# A Globalized Knowledge Infrastructure

## APAN Conference
## Sydney February 2010

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**CEO**

**NORDUnet**

**Nordic Infrastructure for Research & Education**

# NORDUnet Strategy Drivers

## Key strategy drivers

- Globalization and International Competition

  To push the scientific borders further Global Collaboration is necessary and to pool global resources and knowledge fx. CERN, eVLBI GLEON, GENI, CINEGRID etc. This raises the competition between international scientists and institutions.

- Cross Boarder Collaboration - Federated Networking

  To be a recognized as participant in Global Research Projects it requires that national and regional institutions collaborate and pool resources. The Nordic NREN experience is that a coordinating and facilitating interregional coordination body add significant value to the national efforts as a common level play ground.

- Network Paradigm shift

  In addition to the general usage of the network the requirements for specialized high capacity E2E connections are rapidly increasing. This requires a new approach to inter network and inter organizational provisioning and coordination.

- Dependencies of various disciplines

  In addition to the paradigm shift in networking the interdependencies between multiple disciplines like Networking, Storage, GRID, AAI etc. raises the international and inter regional coordination challenges to a new complexity level.

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# NORDUnet Mission

## *The NORDUnet mission builds on the following five pillars:*

### 1) Connectivity

NORDUnet shall build and operate a world-class network infrastructure for the Nordic research and educational community.
NORDUnet shall achieve this through shared infrastructure or bilateral collaboration where it makes strategic, operational and financial sense.

### 2) Coordination of network research and development

NORDUnet shall actively monitor network research activities and development projects coordinating and facilitating Nordic involvement and participation.
NORDUnet shall actively facilitate best practice and lead knowledge sharing within the Nordic NREN community.

### 3) Network & eInfrastructure Services

NORDUnet shall build and operate network and other eInfrastructure services in response to the individual needs of Nordic NREN's taking advantage of operational synergies.

### 4) International Representation

NORDUnet shall, on behalf of the Nordic NREN's, act as the Nordic representative towards GÉANT and DANTE bodies.
NORDUnet may act as the Nordic representative or as a coordinator of important issues and proxies towards other international bodies as applicable.

### 5) Operational Paradigm

NORDUnet shall operate according to best practices within corporate governance, corporate culture and pursue the best possible utilization of all NORDUnet resources.
NORDUnet shall facilitate both common and individual services as long as they are financially neutral to other NORDUnet activities.

