Strategies for modernizing VSAM-reliant CICS applications
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Introduction

IT organizations face ongoing pressures to improve customer service, increase profits and provide more timely access to information. Today’s increasingly rapid pace of technology change introduces new challenges for core business applications and requires IT organizations to seek and assess new solutions. Businesses want software that enables growth and the ability to adjust rapidly to the dynamic data environment.

A vast amount of the world’s business-critical data is still stored on mainframes. More than 60 percent of organizations responding to a 2011 Arcati survey said they manage 40 to 80 percent of their enterprise data on the mainframe.¹

To better fulfill business objectives, companies are looking for ways to extend this data and related mainframe applications. This is especially true for CICS®-based applications. IBM calculates that corporations worldwide use CICS applications to handle more than 30 billion transactions each day, and those transactions process $1 trillion dollars’ worth of business each week. Many of these CICS applications rely on VSAM data.

Many organizations include VSAM data and VSAM-reliant CICS applications in their IT portfolios. This technology has long served some companies while others have inherited it through mergers or acquisitions. The data and applications provide crucial business functionality. Yet, batch updates to VSAM files can pose an obstacle to achieving business goals. While batch processing occurs, VSAM files are unavailable or in read-only mode, so the applications that rely on those files are unavailable or show outdated data while batch runs. This becomes a particular challenge for organizations with global operations or for users trying to access applications and current VSAM data during traditional off hours. The problem is further compounded when the business tries to make the VSAM-reliant CICS applications available on the web, or it attempts to incorporate the applications or VSAM data into a web service or service-oriented architecture (SOA) initiative.

The key is determining how to modernize these VSAM-reliant CICS applications to best meet today’s business needs.
Choosing the best modernization path

The term “modernization” has taken on myriad meanings. In this paper, modernization is defined as making some level of change to existing VSAM-reliant CICS applications, to the VSAM data, or to both in order to increase the effectiveness of the business functionality they provide. When evaluating modernization options, many organizations consider these key business factors:

- The company-mandated direction to implement smaller, more manageable projects that can show value and be completed quickly. Business proposals that don’t show short-term value aren’t being approved.
- The business unit’s need to be competitive today and look for creative ways to move forward.
- The ability of the solution to close the gap between the business needs and the functionality of an application or data while continuing to use existing systems and infrastructure to drive efficiencies and cost savings.

There are many options today for modernizing your VSAM-reliant CICS applications, each involving two important aspects: application renewal and data accessibility. This paper focuses on the latter and suggests three basic approaches:

- Only move data to a relational database (RDB) and keep your existing CICS applications.
- Move the data to a new RDB and rearchitect the application.
- Share VSAM data with more systems and processes and extend its usefulness.

The “right” modernization strategy is the one that best suits your needs, goals, timeframe, tolerance for risk, and budget.

Only moving data to an RDB

One approach to modernization entails moving the data sources to an RDB on the mainframe and keeping the existing CICS applications. This approach can provide long-term savings with greater efficiency. And, it makes the data available for data mining and business intelligence initiatives.

While developing new projects in an RDB might make sense, migrating existing data might not. These projects are time-consuming, costly, and complex, and they might ultimately be more expensive than they are worth, depending on your true needs. According to a 2011 white paper on data migration by Bloor Research, only 39 percent of data migration projects were delivered on time and on budget. The average cost budget for a data migration project was $875,000 with overruns averaging an additional $268,000.2
If you choose this approach, you must use tools to reroute the VSAM request to the RDB. In this situation, CICS applications act as though they are still calling the VSAM files. However, this method works without normalizing the data in the RDB, potentially requiring you to write additional applications, which introduces another layer of cost, time, and complexity. Finally, moving the VSAM files to RDB records without rearchitecting the data can introduce substantial performance issues.

**Moving data to a new RDB and rearchitecting the application**

The most extreme of the modernization options is to move the data to an RDB and rearchitect the existing application or rewrite it in a new language like Java®. Many organizations believe that this approach makes the system more user friendly and increases business functionality. In some shops, IT staff have skills that better align with the newer technologies they are considering. However, this approach contains the same time, cost, and complexity of database migration, and it presents similar concerns for the application. You must also face the risks and potential issues arising from all of the interactions between a new data source and a new application.

**Modernization without migrating**

Modernization doesn’t have to mean migrating to a new data source or rearchitecting the application. You can share and extend the VSAM data and VSAM-reliant CICS applications you have. Using this approach, you can easily and quickly make the CICS applications and VSAM data continuously available, so they can be incorporated into business initiatives.

In a recent interview in *Insurance & Technology*, Mark Clark, CIO at Jackson National Life, whose sales have quadrupled in the past eight years, explains his organization’s approach to legacy modernization: “I’ve seen many failed attempts to move to newer technologies just for the sake of technology and finding that those projects go into massive overruns. So rather than worry about the core engine...we...wrap that legacy application with modern technology [which] allows you to access the business processes and functions within the mainframe applications through web services. So you can use the modern technology and still have the benefit of the years of business logic that exists within that legacy application.”

