Bottom-up Broadband Pilots in Europe (C4EU 5.1.3: Report on Selection of Opportunities and Projects - c)

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Abstract

This report covers the second call for pilots of the Bottom-up Broadband initiative, the consensus process that led to the definition of the pilots to be executed, and also the teams and pilot charters of the pilots that will be executed.

Index Terms

Bottom-up-Broadband (BuB), wifi, fiber, sensor networks, BuB pilots

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This report introduces the second round of pilots in the Bottom-up Broadband initiative. Section II explains that this is a collaborative document open for anyone to contribute. Section III reproduces the text of the second call for pilots and Section IV contains the received proposals. The combination of different proposals to obtain the pilots to be executed is described in Section V. The team in charge of the execution of the proposals and the pilot charter document for each pilot is introduced in Section VI. Finally, Section VII concludes the document.

II. About this document

This report has been produced using open source tools such as LaTeX [1] and *git* [2]. LaTeX is widely used in academia to prepare print-class documents. It automatically takes care of numbering, cross-referencing, tables of contents, bibliography, etc. *Git* is a high performance distributed revision control which is used in many open source projects, such as the linux kernel. Git makes it easy and safe to collaborate as each contributor works on his or her own personal copy. Good contributions can be easily shared with others, and it is always possible to revert to a previous version.

Our git repository is publicly available in *github*:

https://github.com/jbarcelo/C4EU-deliverables

Anyone who is familiar with LaTeX and *github* can contribute to this document. The firs step is to make a copy (a *fork* in *github* jargon). The contributor can work in this copy and make changes to improve the document. After that, it is necessary to request that these changes are merged into the original copy of the document (a *pull request* in github jargon).

If you see anything that can be improved, feel free to contribute. This document is alive in the sense that it will keep evolving as long as contributors make changes and improve it.

The system automatically keeps track of all the contributors and their contributions. It is possible to see who is contributing more actively and which are the exact changes made by each contributor. And everything is public on the web.

III. THE SECOND CALL FOR PILOTS

In February 2013 started the dissemination of the second open call for pilots. The call was first distributed among the *Commons for Europe* partners, then at *BattleMesh* (University of Aalborg) and the TCCC list (The Technical Committee in Computer Communication). We reproduce here the text of the call:

> Dear colleagues,
>
> We are currently studying ”Bottom-up Broadband”. This is collaborative grassroots network deployment and maintenance. In this networks, the users (individuals, institutions, companies or other organizations) participate in the funding, planning, deployment and maintenance of the network. If you are participating in one of this initiatives or are interested in bottom-up-brodband, please contact us.
>
> Open source software has changed the way that software is produced and maintained. Wikipedia has changed the way encyclopedian information is compiled and refined. P2P file exchange has changed the way files are shared and distributed. We believe that collaborative network deployment can change the way that networks are built, extended and maintained.
>
> Probably, the most prominent example of collaborative network deployment is guifi.net. The size of this community network exceeds 20,000 nodes. Last year’s efforts have been focusing on community fiber deployment with around 70 homes and farms connected today.
>
> Besides fiber, we are also interested in ad-hoc mesh networks to cover events, wireless sensor networks to gather environmental data and public wifi offering models.
>
> I attach the Bottom-up broadband call for pilots below.
>
> Best regards, Jaume
>
> ******* BOTTOM-UP BROADBAND CALL FOR PILOTS **********
>
> The high expectations created by the European Digital Agenda call for new models for network deployment. A combination of fiber and wireless technologies must be part of the solution to achieve the objectives in 2020.

The ”Commons for Europe” competitiveness and innovation project explores ”Bottom-up Broadband” (BuB) network deployment initiatives to analyze the best practices, find replicable success models and offer guidance to policy makers. In BuB networks, the users play a relevant role in planning, funding, deploying and maintaining the network. By users we mean the individuals and organizations, including commercial companies and public institutions, that benefit from the network. Network are shared as a ”commons” resource by the communities for a greater benefit (and lower costs) for all the participants. The idea of BuB is closely linked to that of open access networks, which are proliferating in northern European countries.

*** BuB Call for pilots 2013 ***

We are looking for BuB intiatives to be considered in the ”Commons for Europe” project. These initiatives will be profusely documented and used as examples for future BuB network deployments. Each selected pilot will receive the backing of a BuB fellow for nine months.

Proposal submission deadline: May 15th 2013 Selection decision: June 15th 2013 Start of the pilot phase: July 2013

Visit our web

http://bub4eu.net/

and join our mailing list

https://llistes.guifi.net/sympa/arc/bub

for more information.

A brief description of the first round of executed pilots follows. (The application form is at the end of the email) restrictions of the existing infrastructure, allowing mobility and autonomy is an important field that can benefit all the parts involved as long as we find the right balance.

Application form:

==========

This pilot project data sheet will help us to keep track of all pilot initiatives.

Please complete the following fields and submit to jaume.barcelo@upf.edu

(or even better, send it to the bub mailing list if you are registered)

Title:

Brief description:

Goals:

Estimated start date:

Estimated end date:

Priority: (Low/Normal/High)

Stage: (Prospect/Pre-project/Review/Execution/Evaluation/Finished)

Type: (Wifi/SuperWifi/Fibre Optics/Hybrid)

Status: (Not Started/In Progress/On Hold/Completed)

Progress %:

Country:

Area:

City:

Neighbourhood:

Project type:

Contacts:

Risk %:

(0% means that the success is guaranteed, 100% means that it is impossible to successfully complete this pilot)

Regulatory issues:

Potential impact (e.g., number of users, BuB funds raised, cities involved, etc.):

Comments:

Thanks for your collaboration :)

End of application form.

