Project Information

CELTIC
Telecommunication Solutions

Enabling 4th Generation Broadband Systems via the last copper drop

The 4GBB project enables the delivery of fourth generation services (requiring hundreds of Mb/s) to ALL homes. It develops the missing technology for offering cost-effective solutions for fibre to the home, in case a "full fibre" approach is economically unattractive. A "hybrid fibre-copper" approach is proposed, reusing the last copper drop (20-200m, up to 1 Gbit/s) to save installation costs and to speed-up the roll-out.

Main focus

The quality of life and on-line economy depends on the availability of ubiquitous low-cost broadband access. Demands on end-user bit-rate continue to increase as new broadband services emerge. To provide speeds of hundreds of Mbit/s a Fibre-near-the-Home solution is needed. Today, 4GBB services can only be offered by bringing fibre up to the home (FttH), but the investment cost for such a solution is usually prohibitive.

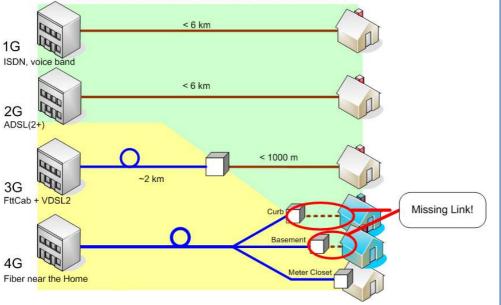2nd generation broadband (several Mbit/s) was not enabled until ADSL became available, opening the market for broadband Internet access. The current transition towards 3rd generation broadband (tens of Mbit/s), to open the market for IPTV services, will be enabled by the combination of Fibre-to-the-Cabinet and VDSL2. The future transition toward 4GBB will also require an enabling technology to reuse the last 20-200 m of existing wiring.

This project aims to show proof-of-concept for this ultimate DSL technology, which is expected to initiate a new standard and to impact wideband cable models, transmission schemes, multi-channel communication, resource management methods and spectrum allocation techniques.

Approach

In order to fulfil the objectives several key aspects have been identified which will be addressed by different activities. One of these key aspects is the **Economic and Technical Viability** of the proposed 4GBB access scheme and its **Requirements**. Among the relevant features to be studied is **Power feeding**, as the provision of power to the nodes is expected to come from the end-user side via the exist-

4GBB

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Closure date: December 2011

Partners:

British Telecom, Great Britain

Ericsson AB, Sweden

EUR AB, Sweden

France Telecom / Orange Labs, France

Lund University, Sweden

Telefónica I+D, Spain

TNO, The Netherlands

Turk Telekom, Turkey

Universidad Politécnica de Madrid, Spain

UpZide Technology AB, Sweden

Partially participating partners:

Actelis Networks, Israel

EPFL, Switzerland

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Project Websites:

www.celticplus.eu/Projects/Celtic-projects/Call6/4GBB/4gbb-default.asp

www.4gbb.eu

The evolution of four generations in offering broadband to end users

ing telephony wiring, and since there is no standard in this respect new requirements need to be defined. **Power consumption** is also a significant issue, not only from the environmental point of view but also from a practical perspective, as battery powered emergency operation is an important requirement.

The use of the existing telephony wiring forms one of the main challenges, as this wiring was designed for the transport of voiceband frequencies (300 – 3400 Hz). 4GBB rates require to extend this frequency range up to 300 MHz and very little is known about the performance beyond 30 MHz, so to build up the missing knowledge **Cable and Noise Measurements** will be performed and **Models** will be created. **Performance** will be studied in reference scenarios, and methods for **Qualifying and Monitoring the Loop** will be developed.

The requirements and models defined will allow the **Development of Transmission Techniques for the Physical Layer** (PHY) that will enable the efficient operation in the proposed extended frequency range overcoming problems like signal attenuation, crosstalk, noise and impairments. The main lines of work include Spectrally Efficient Modulation Techniques, Multiuser strategies and Precoding Schemes and Dynamic Spectrum Management and Scheduling. Finally, a scenario for 4GBB using

PanLab is envisioned: a set-up where new 4GBB infrastructural elements will be tested and validated and that will end up becoming part of the PanLab infrastructure.

Main results

Main results from 4GBB project include feasibility studies, impact towards standardization and reference designs. But also, and in line with PanLab vision, demonstration prototypes will be developed.

The 4GBB consortium will disseminate and exploit its results on various levels: scientific publications and presentations, implementation of a public web site (http://www.4gbb.eu), organisation of tutorials and seminars, creation of an ultimate DSL reference design, contribution to standards, and submission of patents.

Impact

4GBB project results will make it possible to provide a large number of European citizens with an easier and cheaper higher bandwidth broadband access. This will promote the creation of new services and products, and new promising business will emerge, from which SMEs will benefit due to their adaptability and ability to quickly exploit the capacity.

The early development of Ultimate DSL technologies and the conception of new standards would give European industrial companies a clear advantage in the broadband

area. Also, a timely large-scale deployment, enabled by a reliable low-cost low-maintenance solution, would make Europe the leading market for the development and deployment of new services. This could lead to a new era of communication-driven economical growth, based on an ecologically sustainable development where on-line meetings are substituting personal appearance and polluting transportation of people.

About Celtic

Celtic is a European research and development programme, designed to strengthen Europe's competitiveness in telecommunications through short and medium term collaborative R&D projects. Celtic is currently the only European R&D programme fully dedicated to end-to-end telecommunication solutions.

Timeframe: 8 years, from 2004 to 2011

Clusterbudget: in the range of 1 billion euro, shared between governments and private participants

Participants: small, medium and large companies from telecommunications industry, universities, research institutes, and local authorities from all 35 Eureka countries.

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