FUTURE INTERNET TESTBEDS
EXPERIMENTATION BETWEEN
BRAZIL AND EUROPE

Grant Agreement No.: 288356

FIBRE-EU

Future Internet testbeds/experimentation between BRazil and Europe – EU

Instrument**:** ***Collaborative Project***
Thematic Priority: ***[ICT-2011.10.1 EU-Brazil] Research and Development cooperation, topic c) Future Internet – experimental facilities***

D1.1 Project Presentation

Due date of the Deliverable: Month 5
Actual submission date: 10th , November, 2011
Start date of project: June 1st 2011 Duration: 34 months
version: v.1.0

Project co-funded by the European Commission in the 7th Framework Programme (2007-2013)		
Dissemination Level		
PU	Public	✓
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Abstract

This deliverable is a public description of the project in terms of main goals, key issues technical approach and achievements. It is intended for publication on the Websites of the Commission and the project.

TABLE OF CONTENTS

1 Scope

This document contains the high level descriptions of the FIBRE project.

It is the public description of the project in terms of main goals, key issues technical approach and achievements. It is intended for publication on the Commission and Project Websites and at the events where the project will be presented.

The presentation has been prepared in several formats:

i. A text document suitable for printed presentations of the project. This text has been used to compose the project page at CORDIS.
ii. A series of slides for objective description
iii. Web-format presentation
iv. Poster

2 Reference Documents

FIBRE: Future Internet testbeds/experimentation between BRazil and Europe – EU. Description of Work.

Annex I to the Grant agreement no: 288356
Date of preparation of the latest version: 2011-04-29
Date of last change: 2011-04-29
Date of approval of by Commission: 2011-04-29

3 Printed Presentation

This is a project abstract intended for printed leaflets or for any short text presentations.

Project Objectives

In the last two decades networks, and especially the Internet, have become part of the critical infrastructure of governments, businesses, homes and schools. The current Internet architecture, designed about 30 years ago, has suffered many extensions in recent years, to include new functionalities, which were unforeseen in the original design. Many network experts now consider it is necessary to undertake the study of alternative architectures for the Future Internet as a truly effective way to resolve many of the pressing problems that currently afflict the Internet.

However, one serious obstacle to effective adoption of such innovations has been the inability to validate them convincingly. The reduction in real-world impact of any given network innovation is due to the enormous installed base of equipment and protocols, and the reluctance to experiment with production traffic, which have created an exceedingly high barrier to entry for new ideas. The result is that most new ideas from the networking research community go untried and untested, leading to the commonly held belief that the Internet infrastructure has “ossified”.

Having recognized the problem, the network research community is developing alternative solutions for experimental FI research, using programmable testbed networks such as those of GENI in the USA, AKARI in Japan and FIRE in Europe. The main goal of the FIBRE project is the design, implementation and validation of a shared Future Internet research facility between Brazil and Europe, supporting the joint Future Internet experimentation of European and Brazilian researchers. In order to achieve this goal the project will carry out four main activities:

- The development and operation of a new experimental facility in Brazil, including the setup of equipment to support experimentation with various technologies (fixed layer 2 and layer 3, wireless, optical) as well as the design and implementation of a control framework to automate the use and operation of the testbed.
- The development and operation of a Future Internet facility in Europe based on enhancements and the federation (interoperability) of two existing FIRE infrastructures: OFELIA and OneLab. Two of the OFELIA testbeds (i2CAT and UEssex) and the UTH's NITOS testbed will be enhanced by i) adding more physical resources to be able to cope with a bigger number of users and different use cases, ii) improving its respective control frameworks and iii) adding more manpower to operate the facilities.
- The federation of the Brazilian and European experimental facilities, both at the physical connectivity and control framework level, to support the provisioning of slices using resources from both testbeds. This work will allow FIBRE experimenters to use the FIBRE facility as a unified, intercontinental testbed.
- The design and implementation of pilot applications of public utility that showcase the power of a shared Europe-Brazil Future Internet experimental facility.

3.1 CORDIS

The Project Objectives sheet has been used to configure the presentation of FIBRE at the CORDIS portal.

UEssex) and the UTH's NITOS testbed will be enhanced by i) adding more physical resources to be able to cope with a bigger number of users and different use cases, ii) improving its respective control frameworks and iii) adding more manpower to operate the facilities.
- The federation of the Brazilian and European experimental facilities, both at the physical connectivity and control framework level, to support the provisioning of slices using resources from both testbeds. This work will allow FIBRE experimenters to use the FIBRE facility as a unified, intercontinental testbed.
- The design and implementation of pilot applications of public utility that showcase the power of a shared Europe-Brazil Future Internet experimental facility.

Administrative contact
SILVESTRE Jose Maria
FUNDACIO PRIVADA I2CAT, INTERNET I INNOVACIO DIGITAL A CATALUNYA

CALLE GRAN CAPITA 2-4, EDIFICI NEXUS I
08034
BARCELONA
SPAIN
Tel: +34-935532629
Fax: +34-935532520
Email: Contact

Participants

Coordinator: **FUNDACIO PRIVADA I2CAT, INTERNET I INNOVACIO DIGITAL A CATALUNYA, SPAIN**

Organisations	
UNIVERSITE PIERRE ET MARIE CURIE - PARIS 6	FRANCE
NATIONAL ICT AUSTRALIA LIMITED	AUSTRALIA
NEXTWORKS	ITALY
PANEPISTIMIO THESSALIAS (UNIVERSITY OF THESSALY)	GREECE
UNIVERSITY OF ESSEX	UNITED KINGDOM

Record Control Number: 99654
Update Date: 2011-07-19
Permalink

Go back

Top | CORDIS Sitemap | A-Z Index | Glossary | CORDIS FAQ | Help Desk | ©
CORDIS is managed by the Publications Office

4 Slide FIBRE High Level Presentation

A PowerPoint based presentation intended for events where a Project Overview is to be given.

