Q-ImPrESS *Quality Impact Prediction for Evolving Service-oriented Software*

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Q-IMPRESS

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SEVENTH FRAMEWORK PROGRAMME

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OVERVIEW

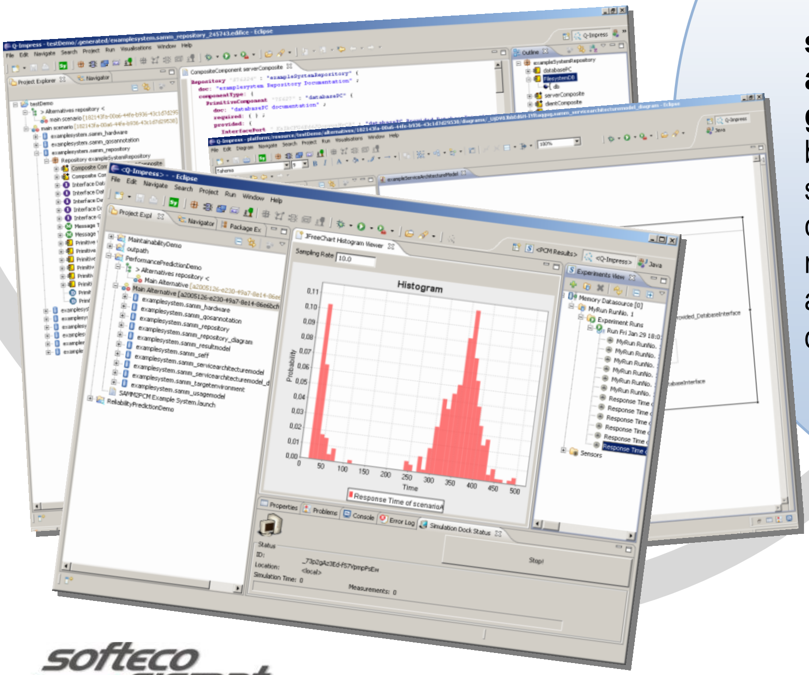
Service orientation completely reshaped the typical ICT landscape of today's organizations, setting them on solid grounds to support the evolution and reuse of valuable business assets and to allow their integration in new applications.

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.

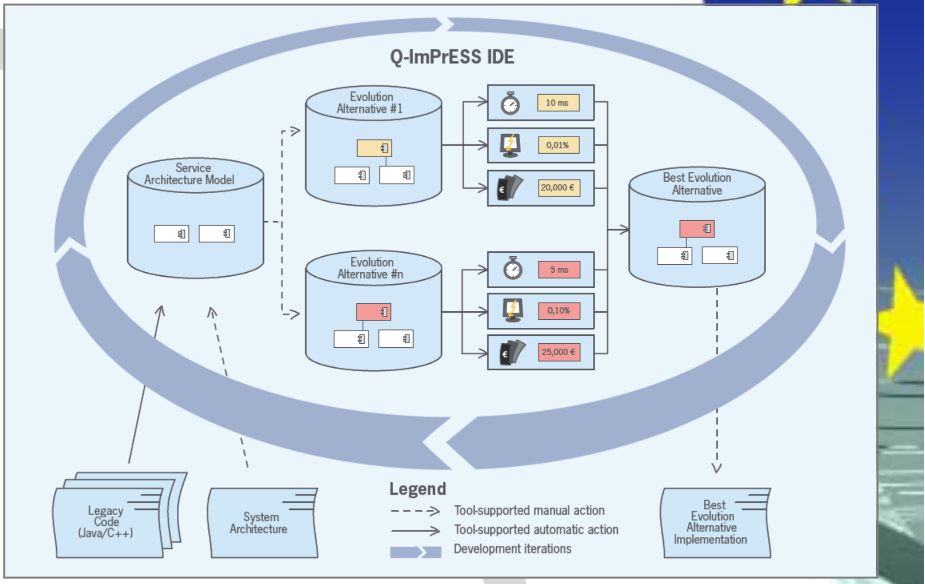
OBJECTIVES

The goal of the Q-ImPrESS project is to **make service orientation available to critical application domains with predictable and guaranteed end-to-end 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**: adapt IT infrastructures to customer requirements, business practices and processes
- **Safe financial investment**: systematically reuse existing software assets
- **Cost efficiency**: predict 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

EXPECTED 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

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