

NORDUnet Outlook

René Buch

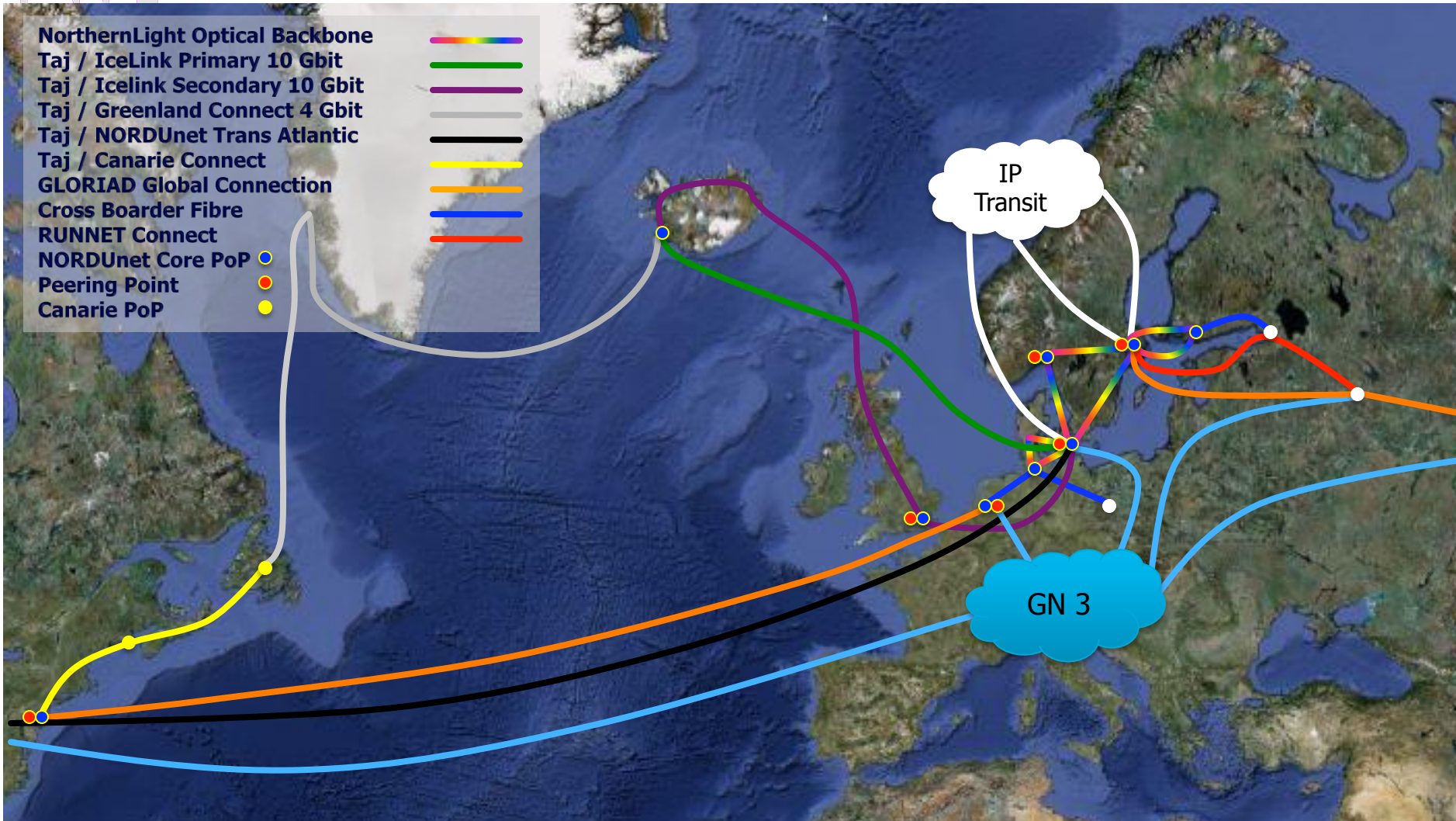
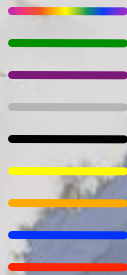
CEO

