How Mainframe Modernization Begins With Application Modernization

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OCTOBER 2023

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Introduction

Enterprises have been running complex applications on mainframes for decades to power their most critical business processes, but over time, they have aimed to enhance accessibility and integration of their applications and data with the rest of their business operations.

- With the advent of the public cloud, the emergence of Agile development processes, the arrival of DevOps and cloud-native approaches, and ongoing shortages of mainframe system programmers, enterprise IT leaders have been looking for new ways to make their mainframe applications more aligned with the dynamic business landscape by integrating the latest technologies and practices.

- These trends and requirements have led enterprise IT leaders to mainframe modernization, where new technologies allow them to continue using mainframes while bringing in modern tools to replatform applications to run on standard hardware that leverages coding languages, processes, and technologies that better align with business requirements. This approach leads to application modernization, offering enterprises the best of both worlds: the reliability of their core mainframes and the flexibility of modern applications on commodity hardware to take advantage of new capabilities.

- OpenText brings to mainframe modernization an established, industry-leading mainframe modernization platform, tools, and expertise that has empowered numerous clients to make the transition to a more dynamic application landscape.

Executive Summary

This research brief dives into how mainframe modernization practices can help enterprises leverage their existing IT assets and make them more agile, cost-effective, and usable long into the future. We discuss application replatforming, how OpenText can help to simplify application complexity, and how enterprises can use adaptable, responsive technology stacks to improve and modernize their operations. We also tackle how mainframe and application modernization can help to futureproof hiring strategies and attract new workers in what is a continuous journey to modernize and improve enterprise IT infrastructure.

Benefits of Application Modernization as Mainframe Modernization

Why are businesses seeking mainframe modernization within their operations?

Often, the pursuit of mainframe modernization is a direct response to companies' need to access, integrate, and leverage critical applications and data running on the mainframe so that they can be adapted to run on completely different platforms, including the public cloud. As public cloud adoption increases, businesses need the flexibility to easily move workloads as needed to the cloud. This functionality allows them to take advantage of the flexibility and speed of deployment inherent in public cloud architectures.

A key driver of mainframe modernization is the need to reuse proven business logic, which is oftentimes the core of many enterprise business processes. Through modernization, existing valuable business logic can be made consumable in different ways and then integrated with cloud-native services, adding considerable flexibility and value. The ability to access, integrate, and leverage applications and data running on the mainframe via other platforms is the new normal when it comes to digital transformation.

Mainframe modernization does not mean replacing business-critical applications. It means bringing in measured improvements and changes that increase an enterprise's

agility and IT responsiveness while meeting business requirements for reliability, availability, serviceability, scalability, and performance. Leveraging existing assets to reuse critical applications and build reliable new architectures on standard hardware can be game-changing for enterprises.

Despite sterling efforts by the mainframe community, many enterprises continue to struggle to find, hire, and retain developers who specialize in mainframe tooling and practices. This struggle has occurred as mainframe and COBOL skills have been giving way to commodity chip architectures, open source, the cloud, and other platforms and systems. These skills gaps are the result of the retirement of mainframe professionals and an increase in computer science students pursuing careers in cloud-native platforms and open source languages.

These transitions have occurred as COBOL training courses remain difficult to find and as non-COBOL developers struggle to maintain and modernize existing COBOL applications. The aim of this brief from The Futurum Group is to look at these issues and share insights and recommendations as enterprises deal with these scenarios and situations within their operations.

What Is Application Modernization?

At its core, application modernization introduces a wide range of innovations to improve the business use of applications. This modernization can include new APIs, process automation features, and other improvements as well as the ability to update legacy business applications to benefit from moving to the cloud and to other cloud-native IT architectures. Application modernization also includes taking advantage of modern integrated development environments (IDEs), continuous integration/continuous delivery (CI/CD), and Agile software development processes.

In the past, application modernization was a serious challenge for enterprises because many mainframe applications are monolithic and unwieldy. They often have decades and millions of lines of code changes, additions, dependencies, custom code, and other traits that make them incredibly difficult to move and run on other platforms without massive overhauls. Companies have large financial and process investments in their mainframe applications, which leaves them rightly cautious about taking steps that diverge from further leveraging those investments.

Today, enterprises have trusted options to help use their core mainframe business applications in new ways and on new platforms with relatively minor changes, that is, without having to entirely rewrite them or devalue their previous investments. This flexibility—being able to continue to use business-critical mainframe applications in new ways without having to start from scratch—gives heavily invested enterprise IT leaders broad new options for gaining functionality and performance from their mainframe platforms. This ability is especially valuable because the success rates for typical "rip out and replace" IT project strategies are often underwhelming, being characterized by cost overruns and project delays.

