Project Achievements

Enabling 4th Generation Broadband Systems via the last copper drop

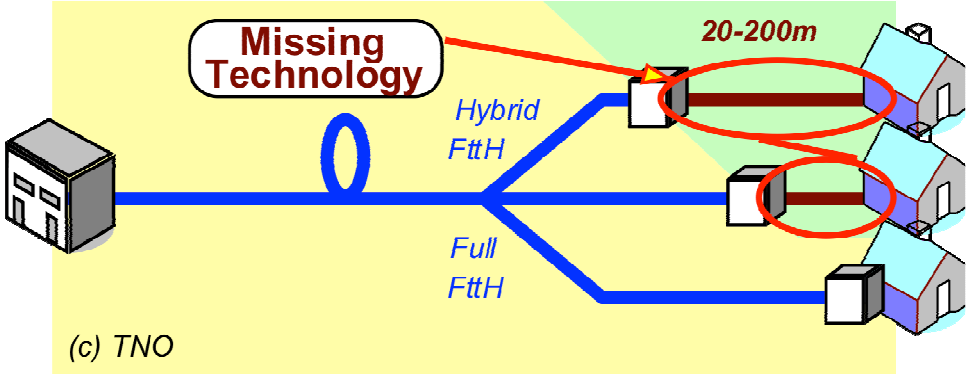
The idea of bringing broadband connections to the citizens of Europe is an ambition shared by many of us. It inspired telecommunication companies and engineers to establish the 4GBB-project to create an economically realistic path towards fulfilment of this vision. All agree that a fibre-to-the-home (FttH) broadband network would be a great asset and many agree that a large scale European roll-out will take place as soon as we have services requiring fibre, which end-customers are willing to pay for. The problem with an FttH network does not lie in the technology, but rather in the investment and deployment cost, which is a too large bite to chew all at once. The purpose of the 4GBB project is to allow us to evolve the network in smaller steps, developing and standardising a system with fibre almost all the way, keeping only the last piece of copper. Such a technology will also support future mobile backhauling capacity demands, and therefore has the potential to become a very important enabler for the massive roll-out of Mobile Broadband. The new standard for this, G.fast, was initiated in ITU-T, February 2011, and its first release is expected in 2013.

Main focus

The 4GBB project started with the technological challenge to achieve the connectivity in pair with fibre technology. The best connectivity known today is achieved by FttH taking fibre all the way to the customer. However, there are two economic barriers exploiting the technology. First, the cost of fibre deployment, which increases as the fibre termination is moved closer to the customer. Each section of installed fibre serves fewer customers, and the likelihood of utilizing ducts decreases, if ducts are available at all. Therefore the final drop of 20-200 meters is the most expensive part of the access section, normally meaning digging along individual paths to each customer. Secondly, the cost of installing new fibre plants inside the customer's premises is higher than utilizing existing wires. Such installation impacts not only the interior work, but also exterior, requiring permission for digging etc. If instead the last 20-200 meters of the existing telephony grid is used to transmit the signals, these inconveniences and expenses can be avoided. At such short ranges bandwidths of up to 200 MHz can be used on the copper, achieving service rates in the range of 1 Gb/s.

Approach

At the launch of the project, little was known about how the telephone wires behave at these high frequencies, much higher than what is used for VDSL2, i.e.



4GBB

Project ID: CP6-001

Start Date: 1 January 2009

Closure date: 1 July 2012

Partners:

British Telecom, Great Britain
Ericsson AB (EAB), Sweden
EUR AB, Sweden
France Telecom / Orange Labs, France
Lund University, Sweden
Marvell Hispania S.L., Spain
Telefónica I+D, Spain
Telnet Redes Inteligentes, Spain
TNO, The Netherlands
Türk Telekom, Turkey
Universidad Politécnica de Madrid, Spain
UpZide Technology AB, Sweden

Partially participating partners:

Actelis Networks, Israel
EPFL, Switzerland
Fundacion Tecnalia Research & Innovation, Spain
SIDSA, Spain
University of Edinburgh, Great Britain

Co-ordinator:

Per Ola Börjesson

Ericsson AB

E-mail: per.ola.borjesson@ericsson.com

Project Website

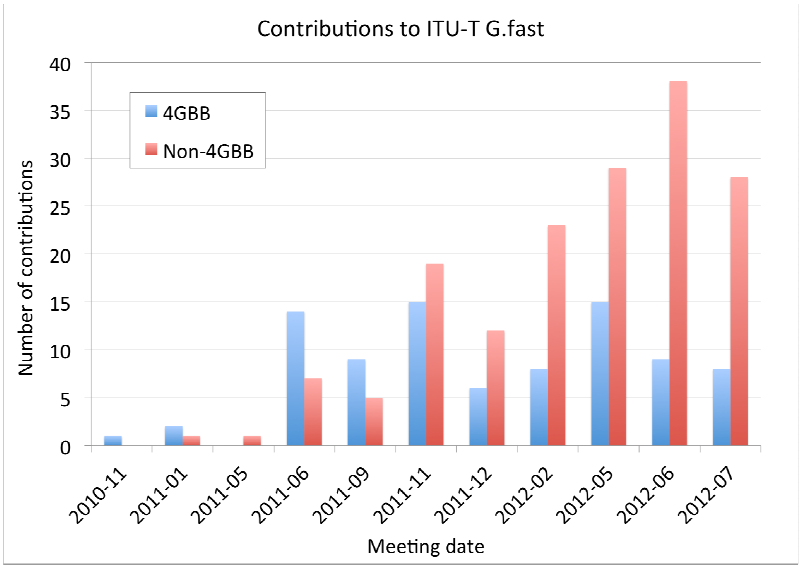
www.celticplus.eu/Projects/Celtic-projects/Call6/4GBB/4gbb-default.asp

www.4gbb.eu

above 30 MHz. Throughout the project there has been a lot of effort in measuring and modelling cables up to 200 MHz or more, both for the direct customer wire and the crosstalk channels between neighbouring wires. With this newfound knowledge we have shown by capacity calculations, simulations and a series of demonstrators that it is possible to reach Gigabit rates at distances between 20-200 meters. The technical study has been complemented by a techno-economical study showing that the foreseen economic incentives indeed are realistic.

Achieved results

As the desired technology seemed plausible, one of the main goals of the project has been to get the ideas into standardisation. The project has been a platform for coordination of the ITU-T G.fast standard, the embodiment of the 4GBB-system that started in February 2011. A standard is necessary both as a basis for regulation, system compatibility and in order to achieve necessary mass-market benefits. Standardisation processes themselves are based on a flow of voluntary technical contributions reaching a critical mass. The project, or rather project partners, initiated the G.fast standard and since then provided enough material to make it progress in a fast pace and attract a large interest from parties outside the project. While the contributions from the 4GBB-project have kept a more or less steady pace, totalling 87 until July 2012, contributions from other parties are increasing exponentially as the standard gains global interest and support.



Impact

There are two major achievements of the 4GBB project. First during the project it has been shown that the concept and the project ideas are both technologically and economically feasible. Secondly, the project has successfully initiated the G.fast standardisation project within ITU-T and shared material to bring the process towards a complete standard with global support. At the outset of the project this seemed a distant dream, but it has met with outstanding success. Furthermore, the project partners have gained increased knowledge and contact networks, new market positions, and a number of pre-standard prototype products that are evaluated and tried in labs and in the field.

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.

Celtic Office

c/o Eurescom, Wieblinger Weg 19/4,
69123 Heidelberg, Germany
Phone: +49 6221 989 405, e-mail: office@celtic-initiative.org
www.celtic-initiative.org

EUREKA