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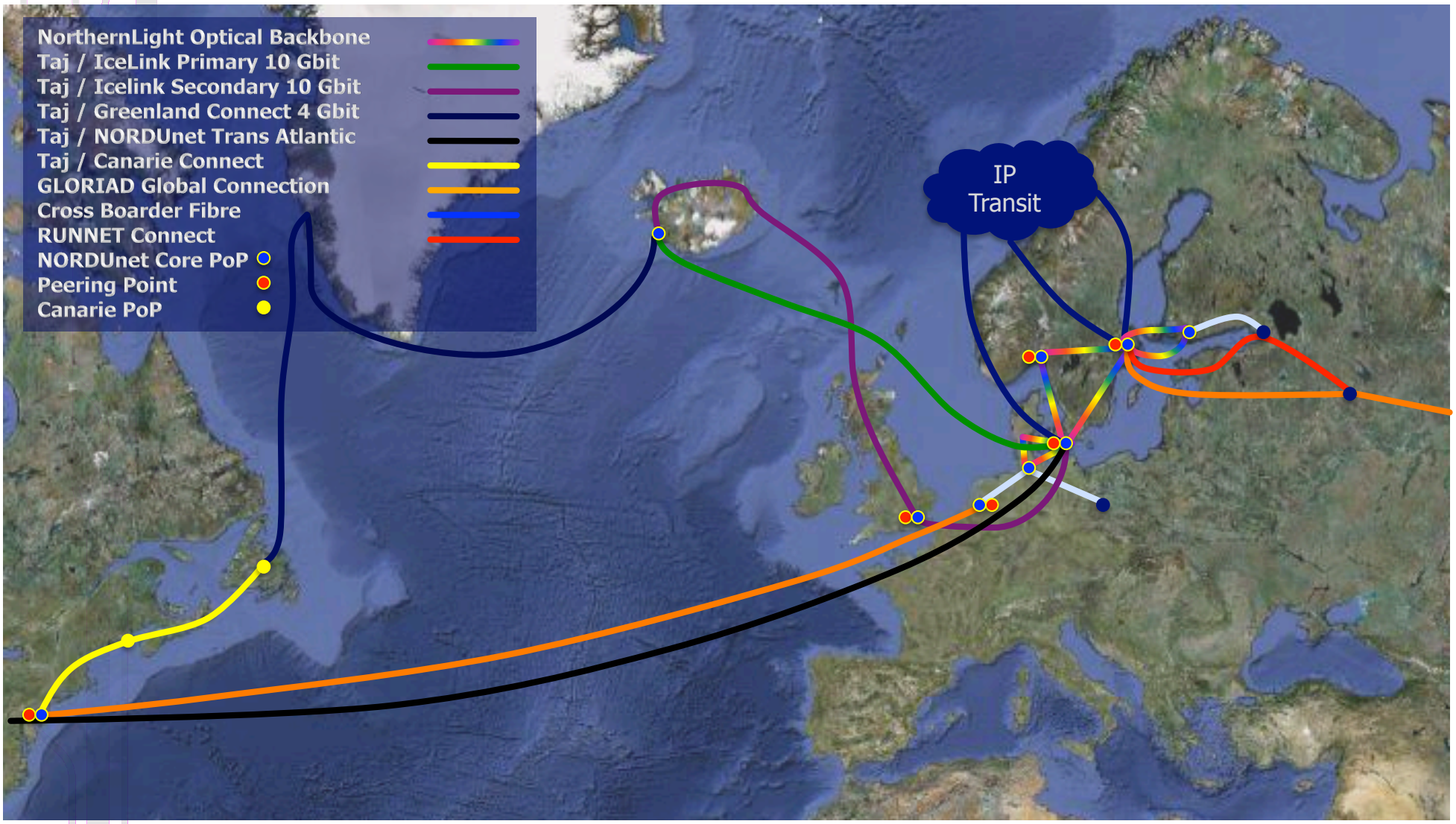
# NORDUnet Q1 2010