==========

IV. Received proposals

A. A Pilot Wireless Network for Remote Sensor Data Collection from Griffin Forest in Central Scotland

Title: A Pilot Wireless Network for Remote Sensor Data Collection from Griffin Forest in Central Scotland

Brief description and Goals:

Geoscientists from Edinburgh University have been conducting field experiments since 1996 in the Griffin forest in central Scotland, 4Km southeast of Aberfeldy. The focus of the current experiment, which is expected to continue for at least 5 years, is on understanding the impact of aerosolbased nitrogen fertilization to stimulate forest growth in comparison with the traditional fertilization method based on solid pellets in significantly higher amounts and infrequently (typically every 5 years). Understanding the effect of background levels of nitrogen on forest growth requires monitoring various environmental, microclimatological and hydrological factors that together reflect forest growth rate. Consequently, the experimental site in the Griffin forest has a wide range of sensors deployed over a 1Km2 area. Currently there is no communications network infrastructure in place at the experimental site for remote access from Edinburgh as well as for onsite communication among various geographically distributed sensors. As a result, geoscientists from Edinburgh connected with the experiment have to make weekly trips to the site for data collection and maintenance of site infrastructure (e.g., replacement of batteries on sensors). The goal of this project is to enable network connectivity to Edinburgh for remote sensor data collection and site monitoring. This will be achieved by deploying a wireless base station at the site and a wireless relay that bridges connectivity between the base station and nearest Internet connection point. Given the remoteness of the site, both these wireless masts have to be selfpowered via renewable energy sources (solar and wind). Longdistance WiFi could be used to interconnect these wireless masts. Since the vegetation and forest cover dampens wireless signal propagation, we also intend to experiment with SuperWiFi to understand the benefits it provides towards achieving required coverage with low power power conservation is important when using selfpowered wireless relays for reliable connectivity at low cost. The Forestry Commission

Scotland, who have a base near the Griffin site, have in principle agreed to allow us to share their Internet connection.

Estimated start date: 1 August 2013

Estimated end date: 30 April 2014

Priority: (Low/Normal/High) High

Stage: (Prospect/Preproject/Review/Execution/Evaluation/Finished) Preproject

Type: (Wifi/SuperWifi/Fibre Optics/Hybrid) Wifi and SuperWifi Status: (Not Started/In Progress/On Hold/Completed) Not Started

Progress %:

Country: UK

Area: Rural

City: Near Aberfeldy, Scotland

Neighbourhood: Griffin Forest

Project type:

Contacts: Dr Mahesh Marina (mmarina@inf.ed.ac.uk)

Risk %: 0%. Through the Tegola project [1] , we have substantial experience on successfully using longdistance WiFi for wireless Internet access in rural and remote areas. (0% means that the success is guaranteed, 100% means that it is impossible to successfully complete this pilot)

Regulatory issues: For experimenting with SuperWiFi, we will get an experimental license from Ofcom, the UK telecommunications regulating authority.

Potential impact (e.g., number of users, BuB funds raised, cities involved, etc.):

Having the experiment site connected to the Internet leads to several benefits. Firstly, it will result in cost savings through reduced travel requirements for sensor data retrieval from the site. Secondly, it will enable remote monitoring of the experimental system for faults in near realtime that will in turn lead to data quality improvement and more informed site visits. Thirdly, networking among sensors within the site will enable development of adaptive sampling systems which would allow for event driven sampling based on measurements from noncolocated measurement systems. Finally, external communication

[1] Tegola Tiered Mesh Network Testbed in Rural Scotland

capability would allow for more rapid dissemination of results from the experiment to interested communities (e.g., European scale carbon exchange modelling efforts).

Comments:

We would benefit from ready to use equipment for this pilot approximately valued around 5000, thanks to the Tegola project which initially was deployed as an experimental wireless testbed but now has evolved into a selfsustaining rural wireless network owned and run by the local communities in Northwest Scotland. As already mentioned, this pilot would also benefit from an Internet connection generously provided by the Forestry Commission Scotland. We would however need a person to help with the pilot deployment at Griffin site who we hope would be supported through the BuB initiative.

B. Mobile Air Quality Sensing in Edinburgh

C. SenseWind

Title: SenseWind

Brief description: Distributed sensor network for wind speed and 3D direction

Goals:

-. Create a wind sensor capable of detect wind speed and its 3D direction and able to send the obtained data through guifi.net network to a central server

-. Create a server where data will be stored and displayed

Estimated start date: 01/06/2013

Estimated end date: 13/05/2014

Priority: Normal

Stage: Pre-project

Type: Wifi

Status: In Progress

Progress: 0%

Country: Spain

Area: Catalunya

City: Manresa

Neighbourhood: Urban

Project type: BuB sensor network

Contacts: alberthoms@gmail.com

Risk: 10%

Regulatory issues: Not expected

Potential impact: -. Data will be publicy accessible so householders can evaluate economical and ecological return for aerogenerator deployment

Comments:

D. Sallent Fibra

Title: Sallent Fibra

Brief description: FFTX deployement in medium sized town taking advantage of some works already planned

Goals:

-. Deploy a FO from a guifi.net location to a backbone (XOC network in c16 motorway)

-. Start data transfer with XOC backbone

-. Deploy some FTTH to buildings near trunk deployment

Estimated start date: 01/07/2013

Estimated end date: 15/05/2014

Priority: Normal

Stage: Prospect

Type: Fiber Optics

Status: Not Started

Progress: 90%

Country: Spain

Area: Catalunya

City: Sallent

Neighbourhood: Urban

Project type: FFTX

Contacts: alberthoms@gmail.com

Risk: 90%

Regulatory issues: Several local regulation altough municipality is collaborative

Potential impact: Sallent has wide guifi.net wifi deployment and penetration (over 100 nodes), internet access is now made trough a dsl proxy that can be moved to the FO deployment. Also municipality has several dsl connections all over the town that can be centralized in this deployment MicroISP and cooperative ISP can provide internet access to the town and sorroundings and also neighbour tons in the area

Comments:

E. Juupajoki FTTx

Title: Juupajoki FTTx

Brief description:

Juupajoki municipality and it's neighbors are too small for incumbents and regional telecompanies to make a long term investment in FTTx and offer good (atleast 100mb) broadband. Existing copper cables are withdrawn. Available broadband is poorly coverage of 3G.