The contents of this presentation is

- FIBRE at a glance
- Objectives
- Project structure
- Planned Work
- Links & Cooperation

This presentation was used at the EU-Brazil workshop, in Brasilia, Brazil, on 7th November, 2011.

Index

- FIBRE at a Glance
- Objectives
- Project structure
- Planned Work
- Links & Cooperation

2

Index

- FIBRE at a Glance
- Objectives
- Project structure
- Planned Work
- Links & Cooperation

3

Main Goal

Create a common space between the EU and Brazil

for

Future Internet (FI) experimental research

into

network infrastructure and distributed applications,

by

building and operating a federated EU-Brazil Future internet experimental facility

The project will design, implement and validate a shared Future Internet research facility between Brazil and Europe, supporting the joint Future Internet experimentation of European and Brazilian researchers

4

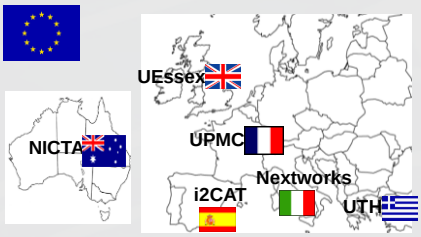
Project at a glance

- Activities
  - The project is structured in six main activities
  - Three test beds
- Budget
  - Requested to the EC 1.09M€
  - Requested to CNPq R$ 2.3 in funding
- Duration
  - Start date: October 1st , 2011
  - End date: March 31th, 2014. (30) months.
- 15 partners
  - FIBRE-EU 6 members
  - FIBRE-BR 9 members

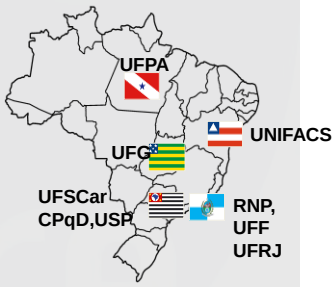
5

Partners

- FIBRE-EU
  - i2Cat, Coordinator
  - Nextworks (NXW),
  - Universite Pierre et Marie Curie (UPMC)
  - University of Essex (UESSEX)
  - University of Thessaly (UTH)
  - National ICT Australia Limited (NICTA)



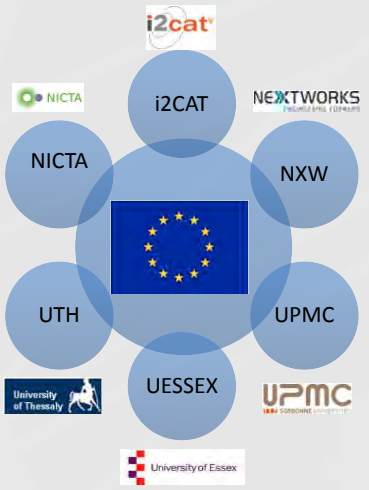
- FIBRE-BR
  - Federal University of Pará (UFPA), Coordinator
  - Brazil's National Education and Research Network (RNP)
  - Telecommunications Research and Development Centre (CPqD)
  - Fluminense Federal University (UFF)
  - Federal University of Goiás (UFG)
  - Federal University of Sao Carlos (UFSCar)
  - Federal University of Rio de Janeiro (UFRJ)
  - Salvador University (UNIFACS)
  - University of Sao Paulo (USP)

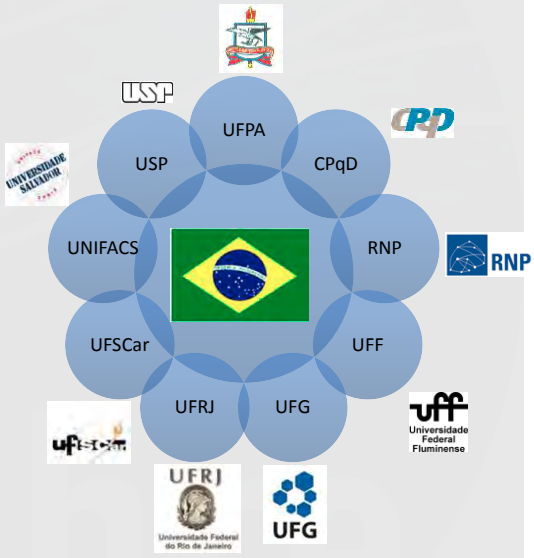


6

Partners

- List of partners

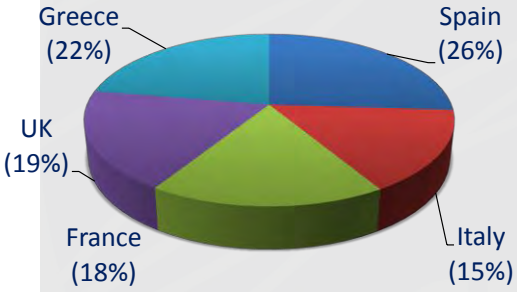




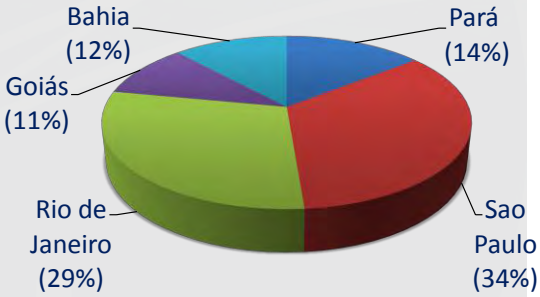
7

The Consortium

Europe (FIBRE-EU)



