



FEDERICA

Federated E-infrastructure Dedicated to
European Researchers
Innovating in Computing network Architectures

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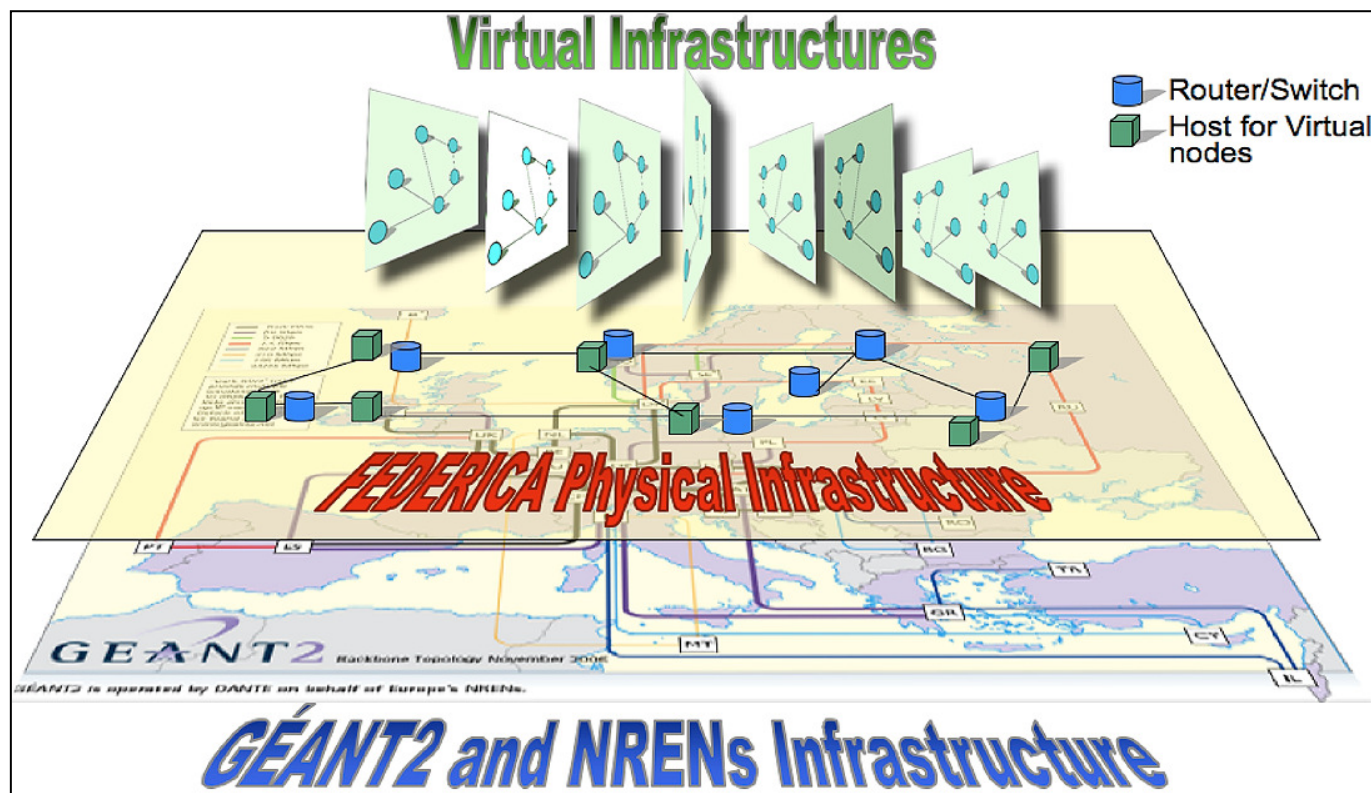
Future Internet Conference
Bled, April 2nd, 2008



What: 7th FP project in the area “Capacities - Research Infrastructures”
3.7 MEuro EC contribution, 5.2 ME budget, 20 partners, 461 Person Months

When: 1st January 2008 - 30 June 2010 (30 months)

Virtualization infrastructure, a “Network Factory” to provide “slices” to researchers in Future Internet, where a slice is a mix of network circuits and computing elements.



