

NORDUnet International Strategy

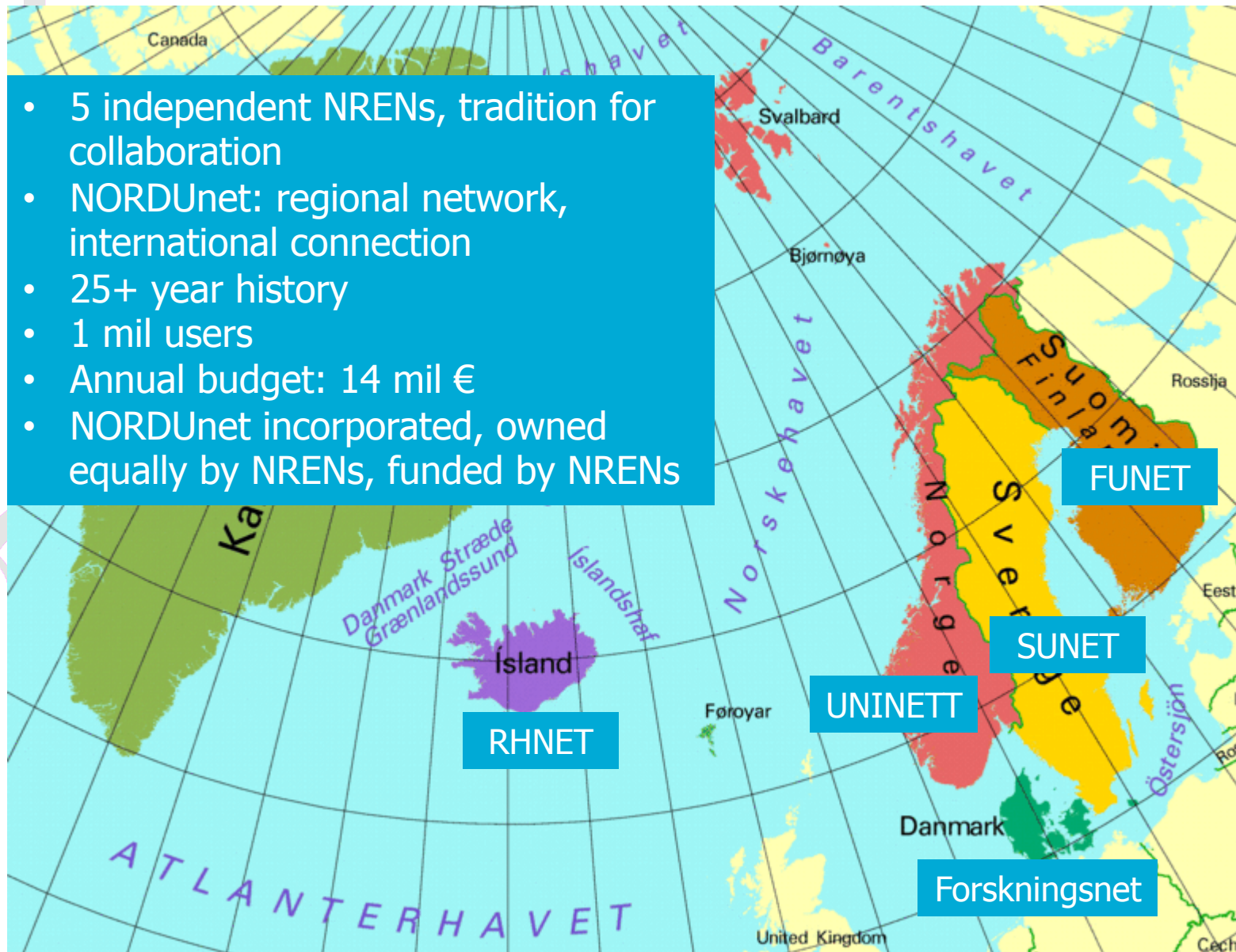
Lars Fischer

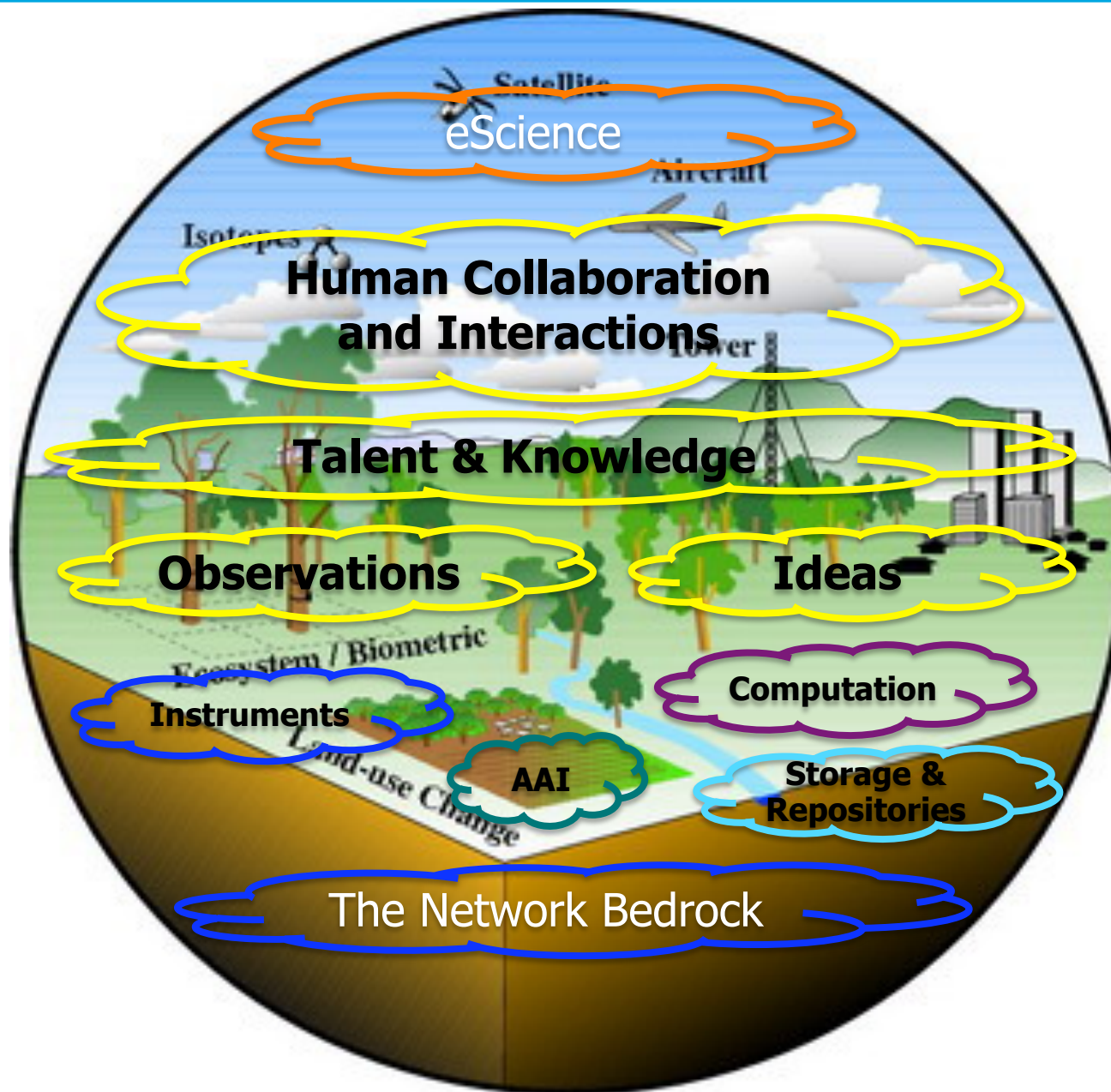
**TERENA TF CPR meeting
Copenhagen, 23 February 2012**





- 5 independent NRENs, tradition for collaboration
- NORDUnet: regional network, international connection
- 25+ year history
- 1 mil users
- Annual budget: 14 mil €
- NORDUnet incorporated, owned equally by NRENs, funded by NRENs





