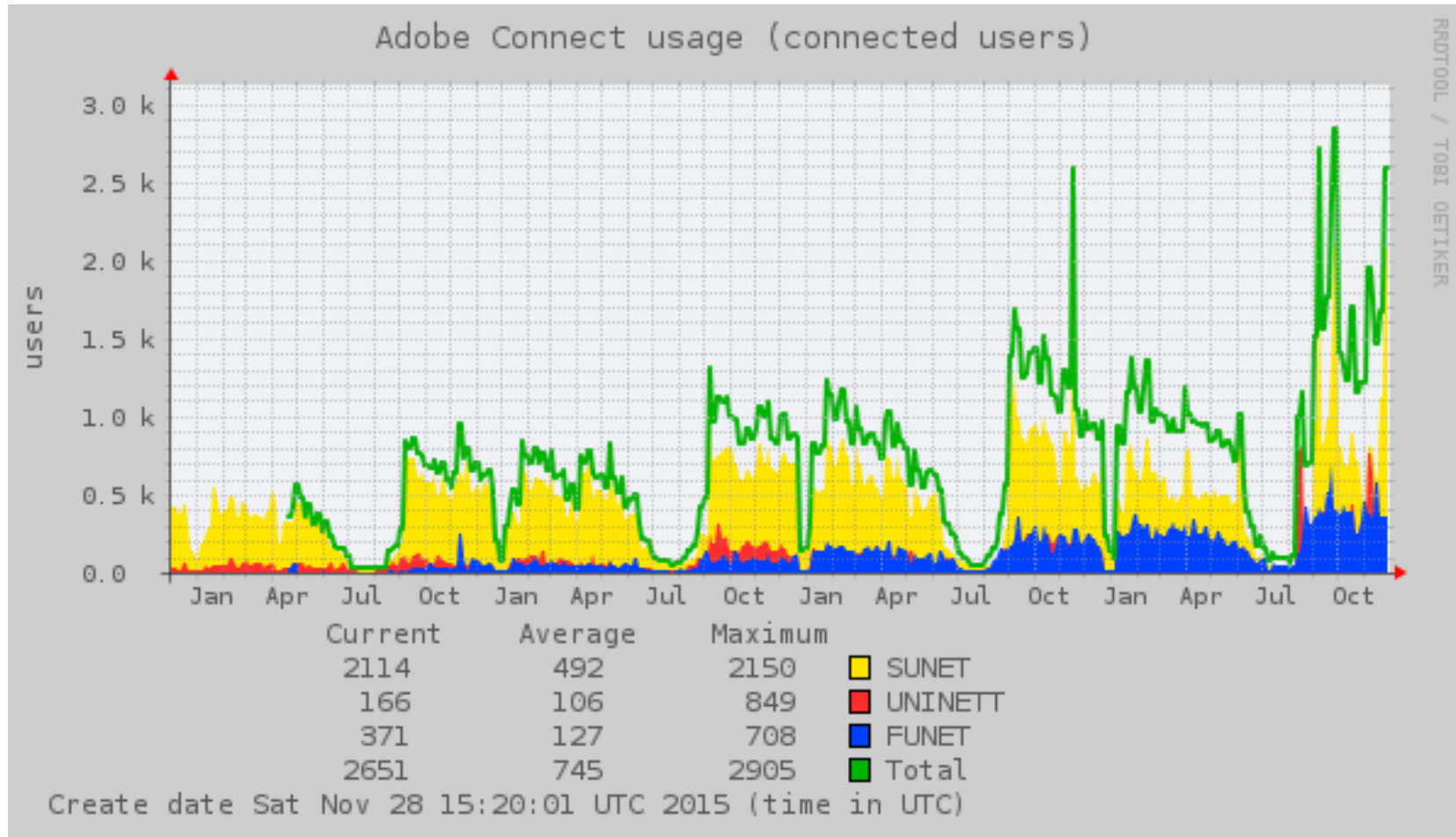




NORDUnet
Nordic Gateway for Research & Education

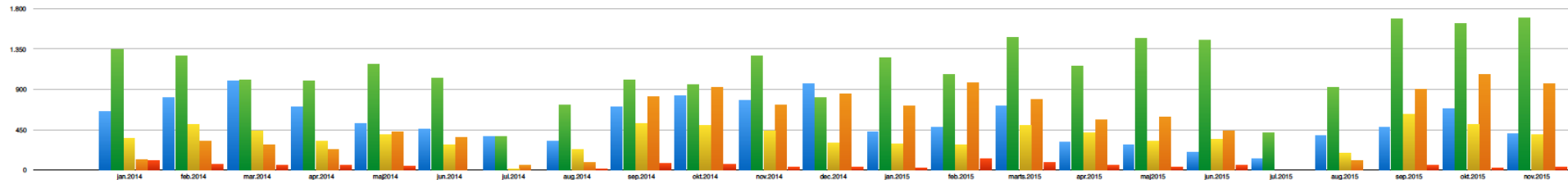


Example in evolution of Above net services

