

The Network of Everything

November 17 2008

(PhysOrg.com) -- Wireless experts believe that, by 2017, personal networks will have to cope with at least a thousand devices, like laptops, telephones, mp3 players, games, sensors and other technology. To link these devices will require a 'Network of Everything'. It represents an astonishing challenge, but European researchers believe that they are moving towards the solution.

European researchers have just completed work on a networking project to perfect what will become known, perhaps, as the Smart Personal Network. Personal Networks, or PNs, are seen as essential for a world where many different devices must work in sync together, known as 4G (fourth generation). It will mean personalised services, low power devices with cheap, ubiquitous and broadband connectivity (see photo 1, right).

The EU-funded MAGNET Beyond project tackled all the issues surrounding PNs. MAGNET stands for 'My personal Adaptive Global NET' and the project further developed the concept of Personal Area Networks (PANs), first introduced in earlier PN projects PACWOMAN and MAGNET.

While the PANs link together all the devices and technology within a person's reach, the PNs spread the networking domain transparently towards the personal devices reachable via different network infrastructures. A PN belongs to and serves a private entity, a person, a fire fighter, or eventually a car, an aeroplane, (see photo 2, below).

In the future, there will be hundreds, even as many as a thousand devices in a PN. It may seem an impossible figure, but in the near future the number of personal devices will multiply enormously. One person might have dozens of sensors, monitoring vital signs like heart rate and temperature, and even the electrolytes present in perspiration. And then there are sensors and actuators in the home, including light switches, and more again in cars.

People will be able to link with TVs, stoves and spectacles, which could double as a personal TV screen, and even clothing. They will have a home gateway, to manage all their home devices, and a car gateway while driving.

A person may access remotely personal files from almost anywhere in the world as if he or she were at the office. People will be able to include others in their PN and exchange personal information, or patch into a presentation in another conference room and watch it remotely. Many of these technologies already exist, but over time, they will become more widespread and connected.

In reality, it is hard to know what kind of devices or technology might be around for sure, but one thing is certain... there will be a lot of them. Hence the World Wireless Research Forum's (WWRF) prediction of 7 trillion devices for 7 billion people by 2017 – in other words, around a thousand devices for every man, woman and child on the planet.

“In the industry, 2017 is like slang for a future where there will be many, many more devices that people use in their day-to-day life,” explains Professor Liljana Gavrilovska, Technical Manager of the MAGNET Beyond project. “This project prepares for that future.”

Crossed-finger

Right now, PNs usually involve fiddling around with Bluetooth settings and crossing your fingers. If it does work, users typically try to complete simple tasks by trial and error, like hunting for photos on your mobile or trying to transfer a tune from your computer to a PDA.

But in the MAGNET model, users are able to easily set up their Personal Networks with all their devices.

“We have a user-centric approach,” reveals Gavrilovska, “with the overall objective to design, develop, demonstrate and validate the concept of a flexible PN that supports resource-efficient, robust, ubiquitous personal services in a secure, heterogeneous networking environment for mobile users.”

In the MAGNET Beyond vision, the devices will be self-organising and will be able to form geographically distributed secure networks of personal devices. This vision includes a platform for a multitude of personal applications and services to support private and professional activities in an unobtrusive, but dependable and trustworthy way.

United federation of PNs

Better yet, these networks will be able to ‘federate’ with other PNs on a permanent or ad-hoc basis. Users will be able to link their PNs permanently with those of their friends and family, or temporarily with other people and companies depending on some purpose or joint interest (see photo 2). Users will be able to control precisely what devices and information other people can link with.

Four fundamental principles guided the consortium’s work: ease of use, trustworthiness, ubiquity and low cost.

“For example, the system is designed to be user friendly, with little or no

training required and no need for system administrators,” Gavrilovska explains. “It will ensure security and protect privacy, and it will work everywhere, even without any additional infrastructure, but still be able to exploit any available resources, like wifi or cellphone networks, for example.”

The key elements to achieving these goals were personalisation and a tailored security, privacy and trust framework, including identity and the management of credentials. Credentials establish the trustworthiness of services outside the PN.

Future-proof

“We also designed it to be a future-proof architecture, to be self-organising, self-managing and aware of the context,” Gavrilovska notes. The consortium even developed new hardware prototypes with optimised air interfaces, to ensure the MAGNET Beyond platform worked efficiently.

It was an enormous challenge, but MAGNET Beyond enjoys substantial resources, too. The consortium includes 35 companies from 16 countries on two continents. It has a budget of over €16m, with €10.3m from the EU – and that is just phase two.

Phase one, called simply MAGNET, had 32 partners in 17 countries on three continents with a budget of €17.4m (€10m from the EU).

Both phases featured many of the world’s leading corporations and research institutes, like Nokia, NEC, Alcatel-Lucent, Samsung, TeliaSonera, Telefonica, CEA LETI, VTT, CSEM, France telecom, Telefonica, Fraunhofer FOKUS, Delft University of Technology, NICT, University of Surrey, Rome and Kassel, Aalborg, GET-INT, and many others.

The effort was worth it, with a vast range of innovative technologies now delivering Smart Personal Networks. Personal Networks that can be easily integrated into the future generations of wireless networks, and co-operate in the unfolding Future Internet and Internet of Things.

The MAGNET Beyond project received funding from the ICT strand of the Sixth Framework Programme for research.

This is part one of a three-part feature on MAGNET Beyond.

MAGNET Beyond project: www.ist-magnet.org/

Provided by [ICT Results](#)

Citation: The Network of Everything (2008, November 17) retrieved 1 May 2024 from <https://phys.org/news/2008-11-network.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.