Project Achievements

HFCC/G.fast

Project ID: CPP2012/1-2

Start Date: 1 January 2013

Closure date: 31 December 2014

Partners:

ADTRAN GmbH, Germany

BT, Great Britain

Dension Broadband Systems Kft., Hungary

Ericsson AB, Sweden

EUR AB, Sweden

FTW, The Telecommunications Research Center Vienna, Austria

Fundacion Tecnalia Research & Innovation, Spain

Lund University, Sweden

Marvell Hispania S.L., Spain

Orange SA, France

Sckipio Technologies, Israel

Telefónica I+D, Spain

Telnet Redes Inteligentes SA, Spain

TNO, Netherlands

Co-ordinator:

Per Ola Börjesson

Ericsson AB, Sweden

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

Pernilla Schuber

Lund University

E-mail: pernilla.schuber@eit.lth.se

Project Website

www.celticplus.eu/project-hfcc_g_fast

www.4gbb.eu

Hybrid Fibre-Copper connectivity using G.fast

The development of European economy, lifestyle and society is increasingly dependent on ICT and a cornerstone of this development is broadband access. The HFCC/G.fast project is about G.fast, the next generation of broadband system delivering gigabit rates. It uses only the last bit of the telephony copper-pairs and relies on a fibre backhaul network coming closer to the end-user, see use case in figure 1. HFCC/G.fast is the middle project in the 4GBB – G.fast trilogy.

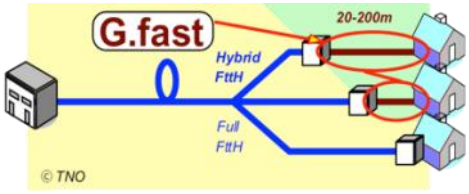

Figure 1: G.fast use case

Main focus

A cornerstone for societal and economical development is broadband access systems, a long-standing area of excellence for European industry. A central trend is how optical fibre gradually replaces copper and how new generations of broadband systems thus can operate over shorter and shorter copper loops providing higher bandwidths. Figure 2 shows a G.fast typology. After progressing first through voice band modems and ISDN, over the ADSL family and then via VDSL systems; the standardization of G.fast was successfully started by the CELTIC project 4GBB (4th Generation BroadBand) aiming at gigabit speeds over a few hundred meters of copper.

The HFCC/G.fast project met its three goals:

- To complete the standardization of G.fast. (The G.fast standard was approved the 5th of December 2014.)
- To maintain a European technology lead in the broadband area and thus laying the foundation for continued export successes.
- To address the path from a completed standard to a commercial, widely deployed success