What Are Signs That Application Modernization Is Needed?

For enterprises using critical mainframe applications, there can be many signs that application modernization is urgently needed. It can occur when software engineers find that they cannot easily and quickly provision an environment to develop and test a new feature or fix for a critical mainframe application. It can also occur when developers and IT leaders want to look toward IT-wide cloud strategies, platform consolidation, data improvements, and other infrastructure modernization pathways that are harder to achieve with mainframe applications. This point is when they need to seek options to find ways of using their mainframe applications, including implementing application modernization methods.

There are other drivers and indicators for the need for application modernization, including new business goals that call for the implementation of cloud-first and cloud-native IT strategies to drive businesses to greater success and flexibility. Changing business strategies that also call for the adoption of Agile development processes and broader innovation using the latest technologies are also motivators for application and mainframe modernization.

For enterprises, this combination of factors—from shortages of skilled mainframe system programmers to the push for using modern tools such as Visual Studio Code and Agile and DevOps practices—is where mainframe modernization quickly makes sense for business-critical operations.

By embracing the continuing use of their mainframes while bringing in modern tools that allow their mainframe applications to use broader languages and commodity chip architecture, enterprise IT leaders have more options. Coupled with a more readily available talent pool of skilled developers in Agile, cloud-first, cloud-native, and other disciplines to fill their needs, enterprises have more job candidates, shorter development schedules, and faster time to market for their IT projects.

Economics also enter the equation when viewing modernization efforts. Finding ways to reduce mainframe costs can push busy enterprise IT teams and their leaders to migrate applications off their mainframes and move them to more economical platforms.

For many enterprises, modernization efforts to provision resources in support of new projects directly on mainframes can often be lengthy, slow, and costly compared with modern and rapid resource provisioning in the cloud. These are the real-world business drivers for pursuing mainframe modernization with OpenText.

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Mainframe Modernization Options

A common method to evaluate and classify IT modernization strategies uses what is known as the Five Rs: replatform, refactor, rearchitect, rebuild, and replace. By using these steps, enterprises have a sensible path toward explaining and choosing their modernization options. Busy enterprises should use this Five Rs framework when evaluating mainframe and application modernization needs.

Mainframe modernization is increasingly popular with enterprise customers and their systems integrators and cloud service providers because it allows businesses to gain new value and functionality from their longtime IT investments.

A wide range of mainframe modernization strategies exist, including rewriting established legacy applications into new languages such as Java or .NET using manual or automated tools. The problem is that it is an incredibly complex and often failure-prone process that can haunt and stymie enterprise business processes for years. For example, TSB Bank in the UK attempted a modernization project in 2018 that was botched when system upgrades were unleashed at the same time as over one billion customer records were being migrated. The resulting disruption led to millions of account holders being locked out of their bank accounts and a $60.8 million fine from British regulators.

Enterprises can also buy new commercial off-the-shelf (COTS) applications that incorporate new technologies to replace their mainframe applications. The problem with this strategy is that enterprises can find that critically needed functions are missing and that data compatibility issues surface along with other problems as they move to all-new applications after decades of using legacy apps. These approaches also do not leverage the specific business logic that has been coded into mission-critical systems over the decades.

The most pragmatic and flexible approach to mainframe modernization is application modernization using replatforming, which moves applications from the mainframe over to commodity chip architectures on premises or using the public cloud. This choice can give enterprises a workable path to modernizing their infrastructure and gaining the most useful benefits of the latest technologies with fewer technical challenges and faster results. By replatforming, a mainframe application's core IP remains largely intact, which reduces risks to enterprises compared with full application rewrites while providing a faster time to get the new application running well for the business.

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Introducing Smarter Modernization by OpenText

As The Futurum Group evaluated the issues of mainframe modernization and application modernization, one vendor stood out in helping enterprises traverse their decisions around taking this path to modernizing and improving their mainframe infrastructures. Micro Focus, which was acquired by OpenText in 2023, has been specializing in the application modernization marketplace for several decades, helping customers on a continuous journey toward improving the use and flexibility of their core business applications across their operations.

One of the main values from OpenText is that the company provides tools and platforms to help enterprises meet their application modernization needs more quickly, at lower risk, and with lower costs by moving their monolithic applications to more cloud-native platforms without having to rewrite or rebuild them from scratch. OpenText does so by modernizing the infrastructure where the application runs, and then modernizing the development processes they use by for the purpose of delivering new capabilities within the code. The changes to the applications are minimized while the impacts and benefits are maximized by moving these legacy mainframe applications to new locations in the cloud,

commodity chip architecture platforms, and containers, or even from UNIX to Linux. The code is not translated or converted to any other language. It remains as COBOL, PL/I, Job Control Language (JCL), or other mainframe code, but it runs effortlessly on the new platform.