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*Bloor Research*
A variety of products and solutions exist to facilitate this modernization-without-migration approach. Among the leaders in this area are IBM’s VSAM RLS for online CICS availability and H&W’s SYSB-II®, which works by making batch updates look like any other CICS transaction. It takes advantage of CICS’s ability to provide file management, data integrity, inherent reliability, and recovery to batch jobs and VSAM data. CICS applications can run continuously, and the VSAM data is updated all day. This means that VSAM-reliant CICS applications can be made available to the web. They and the VSAM data itself can be integrated into web services and SOA projects without downtime, errors, or users seeing outdated data. This noninvasive, cost-effective approach can be implemented within days or weeks.

**Optimizing crucial business processes cost effectively**

Businesses are seeking the best of both worlds: they want to achieve their business goals, but they are directing IT to use what it has. Budgets have often been frozen. Most shops are judicious about hiring new staff, and existing staff are working more hours just to keep up. With new projects, most businesses shy away from rearchitecting current functionality and want to direct dollars to acquiring new functionality. According to Forrester Research, “Business people tend to focus primarily on new projects and systems – the things they want but don’t yet have. When the subject of spending on existing applications comes up, the business prefers to minimize the cost.”

**Sharing and extending as a solution**

Sharing and extending data is a cost-effective way to make existing VSAM-reliant CICS applications or VSAM data available for other uses. Many businesses have tried to reuse these applications and data, as is, in new projects such as web services. Unfortunately, they didn’t know they would encounter errors until they saw the finished project. These errors can be caused by VSAM files being unavailable, without the businesses realizing it. Sharing and extending alleviates this concern by making VSAM files continuously available. This approach delivers results in days, not years, and these results come in the form of additional hours of processing time, better informed decisions by users, and higher user satisfaction.

Sharing and extending is a cost-effective solution, because it makes use of your current investment in mainframe hardware, software, and people skills. It is a noninvasive approach because you don’t have to change source code of business-critical CICS applications, whose functionality can be fragile.
Ball State University is one organization that has employed a sharing and extending approach to achieve success in making some long-existing COBOL programs available as web services. The IT professionals took CICS command-level programs and service-enabled them by putting wrappers around them and calling them from the client side. Fred Nay, Director of University Computer Services, said that “Prior to [this], we really couldn’t do web services on a 24/7 basis. COBOL apps that were written 20 years ago are being leveraged on the Internet today. I think it’s one of the best ways to leverage that huge base of COBOL that exists on the mainframe.”

The business issues of migrating to an RDB

Business functionality can be put at risk when organizations change CICS applications to accommodate a new data structure, which is why many hesitate to touch the fragile source code. While third-party tools can reroute the VSAM requests to an RDB, organizations that have done this have seen unacceptable performance issues. Data integrity and quality issues can pose another huge hurdle. According to a study Gartner, Inc. performed with its clients, “data quality issues have been known to cause migration project overruns of 25% to more than 100%, depending on their magnitude.”

The costs of migration projects are often underestimated. While you don’t need new operating system hardware and software, you do need database software and hardware, if they aren’t already in place. You would also need third-party tools to reroute the VSAM requests to the RDB. Other costs include the increase in MIPS necessary to accommodate a new database. Additionally, you will most likely need to hire help. Forrester Research notes that “it rarely pays to staff migration projects with internal staff exclusively.”

Ultimately, the most crucial decision about whether to migrate data is determining if it is truly necessary and desirable to do so. According to Gartner, you need to “ensure that the scope of the initiative is limited to data sources that will be required or that add value to the target application or data structures – just because data sources related to the target are available does not mean there is business value in migrating them.”

“Business leaders don’t know or care which platforms run their applications – yet IT made getting off the mainframe a top priority, mistakenly believing that doing this would solve all of its problems.”

Forrester Research
Issues to consider with migrating data and rearchitecting the application

Migrating data and rearchitecting the application, whether on the mainframe platform or off, also solves the problem of batch updates. However, some question the value. Speaking about the topic of migrating off the mainframe platform to a new database and application structure, Forrester Research said “Business leaders don’t know or care which platforms run their applications – yet IT made getting off the mainframe a top priority, mistakenly believing that doing this would solve all of its problems.”

Migrating data and rearchitecting applications is the most costly of the approaches and poses the most risks to business functionality. In addition to the risks to the data integrity when you are migrating data, there are additional risks to the stability of the application when it’s rearchitected. Replacing both data structure and applications further compounds these issues. In this scenario, you must also worry about the interaction between the two, the stability of crucial business processes, and the risks to service-level agreements.

A platform migration effort runs counter to company mandates to “use what you have,” which makes these types of projects difficult to get approved. Commenting on the history of moving both data and applications to a new platform, Forrester Research said “The effort and resources expended on the existing portfolio of applications remain virtually invisible to business people – except for the cost.”

