

Architecture-centric Design of Complex Message-based Service Systems

Reference:

C. Dorn, P. Waibel, S. Dustdar, "Architecture-centric Design of Complex Message-based Service Systems (accepted for publication)," in the 12th International Conference on Service Oriented Computing (ICSOC 2014), Paris, France, 2014, pp. NN-NN.

Abstract:

Complex, message-based service systems discourage central execution control, require extremely loose coupling, have to cope with unpredictable availability of individual (composite) services, and may experience a dynamically changing number of service instances. At the topmost level, the architecture of such a complex system often follows a messaging style most naturally. A major problem during the design of these systems is achieving an overall consistent configuration (i.e, ensuring intended message routing across producers, consumers, and brokers). While orchestration or choreography-based approaches support the design of individual composite services along a workflow-centric paradigm, they are an awkward fit for specifying a message-centric architecture. In this paper, we present an architecture-centric approach to designing complex service systems. Specifically we propose modelling the system's high-level architecture with an architecture description language (ADL). The ADL captures the message-centric configuration which subsequently allows for consistency checking. An architecture-to-configuration transformation ensures that the individual deployed services follow the architecture without having to rely on a central coordinator at runtime. Utilizing our provided tool support, we demonstrate the successful application of our methodology on a real world service system.