



Sun's Mainframe Rehosting at Transamerica Life Canada

Lessons Learned

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EXECUTIVE SUMMARY

The Sun Microsystems rehosting initiative calls into question the venerable assumption that the cost of migration will inevitably exceed the cost savings for a new server operating environment. A 10-year development effort has led to a rich and growing suite of rehosting services, methods, tools, and operating environments, which Transamerica Life Canada (Transamerica) has used to rapidly rehost a key business system on time and on budget. The rehosted application was put into production without incident. Transamerica estimates a return on the migration investment in six months, driven by an upwards of 50% reduction in day-to-day operating expenses. IDC observed the migration effort and captured a rich set of migration heuristics — the lessons learned.

The analysis phase of the project was dominated by a systematic audit of the legacy system. CICS and COBOL programs, VSAM databases, job control language (JCL), and utility programs such as CoSORT were inventoried in detail. End users were surveyed to identify necessary batch reports and interactive tasks.

The migration phase was guided by prioritization of system functions, accelerated by migration tools, and managed with regular meetings of all stakeholders. Functionality needed for daily and weekly operations was rehosted first, followed by functionality needed on a quarterly and an annual basis. Software tools automatically checked procedures and data. Twice-weekly status meetings enabled Sun and Transamerica to track the project's progress.

The testing phase was systematic and thorough, with dedicated business users running the newly hosted system in parallel with the legacy system. Problem solving focused on technical issues, such as reintegrating the application with other enterprise systems. Functional problems — that is, miscalculations by the application — did not arise.

IDC concludes that IT managers should reexamine assumptions about the cost of rehosting legacy applications. Transamerica's migration project demonstrates that Sun's rehosting methods and tools can reduce risk and cost.

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INTRODUCTION

The migration decision is a perennial challenge for IT planners. Twenty years ago, proprietary operating environments were prevalent and cross-platform tools were rare. IT planners usually concluded that maintaining the status quo was cheaper. To make matters more irritating, the price, performance, and functionality for new platforms and operating environments were often far better than those of the legacy system. Getting from source to target, however, was an unaffordable process. While greenfield or clean-sheet applications demonstrated what IT wanted to do, the transition was usually unaffordable for most legacy systems.

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More than 10 years ago, Sun Microsystems rehosting engineers began addressing this issue by developing tools and environments to accelerate the migration process. Eager to assist its customers in the decision-making process, Sun developed an audit methodology to provide accurate estimates of the time and effort needed for migration projects. To further guarantee reliable transitions of critical business systems and augment customer resources when necessary, Sun developed a specialty consulting practice aimed at providing professional services and training.

In the spring and summer of 2002, IDC studied a migration project undertaken by Transamerica Life Canada (Transamerica). Naj Hirani, Transamerica's vice president, information technology and chief information officer, participated in interviews with IDC and provided access to workplans and staff members who were directly involved in the migration effort. Three IDC white papers detail each phase of the Transamerica migration. The first focused on the analysis process leading to the decision to undertake the migration and the construction of a project plan. The second dissected the migration process and evaluated the use of special tools and environments developed by Sun. The third focused on system testing as the application was readied for production.

IDC also interviewed Sun's migration experts. These individuals provided additional context in which to understand the Transamerica effort. While some members of the Transamerica technical staff were migrating from a mainframe to a Sun Solaris environment for the first time, Sun's staff had collectively worked on hundreds of migration projects.

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This white paper summarizes lessons learned about a migration from a mainframe to a Sun environment by drawing from Transamerica's experience and from the broader experiences of Sun's migration products and services technicians. After describing the presenting problem at Transamerica, we identify the problems we expected to see and then organize the lessons learned in each of the three basic phases — the decision, the migration, and the testing. In addition, we reflect, with the benefit of hindsight, on typical migration problems.

Transamerica Life Canada

Transamerica Life Canada (Transamerica) is a market leader in the sale of life insurance and investment products in Canada.