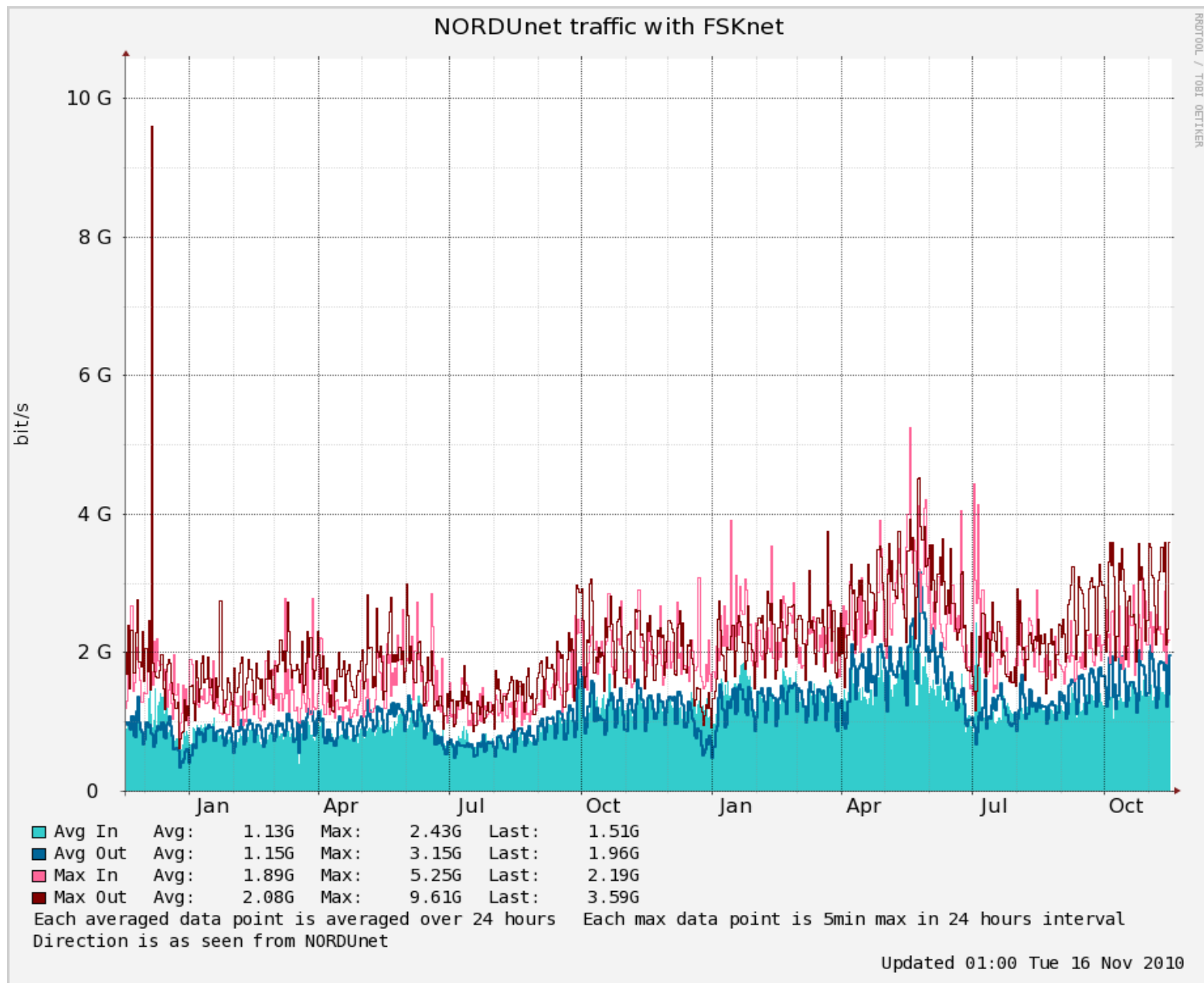
NORDUnet

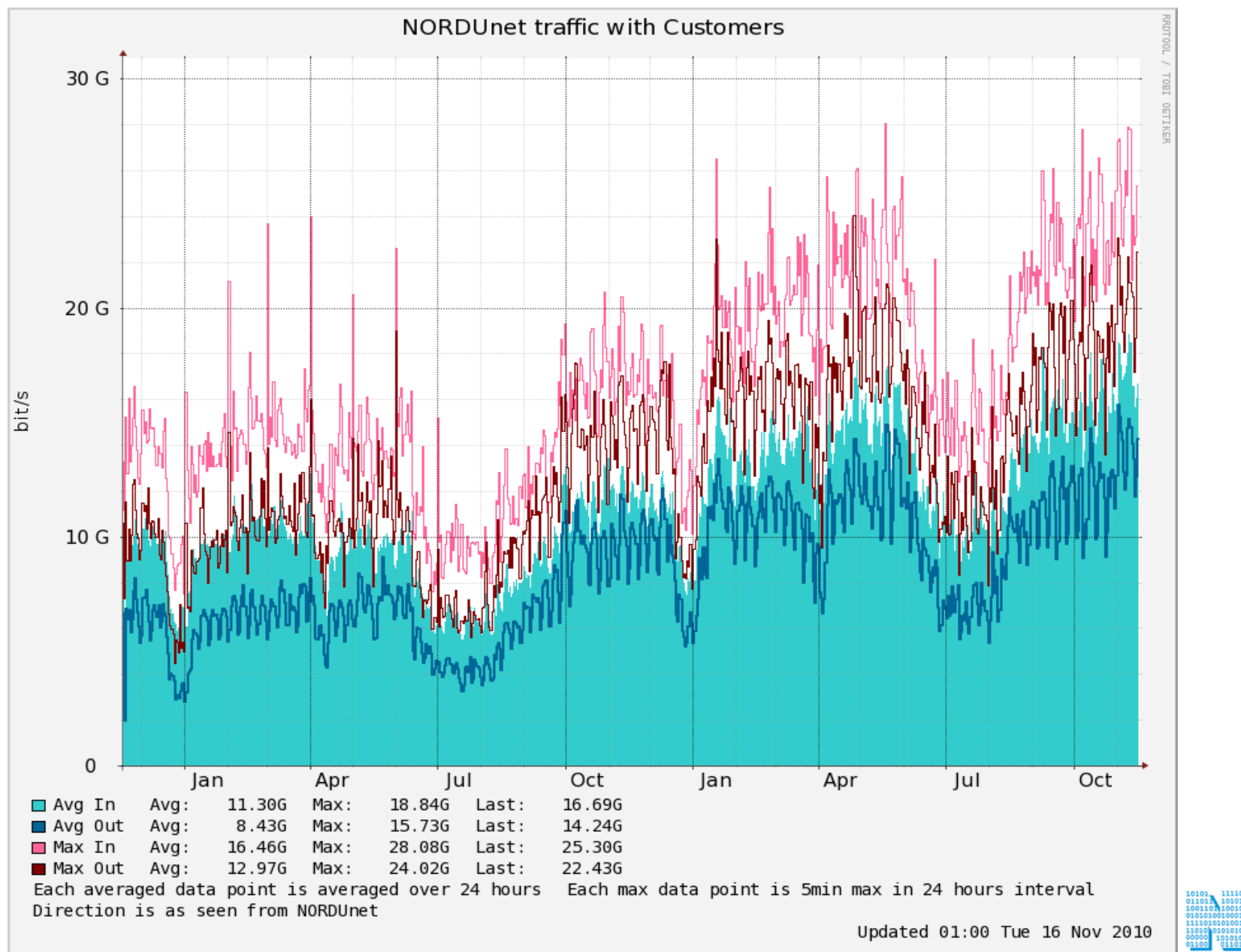
Nordic Infrastructure for Research & Education

