

COMMUNITY NETWORKS TESTBED FOR THE FUTURE INTERNET

CONNECTED COMMUNITIES

CONFINE



Scope

The CONFINE experimental facility supports experimentally-driven research on Community-owned Open Local IP Networks. These networks are already successful in developing internet access in many areas of Europe and the world. The project takes an integrated view of community networking.

This project offers Community-Lab, a testbed for experimental research that integrates and extends three existing community networks: Guifi.net (Catalonia, Spain), FunkFeuer (Wien, Austria) and AWMN (Athens, Greece); each is in the range of 500 – 20,000 nodes, a greater number of links and even more end-users. These networks are extremely dynamic and diverse, and combine successfully different wireless and wired (optical) link technologies, fixed and ad-hoc routing schemes, and management schemes. They run multiple self-provisioned, experimental and commercial services and applications.

This testbed provides researchers with access to these emerging community networks, supporting any stakeholder interested in developing and testing experimental systems and technologies for these open and interoperable network infrastructures.

Community-Lab is a resource for the research community to address the limits and obstacles regarding Internet specifications that are exposed by these edge networks. It supports an integrated and multi-disciplinary effort to address and assess the usefulness and sustainability of community networking as a model for the Future Internet.

Technical and innovation approach

Community-Lab is built from the federation of existing community IP networks that are open to researchers and enabled for experimentation. An entry point with tools allows researchers to select a set of resources, and then deploy, run, monitor and experiment with services and protocols. This is done on real-world IP community networks that incorporate a wide variety of wired and wireless links, nodes, routing, applications and users. It combines researchers and end-users following an innovative model of self-provisioned, dynamic and self-organizing networks using unlicensed and public radio spectrum and optical links.

The project contributes new equipment, extending the existing community networks with additional nodes, network interfaces, links and computing resources. This extra capacity is required to accommodate the additional load caused by experiments running in the community networks. The Community-Lab testbed is operational with more than 100 nodes for experimentation embedded in community networks. Through two open calls, one near the end of Year 1 and another near the end of Year 2, external experimenters are being attracted, leading to an open and demand-driven expansion of the testbed functionality, the federation and its usage. During the second half of the project the spare capacity of the testbed will be made available to external researchers, especially those willing to contribute hardware resources in exchange.

Type of project

Large-scale Integrating Project (IP)

Contract number

FP7 – 288535

Project coordinator

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Project website

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Community contribution to the project

4.942.000 Euro

Project start date

1st October 2011

Duration

48 months

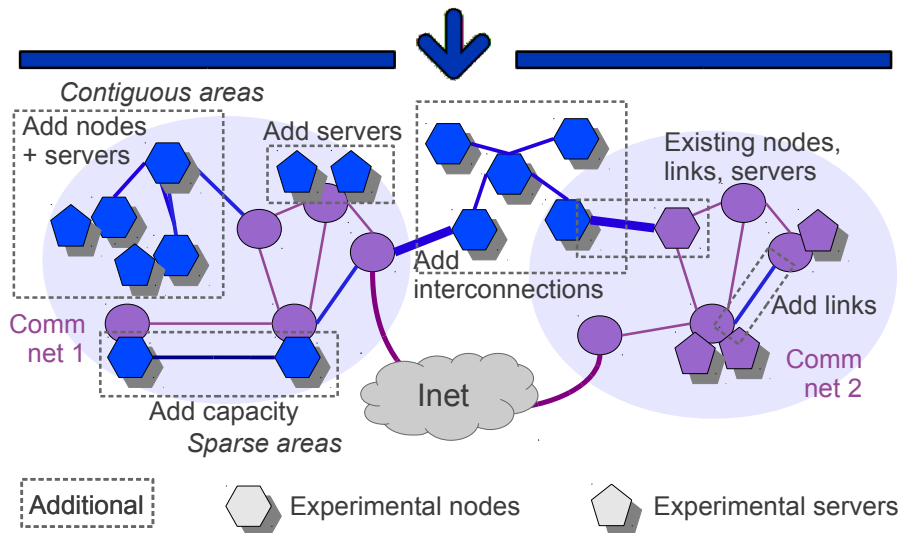


Fig. 2: The project brings in additional users (researchers) with a common entry point and additional resources (nodes, servers, links) in contiguous and sparse areas

Target users and benefits

The scientific and technical objectives of the project can be drawn from the need to explore models for the Future Internet that are socially, economically, and technically sustainable. The CONFINE project targets the exploration and advancement of the community networking model, towards providing the right quality of experience and sustainability of community networks by looking at the social, technical, economic and legal implications. That requires contributions from all societal groups. This testbed aims at researchers from academia and industry to perform experimentally-driven research on obstacles and limitations in community networks, addressing:

- ▲ Scale, heterogeneity and limited resources in the infrastructure (links, nodes, hosts) such as routing extensions for large and heterogeneous networks.
- ▲ The need for cross-layer interactions and optimizations, such as QoS for a variety of real-time (e.g. voice) and non-real-time services (e.g. media distribution), for heterogeneous networks.
- ▲ The definition of global parameters (e.g. QoE through user perceived parameters) concerning the usability of the infrastructure and user-friendliness as seen from the user perspective.
- ▲ Self-management: self-configuration (e.g. adaptive channel and address allocation), self-healing (adaptation to node or link failures), and self-optimization (adaptation to different resource management functions depending on internal or external influences).
- ▲ Creation of open data sets for experimentation: generation of different data sets for off-line experimentation or simulation.
- ▲ Development of a benchmarking framework to ensure repeatability, reproducibility and verifiability of experiments with stable configurations.
- ▲ Best practices: documenting the different experiments performed on the experimental facility.
- ▲ Contributions to standardization of different key specifications for community networks.
- ▲ Contributions to open-source implementations of reference software components and services for community networks.
- ▲ Socio-technical-economic-legal evaluation and sustainability model based on the results of the testbed's provision, usage, and operation*.

Project partners	Country
Universitat Politècnica de Catalunya	Spain
Fundació Privada per a la Xarxa Oberta, Lliure i Neutral guifi.net	Spain
FunkFeuer	Austria
Athens Wireless Metropolitan Network	Greece
The OPLAN Foundation	United Kingdom
Comunicació per a la Cooperació - Pangea	Spain
Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.	Germany
iMinds	Belgium
Consorzio Nazionale Interuniversitario per le Telecomunicazioni *	Italy
Freie Universität Berlin *	Germany
INstituto de Engenharia de Sistemas e Computadores do Porto *	Portugal
University of Luxembourg *	Luxembourg
University of Trento *	Italy

Advisory board: [Jo-Philipp Wich \(DE\)](#), [Sascha Meinrath \(USA\)](#), [Marek Lindner \(DE\)](#).

* Selected in open call 1, participating during one year since 2/2013.