Materials research facility using the neutron scattering technique



Data Facility in Copenhagen, DK

Global connectivity



Knowledge without Borders

GÉANT 2020 as the
European Communications Commons

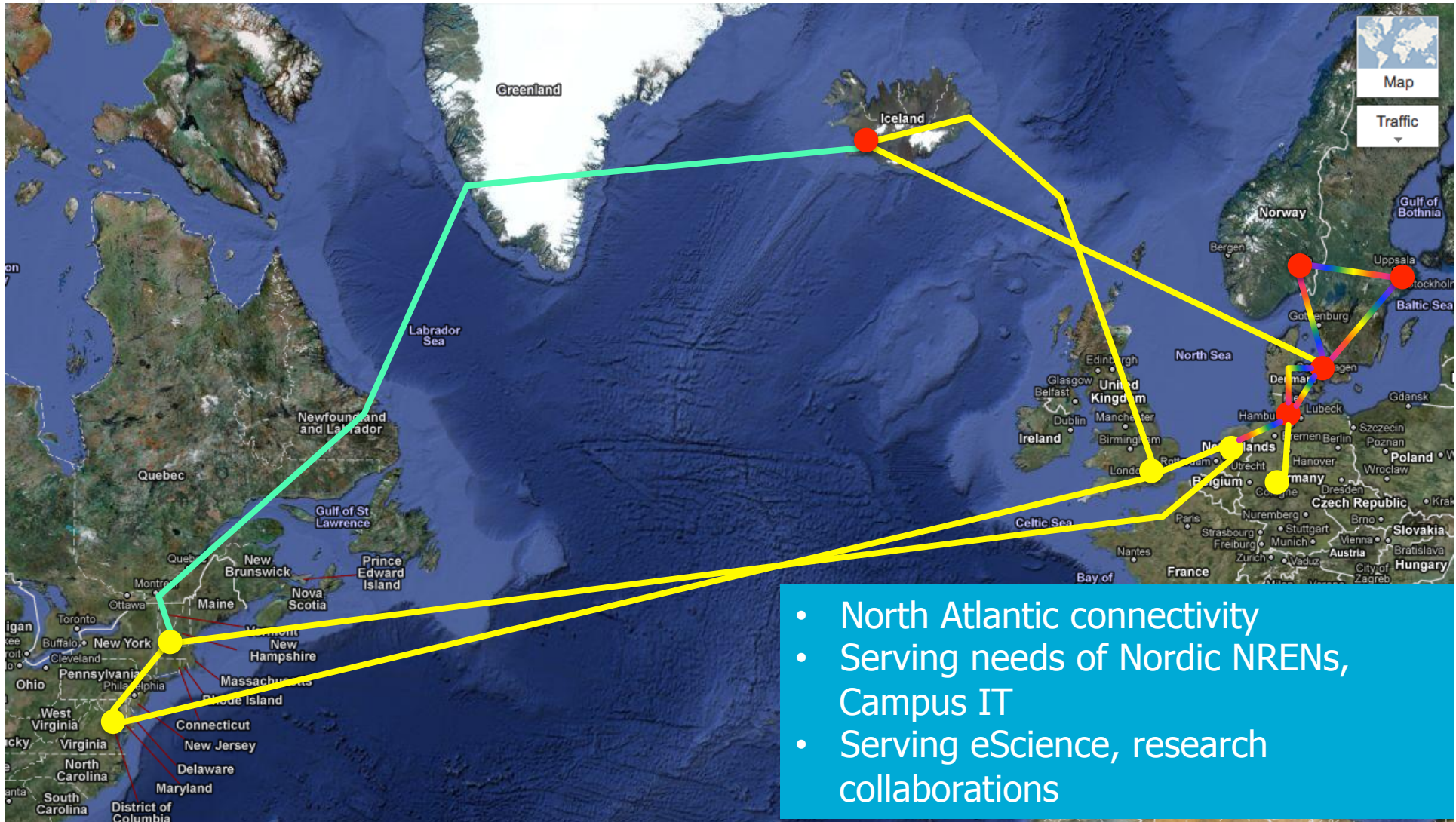
Report of the GÉANT Expert Group
... October 2011



- “GÉANT 2020” is the European communications commons
- Where talent anywhere is able to collaborate with their peers around the world and
- To have instantaneous and unlimited access to any resource for knowledge creation, innovation and learning,
- Unconstrained by the barriers of the pre-digital world.