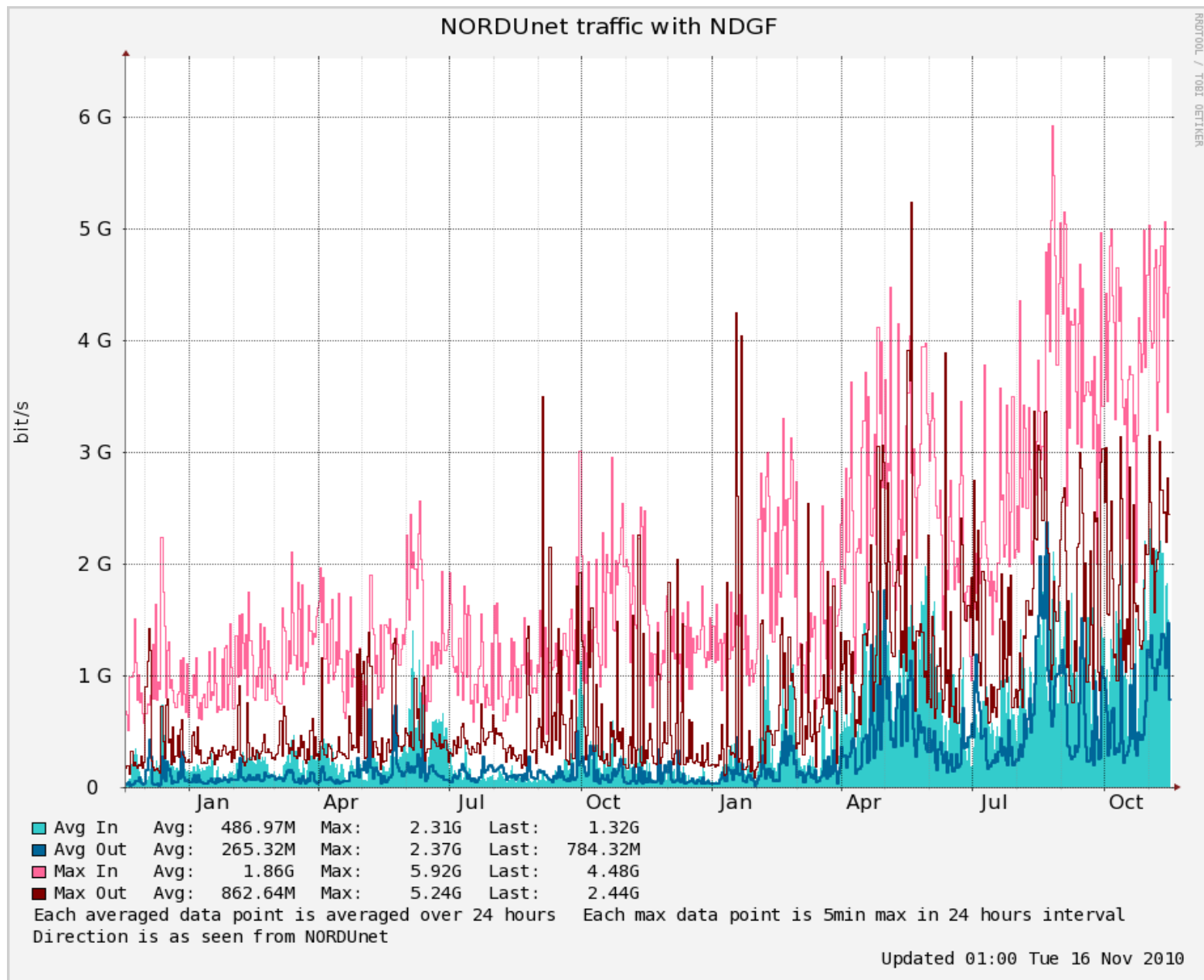
1. NORDUnet Network Status
2. Key Technology Development
3. Knowledge Infrastructure

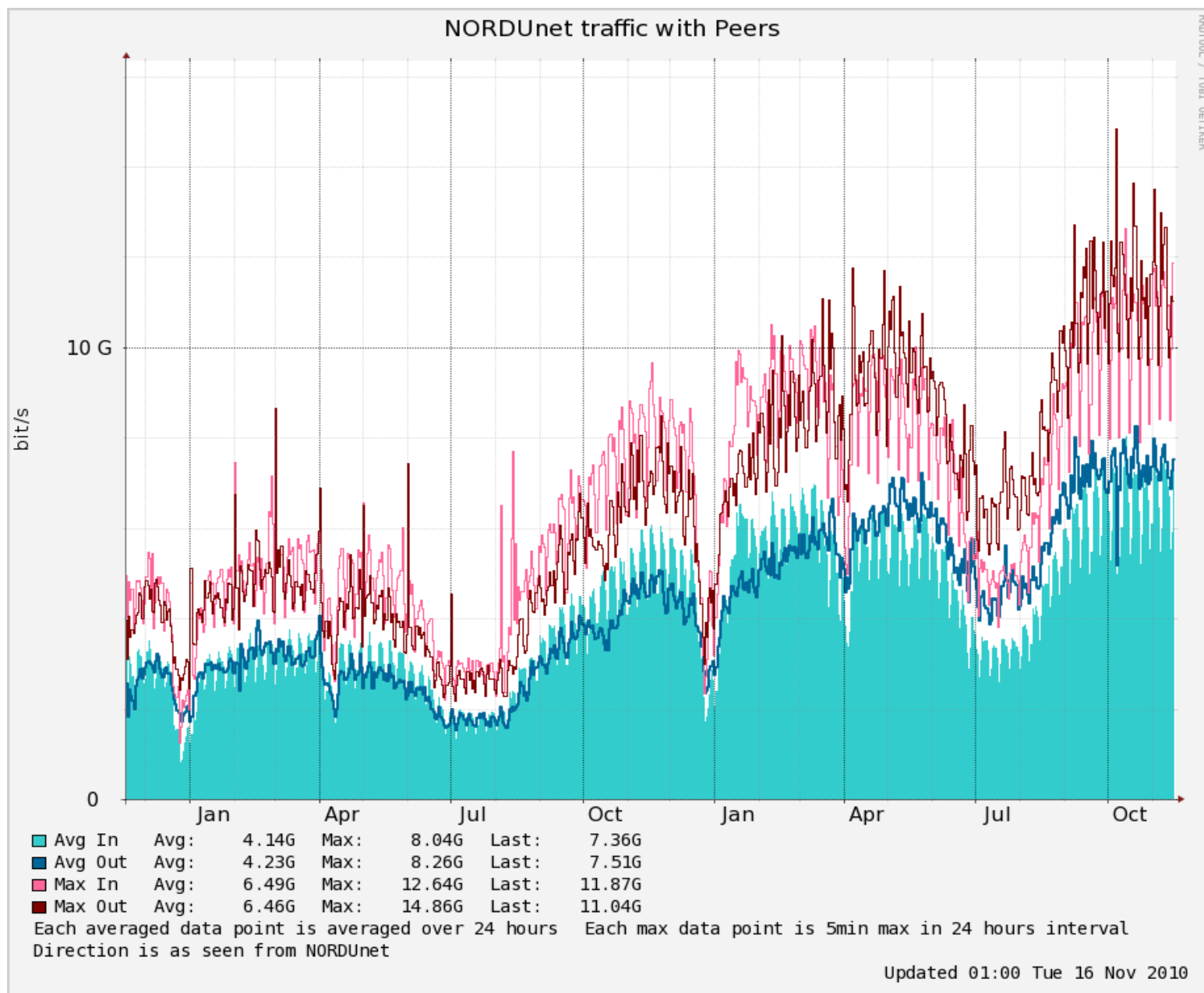
NorthernLight Optical Backbone
Taj / IceLink Primary 10 Gbit
Taj / Icelink Secondary 10 Gbit
Taj / Greenland Connect 4 Gbit
Taj / NORDUnet Trans Atlantic
Taj / Canarie Connect
GLORIAD Global Connection
Cross Border Fibre
RUNNET Connect
NORDUnet Core PoP ●
Peering Point ●
Canarie PoP ●

