

The Customer

The customer provides mission critical IT infrastructure and services to support the businesses of a diverse and large set of banks. The systems support the full range of modern retail and commercial banking transactions and associated data.

The Problem

The services run in a client-server approach with an IBM (AS/400) platform as server. As was best practice with such systems when they were designed, the server software is written in RPG III and CL. A modern development environment supporting C++ programming is also available.

The systems have proven robust and have scaled with the user base's needs. The operation has amassed considerable knowledge of their users business processes which are encapsulated in a large number of RPG and CL programs. These have proliferated over the years and now number in excess of 25,000 RPG and 10,000 CL programs. The business and software engineering processes in place enable the operation to maintain the existing code base despite its size. However, for many reasons (cost reduction, better support and maintenance amongst others), the company has decided to define and prepare a strategy to convert the RPG and CL programs to C++, with as final aim the migration of all software from the AS/400 to other (more open) platforms.

The key strategic requirements are:

- the conversion should (in principle) be a one-off and generate maintainable C++ code;
- no manual intervention or checking should be necessary; due to the number of programs to be converted the conversion has to be 100% correct;
- the process must be incremental; due to the number of programs to be converted it is clear that the conversion process will be done step-by-step; this implies that all interfaces of the converted programs must be identical to the interfaces of the original programs, so that converted programs can work together with non-converted programs;
- special attention should be given to the database interface; in the first phase still the AS/400 database structure will be followed, in a later phase this database will be replaced by an SQL based database.

The Assignment

ACE was asked to participate in the small development team with special focus on the conversion process and the test environment. The first tasks for the development team were:

- creation of an overall project plan: objectives, constraints, methodology, and the technical consequences of the requirements mentioned earlier for the development and implementation of the system;
- description of the target system: working, testability, maintainability;
- investigation of the existing programs: how often do certain (RPG/CL) language constructs occur, what are the weak (undocumented) spots in the (RPG/CL) language definition, are those constructs used and if so: what is the effect?
- the definition and implementation of the (C++) runtime system to support the RPG and CL data types and operations;
- the definition and implementation of converters (RPG to C++, CL to C++);
- definition and implementation of a testbed, first to test the tools and the runtime, later to be used to test the converted programs.

The ACE role

- ACE participated in creating the overall conversion and migration strategy, and test plan; impact & risk analysis (including skills and training needs); internal mentoring; communications & dissemination;
- ACE defined and implemented the tools to convert the RPG and CL programs to maintainable C++ programs; this conversion also takes care of the DDS (database file and printer file) definitions;

- ACE created a suite of RPG and CL test programs, used to check the conversion process and runtime implementation;
- ACE defined and implemented the automated test set-up: all test programs can be executed automatically with the latest conversion and runtime implementations.

The key expertise that ACE used was its in-depth knowledge and experience with:

- large software products;
- legacy systems;
- (UNIX) software development tools and environments;
- compilers, interfaces and various platform specifications;
- automated test and validation systems.

The Result

The (ongoing) ACE participation in the project helps the customer to prepare and implement a conversion strategy that ensures a modern and maintainable solution for its operational software.