Brazil (FIBRE-BR)



% means the manpower effort share per state
Additional 10% on European effort committed by NICTA (Australia)

8

Index

- FIBRE at a Glance
- Objectives
- Project structure
- Planned Work
- Links & Cooperation

9

Objective 1

Build a shared large-scale experimental facility
that enables
experimentation on network infrastructure and distributed applications,
consisting in
a new testbed in Brazil
and
an enhancement of the FP7 OFELIA facility
and the basic wireless facility of FP7 OpenLab, the UTH NITOS testbed, both in Europe.

10

Activities

WP2: The development and operation of a new experimental facility in Brazil, including the setup of equipment to support experimentation with various technologies (fixed layer 2 and layer 3, wireless, optical) as well as the design and implementation of a control framework to automate the use and operation of the testbed.

WP3: The development and operation of a Future Internet facility in Europe based on enhancements and the federation (interoperability) of two existing FIRE infrastructures: OFELIA and OpenLab

11

Brazil Facilities

- Create and operate FIBRE-BR that will experiment with new applications and control the network itself dynamically

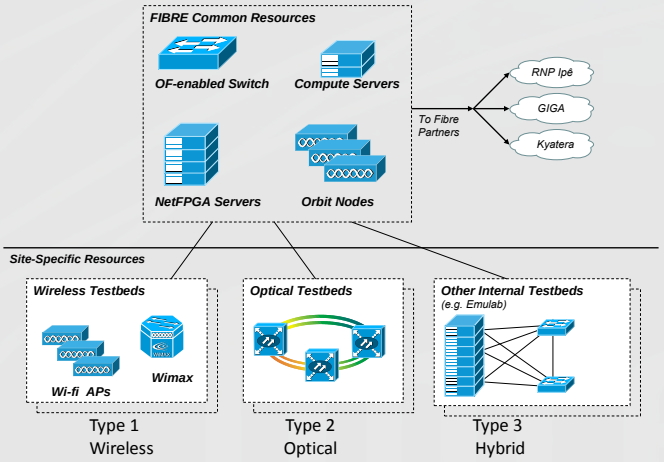
L2 long distance network connections
SINGLE WIDE_AREA FI TESBED FACILITY

NINE GEOGRAPHICALLY DISTRIBUTED INSTITUTIONAL FACILITIES

12

Brazil Facilities

- The structure of each Brazil node (Institutional Facilities, IF) is compose of:
  - Openflow substrate
  - Control and Management Plane (CMF): OMF , OCF,..
  - Monitoring: Orbit, PerfSONAR



13

EU Facilities

- The EU large-scale experimental facilities are an extension and federation of the existing OFELIA, and Openlab projects.

- Two of the OFELIA testbeds (i2CAT and UEssex) and the UTH's NITOS testbed will be enhanced by

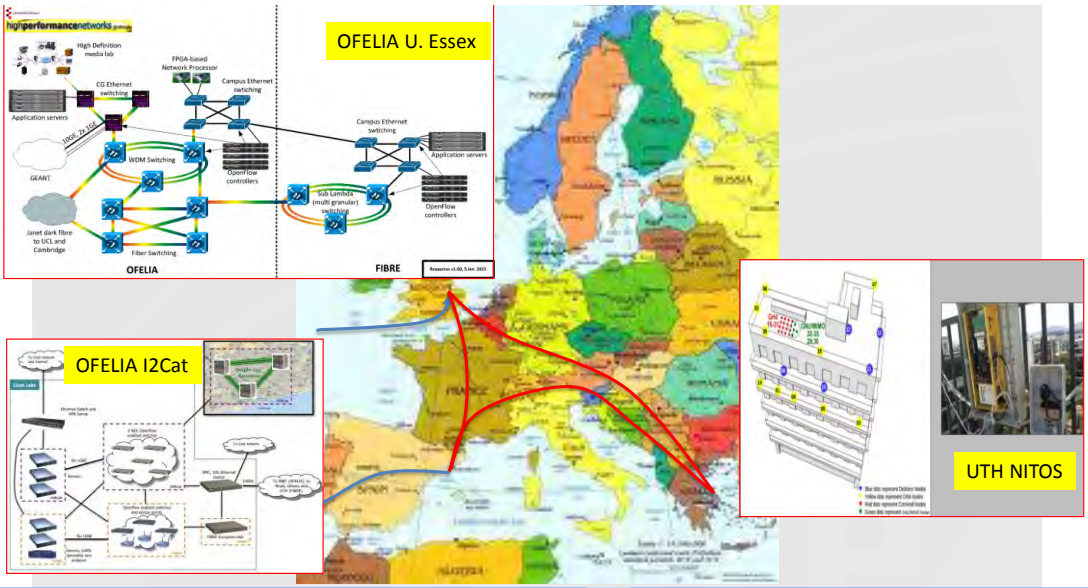
  i) its enhance respective control frameworks

  ii) adding more physical resources to be able to cope with a bigger number of users and different use cases

  iii) adding more manpower to operate the facilities

EU Facilities

- Enhancements of the OFELIA testbeds (i2CAT and U. Essex) and the UTH's NITOS testbed



