BETSY

BEing on Time Saves energY

KEYWORDS: Wireless networks, WLAN, MPEG, wireless video, mobile communication, QoS, hand-held devices, real-time streaming, energy reduction, system optimisation

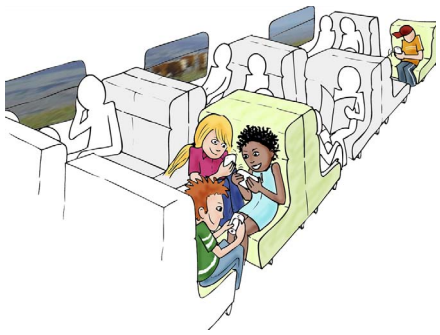
Introduction

Wireless multimedia streaming on hand-held, mobile or otherwise battery operated devices will be a major technology underlying the next generation information and entertainment appliances. From watching small video clips on your mobile device to playing live games with other people on the bus or looking at the latest news bulletin on your palm while waiting for your plane to arrive, the possible user applications are almost endless.

The multimedia market traditionally consisted of closed (rather fixed) boxes, with a few battery-operated mobile devices such as the Walkman, but the market is now expanding its scope towards one where multimedia content can be retrieved from any place at any time.

Our own home slowly becomes a networked environment, in which devices can talk to each other in either a wireless or wired manner, replacing the old stand-alone devices. But wireless multimedia streaming will also be possible when we are on the move, as so-called hot-spots, places in city centers, bus stations, airports, hospitals etc. come in place. Here our own devices can connect into a local networking area where services and content can be provided, which will give the possibility to retrieve the content we want and have a reasonable amount of bandwidth available.

It will be clear that timing requirements of multimedia systems change from a closed-box situation to the need for end-to-end timing specification and enforcement. Also when we look at a networked system consisting of multiple embedded devices, the question comes to mind how we can optimise the resource use, such as CPU power, network bandwidth, memory use and the power consumption over the complete system.



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Many wireless hand-held and mobile devices are short on resources and especially on energy, because they are battery operated. Trade-offs are made already during the design stage but also in an improvised way during their run-time. This becomes vital for optimal system performance and with that an optimal user experience for a reasonable cost. Today it is not possible, even at design time, to make well-founded system trade-offs between network and terminal resource consumption, energy consumption of the terminal and timeliness of the streaming data. This makes the quality of audio-video and gaming in the current first prototypes of wireless networked embedded devices by far not comparable to the high quality that people are used to from their traditional TV and audio sets.

Objectives

The aim of the BETSY project is to have multimedia streams on wireless hand-held devices seamlessly adapted to fluctuating network conditions and available terminal resources while reducing the energy consumption of the stream processing. This way the user can enjoy true multimedia experiences with freedom of movement in a networked home or at any hot spot.

To achieve this, we need to be able to make trade-offs between the use and consumption of network and terminal resources, such as bandwidth use, CPU consumption, memory needed and power consumption by the terminal, while guaranteeing end-to-end timeliness - required for streaming data. The results of the BETSY project will make this possible.

Expected Results

The BETSY project will deliver all the theory, models and design methodology to make well-founded trade-offs between time-constraints, terminal and network resources and energy consumption possible during design time. The project will also deliver a framework implementation that makes dynamic adaptations in this trade-off possible at run-time.

To verify the timing and resource model, the framework will be populated by selected components or modules, for example configurable codecs, bandwidth allocation controllers for WLAN cells and display drivers, which use the framework's mechanisms to adapt the processing chain to changes in the resources mentioned above.

The framework and its components will be implemented in a streaming server and mobile clients (or equivalent evaluation boards), and evaluated against the scenario definitions and their evaluation criteria.

The possible saving of energy consumption in the terminal in a dynamic way compared with traditional methods will be measured as well. The expectation is that the terminal energy savings, depending on the situation, can be in the order of 20%.

BETSY

CONTRACT NUMBER
IST – 004042

FULL NAME
BEing on Time Saves energY

TYPE OF PROJECT
Specific Targeted Research Project

PROJECT PARTICIPANTS
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PROJECT WEBSITE
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BUDGET
Total cost: 4.4 M€
Funding: 2.9 M€

TIMETABLE
Starting date: 1. September 2004
Duration: 30 months

This project is part of the portfolio of the

Embedded Systems Unit – C3
Directorate General Information Society

For more information please check:

http://www.cordis.lu/ist/directorate_c/ems/