Using OpenText modernization technology, enterprises can take a standard COBOL application code and have plenty of options to run it elsewhere. They can compile it directly to Java byte code, run it inside a container, or even run it using PostgreSQL rather than DB2. Enterprises can also take their COBOL applications and add in modern development tools, languages, and protocols to give their mainframe applications new flexibility, capabilities, and scalability. OpenText can do this with mainframe applications, leaving their integral code largely untouched while moving them to new platforms where they can be more agile and feature rich. This process uses helpful tools that identify business logic within the applications while working to decouple it for use in a new platform. OpenText also provides essential modernization analysis tools to allow customers to see what they have and deep documentation relating to code paths, complexity metrics, data flow, third-party technologies, and more.

Performing an application assessment using these tools is critically important and helps to guide and deliver an enterprise's roadmap for modernization. One customer, AG, which is Belgium's largest insurance company, brought OpenText in to help modernize its mainframe infrastructure and bring agility and flexibility to its IT systems for its three million insurance customers. With the help of OpenText, AG replatformed 80 million lines of mainframe COBOL code as part of the project, according to Philippe Van Belle, the chief information and technology officer for AG.

Another customer, US-based FIS, which provides technology solutions for merchants, banks, and capital markets, brought in OpenText to help modernize its critical homegrown InvestOne COBOL application, which was first developed in the 1980s. The InvestOne application had migrated over time to UNIX, but FIS still wanted to get more performance and flexibility out of it in recent years. Instead of rewriting InvestOne from scratch, FIS used OpenText modernization technology to solve the problems, explained Chuck Wainscott, the director of architecture with FIS' asset management group.

> "OpenText enabled us to build and unify a new data-driven backbone for our company through which we leverage new technologies, such as containerization and APIs to open ourselves safely to our business and technology partners' systems while continuing our own technological evolution," said Van Belle. "The whole operation has resulted in an innovative and open environment that enables a new data-driven strategy, as well as our company enjoying a lower total cost of ownership now and far into the future."

> "We chose Micro Focus Visual COBOL by OpenText, which includes a JVM code generator that can compile COBOL applications directly to Java byte code," said Wainscott. "This gave us the opportunity to fully reuse our valuable COBOL code without any risk and integrate it with the rest of our Java architecture. The new architecture now allows us to easily scale up InvestOne to process increased workload just by spinning up a new container. The modernization journey we are on with OpenText is amazing."

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Mainframe Application Criteria for Decision-Making

So how can enterprises use OpenText modernization technology and tools within their own operations?
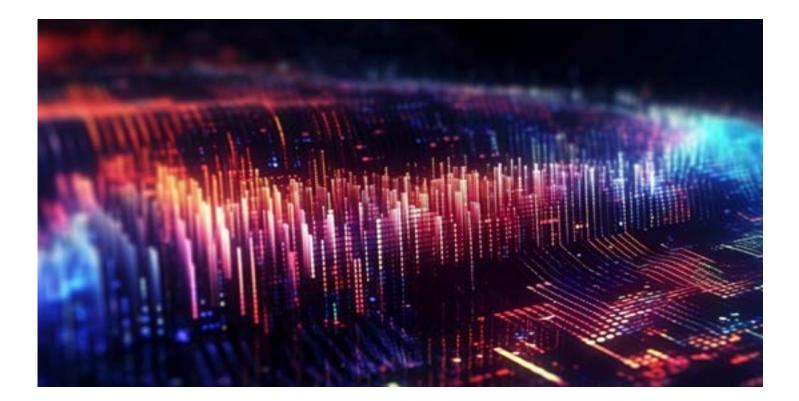
They can start by performing detailed, step-by-step analysis of their mainframe applications using portfolio analysis tools to determine which applications they want to include with their mainframe modernization and application modernization paths. Such tools allow enterprises to remove redundant code and document their systems.

The application analysis must look at whether they represent core business IP and logic or if they are ancillary applications that should remain as is or become candidates for replacement by a COTS solution. If they are core IP applications, replacement with COTS applications is likely unsuitable due to COTS tools' inability to meet existing business rules and goals without expensive and time-consuming customizations.