Goals: Inform about the possibilities of a superfast network. Activate inhabitants and support them to start cooperative(s) and make pre-studie of subscribers. Make a business plan for the network. Negotiate loans and guarantees. Prepare for roll-out

Estimated start date: 15/07/2013

Estimated end date: 15/04/2014

Priority: Normal

Stage: Prospect

Type: Fiber Optics

Status: Not Started

Progress: 10%

Country: Finland

Area: Tampere Region

City: Juupajoki

Neighbourhood: Rural municipality

Project type: FTTx

Contacts: kaj@sydwest.fi

Risk: 10%

Regulatory issues: None.

Potential impact: 500 subscriptions.

Comments: Internet backbone goes trough the area with several service providers.

F. Multi-purpose FTTx-infrastructure in Vesilahti and surroundings

Title: Multi-purpose FTTx-infrastructure in Vesilahti and surroundings

Brief description: Due to the fast evolution of wireless solutions commercial telephone operators have passed the development of fixed networks and concentrated only on 3G/4G technologies. Southern Tampere Region rural areas are in danger to be without any possibility to use internet based services as this area is not commercially interesting. Local inhabitants are not aware of possibilities how to improve their chances to get a better infrastructure in the future.

Goals:

Present the current situation of current commercial services and the plans of service providers in the future for rural areas. Support local inhabitants in their plans to improve fixed network infrastructure in their area by providing them expertise and know-how of various possibilities for financing, network planning, technical alternatives and practical ways of implementing a FTTx-network as a community infrastructure that benefits equally all in reasonable price. Activate communities to realize that new FTTx-networks are needed in order to maintain sufficient platform for using web-based services that government provides and encourages to use. Improve the co-operation with electric companies and other ifrastructue builders in order to build all new solutions simultaneously.

Estimated start date: 15/07/2013

Estimated end date: 15/05/2014

Priority: Normal

Stage: Prospect

Type: Fiber Optics

Status: Not Started

Progress: 10%

Country: Finland

Area: Southern Tampere Region

City: Vesilahti

Neighbourhood: rural surroundings, Urjala, Plkne

Project type: FTTx

Contacts: erkki.makela@vaske.fi

Risk: 10%

Regulatory issues: None

Potential impact: Improvement of fixed network infrastucture will affect 700+ households in short term period and in long term period the impact will be considerably larger, as the rural area will be almost totally without fixed network in the future.

Comments:

Commercial telcos concentrate mainly on providing content services and developing wireless 3G/4G networks. Fixed FTTx infrastructure is not interesting for commercial companies due to long pay back times (over 7 years.).

G. SouthWest Fiber

Title: SouthWest Fiber

Brief description:

South-West of Finlands coastline is a area that have on most of the island good bacbone fiber, but very few private subscribers. Existing copper cables are withdrawn from most of the municipalities and with that the xDSL.

Available broadband is poorly coverage of 3G, WiMAX and WiFi.

Goals: Inform about the possibilities of a superfast network. Activate inhabitants and support them to start cooperative(s) and make pre-studie of subscribers or seek cooperation with existing networks. Make a business plan for the network. Negotiate loans and guarantees. Prepare for roll-out of a modern 1Gb network that reaches as many inhabitants and summerguests as possible. Further development and integration of existing networks (wireless and fixed) in the area.

Estimated start date: 15/07/2013

Estimated end date: 15/04/2014

Priority: Normal

Stage: Prospect

Type: Fiber Optics

Status: Not Started

Progress: 10%

Country: Finland

Area: South-West Finland

City: Turku

Neighbourhood: Rural municipalities

Project type: FTTx

Contacts: kaj@sydwest.fi

Risk: 10%

Regulatory issues: None.

Potential impact: 1500 subscriptions. Cities involved Parainen, Kustavi, Kemi and Taivassalo

Comments: Internet backbone goes trough the area with several service providers.

H. Open Data module for the sensor platform Connecta BCN

Title: Open Data module for the sensor platform Connecta BCN

Brief description: The goal of this project is to develop the module that feed in near line time the Open Data platform of Barcelona with data coming from the Barcelona sensor platform (Connecta BcN)

Goals: Share open data in near line time

Estimated start date: 01/09/2013

Estimated end date: 31/12/2013

Priority: Normal

Stage: Prospect

Type: Hybrid

Status: Not Started

Progress: 0%

Country: Spain

Area: Catalonia

City: Barcelona

Neighbourhood: N/A

Project type: Hybrid

Contacts: mgarrigap@bcn.cat

Risk: 10%

Regulatory issues: N/A

Potential impact: All future sensors In Barcelona and some near cities

Comments:

I. Cost analysis of sensor installation in public spaces

Title: Cost analysis of sensor installation in public spaces Brief description: The more expensive aspect in the IoT and in the use of sensors out of the buildings are the costs of installation and maintenance of this field elements, sometimes more expensive than the cost of the sensor itself. It is very urgent to obtain a cost breakdown that allows identify the cost reduction opportunities. Barcelona I now beginning the installation of an important number of sensors in a Urban Lab in the 22@ rea that could be a good opportunity to work.

Goals: To obtain a clear cost breakdown of sensor installation to reduce them.

Estimated start date: 01/07/2013

Estimated end date: 30/09/2013

Priority: Low

Stage: Prospect

Type: Hybrid

Status: Not Started

Progress: 0%

Country: Spain

Area: Catalonia

City: Barcelona

Neighbourhood: 22@ neighbourhood

Project type: Hybrid

Contacts: mlamarca@bcn.cat

Risk: 0%

Regulatory issues: N/A

Potential impact: N/A

Comments:

J. Real time activity of the wifi network of Barcelona

Title: Real time activity of the wifi network of Barcelona

Brief description: The information about the Access Points of the city WIFI network (AP situation, activity, bandwidth used, etc.) could be interesting for different people (citizens, administrators, politicians, ...)

Goals: Open data to the users and citizens

Estimated start date: 01/10/2013

Estimated end date: 31/03/2014

Priority: Low

Stage: Prospect

Type: Wifi

Status: Not Started

Progress: 0%

Country: Spain

Area: Catalonia

City: Barcelona

Neighbourhood: N/A

Project type: WiFi

Contacts: malvarado@bcn.cat

Risk: 30%

Regulatory issues: N/A

Potential impact: Barcelona WIFI users (about 70.000 a day)

Comments:

K. Development of a generic viewer for data from sensors of the public

Title: Development of a generic viewer for data from sensors of the public works in the city

Brief description: Barcelona has decided monitor public works using sensors.