Transamerica is a member of AEGON, a leading international financial services group. The Group's businesses offer a diverse portfolio of products: principally life insurance, pensions, and related savings and investment products. With close to 1,000 employees across the country, AEGON Canada Inc. is headquartered in Toronto, Ontario, and provides Canadians with wealth management solutions through its companies: Transamerica Life Canada, AEGON Capital Management Inc., AEGON Dealer Services Canada Inc., Money Concepts (Canada) Ltd., and AEGON Fund Management Inc. Through its holdings, AEGON Canada had over \$10 billion in assets under management as of December 31, 2001.

In December 2000, Transamerica and NN Life Insurance Company of Canada (NN) amalgamated and continued to operate as Transamerica Life Canada. NN's IT systems, hosted in a mainframe computing environment, are now under the direction of Naj Hirani, vice president, information technology and chief information officer.

"The business question for us was, Should we host the NN system on an in-house mainframe or migrate the system to our Sun operating environment?"

— Naj Hirani, vice president, information technology and chief information officer, Transamerica

THE PRESENTING PROBLEM

"The IT system that supports NN's [see Transamerica Life Canada sidebar] life insurance and investment products is outsourced and run in a mainframe environment at a United States service provider and is not cost effective to operate," according to Hirani. "Here in Toronto we have a mixed-vendor environment, with about 20% of our business residing on servers supplied by Sun Microsystems and 80% by other suppliers/platforms. The business question for us was, 'Should we host the NN system on an in-house mainframe or migrate the system to our Sun operating environment?' Our analysis indicated that in-house operating costs for Sun systems were lower than [those of] an in-house mainframe, since mainframe platform and skills would need to be acquired."

One of NN's product offerings was of particular concern to Transamerica. The offering is an investment product with an enrollment of approximately 100,000 customers and assets that total just under \$2 billion. To harmonize offerings after the acquisition, Transamerica discontinued the sale of this investment product. At the

same time, the company has an ongoing responsibility to maintain and administer the product for current policyholders and is interested in retaining those policyholders and inviting them to consider other Transamerica products.

The software that administers the investment products supports administrative functions. Policyholders may request that parameters of their investment be changed; for example, they may ask that more money be drawn each month from an annuity or that monies be reallocated among different investment choices. This part of the administrative function is an interactive system used about 12 hours each business day in support of a back-office operations and call center business unit.

A collection of batch operations serves other administrative functions. The investment portfolio price fluctuates with markets, and each day a batch program recalculates this price. Monthly batch processes aggregate information about payments to customers. Quarterly and annual reports summarize the overall financial status of the assets under management.

From a technical perspective, the administrative system is a series of COBOL programs and associated utilities. Some COBOL programs run under CICS, the online transaction processing system (OLTP), to provide interactive OLTP services. All the applications use data stored in a VSAM database. Other software investments include JCL, FOCUS, EASYTRIEVE, and CoSORT programs.

EXPECTED PROBLEMS

The curmudgeonly masters of IT management cynically suggest that "IT systems migrate best on a white board." By that they mean that simple block diagrams, undefined transformational arrows and conduits, and assumptions not enumerated lead to significant risk. In reality, to choose an antithetical saying, the devil is in the details.

Thus, IDC believes that Transamerica's challenges were not writ large; rather, they were in the fine print. IDC watched carefully to see how Transamerica addressed three classic challenges:

- **The 80/80 rule.** The first 80% of a project's milestones consumes 80% of the project budget; the final 20% consumes 80% of the project's budget as well.

Software development projects have a tendency to move smoothly until the endgame, when small accumulated errors and subtle interactions among components frustrate attempts at closure.

- **Murphy's Law.** Anything that can go wrong, will.

Project plans that assume slack time often underestimate the time that it takes to solve unexpected problems.

- **Gordon's Law.** Adapting the user to the software is cheaper than adapting the software to the user.

Transamerica's objective, to produce a system identical in external behavior and performance to the original, may not be the easiest path to success. In many cases, people can accommodate easily to differences in system behavior. Achieving the goal of an exactly equivalent system may be costly in time and programming resources.

LESSONS LEARNED

For each of the three migration phases — decision, migration, and testing — we explain in a nutshell the activities undertaken and summarize with lessons learned.

Decision Phase

Transamerica's primary motivation to migrate the NN administrative system was cost.

