PROJECT RESULTS

- Integrated method for quality prediction and trade-off analysis for performance, reliability and maintainability
- Guidelines on using the method for the enterprise, industrial and telecom domains of service orientation
- Open-source tools for service architecture extraction and quality impact prediction
- Demonstrator on two case studies from the industrial and telecom domains
- Enterprise SOA showcase
- Scientific publications

ADMINISTRATIVE DETAILS

RESEARCH PROGRAMME

EU Framework Programme 7, Information and Communication Technologies

TYPE OF FUNDING

Small or medium-scale focused research project

DURATION

36 months

TOTAL BUDGET

4,681,000 Euro

PROJECT PARTNER

FZI Research Center for Information Technology
Karlsruhe, Germany
Dr. Mircea Trifu
telephone: +49 721 9654-624 | mtrifu@fzi.de
www.fzi.de

ABB AG Corporate Research Center
Ladenburg, Germany
www.abb.de

Mälardalen University
Västerås, Sweden
www.mdh.se

Politecnico di Milano
Milano, Italy
www.polimi.it

Charles University
Prague, Czech Republic
www.cuni.cz

Itemis GmbH
Pforzheim, Germany
www.itemis.de

Softeco Sismat S.p.A.
Genova, Italy
www.softeco.it

Ericsson Nikola Tesla d.d.
Zagreb, Croatia
www.ericsson.com/hr/

www.q-impress.eu

FZI Forschungszentrum Informatik
Haid-und-Neu-Str. 10–14
76131 Karlsruhe
www.fzi.de | fzi@fzi.de

92010100/FZI-CCM/E&B printware

RESEARCH ON YOUR BEHALF

FZI RESEARCH CENTER FOR INFORMATION TECHNOLOGY

ImPrESS

QUALITY IMPACT PREDICTION FOR EVOLVING SERVICE-ORIENTED SOFTWARE

Bringing the advantages of service orientation to new application domains with guaranteed QoS requirements such as industrial production control systems, telecommunications and critical enterprise applications.

This project is funded by the European Union under the Information and Communication Technologies research priority of the Seventh Research Framework Programme (FP7-215013)

SEVENTH FRAMEWORK PROGRAMME

SERVICE-ORIENTED SOFTWARE DEVELOPMENT

Service orientation completely reshaped the typical ICT landscape of today's organizations, setting them on solid grounds to support the evolution and reuse of valuable business assets and to allow their integration in new applications. Service orientation spread like wildfire across the software-supported industry, mainly because it brought about the much needed flexibility and speed of adaptation to changing requirements and business conditions.

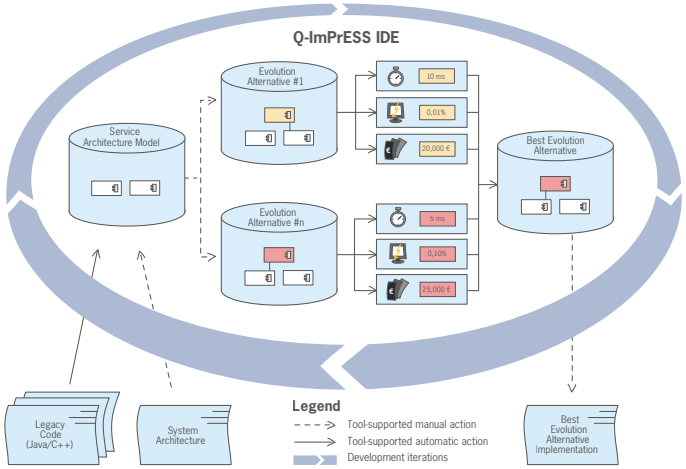
However, this industrial penetration did not happen uniformly across all domains. Many critical domains with non-functional constraints and quality of service requirements are still legging behind, because current service oriented development techniques do not provide analysis methods needed to assess the impact of changes to the service internals on the offered QoS levels.

PROJECT OBJECTIVE

The goal of the Q-ImPrESS project is to make service orientation available to critical application domains with predictable and guaranteed end-to-end Quality of Service QoS requirements, by creating a new method for quality-driven software development and evolution, where the consequences of design decisions and system resource changes on performance, reliability and maintainability can be foreseen through quality impact analysis and simulation.

VISION AND IMPLEMENTATION

The Q-ImPrESS vision is to define a new abstract design model of a software system augmented with information about service encapsulation and deployment, called the service architecture model, and to extract it from existing code or from UML models of newly designed services. This service architecture model is designed to be fully transformable, supporting the simulation of architectural changes such as: redistributing functionality between services, adding functionality to a service and service re-composition without changing the existing implementation.



Starting from this service architecture model and using model-driven techniques, separate prediction models for each considered quality attribute will be derived and used in conjunction with the resource usage model to predict the quality attributes for a given service architecture. The integrated quality impact and trade-off analysis will provide the software engineer with a complete picture of the consequences of his design changes at both the service level and the service architecture level.

EXPECTED BENEFITS

The Q-ImPrESS method will allow for cost-effective development and evolution of service-oriented software. Developers will be able to try out different design scenarios and choose the best possible alternative with respect to the impact on the quality attributes of the software, before ever writing a single line of code, and thus avoiding additional effort and project delays to get certain quality attributes such as performance under control.

The main benefits of this method are:

- Flexibility
  quickly adapt IT infrastructures to changing customer requirements, business practices and processes
- Safe financial investment
  systematically reuse existing software assets
- Cost efficiency
  predict the consequences of changes on quality attributes without costly trial-and-error
- Engineering
  understand the trade-offs between quality attributes during software evolution
  (e.g. performance vs. maintainability)
- New application domains
  spread service orientation to new application domains such as telecommunications, production control systems and critical enterprise applications