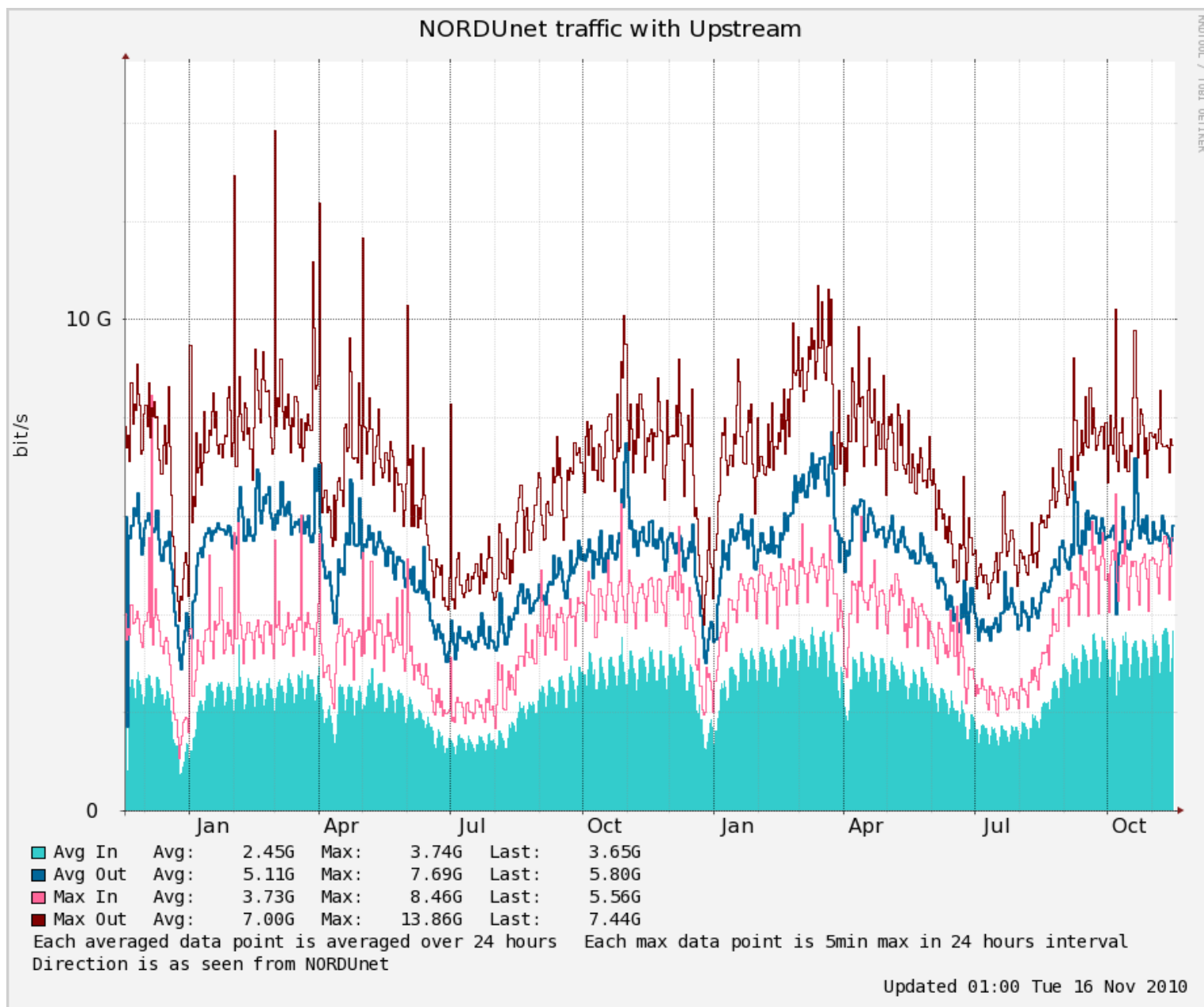


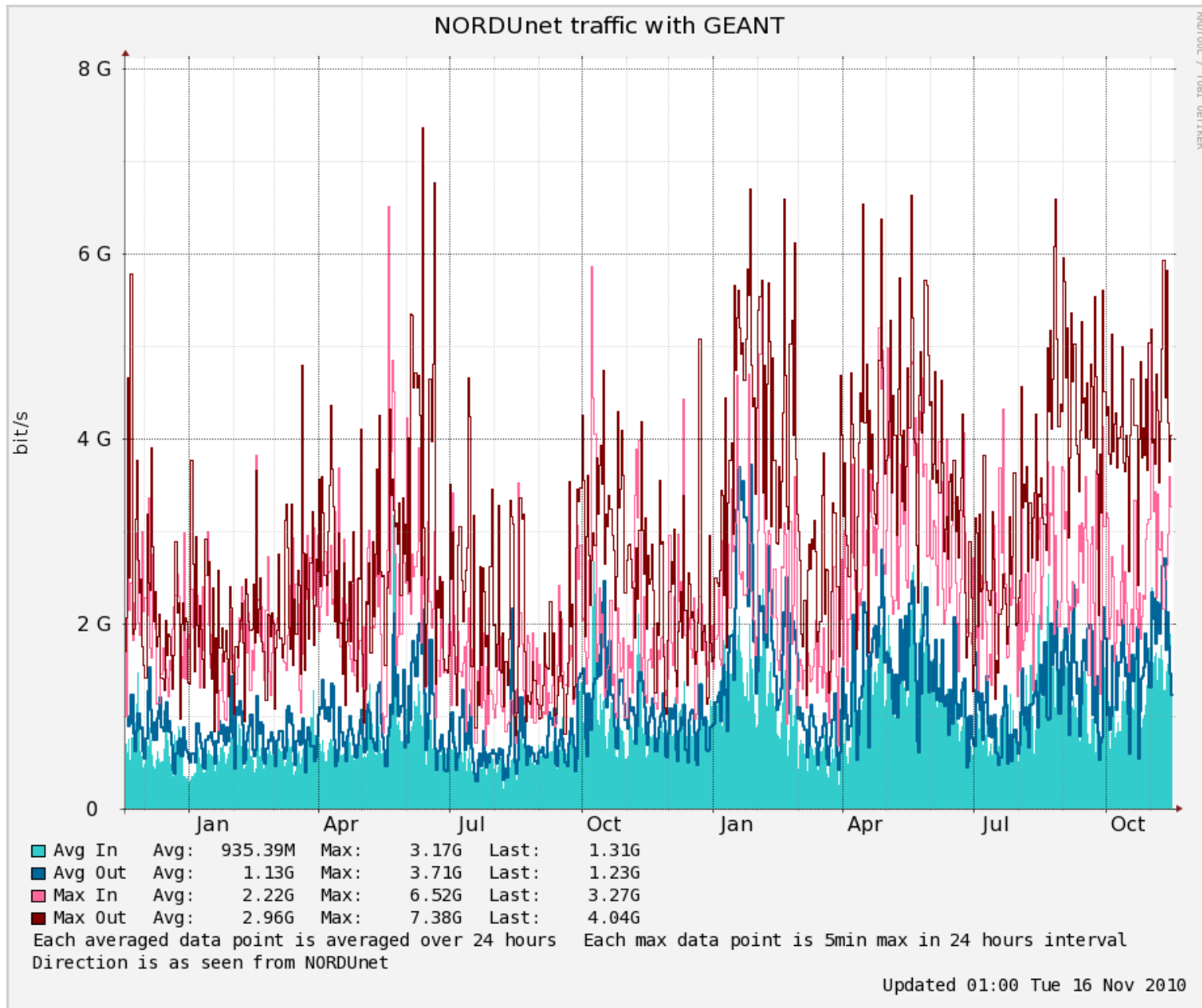


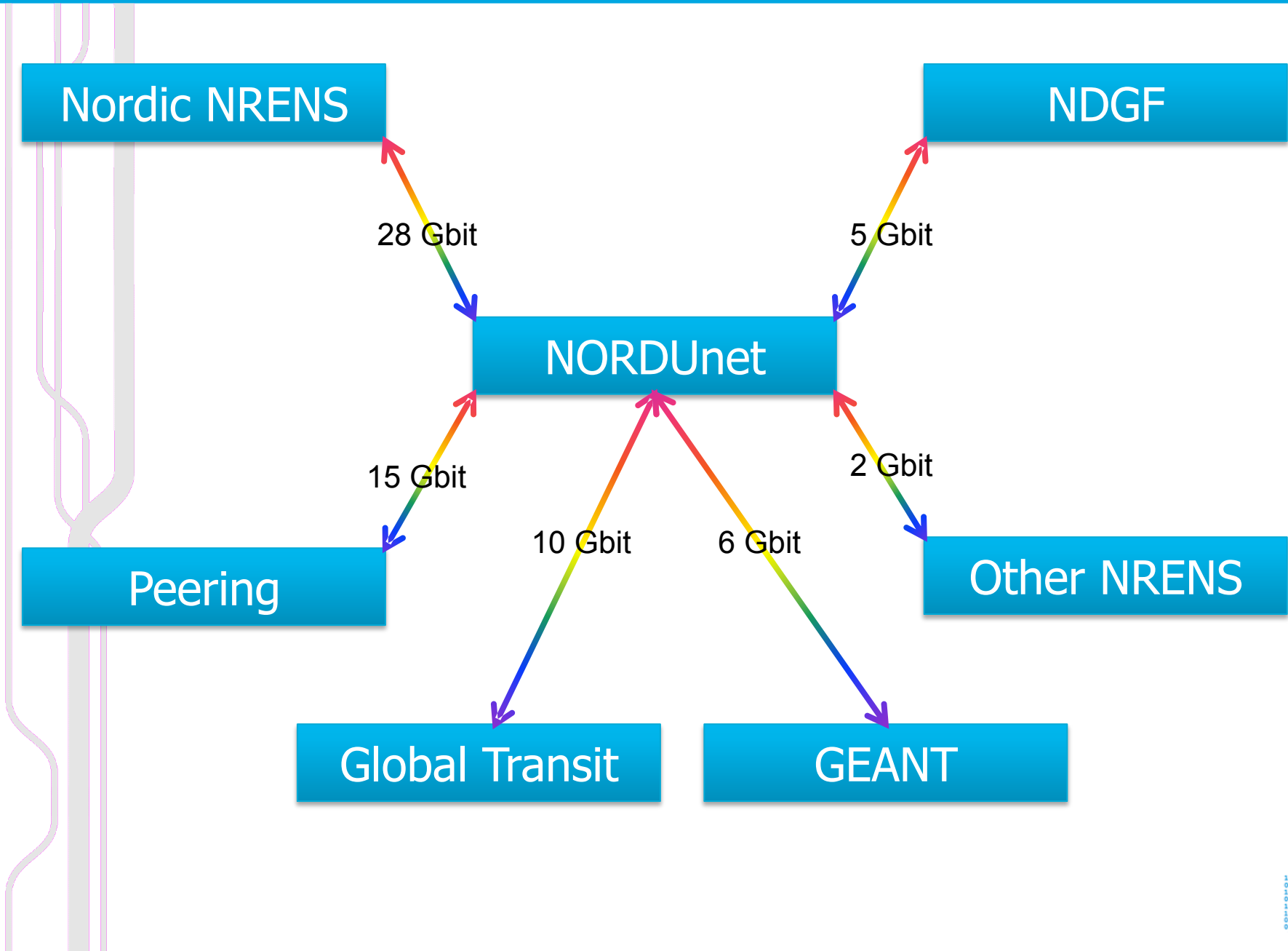












- Troubleshooting:
 - http://www.nunoc.net/nunocweb/open_trouble_tickets.html
 - <http://twitter.com/nordunet>
- Netværks Statistik
 - <http://stats.nordu.net>

	Research Connectivity	IP Transit	adLab	NOC	GN3	Community Services	Equipment Hosting	Virtual Server	Adobe Con	VCONF	EU proj	Media Dist	File Share	SPAM Filt
Forskningsnett	X	X			X		X			X				
FUNET (CSC)	X	X	X		X									
RHnet	X	X			X					X				
SUNET	X	X	X	X	X	X	X	X	X			X	X	X
UNINETT	X	X	X		X		X		X					
WAYF				X		X		X						
NDGF	X		X	X		X	X				X			
RUNET	X	X	X				X							



