PROJECT PROFILE

AI03: Unified network access for e-Europe (UniAccess)

HIGH SPEED COMMUNICATION SYSTEMS

Partners:

Alcatel Microelectronics
CEA-LETI
Ericsson Microelectronics
France Telecom
Gemplus
Infineon Technologies
ISD
Italtel
STMicroelectronics
Nokia
Philips
Siemens
Telit
Thales Communications
University of Athens

Project leader:

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Key project dates:

Start: January 2001
End: December 2003

Countries involved:

Austria
Belgium
Finland
France
Germany
Greece
Italy
The Netherlands
Sweden

The international telephone network is at least one if not the most complex and most embracing structures so far created. The Internet is partially mapped on top of the telephone network and has become a system of similar complexity and coverage. Many of the new developments related to Internet are generated in the USA. Nevertheless significant contributions are also prepared in Europe. MEDEA+ project UniAccess aims to provide cheap and fast Internet access for everybody, everywhere. Its main thrust is the development of a gateway between future 'public' networks, managed by outside operators, and private networks under the control of the consumer.

Unified network access is a basic prerequisite of an e-business economy. Interoperable, easy-to-use architecture will open the doors for rapid mass-market penetration.
In recent years, much has been done to provide faster transmission links for the local loop, using twisted pair cable, coaxial or wireless access. While these 'layer 1' technologies are reaching maturity, higher layers will become the focus of attention. To meet the need for a variety of discrete services, layer 2 (ATM – asynchronous transfer mode), layer 3 (IP – Internet protocol routing and signalling) and beyond must be developed.
The MEDEA+ UniAccess project aims to establish open architectures for the whole access network chain. This initiative provides the critical mass to enable the European telecommunications industry to set a new standard, and will be the nucleus for further companies to join.

Future-proof concept

The primary goal of UniAccess is to develop single-chip controllers for integrated access devices (IADs) acting as home gateways for cost-effective Internet access. In the home, devices from simple telephones to novel wireless web terminals will have to be supported. On the public side, the needs of the network providers, such as compliant behaviour and remote upgradability, must be considered.
Ease of use is a major requirement for the proliferation of new network services. IAD configuration should be possible through a web browser or – for inexperienced users – by on-line intervention of an external agency. Security issues include addressing respect for end-user privacy in a global manner at the system architecture level. Relevant solutions will be included in the design of the IAD as well as in the data flow management process.
Furthermore, given the inevitable merger of the phone network with Internet, the IAD will need to reconcile the needs of the terminal with adequate network protocols. So, a second objective is to define digital subscriber line access multiplexer (DSLAM) functionality and a standard DSLAM architecture. This evaluation will be accompanied by studies and test chips for line-card controller, inter-working and packet processing functions.
To meet all these diverse requirements,

UniAccess brings together a consortium led by IC manufacturer Infineon Technologies with 13 companies and one university from nine European countries. Together, they represent all essential stages – from silicon and system design to network provision and terminal engineering. As all major semiconductor manufacturers are participating, a complete and coherent chip set for IAD and DSLAM will result.

Development of components for terminals is not part of the three-year programme. It is nevertheless intended to build demonstrators of all equipment types – including terminals – to ensure end-to-end system compatibility. The consortium has established a common test site at telecommunications partner Italtel, where all participants can present components for interoperability verification.

Two-speed evolution

The IAD is the key element. Due to its location between public and home networks with very different structures, defining its functional specification is a difficult task. Whereas public networks evolve slowly due to their large scale and higher costs, private networks follow the rapidly changing consumer market.

Flexibility must therefore be built-in at hardware and software levels via flash memory or reconfigurable logic. Interfaces have to be carefully defined to allow a modular structure that enables flexibility. Such a modular set up must provide generic access for network functions such as call set-up, call re-routing, call-back, billing checks, calling party identification and conference call set-up. The slowly evolving network will keep this interface stable. However, upgradability is essential to accommodate future functions – which should be loadable by the network operator or the user, as appropriate.

Cost-saving measures

For optimal service support, access network functionality also has to be considered. The network itself must incorporate home gateway functions, such as conversion between traditional and IP telephony, compressed and uncompressed voice, and the IPv4 and IPv6 generations. Although highly complex, these interworking functions are mandatory for operation of the whole system. The optimised system architecture under development within UniAccess will enable its users to share such expensive resources.

As a further cost-reduction measure, a standardised hardware backplane and chassis are being designed for DSLAMs. In a similar manner to a PC, mechanically and electrically standardised busses, connectors and logic interfaces would allow flexible configuration of DSLAMs according to their particular environment. Third-party OEM equipment, such as router and network management cards, will bring similar diversity to that provided by graphic cards for PCs. It will not be possible to develop devices for the standardised backplane within the timeframe of UniAccess – this could be envisaged as a follow-up.

In the early stages, multiple devices may be necessary to act as home gateways for cable, satellite, terrestrial, xDSL (digital subscriber line) and other types of delivery system. Because the home network will remain heterogeneous for a while, architectures will also be required to accommodate different types of gateway. Typically, bridging a set-top box with an IAD for xDSL will allow linking of broadcast and switched services.

The objective is to realise an intelligent integrated networking device as a low cost, single chip that will seamlessly link the small office/home office (SOHO) environment to the outside world. While remaining inexpensive, this device must offer high performance and adapt easily to future needs. It should operate over wired or wireless links (or even power lines), to permit inter-networking among current protocols. At the same time, it should be scaleable and adaptable with minimal effort to changes in network standards.

Common European vision

UniAccess offers a real possibility to define a common European vision for a market in which fixed phones, mobile communications, wireless Bluetooth devices, PABX, set-top boxes, PCs and new appliances will converge or be connectable to the Internet. By creating a unified access to networks, Europe will inherently set a new standard enabling it to fully exploit time to market and enjoy essential synergies in the whole process of the industrial value chain by surpassing critical masses.

This project, in combination with A104 SCUBA, A105 UniLAN, A106 INCA and A107 4G RADIO are forming MEDEA+ initiatives to establish Europe as technology driver in most modern access networks. Potentially, these activities can establish a key role for Europe here in similar way to its role in the definition and creation of the GSM system.

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