Re-engineering the blue project using Round-Trip-Engineering

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Abstract


This thesis presents a round-trip-engineering (RTE) process for migrating software applications developed in multiple languages into object-oriented software systems. Using a combination of enhancements in code migration processes and tools, the RTE process relies on forward and reverse engineering operations along with a specialized conversion tool for the purpose of achieving a full code migration and conversion.

A sample application is tested on BLUE financial system software owned by MBRM (MB-Risk Management) a leading financial software company in the UK. An automated process has been derived for code migration from VJ++ (Visual Java), C, and C++ used in the BLUE application to a consistent C# platform. The process is based on the RTE as a methodology for implementing a full migration cycle. The methodology starts by generating a class diagram for the whole application then forwards the class diagram into...
code along with a specialized conversion tool known as JLCA (JAVA Language conversion assistant) which supports the conversion process of the code embedded in the body of the methods within the corresponding class. The JLCA tool compares to many of today’s UML (Unified Modeling Language) CASE (Computer Aided software Engineering) tools and has additional conversion features. The resultant converted code is merged into the extracted code form the RTE process. A number of tools have been tested during the merging process.

The results of conversion showed RTE combined with JLCA in the forward engineering process has an efficiency of about 93% of full code conversion compared to a single RTE conversion. The class design generated during the RTE process is regularly updated during the merging process to reflect any design enhancement. Much effort is being done to achieve 100% code conversion. This will require eliminating all types of errors that occurred in the original code. The objective isn’t only to reflect new changes on the architectural design of the system, but also to minimize compilation errors; allow design enhancements; and provide flexibility, reusability, and ease of maintenance features to the current system. The RTE process has also been tested on another set of 9 sample applications that vary in size and complexity. The results showed an average of 93.87% accuracy percentage similarly to the results of the BLUE application.

Key Words: Round-Trip-Engineering, Unified Modeling, Architectural Design, BLUE