GÉANT

Mission and Services

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Senior Technical Business Development Officer
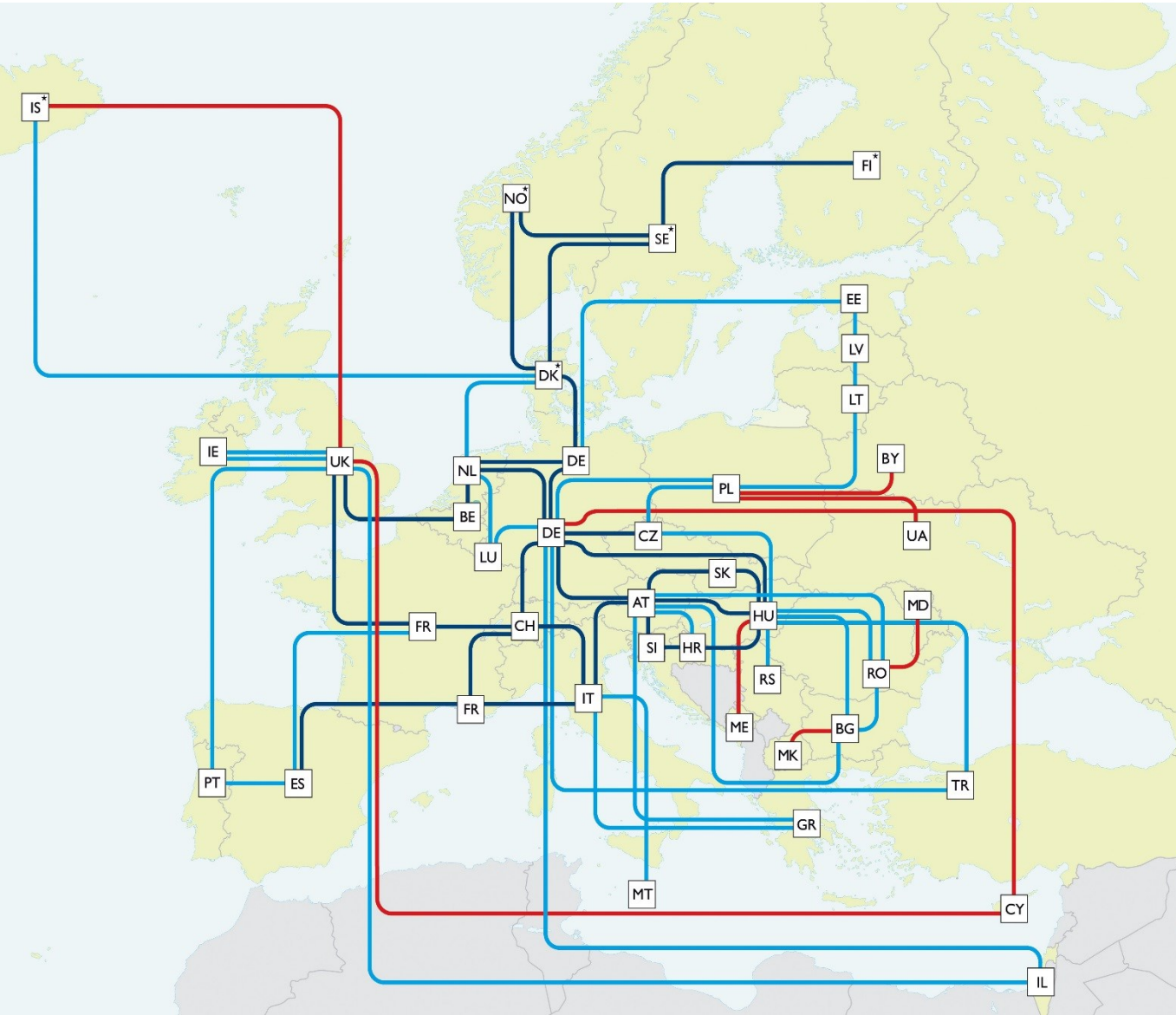
CREMLIN WP2 Workshop on Big Data Management

15 February 2017, Moscow

GÉANT - Networks

- Manages research & education networking projects

- Procures, builds and operates large-scale, advanced international high-speed networks

  - GÉANT (Europe)

  - EUMEDCONNECT (Mediterranean)

  - AfricaConnect (Africa)

  - CAREN (Central Asia)

  - EAPConnect (Eastern Partnership Countries)

- Supports and assists other regional projects

  - ORIENTplus (Europe-China collaboration)

  - TEIN*CC (Asia-Pacific)

  - RedCLARA (Latin America)

