A Metric Tool Suite for the Evaluation of Software Process Data

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<th>Motivation</th>
<th>Declarative Metric Specifications</th>
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<td><strong>Purpose</strong></td>
<td>Limitations of existing tools</td>
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<td>- Monitor current project states</td>
<td>- Users can only use a fixed set of metrics with slight modifications</td>
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<td>- Identify weaknesses in the development process</td>
<td>- Defining and validating new metrics is time-consuming</td>
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<td>- Assess the result of process changes</td>
<td><strong>Our approach: User-defined metric specifications</strong></td>
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<td><strong>Background</strong></td>
<td>- Declarative description of what should be calculated</td>
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<td>- Change Request and Configuration Management Systems contain valuable information about the history of a process</td>
<td>- Allow to concentrate on the model of the metric, not on the implementation</td>
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<td>- Constraints: Metrics of interest…</td>
<td>- Offer a large flexibility (e.g. mathematical operations, weights, filters, grouping, etc.)</td>
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<td>- depend on organization specific goals</td>
<td>- Simplify development and validation of metrics</td>
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<td>- are retrieved from heterogeneous data sources</td>
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**QMetric Tool Suite**

- The QMetric Tool Suite provides a general infrastructure for the assessment of process quality based on evaluating software repositories
- **Features**
  - Flexible definition of a wide range of metrics based on declarative metric specifications
  - Web-based metric query tool for defining, evaluating and saving of metric queries
  - Graphical wizard for metric definition
  - Definition of organization-specific quality models
  - Automatic evaluation based on a quality model and visualization of the results
  - Interpretation based on empirical data
- **Open source**: www.qmetric.org

**Example Evaluations**

- Percentage of defect reports with the first reaction later than 3 days and a severity of „normal“ or higher

- Percentage of reopened change requests relative to the number of resolved change requests in a time period

**Design Concepts**

- **Separation between Metric Specification and Metric Calculation**
  - Metric specification is independent from how it is calculated by the evaluation algorithm
- **Separation between Metric Calculation and Data Retrieval**
  - Metric Calculator is independent from the way the information is stored and retrieved
- **Extendability of the Metric Calculator**
  - Definition of new weights, events, and operations

**Architecture of the QMetric Tool Suite**

- Web-based metric query tool
- Graphical wizard for metric definition
- Automatic evaluation based on a quality model and visualization of the results
- Interpretation based on empirical data

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