Approach

The work started with the 4GBB project in

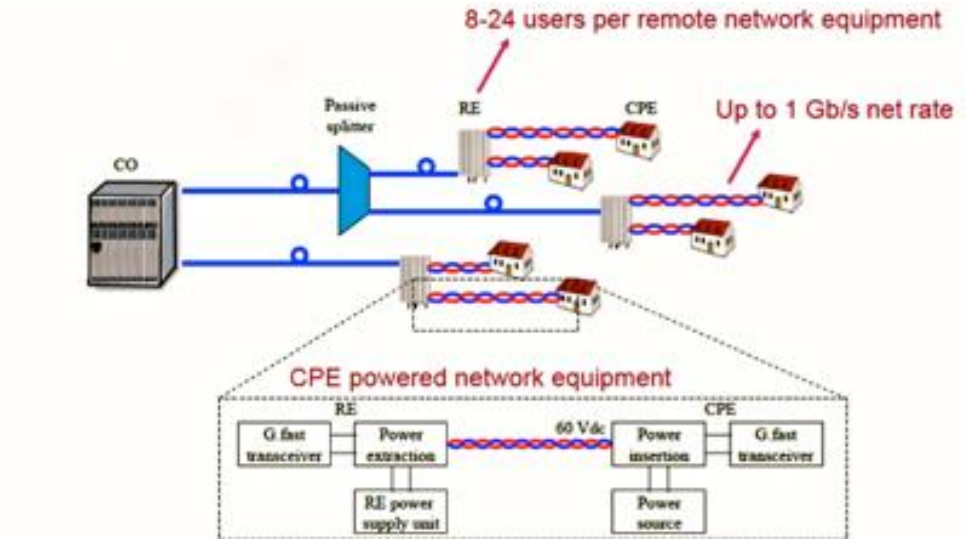

Figure 2: A sketch of a G.fast topology. G.fast is typically backhauled using optical fibre and the remote network equipment (RE) is powered from the customer modem (CPE) through the copper pairs.

2009, where the G.fast concept was shown to be both technologically and economically feasible and where the G.fast standardisation activities were initiated. The HFCC/G.fast project has continued this work with G.fast. The consortium's use of the project as a coordination platform has been a very successful approach for all three goals. Standardisation topics, issues and findings have been discussed, tested and sometimes solved within the consortium. The set-up of the consortium has made it possible to develop test equipment, create test plans and to perform trials. The work of the consortium shortened the time from concept to product by approximately five years.

	ADSL	VDSL	G.fast
Start of standard development	1992	1996	2011
First approved ITU standard	1999 (T1.413 approved 1996)	2004	2014
Start of interoperability tests	~2003	~2006	2015
Start mass deployment	~2000	~2009	Expected: 2016
Years to deployment	11 years	13 Years	5 Years

Achieved results

The HFCC/G.fast partners work with the G.fast standard has resulted in the approval of the G.fast standard (G.9701) in December 2014.

During the project, deployment studies have shown that G.fast is both feasible and cost efficient for many use cases. TNO has made in-depth deployment studies for cities in the Netherlands with their developed analysis tool, GIANT.

The close collaboration and combined work with standardisation has fuelled the development of G.fast prototypes and chipsets from ADTRAN, Sckipio and Telnet (figure 3) with additional product development by Marvell with G.hn (G.hn is the ITU standard for home network technology). In parallel with this development, test plans were made and trails have already been performed by several partners and by other operators.

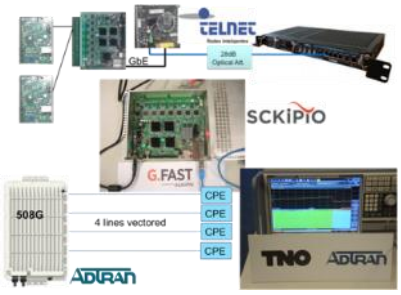

Figure 3: Various project equipment and set-ups used for lab trials from ADTRAN, Sckipio, Telnet-RI and TNO.

Impact

Results from HFCC/G.fast partners include: the approval of the G.fast standard, the development of G.fast chipsets and associated network equipment. Results from numerous lab trials have already made a large impact on the business. As an example we quote from the CEO of BT, Gavin Patterson (Jan 30, 2015). "BT is a world leader when it comes to fibre innovation and we are excited about the next stage in our story," Patterson said today. "We believe G.fast is the key to unlocking ultrafast speeds and we are prepared to upgrade large parts of our network should the pilots prove successful."

About Celtic-Plus

Celtic-Plus is an industry-driven European research initiative to define, perform and finance through public and private funding common research projects in the area of telecommunications, new media, future Internet, and applications & services focusing on a new „Smart Connected World" paradigm. Celtic-Plus is a EUREKA ICT cluster and belongs to the intergovernmental EUREKA network. Celtic-Plus is open to any type of company covering the Celtic-Plus research areas, large industry as well as small companies or universities and research organisations. Even companies outside the EUREKA countries may get some possibilities to joine a Celtic-Plus project under certain conditions.

Celtic Office

c/o Eurescom, Wieblinger Weg 19/4

69123 Heidelberg, Germany

Phone: +49 6221 989 381

E-mail: office@celticplus.eu

www.celticplus.eu

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