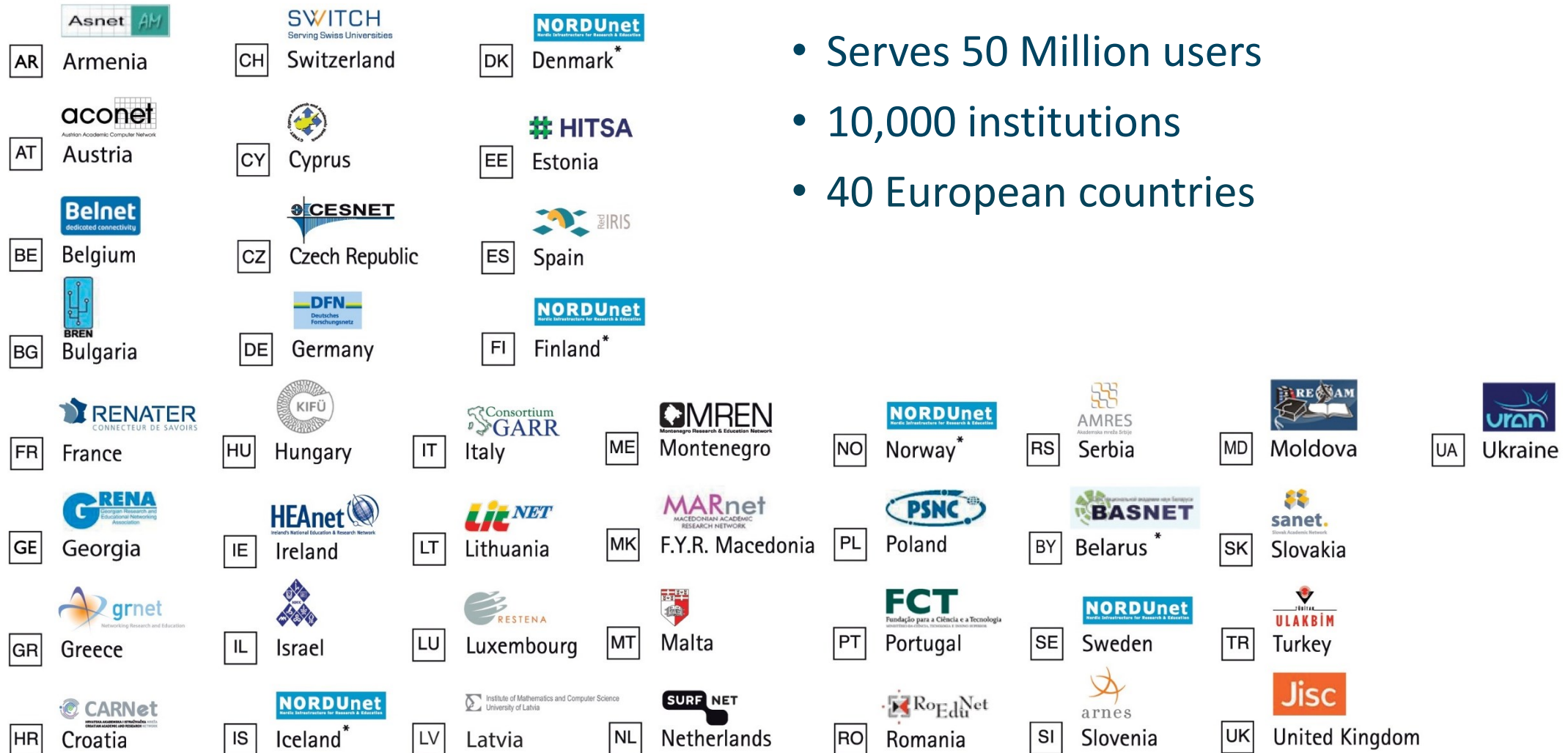# The GÉANT Pan-European Network infrastructure

- Widely diversified footprint

- Operates at speeds up to 1Tbps

- 50,000km network infrastructure on 44 routes

- Over 2,000 Terabytes/day of data transferred across network

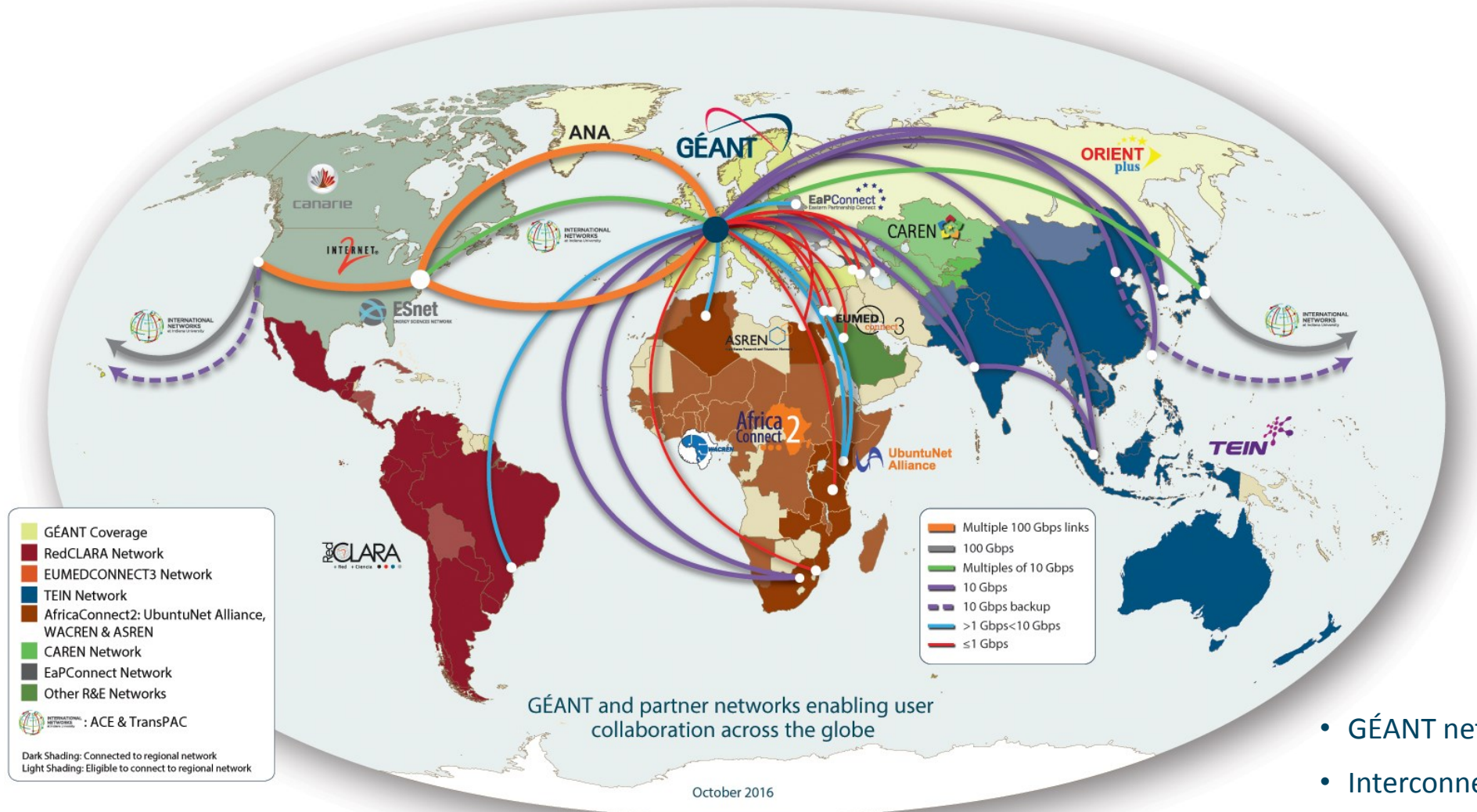- 100% average monthly IP service availability

