Project Achievements

CELTIC
Telecommunication Solutions

Home Base Station:

An Emerging Network Paradigm

A Home Base Station (HBS) – as known as "femto" - is a small cellular station. It is characterized by very low costs, plug-and-play installation, low transmission power, use of existing fixed broadband (typically, digital subscriber lines) backhaul and usually limits access to a closed user group, such as household members. Mass adoption of HBS requires innovations in various directions: device and network management, architecture, performance, services.

Main focus

Initial objective of Homesnet was to develop and to integrate all the elements that are needed to provide HBS. During the project lifetime, the Femto Cells have come into production and the project has been reoriented to propose innovation beyond what exists today. The activities aimed at analyzing and proposing comprehensive answers to the difficulties generated by the deployment and operation of a huge number of HBS. The project

addressed almost all aspects that are crucial for equipment vendors, operators and customers, for taking their deployment decision. Homesnet activities span from hardware development, to design of innovative services and implementation, through self-configuration algorithms.

Approach

A first stage of the project focused on the definition of scenarios and requirements that have been gathered and analyzed by the project. Based on this, parallel works have been conducted on the:

- architecture of HBS in the context of the different cellular technologies (including 3G and LTE);

- definition of self-configuration and self-organizing algorithms to ease the deployment and operation of networks composed of a large number of HBS;

- analysis through simulation of the performances, under a large number

Architecture — Performance — Technology — Services — OAM

Homesnet

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European Communications Engineering, Finland

France Telecom, France

INOVEL Electronics and Software Systems Ltd., Turkey

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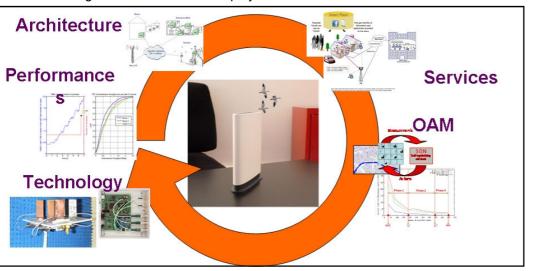VTT, Technical Research Center of Finland, Finland

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Project Website

www.celticplus.eu/projects/Celtic-projects/homesnet/homesnet-default.asp

of cases and hypothesis; partners shared their simulation environment and results such that to have a complete understanding of all the aspects considered;

- implementation of the most relevant innovations on the basis of existing or developed platform, with the objective to prove the technical validity of the concept through a set of prototypes and associated demos.

Achieved results

The project as a whole achieved several very valuable advances in different aspects related to Home base stations. Most of them have been worked out from the concept definition, to implementation and demonstration. The prototypes that have been developed are used by the partners to prove the industrial value of the concepts and results produced by Homesnet. These prototype concepts include:

♦ social networked femto that was demonstrated through prototyping the value of the femto concept as a "very local based service" enabler;

♦ green femto which demonstrated one of the most prom-

ising technique to reduce energy consumption in wireless networks;

♦ femto assisted emergency telemedicine that produced a pre-product level prototype including real database access, and that ease customer adoption.;

♦ femto/macro self-configuration system which helps Telcos to prepare femto deployment at large scale while preserving macro network quality;

♦ dynamic antenna system that enables optimum energy consumption, coverage and interference mitigation.;

♦ Very Low energy Distributed Antenna System (VL-DAS) that allows transmission of the radio signal from a femto through an optical fiber to a passive optical/radio transceiver;

♦ Optical broadband backhaul solution supporting fixed and mobile convergence based on Radio over Fiber (RoF) technology and passive photonic antenna.

All these results are especially valuable in terms of novelty with respect to the current femto market that is growing

rapidly. These prototypes are key elements to develop "next generation" femto that will go beyond coverage extension only.

In addition, to these prototypes, the work conducted in the project addressed the key issues in femto network deployment and operation, including architecture, interferences avoidance and mitigation, self-configuration. The partners delivered analysis and solutions with proven performance through simulations. Several dedicated technology (Green, VL-DAS) have been developed in the scope of Homesnet.

Impact

The project results were numerous and impacting. Among them, are:

♦ the VL-DAS product has been developed by Optiway in the context of the project;

♦ six patents have been filled spanning from resource management to services;

♦ six prototypes have been developed and demonstrated in several events, half of them including new hardware development;

♦ cross-domain exchanges have been initiated and developed, especially on emergency telemedicine.

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