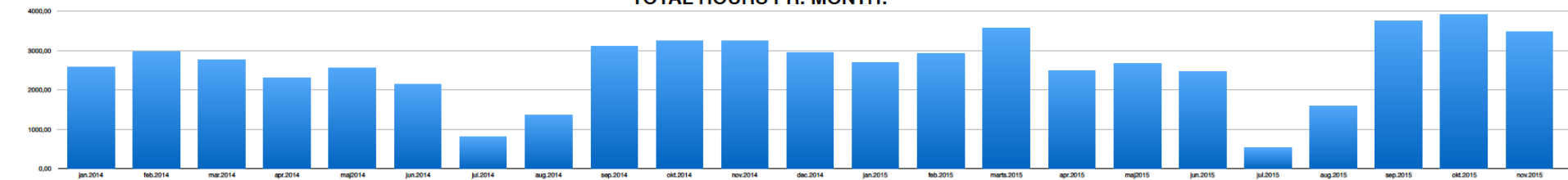


Multitenant Solution for all Nordic NRENS

HOURS



TOTAL HOURS PR. MONTH:



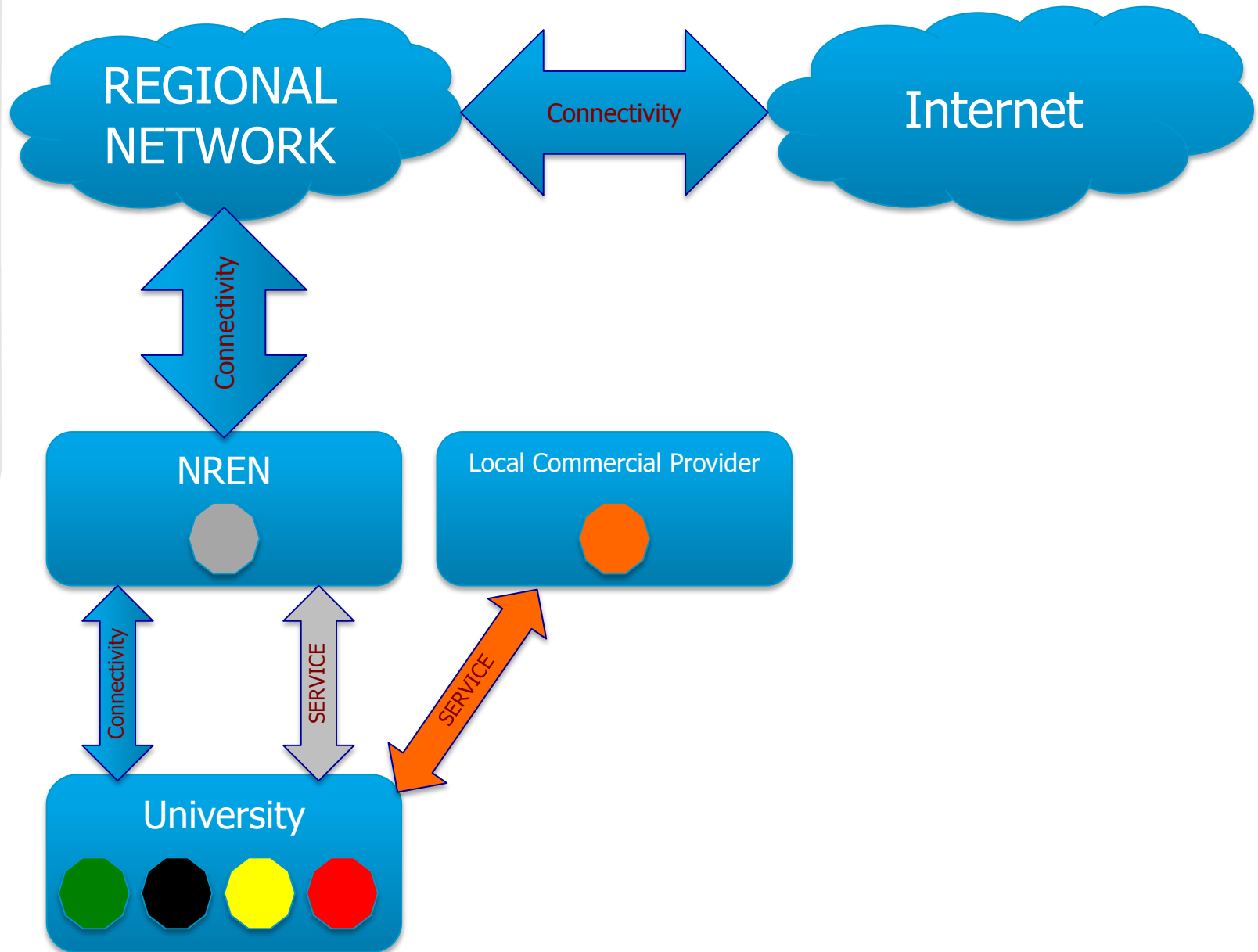
Client Available on:

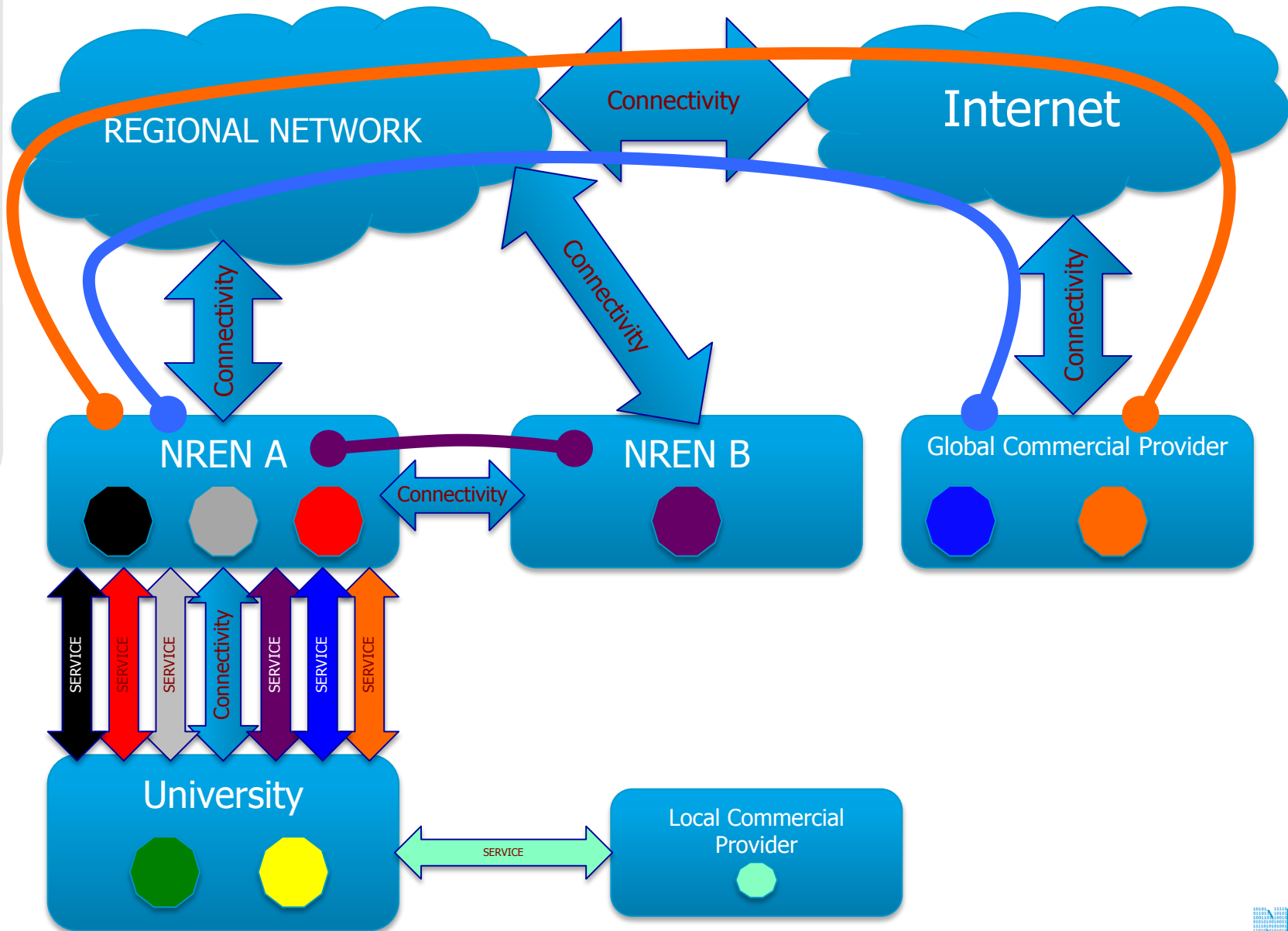
- Windows
- Mac
- Android
- iOS
- Linux

Integration With

- Zoom
- Lynx
- SIP
- NRENnum
- ...