The GÉANT Community

AR Armenia (Asnet AM)	**CH** Switzerland (SWITCH – Serving Swiss Universities)	**DK** Denmark* (NORDUnet)
AT Austria (aconet – Austrian Academic Computer Network)	**CY** Cyprus	**EE** Estonia (HITSA)
BE Belgium (Belnet – dedicated connectivity)	**CZ** Czech Republic (CESNET)	**ES** Spain (RedIRIS)
BG Bulgaria (BREN)	**DE** Germany (DFN – Deutsches Forschungsnetz)	**FI** Finland* (NORDUnet)

FR France (RENATER – Connecteur de Savoirs)	**HU** Hungary (KIFÜ)	**IT** Italy (Consortium GARR)	**ME** Montenegro (MREN)	**NO** Norway* (NORDUnet)	**RS** Serbia (AMRES – Akademska mreža Srbije)	**MD** Moldova (RENAM)	**UA** Ukraine (Uran)
GE Georgia (GRENA – Georgian Research and Educational Networking Association)	**IE** Ireland (HEAnet – Ireland's National Education and Research Network)	**LT** Lithuania (LITNET)	**MK** F.Y.R. Macedonia (MARnet – Macedonian Academic Research Network)	**PL** Poland (PSNC)	**BY** Belarus* (BASNET)	**SK** Slovakia (sanet – Slovak Academic Network)	
GR Greece (grnet – Networking Research and Education)	**IL** Israel	**LU** Luxembourg (RESTENA)	**MT** Malta	**PT** Portugal (FCT – Fundação para a Ciência e a Tecnologia)	**SE** Sweden (NORDUnet)	**TR** Turkey (ULAKBİM)	
HR Croatia (CARNet – Croatian Academic and Research Network)	**IS** Iceland* (NORDUnet)	**LV** Latvia (Institute of Mathematics and Computer Science University of Latvia)	**NL** Netherlands (SURFnet)	**RO** Romania (RoEduNet)	**SI** Slovenia (arnes)	**UK** United Kingdom (Jisc)	

- Serves 50 Million users
- 10,000 institutions
- 40 European countries

Networks · Services · People   *www.geant.org*

Global connectivity

GÉANT and partner networks enabling user collaboration across the globe

October 2016

Legend:
- GÉANT Coverage
- RedCLARA Network
- EUMEDCONNECT3 Network
- TEIN Network
- AfricaConnect2: UbuntuNet Alliance, WACREN & ASREN
- CAREN Network
- EaPConnect Network
- Other R&E Networks

: ACE & TransPAC

Dark Shading: Connected to regional network
Light Shading: Eligible to connect to regional network

Link types:
- Multiple 100 Gbps links
- 100 Gbps
- Multiples of 10 Gbps
- 10 Gbps
- 10 Gbps backup
- >1 Gbps<10 Gbps
- ≤1 Gbps

- GÉANT network is connected to all continents
- Interconnecting >100 countries globally

Services

- **Connectivity & network management**
  - Standard IP, up to multiple 100Gbps
  - MD-VPNs (L2 and L3)
  - Point-to-point circuits
  - Wavelengths 10 -100Gbps
  - Open Exchange for global & commercial collaborations 1, 10, 100Gbps
  - GTS
  - International and Commercial Peerings
  - Firewall on-demand

- **End to end Performance**
  - perfSONAR – *Real-time, multi-domain performance monitoring*
  - eduPERT – *Performance troubleshooting*

- **Trust, Identity and Security**
  - eduGAIN – *Secure access, single sign-on*
  - eduroam – *Seamless Wi-Fi access for research and education around the world*

- **One Stop Shop**
  - Consultancy
  - International co-ordination
  - Bespoke solutions

Connectivity Services

GÉANT IP	IP Connectivity	GÉANT Lambda	Lambdas up to 100Gbps
GÉANT Plus	Static point-to-point	GÉANT Open	Open Exchange
GÉANT L3VPN / GÉANT BoD	L3 VPN	GÉANT GTS	Testbed service
GÉANT MD-VPN	Multi-domain VPN	GÉANT World Service	Internet peering service