Built using resources (Gb Ethernet circuits) from **GEANT2** and **NRENs** as contributions to the project.

Open to interconnect other Infrastructures

Connected to **Internet** (through NRENs)

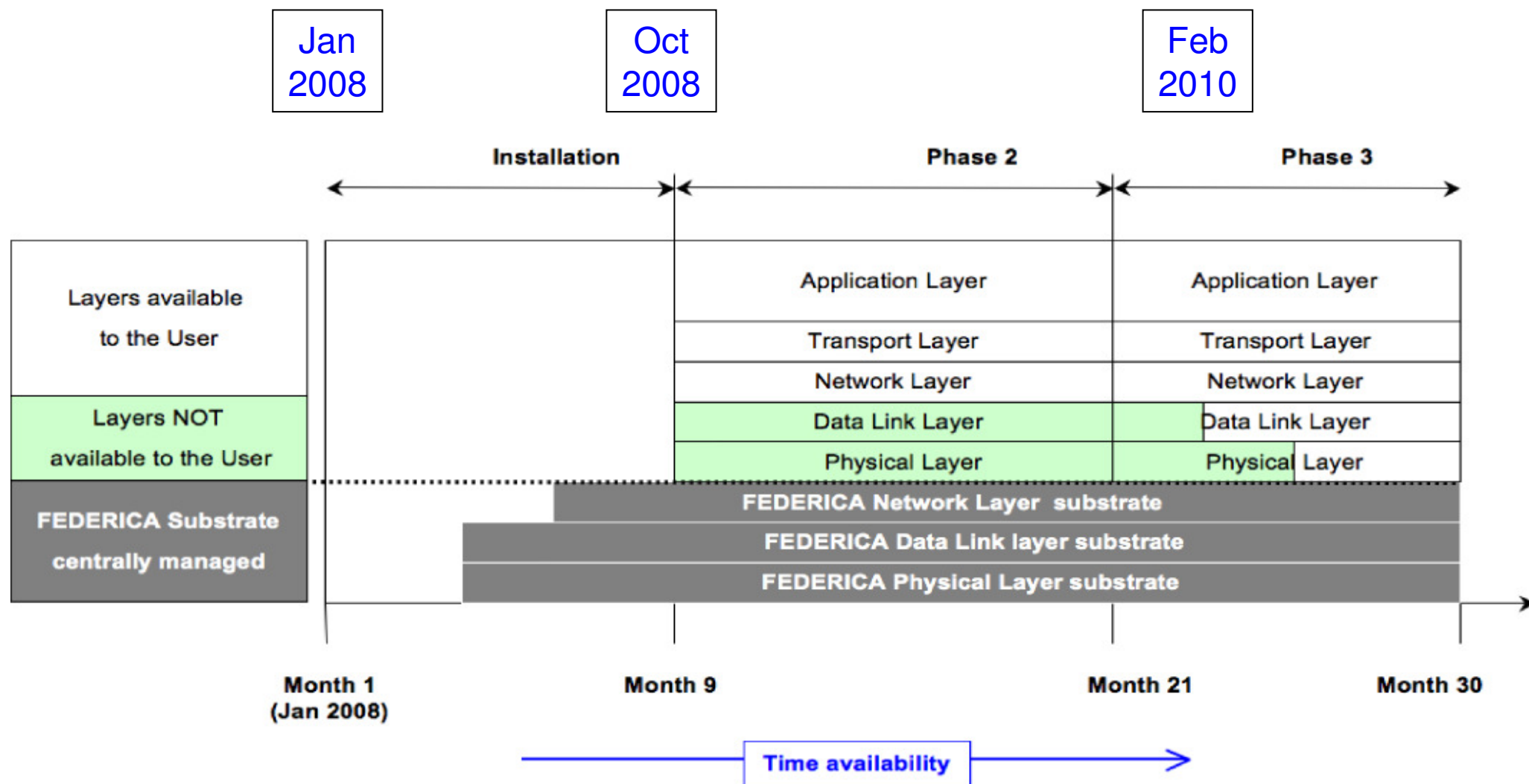
In scope

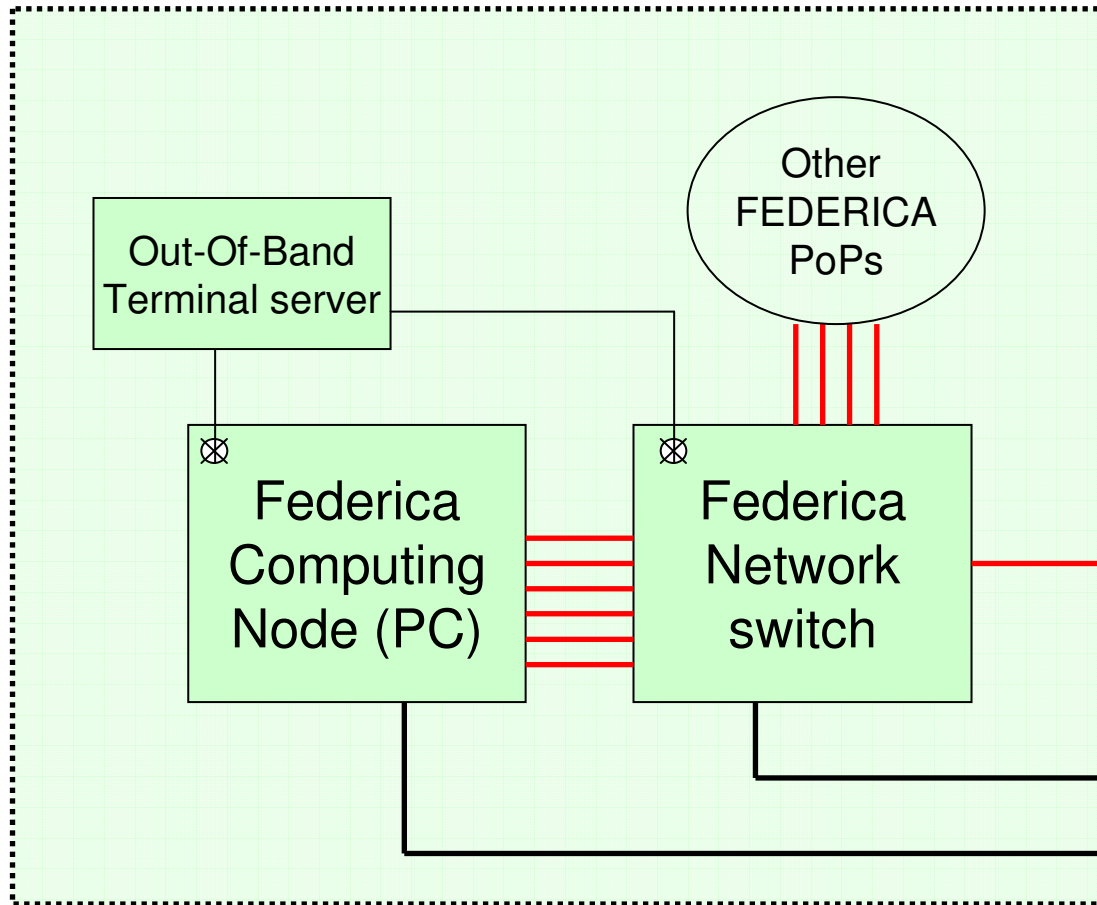
- Act as a **forum** and **support** for researchers/projects on “Future Internet”. Support of **experimental activities** to validate theoretical concepts, scenarios, architectures, control and management solutions. Users have full control of their slice
- Provide on European scale network and system **agnostic e-infrastructure** to be deployed in phases. Provide its operation, maintenance and on-demand configuration
- Validate and gather experimental information for the next generation of research networking also through basic tool validation
- **Dissemination and cooperation between NRENs and researchers’ community**
- **Contribution to standards** in form of requirements and experience