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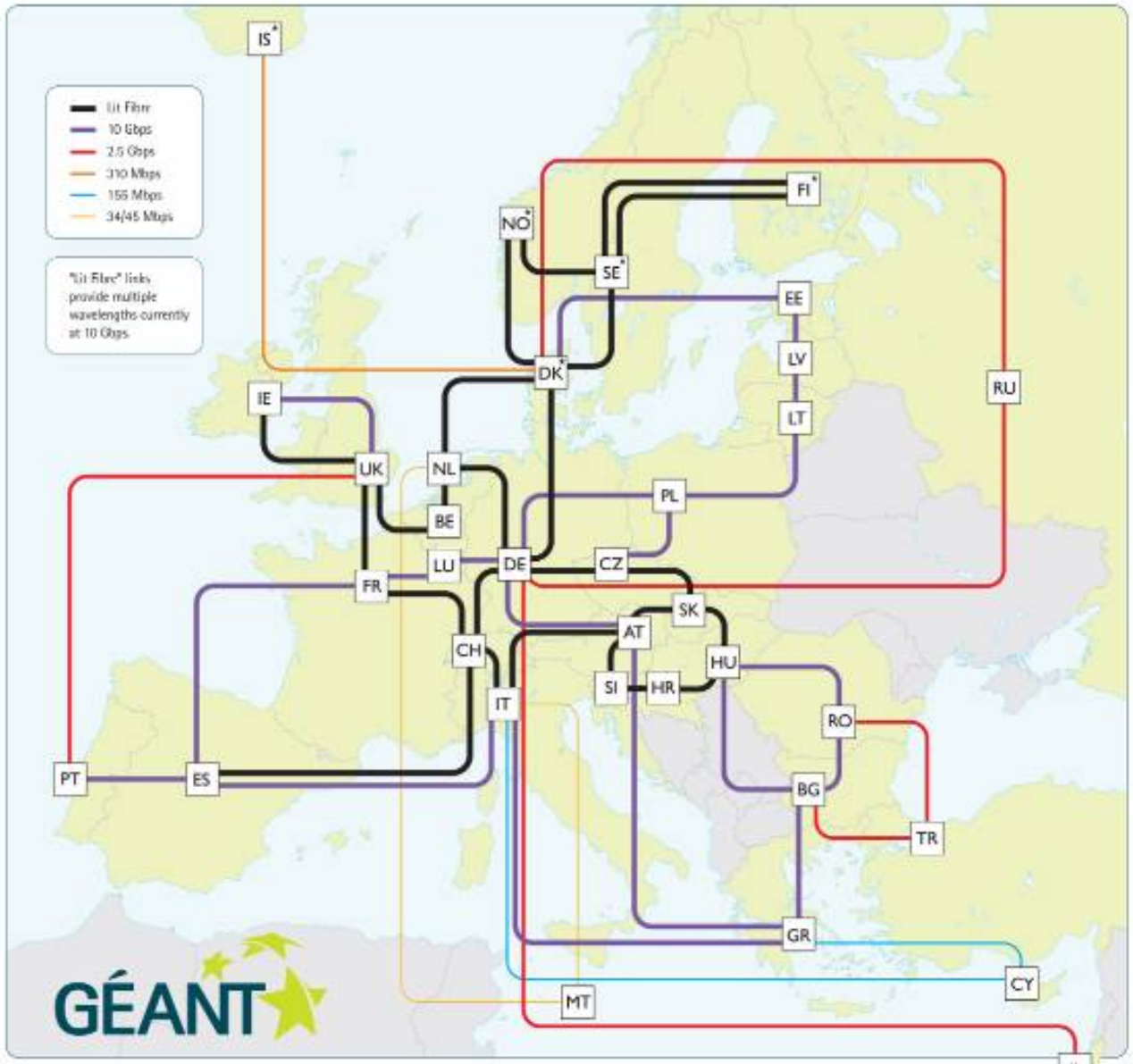
# GÉANT Topology




Backbone Topology April 2009. GÉANT is operated by DANTE on behalf of Europe's NRENs.

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# NREN's – The GÉANT Ecosystem

- Connects 36 European countries through 32 NREN partners
  - Over 3,500 Research & Education (R&E) campuses across Europe.
  - Over 30 million users.
  - Total GÉANT Cost: 40 M€/year (shared equally by the EC & NRENs)
  - Involves more 400 NREN staff in production and R&D activities.
- Including R&E communities across Digital Divides
  - Leverage collaboration via virtualization
  - Enable access to the Knowledge Society
  - Make Big Science affordable at the desktop
- Creating a distributed Critical Research Infrastructure
  - Provision & manage Optical Private Networks for Science: LHC OPN, eVLBI…
- Fostering European innovation by sustaining a vast Network of Excellence to:
  - Test & deploy  bleeding-edge networking technologies.
  - Advance network multi-domain toolsets & federated services