Connectivity Services: L3VPN Service
LHCONE
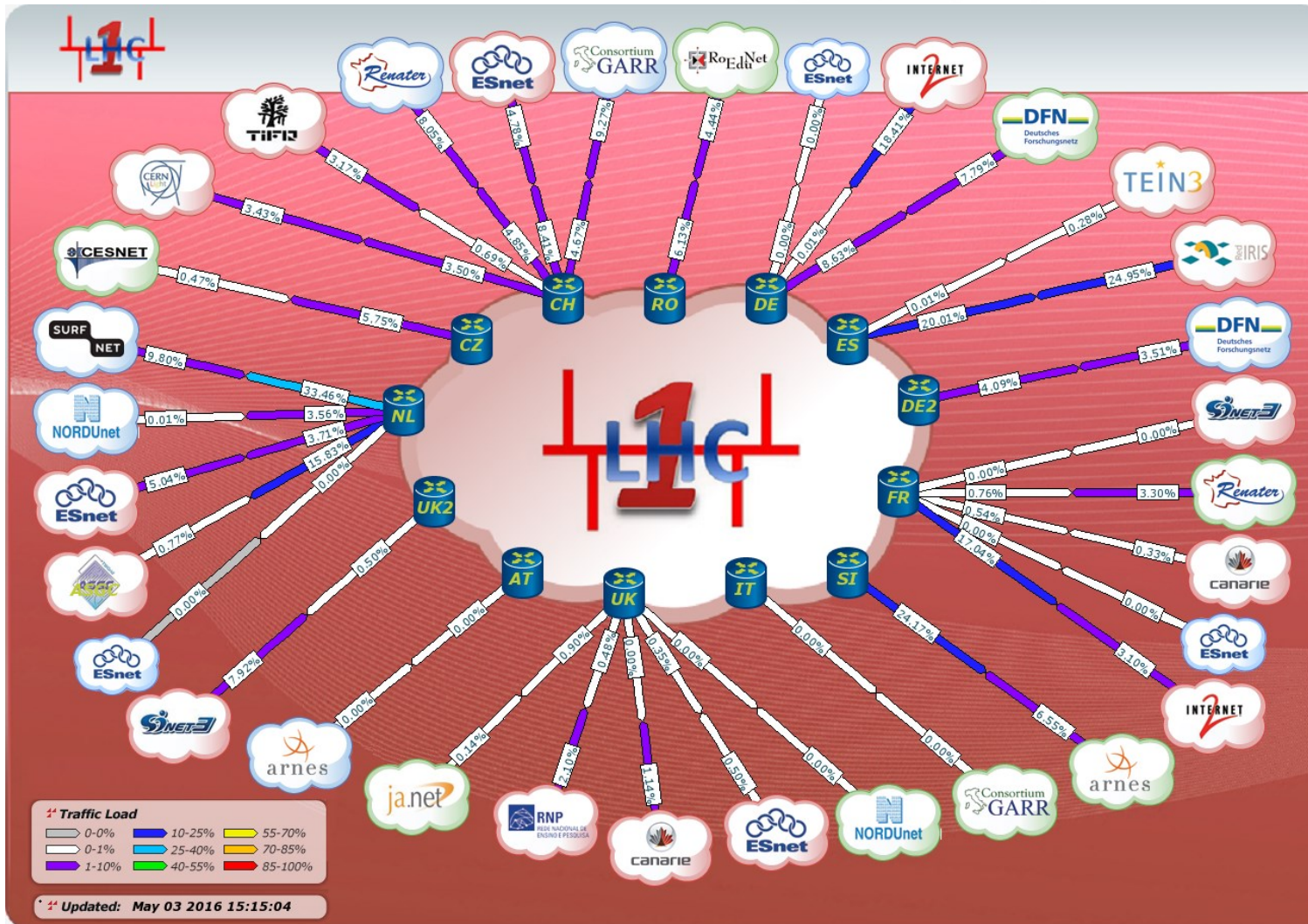
Serving the LHC experiments:
- ATLAS
- CMS
- ALICE
- LHCb

But also:
- BELLE 2
- Pierre Auger Observatory
- NOVA
- *XENON1T (in discussion)*

Currently spanning three continents
- Europe
- North and South America
- Asia

Connectivity Services: Multi-domain VPN

Lead-time reduced

Easy to deploy
No Capex
VPN multiplexed

High scalability

Configure only at the edge

VPN Provisioning as easy as in a single-domain

An end-to-end extensible and flexible service

NREN OPEX Reduced

Configure only at the edge
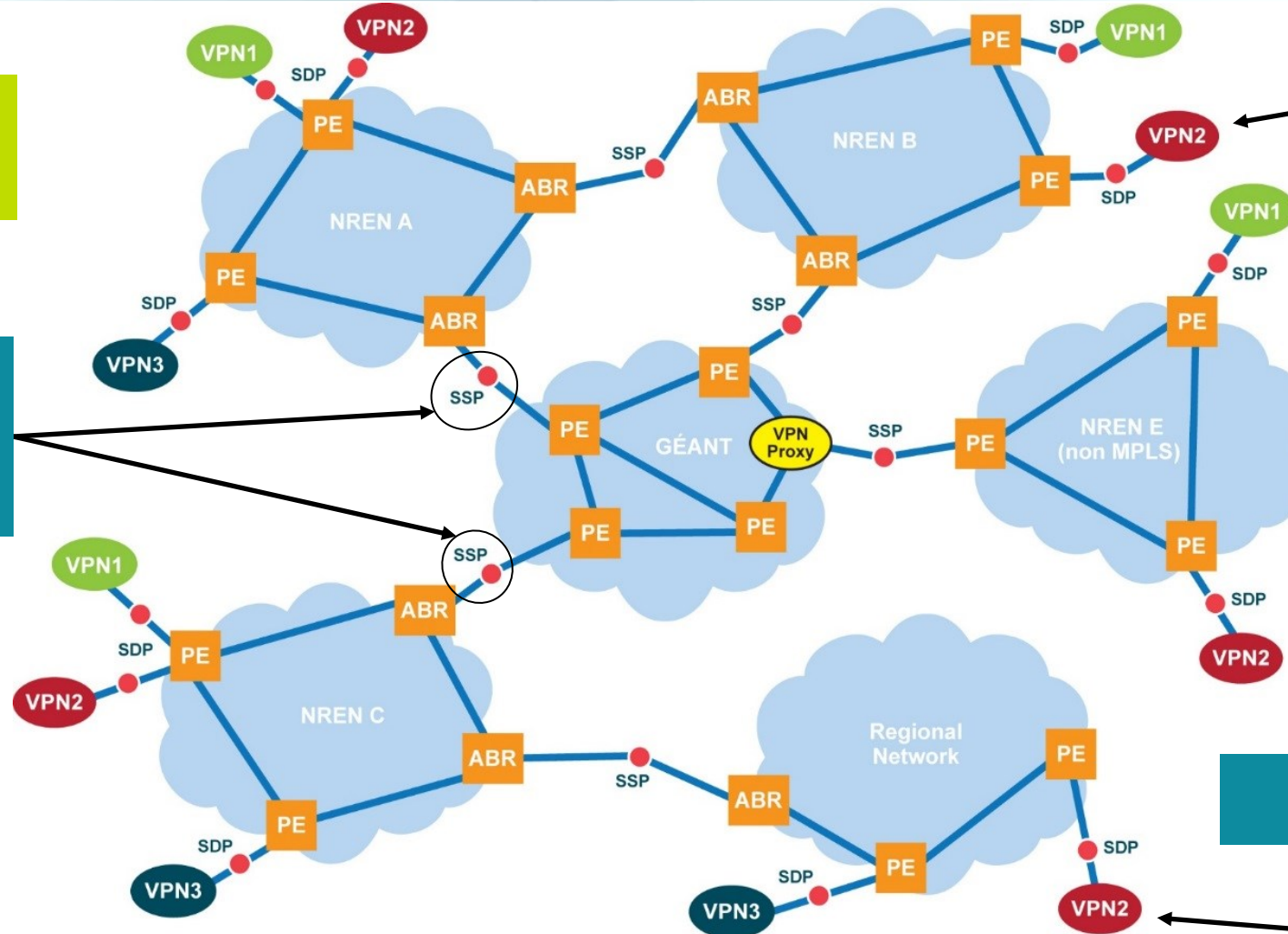
Connectivity Services: lambda service
CERN

