Experiments & Research on federated testbeds

www.ict-fire.eu

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Why Future Internet research?

Internet today, its size, complexity and the role it plays in modern society has far exceeded the expectations of its creators

Internet has become an essential part of our lives, work, communication and entertainment

Internet has become a critical infrastructure both from a social and economic perspective
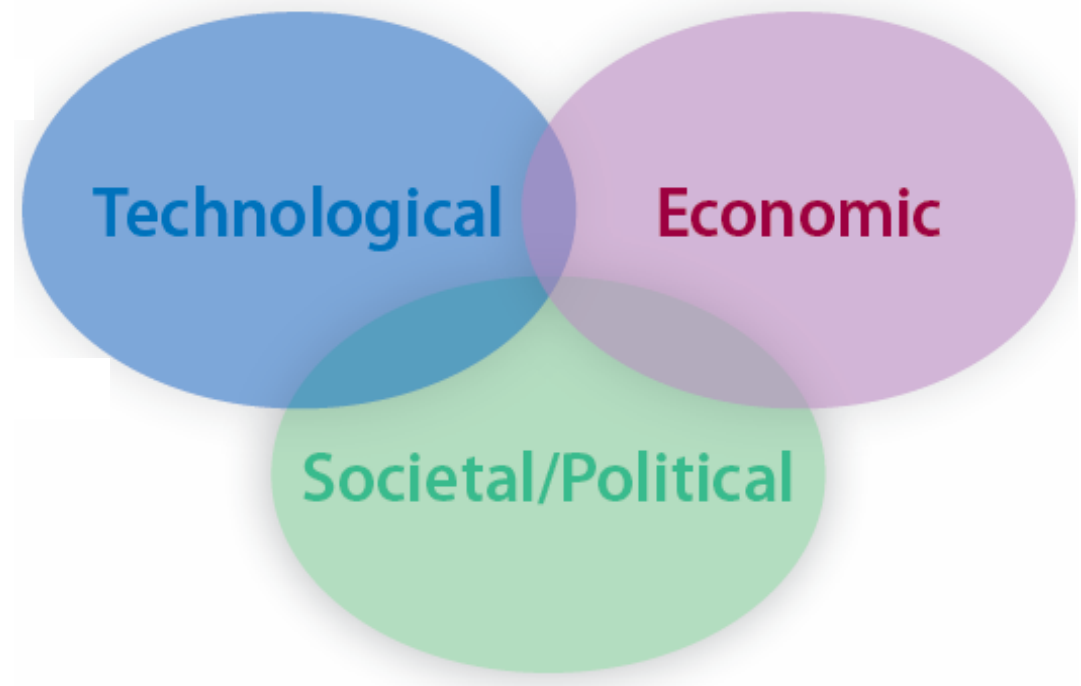
Benefits of FIRE for Europe

The FIRE initiative creates an **open research environment**, which **facilitates strategic research** and **development** on new Internet concepts giving **researchers** an instrument **to carry out large-scale experimentation on new paradigms**
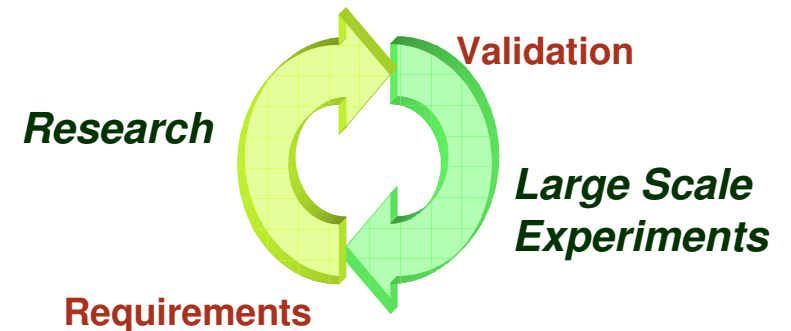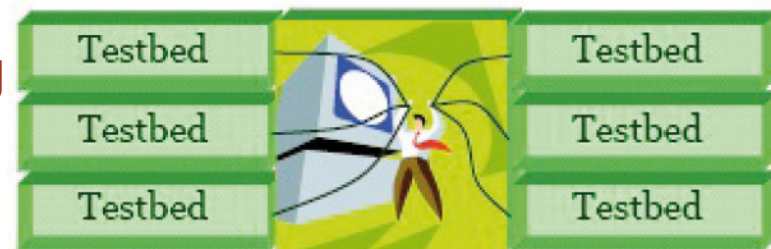
Future Internet Research & Experimentation

