Service-oriented Measurement Infrastructure

Hashem Yazbek, Reiner R. Dumke, Andreas Schmietendorf, Robert Neumann

Otto-von-Guericke Universität Magdeburg
http://ivs.cs.uni-magdeburg.de/sw-eng/agruppe/
http://www.smlab.de
1 Introduction

2 Service-oriented Software Measurement

3 SOA-based Measurement Infrastructure

4 Prototypical Implementation

5 Conclusion and Future Work
1. Introduction

Measurement based on ISO 9126

Software process

Process quality

Internal quality attributes

External quality attributes

Software product

Quality in use

Process measures

Internal measures

External measures

Software product effects

Use context
1. Introduction

Measurement in the Business Context

Introduction

Measurement in the Business Context

World wide Marketplace
(Domain overviews, Trend analysis)

Evolution

Industry

Business Process models
(Scorecards, BPMN’s)

Technology

IT Process models
(Process mining, Dashboards)

Development Process models
(PERT, CPM)

Methodology

Measuring the Software Process

The IT Measurement Compendium

Source: Gartner IT Key Metrics Data 2009
1. Introduction
Rational-based Project Controlling

- heterogeneous Measurement Data Basis
- supporting Process Measurement
- stand-alone Solution
1. Introduction

The Magdeburger Java Measurement Service

Object-Oriented Measurement of Java Technologies

- supporting Product Measurement
- comparable to other Measurements and Experiences
- as a Portal Solution
(C01) the quality assurance has no limitation to product measurement; supporting measurement of resources and processes is included also.

(C02) the quality assurance processes support any corporate measurement programs.
(C03) controlling and enhancement of measurement process level and continuous realization of a standardized software measurement process

ISO 15939

(C04) overcoming of general measurement tool shortcomings
(C05) establishment and support of software measurement repository inclusion of a measurement experience base
(C06) application of ICT and guideline for the interplay of tools of different providers

(C07) standardized approach for integration of different services enable different license models

(C08) enable automated procedures for measurement service orchestration according to a specific information need
3 SOA-based Measurement Infrastructure

SOA-based Measurement Infrastructure by Kunz

Measurement Process Definition

Semantic Measurement Description

Quality Driven Design

Service Repository

Service-oriented Measurement Process

Measurement Service Evaluation

Service-oriented Measurement Data-base

(S01) At first it is essential to describe the process model in a semantic manner to obtain a high level view of the entire Measurement Process and to enforce a standard compliant procedure (using ISO 15939)
(S02) Ontology’s are a fundamental concept of the Semantic Web and can be defined as a specification of a conceptualization of all measurement ingredients as **Semantic Measurement Description**.
(S03) Another core component for a service-oriented measurement infrastructure is for sure a Web Service for performing measurement activities as Quality Driven Design.

(S04) To realize the components for the service directory and measurement service integration we choose the approach of an empirical-based assembly process with Measurement Service Evaluation.

(S05) The Service Repository contains services, their semantic description and their evaluation data regarding all defined quality attributes.
(S06) *The Service Evaluation Process* uses the defined formulas for each quality attribute being stored in the quality attributes list to calculate the evaluation values for every service.
(S07) Finally, we need a **Service-oriented Measurement Process** description including the detailed measurement activities themselves.
4 Prototypical Implementation
Conceptual Basics

- Implementation of a Web service based on the application of different metrics tools using a central measurement data basis (considering (C01), (C02), (C04), (C07) and (S01), (S02), (S07) in principle)

- Implementation of first analysis supports using measurement value visualization in a Web client (considering (C05) and (S02))

- Using the initial measurement service data basis as first contents of the measurement repository (considering (C05) and (S03))
4 Prototypical Implementation

Different Roles for the Measurement Data

- Define information need
- Select measurement service
- Evaluate entity
- Traffic light report
- Evaluate measurement process
- Select benchmarking data
- Analyze measurement process
- Cockpit visualization
- Create quality report
- Define model
- Select measures
- Define weights
- Define thresholds
4 Prototypical Implementation

Platform Basics: .NET
Based on 15000 measured Java classes, 150000 measured methods and 400 Mio measured LOC
We discussed the possibility of using the paradigm of service-oriented solutions (e.g. as SaaS) in the area of quality assurance as a flexible innovative solution in order to support different high dynamic requirements in software measurement and evaluation. On the other hand, this solutions must consider the many existing solutions that are used in practice and must be migrated to such powerful infrastructures.

Further work is addressed to the extension of the given solution by adding new measurement input and using this first approach for further (practical) applications.
Thanks for the attention!

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