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Constraint Verification Failure Recovery in Web Service Composition

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Abstract

Automated service composition aims at fulfilling complex tasks by combining different existing elementary web services in a workflow and creating value-added services. Many approaches have been proposed for automatic web service composition. Most of these approaches are based on the matching of input/output parameters across different elementary services. However, in addition to input/output parameters, many real-world services have applicable conditions and usage restrictions (i.e., service constraints) that are imposed by their providers. The constraints of a service should be verified prior to service call to ensure its correct execution. However, constraint verification of a composite service is different, as verification of some of the elementary services' constraints might require execution of other elementary services inside the composite plan. In addition, failure during verification of constraints inside a composite plan results in the failure of execution of the whole composite service, which requires failure recovery for the composite service to continue execution. Composite service failure recovery implies the rollback of certain service transactions during the recovery of the composite plan. Current composite service failure recovery approaches are not adapted to the minimization of service rollbacks due to constraint verification failures. In this paper, a constraint-aware failure recovery approach is proposed to predict failures inside a composite service. Then, a method is proposed to do failure recovery based on those predictions and minimize the number of service rollbacks

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