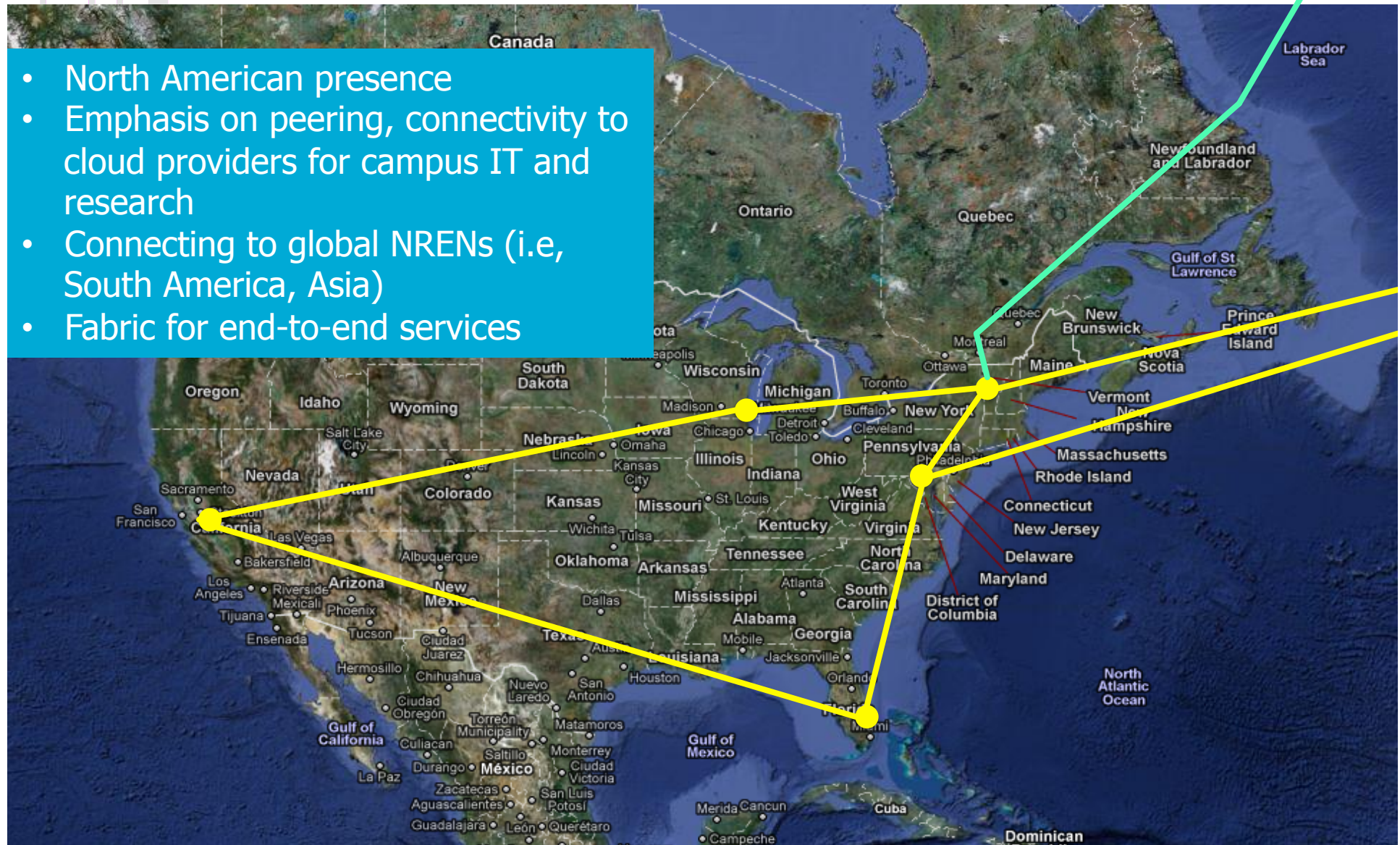


- Five key themes
 1. The NREN as a Global Network Service Provider
 2. The NREN as a Community Service Provider
 3. The NREN as the e-Science enabler
 4. The NREN as the e-Education enabler
 5. The NREN's as an Innovative Framework Provider
- Our future demands a global strategy and global partnerships
 - We service affinity groups, not restricted by geography
 - Science is global, the collaborations we serve are global
 - Academic community demands global services
- We must offer a full range of network services – best effort, circuits, and whatever in between
- We cannot succeed alone - We must work together in open forums and global partnerships
- We must manage cost