- Connection to the remote data centre in Budapest

- First ever 100G user service in R&E community

- In operation since 11/2012

- A second 100G has been deployed in January
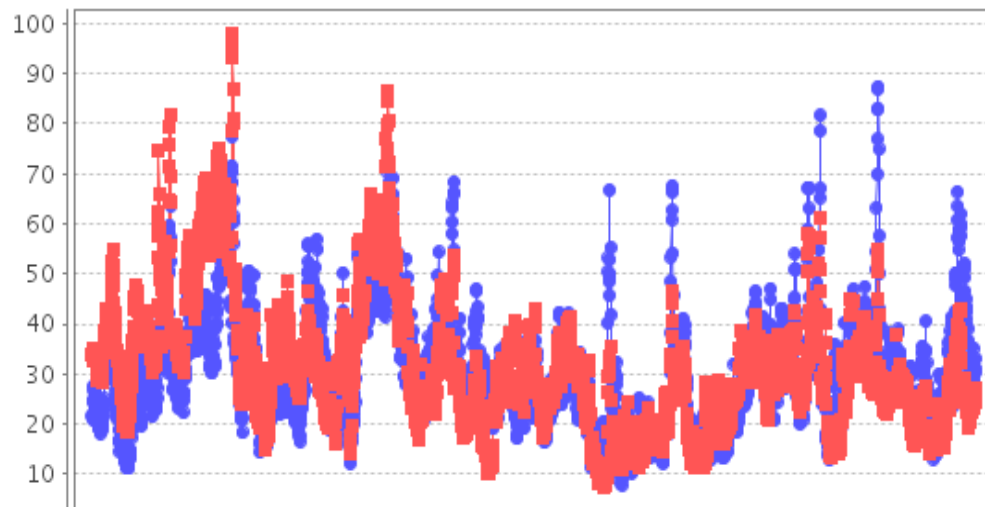
Connectivity Services: GÉANT+ circuits
InfiniCortex project
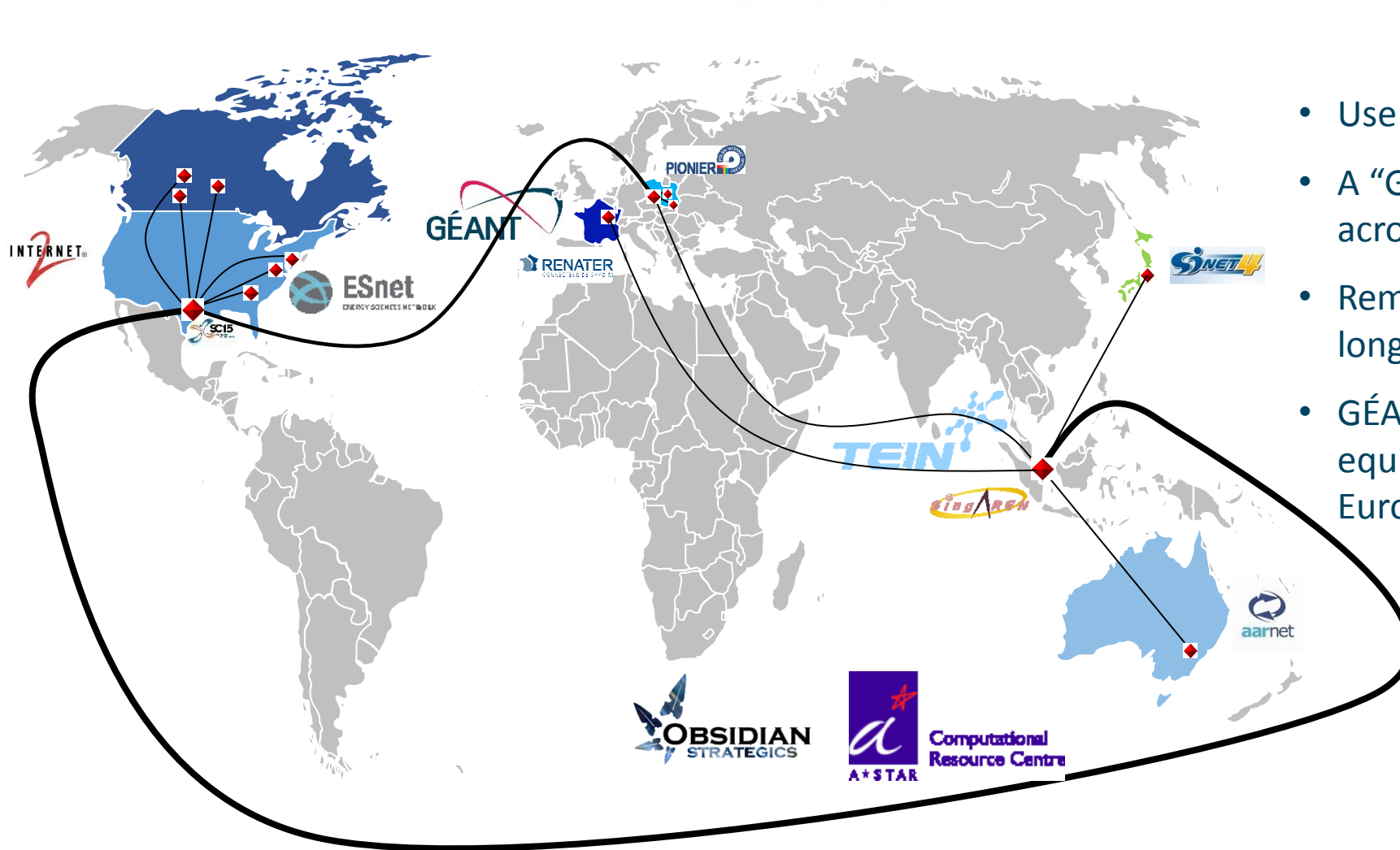
- Use of InfiniBand on the WAN

