SLA Management and contract-based Service Execution

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Abstract. In the Internet of Services vision, services are traded via internet service marketplaces. Service provisioning is regulated by service level agreements (SLAs). In this demonstration[3] we present an infrastructure which supports SLA creation and negotiation as well as service provisioning and monitoring based on SLAs in the context of service marketplaces. It is an implementation of the work presented in [1] and [2] and an intermediate result of the TEXO project[4].

1 The SLA Management Infrastructure

We present a novel system for end-to-end SLA handling during design time, negotiation, and runtime which improves existing work by increasing automation of SLA management. The system is also different from existing ones because of its centralized SLA negotiation and monitoring support via the marketplace instead of requiring consumer-provider negotiation. Our system supports contract-bound tradable service execution through a distributed service infrastructure with ubiquitous support for WS-Agreement[5]. SLAs are created, negotiated, and monitored by specialised components on the infrastructure for engineering, trading, and executing services.

The ISE development environment consists of tools for modelling and describing services. The Service Management Platform (SMP) provides service marketplace functionality for offering and searching services, SLA negotiation and monitoring, and billing. The Tradable Services Runtime (TSR) supports service execution and monitoring at the provider side. Multiple distributed service runtimes are interacting with the central service marketplace. The communication between the SMP and the TSRs is realized via a message-oriented middleware which supports the exchange of information regarding deployed services, negotiated SLAs, and monitoring data. Figure 1 provides an overview of the infrastructure of ISE, SMP and TSR.

SLA template generation and deployment: SLA templates, which form the base for SLA negotiation, are created at design time by the *SLA Template Generation* component [2] of ISE. It takes a USDL (Universal Service Description Language) service

[3] Associated video: http://texo.inf.tu-dresden.de/servicewave-texo-video

[4] The project was funded by means of the German Federal Ministry of Economy and Technology under the promotional reference “01MQ07012”. The authors take the responsibility for the contents.

[5] WS-Agreement: http://www.ogf.org/documents/GFD.107.pdf

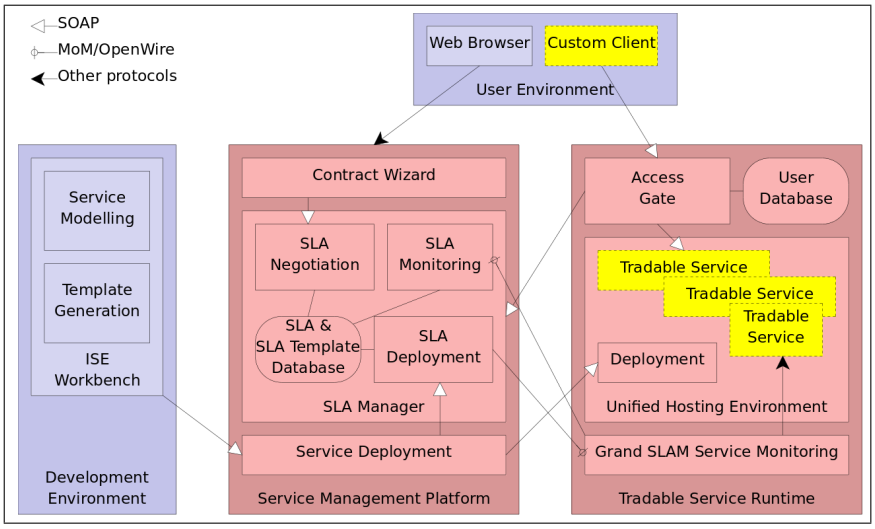

Fig. 1. Infrastructure for SLA management of tradable services

description as input and generates a WS-Agreement SLA template via a model-to-text transformation. This automates part of the work of a service provider.

Negotiation of SLAs The negotiation of SLAs is supported by the *SLA Manager* component, which provides the agreement provider interfaces defined by WS-Agreement. The *Contract Wizard* and the *ISE SLA Negotiation Wizard* provide front ends for the negotiation of SLAs for service consumers and composite service creators, respectively. While the Contract Wizard was implemented as a web application, the ISE SLA Negotiation Wizard was implemented as a plug-in for the ISE workbench. Upon the successful negotiation of an SLA, different runtime components are activated in order to prepare service provisioning and monitoring.

Service Execution and Monitoring Once an SLA was negotiated, the respective service can be consumed. Service requests are checked by the *Access Gate* SOAP proxy for user authentication and SLA-based authorisation. Invocation-related statistics are injected into the SLA-driven monitor *Grand SLAM*. Further system and service metrics are measured by its monitoring sensors. They are aggregated and evaluated according to the negotiated SLA conditions. In the case of detected problems a violation event is sent to the SLA Manager. Adaptive execution environments can react on this event.

References

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