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Research

Can Software Clones Enable Mainframe Migrations?

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Vendor solutions that support the migration of applications from the IBM mainframe to distributed platforms use runtime environments to simulate the mainframe platform. Don't forget the operational characteristics of these applications.

WHAT YOU NEED TO KNOW

Mainframe migration solutions that simulate legacy runtime environments minimize the cost and risk of a platform shift. For smaller mainframes, this has been proved. Consider the operational characteristics of a mainframe, which are often overlooked when performing a complete platform migration above 500 million instructions per second.

ANALYSIS

Some companies see mainframes as the workhorses of business computing, while others see them as expensive, rigid and stricken with a declining skills base. Both attitudes can be true. The mainframe is both a hardware and an application concept.

Mainframes are proprietary hardware platforms. This platform is always associated with IBM, Unisys and Bull. But the term "mainframe" also indicates an application architecture or style. Hence, migrating mainframes is a hardware, software and application architecture endeavor.

Migrations can result from changes to a packaged software solution, which often brings a new, distributed operating platform with it. They can also result from a complete redevelopment of an established application. Rewriting mainframe COBOL applications in Java or Visual Basic is feasible with an internal programming staff; however, this is often done in conjunction with an outsourced application development (AD) organization. These solutions have a greater risk and cost more than the new breed of mainframe migration solutions, which try to reduce as much of the change as possible.

IBM Mainframes Under Attack

Most vendors that provide mainframe migrations solutions typically pursue the "gold standard" for mainframe processing — IBM. Unisys and Bull migrations occur less often through solutions that try to simulate that runtime environment. Unisys' ES7000 platform is a possible platform for its MCP/BS2000 migrations, as well as IBM mainframes. In "The Future of the IBM Software Ecosystem," we discuss a categorization of IBM mainframes based on total number of instructions per second (MIPS). When considering application or platform migrations, Gartner divides the IBM mainframe environment into three general segments:

- Fewer than 500 million instructions per second (MIPS)

- 500 to 1,000 MIPS

- More than 1,000 MIPS

IBM mainframe enterprises operating at below 500 MIPS are the most likely to successfully migrate to Windows or Unix platforms. However, this depends heavily on application and environmental complexities. It is difficult for enterprises with mainframe environments of more than 1,000 MIPS to migrate their entire application portfolios from the mainframe in a timely manner. Enterprises with many thousands to tens of thousands of MIPS face even-greater challenges, and we do not expect them to leave this platform. In fact, the number of MIPS in these enterprises is growing rapidly.

Clones to the Rescue

Several vendors provide solutions that simulate the IBM mainframe online and batch environments. One of the leading providers in this area is Micro Focus, a vendor more traditionally associated with COBOL. Micro Focus continues to be a leading COBOL vendor, and

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its migration solution depends on this language. Micro Focus International's "Lift and Shift" strategy uses a runtime environment (Enterprise Server with Mainframe Transaction Option) to simulate the IBM Customer Information Control System (CICS) online TP monitor. IBM mainframe COBOL applications are lifted (as is, in the ideal world) and executed in the Micro Focus runtime.

Micro Focus can simulate CICS calls and database access to Virtual Storage Access Method (VSAM) or DB2. The company has indicated that it will support the execution of batch jobs using a job control language (JCL) in the same runtime environment. Any other mainframe database environment needs to be migrated. Its solution also works for applications written in COBOL. Applications or programs written in any other language need to be migrated to COBOL first, then ported.

Micro Focus believes that these kinds of migrations require a service provider component, and it only offers its technology in conjunction with its service provider partners. In conjunction with Microsoft, it has formed the Mainframe Migration Alliance, a loose consortium of tool and service vendors that support mainframe migrations to the Windows platform. The Micro Focus solution is not limited to IBM mainframes. Through the Micro Focus Mainframe Migration and Transformation Consortium, a mix of technology and service providers, it can migrate Bull, Wang, Unisys, Data General, Fujitsu-Siemens, HP 3000, HP Non-Stop and NCR 9800 mainframes.

Fujitsu Software also provides an IBM mainframe migration solution. Fujitsu Software has developed NetCobol, a variant of COBOL that executes in a Microsoft Windows .NET environment. It has been added into the Visual Studio .NET developer suite as an equal development language to Visual Basic or C#. Organizations can use NetCobol independently of any mainframe migration efforts. However, in addition, Fujitsu offers NeoKicks, also a CICS clone environment, as well as NeoBatch, which is a batch JCL runtime product. Similar to Micro Focus, NeoKicks and NeoBatch enable the porting of IBM mainframe applications to the Windows platform.