- A "Galaxy of Supercomputers" scattered across the world

- Remote Direct Memory Access over long-distance connection

- GÉANT will host some InfiniBand equipment in the London PoP for a European InfiniCortex infrastructure

Network Performance Monitoring: *perfSONAR*

perfSONAR

- Tool to monitor network performance
  - Bandwidth / Latency / Jitter / Trace route

- Previously two versions: perfSONAR MDM and perfSONAR PS
- Now just one version for use globally by R&E Networks and Institutions!
- Single website: http://www.perfsonar.net/

perfSONAR

perfSONAR Home

About perfSONAR

What is perfSONAR?
How does it work?
Why use perfSONAR?

Download   FAQ   Mailing List

PerfSONAR

Please log in using your perfSONAR UI account or a Federated Identity Provider

perfSONAR UI:
Login using embedded user database

perfSONAR UI Login

Federated Login:
On the next page please select your Identity Provider from the list and complete login with your credentials

Organizational Login

- Web User interface
  http://psui.geant.net/
- In eduGAIN

- Over 1100 BWCTL and OWAMP
  MPs deployed globally

The GÉANT Performance Community for All:
eduPERT

- A world-wide Open Community for Performance Enhancement Response Teams,
- A virtual community covering performance issues for R&E networks.

- Discussion group: pert-discuss@geant.net
- Knowledge database: http://kb.pert.geant.net
- Monthly calls
- Performance Workshops / Performance U!
- http://services.geant.net/edupert/Pages/Home.aspx

Questions, Remarks, Inputs are very welcome!
Please contact eduPERT:
pert-discuss@geant.net
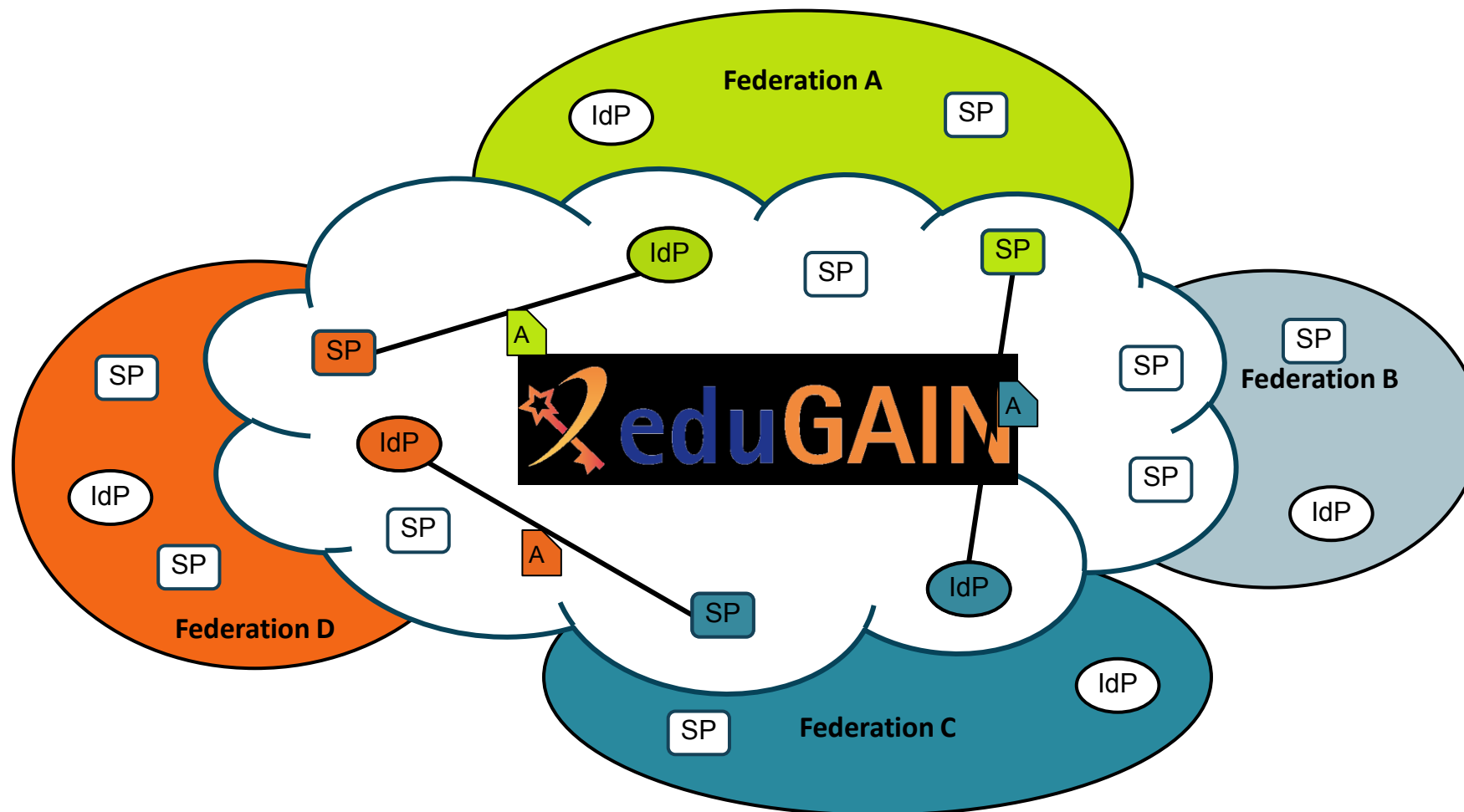
Trust and Identity:
eduGAIN

The GÉANT eduTEAM service was developed to provide a platform as a service Authentication and Authorization infrastructure for Collaborative Organizations (VOPaaS)

By adopting a collaborative and user-requirements driven approach, AARC works to deliver a framework that builds on eduGAIN but it is interoperability with existing AAIs.

