Abstract: SoftAnal and SoftRepo are tools developed to provide repository services to a Viennese software house – Software Data Service – that has developed a series of financial service software systems now in the evolution phase. Repository services include automated software measurement, automated code inspection, automated post-documentation, automated generation of test cases, impact analysis, evolution project estimation and software structure visualization. Keywords: Reverse Engineering, Metrics, Impact Analysis, Visualization Techniques

SoftAnal: Source Analysis Tools

SoftAnal is the name for a series of source code analysis tools – CPPAnal, JAVAnal, IDLAnal, XMLAnal and SQLAnal. The software source is analyzed by product, subsystem, component, and module. For each component the following outputs are produced:

- A metric report with 52 size, 8 complexity and 8 quality metrics.
- A deficiency report with all coding convention rule violations
- A comment file with all structural statements and comments
- A set of specification tables containing all features of the code plus Nassi/Sheidlermann diagrams and testcase trees.

The metric reports go to the managers to help them monitor quality and productivity as well as to support them in planning future releases. The deficiency reports go to the programmers to help them in improving their conformance to quality standards. The comment files are stored in the repository to document individual components, modules and classes. The specification tables are used to populate the repository.

The SQL database table descriptions are analyzed by the tool SQLAnal to produce three reports:

- A metric report with 16 size, 5 complexity and 5 quality metrics
- A deficiency report with all data convention rule violations
- A specification table of all keys, indexes, and attributes

The metric report goes to the managers to help in monitoring data quality and quantity.

All of the analysis outputs are stored in a public repository on a central server to which all employees have access. That way everyone can control himself. In the ranking lists, everyone can also see where his results are ranked in terms of size, quality, and complexity. The analysis requires three days to go through all of the source libraries and is repeated every six months in tune with the new releases.

SoftRepo: Repository Management Tools

SoftRepo is the name of the repository management system which populates and processes the repository. Once the repository has been created, it is possible to generate various diagrams, including calling trees, sequence diagrams, class-diagrams, and package diagrams. The user has a wide selection of views on the software, which he may choose from such as how does he get to a particular method or who accesses a particular database. In addition to these graphical representations, there is also an impact analysis. The user may submit some feature of the specification such as a panel, a function, a business rule or a resource that he would like to change. Using this as a starting point, all potentially impacted elements of the specification, the source code and the test documentation are collected via a recursive search algorithm and their size, complexity and quality metrics displayed for the purpose of making a cost estimation on the change request.

The GEOS repository is one of the largest software repositories in Europe. It contains more than 3000 components with 6,900 source modules, 2700 classes, 35,000 functions and 512 database tables with more than 11,000 data attributes. There are 20 relational tables in UDB2 containing some depicting the more than 3 million relationships between these entities.