Each new public work needs different type and number of sensors to control it, so an easy way to customize the viewer of this data is needed.

Goals: Facilitate and universalize the use of sensors in the city

Estimated start date: 01/09/2013

Estimated end date: 31/03/2014

Priority: High

Stage: Prospect

Type: Hybrid

Status: Not Started

Progress: 0%

Country: Spain

Area: Catalonia

City: Barcelona

Neighbourhood: N/A

Project type: Hybrid

Contacts: jcirera@bcn.cat

Risk: 10%

Regulatory issues: N/A

Potential impact: 6 great public works for next two years.

Comments:

L. Sharing Public infrastructures for un-licensed band wireless equipment

Title: Sharing Public infrastructures for un-licensed band wireless equipment Brief description: Definition of the management model for the infrastructure sharing in a Municipal scope for network un-licensed band wireless devices. The project will focus on the analysis of the possible funding schemas and the extension of those infrastructures in order to be used by users and groups of interest, in research and experimentation projects related with the Smart Cities concept and with the Barcelona Laboratory (Project promoted from ICUB). In the same scope, it will be analysed in deep how to facilitate the introduction of new equipment to those infrastructures defining a detailed guide of

the use rules, with the aim to generate a open management model able to stimulate the creation of new technological pilots.

Goals:

-To define a detailed set of use rules for the infrastructure.

-Study in deep the limitations of their use

-Study new funding schemas for facilitating the access to the infrastructures

-Research about the potential impact of these kind of initiatives for the citizens

Estimated start date: 17/06/2013

Estimated end date: 31/12/2013

Priority: Normal

Stage: Prospect

Type: Wifi

Status: Not Started

Progress: 0%

Country: Espanya

Area: Catalunya

City: Barcelona

Neighbourhood: Sant Andreu

Project type: Wifi

Contacts: pedro.lorente@iglor.es

Risk: 60%

Regulatory issues: This pilot should not be affected for any regulatory issue.

Potential impact: Potential impact of the pilot is centred mainly in the opening of a municipal infrastructure for an exhaustive use, done by citizens, groups of interest and/or organized user communities, interested on research and innovation projects in the field of Smart Cities and Barcelona Laboratori. The pilot can result one of the first iterations of an open management model for the public administration, in this case the municipality of Barcelona, and can be used as a referent model for replicating the model in any other city and/or public infrastructures. It is very important to consider the value of this kind of initiatives to R+D+i initiatives as BcnLab, that try to establish structures for promoting the

citizens innovation at the same time that generates communities where the innovative talent of the city is gathered.

Comments:

M. Interconnecting networks infrastructures thought Fiber Optics

Title: Interconnecting networks infrastructures thought Fiber Optics Networks, for innovation and research projects

Brief description: Analysis of the available options for the interconnection of wired and wireless network infrastructures to fibre optics networks. Analyse the options (technical and legal) for interconnection of different wireless infrastructures through municipal fibre optics, in order to facilitate the creation of technological pilots for the Barcelona Laboratori project. The scope of the project goes from the definition of the necessary network elements to the definition of the proper mechanism for the correct us of these elements and the interconnection.

Goals:

-Definition of a transparent and common management model for the proper interconnection between different network infrastructures

-To establish the proper use rules and limitation of use for these interconnections

-To establish the conceptual framework for these interconnection when used in the BcnLAb research and innovation projects

Estimated start date: 17/06/2013

Estimated end date: 31/12/2013

Priority: Normal

Stage: Prospect

Type: Hybrid

Status: Not Started

Progress: 0%

Country: Espanya

Area: Catalunya

City: Barcelona

Neighbourhood: Sant Andreu and other zones of Barcelona

Project type: Hybrid

Contacts: pedro.lorente@iglor.es

Risk: 70%

Regulatory issues: It is possible to find municipal regulatory issues for the use of those fibre infrastructures involved in the pilot, as part of the project we will work on detecting and analysing them according to the project objectives.

Potential impact:

In this pilot, BcnLab will get the proper models and needed protocols for the creation of common infrastructure trials, that will simplify the creation a deployment of research and innovation pilots in the networking fields. In any case, the use of those trials will be always focussed only in research and innovation projects. One of the main aspects, at the technological point of view, will be the option of offering the infrastructures to the communities involved in the BcnLab project, as a main active for their research and development projects

Comments:

N. Extending Fibre Optics networks between academic Institutions

Title: Extending Fibre Optics networks between academic Institutions Brief description: The proposed pilot is focussed on the definition of a bottom-up model for the deployment of fibre optics between academic institutions, in order to establish a research and experimentation area in urban environments. The pilot wants to study the existing possibilities for combining existing and non-used networked elements (fibres). The objective is the construction of a shared infrastructure model co-managed and supervised by the municipality.

Goals:

-To detect the main existing and unused fibre deployments in the city

-To define the co-management model for the shared infrastructure

-To achive the first European fibre deployment in a bottom-up urban model

Estimated start date: 17/06/2013

Estimated end date: 31/12/2013

Priority: Normal

Stage: Prospect

Type: Fiber Optics

Status: Not Started

Progress: 0%

Country: Espanya

Area: Catalunya

City: Barcelona

Neighbourhood: UPF - Fabra i Coats - and other entitties

Project type: Fibre Optics

Contacts: pedro.lorente@iglor.es

Risk: 60%

Regulatory issues: It is possible to find municipal regulatory issues for the use of those fibre infrastructures involved in the pilot, as part of the project we will work on detecting and analysing them according to the project objectives.

Potential impact: A common fibre infrastructure with a bottom-up model is a unique opportunity in order to have an inter-institutional co-managed network for citizens use. Also the infrastructure should become a catalyser for the creation and development of research and experimentation projects between academic institutions, the public administration and the citizen. These common infrastructures should be the first step for having a transversal system for research and innovation in Barcelona city. BCNLab will be the conceptual scope to cover the differents pilots of this type of infrastructure.