Objective 2

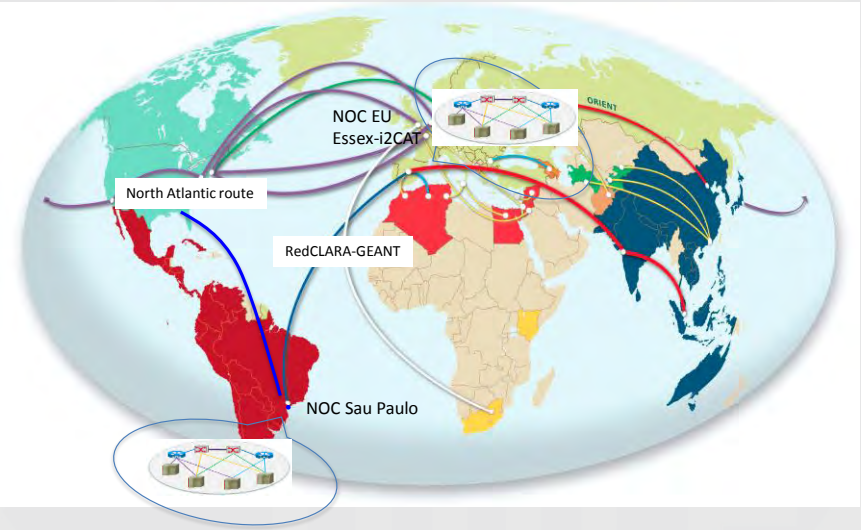
Federate the Brazilian and European facilities, to allow researchers to use resources of both testbeds in the same experiment

WP4: The federation of the Brazilian and European experimental facilities, both at the physical connectivity and control framework level, to support the provisioning of slices using resources from both testbeds. This work will allow FIBRE experimenters to use the FIBRE facility as a unified, intercontinental testbed.

16

Large scale experimental facilities

- Federation of EU and Brazil FIBRE research infrastructures creating an intercontinental multi-domain, multi-layer and multi-technology experimental platform.



17

Objective 3

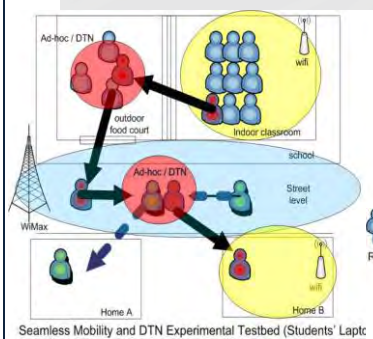
Showcase the potential of the facility by demonstrating experimental network-enabled applications deployed on top of the federated facilities resources. Develop local and federated technology pilots and validate the developed local and federated FIBRE facilities through showcases, which have been pre-selected from a number of use cases

WP5: design and implementation of pilot applications of public utility that showcase the power of a shared Europe-Brazil Future Internet experimental facility.

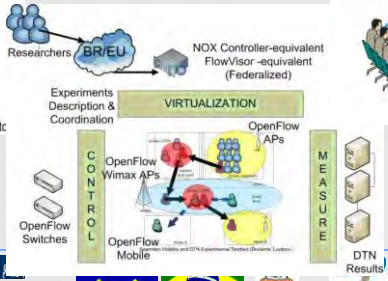
Pilot applications

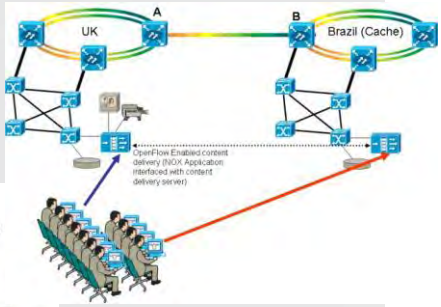
The expected applications to be showcased are:

- Seamless Mobility for Educational Laptops
- High definition (4K) content delivery across different sites
- Bandwidth on Demand through OpenFlow GMPLS in the FIBRE facility.



Seamless Mobility and DTN Experimental Testbed (Students' Laptc





Objective 4

Enhance the collaboration and exchange of knowledge between European and Brazilian researchers in the field of Future Internet. To develop a project dissemination and communication strategy

WP6:

- To set up and carry out a concrete set of activities that will increase the visibility of the provided facility by disseminating the use cases' results and technologies adopted by the project.
- To ensure that the project results benefit as many stakeholders as possible, such as Research Policy makers, Researchers, Governmental authorities, R&D entities, SMEs, Universities, Science and Technology Parks and potentially- on the long run- have a positive impact on the Cooperation activities of the European Commission with the Brazil region.
- To seek for collaborations with related projects, equipment manufacturers and other experimental facilities to organize common events and/or participate in events organized by other projects.
- To plan and realise key workshops and events to support the wide diffusion of the above and guarantee proper input and feedback by key stakeholders.