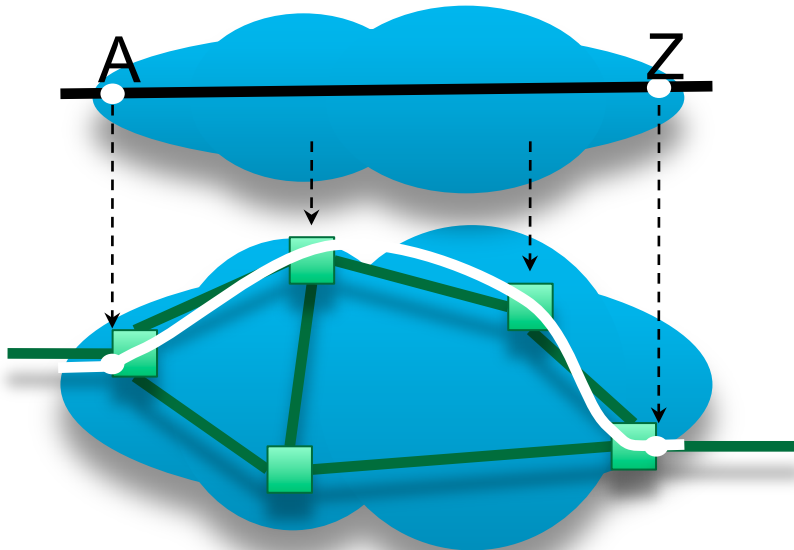
- Stadig Kraftig i trafik vækst på 30+ % YoY
- Flere High Capacity Users
- Effekt af Finanskrisen i Globalt
- Network as a Service
- Applikations drevet kapacitets behov
- Focus on Bruger tilgængelighed og bruger oplevelse for at nå nye brugergrupper

Technology Development within the R&E Networking Community

Key emerging trends and
the technologies necessary to realize them

- **Network Virtualization (NV)**
 - Separates logical (service) functionality from physical infrastructure.
 - The virtualization layer maps logical functionality to a physical layout
 - Expresses network functionality as a set of quantifiable service capabilities
 - Example: VLANs provisioned over a switched Ethernet core
- **Network Federation (NF)**
 - Creates a single network entity from a set of independent network resources.
 - Integration of independently contributed (owned/managed) network resources into a single operational/administrative entity.
 - Example: GLORIAD – CSTnet+NORDUnet+Tata+KREOnet, ...
 - Differentiates the "Service Provider" from the "Infrastructure Provider"
- Together, NV and NF provide the ability to create flexible network service topologies that span global hardware/transport providers and that can function as a single coherent network service provider.

- What it is:
 - The network is presented as a set of services – A set of functions that can be performed, and a set of resources that are manipulated to deliver the requested functionality
 - A service “instance” is the functionality delivered as a result of the service interaction (the service request).

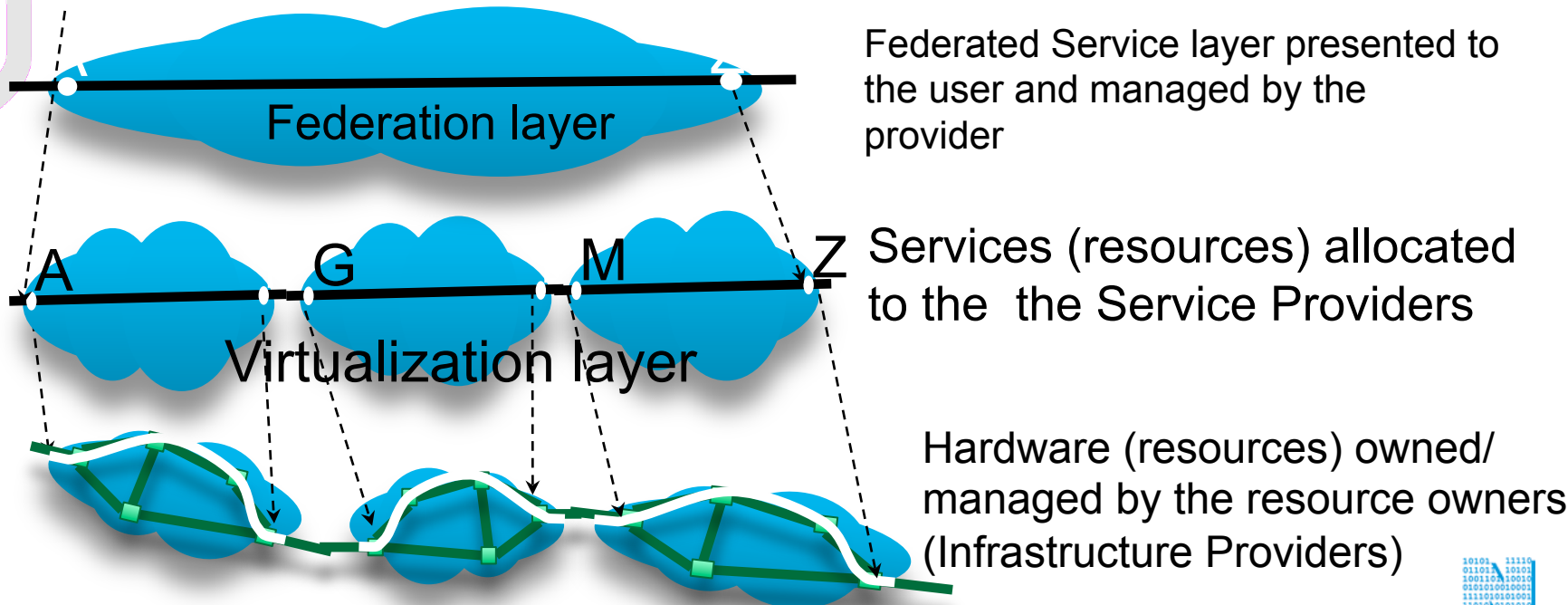


Service request: A “*connection*” -
from A to Z, with *certain capacity*,
with *certain framing*.

Virtualization layer - the intelligence
that maps the request constraints to
the available resources...

Physical layer – configures the
hardware assets [ultimately]
realizing the functionality
requested.