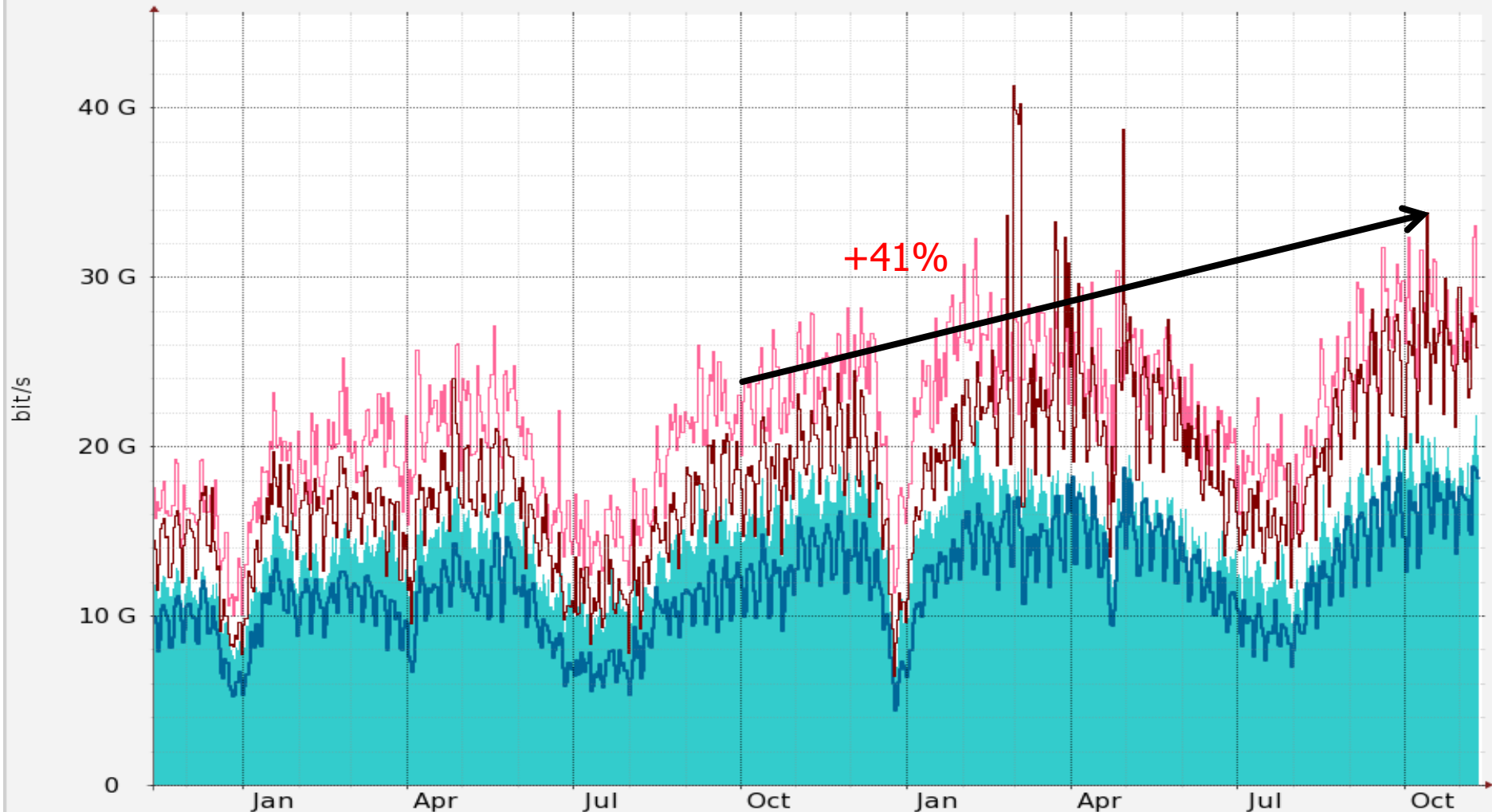


- North Atlantic connectivity
- Serving needs of Nordic NRENs, Campus IT
- Serving eScience, research collaborations

- North American presence
- Emphasis on peering, connectivity to cloud providers for campus IT and research
- Connecting to global NRENs (i.e, South America, Asia)
- Fabric for end-to-end services