Comments:

O. European public promoted WiFi networks census

Title: European public promoted WiFi networks census

Brief description: Survey about the situation on European public promoted WiFi networks reported by focusing on the main (at least two) Cities in each EU Country.

Goals: Sharing Knowledge and produce documentation about the situation on European public promoted WiFi networks. For each cities try to answer to question like: 1) Is there a public promoted WiFi network? 2) Is it free for the users? 3) Is there a log in

process? 3) How many connected areas are in place? 4) Numbers and characteristics of the European experiences and practices analysed in a comparative survey

Estimated start date: 01/07/2013

Estimated end date: 01/11/2013

Priority: Normal

Stage: Execution

Type: Wifi

Status: Not Started

Progress: 0%

Country: all

Area: Europe

City: all

Neighbourhood: all european countries

Project type: Documental research

Contacts: m.goretti@cineca.it

Risk: 20%

Regulatory issues: Some indirect check of national law about WiFi

Potential impact: Survey will help the attempt to create FreeEurope WiF federation

Comments:

P. Laws and regulation on WiFi across Europe

Title: Laws and regulation on WiFi across Europe

Brief description: A survey on Laws and regulation on WiFi with technicaland operative requirements in each European country.

Goals: Information about User Authentication, Service licensing, role and chances of Public Bodies and the Private Sector in WiFi networks in each European contry

Estimated start date: 01/07/2013

Estimated end date: 01/11/2013

Priority: Normal

Stage: Execution

Type: Wifi

Status: Not Started

Progress: 0%

Country: all European contry

Area: Europe

City: all European cities

Neighbourhood: all european countries

Project type: Documental research

Contacts: m.goretti@cineca.it

Risk: 20%

Regulatory issues: Look for differente aspects of laws about WiFi in different European Contry.

Potential impact: Allow all EU citizen to travel across EU country and use che same account and rules connecting to WiFi (Free Europe WiFi)

Comments:

Q. Free Europe WiFi (Documentation)

Title: Free Europe WiFi (Documentation)

Brief description: continuing the previous fellowship work of Ignacio Alberto Justel from UPF, the fellow will support CINECA in writing FreeEuropeWIFI federation technical documentation to be adopted as reference by the the new members.

Goals: Produce FreeEuropeWIFI federation technical documentation

Estimated start date: 01/07/2013

Estimated end date: 31/12/2013

Priority: Normal

Stage: Execution

Type: Wifi

Status: In Progress

Progress: 20%

Country: all European contry

Area: Europe

City: all European cities

Neighbourhood: all european countries

Project type: Create technical documentatipon about FreeEurope WiFi

Contacts: m.goretti@cineca.it

Risk: 20%

Regulatory issues: To check different laws about public WiFI in the differente EU countries

Potential impact: Help in creating FreeEurope WiFi Federation Comments:

R. Advanced QMP and Mobile node phase I

I

Title: Advanced QMP and Mobile node phase II

Brief description: Develop qmp.

Goals: Improve, test and extends qmp.

Estimated start date: 01/07/2013

Estimated end date: 10/06/2014

Priority: Normal

Stage: Execution

Type: Wifi

Status: In Progress

Progress: 80%

Country: Spain

Area: BCN

City: BCN

Neighbourhood: BCN

Project type: Wifi protocols and routing.

Contacts: dforcadell@gmail.com

Risk: 20%

Regulatory issues: Nothing

Potential impact: Improve and extends internet over every people and improve the networks of people.

Comments:

S. European Smart Citizen testbed

Title: European Smart Citizen testbed

Brief description:

In this pilot, partner cities will experiment with a Smart Citizen Kit (SCK, www.smartcitizen.me) prototype and its platforms to start gathering their own data. The SCK is a low cost open hardware Arduino-compatible board which is integrated with software tools which provide an open source online platform with its own API, and a mobile app; all its parts can be adapted to fit the needs of each city. The pilot combines sensors and wifi technology to gather and communicate the data. Goals: Demonstrate the feasibility of the collaboration of cities and citizens in the gathering and sharing of sensory data as a first and necessary step towards the realization of the Smart City concept.

Estimated start date: 01/07/2013

Estimated end date: 10/06/2014

Priority: High

Stage: Review

Type: Hybrid

Status: In Progress

Progress: 20%

Country: European-wide

Area: European-wide

City: European-wide

Neighbourhood: European-wide

Project type: Hybrid sensors WiFi

Contacts: tomasdiez@iaac.net

Risk: 20%

Regulatory issues: As long as gathered data is not privacy-sensitive, the pilot presents little challenges from the regulatory perspective. If the gathered data is deemed to invade privacy, then a regulatory study is in order. Examples of privacy invading situations are the use of camera sensors, or use of temperature sensors in a room in which the presence or absence of heating can be correlated to the presence of human beings.

Potential impact:

Over fifty SCK prototypes have been distributed around the world for a first round of testing. A platform to share information with users http://test.smartcitizen.me/ and applications http://data.smartcitizen.me/testjson?device=63 is already in place. If this initial setting grows and is enriched by the citizens and cities taking advantage of open nature of the project, it can become a bottom-up broadband Smart City implementation.

Comments:

T. Mesh everywhere

Title: Mesh everywhere

Brief description:

In a few years every citizen will have a smartphone connected to the Internet. These powerful devices allow a more efficient model of communications in which every Internet user is at the same time an active communication node. Mesh networks, self-organizing, self-forming and self-healing networks are such a model and humans will be the routers. Different testbeds have proved that open mesh networks are feasible. Even companies are flourishing in this field (http://www.shareable.net/blog/how-to-set-up-a-open-mesh-network-in-your-neighborhood) Servin Pishevar has founded the OpenMesh Project as a result of the shutdown of Internet in Egypt during the Arab Spring.(http://www.openmeshproject.org/, http://techcrunch.com/2011/02/27/humans-are-the-routers/). Our goal is to start with this open mesh multi-hop platform with simple configurations to provide ease of use even to those without networking experience. A platform that will enable any Wi-Fi equipped device (802.11b/g/a) to form a spontaneous Self-Organizing Network (SON) with other users. The solution will be able to emulate infrastructure connectivity but also simple message exchange for situations where only mobile devices are available. The system will be congestion aware in order to guarantee communication even in case a high number of devices will be connected. Our pilot will be based in different living labs, such as Gufi.net, BCNLab, Citilab and Neapolis.

