

FEDERICA

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



FEDERICA

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Researchers wishing to conduct disruptive experiments, that will shape the future Internet and other computer network infrastructures, have a safe and flexible 'environment' for their work. A European project called FEDERICA will create 'slices' of network infrastructure that can be allocated to researchers as a virtual resource for their experiments.

FEDERICA's experimental infrastructure will be neutral as to the types of protocols, services and applications that may be tested, while allowing disruptive experiments to take place without adverse effect on existing production networks. In its first phase, the project is focusing on creating the Europe-wide infrastructure and developing and testing mechanisms that achieve virtualisation or 'slicing' of the network resources, as well as mechanisms to control these processes.

A Unique Approach

The combination of virtualisation techniques with network control mechanisms is a unique aspect of FEDERICA. This will permit to create virtual network resources such as circuits (e.g. VLANs, MPLS (multi-protocol label switching) LSPs), interfaces, routers and computing nodes to be allocated in parallel to multiple users, while granting varying degrees of control and avoiding interference. The concept of running virtual overlay networks, for example VPNs (Virtual Private Networks), is well established, but FEDERICA will also allow researchers to access the lower network layers. Furthermore, they will be also enabled to add virtual computing resources to the network. Specific parts of the physical substrate will be allocated as virtual resources.

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Started: 1 Jan 2008

Duration: 30 months

Total budget: 5.179.645 €

Funding from the European Commission: 3.700.000 €

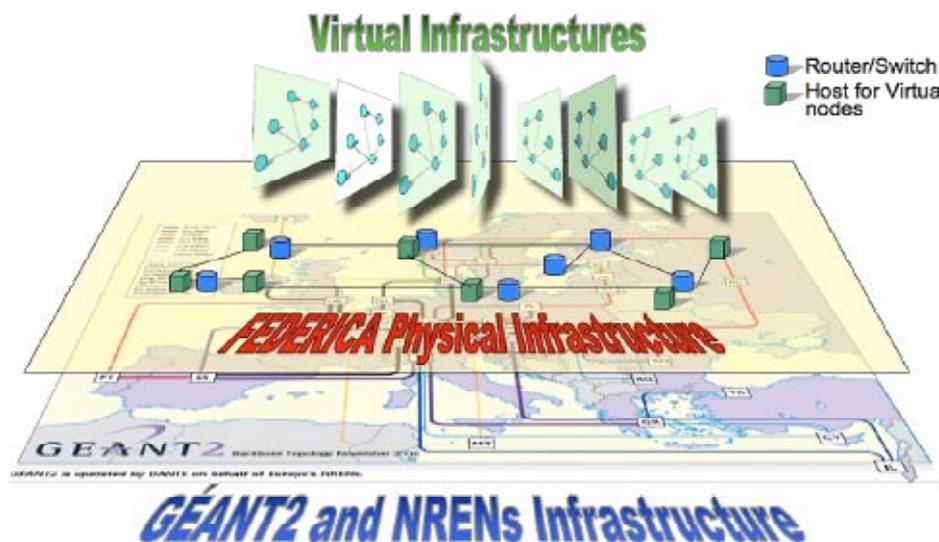
Funded effort: 464 person months

Collaboration with other EC funded projects:

GÉANT2
Phosphorus
Onelab2
OGF Europe
VINI

Project participants:

CESNET	CZ
DANTE	
DFN	DE
FCCN	PT
GARR (coord)	IT
GRNET	GR
HEAnet	IE
i2CAT	ES
ICCS	GR
Juniper Networks Inc.	
KTH	SE
Martel	CH
NII/Hungnet	HU
NORDUnet	
POLITO	IT
PSNC	PL
Red.es/RedIRIS	ES
SWITCH	CH
TERENA	
UPC	ES



Experimental users

Users of the FEDERICA infrastructure will include individual researchers, PhD students, groups in universities or research centres, EC project participants and equipment manufacturers' research laboratories studying Future Internet. Their research will not just use the network as a tool, but primarily as the subject of their work. Training for users is also included in the project.

First Connections

The FEDERICA infrastructure will use the points of presence (PoPs) of the national research and education networking organisations (NRENs) participating in the project. These PoPs will host routing and switching equipment capable of supporting virtualisation and will be interconnected via dedicated Gigabit Ethernet links or MPLS tunnels running over existing GÉANT2 or NRENs production network.

The core PoPs to be available initially are in the Czech Republic, Germany, Italy and Poland. Nine PoPs in the other participating countries will be connected gradually. This will create a long-distance, multi-domain infrastructure that will provide a real-world environment for end-to-end experiments on Future Internet.

Next Goals

The second phase of the project will implement a 'tool-bench' that will integrate these mechanisms in order to support more automated on-demand allocation of 'slices' to researchers. The tool-bench will ultimately enable control of resources across multiple domains, allowing the FEDERICA concept to be extended to communities beyond the European research and education sector, which is the primary target user group.

The FEDERICA infrastructure will cover a significant part of Europe through participating NRENs, although access could be granted to any user with an Internet connection. Furthermore, FEDERICA will liaise with similar infrastructure projects such as the PlanetLab overlay network, the PanLab II project and the USA's National Science Foundation GENI (Global Environment for Network Innovations) initiative. While the initial testing phase is limited to selected users, The infrastructure will be made available to other EC projects at the end of 2008.



ACTIVITIES

Networking:

- NA1 Project Management
- NA2 Building consolidating the User Community
- NA3 Standardisation & Liaisons
- NA4 Dissemination & Training

Service:

- SA1 Infrastructure Support
- SA2 Operational User Support

Joint Research:

- JRA1 Network Control & Management
- JRA2 Novel paradigms & user control

OBJECTIVES:

- Develop suitable infrastructure;
- Develop solutions for allocating, controlling & managing virtual network resources in a multi-domain infrastructure;
- Identify users & their needs;
- Provide user training & support;
- Contribute to standardisation
- Disseminate results to NRENs, universities, research institutes etc.