FIRE has two interrelated dimensions:

- **Experimentally-driven** long-term, visionary **research** on new paradigms **and networking** concepts and architectures for the **future internet**

- **Building large-scale experimentation facilities** to support both medium- and long- term research on networks and services by gradually **federating existing and new testbeds** for emerging or future internet technologies
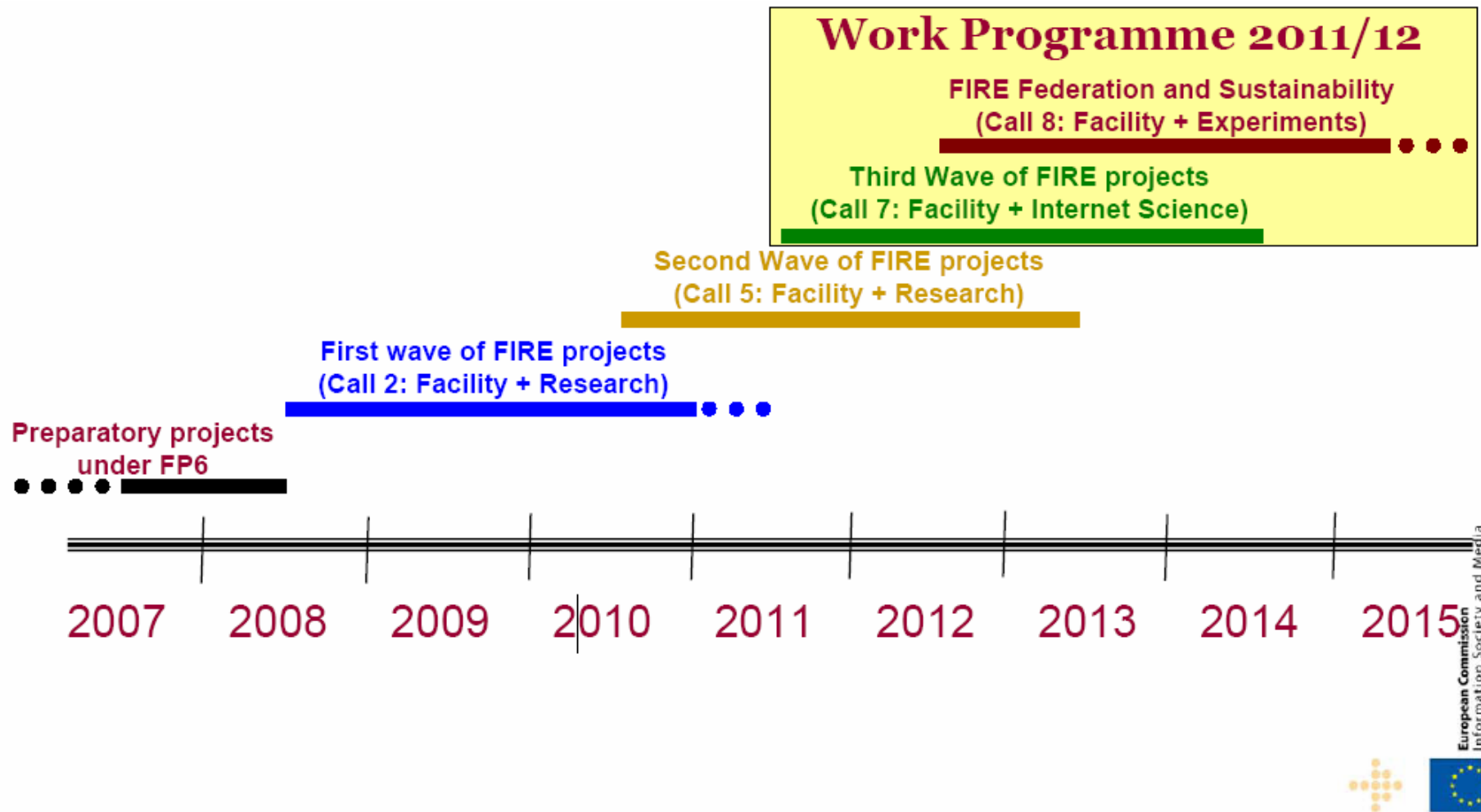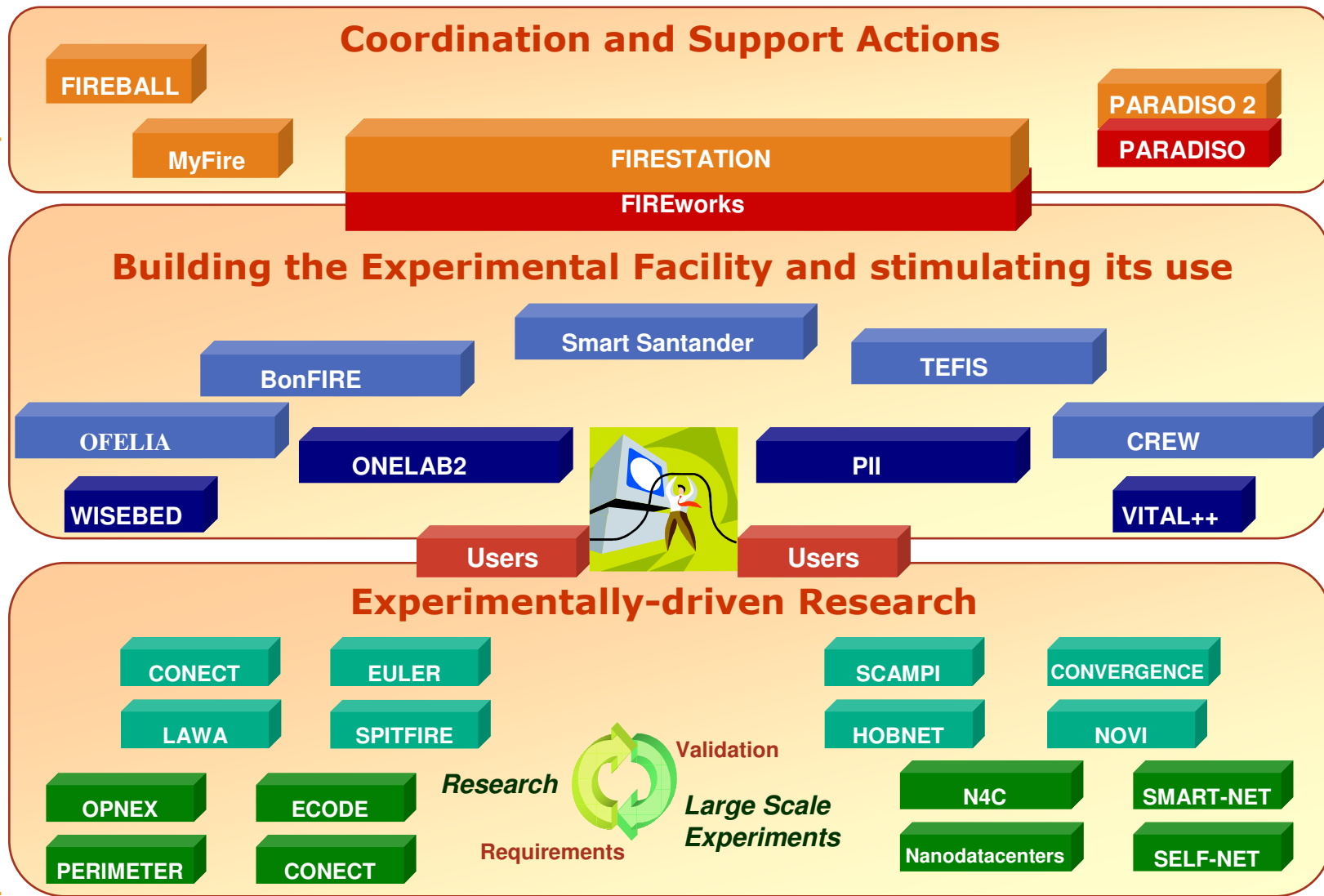
FIRE Research

Research

Validation

Large Scale
Experiments

Requirements

FIRE Experimental Facility

Testbed		Testbed
Testbed		Testbed
Testbed		Testbed

FIRE Roadmap

Work Programme 2011/12

FIRE Federation and Sustainability
(Call 8: Facility + Experiments)