Transamerica's primary motivation to migrate the NN administrative system was cost. Because of the high total cost of ownership combined with the currency exchange rates, Transamerica estimated that there was an immediate 50% premium associated with the outsourcing operations being in the United States. Integration of this system with other Transamerica systems was more difficult because it was not hosted in-house. Even though Transamerica had curtailed sales of new NN products, the company expected to attend to existing policyholders for years to come.

If the applications were ported from the mainframe environment to the prevalent Sun server environment, then current staff members would have all the skills necessary to operate the system.

Mainframe In-House Alternative

The internal IT team evaluated the option of bringing the mainframe environment in-house. Analyses showed that in-house operating costs would certainly be lower than those for outsourcing the environment to the U.S. service provider. However, to bring a mainframe environment into the Toronto datacenter would have required additional staff with mainframe skills and experience — and the organization discovered that such employees were relatively hard to find. Meanwhile, if the applications were ported from the mainframe environment to the prevalent Sun server environment, then current staff members would have all the skills necessary to operate the system.

Risks and Costs

The IT team's focus shifted to the risks and costs associated with a migration from the mainframe environment to the Sun operating environment. Could the system be migrated quickly and reliably and at a price that could be recovered due to lower operating costs moving forward? To answer this question, the Transamerica team working with Sun migration specialists began an audit to establish an inventory of the mainframe application's components, to develop a best-practices plan for the migration process, and to estimate a sequence of tasks, an estimate of resources, and a tentative project schedule.

Results of the Audit

Results of the audit, which concluded in March, indicated that the migration option was viable. An inventory identified that there were hundreds of components to be considered. At the same time, Sun's

mainframe rehosting software environment includes tools and features that streamline the migration process. VSAM files, for example, can be rehosted using Sun's VSAM capabilities. Tools such as FOCUS and CoSORT have been ported to and certified in the Sun environment. Existing tools could leverage much of

"There are two primary objectives for what Sun calls the 'source audit,'" said Wayne Worden, rehost center manager for the Transamerica audit. "The first objective is to establish an initial baseline inventory of all source modules sorted by type — CICS COBOL program, batch COBOL program, JCL, and so on. The second objective is to identify those components that are adaptable with existing tools as well as those that will require special attention."

Sun Professional Services technicians audit a project repository built from application source modules supplied by the customer. Sun professionals initially analyze the inventory for completeness and review their findings with the customer. Sun professionals then analyze the source modules to identify areas that require or potentially require customization. The information is collected and presented to the customer in a source audit assessment report. Only active application source modules need to be rehosted. Often, customers eliminate unused or inactive modules as a result of this review. Transamerica eliminated programs, JCL, and utilities as part of this process, reducing the overall project scope to those core elements required for the future.

The analysis results depicted in the source audit assessment report are the foundation for estimating the time, tools, and skills required for the application component migration. Past experience has provided the basis for tool development to identify situations requiring source modification (via an assortment of methods). With an increasing availability of adaptive tools and methodologies, Sun analysts are able to anticipate the toolsets and effort that will be needed to complete the application component migration.

The customer/Sun team can use the results to establish a partnership; together they can determine which company will be responsible for specific tasks by balancing their core competencies with the overall project cost.

"The final result is a budgetary estimate," Worden explained, "because the final decision whether to migrate always depends on the total cost of ownership and expected time frame to capture a complete return on investment. As costs drop, we see more of our customers deciding to migrate.

"Our Transamerica engagement provided a good platform for establishing a productive partnership by providing a common view into the application. The source audit assessment results have

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served as an objective basis for Transamerica to make an informed decision and to prepare for the project."

The Project Plan

"We are confident that we can rehost the mainframe platform to the Sun platform successfully," claimed Hirani, "because we've done it before." Hirani and his colleague Grace Kennedy, assistant vice president, investment products systems, have used Sun's rehosting products in their previous organizations to port financial services applications from the mainframe to the Sun environment. Drawing on its experience, the Transamerica team devised a plan that leveraged in-house resources and expertise complemented by consulting services from Sun and supported by Sun's migration products.

