Rationale

Dependable and secure Services Oriented Architectures (SOAs) are mainly the result of good design and implementation practices, but the stakeholders' trust can be decisively strengthened only by rigorous, sound and open validation and verification processes. The contract-based, model-driven SOA engineering approach, effectively supports the validation task. SOA key characteristics (reduced control, observability and trust between participants) make actually black-box and grey-box testing the only practicable verification methods. Nevertheless, SOA testing is a heavy, complex, challenging and expensive task.

Objectives and approach

The objective of the MIDAS project is to realize a comprehensive framework able to support automation and intelligent management of SOA testing. The framework is available as a Platform as a Service (PaaS) solution on a cloud infrastructure and supports all the testing activities: generation, execution, result analysis, planning and scheduling. Moreover the framework supports the main testing domains such as functional, interactional, fault tolerance, security and usage-based testing. The test execution environment is based on a distributed TTCN-3 runtime engine. The adopted testing methods and technologies are beyond the state of the art, particularly on model-based testing, fuzzing for security testing, usage-based testing, probabilistic inference reasoning about test evaluation, planning and scheduling. Two pilot SOA testing experiences in different business domains (healthcare and supply chain management) are carried out.

AT A GLANCE

Project title:
Model and Inference Driven - Automated testing of Services architectures (STREP)

Project coordinator
Dr. Riccardo Fontanelli
DEDALUS S.p.A. (IT)

Partners:
Dedalus S.p.A. (IT)
Fraunhofer Institute for Open Communication Systems (FOKUS) (DE)
Instituto Tecnológico de Aragón (ES)
Simple Engineering France (FR)
Consiglio Nazionale delle Ricerche - Istituto di Scienza e Tecnologie dell’informazione (IT)
T6 Ecosystems S.r.l. (IT)
Sintesio Foundation (SI)
Georg-August-Universität Göttingen Stiftung Öffentlichen Rechts (DE)
Université Pierre et Marie Curie - Paris VI - Laboratoire d’Informatique de Paris VI (FR)

Duration:
September 2012 – August 2015

Total cost:
€ 4.3 M

Website:
www.midas-project.eu

The MIDAS project aims to implement an integrated framework for the automation and intelligent management of SOA testing. The framework is available as a Platform as a Service (PaaS) solution on a cloud infrastructure and supports all the testing activities: generation, execution, result analysis, planning and scheduling. Moreover the framework supports the main testing domains such as functional, interactional, fault tolerance, security and usage-based testing. The test execution environment is based on a distributed TTCN-3 runtime engine. The adopted testing methods and technologies are beyond the state of the art, particularly on model-based testing, fuzzing for security testing, usage-based testing, probabilistic inference reasoning about test evaluation, planning and scheduling. Two pilot SOA testing experiences in different business domains (healthcare and supply chain management) are carried out.
of the Services Architecture Under Test (SAUT); it is based upon the Test and Test Control Notation (TTCN-3) standard;
• probabilistic and symbolic inference based methods and tools for test result analysis and test campaign planning and scheduling.

In order to support the elastic scalability of the testing environment (allocation of huge amounts of computation resources for relatively short test campaigns on very large services architectures) the MIDAS framework is made available as a cloud based PaaS. Fig. 1 illustrates the architecture of the MIDAS framework.

In HC, the MIDAS framework will be used for building test campaigns upon the HSSP1 services implementation, provided by the Italian HealthSOAF2 research project.

The SCM pilot aims at building test campaigns, according to the MIDAS approach, upon an existing services architecture for mobile services supply chain management.

**Impact**

The research on the economic impact of the current inadequacy of SOA testing tools and the evaluation of the testing needs of the existing business solutions allows the MIDAS project to:
• estimate the optimization of the present maintenance and management costs by the availability of advanced verification and testing methods, tools and infrastructures;
• define new business models for testable service and services architecture delivery and for distributing the advanced SOA testing facilities through new channels, such as PaaS on cloud infrastructures.

The potential impact of the MIDAS achievements involves the actual deployment and delivery of dependable and secure services and services architectures. In particular, the MIDAS framework and platform:
• guarantees the general availability of rigorous, sound, powerful and cheap automated testing processes and tools;
• allows the providers to deliver their SOA production environment with integrated service test facilities.

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For further information:
R&D Division - DEDALUS S.p.A.
Via March 14/C - 57121 Livorno (ITALY)

Email: ricerca@dedalus.eu
Tel: +39 0586 426790 - Fax: +39 0586 443954
http://www.dedalus.eu

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1 Healthcare Services Specification Project
http://hssp.wikispaces.com/
2 www.healthsoaf.it