Third Wave of FIRE projects
(Call 7: Facility + Internet Science)

Second Wave of FIRE projects
(Call 5: Facility + Research)

First wave of FIRE projects
(Call 2: Facility + Research)

Preparatory projects
under FP6

2007   2008   2009   2010   2011   2012   2013   2014   2015

European Commission
Information Society and Media

5

FIRE Projects

Coordination and Support Actions

FIREBALL

MyFire

FIRESTATION

FIREworks

PARADISO 2

PARADISO

Building the Experimental Facility and stimulating its use

Smart Santander

BonFIRE

TEFIS

OFELIA

ONELAB2

PII

CREW

WISEBED

VITAL++

Users

Users

Experimentally-driven Research

CONECT

EULER

SCAMPI

CONVERGENCE

LAWA

SPITFIRE

HOBNET

NOVI

Validation

Research

Large Scale Experiments

OPNEX

ECODE

N4C

SMART-NET
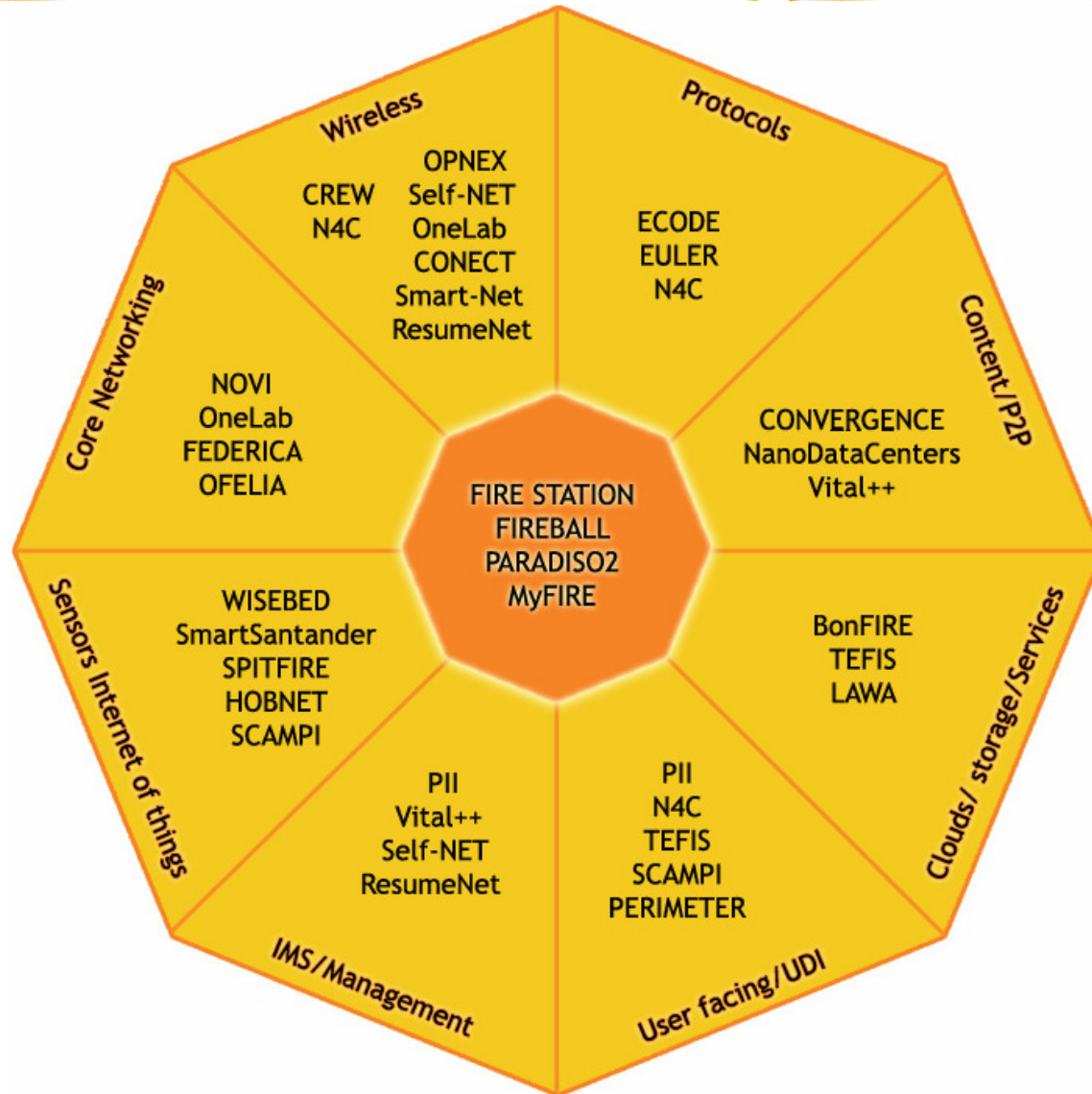
Requirements

PERIMETER

CONECT

Nanodatacenters

SELF-NET

14 projects, 40 M€ - Call 2 - 2008

17 projects, 50 M€ - Call 5 - 2010

