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Bruce Claremont, December 1994

The Flanagan Story: Migration Specialties & Digital Deliver a Successful VAX DIBOL to Alpha DEC C Conversion

J. & D. Flanagan Sales & Distribution Ltd. was able to successfully integrate an Alpha 2100 processor running OpenVMS into their Information Systems (IS) operation and migrate a set of DIBOL applications consisting of over 1,400 modules to DEC C in 10 weeks. The entire project was accomplished without disrupting user services or adversely impacting day-to-day operations in a business which operates 24 hours a day, seven days a week. All of this was accomplished under the administration of an IS department consisting of only two full-time employees through careful planning, judicious use of resources, and employment of Digital Consulting and MSI services.

THE BUSINESS

J. & D. Flanagan Sales & Distribution Ltd. provides wholesale food and related product distribution to restaurants, bakeries, institutions, and other food service customers throughout Ontario, Canada. Current company sales exceed \$75 million annually. Flanagan's 6,000 product lines include fresh produce and dairy products, meat and seafood, grocery and frozen foods, bakery products, paper and maintenance supplies, smallwares, and equipment.

Flanagan operates on a 24 hour, seven-day a week basis from three Ontario locations: Kitchener, Owen Sound, and Sudbury. Flanagan currently has 150,000 square feet of warehouse space, 200 employees, including 50 customer service and sales professionals, and a delivery fleet of 27 vehicles. Flanagan's order processing, sales, accounts, inventory, and delivery systems are completely dependent upon their computer network.

THE PROBLEM

Over the past several years, Flanagan Sales & Distribution has experienced constant growth. During this period of growth, the IS department, managed by Dave Blair, has kept pace by upgrading and adding VAX systems and developing and enhancing their DIBOL software applications. In 1994, Flanagan was again faced with the need for more processing capacity. In addition to this, Flanagan needed to increase its ability to implement application changes quickly and make information more readily available to its sales force and administrative staff in order to retain its competitive edge.

THE SOLUTION

Dave met his processing capacity and performance needs by adding an Alpha 2100 system to his existing VAX 4300. He elected to address the challenge of improving application responsiveness and data availability by migrating Flanagan's existing DIBOL applications to C and installing them on the Alpha system.

The DIBOL applications used by Flanagan to handle their IS needs had been developed over the past 10 years and were tailored to the company's needs. By converting the applications to C, Dave was able to preserve Flanagan's investment in application design and functionality while moving to a more modern development environment and enabling a move to an Alpha processor with faster throughput, greater capacity, and reduced maintenance costs.

FLANAGAN'S INFORMATION TECHNOLOGY ENVIRONMENT

Flanagan believes that the ability to provide valuable service to customers is linked to the use of the latest information technology. Flanagan users and customers have ready access to up-to-date information on orders, invoices, accounts, pricing, and inventory. A fleet of laptops, an extensive telecommunications network, and an in-house programming staff provide flexibility to meet the needs of a growing business.

Customers, sales and service personnel, warehouse management, and administration staff use the Flanagan IS system constantly. The core applications consisted almost entirely of custom DIBOL programs utilizing RMS data files and running under the VMS operating system.

THE CONVERSION PLAN

While researching his options to meet current business demands and provide a viable solution for future growth and expansion, Dave solicited the advice and assistance of Digital Consulting. Digital, in turn, brought in Migration Specialties International (MSI), a Digital partner organization specializing in software migrations, to assist with the migration of the DIBOL applications to the Alpha platform.

Dave planned the incorporation of the Alpha system into Flanagan's IS department in two parallel phases. The Alpha system would be clustered with the existing VAX 4300 and brought on-line while the DIBOL applications were converted to C. The converted code would then be installed on the VAX and Alpha systems, thoroughly tested, and put into production. The project was to be accomplished as quickly as possible to meet Flanagan's immediate needs for greater data capacity and processing speed, and to eliminate a backlog of programming requests.

MSI's DIBOL to C conversion service was chosen for several reasons. It offered a quick and relatively inexpensive way to move existing VAX DIBOL applications to the Alpha system. The service could be quoted on a fixed price basis, eliminating the risk of potential cost overruns in the migration phase of the project. It transitioned Flanagan from a DIBOL to C development environment, a direction Dave had been looking to move for some time, while preserving Flanagan's investment in application design and development. The MSI migration solution did not require the Flanagan IS staff to learn C overnight. It preserved the DIBOL applications as legacy code, allowing Flanagan to continue to maintain the applications in DIBOL for as long as they so desired. Finally, by

converting the existing DIBOL applications to C, Dave hoped to be able to reuse some of the existing modules in a new database system, thus reducing future development time and costs.