Goals:

To build communication facilities that support the communication between users when no infrastructure is available or when the existing one is congested making it useless. To build the facility for peer to peer communication in portable devices such as smart phones

or tablets. To get profit of the access point function of a mobile device to offer communication to other legacy mobile devices only working as a clients. To route messages between portable devices to support communication from other devices connected peer to peer, other legacy devices connected through an access point or messages generated by the device itself. To support Internet connectivity with the usage of the data connection available on the mobile or fix devices. The functionality will be available as an Android APP and will be based on the WiFi interface for peer to peer communication and on the cellular data connection (GPRS, UMTS, HSPA or LTE) of the devices that offer this capability. Also, the same functionality will be available on fix computers running Ubuntu Linux with Internet connectivity and a WiFi interface.

Estimated start date: 01/09/2013

Estimated end date: 01/04/2014

Priority: High

Stage: Execution

Type: Wifi

Status: In Progress

Progress: 40%

Country: Spain

Area: Catalunya

City: Barcelona

Neighbourhood: –

Project type: Research and innovation project

Contacts: josep.paradells@entel.upc.edu

Risk: 30%

Regulatory issues:

From the technical point of view as an ISM band will be used (2,4GHz) no regulatory aspect is identified. From the model of communication the solution proposed is ad-hoc, the communication facilities are provided by the user and no infrastructure is needed for the communication, so no regulatory issue is foreseen.

Only, and depending on the contract of the user with the mobile operator, the sharing of the cellular data connection can be forbidden, but in this case the user can ban its

usage.

Potential impact:

Spain is one of the European countries where the penetration of smartphone is higher. They represent the 66% of the mobile terminal market. The application developed will be available to users having an Android mobile phone (that represents the 75% of the present smartphone market). Adding these two numbers will give the proposed project a great impact. In Spain, and in particular Barcelona, it is quite common to have outdoor events (concerts, parties, demonstrations,..) where mobile communication is the only option and also it is quite common to become congested since networks are not prepared to this occasional concentration of people. The application can leverage this limitation and provide communication even in case no infrastructure is available. Additionally, this application can be used in case of emergency or natural disaster.

Comments:

Mobile devices have become the personal platform for communication. Even voice and video communication are possible, simple text messages have appeared as the preferred (Twitter, WhatsApp...). They are easy to create and handle, they do not require simultaneous availability of the sender and receiver and they can be sent individually and to a group. This type of communication has been shown to be a key element in the organisation of the society. They require minimal or no infrastructure, they can avoid any control and they are fully democratic since anyone has the opportunity to express its opinion. The merits of these platforms have been seen as a threat for the governments and they have banned the access to the servers or even removed any connectivity. In other cases the system has died of success, the usage has been so high that the system becomes congested and useless. The aim of the project is to work in the development of a system that, based on the portable devices, offers the possibility to communicate using existing applications and also a new one using messages. The solution will be ad-hoc (so no infrastructure is required) and congestion aware to keep offering a basic functionality even in case of saturation. The system should guarantee anonymity and repudiation to avoid misbehaving users.

V. Pilot Proposal Combination

After receiving all the proposals we started to analyze common trends and possible synergies among them. We proceeded to select the fellows and started a fellow-pilot matching process. We closely scrutinized the interests of the fellows to make sure that they enjoyed working in the pilots. The pilot proposals were flexible enough to be adjusted and enriched by the contributions of the fellows. In the following section, we reproduce the pilot charter of all the pilots that will be executed in the second round of pilots.

VI. Team and Pilot Charters

A. Pilot Charter: A bottom-up sensor testbed

Fellow: Sergio Almendros Diaz

Mentor:

Advisor: Jaume Barcelo

1) Pilot purpose or justification: The purpose of this pilot is to build a sensor platform that can be attached to guifi nodes to gather and share sensory data.

2) Measurable pilot objectives and related success criteria:

- Gather data about temperature, humidity, light and noise.
- Share the data as open data.
- Deploy at least two nodes and gather data for at least two weeks.

3) High-level requirements:

- Outdoor enclosure.
- Use open hardware and open software to the possible extent.
- Use standardized interfaces to integrate with other projects.

4) High-level pilot description: The goal is to use an arduino platform to create a bottom-up broadband wireless sensor networks. As guifi.net has already over 20,000 nodes, the idea is to co-locate the sensory platforms together with the guifi.net nodes and use the guifi.net network to transmit the data. This data should be gathered and shared. Ideally, the pilot should include a presentation interface for the users to visualize the data.

5) High-level risks: A possible risk is that the prototypes are not rugged enough for outdoor environments. It is also a risk that the prototype is not stable and needs to be reset very often.

6) Summary milestone schedule:

- From 20/09/2013 to 23/09/2013
  - Establish the general idea of the TFG and specifics goals.
- From 23/09/2013 to 11/10/2013
  - Specify the tasks to do and make a planning.
- From 11/10/2013 to 30/10/2013
  - Connect first sensors to the Arduino.
- From 31/10/2013 to 10/01/2014
  - Connect to guifi network and upload data to an open data platform.
- From 10/01/2014 to 01/06/2014
  - Integration of sensors and communication aspects.
  - Install prototypes.
  - Data sharing and visualization.
  - Data analysis and evaluation of the testbed.
- From 02/06/2014 to 30/06/20014
  - Preparation of the final memory.
- From 01/07/2014 to the date of the presentation
  - Make the presentation.

7) Summary budget: The cost of this pilot will be approximately 4000 . This quantity is for the scholarship to the student that will develop this pilot, budget for attending a conference or visiting collaborators, and the purchase of the necessary hardware.