NORDUnet traffic with Customers

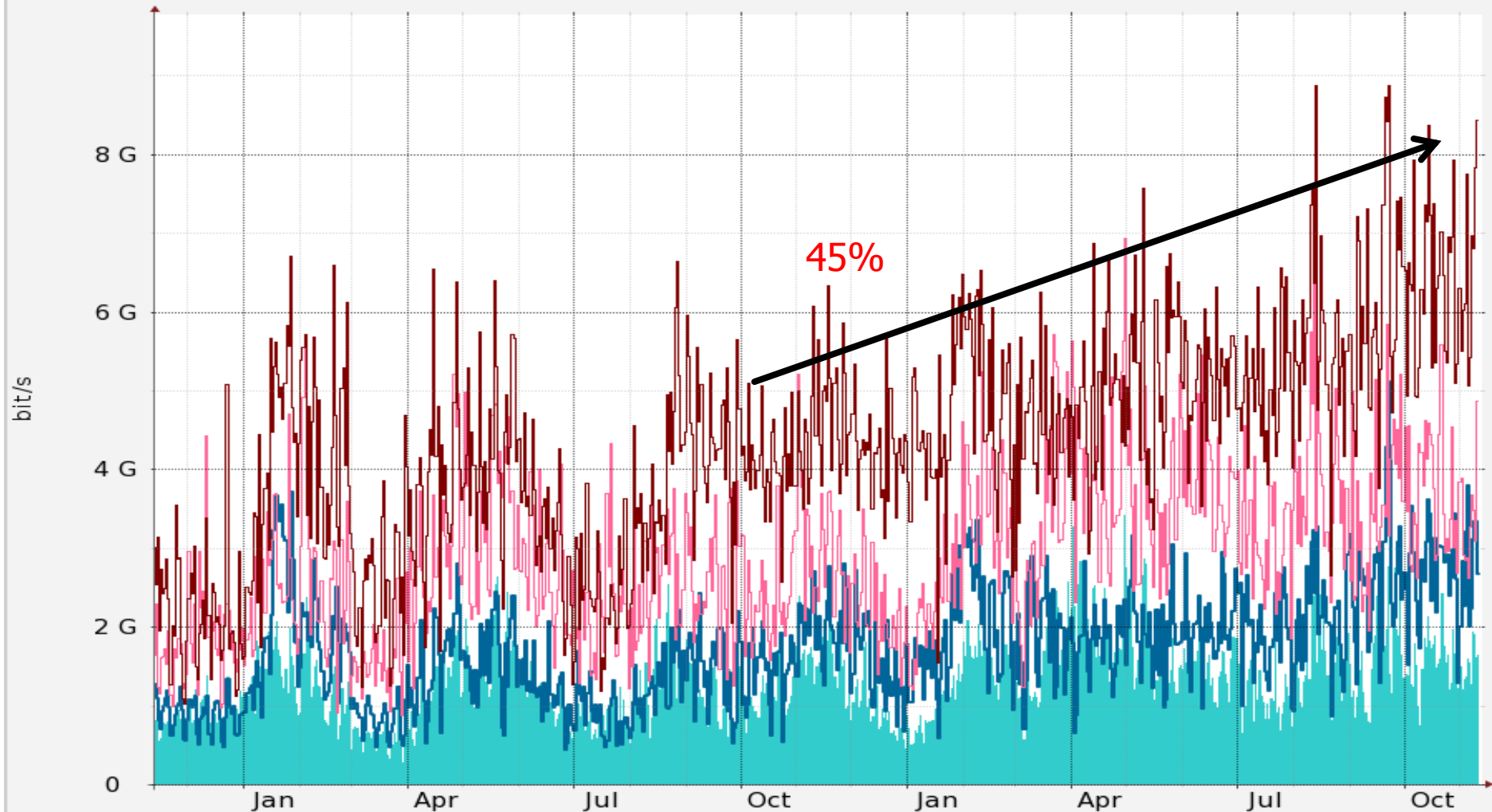


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█ Avg In	Avg:	14.57G	Max:	21.80G	Last:	19.50G
█ Avg Out	Avg:	11.81G	Max:	18.82G	Last:	18.15G
█ Max In	Avg:	21.61G	Max:	33.09G	Last:	28.30G
█ Max Out	Avg:	18.38G	Max:	41.35G	Last:	25.88G

Each averaged data point is averaged over 24 hours Each max data point is 5min max in 24 hours interval
 Direction is as seen from NORDUnet