20

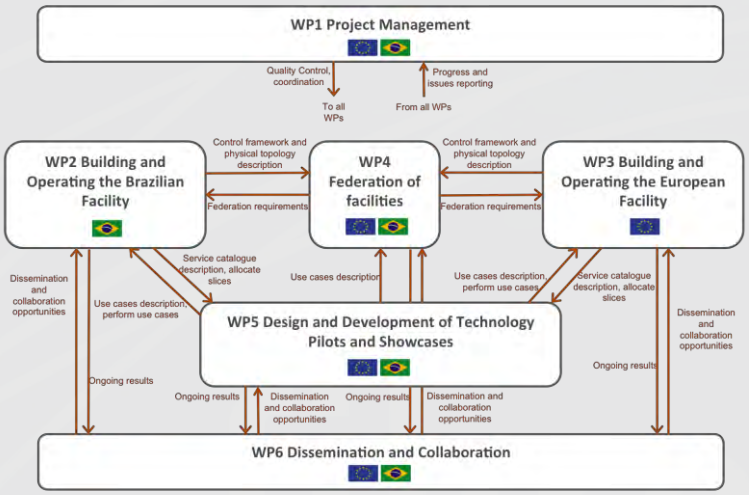
Index

- FIBRE at a Glance
- Objectives
- Project structure
- Planned Work
- Links & Cooperation

21

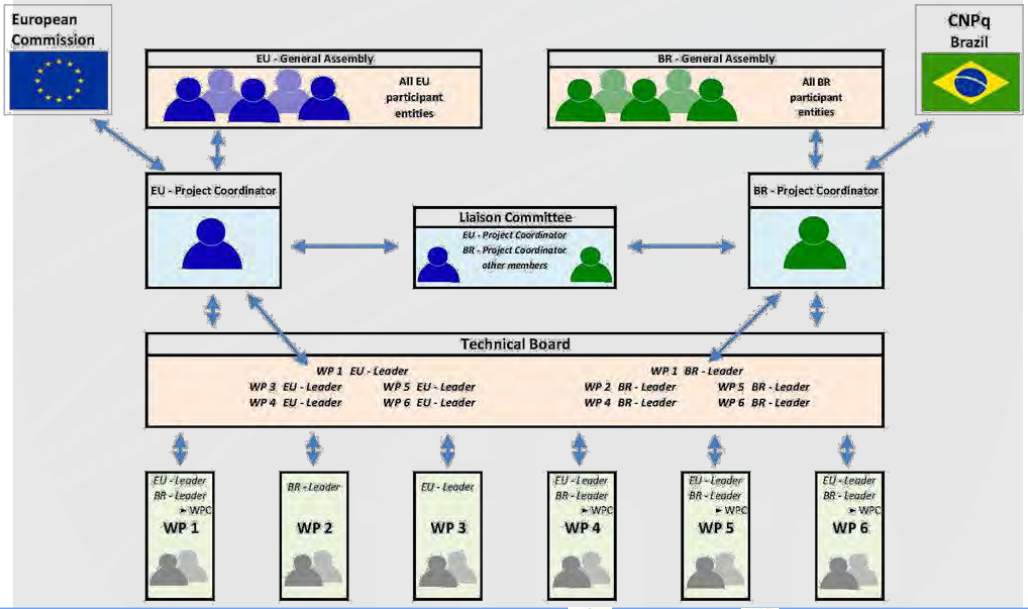
Project structure

- Work Plan: WP structure



22

Administrative structure



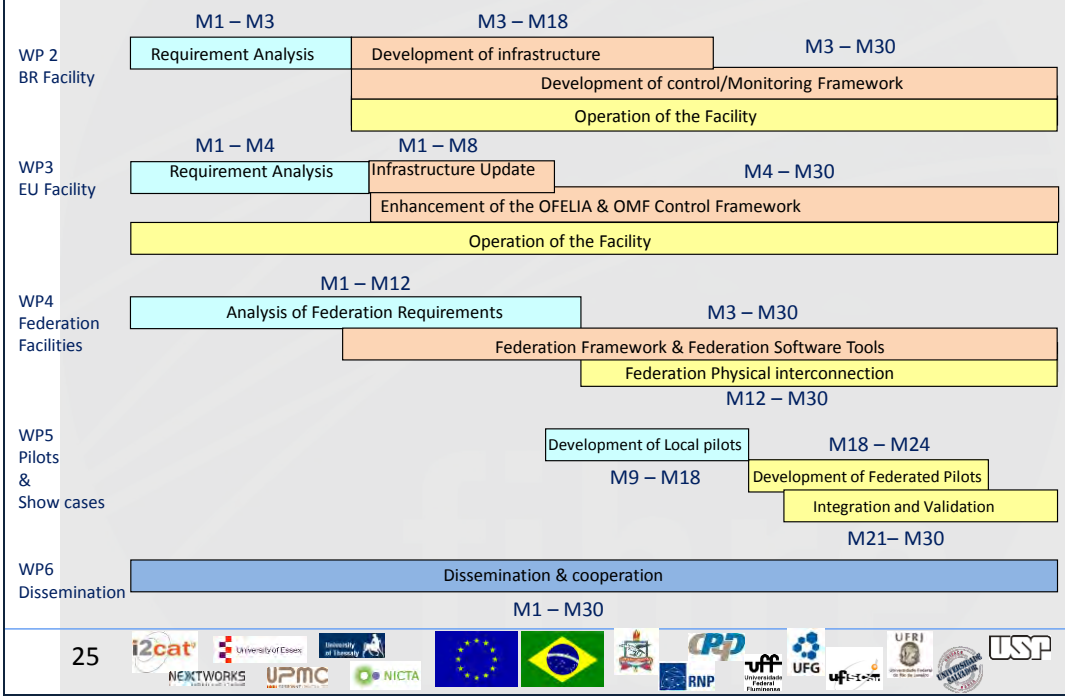
23

Index

- FIBRE at a Glance
- Objectives
- Project structure
- Planned Work
- Links & Cooperation