IP Facility Projects Call 5

STREP Projects Call 5

Coordination & support actions Call 5

IP & STREP Facility Projects Call 2

STREP Projects Call 2

Coordination & support actions Call 2

6

FIRE Projects

Wireless
OPNEX
CREW · Self-NET
N4C · OneLab
CONECT
Smart-Net
ResumeNet

Protocols
ECODE
EULER
N4C

Core Networking
NOVI
OneLab
FEDERICA
OFELIA

Content/P2P
CONVERGENCE
NanoDataCenters
Vital++

FIRE STATION
FIREBALL
PARADISO2
MyFIRE

Sensors Internet of things
WISEBED
SmartSantander
SPITFIRE
HOBNET
SCAMPI

Clouds/storage/Services
BonFIRE
TEFIS
LAWA

IMS/Management
PII
Vital++
Self-NET
ResumeNet

User facing/UDI
PII
N4C
TEFIS
SCAMPI
PERIMETER

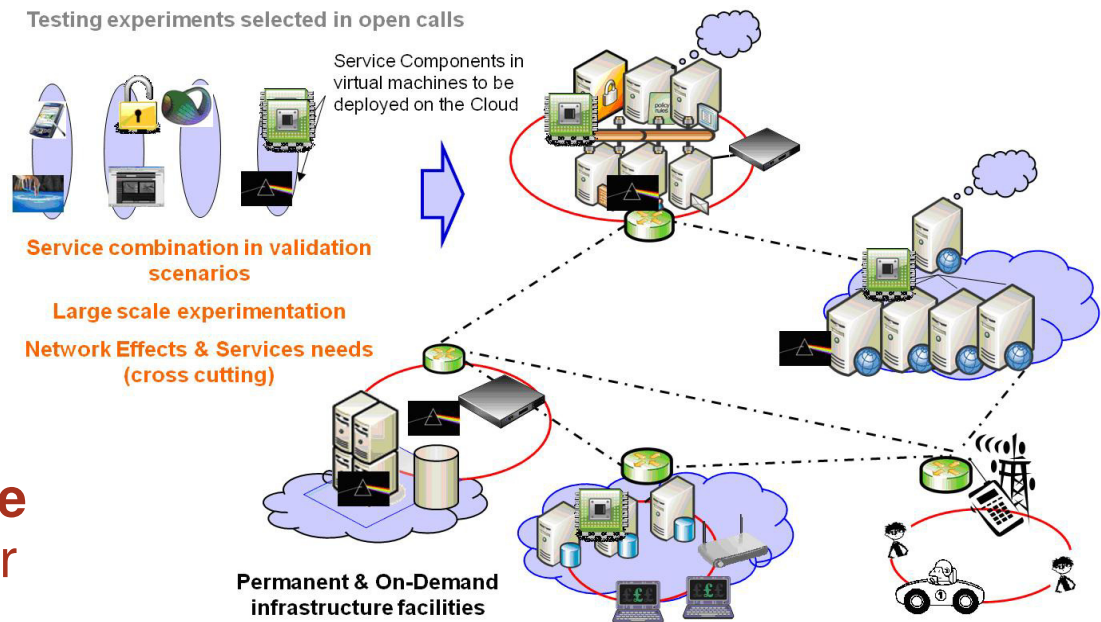**http://www.ict-fire.eu/home/fire-projects.html**

Objectives:

- To create a **unique experimental facility** that allows researchers to not only experiment on a test network but to **control the network itself precisely and dynamically**