Application rewriting using manual or automated tools is another option, but that is only workable for small-scale mainframe applications that can be isolated from the rest

of an enterprise's application portfolio for reliability reasons. When it comes to larger applications, rewriting strategies typically fail due to their enormous complexity or suffer huge delays and cost overruns. Rewriting mainframe applications often sounds like a good idea at the start, but the resulting frustrations quickly overshadow any perceived gains. The IT landscape is littered with disaster stories such as the TSB Bank debacle about enterprise attempts to rewrite and modernize mainframe applications from within.

Organizations also must look at application modernization projects with other criteria to help target their business goals. This process includes reviewing non-functional requirements (NFRs) they are targeting, including performance, availability, scalability, security, and environmental concerns, as well as how long the project will take to complete. Impacts on the organization, risks associated with the projects, and the costs of the modernizations must also be evaluated to ensure success for the initiatives.

![The Futurum Group logo]

How OpenText Delivers Application Modernization

Instead of attempting to rewrite the challenging, complex, and sinewy code of a custom, monolithic mainframe application or replacing it with a new commercial off-the-shelf (COTS)product, OpenText offers an alternative strategy that takes an innovative and flexible tack. OpenText modernization technology allows applications to be decoupled from their hardware platforms and reused elsewhere, including in containers and the cloud.

Using Micro FocusTM Enterprise Suite by OpenText, IT leaders can decouple mainframe applications from mainframe hardware and then replatform their critical mainframe applications while maintaining the original business rules and subsystem compatibilities that were made when the applications were created.

Alternative strategies that involve rewriting or replacing COBOL code are often pursued when enterprises desire to modernize their mainframe applications and no longer believe that COBOL can fulfill their future state requirements. They are also considered when enterprises realize that they cannot reuse their COBOL code on other platforms because it is coupled to mainframe hardware and software systems. OpenText can perform this decoupling of mainframe applications from mainframe hardware – which enables them to be run on other platforms, including the cloud – due

to the built-in compatibility of mainframe API and subsystem support within Micro FocusTM Enterprise Suite by OpenText. This functionality has been a core strength for over 40 years, which has resulted in constant maturity and compatibility for mainframe applications.

Micro FocusTM Performance and Availability Cluster (PAC) technology by OpenText scales the application horizontally across commodity cloud platforms to provide scalable, fault-tolerant application architecture within an application's replatformed location, giving it a new home where further modernization can be accomplished.

OpenText delivers a holistic approach to application modernization across three critical pillars: application, process, and infrastructure. The Futurum Group believes that this robust strategy for enterprises gives them trusted pathways for improving applications using process automation and other steps that add value and performance while tapping into OpenText's rapid analysis, agile development, continuous testing, and faster application delivery to modernize their technology stacks. OpenText's infrastructure pillar looks at application modernization by ensuring greater connectivity, flexibility, and security to allow enterprises to deploy applications across a variety of hosts, servers, cloud, and containers.

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Conclusions

In the digital era where the pace of innovation, performance, and scalability stand as the cornerstones of competitive advantage, organizations that still rely on mainframe systems face a litany of challenges. These challenges range from the escalating costs of maintenance to increasing skills shortages to the inability to seamlessly integrate with newer, cloud-native services and crucially embrace the transformational power of generative AI. This brief articulates the multifaceted benefits of application modernization within a mainframe environment, providing a comprehensive roadmap for stakeholders contemplating this transition.

- As enterprise mainframe customers evaluate their options in mainframe modernization and application modernization, we at The Futurum Group believe that OpenText, with more than 1,000 successfully completed customer modernization projects, is worthy of consideration and can play an important role in helping mainframe users to ease these transitions.

- OpenText helps to scope and plan these projects starting with rapid assessments that collect and analyze information about the applications, including source code and functional requirements and NFRs. The assessments are then used to create detailed reports on application compatibility, risk areas, and third-party technologies and their equivalence in the target platform. These deep insights deliver actionable and useful details to enterprise IT leaders that allow them to make the best technology decisions for their companies.

- Mainframe modernization is a complex and challenging process, but it can benefit organizations significantly. By carefully considering the NFRs, drivers, benefits, and options for mainframe modernization, organizations can choose the right approach for their specific needs.

- Ultimately, mainframe modernization and application modernization are continuous journeys for enterprise IT departments, not just destinations that are reached after following a list of steps. These modernizations start from a legacy platform and encompass development, integrating applications, building teams with the right skill sets, adopting new technologies, driving business value, and adapting to evolving requirements that take enterprises in new directions in their roadmaps to success.

- There are many ways for enterprises to reach their application modernization goals. Important advice we can provide is for mainframe users to jump in and get started. Mainframe and application modernization initiatives from OpenText help companies make their IT infrastructure more flexible, powerful, and capable of dealing with the technology challenges of the future.

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