

Abstract

Application-driven Embedded System Development (ADESD) defines a strategy to design and implement embedded systems as aggregates of reusable components arranged in application-specific frameworks. ADESD addresses the gap between the two most promising methodologies in the field, Model-driven Engineering and Platform-based Design, by offering concrete alternatives to translate Platform-independent Models into Platform-specific Models, and also by promoting beyond-platform reuse. While guiding the development of reusable (hardware, software, or hybrid) components that encapsulate scenario-independent abstractions, ADESD induces scenario dependencies to be modeled as Aspect programs. Resulting components can thus be automatically woven to a variety of execution scenarios by means of Scenario Adapters. Scenarios themselves are modeled as application-specific component frameworks. ADESD main test case, the EPOS system, has been ported to a dozen distinct architectures, including AVR, H8, ARM, MIPS, SPARC, PowerPC, and x86, and has been deployed in scenarios as distinct as scientific computing in super computers and sensor networks, therefore confirming the reusability of components.

Bio

Antônio Augusto Fröhlich received his PhD in Engineering from the Technical University of Berlin in 2001. He is currently an Associate Professor of Operating Systems at the Federal University of Santa Catarina (UFSC). As head of UFSC's Software/Integration Lab (LISHA), he has coordinated a number of R&D projects on embedded systems, including dedicated operating systems, hardware/software co-design, wireless sensor networks, and power management. Major contributions from these projects materialized within the Brazilian Digital Television System (ISDTV) and wireless sensing technology for Energy distribution, precision agriculture, and smart cities. Dr. Fröhlich led the consortium that developed the ALTATV Open, Free, Scalable Digital TV Platform and since 2011 leads the CIA² national research network on Smart Cities. He is a senior member of ACM, IEEE, and SBC.