Hartmut Schmeck
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Trends in Network and Pervasive Computing – ARCS 2002

International Conference on Architecture of Computing Systems
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Dedicated to the memory of Jochen Liedtke
who died much too early on June 10, 2001

Preface

Future processors will become smaller, provide higher performance, and consume less power than today's devices. Such processors will spark off new applications in particular in the area of everyday consumer devices. Personal digital assistants, mobile consumer devices, and various smart personal appliances will soon be widely used. Mobile telecommunication systems will increase their bandwidth and will yield highly connected, ubiquitous computing appliances. Ubiquitous computing induces a new way of thinking in system design: computers vanish into the background hidden behind the habitual human environment.

These trends are the major topics of ARCS 2002, the "International Conference on Architecture of Computing Systems", which continues and replaces the biennial series of German Conferences on Architecture of Computing Systems, organized by the special interest group on "Computer and System Architecture" of the GI (Gesellschaft für Informatik – German Informatics Society) and the ITG (Informationstechnische Gesellschaft – Information Technology Society). The 15 predecessor conferences (except the EuroArch in 1993) were national conferences only. This is the first German conference on computer architecture addressing the international research community. It serves as a forum to present current work by researchers from around the world, this year being focused on topics that are truly changing our perception of information processing – "Trends in Network and Pervasive Computing".

The call for papers resulted in a total of 42 submissions from around the world. Every submission was reviewed by four members of the program committee or additional reviewers. The program committee decided to accept 18 papers, which are arranged into 6 sessions with the result of a strong program. The two keynote talks by Ralf Guido Herrtwich (DaimlerChrysler Research) and Marc Fleischmann (formerly Transmeta, now Pixelworks) focus our attention on an innovative application area ("Communicating Cars: A Case for Ubiquitous Computing in the Automotive Domain") and on innovative architectures ("Microprocessor Architectures for the Mobile Internet Era").

The organizers gratefully acknowledge the support by ACM, IEEE, IFIP TC10, CEPIS, and EUREL, and, in particular, the financial support by PEP Modular Computers and by SAP.

The preparation of this conference has been heavily influenced by our colleague Jochen Liedtke, who died much too early in June 2001. He strongly advocated the international orientation of this conference, he was a major contributor in shaping its thematic focus, and he helped significantly to form a truly international program committee. The research community on computer and system architecture deeply regrets the loss of such an energetic and enthusiastic colleague, who contributed numerous stimulating concepts and ideas, in particular on the design of micro kernel architectures.

We would like to thank all who contributed to the success of this conference, in particular the members of the program committee and the additional referees for carefully reviewing the contributions and selecting a high quality program. Our Workshop and Tutorial Chair Uwe Brinkschulte did a perfect job in organizing the tutorials and coordinating the workshops. Our special thanks go to the General Co-chair Lars Wolf and to the members of the organizing committee, namely Michael Beigl and Martina Zitterbart, for their numerous contributions as well as to Daniela Müller and André Wiesner for setting up the conference software and for designing and maintaining the conference web-site. Faruk Bagci and Jan Petzold did a perfect job concerning the preparation of this volume.

We hope that all participants enjoy a successful conference, make a lot of new contacts, engage in fruitful discussions, and have a pleasant stay in Karlsruhe.

January 2002

Hartmut Schmeck
Theo Ungerer

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Keynote
Communicating Cars: A Case for Ubiquitous Computing in the Automotive Domain

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Abstract. Examples for ubiquitous computing applications usually come from the household domain. Typical lists include microwave ovens with integrated web-pads, refrigerators or washing machines with remote Internet connections for maintenance access, and even instrumented coffee mugs or clothes. While many of these examples have substantial entertainment value, the likelihood of their realization and pervasive deployment in the not too distant future is questionable. There is, however, another application domain for ubiquitous computing which holds substantial promise, but is often overlooked: the automotive sector.

Cars are fairly attractive protagonists for ubiquitous computing: They are large enough to have communication devices integrated in them, in fact, a substantial portion of them has integrated phones today. They come with their own power source which can also feed their communications equipment. Their price is some orders of magnitude higher than that of the device to be included, so the relative price increase to make them communicate is small. And, perhaps most importantly, some services such as mayday, remote tracking, or tele-diagnosis make vehicle connectivity desirable for car buyers and car manufacturers alike.

In this talk, we discuss how ubiquitous computing in the automotive domain can become a reality. We investigate the principal services resulting from network-connected cars, focussing on vehicle-originated rather than passenger-related communication as we believe that ubiquitous computing is more about communicating machines than communicating humans. Within the vehicle-centric services identified, we distinguish between client/server and peer-to-peer applications, resulting in different communication requirements and system setups. We outline some network solutions to meet these requirements, including technologies for car-to-infrastructure and car-to-car communication in different regions of the world. We conclude by discussing the overall effect which these developments may have on the automotive industry.

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