B. Pilot Charter: Visual Interface/Mashup for WiFi and Sensor Networks

Fellow: Ferran Selva Rodriguez

Mentor: Miriam Alvarado Suner and Jose Manuel Velilla Balaguer.

Advisor: Jaume Barcelo

1) Pilot purpose or justification: The principle purpose of my pilot is to develop an application that shows the location and current statistics of usage for public Wifi and Sensor networks.

2) Measurable pilot objectives and related success criteria:

- Fully functional application showing the location and Statistics of public Wifi Networks.
- Statistics will be performed with the real-time data collected from the IT Networks.
- Application have to be able to access, the 80% of times, to real-time data from IT Networks.

3) High-level requirements:

- Development of the application with a visual interface with the location of the IT Networks.
- Recollection of the data from the IT Networks.
- Generate statistics for IT Networks.
- Display of the data from the IT Networks.

4) High-level pilot description: The principle purpose of my pilot is to develop an application with a visual interface with the location of the IT Networks. It will be displayed too, statistics of usage, coverage and downtime of IT Networks. It will be done with SDI, Spatial Data Infrastructure (IDE in Spanish). This pilot will be done with he cooperation of IMI (Institut Municipal d'Informatica).

5) High-level risks:

- SDI programming: Never did before.
- Time: The control of time is a priority. The steps have to be executed on its time.
- Data: Availability to collect the necessary data.

6) Summary milestone schedule:

1) Planning: Review all requirement, and evaluate how and when do it and Its duration.
2) Documentation: How to develop a code of SDI Application. What I need to know? What tools are needed?
3) Development of the code:
    - SDI application. Where the IT networks location will be shown.

- Access to de real-time data from IT Networks.
- Data Base, where all data will be processed to get statistics.
- Access to Data Base from the application.
- Show statistics of each IT Networks in the application.
- Testing. Resolve bugs and improve the application.
- Review that all requirement are satisfied and all goals are achieved.
- Document all this process in a Project memory.
- Present the result.

7) Summary budget:

- Student Grant: 3.240,00
- Travel and accommodation costs: 200-300(Reason: Assist to meetings and conventions).

C. Pilot Charter : A Pilot Wireless Network for Remote Sensor Data Collection from Griffin Forest in Central Scotland.

Fellow: Ryan Chetcuti Mentor: Dr. Mahesh Marina, Dr. Robert Clement

1) Pilot Purpose or Justification: The aim of this pilot is to provide remote connectivity to a network of sensors within the Griffin forest, such that the data can be monitored in near real-time. The final aim is to reduce as much as possible the number of visits that personnel would have to do, as well as enabling more complex sampling to take place.

2) Measurable pilot objects and related success criteria:

- Implement a network connecting the site to the nearest possible internet connection
- Connect the currently installed sensors to a local network on site
- Enable remote access to the local network for the Geosciences researchers

3) High-Level Requirements:

- Wireless technology will have to be used to get connectivity given the location. A relay point will have to be used to connect the site to the nearest internet connection point.
- A network will need to be installed on site, consisting of both wired and wireless connectivity depending on location and type of sensor.

- Tunnelling will have to be used to set up a secure connection from the site to the researchers' office network.

4) High-Level Pilot Description: The Griffin forest is a plantation forest where research has been underway sine 1996. The research is investigating the performance of aerosol based nitrogen fertilisation as compared to traditional fertilisation methods using solid pellets in significant amounts infrequently. To carry out this research the geoscience team is using a number of sensors measuring different values over an area of 1 km2. At present, the team has to visit the site weekly to gather the data from the sensors, and ensure that the readings are going well.

During the initial phase of this project, a connection from the site to the nearest point of connection to the internet will be set up. Using this link, along with the use of tunnelling protocols to connect from the team's office at the University of Edinburgh to the site. There are no sites within line-of- sight from the experimental site where an internet connection may be set up. Thus relays will have to be used to set up the link. A base station will be set up on top of a tower within the forest, reaching above the forest canopy, a relay station will be set up on a hill opposite the site, while the final base station will be located at the Internet connection point, which is in direct view from the relay point. The challenges anticipated for this part of the project are the location of adequate relay sites and associated permissions for use of the site, as well as the use of renewable energy sources to power the devices.

During the second part of the project, the temporary link will be replaced by a longer-term and longer length link to the JANET network. JANET is the network infrastructure between the educational and research institutions within the UK. This link will probably need to be much longer than the initial one, require higher transmission powers and possibly the need of a license for such transmissions.

In the final stage of this project, the sensors on site will be connected to the local area connection, so that data from all the different sensors may be relayed back to the office. The challenge in this part of the project will be connecting the different types and makes of sensors, not all of which may readily have a network connection or similar connection.

5) High-Level Risks:

- Local geographical features, such as terrain and weather may dictate the need for

multiple relay points rather than just one.

- Low power, self-sustained nodes may not be able to fully sustain uninterrupted connectivity. Due to the use of renewable energy sources, the power available will depend on weather conditions.
- The vegetation and forest cover may make the attenuate the Wifi signal, leading to either shorter links and multiple relays, or experimentation with other types of radio links, including SuperWiFi.

6) Summary Milestone Schedule:

- September October 2013 : Investigate site, along with possible physical layout of the network.
- October November 2013 : Install a prototype network, connecting the site to the office of the Geoscience research group.
- February March 2014 : Deploy a long-haul network connectivity from the site to the JANET network.
- April 2014: Implement the local sensor network on site.

7) Summary Budget: The cost of this pilot will be approximately 4000 . This quantity is for the scholarship to the student that will develop this pilot, budget for attending a conference or visiting collaborators, and the purchase of the necessary hardware.

D. Android Mesh Networks

Fellow: Aleix Sala

Mentor: Daniel Mur

1) Pilot purpose or justification: The purpose of this pilot is to connect different android devices through a mesh network regardless of the smartphone hardware.

2) Measurable pilot objectives and related success criteria:

- Find a solution that is able to create a mesh network with different Android smartphones.
- The hardware or software solution must work for any Android mobile.
- The solution must work in mobility conditions, such as in the case of people walking on the street.