- The OFELIA facility is based on **OpenFlow**, a currently emerging networking technology that allows to **virtualize and control the network environment** through **secure and standardized interfaces**

BonFIRE

**Building *service* testbeds
for Future Internet Research and Experimentation**

Objectives:

- To build a **multi site cloud facility** to support **applications, services and systems research**, targeting the future **Internet of Services**

- To give **researchers** access to a facility which enables **large scale experimentation** of their systems and applications

- To evaluate the **cross-cutting effects** of **converged service and network infrastructures**

Testing experiments selected in open calls

Service Components in virtual machines to be deployed on the Cloud

Service combination in validation scenarios

Large scale experimentation

Network Effects & Services needs (cross cutting)

Permanent & On-Demand infrastructure facilities
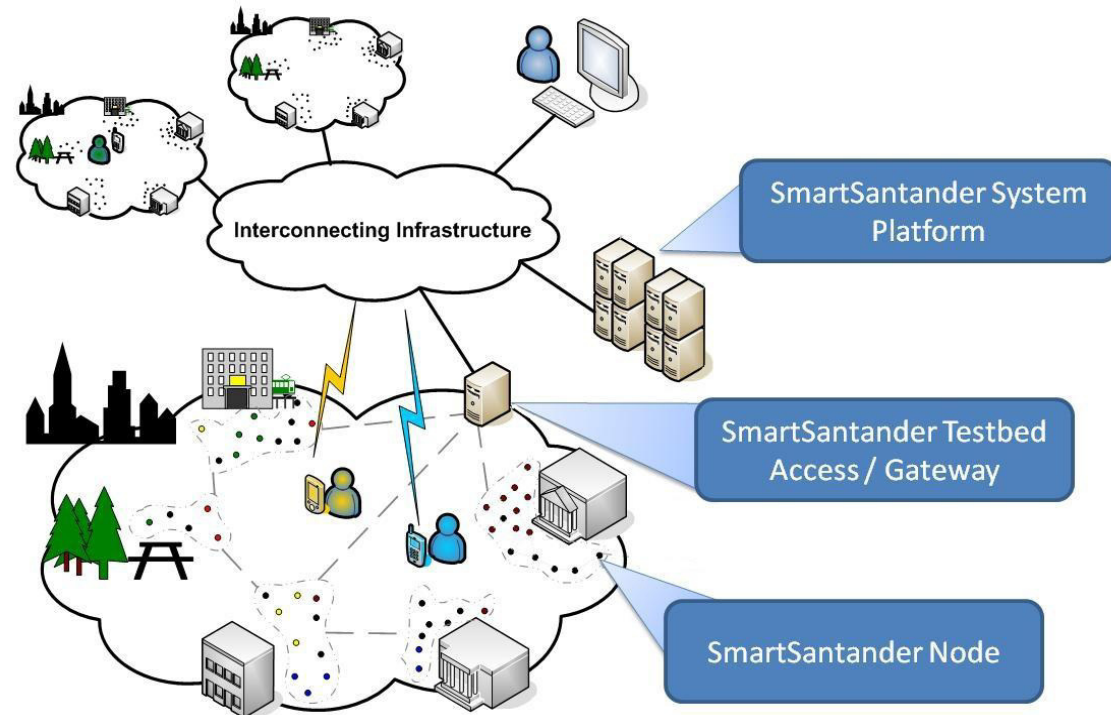
www.bonfire-project.eu

Smart Santander

Objectives:

- To build a **unique-in-the-world city-scale experimental research facility** in support of typical applications and services for a Smart City

- More than **20,000 sensors** based on a **real life Internet of Things deployment** in an urban setting

www.smartsantander.eu

Objectives:

- To build a **multi site cloud open platform** able to integrate existing and next generation testing and experimental facilities

- To develop a **connector model** that enables facilities to be accessed and used in a **unified manner** using **Web services**

- The TEFIS platform integrates **7 complementary experimental facilities,** including **network and software testing facilities**, and **user-oriented living labs**

CREW

Cognitive Radio Experimentation World

Objectives:

- To build an **open federated platform** for experimentally-driven **research on advanced spectrum sensing**, **cognitive radio and cognitive networking strategies** in view of horizontal and vertical spectrum sharing in licensed and unlicensed bands

