

# NETWORKING INNOVATIONS OVER VIRTUALIZED INFRASTRUCTURES

## NOVI

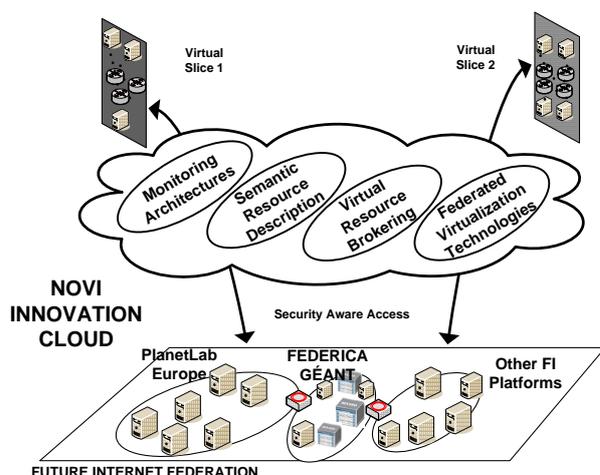


### Project Overview

NOVI concentrates on methods, algorithms and information systems that will enable users to compose and manage isolated slices, baskets of virtual resources and services provided by diverse yet federated Future Internet (FI) platforms.

### Research Description

NOVI aims at providing algorithms and tools to end-users and FI service providers for the establishment and management of federated virtualized infrastructures. Its research objectives can be classified within four closely related areas, visualized in the figure below as oval objects within the **NOVI Innovation Cloud**. Users are assigned slices (depicted in the figure by the two shaded vertical planes) consisting of virtual instances of networking and processing resources, drawn from a federated FI substrate. In the figure, secure interactions of user slices with the FI federation in the bottom are shown as bold arrows.



Early research prototypes will be developed in NOVI's first phases. Validations of an integrated prototype will follow in the experimentation phase over existing FIRE facilities, notably PlanetLab Europe / OneLab - FEDERICA, and European National Research & Education Networks (NRENs) - GÉANT.

#### Testbed Infrastructure

**FEDERICA, GÉANT, PlanetLab Europe**

#### Contract number

**257867**

#### Project coordinator

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#### Project website

[www.fp7-novi.eu](http://www.fp7-novi.eu)

#### Community contribution to the project

2,363,999 Euro

#### Project start date

01 September 2010

#### Duration

30 months

## Target Users and Benefits

European Future Internet (FI) experiments, both academic and industrial, will profit from NOVI's research by having the capability to assemble a rich basket of heterogeneous resources at various protocol layers, discovered within interworked testbeds via context aware information models. NOVI will develop and validate its results on a federated testbed, deploying prototypes with measurable and predictable composite services; this will pave the way for reproducible FI experiments over a foreseen FIRE federated facility. The initial testbed will be a combined PlanetLab Europe & FEDERICA platform; extensions will consider expanded federations with various National, European and global testbeds that address specific aspects of the FI, e.g. data repositories and cloud computing infrastructures, optical, wireless and autonomic experimental facilities. Use of NREN services will provide high-bandwidth advanced connectivity, suitable for establishing isolated virtual networking; at the same time it will strengthen human networking between the FIRE and the GÉANT communities.

The NOVI consortium aspires to advance European know-how within the global environment for Future Internet research. This is manifested by the concerted effort of academic researchers and operators of advanced public e-Infrastructures (NRENs - GÉANT, FEDERICA, PlanetLab Europe) in partnership with a pioneer vendor in Internet technologies (Cisco). As such, it is expected to contribute in evolving standardization efforts and provide pre-normative research and proofs of concept on federated virtualized solutions to vendors and service providers.

<b>Project partners</b>	Country
National Technical University of Athens (NTUA)	Greece
Martel GmbH	Switzerland
Université Pierre & Marie Curie (UPMC)	France
Consortium GARR	Italy
Universiteit van Amsterdam (UvA)	Netherlands
Fundació i2CAT	Spain
Verein zur Förderung eines Deutschen Forschungsnetzes (DFN)	Germany
Institut National de Recherche en Automatique et Informatique (INRIA)	France
Eötvös Loránd Tudományegyetem (ELTE)	Hungary
Poznan Supercomputing and Networking Center (PSNC)	Poland
Cisco Systems International B. V.	Netherlands
Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.	Germany
Universitat Politècnica de Catalunya (UPC)	Spain

### Key Objectives

- To formally describe virtualized network and cloud computing objects in a complex environment, assisted by semantic methods and ontologies
- To enable interoperable operations of virtualization mechanisms across federated heterogeneous platforms
- To allocate virtual resources with QoS attributes and set up federated monitoring systems to allow for accountable, predictable Future Internet services
- To enrich the FIRE facility with federated models and methods enabling comprehensive and reproducible experiments