On May 14, the IT team made the final decision and set in motion an aggressive schedule. High points of that plan are as follows:

- Sun consultants took primary responsibility for porting the COBOL programs, while Transamerica focused on the migration of data sets.
- Migration began with system functionality used daily and weekly and then moved systematically to system functionality needed quarterly and annually.
- Migration concluded with all systems in operation by the end of June.
- Testing occurred from July 1 to August 6 with Transamerica at the lead and Sun consultants in reserve to help with problems as needed.
- The new systems were put into production on August 6, which coincided with the termination of outsourcing services from Transamerica's U.S. service provider.

Lessons Learned

1. Transamerica reaffirmed that significant financial benefits could accrue if the migration could be accomplished on time and on budget. The audit process underscored the high cost of processing that Transamerica inherited when acquiring the businesses of NN Life Insurance Company. Generally, merger and acquisition activities are disruptive to IT operations, and this acquisition was not an exception to the rule.
2. A systematic audit of the existing application was a critical step in the planning process. Use of third-party audit services was prudent because in-house staff could be too familiar with the application and overlook areas of potential risk. External specialists guided by a well-developed methodology were able to identify issues quickly and reliably.
3. The audit process signaled that the schedule would be tight. The objective of switching to the newly migrated system in just 68 days was driven by the termination date of the outsourcing agreement and was not a result of unconstrained planning. Knowing that elapsed time would be scarce, Transamerica

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planned accordingly by including overtime in the budget for work outside normal business hours.

4. Sun and Transamerica knew that the outsourcing arrangement brought an additional degree of complexity to the migration process. In addition to the constrained schedule, the IT staff knew that responsiveness from the outsourcing provider was at risk as plans were made to decommission the Transamerica application along with its hardware and its staff.

Migration Phase

"When we planned the migration, we divided the application's online and batch programs into categories that we called Day 1 and Day 2," explained Kennedy. "Day 1 programs are the online programs and the daily batch processes — functionality that we absolutely had to have converted, tested, and live in production on the new Sun platform. Of course, all of the data needed to be in place in the new environment."

Division of Labor

Transamerica divided the migration tasks with Sun mainframe rehosting consultants. Transamerica took primary responsibility for the conversion of data from mainframe VSAM files to a VSAM environment that Sun provides for Solaris, Sun's Unix operating environment. Sun took primary responsibility for converting the code, which consists of COBOL, JCL, and calls to utilities such as CoSORT and EASYTRIEVE.

Communication

"Communication was a high priority for us," Kennedy emphasized. "Transamerica project team members were constantly in communication with Sun advisors and other suppliers to ensure nothing fell through the cracks. Project status meetings were held each week, and project status was documented and issued via written status reports distributed to all players. Additionally, project steering committee meetings were held biweekly, which included IT leadership at Transamerica and key players at Sun." All this communication and reporting was essentially the glue that enabled the synergy and helped solidify the partnership between Transamerica and Sun.

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Sun's Migration Environments and Tools

"Sun is committed to accelerating the migration of enterprise applications from mainframe environments to high-performance Sun servers," said Tony Zigrossi, development manager for Sun's migration products. "Let me propose a simple analogy. When you lift a slice of hot pizza from the pie, there are lots of cheese strands that stretch between your piece and the pie. That's what migration is all about — making all the connections between your application [i.e., your 'slice'] and the new pizza pie."

In 1990, Sun engineers with backgrounds in high-volume transaction processing began constructing the mainframe environments and tools. The objective was to allow mainframe users access to Sun Solaris platforms without the need to reengineer systems. "VSAM files remain VSAM files, COBOL procedures remain COBOL procedures," explained Zigrossi. "And it's an easy migration for online applications because we provide the CICS API."

Sun Mainframe Transaction Processing (MTP) and Sun Mainframe Batch Manager (MBM) are the major environments for hosting mainframe applications on Sun Solaris. While providing these essential components, Sun encourages independent software vendors to compete in providing additional necessary functionality.

For Transamerica, CoSORT provided a necessary sort utility and Maestro was its scheduler. The print spooler was replaced with a simple script. "Our customers typically choose sort, scheduling, and spooling products," Zigrossi explained.

"We have products ready for Transamerica's future interests," said Zigrossi. "On Day 1, Transamerica users will access applications with 3270 emulators running on workstations. Should Transamerica wish to move on to browser-based access, our Pathway product is ready to provide that functionality."