- The CREW facility will **incorporate 4 individual wireless testbeds incorporating diverse wireless technologies** (heterogeneous ISM, heterogeneous licensed, cellular, wireless sensor) augmented with state-of-the-art cognitive sensing platforms

www.crew-project.eu
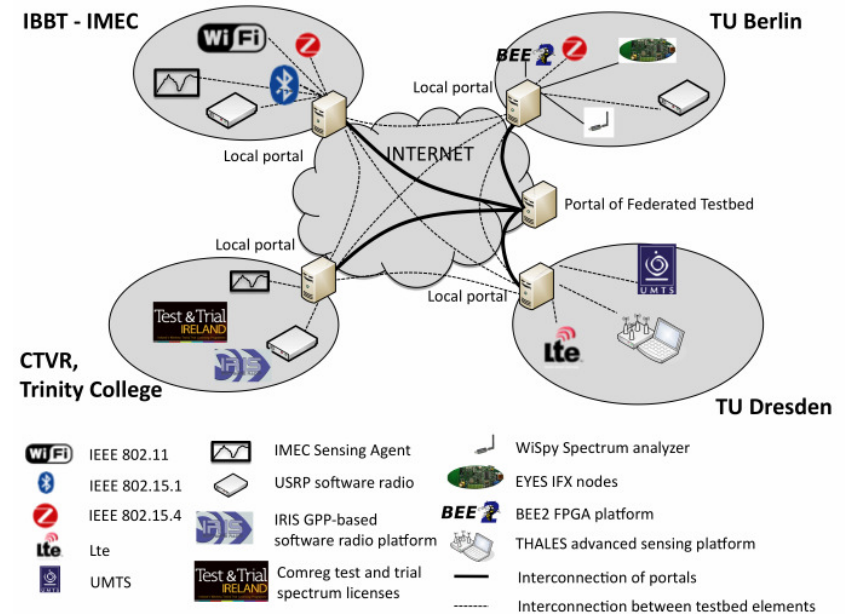
New facility projects

- New facilities projects from call 7
  - OpenLab – Networks & Services
    - Focus on interoperability of testbeds, control plane prototypes, tools, and future networking technologies
    - Emerged from OneLab2 and PII
  - Confine – Community Networks Testbed for the Future Internet
    - Concept: Community-owned Open Local IP Networks (COPLAN)
  - ExperiMedia

Open calls for experiment

- Call 5 and call 7 projects have reserved budget for experiments
- Experiments by external entities through open competitive calls
- BonFIRE, TEFIS, OFELIA completed 1st call

  - CREW – 19 Oct. 2011
    http://www.crew-project.eu/opencallinfo
  - SmartSantender – 16 Nov. 2011
    http://smartsantander.eu/index.php/open-calls
  - OpenLab – 30 Nov. 2011
    http://www.ict-openlab.eu/open-calls.html

29 proposals received, 4 selected

- TurboCloud
  (Partners: RedZinc and Cloudium Systems)
- VCOC: Virtual Clusters on Federated Cloud Sites
  (Partner: CESGA)
- ExSec: Experimenting Scalability of Continuous
  Security Monitoring
  (Partner: CETIC)
- TEOS: Testing Optimization in Service Ecosystems
  (Partner: University of Manchester)

22 proposals received, 4 selected

- Smart Ski resort
  (Partner: University of Geneva)

- Dynamic Quality User Experience Enabling Mobile Multimedia Services
  (Partner: Institute of Communication and Computer systems (ICCS))

- Augmented Reality Collaborative workspace using future internet
  videoconferencing platform for remote education and learning
  (Partner: Poznan Supercomputing and Networking Center)

- Experimenting with Quagga Open API and cross-layer Coordinated
  networks
  (Partner: Universitat Politecnica de Catalunya)

- 21 proposals received, 2 selected

  - VERTIGO
    Virtual Topologies Generalization in OpenFlow networks

  - EXOTIC
    Extending OpenFlow to Support a future Internet with a Content-Centric model

GÉANT–NRENs

- **Potential role of GÉANT–NRENs in Future Internet Experimental Research**
  - Provide **NOC functionality** for virtual communities based on scalable management of virtual resources by stake-holders in the federation, also leveraging collaboration with **external platforms** (Internet, GENI, FIRE…)
  - **Contribute to Future Internet core facilities** (FIRE, Future Internet PPP) with 1-10 Gbps connectivity at all layers (including **Bandwidth on Demand**) & virtual infrastructures (including systems)

