Key Issues

- Seamless integration of diverse software environments
- Multiple cores will only provide more speed when used with multi-threaded software
- Concurrent and parallel execution of applications and control signals

Expected Impact

The mobile communication market is still one of the fastest growing markets in the area of consumer electronics; this applies especially to the mobile devices used in these networks.

The project will support Europe to gain:

- Sustained leadership in mobile communication
- Market leadership for embedded multi-core systems
- Leadership in software development tools for embedded multi-core systems
- Open source platform components for European embedded systems

Partners

Ruhr Universität Bochum (Germany)

Infineon (Germany)

Telelogic (Sweden)

ARM (United Kingdom)

Technische Universität Dresden (Germany)

University of York (United Kingdom)

University of Timisoara (Romania)

GWT-TUD (Germany)

Project Cost

Total Cost: € 4.582.829,00

EC Contribution: € 2.900.000,00

Coordination

Prof. Dr.-Ing. Attila Bilgic
E-mail: attila.bilgic@is.rub.de

Ruhr-Universität Bochum
Institute for Integrated Systems
Universitätsstrasse 150
D - 44780 Bochum
GERMANY

Project Duration

February 2008 – January 2010

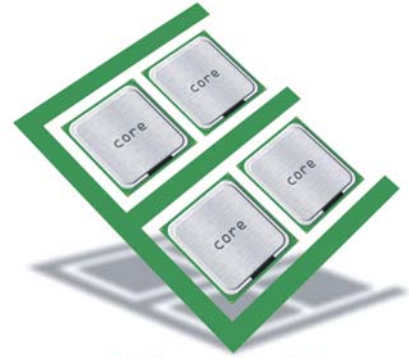
Project Web Site

www.emuco.eu

Contract Number: INFSO-ICT-216378

@ April 2009

ICT-eMuCo. Embedded Multicore Processing for Mobile Communication



ICT-eMuCo is a European project supported under the Seventh Framework Programme (FP7) for research and technological development

eMuCo

Embedded Multi-Core Processing for Mobile Communication Systems

The ICT-eMuCo project targets the system platform of future mobile devices based on a multi-core architecture. This comprises the relevant controller elements as well as the operating system and application layers.

(Hard) Real Time Requirements

- Wireless radio access
- Audio and UI processing
- Power management

Constraint Resources

- Battery (low-) powered
- Limited processing
- Limited memory
- Limited space

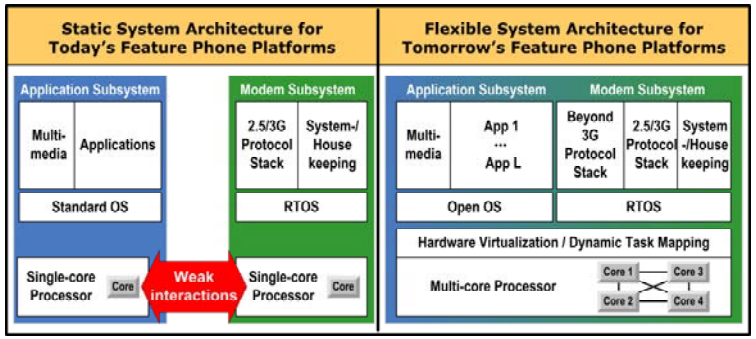
Integration of Multiple Subsystems

Objectives

Addressing Multi-Core Systems for Future Mobile Convergent Devices

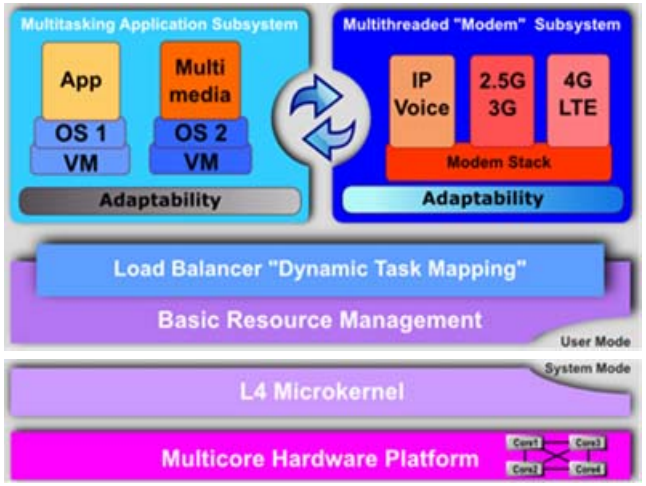
The aim of eMuCo is to address the platform for future mobile convergent devices based on a multicore architecture offering:

- Flexible system platform by a modular architecture
- Seamless system platform allowing the coexistence of different radio access technologies and software environments on the same platform
- Improvement of computational processing capacity
- Reduction of power consumption
- Scalability
- Real time handling of the system control signals and real time applications



eMuCo Technical Approach

Scalability and Flexibility Thinking on the Trends of Future Mobile Communication



eMuCo proposes a multi-core hardware platform, which is effectively exploited by the combination of a *L4 micro-kernel*, a load balancer, virtualization techniques and model-driven parallel code generation.

L4 microkernel provides a minimal set of kernel functionality and allows building user-level services by providing mechanisms such as address space management, thread handling, and inter-process communication (IPC).

Load balancer provides the necessary services to support multi-core such as allocation of task/thread on the multiple cores, priority management and thread monitoring.

Virtualization allows to run a broad set of existing applications in new environments by using virtual machines to run whole operatings systems along with their applications.