Sun Microsystems also offers a mainframe migration system. This solution is based on Sun's acquisition of UniKix from Critical Path in 2001. Although this solution is not completely limited to Sun Solaris environments, Sun is mostly interested in migrating IBM mainframe workloads to its own hardware platform. The product's Mainframe Transaction Processing (MTP) and Mainframe Batch Manager (MBM) provide runtime environments to simulate IBM CICS and batch processing. MTP supports programs written in COBOL, PL/1 and even Java. It supports the concepts of application-owning regions (AORs), terminal-owning regions (TORs) and data-owning regions (DORs), just as IBM CICS does. It can also connect to other CICSs through its intersystem communication capabilities, just as any CICS would do. Sun also provides a migration reference architecture that helps organizations in the planning of the complete platform migration, not just the applications.

Life Expectancy of the Clones

In Gartner's discussions with these migration vendors, including Microsoft, we have come away with a somewhat muted view of their success. Although each vendor can tout case studies demonstrating its success, in total, we can find only several hundred examples of organizations that have used these approaches. A few hundred examples out of an installed base of 15,000 to 20,000 mainframes does not seem to be much of a dent.

The success has been limited not because of a lack of interest, but, rather, because of a lack of focus on the part of these vendors. Their marketing is somewhat unclear and inconsistent. Their sales motivation seems to be limited, and, so far, they have merely taken advantage of the "low-hanging fruit" available in the mainframe migration market. They tout their solutions as applicable at greater MIPS levels (more than 500 MIPS), but have not demonstrated consistent success

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above several hundred MIPS. Some have been successful migrating several hundred MIPS from mainframe installations, albeit in smaller chunks at a time.

Without a greater focus on the operational characteristics of the mainframe, these clones will be limited to the low end of the mainframe installed base. Mainframes have high quality-of-service (QOS) standards, high I/O requirements, significant batch workloads, large tape usage, highly reliable storage environments and high-volume print loads. With the possible exception of Sun, we have not seen the vendors of these clone environments address these operational issues.

These efforts have not gone without response from IBM. With new versions of the z/Series mainframe at a lower total cost of ownership (TCO), the company has tried to reinvigorate the low end of the mainframe market. The IBM Mainframe Charter, which is a public statement of support dealing with the evolution of the mainframe, is trying to address cost, innovation and community on this platform. It is to IBM's advantage to regrow a vibrant software ecosystem around this platform, but IBM has shown great interest in being the sole steward for this platform.

Unless these vendors can provide a compelling solution that addresses the entire hardware and software ecosystem, they will have small-scale success, limited to the low end of the mainframe MIPS range. They need to be able to provide solutions, not only for application migration, but for job scheduling, job control, security, tape management, print management and so forth.

Recreating the Platform

When migrating from a mainframe platform to a Windows or Unix infrastructure, you need to be concerned with more than just the applications. This is why Sun has developed its Mainframe Rehosting Reference Architecture (MFRRA) to support its offering. This reference architecture addresses other software infrastructure issues, including application support (such as sort, testing and change management), job scheduling, security and operations management. These issues are critical to mainframe customers and must be addressed as part of a complete platform migration. We recommend that customers evaluating a mainframe migration option broaden their perspective to include these surrounding application issues.

Even with the advantages offered by these clones, the impact of software change related to recreating the mainframe operational environment is significant. Mainframe 4GLs or reporting products such as CA's CA-Easytrieve might be different. Capacity planning tools (such as RMF) must be replaced. Chargeback and accounting solutions (such as CA JARS) must be rebuilt. Except for DB2 or Software AG's Adabas, database migrations are usually required. Sorting software (such as IBM's DFSORT), a key component of most mainframe batch jobs may change. Most mainframe AD tooling for source change (such as IBM's ISPF), source control (such as CA's Endeavor) and testing products (such as Compuware's Expediter or AbendAid) must be replaced. Job scheduling (such as CA's CA-7) and security products (such as IBM's RACF or CA's TopSecret) must be changed. The software used to replace these functions is different, depending on whether the destination platform is Windows or Unix.

It is possible to recreate many of the operational characteristics of an IBM mainframe; however, do not underestimate the training costs necessary to migrate to the replacement products. This is less of an issue when migrating application workloads than when migrating the entire mainframe platform. Organizations must also be prepared to spend an extensive amount of time upfront evaluating software decisions made decades ago. Functions that have long ago become operational habits must be revisited. The impact on the software is clear; however, the effects on staff, skills and culture are murky. A management commitment to the organizational changes necessary to support a mainframe migration is as important as the hardware/software decisions.

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Acronym Key

AD	application development
AOR	application-owning region
CICS	Customer Information Control System
DOR	data-owning region
JCL	job control language
MBM	Mainframe Batch Manager
MFRRA	Mainframe Rehosting Reference Architecture
MIPS	million instructions per second
MTP	Mainframe Transaction Processing
QOS	quality of service
TCO	total cost of ownership
TOR	terminal-owning region
VSAM	Virtual Storage Access Method

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