

## **A CASE STUDY OF PLATFORM MIGRATION FROM UNISYS 2200 TO UNIX**

**ALBERTA BLUE CROSS “PORT PROJECT”**: A project by Inglenet Business Solutions, February – November 2001.

### **General Premise**

Most mainframe users face the standard legacy system suite of problems. Applications have grown over many years and provide core functionality that is deeply engrained in the organization and its business processes. But the applications are often poorly documented, batch oriented, inflexible and are hard to adapt to meet changing business needs. They contain a wealth of information that cannot be accessed with modern, every day tools, and are difficult to integrate with new technology and applications. The overall system is inflexible, and needs to be maintained by experienced but expensive staff, many of whom are within early retirement range. It is nearly impossible to find younger staff interested to train or work in this environment.

For Unisys 2200 mainframe users, the future is even more uncertain due to the more arcane nature of the operating systems, and the fact that both operating system and development tools have seen limited improvements in the past decade. In addition, the base of 2200 systems in use is shrinking every year.

Deciding to eliminate a platform does not necessarily mean that one needs to discard what runs on that platform. On the contrary, a proper evaluation of alternatives is required. These alternatives fall roughly into three categories:

1. Completely replace
2. Modernize and Port
3. Port and Modernize

The “completely replace” scenario has great appeal, because of its promise of “everything new and better”. In reality, this most often means implementation of a packaged solution, often combined with complex customization. Unless the package found is a really close fit, it often becomes a path fraught with pitfalls due to lack of transition planning, required corporate culture adjustments and very long project time frames. Funding overruns, as well as scope creep due to incessant demands from corporate stakeholders derail many of these projects. And once up and running, the consulting firms now turn you over to their upgrade practice.

The replace scenario tends to be more successful when applied piecemeal to large mainframe systems. It will then often expose core applications which are still of high value to the organization.

The “modernize and port” scenario recognizes the value of existing application software, and tries to salvage this by either porting portions of code, or by extracting the business rules. Often these are core applications, essential to large numbers of corporate users, which drive critical business processes very satisfactory. The disadvantage of modernizing and porting at the same time is the difficulty in comparing new against old, making testing and acceptance more complex, with scope creep remaining an ever-lurking danger. In addition, the switching of technologies on IT staff and a large number of users needs to be managed carefully.

The “port and modernize” scenario breaks the project into two more distinct, readily identifiable components by separating the port from the modernization. By focusing on the port of valuable application code first, it also forces a number of important technical issues:

- Education and familiarization with the new technology environment
- Documentation of functionality to be salvaged
- Development of test and acceptance methods

Following this approach, one also insures that modernizing happens in the new world, rather than the old. And most often, a platform switch, a database replacement and a new user interface is all that an older application needs to make users more productive.

## **Blue Cross specifics**

Based on the considerations outlined above, Alberta Blue Cross made a strategic decision in the early nineties to redevelop and expand their in-house systems. This was driven by the need for new application functionality and greater flexibility, combined with increasing demands for system access and better performance.

This decision resulted in a major re-development effort, partially in collaboration with other “Blue Cross” organizations, using HP Unix hardware platforms with Oracle Database and Enterprise tools. In addition, significant new applications were developed to support quickly arising initiatives; for example on-line pharmacy claim processing.

Effectively, the process was a redevelop-replacement strategy, which provided new and replacement functionality in the new environment, but left valuable and hard to replace, core applications, on the mainframe. This made the Unisys 2200 mainframe increasingly expensive, because functionality had been removed, but costs stayed the same. The increased need for communications also put an increasing burden on the limited mainframe communications infrastructure, and the ageing hardware became progressively more expensive to maintain.

These core applications functioned well, and replacement would be a lengthy process, because these systems were so integrated with day-to-day business processes. Porting would achieve the removal of the Unisys 2200, providing an immediate, significant cost reduction, and a lowering of operational risk by moving to a more reliable hardware platform. Replacing Unisys RDMS with Oracle would achieve a major step in the direction of overall system integration.

There was no initial anticipation of significant improvements in performance. The main objective of the port project was a no-impact scenario for Blue Cross’ clients, with no disruption of service. To the pleasant surprise of Blue Cross, performance improved significantly, as documented herein on page 5.

