Model-driven Generative Techniques for Scalable Performability Analysis of Distributed Systems*

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Abstract

The ever increasing societal demand for the timely availability of newer and feature-rich but highly dependable network-centric applications imposes the need for these applications to be constructed by the composition, assembly and deployment of off-the-shelf infrastructure and domain-specific services building blocks. Service Oriented Architecture (SOA) is an emerging paradigm to build applications in this manner by defining a choreography of loosely coupled building blocks. However, current research in SOA does not yet address the performability (i.e., performance and dependability) challenges of these modern applications. Our research is developing novel mechanisms to address these challenges. We initially focus on the composition and configuration of the infrastructure hosting the individual services. We illustrate the use of domain-specific modeling languages and model weavers to model infrastructure composition using middleware building blocks, and to enhance these models with the desired performability attributes. We also demonstrate the use of generative tools that synthesize metadata from these models for performability validation using analytical, simulation and empirical benchmarking tools.

Keywords: Model driven development, Generative programming, Performability

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