The TECLA Service Platform: Web Service Sharing based on Modular Platform Services

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Abstract. We demonstrate the functionality of TECLA, a prototypical web service hosting and management platform based on loosely coupled, integrated platform services. Compared to other approaches, we claim to have created the first system which properly handles provisioning and consumption of redistributable, heterogeneous services in the context of contract-bound adaptive service execution. We support our claim by making the platform freely available through serviceplatform.org.

1 Motivation

Advanced SOA research and innovation benefits from prototypes which can help realising and validating concepts. Such prototypes exist for almost every individual aspect like service composition, contracting or semantic reasoning. Only few approaches are known to combine prototypes into holistic service platforms which can be used as central systems for driving the participative Internet of Services (pIoS). Our work was hence motivated by the need to understand the big picture of distributed and user-centric service hosting, trading, composition and sharing[1]. The result is TECLA, an emerging open source prototype which is now functional enough for public evaluation. It can be used to operate pIoS portals and to perform research on advanced individual aspects like service hosting quality improvements.

2 Design Principles

The creation of an integrated, distributed service-oriented hosting platform was made possible by consequently following architectural design principles.

- User-centric approach. Our system combines autonomous computing aspects, in particular contract-bound adaptive service execution, with user control through web applications across the service lifecycle.
- Real-world relevance. TECLA can process industry standard documents like WSDL alongside academic service and contract descriptions like WSML and WS-Agreement.
- Rapid experience and progress. Instead of building a best-of-breed system, we concentrated on a number of innovative aspects in each component while staying focused on the creation of a user-centric platform.

– Loose coupling. The platform is following the architectural style of using modular platform services to achieve a service-oriented middleware where each part of the middleware is a distributable and exchangeable service by itself[2]. A system and intra-service integration through configuration files, databases and web service interfaces connects otherwise standalone platform services and components to the integrated platform TECЛA.
– Reusability. Future research and custom prototypes can build upon any combination of our platform services due to their open source nature and availability as pre-built packages. This toolbox approach encourages concentrating on the innovative areas instead of having to build a complete platform from scratch.

3 Features and Capabilities

TECЛA aims to cover all runtime phases of the service lifecycle. For service developers, it contains *Provider Wizard*, a web application for offering new services and managing the service and contract portfolio. For service users, it contains *ConQoMon*, a context- and QoS-sensitive semantic service discovery based on WSML descriptions and associated documents like WSDL and SLA templates. ConQoMon links to either *Dynvoker* for ad-hoc interactive service invocation with automatic form generation, or to *Contract Wizard* for SLA negotiation and management. Underneath these applications, services are executed in the unified hosting environment *Puq*. The execution is supervised by the OSGi-based, modular, SLA-driven monitor *Grand SLAM*. Its reports are visualised and made available to users through a Monitoring-as-a-Service interface (*MaaS*). Monitored non-functional properties determine the application of adaptation mechanisms such as process rebinding and service reconfiguration. The heterogeneous nature of distributable services is unified by a service abstraction layer which allows the extraction of functional and non-functional properties as well as an SLA abstraction library used by the monitoring service.

The TECЛA architecture is shown in figure 1. While the user-centric parts are supposed to be hosted centrally, the autonomous parts can be run on multiple nodes in parallel. This distribution model ensures an acceptable scalability and could be combined with elastic resource allocation to increase it further.

4 Exploitation

The TECЛA platform serves as a base for research and development prototypes. Through strict system integration, developers and hosters can run and propagate our platform services. We have been developing a Linux-based live demo system on DVD on which users find the running platform along with documentation and explanatory videos. By leveraging standard Debian GNU/Linux packaging mechanisms, we have achieved instant zero-configuration installability of our platform services onto other computer systems. Beside the demonstration system, we currently build a service portal on which users will be able to exchange

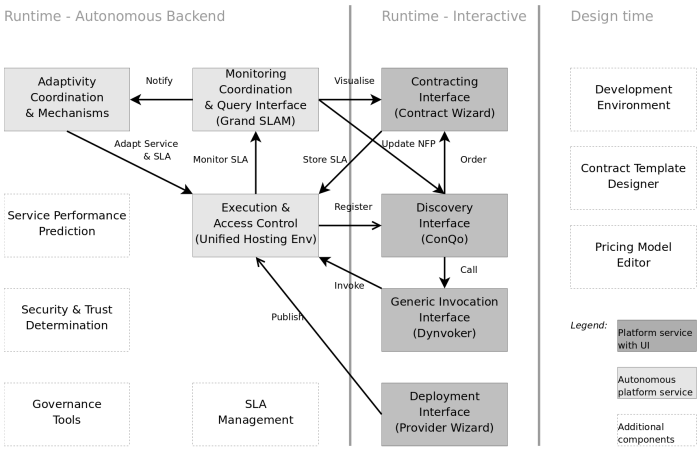

Fig. 1. Choreography among distributed platform services defines the TECЛA architecture which is already prepared for additional components.

web services. Future research focuses on finding differences between advertised and accomplished service hosting quality in real-world service sharing scenarios. TECЛA helps to collect the runtime data needed to calculate the differences and to let the users participate with ratings in the feedback loop.

5 More Information

Published results of related research on individual platform services and lifecycle issues are being collected at `http://texo.inf.tu-dresden.de/publications/`. The service platform components, their source code and documentation as well as pre-built packages are available on the TECЛA website at `http://www.serviceplatform.org/`.

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