



OpenLab



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Extending FIRE testbeds and tools



Overview

OpenLab's main objective is to foster innovation on the Internet by providing interoperable, large-scale testing facilities which enable a wide scope of experiments across diverse domains of the Future Internet. In particular, OpenLab will:

- Stimulate different user communities to utilise large-scale testbeds for experiments
- Enable cross-environment experiments and reuse of monitoring tools
- Establish interoperability among testbed environments at various levels
- Establish common procedures for deployment, authorisation, and security of experiments
- Ensure reproducibility of experiments
- Upgrade existing testing infrastructures and add mobility to wireless testbeds

Scope

Experimentally-driven research is a key to successfully exploring Future Internet concepts and technologies. An open, shared experimental facility that is both large-scale and sustainable is essential for European industry and academia to innovate and assess the performance of their solutions.

OpenLab brings together the essential ingredients to address the challenge of establishing such a facility. The project will build on and improve Europe's early and successful prototypes of facilities for Future Internet Research and Experimentation (FIRE). OpenLab will deploy software and tools that allow a selection of advanced testbeds to support diverse applications and protocols in more efficient and flexible ways. The project delivers control and experimental plane middleware to facilitate early

use of these testbeds by researchers in industry and academia. This will be based on proven technologies, developed in the predecessor projects OneLab and Panlab. OpenLab will also use the best work of other initiatives, such as the Slice Facility Architecture (SFA) control framework and OpenFlow switching.

OpenLab extends these facilities with advanced capabilities in the area of mobility, wireless, monitoring and domain interconnections, and introduces new technologies such as OpenFlow. In addition, OpenLab will finance and work with users who propose innovative experiments based on OpenLab's technologies and testbeds, using the open call mechanism developed for FIRE Facility projects.

Competitive calls for additional partners

Two competitive calls for additional project partners are organised in the scope of OpenLab, seeking new partners to carry out specific tasks within the project, in particular the execution of cutting-edge experiments in the area of Future Internet.

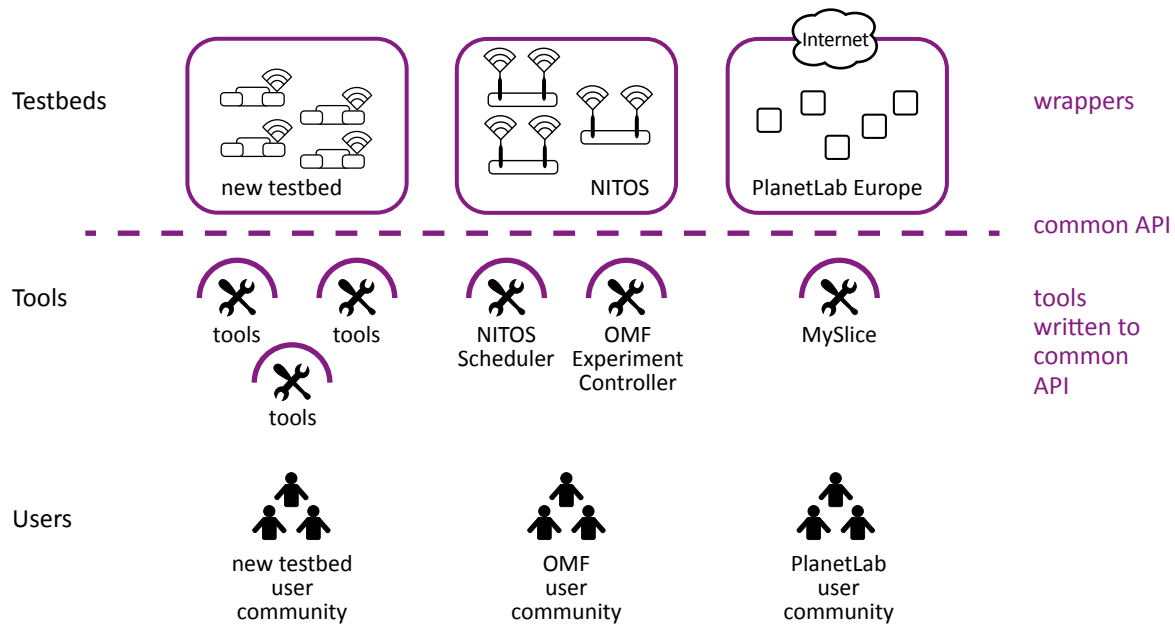
One of the OpenLab project objectives is to make the infrastructure available for execution of experiments by users. It is, thus, required that these

users come from organisations that are not part of the project consortium. In order to select the most innovative experiments to be executed within the project, independent evaluations of the submitted proposals will be performed in accordance with the rules of EC FP7. The proposals have to demonstrate technological expertise, scientific novelty, and quality.

OpenLab testbed infrastructure

OpenLab integrates several testbeds, tools, control frameworks and networking technologies. It is an objective of OpenLab to enable transparent access to combinations of resources from different testbeds for advanced and large scale Future Internet experiments. As not all control planes are available with all testbeds, the project aims to

integrate control plane technologies, in particular observing the principles of transparency and simplicity. User support and tools for simulation and the collection and analysis of data are also available. By default the interconnection of testbeds is done via the Internet. For other scenarios specialised solutions are available.



OpenLab interoperability framework for testbed infrastructure

Testbeds offered by OpenLab

OpenLab offers access to a wide range of testbeds, providing an infrastructure for experiments that go beyond what can be tested on the current Internet. The testbeds offered include:

- **PlanetLab Europe**, offering access to over 1000 nodes distributed world-wide based on the proven PlanetLab system
- **NITOS**, an OMF-based wireless testbed consisting of 45 nodes equipped with a mix of Wi-Fi and GNU-radios
- **w-iLab.t**, a wireless mesh and sensor network infrastructure of 180 nodes (including 20 mobile nodes)
- Two **IMS** telco testbeds, supporting carrier-grade next generation network platforms that can connect to the public PSTN and IP phone services, and can explore merged media distribution
- **ETOMIC**, a high-precision network measurement testbed featuring dozens of Internet-connected nodes synchronized via GPS
- **.SEL**, a hybrid delay-tolerant opportunistic networking testbed
- **ns-3**, a free open-source discrete-event network simulator
- **HEN**, which allows emulation of rich topologies in a controlled fashion over switched VLANs that connect multiple virtual machines

About OpenLab

OpenLab is an Integrating Project under the European Union's Seventh Framework Programme (FP7) addressing the work programme topic Future Internet Research and Experimentation (FIRE - ICT 2011.1.6). The project is realised by a consortium of 19 partner organisations

from 12 countries, and is coordinated by UPMC Sorbonne Universités, France. It started in September 2011 and will run for 30 months, until the end of February 2014. The total budget of the project is 7.35 million euros, including an EC contribution of 5 million euros.

Contact

Prof. Serge Fdida (Project Coordinator)
UPMC Sorbonne Universités – Paris 6
E-mail: contact@ict-openlab.eu

OpenLab partners

- Cosmote, Greece
- Creative Systems Engineering, France
- Eötvös Loránd University, Hungary
- ETH Zurich, Switzerland
- Eurescom, Germany
- Fraunhofer, Germany
- Hebrew University of Jerusalem, Israel
- IBBT, Belgium
- INRIA, France
- National ICT Australia Limited Australia
- Ecole de Technologie Supérieure, France
- Technische Universität Berlin, Germany
- Universidad Autónoma de Madrid, Spain
- University College London, UK
- Università di Pisa, Italy
- University of Patras, Greece
- University of Thessaly, Greece
- UPMC Sorbonne Universités, France
- Waterford Institute of Technology, Ireland

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