- What it is:
 - Differentiates the Service Provider from the Infrastructure Provider
 - Allows the service provider to compose a more sophisticated/comprehensive service environment from a collection of basic infrastructure resources
 - In network federation, the basic resources may be facilities (fiber, switches, colo space, etc) and/or other virtualized resources (e.g. VLANs, virtual routers, [G]-MPLS LSPs, etc.)
 - Federation allows a common set of administrative and/or management policy and/or procedures to be applied across the aggregate resources in the federation



A Globalized Knowledge Infrastructure

René Buch

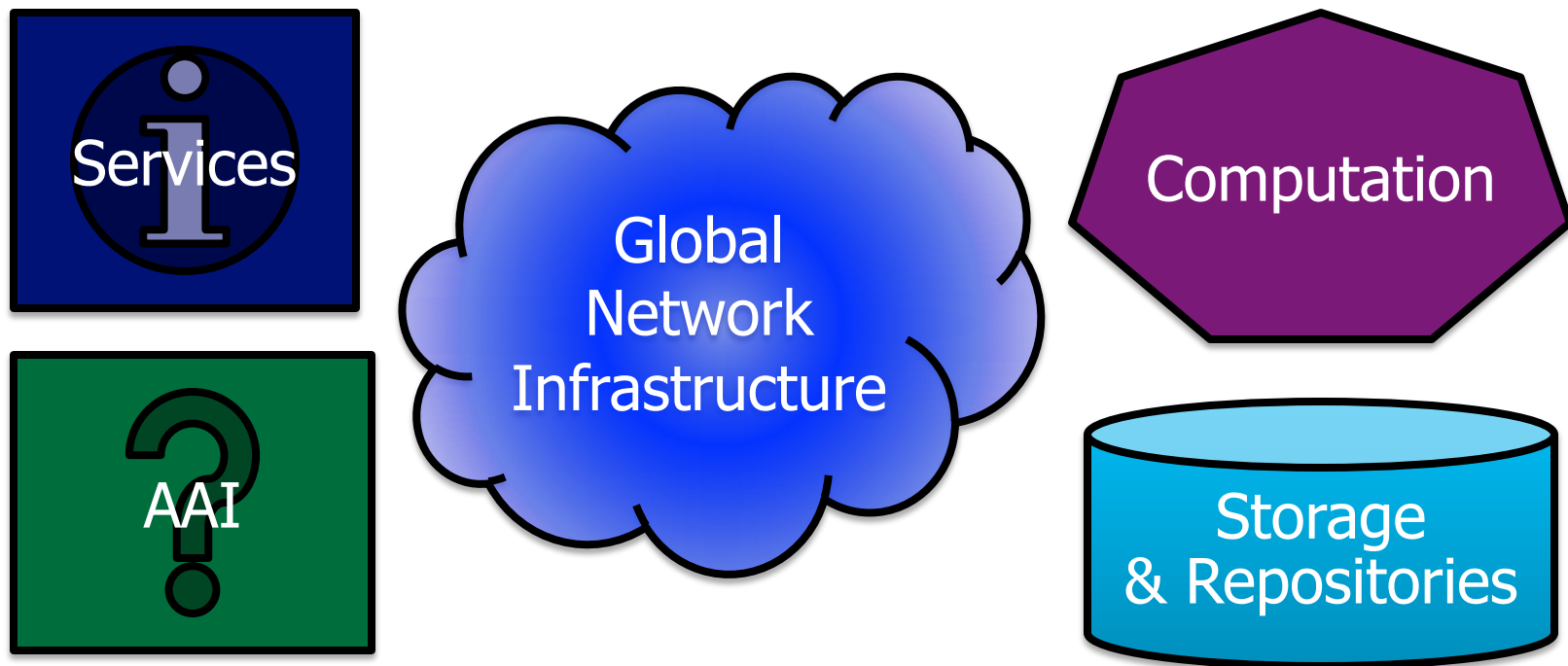
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Nordic Infrastructure for Research & Education

“Information at your fingertips”

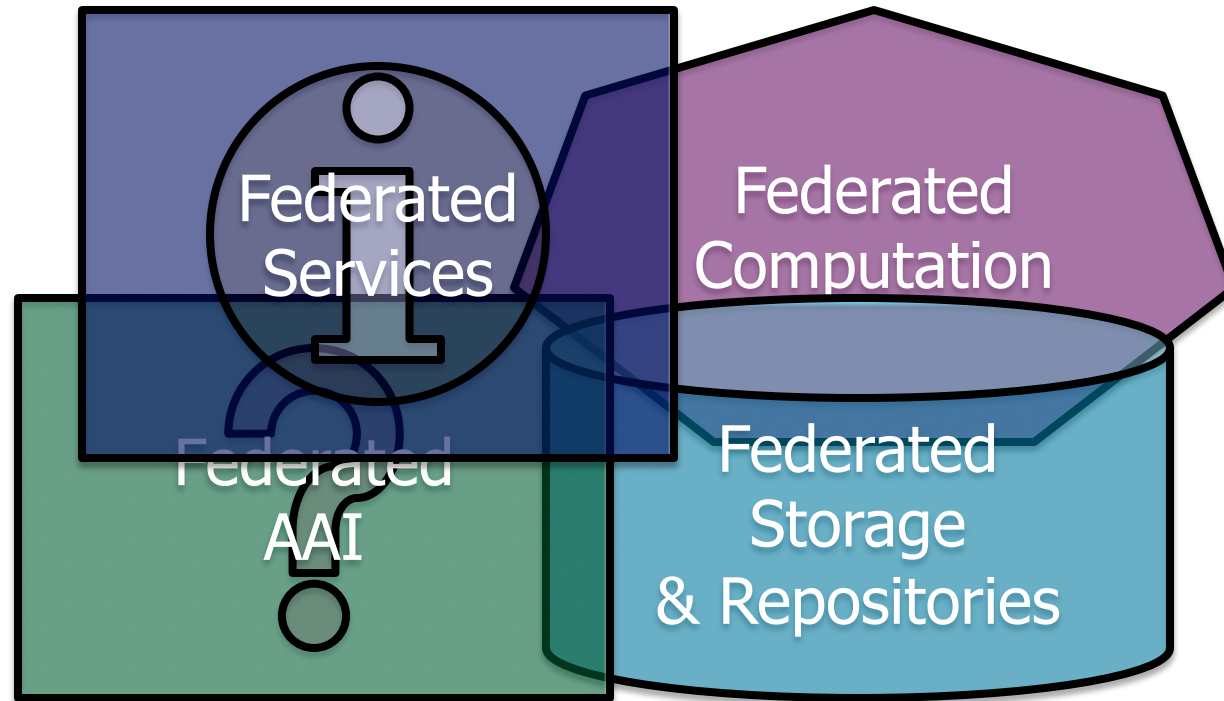
Bill Gates - 1990



Characteristic:

