Optimizing Automatic Deployment Using Non-Functional Requirement Annotations

Model-driven development has become common practice in design of safety-critical real-time systems. High-level modeling constructs help to reduce the overall system complexity apparent to developers. This abstraction caters for fewer implementation errors in the resulting systems. In order to retain correctness of the model down to the software executed on a concrete platform, human faults during implementation must be avoided. This calls for an automatic, unattended deployment process including allocation, scheduling, and platform configuration. In this paper we introduce the concept of a systems compiler using non-functional requirements (NFR) as a guidance for deployment of real-time systems. The postulated requirements are then used to optimize the allocation decision, i.e., the process of mapping model entities to available computing nodes, as well as the subsequent generation of schedules.
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