

# Embedded Java

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The increasing complexity of embedded systems also results in a rapid growth of the software part, which tends to be developed in object oriented programming languages like C++ or Java. Originally planned for embedded systems, Java recently plays again a more important role in the context of embedded system from different points of views. Especially platform independence, multithreading parallelism, and internet embedding are important advantages and contribute to the increasing importance of Java in the following different aspects.

At first, software reuse oriented concepts like Java Beans for the specification and prototyping of embedded systems have to be mentioned.

Second, several standards have been developed to improve memory footprints as well as performance of Java for its use in embedded systems. Examples include PersonalJava, EmbeddedJava, JavaCard, Romizers, J2ME, and KVM.

As a third more research oriented development we find Java more and more in the role of a modeling, specification, simulation, and synthesis language not only for the software but also for the hardware parts of embedded systems. This aspect is especially interesting for hardware/software co-design and co-simulation.

In this talk, all these different aspects of Java, as well as their roles, contributions and impacts especially for embedded system design will be discussed.

## Relevant Publications

- 1) C. Weiler and W. Rosenstiel, *Using Java in Embedded Systems Design*, Proceedings of SASIMI, Japan-Osaka, 1997
  - 2) R. Boch, *JVM167 – Design and Implementation of a Java Virtual Machine for a 16-Bit Microcontroller*, Diploma Thesis, Universität Tübingen, April 1999
  - 3) A. Hergenhan, C. Weiler, K. Weiß and W. Rosenstiel, *Internet-based Embedded Systems in Industrial Automation*, GI/ITG-Workshop Java and Embedded Systems, 1998
  - 4) B. H. Lee, *Embedded Internet Systems: Poised for Takeoff*, IEEE Internet Computing, 24-29, Mai/Juni 1998
  - 5) D. Mulchandani, *Java for Embedded Systems*, IEEE Internet Computing, 30-39, Mai/Juni 1998
  - 6) T. Kuhn, W. Rosenstiel and U. Kebschull, *Description and Simulation of Hardware/Software Systems with Java*, 36 Design Automation Conference (DAC), New Orleans, USA, 1999
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