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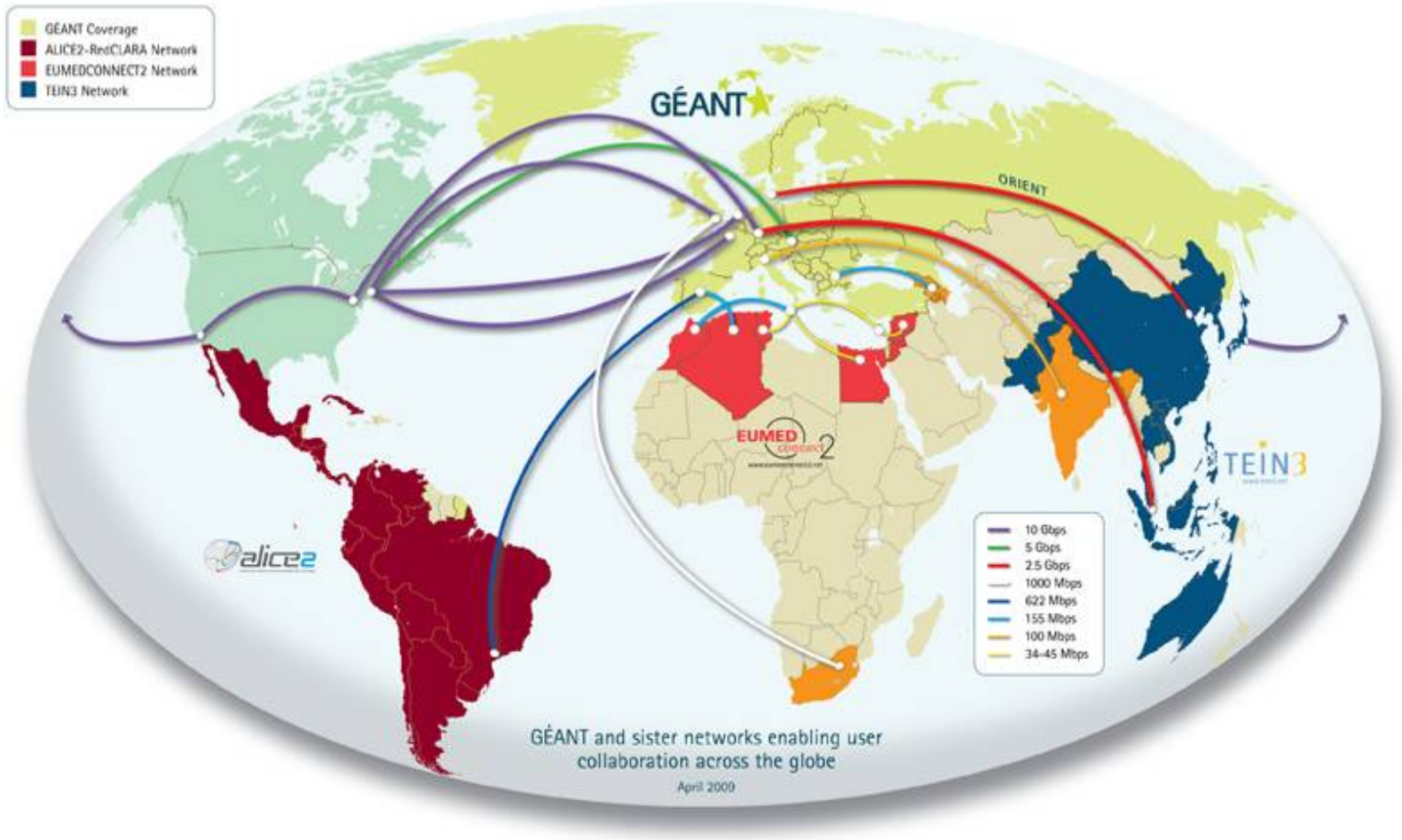
# GÉANT Global Connectivity




GÉANT global connectivity – April 2009

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# Why is APAN Area Important

- Encompasses half of the World Population
- It is a major growth engine.
- It is a major source of new knowledge.