The tactical tools for translating files and auditing COBOL code are collected in a Sun product called Migration Tool Kit (MTK). "MTK comes into play early in the migration process," explained Zigrossi. "MTK was used in the audit process that led to the decision to migrate. When migration begins, we already know which parts of the application will port easily and where our direct attention will be required."

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Environments and Tools

Sun's software environments and tools assisted Transamerica's migration efforts. In addition, independent software vendors (ISVs) worked through the certification process to ensure that their products operated correctly in the Solaris environment and were available and helpful when Transamerica encountered challenges. These environments, tools, and ISVs supported the migration efforts as follows:

- Sun's software environments support the application as it executes and remain in place when the application is put into production. The two primary environments are the Sun Mainframe Transaction Processing (MTP) and Sun Mainframe Batch Manager (MBM).
- Sun's translation tools are useful in reconfiguring existing code and are used only during the migration process. Sun provides a mainframe Migration Tool Kit (MTK), which contains specific tools for importing mainframe files, auditing COBOL code and JCL, and converting tables and data.
- ISVs must certify their products for different operating environments. For the Transamerica migration, products from MicroFocus (COBOL 3GL), IRI Inc. (CoSORT sort utility), and Information Builders (FOCUS 4GL) were on the critical path.

MTP provides the Solaris environment with an OLTP monitor engineered to be compatible with code written for the mainframe OLTP monitor called CICS. MTP supports the application programming interfaces (APIs) of CICS and is responsible for maintaining the integrity of transactions.

MBM is middleware that provides the Solaris environment with a modern way of accomplishing the tasks that JCL has handled in the past. Like JCL, MBM allocates resources, identifies files to read and write, and sets priorities and scheduling for batch files. Tools in the MTK translate JCL into MBM format to recreate batch operations as they were on the mainframe. To modify existing jobs or create new jobs, however, users are provided with a graphical user interface that guides them through the process. In the MBM environment, writing JCL by hand has been eliminated.

The Role of ISVs

"Support from our three ISVs was important to the success of the migration," said Denis Brunke, migration project manager and consultant to Transamerica. "We included these ISVs as members of our migration team, and they eagerly participated and provided the necessary support and assistance. We talked with them before issues arose, which makes efforts later on much more effective."

Typical Issues and the Problem Resolution Process

A migration of this magnitude is certain to pose daily challenges. IDC inquired about the nature of typical problems that Transamerica encountered and how it solved them. The following vignettes address the issues and the problem resolution process:

- "One example of a typical issue was a problem with the edit stream from some of our legacy COBOL code," Brunke explained. "When amounts of money were printed, the integers appeared correctly, but the delimiters [commas and periods] and symbols [dollar and cent signs] did not. We were stumped.

"Issues like this one must be solved by suppliers," concluded Brunke. "Bringing all the players together on the telephone was the first step. It was our good fortune that MicroFocus was willing to escalate the importance of our problems and solve them, usually within 48 hours."

- "We ran into a problem with French characters appearing in our screens," said Brunke. "We did not need to employ French characters as the application was not bilingual. Sun advised a change in environmental variables to align the MBM configuration more precisely to our needs.

"Most of our issues were resolved by adjusting environmental variables," Brunke reflected. "We are working in complex environments with products that are adaptable to different needs. The technology is good. We just needed to set the parameters correctly for our particular needs."

Lessons Learned

1. Transamerica decided to seek a contractor with migration experience to step in as project manager. Generally, unless organizations anticipate a series of migrations and intend to develop in-house expertise in the process, finding an external resource with appropriate experience will be cost effective.
2. The Sun Migration Tool Kit saved significant effort by automating routine tasks. Sun's mainframe environments, MBM and MTP, allowed Transamerica to move existing code and data and run them unchanged. These products provided the necessary technology to make the migration possible.
3. Help from ISVs is likely to be needed, especially for products recently migrated to the Unix environment. Rather than uncovering bugs in ISV products, Transamerica learned that improper configuration was the more common source of problems.
4. Driven by concern for the tight timetable, Transamerica quickly established regular communication and issue tracking systems. For a project of this intensity, twice-weekly meetings were necessary to keep all parties in close communication.