NORDUnet traffic with GEANT



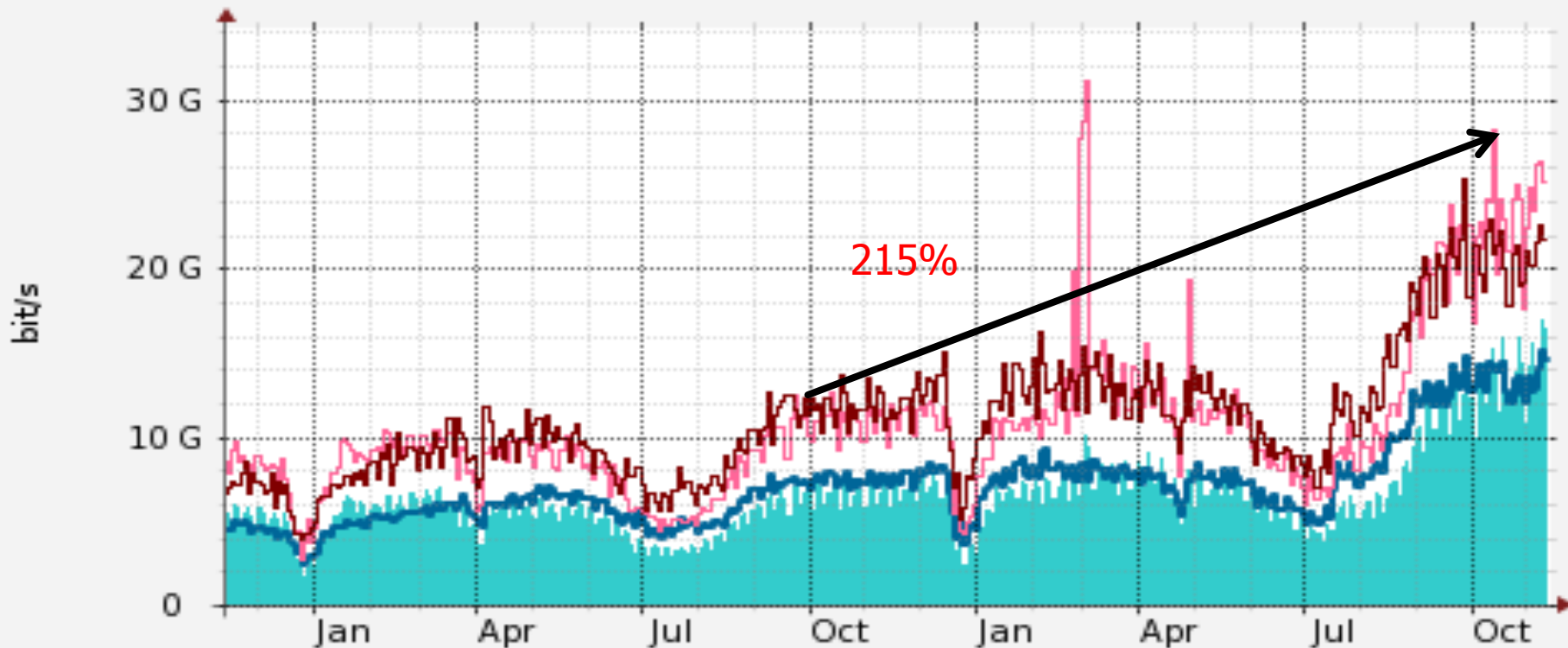
RRDTOOL / TOBI OETIKER

■ Avg In	Avg:	1.31G	Max:	3.42G	Last:	1.65G
■ Avg Out	Avg:	1.72G	Max:	5.11G	Last:	2.67G
■ Max In	Avg:	2.91G	Max:	6.94G	Last:	4.87G
■ Max Out	Avg:	4.33G	Max:	8.88G	Last:	8.43G

Each averaged data point is averaged over 24 hours
Direction is as seen from NORDUnet