## **Case Highlights**

### **Overview**

The application suite to be ported services core Blue Cross business processes, in the areas of Group Enrollment, Alberta Health, Blue Link, Individual Products, Health Spending Account, and others. The systems are tightly integrated with several other newly developed or re-developed systems already running in an Open Systems environment.

This new environment consists of a three-tier architecture, with back-end HP UNIX database servers utilizing Oracle database technology, SUN Solaris UNIX application servers running Mapper-C and COBOL and PC front-ends with MPC emulators providing a character as well as a graphical user interface.

The major deliverables provided to ABC Benefits Corporation (“Blue Cross”) by Inglenet Business Solutions as part of the 2200 legacy application migration project included:

- Port Mapper 2200 to Mapper-C
- Move Mapper code and data
- Adaptation of Mapper code for Oracle SQL
- Implementation consulting for MPC (new emulator)
- MAPPER-C installation
- Port of USC-Cobol to Micro Focus Server Express Cobol
- Resolve syntax issues and file assignment
- RDMS to Oracle SQL changes
- Program execution environment
- Unit test of 20% of code
- ECL to script conversion
- Script submission from Mapper-C
- Data migration
- RDMS to Oracle
- MSAM to C-ISAM
- SDF to Sequential
- Migration of all non-RDMS and non-Mapper data
- Project management and consulting services
- Project management meetings and status reporting
- Unix system set-up
- Source management
- Development environment
- Printing re-evaluation (Xerox DP96 support)
- Training

Inglenet also provided email folder management, a SUN test system, an FTP site for file and data exchange and services to establish an Internet based link between the Inglenet and Blue Cross offices. Initiated in the fall of 2000, the project ran from February 2001 till November 2001.

## **The Process**

The project was broken down into ten (10) sub-sets, representing major application areas, to provide a controlled conversion, test and acceptance process. The first sub-set contained all the base system components and a few programs to test the proper conversion of these.

The sub-setting approach also provided for a method to detect early on any flaws in the conversion process, and for working out the detailed administration steps without being burdened with large volumes of code and data. Administrative procedures were needed for email use (headers, reporting methods, folder use, archiving), network and system access (link set-up, security, user id’s and passwords), FTP site use, delivery procedures, documentation requirements, etc.

A large number of detailed technical steps were worked out in the first months, from conversion parameters to Oracle authentication and UNIX makefile use. The test Oracle and Mapper systems were installed and configured.

Because a lot of the base system functionality was tested with the first sub-set, a substantial volume of test data was required up-front. In a parallel process, the basic method for data conversion, validation and the associated system administration procedures were worked out. With all the procedures worked out, a prepare, convert and test sub-set cycle was achieved. Blue Cross IT staff also redeveloped their MAPPER based batch scheduling system.

## **Technical Highlights**

### **RDMS Adaptation**

The Cobol and Mapper RDMS SQL syntax needed to be adapted for Oracle. Inglenet developed automated tools to achieve the bulk of the adaptation, only requiring “fix-up” editing after that. Blue Cross system administration staff mapped the MAPPER security matrix into Oracle.

### **Instant Development Environment**

Because of its significant experience in porting legacy Cobol code, Inglenet could provide Blue Cross a nearly instant Unix development environment, including source management and compile scripts for the Oracle environment.

### **System Performance**

Initially there had been concern from Blue Cross about performance of the new systems; however, early during initial testing, positive feedback started to come in. Compiles ran in a fraction of the mainframe time, MAPPER response times were very good, and batch programs would execute in significantly shorter time.

Although there was never a formal performance comparison made, the online response times in the new production environment dramatically exceeded expectations. In some circumstances, batch performance improved 20x.

### **Xerox Print Support**

Like with many mainframes, the Xerox DP96 printing system was channel connected to the mainframe. This needed to be replaced with a LAN based TCP/IP interface. The mainframe applications used DJDE and forms overlays to achieve the desired print result.

The solution was the implementation of Xerox's Emtex VIP product, which provides the required print stream transformations, form overlay and print queue management. It was implemented on a MS Windows 2000 platform.