Out of scope

- **Internal extended research**, e.g. advanced optical technology
- Development and support of **Grid** applications
- Offer **raw computing power**
- Offer **transit capacity**

Work plan outline (I3)








Notes:

- Each PC has many GbE interfaces
- The FastEthernet Interfaces are to decouple the control and data plane
- OOB is not mandatory

The FEDERICA substrate
(physical infrastructure)

Legend

-  1 GigabitEthernet
-  1 FastEthernet
-  RS-232

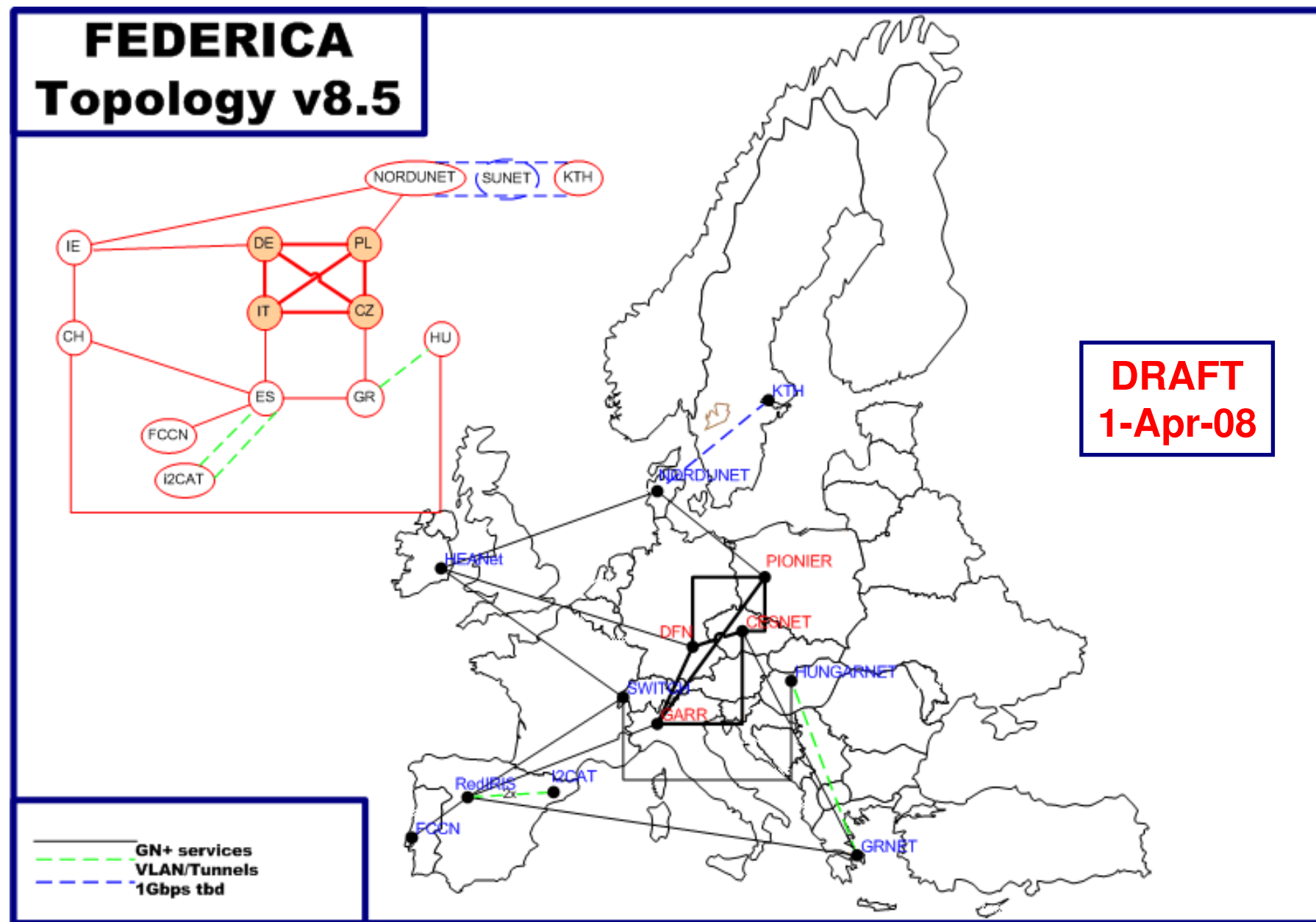
- Suited to “core” network research, where a network is a (stack of) virtual networks as mix of circuits and computing elements. A slice is as transparent and agnostic from specific technologies as possible.
- Interdomain communication developments (monitoring, services, topology) also between “real” and “virtual” networks (scaling)
- Full User control on its “slice”, including disruptive experiments
- Parallel use by more than one research group
- Open to host any application/service
- Open to host researchers’ hardware and to external connections
- Internal research activities on control, management and monitoring of virtual infrastructures
- Basic monitoring data is provided to the user