Solutions in relation to Services



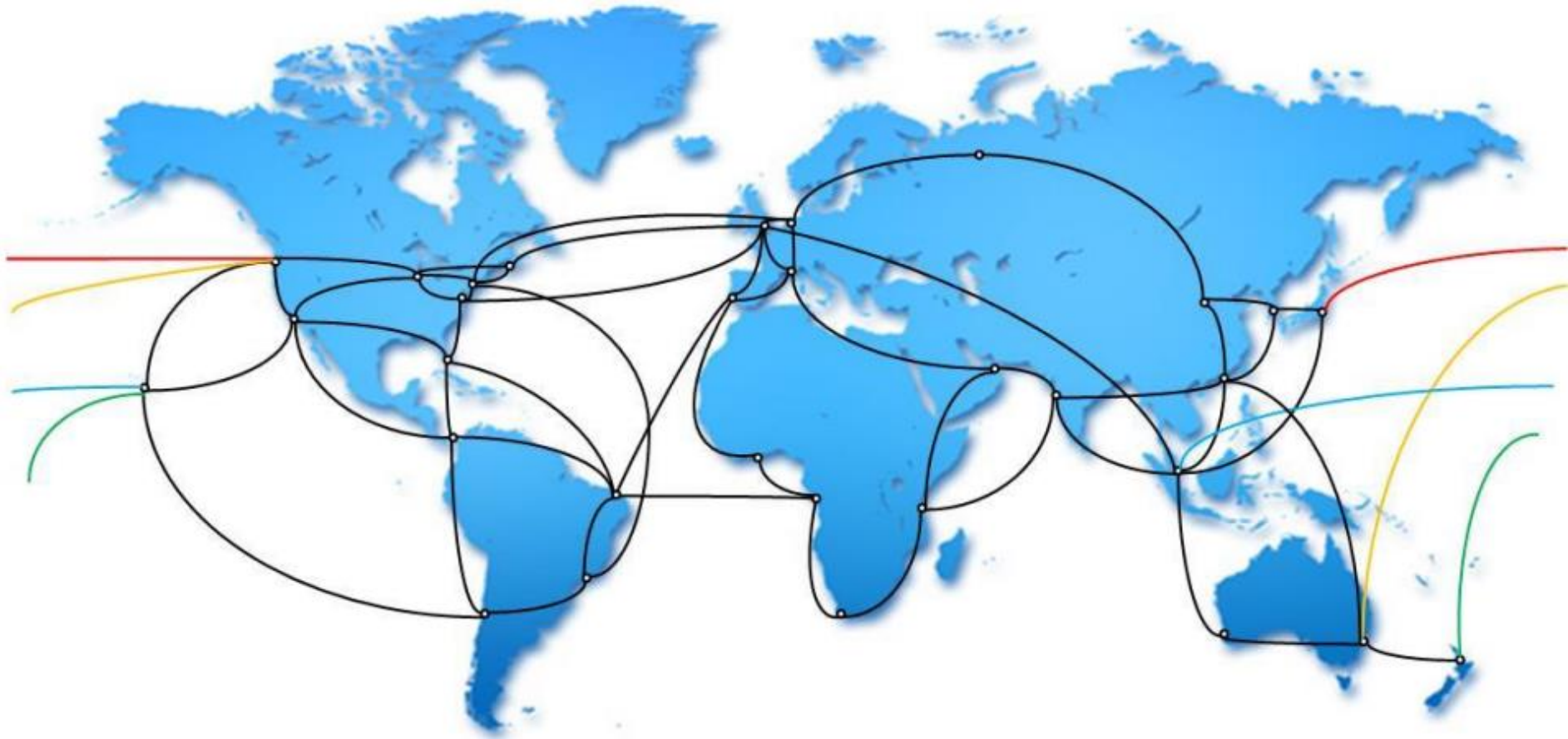


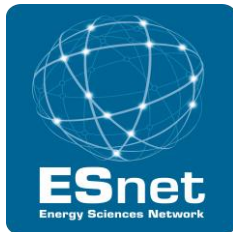