3) High-level requirements:

- It has to work for any mobile. This may imply the use of external hardware.
- The communication must be available even in the absence of infrastructure.
- A mesh routing protocol must be implemented.
- Accessible by any Android application.

4) High-level pilot description: The goal is to provide a solution for all kinds of Android smartphones to create a mesh network using the standard 802.11s. We will create a multi hop network that will be able to route packets of other smartphones. This solution can be used for mobile apps developers to create new kinds of apps like social apps, chats, multi device media reproducers or apps that could help people in extreme situations where the normal infrastructures cannot be used, for example after a natural disaster.

5) Summary milestone schedule: 1/10/2013 to 12/10/2013: Look for information about mesh networks, mesh routing protocols and consider different options to implement the project.

12/10/2013 to 3/11/2013: Try different devices and look for the best option.

3/11/2013 to 17/11/2013: Look for already existing mesh implementations for that device and try to make it work to study and understand its performance.

17/11/2013 to 1/12/2013: Decide if it's really possible to implement this project in Android Kernel of if it is necessary to use an external device.

1/12/2013 to 1/6/2014: Implement routing mesh protocols to the final device. Test its performance. Look for project limitations such as battery life and communication distance. Document all the project.

1/6/2014 to 1/7/2014: Prepare final report and presentation.

E. Operator Business Model from the communities

Fellow: Ivan Fernandez

Mentor and advisor: Albert Domingo and Miquel Oliver

1) Opportunity / Idea: Nowadays the Telecommunications traditional model is Operators managing all the layers of a networks and make great long-haul investment. The ida is to use alternative models in which users are involved both as the existing business in the rea where the deployment is done on the principle of Bottom Up Broadband.

2) Description / purpose:

- Study the BuB model applied to Fiber deployment models.
- Know how a traditional operator works and in what consists deployment or resale networks.
- Analyze investment models involved in the current traditional model.
- Make a study on the necessary infrastructure for the traditional and BuB deployment.
- Pay attention in two different situations that can occur, rent or network deployment.
- Analyze the cost of a deployment with Fiber Optic or WIFI in the last section of the network.
- Analyze the feasibility of a model BuB coexisting with traditional models in cities where competition is higher.
- Consider what type of community or society should be to the interest of a person in applying this kind of network.

3) Goal: Create a operator to deploy a BuB network in a competitive area like cities. It will therefore be necessary to study the viability and sustainability taking into account all the elements that can appear. Finally it will be interesting to analyze the community acceptance of this type of models that we have little knowledge of their impact on cities.

4) Aim:

- Define a BuB operator to join into a competitive market. It will be necessary study the feasibility of all steps (technical, legal and economic).
- Be able to engage the client and business community both of the area through collaborative agreements.
- Study the impact it would have on the price if the user only sign on the services that he needs (mobile and television being optional, and through IP).
- Make a business plan for a this kind of company analyzing their sustainability in the current telecommunications market.

5) Scope: The magnitude of this study is regional first, the neighboring communities with internet Access are the purpose of this project. In addition there must be a person in the community with a network knowledge, since that person will be interested in the services of the operator. Through the creation of this operator, the barrier to create

a network of this kind is lower. The operator will become a technical consultant. The intention is to carry out a pilot in the city of Barcelona in January of 2014.

6) Stakeholders and Project sponsors:

- Academic
  - Ivan Fernandez
  - Albert Domingo and Miquel Oliver
  - NeTS Research Group
  - Universitat Pompeu Fabra
  - ESADE
  - CASPUR
- BuB activists
  - Guifi.net
- Public Organizations
  - Ajuntament de Barcelona
  - Provincia di Roma
- Collaborating companies
  - Manchester Digital Development Agenda

F. Interconnecting wireless mesh networks using fibre optics for innovation projects

Fellow: Pedro Vlchez

Mentor: Roger Baig (guifi.net Foundation), Pedro Lorente (iglor, I2CAT)

Advisor: Jaume Barcel

1) Pilot purpose or justification: Wireless mesh networks are flourishing in the city and represent an opportunity for bottom-up innovation. The potential for experimentation is multiplied if those isolated networks are inter-connected using optical fibre.

2) Measurable pilot objectives and related success criteria:

- Fibre interconnection of existing qmp (quick mesh project) networks in the city of Barcelona.
- Routing between those networks.

3) High-level requirements:

- The resulting network should be a heterogeneous optical/wireless network.
- The resulting network should be open for the research community, administration and citizenship to experiment and innovate.

4) High-level pilot description: Current technology makes it possible for neighbourhoods to deploy wireless mesh networks that contribute to the technological development of the city. The access to data networks empowers the citizens and stimulates the economy. In its current state, the different wireless mesh networks are not adequately interconnected. In this pilot we go one step further and in collaboration with the public administration and research infrastructures we experiment with the interconnection of existing wireless mesh networks using the existing optical fibres. As a result, a more efficient use of the existing network resources will be possible. The capillarity of wireless mesh networks will be combined with the bandwidth of optical communications.

5) High-level risks:

- Novelty of the proposal.
- Resistance to innovation.

6) Summary milestone schedule: 15112013: Public commitment and announcement by the participating entities.

15122013: Experimental connection of two Wireless Mesh Networks using existing optical fibre.

01022014: Interconnection of all the existing QMP networks in Barcelona.

01042014: Suite of tests and validation experiments.

01052014: Presentation of the results: GuifiLab, Barcelona The Lab, BattleMesh, Commons for Europe, Confine, etc.

01062014: Final publishable report

7) Summary Budget: The cost of this pilot will be approximately 4000 . This quantity is for the scholarship to the student that will develop this pilot, budget for attending a conference or visiting collaborators, and the purchase of the necessary hardware.

VII. Conclusion

The number of pilot proposals received in the second call has been considerably larger than in the first call. The project lacks the resources to execute and track all the pilots proposals. There has been an effort in combining related pilot proposals to reduce the number to a manageable dozen.

In parallel, the fellows have been recruited. The fellows need to be genuinely interested in bottom up initiatives and passionate about the pilot they work on. Each fellow has prepared a pilot charter which is the first step towards the execution of the pilot.

Acknowledgment

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