Supporting Heterogeneous Applications in the DECOS Integrated Architecture

Roman Obermaisser
romano@vmars.tuwien.ac.at
TU Vienna

Abstract

The DECOS integrated time-triggered architecture provides a framework for integrating multiple heterogeneous real-time application subsystems within a single distributed computer system while retaining the fault-isolation, fault-containment and complexity-management benefits of a classic federated system. A central issue in the DECOS architecture is the provision of standardized, validated and certified services that facilitate the development of distributed real-time applications. This presentation describes how these services are structured within the architecture in order to satisfy the diverse requirements of heterogeneous applications (e.g., different real-time requirements, different criticality levels). In particular we focus on the reuse of legacy subsystems and the model-based development process of the DECOS architecture. The specification of a DECOS system starts with platform independent models of the application subsystems, defining their requirements with respect to communication, performance, and dependability. In conjunction with a specification of the communication and computational resources of the target platform, the platform independent model is used to derive a platform specific model. The platform specific model defines the allocation of jobs to nodes and the allocation of the network resources, while satisfying the communication, performance, and dependability requirements. From the platform specific model, configuration files and schedules for both task execution and message transmission are generated, as well as middleware for the architectural services.