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# APAN

# “Information at your fingertips”

Bill Gates - 1990

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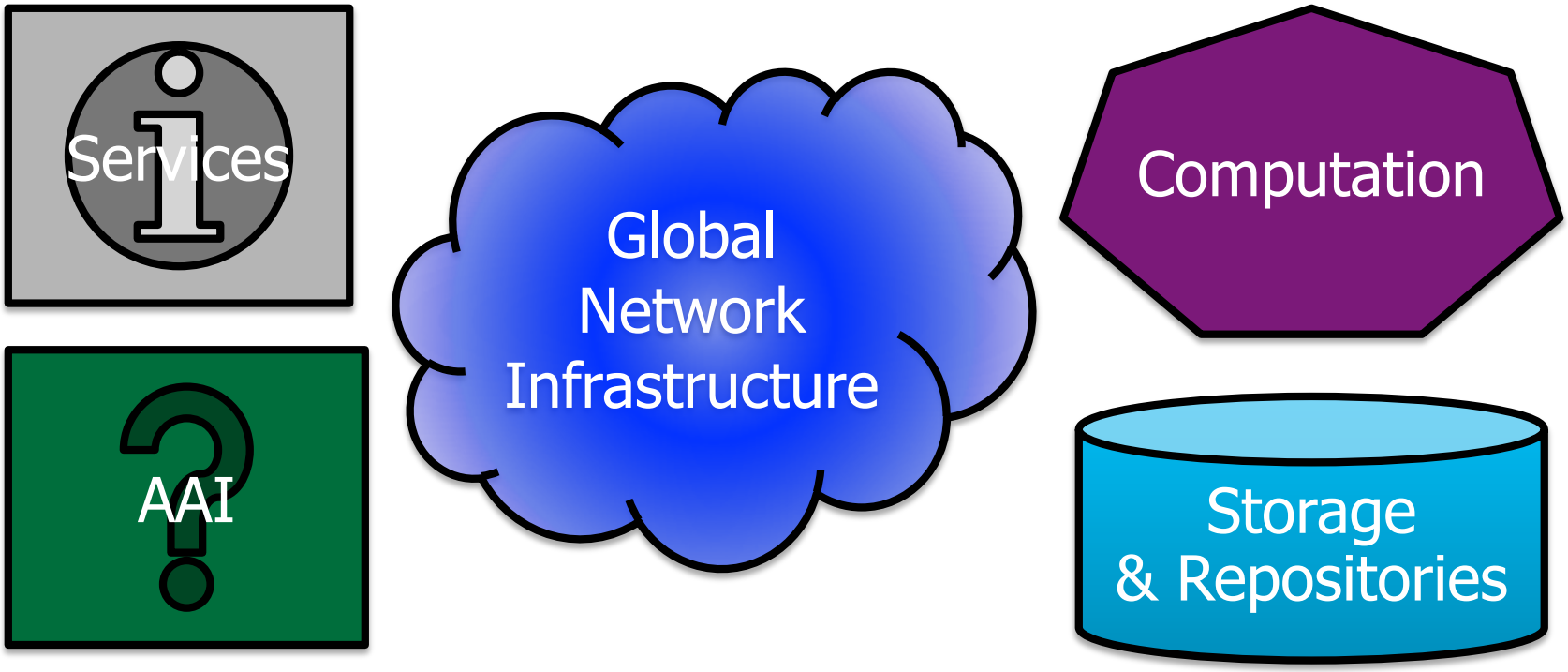
# Today's Infrastructure