- Fragmented
- Little Inter discipline coordination
- Each discipline has internal challenges
- Competition rather than collaboration
- Highly Complex
- Few but Advanced Users – Knowledge Divide

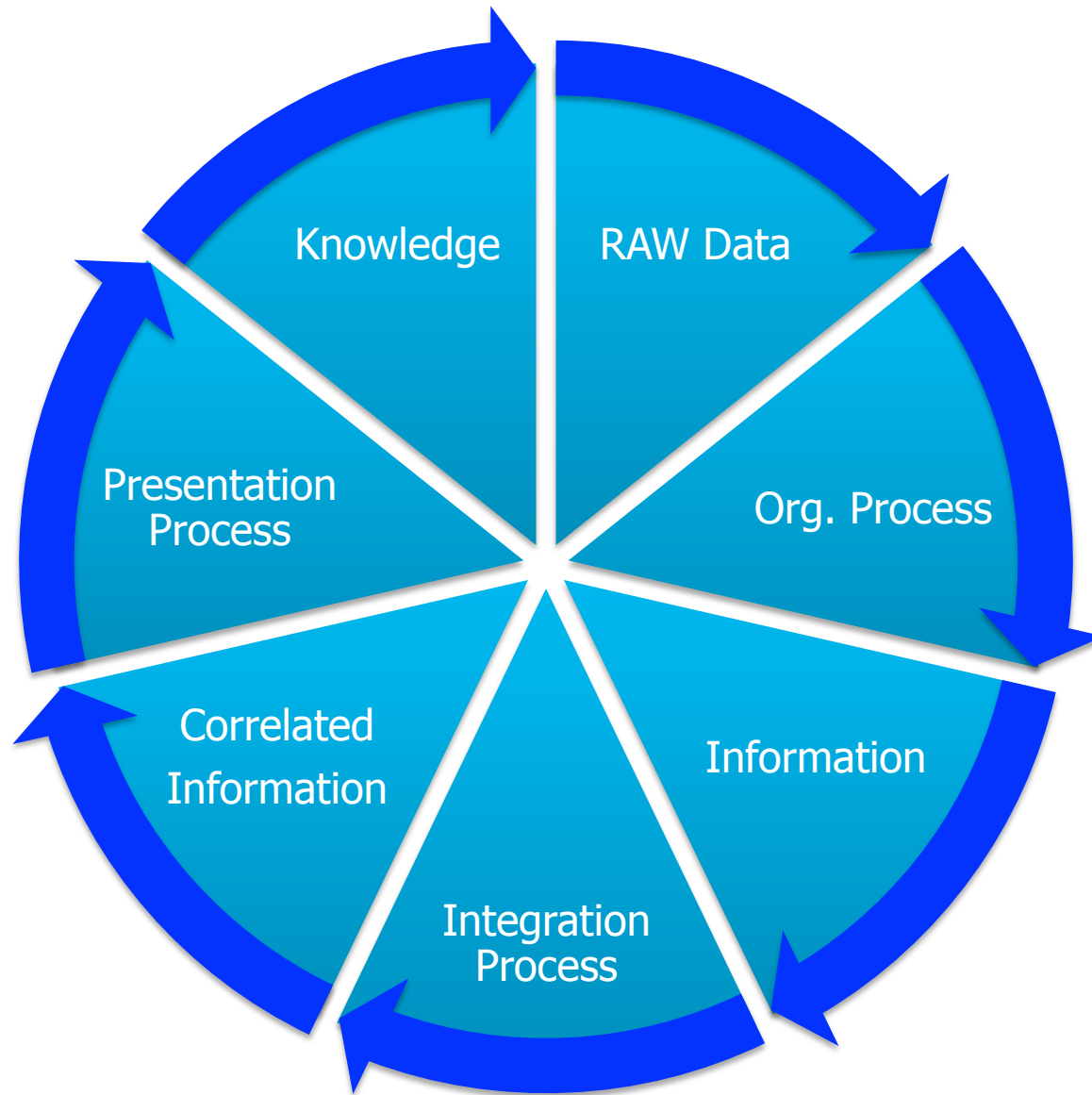
- The ability to provide knowledge require the scientist/teacher to have a significant amount of technical capability.
- The ability to access knowledge require the user/student/scientist to have the necessary technical capability.
- This requirement for a certain technical skill set creates a significant knowledge divide.



Characteristic:

- Coherent but still complex
- Federated - Common Commitment
- Collaboration rather than Competition
- Still for the few advanced users

Knowledge Infrastructure



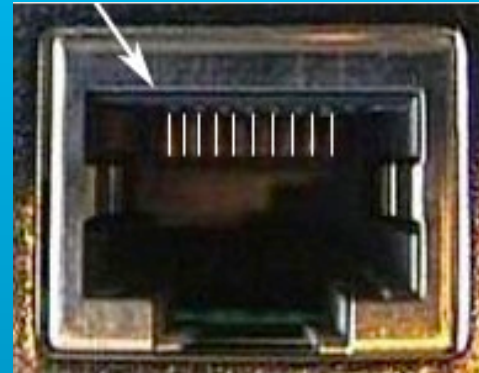


Federated Global Network Infrastructure

Characteristic:

- Synergetic
- Incorporates ALL Science areas.
- Collaborative
- For the masses





FROM

- A few scientific disciplines
- A technical complex setup
- A High usage threshold
- A few advanced users

TO

- Encompass all science areas
- Simple access methodology
- A low usage threshold
- All users

- It is also about integrating knowledge from separate sources presenting it in an easy to access manor enabling the society to reveal new relationships/ correlations in new and existing knowledge
- The educational challenge for the future generations needs to be addressed all ready from the early days in primary school to enhance the knowledge sharing capabilities.
- The threshold of accessing knowledge infrastructure needs to be lowered significantly by utilizing new and innovation technologies that enable users to easily produce and share information they possess in a format that is easily obtainable by others.

- A global federated network infrastructure is the first essential step in process of creating a global Knowledge Infrastructure.
- Politically agree to collaborate and sharing of common resources.
- Networking must be about more than connectivity – it must be a tightly integrated with other Knowledge Infrastructure components
- Create new tools for:
 - Provisioning global circuits and global communication.
 - Manage and monitor a global federated infrastructure.
 - Virtualizing global network infrastructure.

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**NORDUnet Presentation Library can be found at:
<http://wiki.nordu.net>**