WS-Engineer 2008

A Service Architecture, Behaviour and Deployment Verification Platform

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Abstract. In this demonstration we present the LTSA WS-Engineer Tool Suite. WS-Engineer[1] started as a formal service composition analysis tool for service orchestrations based upon the Labelled Transition Analyser (LTSA). Since its introduction in 2006, the tool suite has grown to consider several areas of service composition engineering, including architecture, behaviour and deployment. The tool is integrated into the Eclipse and IBM Rational Software Architect IDEs.

1 The WS-Engineer Approach

Our initial tool support [1] and expanding approach in service composition analysis, takes a 2-dimensional view of service composition analysis. In a first dimension it considers core service composition artifacts being; orchestrations (service processes), service interfaces, choreography (global partner policies for interactions) and resources (architecture dependent features of service compositions). From a second dimension it considers the analysis features of service compositions including; design, implementation, architecture configuration and deployment. Thus, service engineers can use the approach to safety check designs for service orchestrations and choreography, or alternatively the deployment of collaborating processes and their architecture configuration in service choreography, or any aspect against the other in the matrix. We believe such an approach provides a much richer coverage of service composition development, accessible to engineers such that they can analyse compositions from different viewpoints (depending on the context of analysis). An overall integrated service behaviour analysis approach is suggested in Figure 1. The core of the approach is transforming some design or implementation artifact to relevant and detailed models (Labelled Transition Sstems) for analysis (Model Generation). We consider analysis of service orchestrations and choreography given input as design specifications (e.g. MSCs, UML2 and xADL2 models), implementations (in the form of WS-BPEL and WS-CDL policies) and service component interfaces (in the

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A. Bouguettaya, I. Krueger, and T. Margaria (Eds.): ICSOC 2008, LNCS 5364, pp. 728–729, 2008.

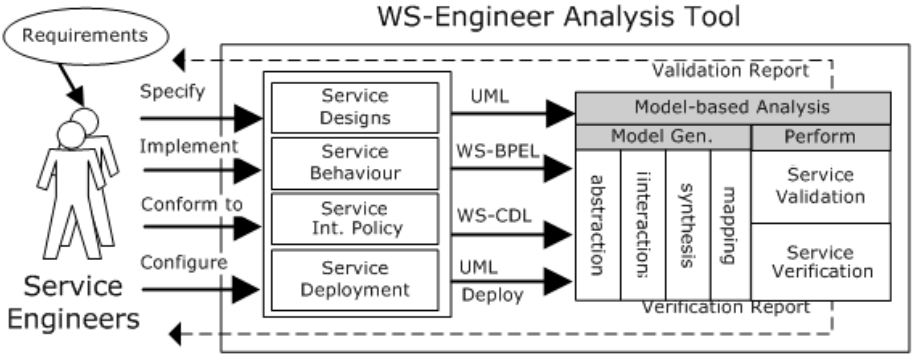

Fig. 1. WS-Engineer Approach to Service Composition Analysis

form of WSDL documents). Analysis in the approach provides features to compare each of these either as model validation (through animation) or verification through model property traces. Each feature considers behaviour analysis for a different element of service compositions which we aim to clearly demonstrate.

2 The Demonstration

The demonstration illustrates several integrated key features of WS-Engineer, themed in a way that follows conceptual design, implementation and deployment of service compositions. The example is focused on a single case study yet with multiple properties (engineering concerns) covered through different techniques using formal analysis. To begin with the user specifies a high-level design (in UML sequence charts) and implementations in WS-BPEL. Verification shows any violations with a weak bi-simulation between the models of processes in the service composition. Corrective actions are illustrated. The user then proceeds to specify a service choreography specification (in WS-CDL) and performs a similar verification against design and implementation. Towards deployment of these artifacts, the user builds a service deployment diagram for architecture configuration (highlighting service host resource constraints) of the compositions, specifies the WS-BPEL implementations and performs a check on behaviour and resource usage. Similarly a set of violations are raised and corrective actions illustrated. All three verifications steps aim to provide greater assurance prior to deployment and runtime of service compositions. Additionally we will highlight some future work on dynamic service compositions using our concepts of Service Modes and a prototype dynamic service broker.

References

1. Foster, H., Uchitel, S., Magee, J., Kramer, J.: Ws-engineer:tool support for model-based engineering of web service compositions and choreography. In: IEEE International Conference on Software Engineering (ICSE 2006), Shanghai, China. IEEE, Los Alamitos (2006)