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## Agenda 3<sup>rd</sup> Workshop (project re-kick-off)

Validation of Metrics-Based Quality Control

### Overview

#### Date/Location

Date: 29<sup>th</sup> of August 2008  
Time: 11.00h – 12.00h  
Location: Alstom

#### Participants

ARiSA: Rüdiger Lincke, Welf Löwe  
Alstom: Per Ranstad

#### Purpose

1. Getting started with a First Contact Analysis (FCA).
2. Discussion of available information and technical realization of Quality Monitor installations allowing a detailed planning and realization regarding the individual partner infrastructures.
3. Catching up with the project.

### Agenda

11.05h	<b>Opening with Initial remarks</b> <ul style="list-style-type: none"> <li>– Outline for this workshop, motivation and goals</li> <li>– Summarizing the current status of the project</li> <li>– News from the partners (?)</li> </ul>
11.10h	<b>Presentation and Discussion of a getting started scenario</b> <p>In short: ARiSA receives the complete source code and all build instructions, then performs a FCA and adjusts the analysis and Quality Model to the project. Integration of the Quality Monitor with our Quality Model on partner side in the build process to derive metrics. ARiSA has remote access to the Quality Monitor to perform updates and adjustments. Stressing of requirements.</p> <p>To discuss in particular: technical and legal constraints. How does the infrastructure (in particular build environment) look like, how can we access the code, retrieve results and push updates. How well can the requirements stressed in the ideal scenario be satisfied, what alternatives are available.</p>
11.35h	<b>Discussion of relevant project available to ARiSA</b> <p>In short: Discussion about which project will be provided by Alstom, and how it is provided to ARiSA</p>
11.50h	<b>Presentation and brief discussion of information retrieval (optional)</b> <ul style="list-style-type: none"> <li>– What kind of information (e.g. on bugs, test data, development costs etc.)?</li> <li>– What format, how can it be accessed?</li> <li>– What can we derive from this information?</li> <li>– What relevance does it have for the partners?</li> </ul>
12.00h	<b>Closing session</b>

## Presentation and Discussion of a getting started scenario

Rüdiger Lincke

ARISA™ - Applied Research in System Analysis

<http://www.arisa.se>

Växjö, 29 August 2007

## Goals of this talk

- ⇒ Proposal how we could start the project
- ⇒ List the technical, legal, organizational requirements of Quality Monitors (QM) on the partners side
- ⇒ Questions to be discussed

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## Proposal to get started

- ⇒ Partners select a project
- ⇒ ARISA performs a First Contact Analysis (FCA):
  - Preparing Front-end to parse and analyze project
  - Applying standard metrics
  - Therefore, we would get a copy of the complete project (everything needed to build it, including instructions)
    - Source code
    - Build scripts
    - Libraries
- ⇒ If this works, we can in principle analyze the project

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## Next step

- ⇒ We decide on **model** and **validation** metrics
- ⇒ ARISA installs a QM on partner side, integrated in their build process, for measuring the **model** metrics
  - Automatically on every build the QM measures the new source code (part of Ant script)
- ⇒ The **validation** metrics are measured individually
  - Depends on available information (bug database etc.)
- ⇒ The results are stored in a CM system

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## Maintain QM

- ⇒ ARISA has remote access to the installed QM on partner side
  - It is possible to perform remote updates of the QM
    - Program updates
    - Metric/analysis updates
    - Software Quality Model (SQM) updates
  - To adjust the QM to changes in the build environment
- ⇒ ARISA has access to the installed CM (trivially since Web based)

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## Implied Requirements

- ⇒ Access to full source code, build information and process
- ⇒ Scripted build process, e.g. Ant (desirable)
- ⇒ Stable build environment, class path, folders (desirable)
- ⇒ Remote access to QM installation
  - ssh connection and user account
  - Read/write access to QM installation
  - Read access to build environment (for QM)
- ⇒ Contact person in each project for, e.g., information about changes in build environment

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## Open questions - discussion

➡ Refer to handout

## Presentation & brief discussion of information retrieval

Rüdiger Lincke

ARISA™ - Applied Research in System Analysis

<http://www.arisa.se>

Växjö, 29 August 2007

## Goals of this talk

- ⇒ Short overview about experimental setup as basis for discussion
- ⇒ Discussion of related questions

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## Distinguish

- ⇒ Practical project contributions:
  - Contiguous monitoring of quality using model metrics
  - Allowing trend analysis of quality
  - Goal directed quality improvements
- ⇒ Scientific project contributions:
  - Validation of a Quality Model implemented in the Quality Monitor (model metrics) using accepted quality indicators (validation metrics)
  - Scientific experiment

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## Experimental setup

- ⇒ Measuring software quality in two different ways and finding correlation
  - **Model metrics:** derived from source/binary code using Software Metrics and a Software Quality Model (QM – VizzAnalyzer)
  - **Validation metrics:** derived from bug, test, cost information
- ⇒ Following up on measurements over time and looking back into project history

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## Correlation

- ⇒ of High Software Quality indicators in:
  - **Model Metrics**, e.g. good structure, documentation, etc.
  - **Validation Metrics**, e.g. few bugs, many passed test cases, few failed test cases and low costs etc.
- ⇒ of Low Software Quality indicators in:
  - **Model Metrics**, e.g. bad structure, documentation, etc.
  - **Validation Metrics**, e.g. many bugs, few passed test cases, many failed test cases and high costs etc.

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## Ideal Scenario

- ⇒ Partners record (have recorded) validation metrics
  - bug information (bug tracker)
  - test information (unit and integration test results)
  - cost information (time for a package, how many developers etc.)
- ⇒ Correlated to code (may be in a version control system)

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## Questions - discussion

- ⇒ What kind of information is available?
  - Bugs
  - Test data
  - Development costs
- ⇒ What format has this information?
- ⇒ How can the information be accessed?
- ⇒ Can we restore/derive this information from others?
- ⇒ What relevance does it have for the partners?

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## Challenge

- ⇒ Model metrics measure the quality for program elements having equivalence classes often in logical components (per class, package, sub-system, system)
- ⇒ Validation metrics measure bugs/tests having possibly other equivalence classes (one test case involves many classes and sub-systems)
- ⇒ Creating a relationship between the two

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## Overall

- Is the scenario described possible (requirements)?
- Can we identify a concrete project to start with?

## Legal

- Are we allowed to take the code from the partners?
- Are we allowed to introduce QM in the build environment?
- Are we allowed to extract and use information? What includes usage?
- Are we allowed to get local/remote access to the build environment (QM relevant parts)?

## Technical

- How does the infrastructure look like?
- Which programming language is used?
- How does the build process look like?

## Later for QM

- How frequent are builds?
- How much data are we going to extract?

## Organizational

- How can we get insight in the infrastructure?
- What kind of resources are available on which the QM can be installed/run?
- Are delays in the build process acceptable?
- Can we integrate the run of a QM into the build process?
- Is a contact person available to:
  - Start QM if automatic run is not possible.
  - Inform about problems with the QM
  - Inform about changes in the build process requiring changes in the QM
  - Answer questions about the build processes needed for configuring front-end
  - Enter results of QM in the CM system, if it can not be done automatically
- How can we add content to the CM system?
- What information do we want to store in the CM system (raw data, preprocessed data?)