Karlsruher Institut für Technologie

Institut für Angewandte Informatik und Formale Beschreibungsverfahren

Graduiertenkolloquium Angewandte Informatik

Modeling and Selection of Software Service Variants

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Abstract:

Software services are increasingly relevant for companies, public administrations, and end users. Major challenges for them are to be developed and delivered to meet possibly diverse consumer requirements and preferences. This requires the modeling of variants, addressing diverse consumer needs, and their selection. Existing approaches to deal with variability from software product line engineering fall short in this regard because they do not consider service-specifics like the involved roles, the changed delivery model, or the needs for participation and collaboration. This thesis presents service feature modeling, a novel approach consisting of a variability modeling language and a set of corresponding methods to model and select software service variants.

The service feature modeling language extends standard feature modeling from software product line engineering. A typology of feature types differentiates the semantics of features and enables service feature models (SFMs) to be utilized in novel ways. Attribute types represent concerns common to multiple attributes within an SFM, thus reducing modeling efforts and avoiding redundancies, and allowing for the aggregation of attributes. A novel modeling method considers SFMs to be composed by services, allowing modelers to collaborate and to integrate software services to contribute parts of an SFM

Making use of SFMs, a set of methods is flexibly combined to allow decision-makers to determine which variant to develop or deliver. Configuration set determination produces all valid service variants represented by an SFM. Determined configuration sets are narrowed down via requirements filtering, which dismisses service variants that do not fulfill the needs of decision-makers. Skyline filtering dismisses a configuration set of service variants that are dominated by others. Preference-based ranking applies multi-criteria decision making approaches to rank service variants based on their modeled fulfillment of preferences stated in polls. Through the abstraction of polls, preference-based ranking allows non-technical decision-makers to take part in service variant selection, thus enabling participation.

This thesis presents an evaluation of the outlined concepts that consists of multiple parts. A proof-of-concept implementation and a performance evaluation of a SFM tool suite show the realizability and applicability of service feature modeling. Two use cases further assert the applicability of the approach. The first one concerns the development of public services under consideration of service variants, whose selection was driven through citizen participation. The second use case concerns the modeling and selection of Infrastructure as a Service (IaaS) configurations and their automatic consumption and usage, illustrating how service feature modeling can drive the realization of selected service variants. Finally, an empirical evaluation indicates good acceptance, expressiveness, and usefulness and interpretability of service feature modeling.

Termin: Mittwoch, 12. Februar 2014, 15.45 Uhr

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Zu diesem Vortrag lädt das Institut für Angewandte Informatik und Formale Beschreibungsverfahren alle Interessierten herzlich ein.

Andreas Oberweis, Hartmut Schmeck, Detlef Seese, Wolffried Stucky, Rudi Studer, Stefan Tai (Org.),

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