Applying Probabilistic Model Checking to Service Dynamic Reconfiguration

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Abstract

Web service has been an important solution to resource sharing and application integration in the Internet era. Today, more and more enterprises and organizations have been involved in the emerging service software industry. They explore enterprise solution through Web service and service composition to implement their core business activities and functions, and build dynamic e-commerce mechanisms among enterprises, customers, suppliers and partners. However, due to the heterogeneous, open and collaborative nature of Internet, any application failure may cause an immediate service interrupt, which will seriously influence the correctness and reliability of business process of service-oriented software. Thus, service-oriented software cries for an effective approach to constantly adjust its architecture for responding to varying user requirements and instable runtime environments, where one of the most challenging issues is how to effectively execute a dynamic evolution for Web service to ensure that the critical business application is trustworthy.

To this end, we apply the probabilistic model checking technology to the implementation of Web service dynamic reconfiguration. According to the lifecycle of Web service dynamic reconfiguration, our research is partitioned into three parts including Web service monitoring, Web service dynamic reconfiguration and Web service dynamic reconfiguration verification. As a result, the verified reconfiguration will be used for handling the failed service.
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