THE CONVERSION PROJECT

To meet Flanagan's goals and deliver the conversion in a timely manner, a team was formed consisting of Flanagan, Digital, and MSI personnel. The Flanagan team was headed by Dave Blair and was responsible for providing source code, data files, an acceptance test plan, testing material, and facilities to test the converted applications. Digital's team was headed by Donna Pickel, a Digital Project Manager. Donna had responsibility to oversee the conversion project, supplying any special resources needed to complete the conversion, and providing technical assistance to ensure that the Alpha system was smoothly integrated into the Flanagan IS operation. MSI's team was headed by Bruce Claremont and was responsible for delivering a turnkey migration of Flanagan's DIBOL code and for providing onsite assistance during the installation and acceptance testing of the converted code. The entire project was scheduled to be completed in 10 weeks.

The conversion project kicked off with Flanagan providing all of the DIBOL programs to be converted to MSI. This allowed MSI to immediately begin the conversion process. Concurrently, Flanagan's Alpha system was delivered and installed, and Flanagan and Digital developed a structured Conversion Validation Package (CVP) for remote software testing. The CVP was delivered to MSI four weeks into the project and was used to conduct initial testing on the converted software. Over the next four weeks, MSI continued to convert the DIBOL applications to DEC C, optimize the

converted C code, and verify the converted software using the CVP. At the same time, Flanagan and Digital prepared the Acceptance Test Package (ATP) for the converted software. The ATP was used to validate the converted software onsite at Flanagan. During this period, Dave also completed a one-week course in DEC C.

At the end of eight weeks, the converted code was delivered to Flanagan and installed on their VAX system. The CVP was demonstrated and then Flanagan began acceptance testing on both the VAX and Alpha systems in accordance with the ATP. During the next two weeks, Flanagan conducted acceptance testing while MSI provided onsite conversion discrepancy resolution and Digital provided management services and technical support. At the end of the two-week period, Flanagan had successfully completed the ATP on both the VAX and the Alpha system and accepted the conversion.

During the onsite portion of the project, the compiling and linking associated with the ATP placed a greater than anticipated load on Flanagan's VAX system, interfering with daily user processing. Digital stepped in and resolved this problem by loaning Flanagan a VAX 3100 and clustering it with the Flanagan VAX and Alpha systems. The 3100 was then used for all ATP compiles and links, resolving the overload problem.

THE CONVERSION PROCESS

MSI employed a product known as CBL to carry out the conversion of DIBOL code to DEC C. The CBL product consists of two parts: a code translator and optimizer and a runtime system.

The conversion process consisted of the following steps:

- MSI compile tested and mapped all of the DIBOL code supplied by Flanagan.

Missing modules and compiler problems were noted and resolved before the actual code conversion began.

- An initial pass was run on the DIBOL code to identify and create the application specific header files and optimization files used by DEC C and CBL.
- A second pass was run on the DIBOL code to identify areas where translation errors occurred. When translation errors were identified, the DIBOL code was modified to eliminate the problem. One of the goals of the CBL conversion process is to provide the customer with DIBOL and C code which are functionally identical, allowing the customer the option of continuing code maintenance in DIBOL.
- Once most potential conversion problems had been identified and eliminated, the code was fully converted and the optimization process was begun. The CBL Translator offers several levels of optimization in the resulting C code and MSI's goal was to maximize the code's efficiency as much as possible in the timeframe available.
- After conversion and optimization, the resulting C code was compiled, linked, and tested using the CVP supplied by Flanagan and Digital.
- Once onsite, MSI provided technical support to Flanagan as they ran their ATP.

THE RESULTS

On September 6, 1994, Flanagan signed an agreement with Digital to proceed with the DIBOL to C conversion. On November 16, 1994, Flanagan accepted the converted programs from MSI and Digital. On November 25, 1994, Dave Blair moved the

last user to production using the DEC C programs on the Alpha processor. In a period of 10 weeks, through a judicious use of resources and outside services, Dave Blair was able to move Flanagan's IS services from a VAX VMS environment running VAX DIBOL applications to an Alpha OpenVMS environment running the same applications under DEC C. The conversion was accomplished without disrupting daily operations and without inconvenience to the end-users.

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