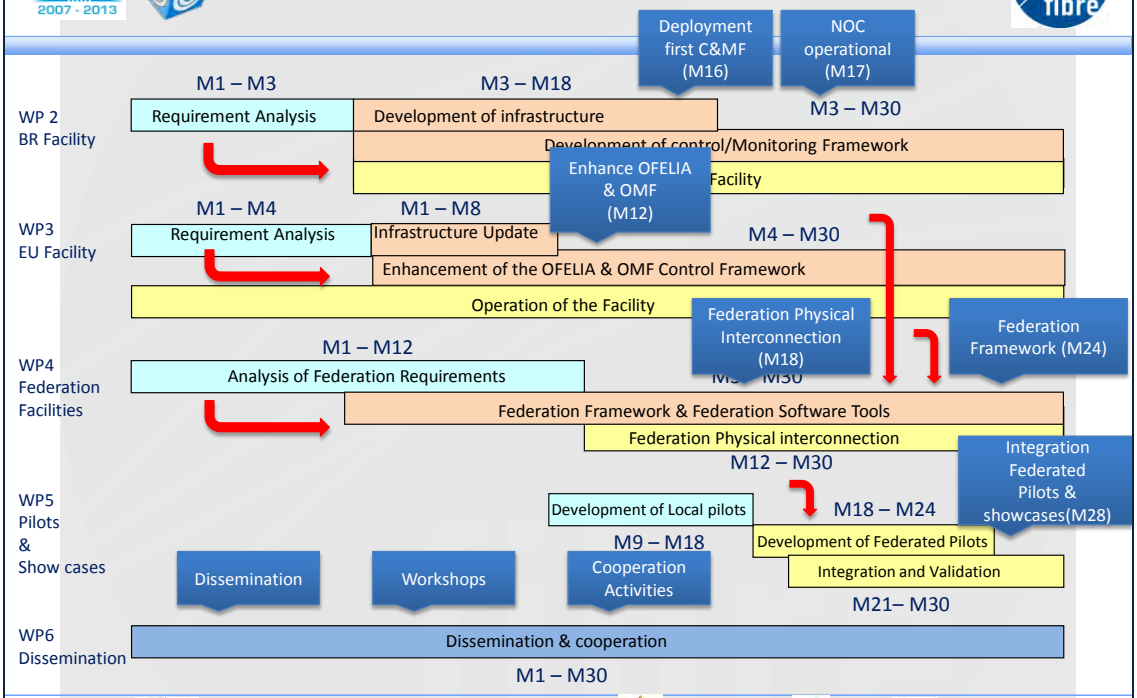
24

Planned Work



25

Planned Work



Index

- FIBRE at a Glance
- Objectives
- Project structure
- Planned Work
- Links & Cooperation

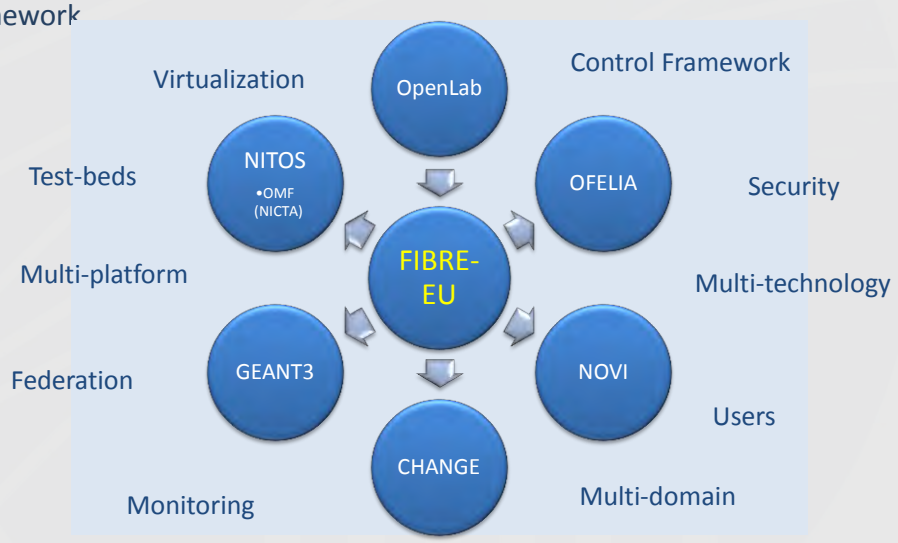
Potential links

- Fibre is based on three main pillars:
  - Future Internet Research Infrastructure
  - Intercontinental Federation of Research Resources
  - Pilots and Users
- The research activity of the consortium members provides:
  - Internal links with the most outstanding research infrastructure projects
  - Direct participation in the most relevant Future Internet Platforms
  - Participation on standardization bodies
- Fibre should be boosted, aligned and linked with the most relevant FI initiatives, providing a functional enhancing of the existing platforms, and a intercontinental deployment