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Testing Phase

In early August, Hirani and Kennedy reported that the new system was in production and that while testing did identify some problems to solve, the migration as a whole continued smoothly as the new system went into daily use.

According to Hirani, communication remained a critical success factor for the migration effort. "In the testing phase," Hirani explained, "our focus shifted. Rather than communication among IT professionals and suppliers that dominated during the migration effort, we shifted attention to our stakeholders within Transamerica. Our executives and users needed to trust that the system was reliable.

"When we first brought up the interactive applications, we demonstrated them to Transamerica's senior executives and that was a very important milestone for our project," Hirani reflected. "Their first reaction was, 'Wow, these screens look just the same!' Our executives were delighted to see that in a short time frame we had actually migrated the system. No changes in screens means that staff who depend on this system can use it without training.

"We had verified a key assumption in our business case, which was that no training would be required. And we brought in a lot of new computing technology at the same time," Hirani continued. "Typically, when systems are refurbished, extensive user training is necessary. In our case, all we had to do was tell users to click a new icon on their electronic desktop."

System Test Planning and Execution

"Testing followed the same strategy that we used when migrating the applications. We tested online and batch programs that would be used on a daily basis first and then moved on to programs run weekly and monthly," said Kennedy. "Our mainframe system was still running during the testing period, and we brought up our new Sun-hosted system in parallel. The primary criterion for a successful test was that the new system behaved identically with the old system."

Transamerica took primary responsibility for system testing. Sun mainframe rehosting consultants remained available and continued to participate in twice-weekly status meetings. Transamerica developed a system to track all problems that emerged during the testing process, to set priorities and identify resources needed to repair each problem, and to retest and certify that problems were solved.

"We had prearranged with our business colleagues that two business analysts and 10 users of the system be freed of everyday responsibilities so that they could focus their attention on testing the new system," explained Kennedy. "These people worked steadily and patiently for a month to make sure that everything was ready for Day 1."

Sun's Mainframe Migration Project Management

"Transamerica took primary responsibility for system testing," said Paula Wood, Sun's project manager for the Transamerica migration since its onset. "But we still stayed close at hand. Our twice-weekly status meetings continued, for example, and we remained ready to assist if Transamerica encountered problems.

"My objective was to be the focal point for Transamerica's communications with Sun," Wood explained. "When issues arose, it was my job to find the right Sun resources and make sure that our people and the Transamerica staff worked together to solve the problem.

"Since I've seen a number of migrations, I was able to recognize familiar issues," Wood added. "For example, Transamerica discovered during the testing period that some ad hoc reports had not been migrated. This is a typical occurrence. It's important to realize that when companies migrate legacy applications, there are ordinarily a lot of batch programs that are left behind."

Obsolete programs accumulate as modifications and enhancements produce new versions over the years. For Transamerica, approximately 4,500 programs were inventoried during the audit process and only about 800 programs were migrated. As a side effect of the migration process, Transamerica has a smaller portfolio of programs to maintain.

"Transamerica's strong sense of urgency was an unusual factor in this migration," observed Wood. "While our customers are always interested in moving through the migration process as quickly as possible, Transamerica's need to end its outsourcing relationship in 68 days presented a harder-than-usual stopping point."

Transamerica subcontracted some migration tasks to Sun engineers, and this approach is midway on a spectrum of service offerings available from Sun. "Sometimes we take primary responsibility for migrating all programs and data, if that strategy is the best fit to our customer's needs," Wood explained. "We also provide technology transfer programs that train our customers, who then take primary responsibility for the migration themselves.

"I enjoyed our intense work with Transamerica," Wood concluded. "We at Sun quickly came to respect their commitment to this project, their careful organizational planning, and their positive problem-solving attitude."

Typical Issues and the Problem Resolution Process

"The majority of our testing raised 'technical' issues, not 'functional' issues," Kennedy reported. "A functional issue would appear as a problem where the results of an interactive query or a batch report were different between the old and new systems, and this type of problem did not occur. A technical issue would be the challenge we faced when integrating the new system with other systems at Transamerica and discovered data formatting variances that needed to be reconciled."