Each max data point is 5min max in 24 hours interval

NORDUnet traffic with Peers



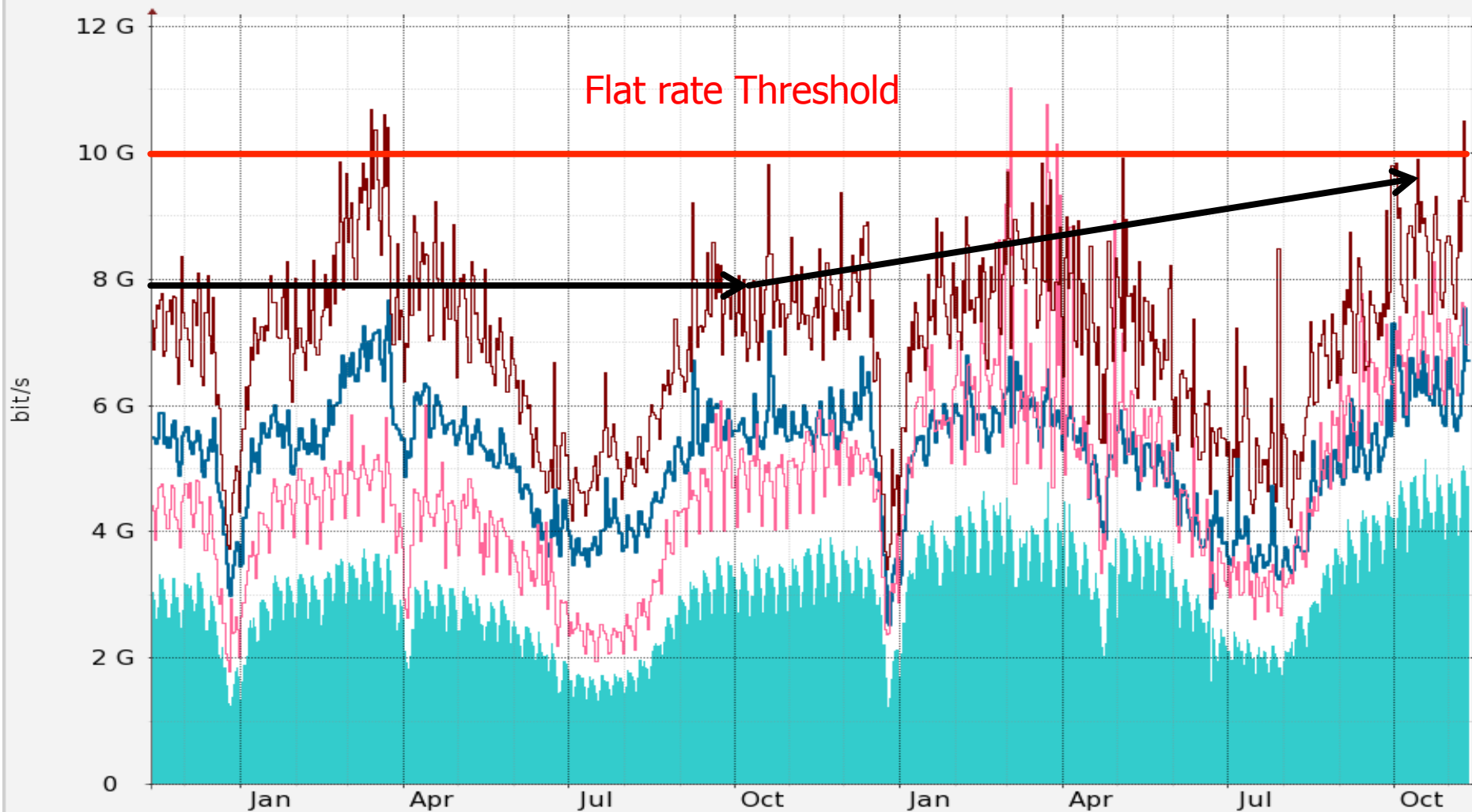
RRDTOOL / TOBI OETIKER

■ Avg In	Avg:	6.53G	Max:	16.95G	Last:	16.37G
■ Avg Out	Avg:	7.06G	Max:	15.15G	Last:	14.62G
■ Max In	Avg:	10.85G	Max:	31.14G	Last:	25.20G
■ Max Out	Avg:	11.21G	Max:	25.33G	Last:	21.82G

Each averaged data point is averaged over 24 hours
 Each max data point is 5min max in 24 hours interval
 Direction is as seen from NORDUnet

Updated 01:00 Sat 12 Nov 2011

NORDUnet traffic with Upstream



RRDTOOL / TOBI OETIKER

■ Avg In	Avg:	3.02G	Max:	5.14G	Last:	4.71G
■ Avg Out	Avg:	5.20G	Max:	7.65G	Last:	6.71G
■ Max In	Avg:	4.71G	Max:	11.04G	Last:	6.96G
■ Max Out	Avg:	7.04G	Max:	10.69G	Last:	9.22G

Each averaged data point is averaged over 24 hours
Direction is as seen from NORDUnet

Each max data point is 5min max in 24 hours interval



- Connectivity
 - GÉANT, Baltic region, European cross border fibre
 - ORIENTplus
 - GLORIAD
 - Strong history of collaboration w/Russian R&E networks
 - North America
- Supporting applications
 - eScience project (i.e., eVLBI, medical imaging, HEP)
 - Remote Campus
 - Academia – Industry collaborations, Clouds
- Soft/middleware
 - Nordic community efforts (i.e.. Kalmar)
 - GEANT, TERENA
 - GLIF, OGF

- NORDUnet & Nordic NRENs are
 - a strong global partner
 - a strong partner in European networking
 - a major contributor to GÉANT – 3rd largest contributor of man-hours in GN3
- NORDUnet firmly
 - believe in and support a strong European infrastructure
 - understand that world-class European networking is essential to Nordic R&E
 - believe that through regional collaboration we offer the best support for European networking – for the benefit of all

- World class L3 network – 40G, 100G coming
- Lightpath / BoD service
- Partnership for evolution of NSI
 - foundation for emerging services, such as global performance guarantee network services
 - enabler for higher-level applications and services.
- Higher-level services
 - Federated Identity
 - Multi-domain (federated) management, operations, and diagnostics, automation of multi-domain services
- Software development increasingly critical to evolution of NREN services
 - Having our own software group is essential



Thank You

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