Undertaking such a complex effort is certainly not without its expense. Organizations face extensive costs in building a new environment and porting the business process intact from one environment to another. And, they aren’t truly eliminating the costs of mainframe hardware and software; they are trading those costs on one platform for similar costs on another platform. There is little question that any effort as complex as migrating data, rearchitecting applications, and integrating the two will require employing a team of consultants.

Contemplating time and complexity with modernization

The ability of a solution to accomplish the goal and stay on budget are central considerations with any modernization effort. Time and complexity must also be weighed especially when many organizations are delaying or abandoning projects that can’t show results in the near term.
Sharing and extending VSAM-reliant CICS applications using SYSB-II is a timely, straightforward project with high-value results. SYSB-II can be implemented in a matter of days, not months. Being noninvasive means it is a short-running project with low risk of failure that allows you to start realizing benefits from the first file you choose. Because source code doesn’t change, it is an uncomplicated method to employ with only standard CICS tuning adjustments to make. And, planning efforts are kept to a minimum because you aren’t migrating data or rearchitecting an application.

Data migration is complex and time-intensive

By contrast, projects to migrate data to an RDB can take 2 to 6 years to complete, and you must invest significantly in the planning effort. Bloor Research’s 2011 Data Migration survey, for example, lists among its top “best practices” that data profiling tools be used prior to setting a budget and schedule.\(^\text{10}\) And Gartner recommends: “In total, plan for a minimum of 50% of the effort in analysis and design activities, before any data migration process development occurs.”\(^\text{11}\)

The planning effort is fairly complex. You must analyze the current system, create the new structure, map indexes, and understand business logic and rules. You must then allot time to execute the strategy. Not to be underestimated is the time for iterative testing to verify the data integrity.

Both planning and verification must include the business subject matter experts. Says Gartner: “Organizations where business subject matter experts are not engaged and providing input to determine the rules for mapping, transformation and quality assurance of the data in a migration risk poor quality results, lack of acceptance of the target applications and processes, and potential business disruption.”\(^\text{12}\) Bloor’s 2011 survey adds additional emphasis here, noting that respondents indicated by far the most critical success factor in data migration projects was business engagement: “[I]t is business people that understand customers and products and how they inter-relate, not IT. If relevant personnel are not engaged in ensuring that these relationships are correctly maintained during the migration process then the project may fail.”\(^\text{13}\)

“Plan for a minimum of 50% of the effort in analysis and design activities, before any data migration process development occurs.”

Gartner, Inc.
**Data migration and application rearchitecture together bring exponential complication**

Moving data and rearchitecting the applications is a highly complex project that takes years to complete. As with data migration-only efforts, you must understand the impact to the current environment and the underlying business logic for both the data and the application. You must plan for a data migration, an application rearchitecture, and the integration of the two.

Once planned, you must do the actual work to build the new environment, rearchitect applications, and build the new data structure. You must then port the data and the applications and ensure that both interact correctly to provide the business processes. Testing is exponentially more extensive and complex than testing just for a data migration. Ultimately, you might see performance and scalability issues. According to an Insurance Networking News report covering the Innovation World 2008 conference in Miami, the consensus was that “legacy extension would gain at the expense of costlier system replacements.”

**Conclusion**

Modernizing VSAM data and VSAM-reliant applications allows you to repurpose crucial business processes and data to keep up with the demands of the business. These demands include making business processes available on the web, using the data or functionality in a web service, or using the data or functionality in an SOA initiative. Modernization doesn’t have to mean moving to an RDB or a new database and rearchitecting the applications. It also doesn’t mean you have to strictly “leave it alone” and forego valuable functionality now, even if you plan to move to an RDB eventually. Modernization can mean sharing and extending the data to take advantage of additional functionality right now.

Modernizing by sharing and extending using SYSB-II is the most cost-effective way to enhance the value of critical business processes and data by putting them to new uses, while avoiding errors caused by batch or forcing users to work with outdated data. This approach leverages your current investment in hardware, software, and people skills and can provide results in days. This contrasts with the other approaches that require new infrastructure hardware, software, and consultants, and that won’t produce results until project completion.
Sharing and extending using SYSB-II can be implemented in a timely and nondisruptive manner. Projects take days to complete, not years, and the functionality of often fragile business processes and data are not placed in jeopardy. Migrating to an RDB or migrating and rearchitecting applications makes projects complex and pose risks to data integrity and service-level agreements of the applications. They can take years to implement, assuming the project can be completed at all.

Ultimately, it is important to weigh the risks of a solution versus the benefits. If migrating to an RDB or moving off the mainframe seem like efforts that are too large, complex, and costly to achieve your goals, then consider sharing and extending those applications simply and cost effectively. SYSB-II enables you to achieve your availability goals quickly and simply.

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