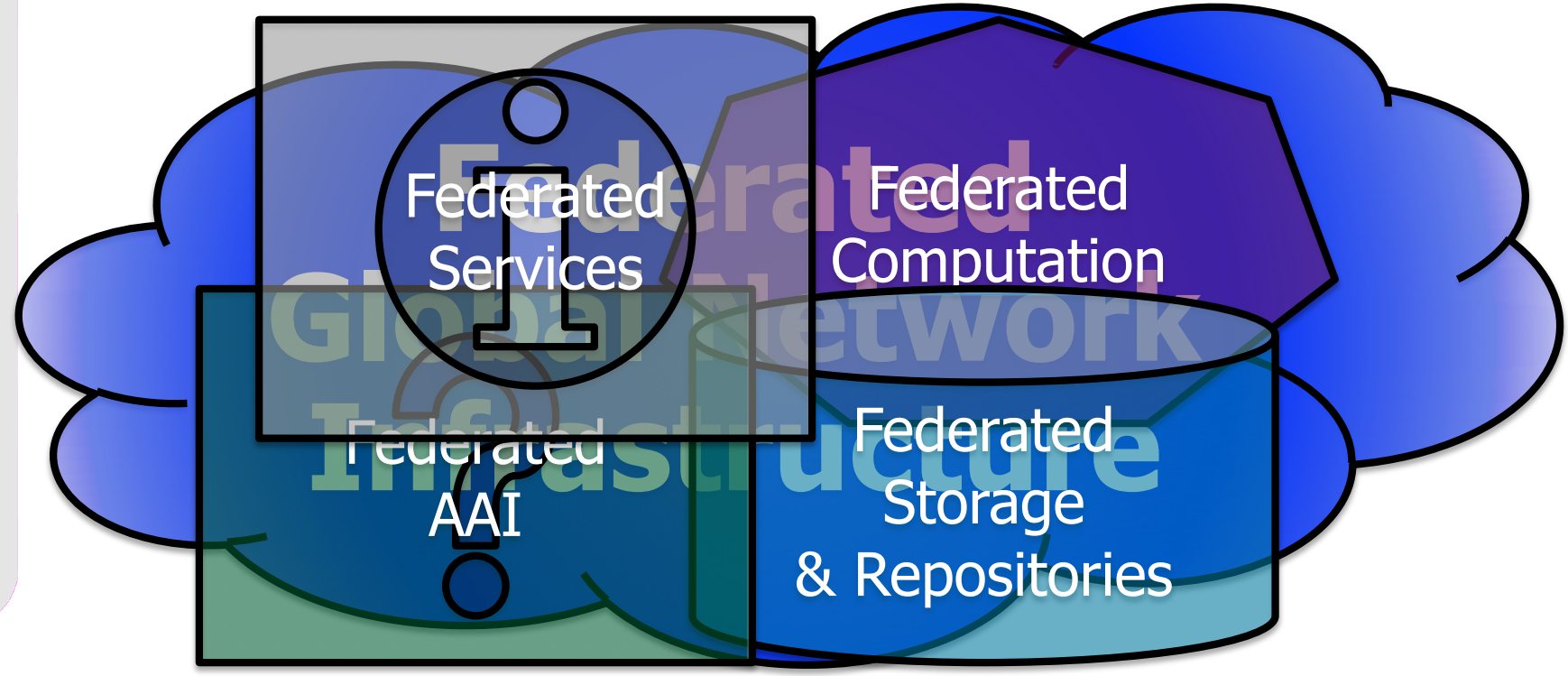

## Characteristic:

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

# The Problem

- 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.

# eInfrastructure




Characteristic:

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

# Knowledge Infrastructure

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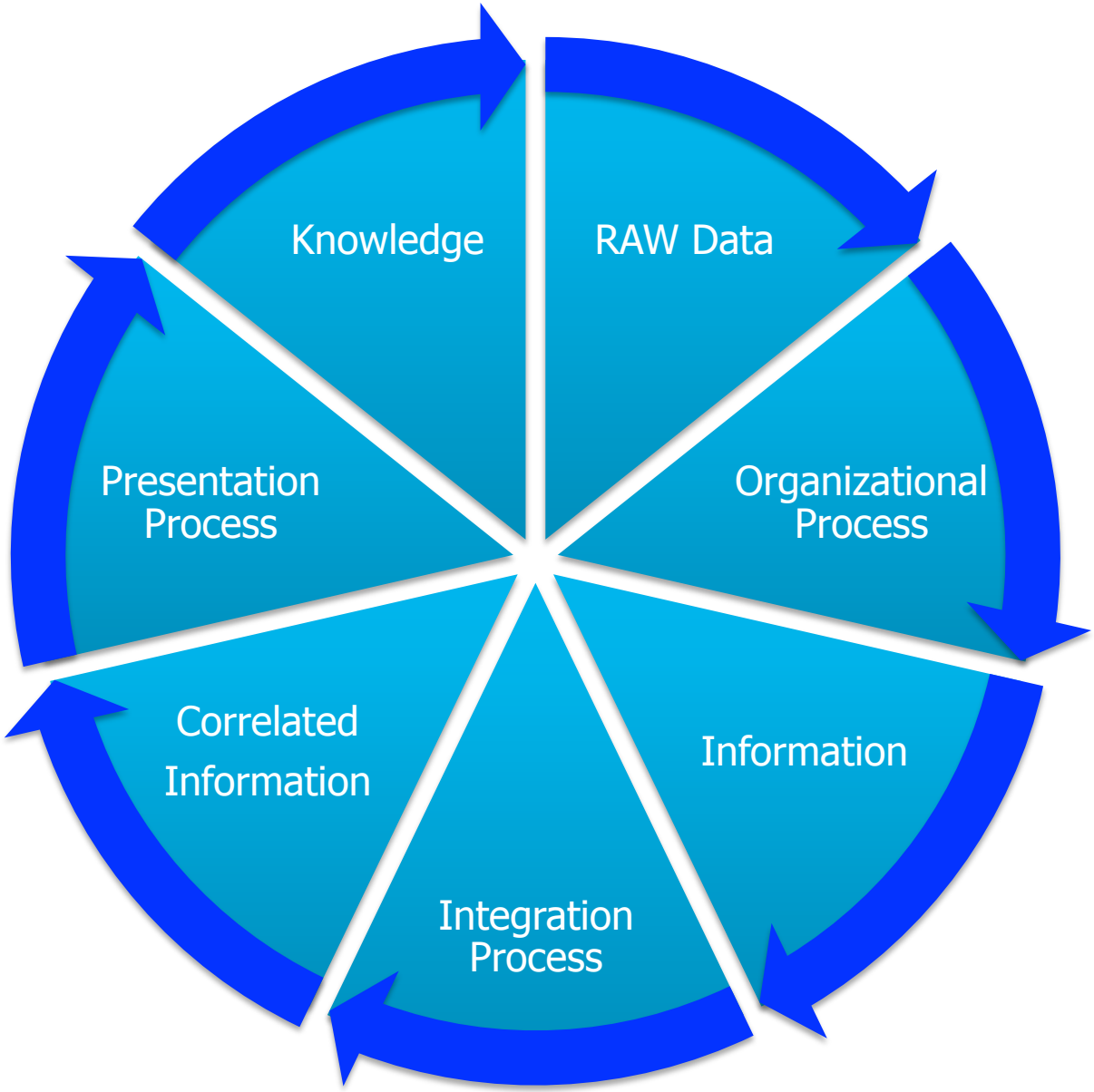
# Knowledge Process



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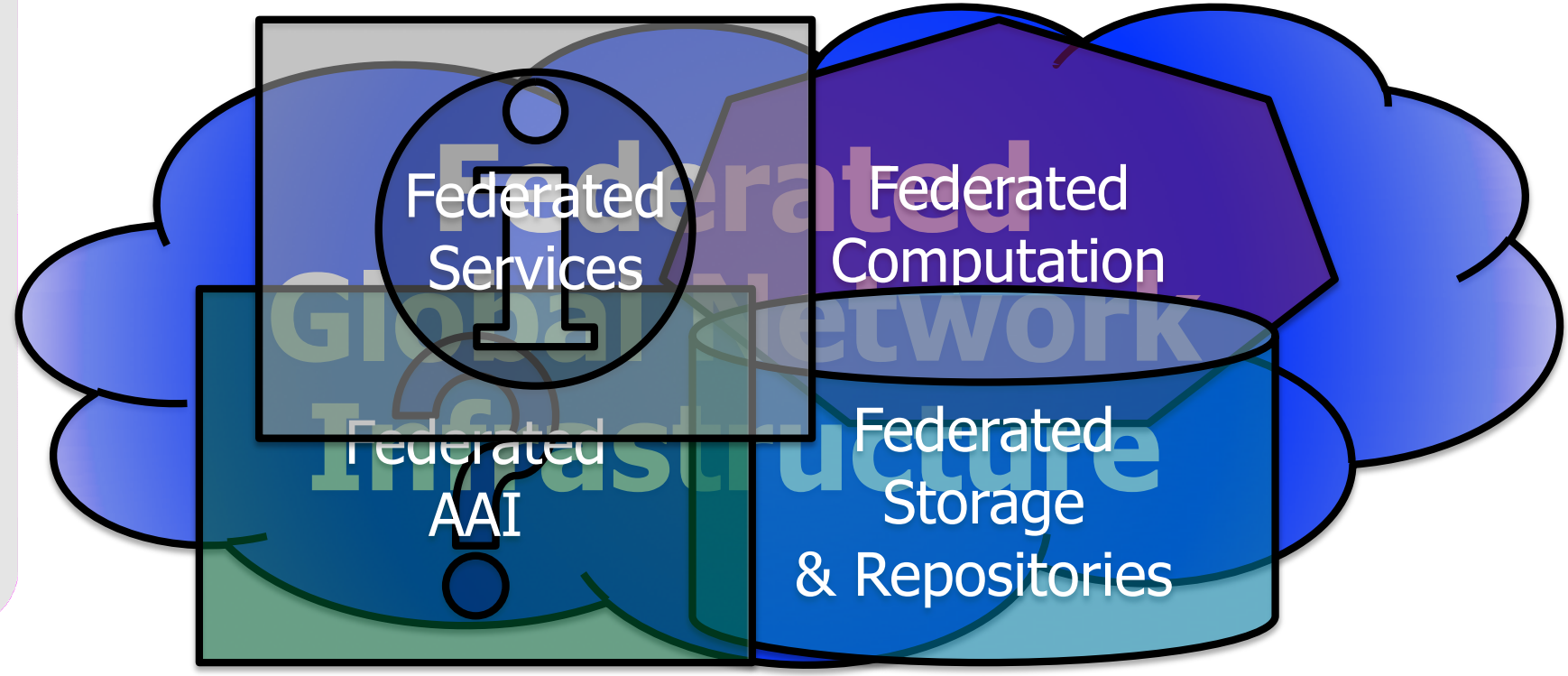
# Knowledge Infrastructure




