Yu, Jian; Sheng, Quan Z.; Swee, Joshua K.Y.; Han, Jun; Liu, Chengfei; Noor, Talal H.
Model-driven development of adaptive web service processes with aspects and rules.

Summary: Modern software systems are frequently required to be adaptive in order to cope with constant changes. Unfortunately, service-oriented systems built with WS-BPEL are still too rigid. In this paper, we propose a novel model-driven approach to supporting the development of dynamically adaptive WS-BPEL based systems. We model the system functionality with two distinct but highly correlated parts: a stable part called the base model describing the flow logic aspect and a volatile part called the variable model describing the decision logic aspect. We develop an aspect-oriented method to weave the base model and the variable model together so that runtime changes can be applied to the variable model without affecting the base model. A model-driven platform has been implemented to support the development of adaptive WS-BPEL processes. In-lab experiments show that our approach has low performance overhead. A real-life case study also validates the applicability of our approach.

Keywords: web services; adaptive systems; model-driven development; aspect-oriented methodology; design tools and techniques
doi:10.1016/j.jcss.2014.11.008