## **Non-technical Highlights**

### **Project Management**

The project was run off a Microsoft Project schedule that was designed and coordinated between Blue Cross and Inglenet. This was augmented with weekly project review meetings with an agenda, and followed up with minutes. Action items and issue lists went out with the minutes.

Both Blue Cross and Inglenet had the same project manager throughout the project. Most meetings were done by conference call, but the Inglenet Project Manager also spent time on-site.

Using a mail distribution list for all project correspondence created a level playing field, with all project participants fully informed. Using mail folders associated with the distribution list to auto-archive all project correspondence created a knowledge base that could simply be queried when needed. At the end of the project the Blue Cross project mail folder contained over 1,700 mail items.

### **End-user Testing Commitment**

The application suite ported touched upon most of Blue Cross' critical business processes and applications that service its major clients. Consequently, governance rules at Blue Cross dictated that testing and acceptance by the end-users of these applications was critical to the success of the project.

Before end-users were involved in testing, all code was unit tested. When successfully completed, the applications were parallel tested under the end-users responsibility.

The Blue Cross end-user community did a splendid job in testing applications on a consistent basis. In addition to ad-hoc data sets, three major mainframe data snap shots were used for various parallel and system tests, an initial one in May, a cut-over test snapshot in early October, and a final acceptance test snapshot in November.

### **Resource Scheduling**

A high level IT resource plan was worked out up front, with Blue Cross assigning a core team of developers, augmented with a project leader and an analyst responsible for the data conversion and validation. In addition Unix, Oracle and networking resources were available when needed. Inglenet assigned, in addition to the Mapper specialist, two code conversion specialists and development resources to assist with bulk code conversion and extraction tools.

### **Support Across the Internet**

At the start of the project, an Internet Virtual Private Network was set up between Blue Cross and Inglenet using a pair of Telus provided Instant Internet 100-S routers. This provided a secure, fully encrypted connection allowing Inglenet staff access to Blue Cross' development systems, and for code and test data transfer. Inglenet also set up a secure Microsoft based VPN services for the MAPPER analyst access to the development systems in Alberta.

These links were instrumental to provide nearly instantaneous support when problems arose. It also made it less important where resources resided, and eliminated the need for Inglenet resources to be on-site all the time, thereby greatly reducing travel and accommodation expenses.

## **Case Conclusions**

### **Planned Results**

Completing the port project resulted in the achievement of a long-term goal for Blue Cross, the consolidation of all applications in a Unix environment. Completing the port project was also achieved with no impact on the Blue Cross clients, and without any disruption in service.

The project case context illustrates that the "port project" itself was one of the many smaller sub-projects into which the achieving of the larger strategic objective was broken down. The port project itself fits the "port and modernize" category. In this category, a well understood process was applied. The project was well defined, quickly broken down in manageable steps, with scope creep kept to a minimum.

The project case also highlights that the value of existing applications can be maintained and improved by 'just porting', because of a better data store, availability of industry standard tools and platforms, greatly improved response times and improved data accessibility.

The latter is illustrated by the fact that the re-development started almost immediately, because most critical production data now resides in Oracle. This allows for the quick elimination of various unload-transfer-reload processes required with the mainframe, because all Oracle data is accessible from other Oracle instances.

The benefit of data accessibility also became immediately evident because of the availability of industry standard reporting tools, and their associated ability to publish this information on WEB sites immediately.

### **Other Results - Performance**

The improvements in overall system performance were very significant, resulting in not only reduced compile times, but also as much shortened batch runs. Initially operators would think a job had failed, because it ran so quickly! Batch jobs that would run for 14 hours now finish in just 40 minutes!

For end-users, screen response times also often dropped to sub-second, resulting in significant improvements in productivity. Users that traditionally had relied on two sessions to do their jobs reverted back to using single sessions. Data entry response times went from being bearable to excellent.

While the destination platform was chosen by Blue Cross in anticipation of providing the same or slightly better response times, there were many such clear indications of consistently exceeding these expectations.

### **Cost Savings**

Blue Cross does not wish to disclose financial information concerning the project; however, they have acknowledged that their project costs were quickly recovered and they continue to enjoy ongoing savings. This does not take into consideration productivity improvements due to better response times.

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