"Interfaces to other systems provided most of our technical challenges," Hirani summarized. "And some of the satellite systems were very important to us. For example, we provide Web browser access to our agents and brokers so that they can obtain information on their clients' accounts. Since that interface is 'customer-facing,' from our point of view, it was a critical system. Our call centers also use this interface, and so it was a 'must have' for Day 1."

"Testing showed that some reports were not being generated," Kennedy reported. "In retrospect, the problem was in the taxonomy of reports we constructed with our business users. While we systematically indexed the recurring daily and weekly reports, we were not able to index all of the ad hoc reports — reports that are triggered by particular events and that are not run on a regular basis." Transamerica anticipated this problem, however, and resources were available to prepare the missing reports during the testing period.

Going Live

"On August 6 the system went into production on schedule," Hirani recalled. "We watched the error logs for any sign of problems and monitored calls to the help desk. Nothing went wrong. Day 1 for the new system was an ordinary day."

The critical milestone was achieved, and system operations have been successfully shifted from an outsourcing provider using mainframe technologies to an in-house system hosted on a partition of a Sun server.

Work continues at Transamerica as applications used less frequently are ported, tested, and put into service. The critical milestone was achieved, and system operations have been successfully shifted from an outsourcing provider using mainframe technologies to an in-house system hosted on a partition of a Sun server.

Lessons Learned

1. Early demonstrations showing that the new system did indeed operate exactly like its predecessor were invaluable in securing endorsements from Transamerica executives and business managers.
2. Budgeting for participation by line-of-business staff members who are freed from everyday work was key to the testing process. Real users will notice aberrant system behavior or, as was the case at Transamerica, realize immediately that some reports are missing.

3. Continuing access to the migration team reduces risks encountered during testing. Transamerica profited by having the same point of contact from Sun's migration services throughout the project, including during the testing phase.
4. When ISVs provide the "same" software running on the mainframe and in Unix environments, it is best to assume that the software is not the same. For this reason, it is crucial for Transamerica to develop and maintain close contact with these ISVs because it is likely to need their help.

20/20 Hindsight

IDC spoke with Hirani and Kennedy after the cutover date and asked them to reflect on the entire project and indicate what they would do differently knowing what they now know. Their final thoughts on the migration effort are as follows:

1. End-of-life issues were particularly time consuming, especially because of the outsourcing relationship. Not only was the outsourcing contract coming to an end, but testing activities at Transamerica were drawing heavily on IT resources. Making sure that proper archives were prepared and that user directories were stored in an accessible manner was a last-minute time sink.
2. When called upon to provide a list of necessary reports, users may fail to include irregular or special-purpose reports. Further, some users may be post-processing data with spreadsheets on their workstations. It is difficult, or perhaps impossible, to be exhaustive in identifying all necessary reports.
3. Training of IT staff should occur as early as possible in the migration process and cannot be overemphasized. As a rule, err on the side of teaching people more than you might expect that they will need to know. And remember that knowledge of a mainframe version of a product is not equivalent to knowledge of its Unix analog.
4. This migration succeeded in producing a new system that could be put into operation by business users with no transitional training. Therefore, the project was a true migration of system behavior and functionality. Significant cost savings accrued because users were able to accomplish tasks immediately.

Schedule, Budget, Operating Costs, and ROI

According to Transamerica staff, the migration project was a success on all metrics. The effort was completed on schedule and on budget.

According to Transamerica staff, the migration project was a success on all metrics. The effort was completed on schedule and on budget. Tactical changes occurred along the way, but the overall plan remained sound throughout the migration process.

Transamerica estimates an upwards of 50% reduction in day-to-day operating costs, compared with the cost of hosting the application with an outsourcing provider. The locus of the savings is in hardware, software, and system maintenance expenses. Other costs, such as printing and storage, remain the same regardless of the migration.

"We expect to recover the cost of migration in approximately six months," Hirani reported. "This is a success story for us on every dimension. The audit process led to an accurate estimate of what needed to be done; Sun technologies accelerated the migration process; testing affirmed the quality of the results; and the project is a financial success as well."