28

Potential Internal EU links

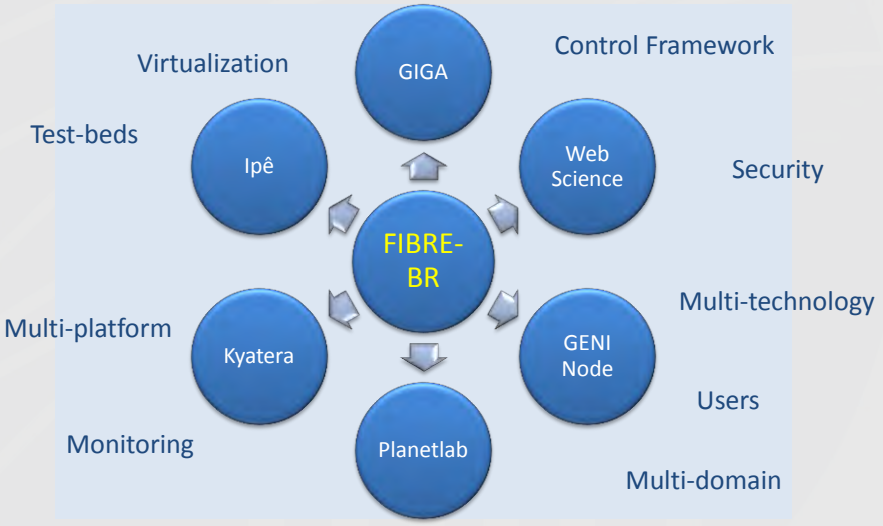
- All of the FIBRE EU members participate in FI research Infrastructure, Virtualization, and User Testbets projects, some of them in the FIRE framework



29

Potential Internal BR links

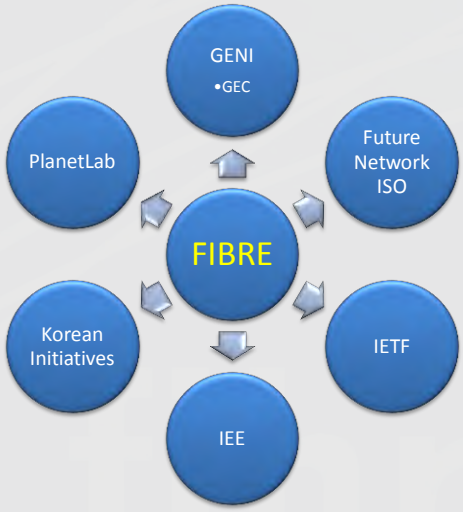
FIBRE BR members participate in FI research Infrastructure, Virtualization, and User Testbets projects, some of them in the GIGA and Ipê networks



30

External links

- Create external liaisons with adequate initiatives in order to increase the scope of the project activities



31

CONCLUSIONS

FIBRE will provide:

- Intercontinental slices of heterogeneous infrastructure to network researchers.
- A federated infrastructure automatically controlled by one or more CMFs
- High speed intercontinental links connecting the European and the Brazilian parts of the joint facility.
- Enhanced OFELIA Control Framework software
- Enhanced OMF and OML software
- Federation software and tools
- Experimental network application software
- Network of contacts between Brazilian and European partners
- Internal and external links with similar initiatives