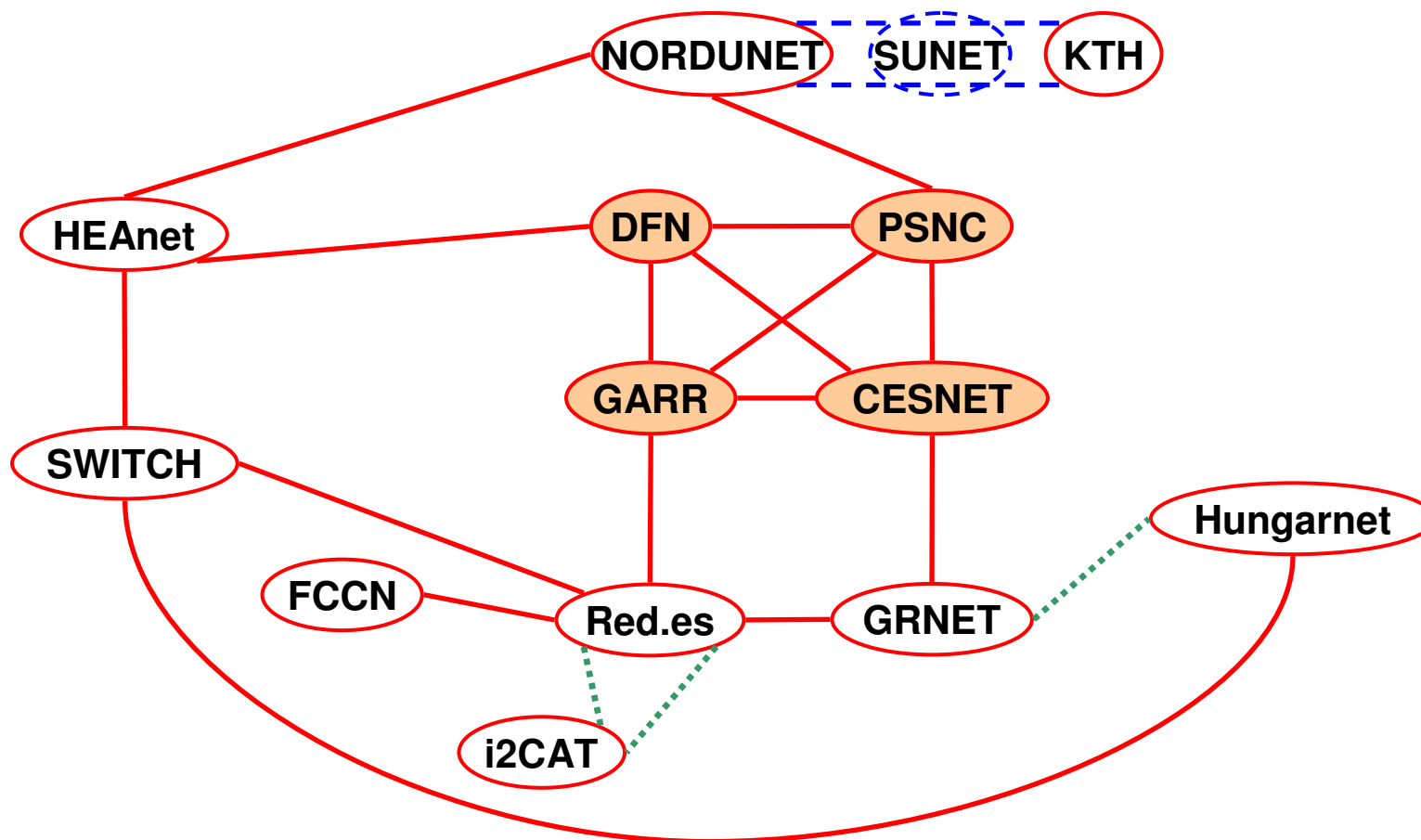
Phase 1:

- Start with manual configuration of “slices” (e.g. L2 networks, IP routed networks) and proceed developing automated tools
- Scalability according to infrastructure load and available resources





- A **User Policy Board** will receive and approve project for the use of the infrastructure
- Access to the infrastructure is subject to the signature of an “**Acceptable User Policy**”, which includes providing feedback
- The access to the core network will be **free of charge if no additional equipment is requested**
- **Interconnection** with other infrastructures, labs is possible the cost is to be defined/shared.
- The **time duration** of the project will be in principle limited to facilitate turnover
- Access is **open** to research groups from academia and private sector with priority to European Community funded projects.
- The code and toolbench produced will be **OpenSource**

We need to receive your users' requirements and specification ASAP

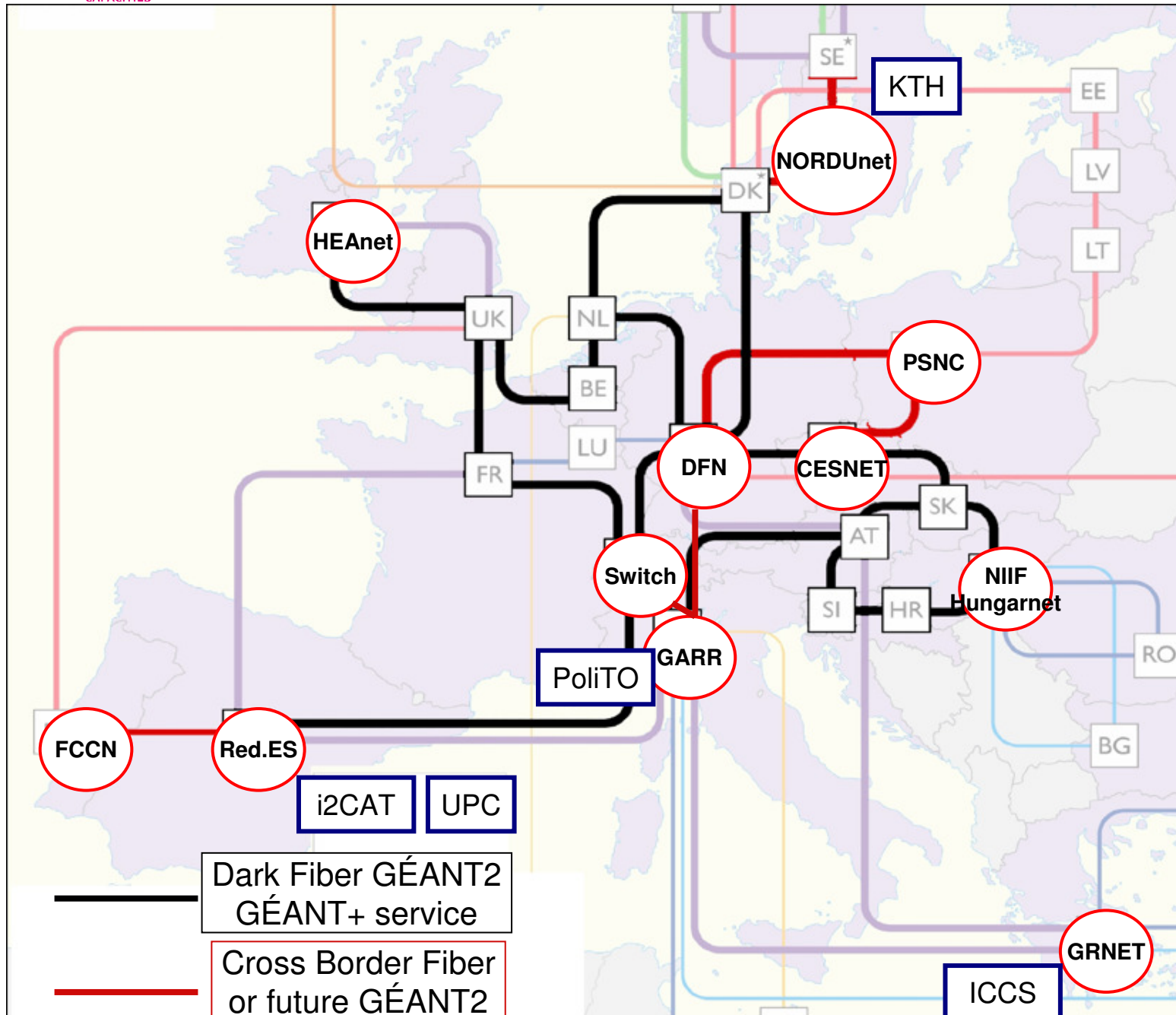




Legend

	1 Physical GbE from GN2+		1 GbE VLAN or L2MPLS
	Core Nodes		1 Physical GbE tbd

Partners' Location



NREN
Univ. or Res. Centre

NREN partners provide a European coverage using the GN2+ service and

- allow *connection* to Univ. and Research Center partners
- Provide “*HUB*” functionalities and possibility extend the e-Infrastructure to other countries and projects using physical or logical circuits
- Contribute with *tools and specific expertise*

National Research & Education Networks (11)

CESNET	Czech Rep.
DFN	Germany
FCCN	Portugal
GARR (coordinator)	Italy
GRNET	Greece
HEAnet	Ireland
NIIF/HUNGARNET	Hungary
NORDUnet	Nordic countries
PSNC	Poland
Red.es	Spain
SWITCH	Switzerland

Small Enterprise