Support for International Users

- **Dedicated User Support Team**

- **Single point-of-contact for international collaborations and organisations**

- **Providing a one-stop-shop**

- **Policy and technical consultancy**

- **User's voice within GÉANT**

  - NREN feedback, Surveys

  - Conferences, Focus Groups….

The One-stop-shop concept

- Work closely with Users, NRENs, other e-Infrastructures and GÉANT subject experts

- Discuss and understand user requirements

- Develop a consolidated and consistent solution for all involved sites:

  technical/administrative/financial/contractual

- Ensure seamless service implementation and operation through full project lifecycle management

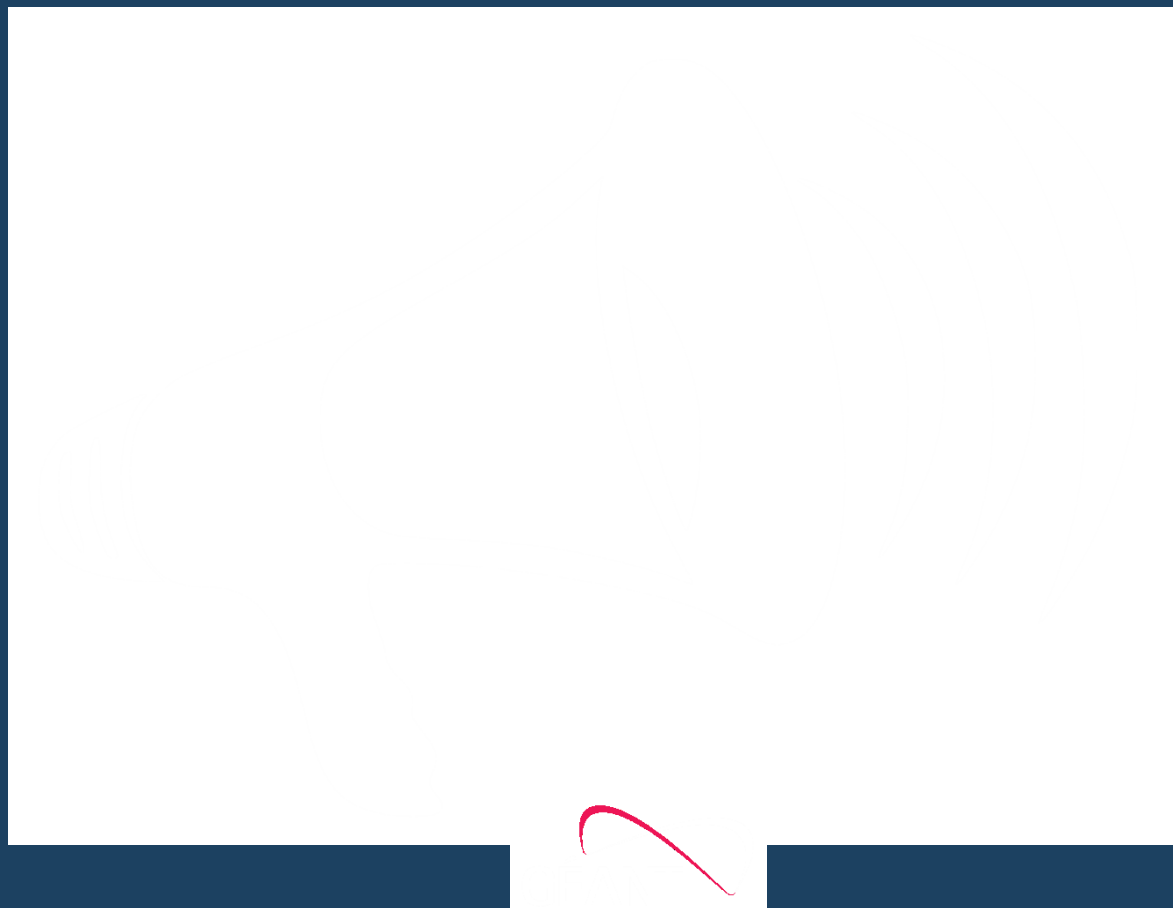- Respect for the NRENs administrative boundaries→ GÉANT connects networks, not end-sites
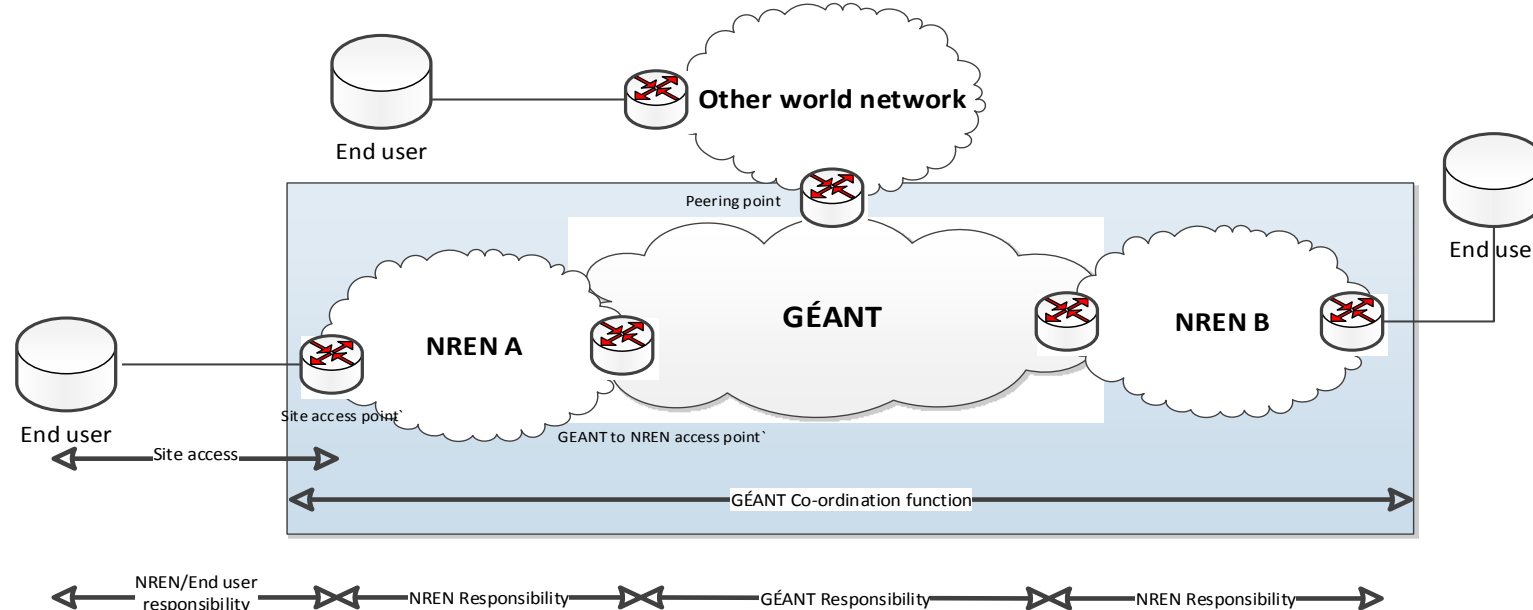
Expanding the collaboration
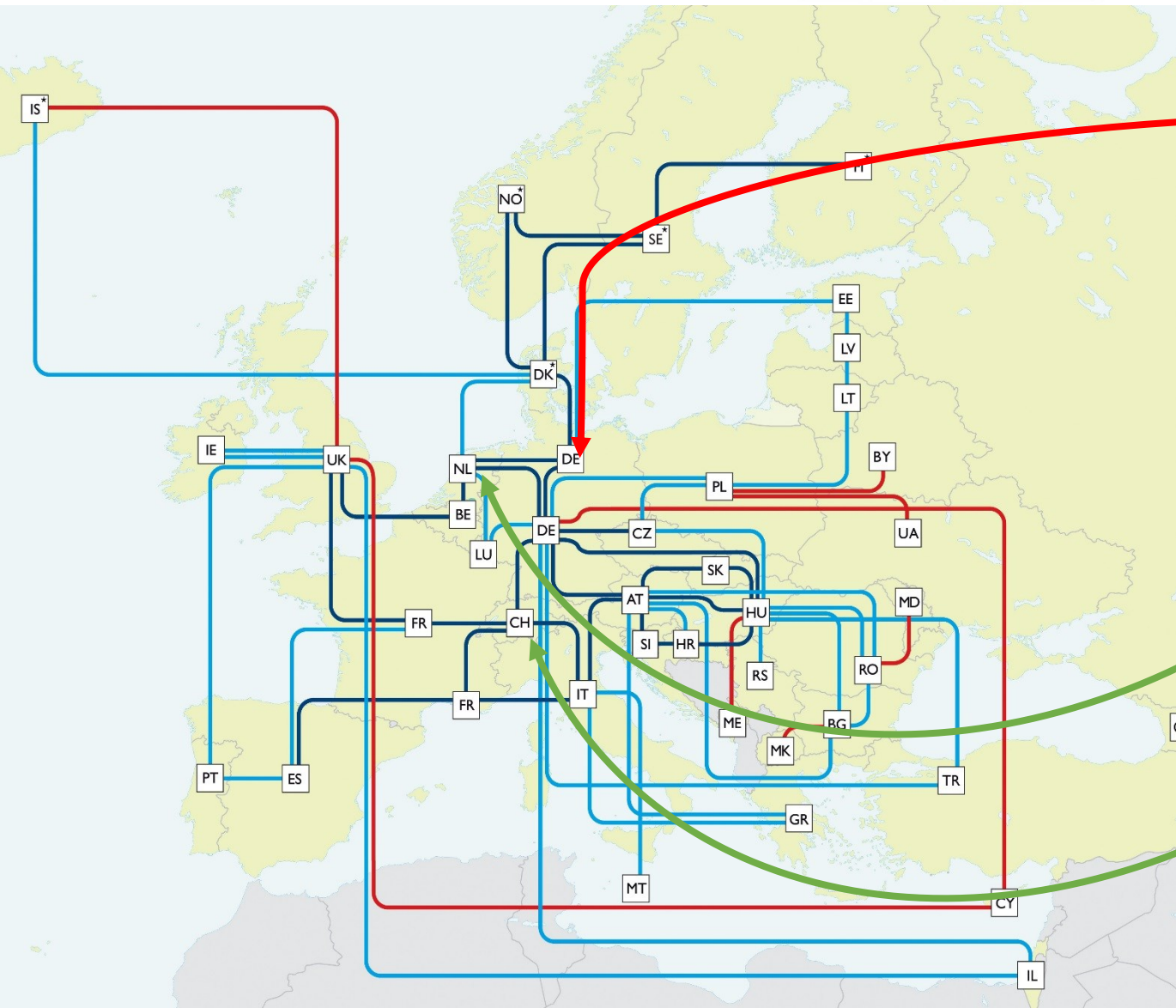
- Increase the connectivity to Europe

  - Join forces with other science groups (e.g.: Synchrotrons, Radio-astronomy, etc.)

- **eduroam**

- **eduGAIN**

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