**Solutions in relation to
Network
Regional & Global
Connectivity**

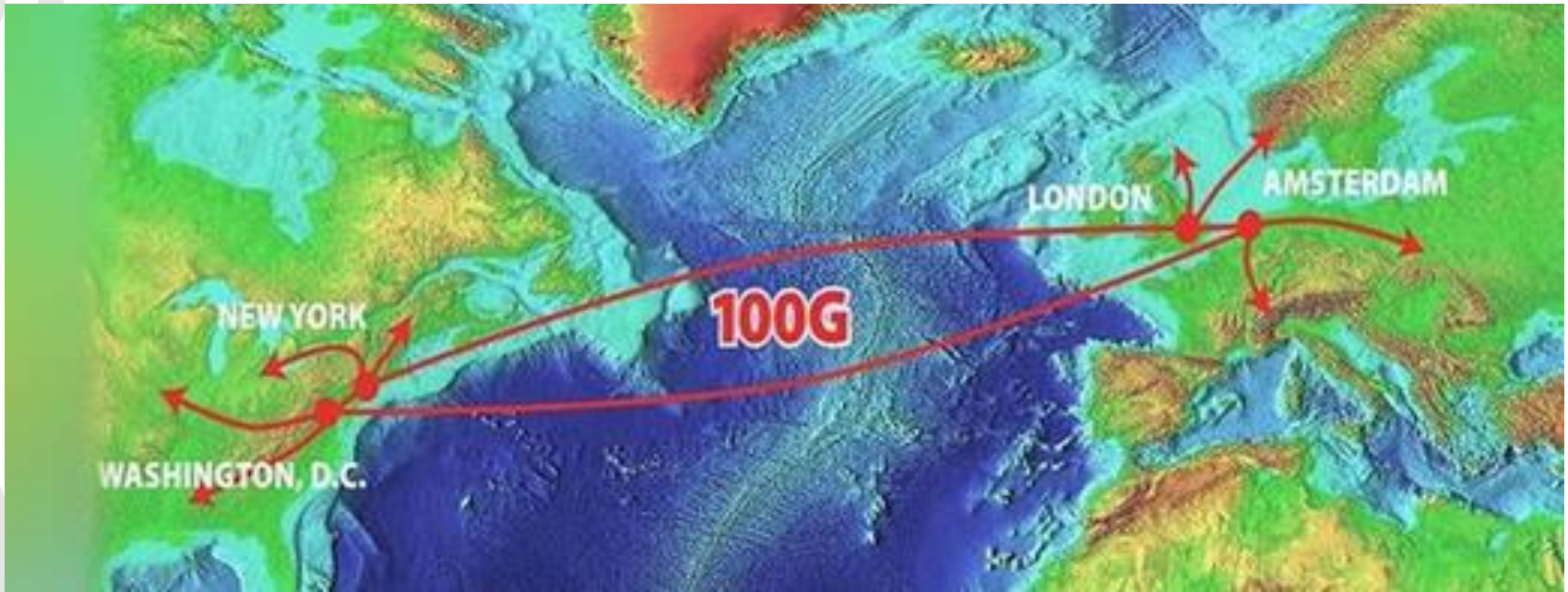
Participants:

- Jun Adachi – SINET (Japan)
- Erwin Bleumink – SURFnet (The Netherlands)
- René Buch – NORDUnet (European Nordics)
- Carlos Casasoes – CUDI (Mexico)
- Patrick Donath – RENATER (France)
- Jim Ghadbane – CANARIE (Canada)
- Christian Grimm – DFN (Germany)
- Chris Hancock – AARNet (Australia)
- Pascal Hoba – UbuntuNet Alliance (Eastern & Southern Africa)
- Dave Lambert – Internet2 (USA)
- Nelson Simoes – RNP (Brazil)
- Jianping Wu – CERNET (China)
- Steve Cotter – GEANT Association (Europe)
- Florencio Utreras – RedCLARA (Latin America)
- TBD – JISC (UK)
- TBD – REANNZ (New Zealand)

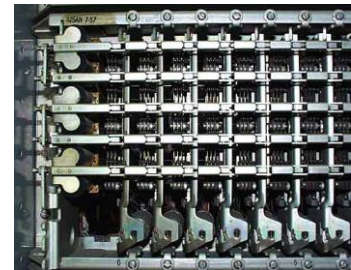
Group Name	Exec Sponsor(s)	Co-chair(s)
Global S ervice D elivery	Dave, Steve	Shel Waggener, Jørgen Qvist
Global R eal T ime C olaboration	Chris, René	Guido Aben
Global F ederated I dentity M anagement WG	Erwin, Jim	Josh Howlett, Floor Jas
Global N etwork A rchitecture - Technical WG	Dave, Christian, Prof. Wu	Jim Williams, Erik-Jan Bos
Global N etwork A rchitecture - Executive Action Team	Dave, Christian, Prof. Wu	Peter Elford
Global K nowledge S haring WG	René, Nelson, Pascal	Mary Fleming, Gyongyi
Security WG	Dave	Wayne Routly
Mobility	Erwin	Frans Panken
Big Sciences	Chris, Steve	T. Charles Yun
In the Field Blog	Chris	Jane Gifford







- Defined components & capabilities:
 - Peering Fabric,
 - Transparency,
 - Remote hands,
 - Security & Access, and 5 more
- Defined principles of operation:
 - Open Acceptable Use Approach
 - Measurements
 - Open Access, and some more

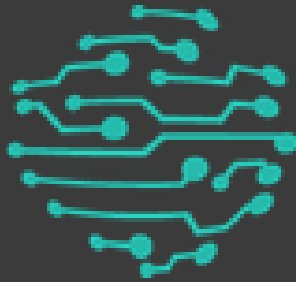


- Deterministic Services:
 - Guaranteed BW Service
 - Guaranteed BW Service with Bursting
- Non-deterministic Services:
 - Best Effort Service
 - Flow Separation
- Other Services:
 - Special Use



- ANA-200G
 - Governance
 - Cost sharing
 - Technical
 - Federated Operations
- Ambition for expanding pathfinding:
 - South Africa: Working with SANReN & TENET
 - South America: AmLight
 - Singapore: Internet2, SingaREN, et al.
 - ...





global network architecture

<http://gna-re.net/>

The NRENs needs to:

- Work together on a local, regional and global scale.
- Leverage local, regional and global infrastructure and explore synergies.
- Avoid Duplication of Efforts and Parallel infrastructures.
- Speak with one voice where applicable
- Integrate with other e-Infrastructures
- Close integration of AAI & Identity Federations
- Address the global Knowledge Imbalance
- Address the growing Security Implication of a global coherent infrastructure

Obstacles to Regional & Global Integration:

- Procurement legislation
- The knowledge threshold
- Uptake of delivery mechanisms for new services
- Privacy Laws and Protection
- Regional & Global View restricted by regional or even personal agendas
- Organizations focusing on their own internal agendas and not the Global Vision and opportunities
- The "Not invented here syndrome"
- Ridiculous Corporate EULA & Licensing