Martel Consulting	Switzerland
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NREN Organizations

TERENA	The Netherlands
DANTE	United Kingdom

Universities - Research Centers

i2CAT	Spain
KTH	Sweden
ICCS (NTUA)	Greece
UPC	Spain
PoliTO	Italy

System Vendor

Juniper Networks	Ireland
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FEDERICA Partners



- Horizontal vs vertical approach (mixing layers, interdomain communication at just one layer)
- Centralized vs distributed approach
- Edge vs core
- Intelligence IN the network vs OUT (in the end-users)
- End-to-end capabilities, neutrality, transparency
- Mantain one Internet,
- Data representation standards, not just syntax, but also semantic. Interdomain communication (network representaton, abstraction, service definition, AAI)?
- Control vs data plane
- Things change constantly and asynchronous events are there
- Integration of nodes and networks
- Basic Hypoteses : capacity abundant, mixed system and networks as resources
- Scalability

- Metrics to compare the architectures ?

E-Infrastructure Requirements for experiments

Key requirements

- Reproducibility and repeatability of experiments (given the same initial conditions, obtain the same results)
- Disruptible and destructible (not physically ...)
- Allow scaling of experiments
- Combination of computing elements and circuits
- Capable of providing monitoring data
- Offering different scenarios (not just clean slate, also fully functional infrastructures at various layers)

Desirable requirements

- Multidomain, multi-technology (better: technology agnostic)
- Transparent, neutral
- Open to Internet, other infrastructures connections
- Concurrent usage,
- Open to host users' equipment