Characteristic:

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

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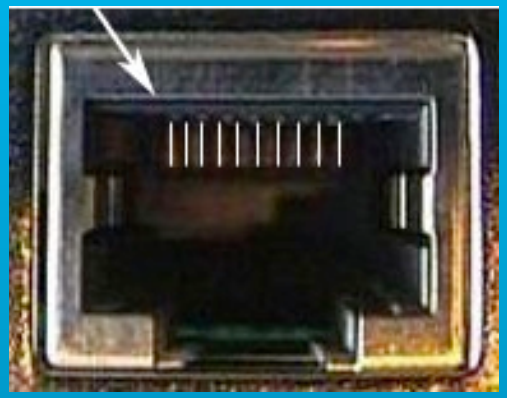
# Knowledge Infrastructure



Characteristic:

- Access to all information
- Easy to use for all – no digital or social divide
- Invisible – Users don’t care about technology
- Not a new paradigm.

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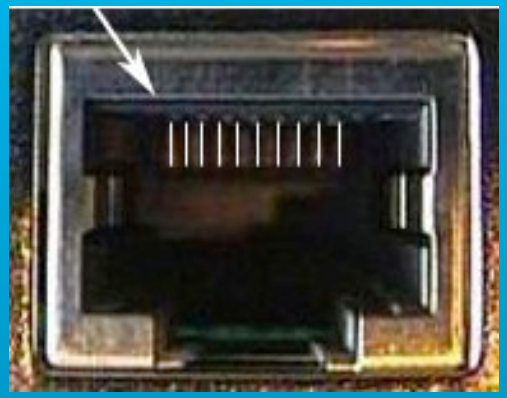
# Knowledge Infrastructure



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# A Necessary Evolution

| FROM | TO |
| --- | --- |
| • A few scientific disciplines | • Encompass all science areas |
| • A technical complex setup | • Simple access methodology |
| • A High usage threshold | • A low usage threshold |
| • A few advanced users | • All users |

“ It must be just as easy to produce, share and retrieve knowledge as it is to plug into the power mains of you house without having a engineering degree”.

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# It is not just about technology

- 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.

# Network Challenges

- 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.

"The job of providing a real Knowledge Infrastructure for the masses will be one of the biggest challenges in the decades to come."

# NORDUnet

www.nordu.net