

The digital home: An all-in-one device

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Cable clutter and interface problems will soon be a thing of the past. In the living room of the future, all devices are connected wirelessly and can be easily operated via the television set. Fraunhofer researchers and their partners will be presenting the first solutions at CeBIT in Hanover (Germany) on March 4 through 9.

Thick instruction manuals, a confusing tangle of cables and endless different standards – trying to connect your flat screen, DVD recorder, MP3 player, surround system and computer to one another and get them to work is rather a complicated task. Help is on its way in the form of a project called WiMAC(at)home (Wireless Media and Control at Home).

In this project, which is being financed by the German Federal Ministry of Economics and Technology (BMW_i), researchers are working on the wireless connection of electronic devices for broadcasting and entertainment in home networks. Among the partners in this consortium are Loewe Opta GmbH, the Fraunhofer Institute for Integrated Circuits IIS, Germany's Broadcast Technology Institute (IRT), Nagravision GmbH and Weinzierl Engineering GmbH.

At the heart of the system is a novel TV set which unites several functions in one device. It serves as a digital media archive that can store music, videos and photos, and make them available together with live TV programs in the home network. Pay TV contents, too, can be distributed in a protected environment and in compliance with copyright regulations. The TV can even be connected to automated home systems, enabling heating appliances, alarm systems and air conditioners to be

controlled via the screen.

All devices in the wireless WiMAC(at)home network configure themselves automatically. New components are incorporated independently by means of Universal Plug and Play (UPnP) technology. The system is based on the specifications of the Digital Living Network Alliance (DLNA), a global collaboration between computer and consumer electronics manufactures who have set fixed standards for home networking. Thanks to these standards, it is possible to connect notebooks, surround systems, digital video recorders and TVs of different brands.

An essential key to these advanced multimedia applications is audio and video coding. These processes compress the huge streams of data that are transmitted from the radio and TV stations to the user or between the different devices in the network. They make it possible to deliver high-quality information, even at low bit rates. Compression shrinks the volume of data without significantly compromising the quality of information transported. In the WiMAC(at)home project, the IIS in Erlangen is developing the necessary software for transporting videos and music within the home network. It uses highly efficient MPEG coding techniques.

“New compression techniques for audio and video data enable the best possible image and sound quality for high-resolution and mobile television,” explains Andreas Werner of the IIS. “At CeBIT, we will be showing HDTV with impressive surround sound at extremely low data rates. This is made possible by using efficient standards such as MPEG AVC, AAC and MPEG Surround.” The use of backward compatible, open standards also guarantees independence from individual manufacturers and ensures that contents can still be played back on future generations of devices. In addition, the researchers are working to ensure that contents can easily be exchanged between mobile devices,

such as cell phones or PDAs, and the user's entertainment electronics at home.

The WiMAC(at)home project has yet another special feature in store: Music or films are always played back in the room the user is in at any given moment. If the user leaves the kitchen to go to the living room, for example, the program currently being broadcast on the kitchen radio is automatically rerouted to the stereo system in the living room. The user can be located via a WLAN enabled device such as a smart phone. This WLAN localization technology is a product of the IIS and was specially optimized for use in wireless home networks. Alternatively, users can authenticate themselves via radio frequency identification (RFID).

Further information on WiMAC(at)home is available at:
www.wimac-at-home.de

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