32

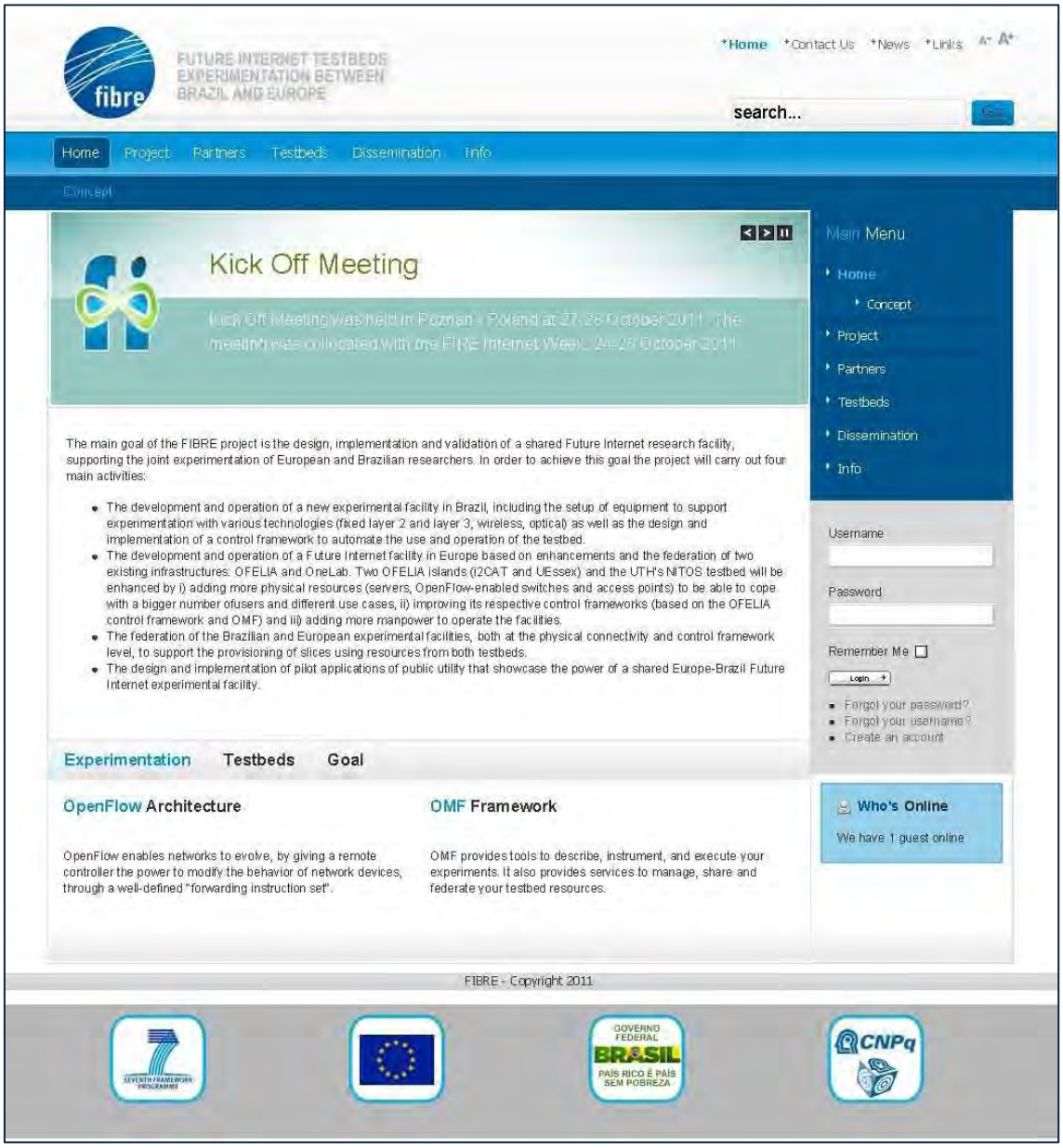
Expected results for Brazil/LA

- FIBRE is a showcase project in international collaboration in Future Internet
  - Demonstrate local capacity to collaborate with leading European projects in this important area
  - Provide local experimental facilities for validating and demonstrating new FI proposals
  - Provide opportunity for extension to and participation by researchers from other Latin American countries
  - Promote involvement of and technology transfer to the industrial sector, to prepare for Future Internet needs, especially involving OpenFlow and SDN approaches.


Thank you for your attention
Antônio Jorge Gomes Abelém
abelem@ufpa.br
Sebastià Sallent
sebastia.sallent@i2cat.net
Michael Stanton
Michael@rnp.br
34

5 Web

The Project web page is under construction at the time of delivery of this presentation, but the work already done gives an idea on how it will be.



The current URL is http://volos.iti.gr/fibre/ , but will be changed into a FIBRE domain to be defined.

6 Poster

Intended for workshops and any static presentations. This poster was presented at the Open Networking Summit at Stanford (17 to 19 October 2011).

Future Internet testbeds/experimentation between Brazil and Europe - FIBRE

What? Main goal

Create a **common space** between the **EU** and **Brazil** for **Future Internet** (FI) **experimental research** into **network infrastructure** and **distributed applications,** by building and operating a federated EU-Brazil Future Internet experimental facility

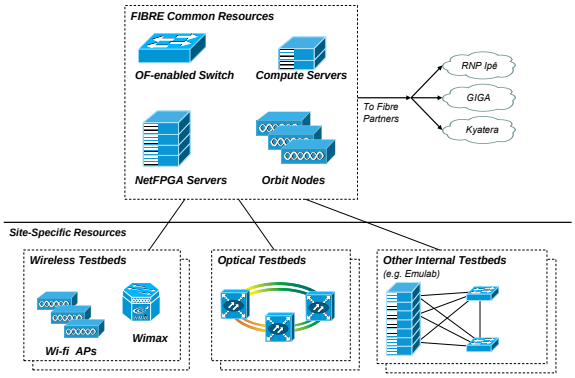
When? Project start date: October 1st, 2011
Duration: 30 months

FIBRE-EU FIBRE-BR

Objective 1 – Build Future Internet experimental testbeds in Brazil

(The FIBRE-EU partners already have working testbeds in the OFELIA, CHANGE and OpenLAB projects)

Locations and interconnection topology

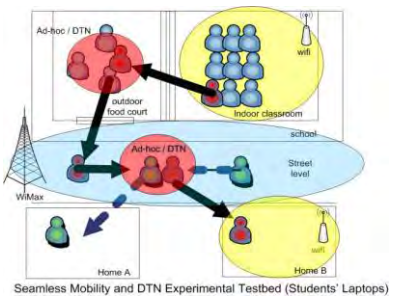


Local testbed (nucleus and possible extras)

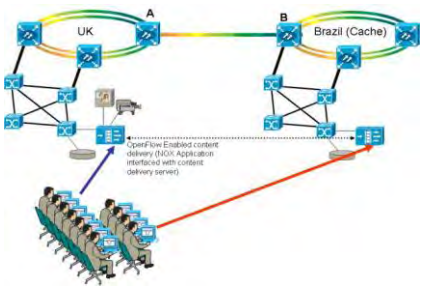
Objective 2 – Federation of FIBRE-BR and FIBRE-EU facilities

- Federation of different control and monitoring frameworks
- Physical interconnection

Objective 3 – Technology pilot experiments and showcases



Seamless mobility testbed



High-definition content delivery

END OF DOCUMENT