![FIRE]

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You are here: Home >   9.10.2011 : 16:06

Home

- Roadmap
- FIRE offering
- FIRE projects
- FIRE related initiatives
- FIRE Calls
- Use cases
- Publications
- Testbed Repository
- The FIRE landscape
- FIRE STATION project

2nd Open Call Information day

NEWS

20 September 2011

BonFIRE publishes experiment descriptions

Project BonFIRE publishes descriptions of the experiments that were accepted following the first open call for experiments by the project. 29 proposals were... [more]

16 September 2011

2nd Open Call information day presentations

The second open call information day successfully took place in Brussels on 14 September 2011. All presentations are available at the event pages. For any... [more]

15 July 2011

Applying machine learning or bio-inspired learning techniques to communication networks

Setup of an Internet Research Task Force group [more]

27 June 2011

Clarification of the Call 8 requirement for proposers to: "demonstrate a clear commitment of the FIRE facilities they intend to use"

EVENTS

Future Internet Week
24-28 October 2011, Poznan, Poland [more]

IPV6 Workshop, IPv6 Deployment in European Public Authorities
28 Oct. 2011, Poznan, Poland [more]

Submissions for the OFELIA/CHANGE Summer School
7-11 November, 2011 - Berlin, Germany, OFELIA/CHANGE Summer School [more]

Euro-African Cooperation Forum on ICT Research
14-15 Nov. 2011, Cape Town, South Africa [more]

Future Seamless Communication (FUSECO) FORUM 2011
17-18 November 2011, Berlin, Germany [more]

Innovation Union Flagship event in Brussels in December 2011
5-6th December 2011 in Square -

The FIRE Brochure

Downloadable at http://www.ict-fire.eu/home/publications.html

Further information & events

- FIRE portal: www.ict-fire.eu

- FIRE brochure:
  http://cordis.europa.eu/fp7/ict/fire/docs/fire-brochure-2010_en.pdf

- FIRE @ Future Internet Week Poznan, 24-28 October 2011
  - FIA session 2.3 on "International collaboration on testbeds"
    http://www.future-internet.eu/poznan
  - FIRE event Poznan, 26-27 October 2011
    http://wiki.ict-fire.eu/index.php/FIRE_event_Poznan

- TridentCom 2012, 11-13 June, 2012 in Thessaloniki, Greece
  http://www.tridentcom.org/2012/

- Contact FIRE Office: contact@ict-fire.eu
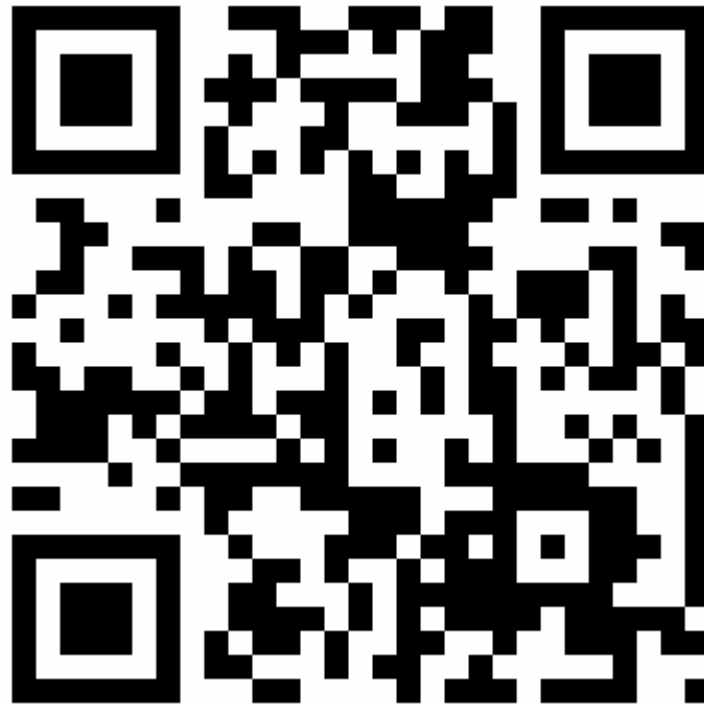
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