IDC Analysis

Migration is all about mitigating risk and reducing cost. The goal of hosting an existing application on a new computing platform is rarely controversial. Over the years, however, many IT professionals have discovered that the journey can be a harrowing adventure.

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Sun's investment in capturing and codifying experience in the form of environments, tools, and professional services is an impressive response to a formidable challenge. The proof point offered by the Transamerica migration suggests that this investment is paying off and that applications embedded in the COBOL, CICS, and VSAM environments are candidates worth examining.

At the onset of this research, we identified three challenges in our conversation with Transamerica. Now, as we review the project, it appears that the challenges were met as follows:

- The 80/80 rule, which states that accumulated errors and interactions among system components make closure to software projects difficult, did not apply to Transamerica's efforts. Motivated by the tight timeline, Transamerica and Sun stakeholders worked hard and tracked their efforts with great care, which is the most likely explanation of how they were able to hit their milestones.
- Murphy's Law, which states that anything that can go wrong will go wrong, did not apply. Or perhaps Murphy was right but was overwhelmed by Transamerica's aggressive problem resolution mechanisms. All participants agreed that the migration process was one of identifying and solving problems by bringing the right resources to bear.
- Gordon's Law, which states that people are easier to reengineer than systems, also failed to apply. In this case, the salient reason for nearly identical system behavior was that the core logic of the original application remained intact. This migration was not a rewrite guided by specifications; rather, the migration was accomplished by moving existing code into a virtual environment that emulates the mainframe.

Reducing the cost and risk of migration provides Sun Microsystems with an opportunity to expand its customer base using the following powerful value proposition: Keep your legacy applications intact and swap your older server. IDC expects Sun's competitors to respond in the following ways:

- Suppliers of traditional mainframe hardware and operating environments will continue to cut the cost of legacy hardware, which will diminish the financial incentives that support decisions to migrate.
 - Sun's rehosting strategy will thus depend in part on continued price/performance improvements for the Solaris platform. Historically, price/performance improvements have been substantial for Sun's customers. The detailed audit methodology that Sun has developed will certainly aid customers in making an informed decision.
- Other competitors will argue their case for reimplementing legacy applications rather than rehosting them. Rehosting an application does not extend its functionality. Some applications may gain significant value for the enterprise when reengineered (e.g., reworking an inventory management system to integrate with supply chain partners).
 - Sun is addressing the rehosting versus reimplementation challenge in two ways. First, Sun recognizes that rehosting is one of many choices that an IT planner should consider. When the functionality of an IT system no longer serves business needs, then reimplementation should be considered. Second, Sun's rehosting environment enables incremental enhancements to a rehosted application. For example, Sun's Pathway product, which enables Web browser access to rehosted applications, enables companies to modernize user access.
- Sun's mainframe migration methodology is designed for well-bounded applications. Fully integrated applications that span heterogeneous operating environments, where a mainframe is just a part of the workload, will raise the need for increased unit and integration testing and validation.
 - Sun's rehosting environment does integrate with some of the major mainframe connectivity protocols. Message passing with MQ is supported, and a CICS-to-CICS protocol can coordinate transactions processing on a mainframe and a Solaris platform. Networking interfaces to SNA are available. In short, Sun must continue to demonstrate the efficiency of its migration methodology, environments, and tools. IT managers will weigh the question of whether existing application functionality is indeed sufficient for business needs or whether enhancement or reengineering is needed. While many applications are more fully integrated in complex IT environments, Sun is likely to find a large family of bounded mainframe applications suitable for migration.

The migration of a critical business system at Transamerica provides a proof point for the efficacy of Sun Microsystems' mainframe migration products and services.

CONCLUSION

The migration of a critical business system at Transamerica provides a proof point for the efficacy of Sun Microsystems' mainframe migration products and services. IDC's investigation of the Transamerica migration identified a number of lessons learned. Conversations with Sun product designers and service providers enriched our understanding of Sun's commitment to easing the path from the mainframe environment to Sun servers.

IT managers who believe that the cost of migration will inevitably exceed the cost savings for a new server operating environment are encouraged to reexamine this assumption. Systematic analysis of mainframe applications may well identify candidates for migration and help IT managers estimate ROIs that are attractive to IT and business executives.

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