

APPLYING SOFTWARE MODULES FOR TEST METRICS ANALYSIS IN QUALITY ASSURANCE

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The growing complexity of software systems and increasing demands for product quality make the automation of software testing and its evaluation a critical factor for development teams. The aim of this project is to design and implement a software solution that performs quantitative evaluation of tests and the software testing process using modern metrics and visualization tools.

The proposed solution is based on a client-server modular architecture. The backend is implemented in Python and JavaScript/TypeScript, and PostgreSQL is used as the primary database. The system supports integration with CI/CD pipelines (e.g., GitLab CI, Jenkins), which enables continuous collection and analysis of test metrics.

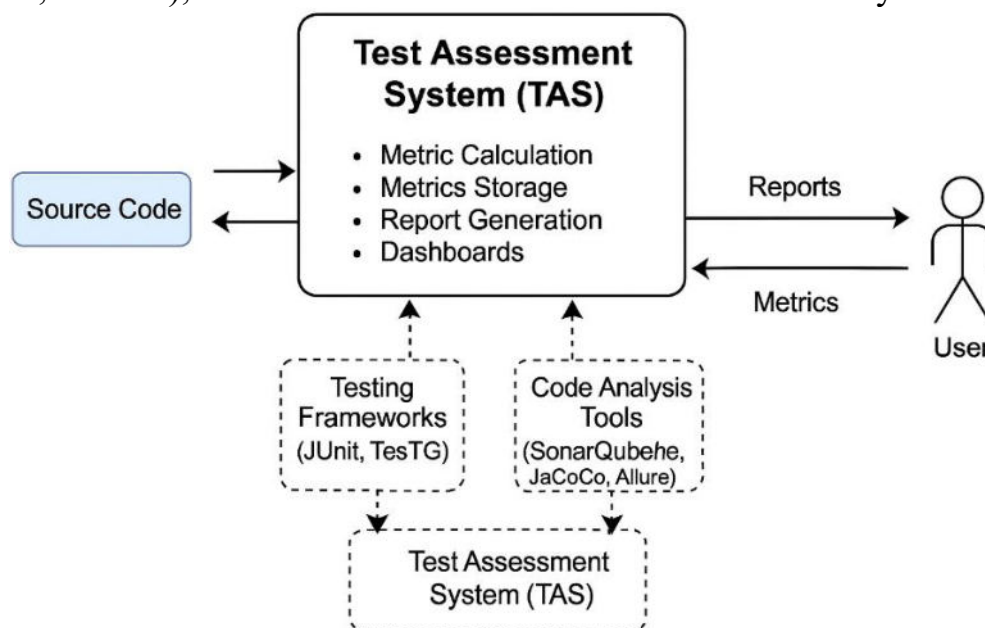


Fig. 1 – General structure and interaction flow of TAS

The core functionality includes:

1. Calculation of test coverage metrics (line, branch, function),
2. Measurement of test execution time and effectiveness,
3. Evaluation of test complexity,
4. Defect tracking and criticality analysis,
5. Generation of detailed visual reports in PDF/Excel formats.

In addition, the system provides customizable metric settings, real-time dashboards, and integration with testing frameworks (JUnit, TestNG) and code analysis tools (e.g., SonarQube, JaCoCo, Allure).

The outcome of this project is a flexible and extensible tool – Test Assessment System (TAS) – that supports engineering teams in making data-driven decisions about test quality, improving the efficiency and transparency of the software testing lifecycle.