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Why mainframe modernization, why now?

Discover the power of a comprehensive cloud migration strategy for innovation and agility

Mainframe modernization—investing in migrating core business applications to a more technologically advanced information technology (IT) architecture such as the cloud—is really no longer optional; it's essential. A rapidly evolving technology landscape is prompting many organizations to digitally transform to increase agility, harness the power of modern technologies, and enhance cybersecurity and resiliency. However, that transformation can be nearly impossible without a holistic mainframe modernization strategy. In order to improve responsiveness to dynamic markets, businesses must innovate to unlock the potential of their legacy systems.

The modernization imperative

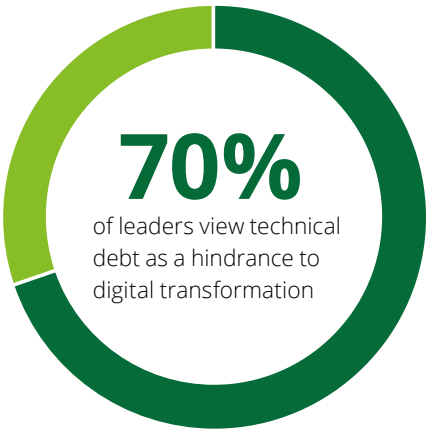
For more than 50 years, mainframe systems have been the technological backbone for most large organizations, offering unmatched reliability and processing power to perform critical operations. However, over the past decade, foundational market, technical, and talent shifts have occurred that are now compelling organizations to modernize their mainframe systems, whether that's to the cloud or to another technology environment.

Consumer expectations such as real-time transactions, personalization, mobile access, and Internet of Things are obliging organizations to adopt new technologies like artificial intelligence (AI), cloud, and mobile/edge computing. Mainframe environments often can't adequately support these new technologies, and that can hobble digital and business transformation efforts.

Additionally, continued reliance on mainframes has led to significant technical debt, which arises when ad hoc changes are made, technical bandages are applied, or new technology is layered over an existing solution. Over time, the accrual of technical debt can negatively affect cybersecurity, operational efficiency, and innovation.

In fact, recent Deloitte research reveals that 70% of technology leaders view technical debt as a hindrance to their organization's ability to digitally transform.[1] And that tech debt is a growing problem: In 2022, the cost of technical debt grew to an estimated $1.5 trillion in the United States alone.[2] Its impact is only exacerbated by an aging talent pool, declining vendor support, and product obsolescence.

The result? Without modernizing their mainframe business applications, it will become increasingly, perhaps disastrously, difficult for most organizations to stay competitive, much less innovate and thrive.



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~$1.5T

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Modernization can have big payoffs

The benefits of technology modernization are substantial, and they significantly improve operational efficiency, agility, and competitiveness.

Reduced costs: Modernized systems can reduce maintenance and operational costs by using more efficient infrastructure and eliminating the need for specialized—and increasingly rare—mainframe skills.

Improved performance: Adopting modern development practices like Agile and DevOps improves scalability, performance, and reliability, which can result in faster product delivery cycles and reduced system downtime.

Ability to leverage advanced technology: Applications built on modern IT architectures integrate more easily with the cloud and advanced technologies like AI, enhancing operational efficiency and security, while improving regulatory compliance.

Increased innovation potential: Modern technologies can provide real-time data access and advanced analytics for better business decisions, improve customer satisfaction with intuitive interfaces, and free up resources for innovation.

Improved sustainability: Modern IT architectures promote sustainability through energy efficiency, virtualization, and cloud technologies, thereby reducing carbon footprints.

Approaches to mainframe modernization—strategy and tactics

The migration strategies that organizations employ to reap these benefits are dependent on their specific goals and environment. Some organizations take a tech-led approach to modernization. This approach involves using automated tools to modernize an application to achieve the same functionality as on the mainframe.

One potential benefit of this approach is that it streamlines testing because it focuses on checking for equivalence to current functionality so that test cases can be generated without having to rely on "mainframe wizards" with institutional knowledge. Another potential benefit of this approach is that organizations can ensure that they preserve current capabilities and embedded intellectual property, but with flexible timelines and prioritized modernization projects that deliver higher confidence and lower risk.

There's also a business-driven approach in which organizations can select multiple business capabilities to modernize and identify which business processes and data touch those capabilities. They can then trace those processes and data across systems, leveraging automation tools, to identify and understand dependencies. This approach can also lower risks because it mitigates complexity compared to manual approaches, and it promotes better alignment with business objectives.

While migration strategies may differ, there are common tactical activities that typically characterize a successful modernization initiative:

Perform discovery: Inventory current systems and identify all applications and dependencies to transform the organization's "cyclomatically complex black box" into a well-documented and definitive component list.

Develop a business case and roadmap: Develop a strategic plan that outlines the initiative, which IT architectures will be used—cloud or other modern architectures—and emphasizes maximizing return on investment by prioritizing the modernization of applications that offer the most financial and operational benefits. The plan should also provide a clear understanding of the total cost of ownership.

Create AI-enabled documentation: Use AI-enabled tools to translate complex technical details and legacy code, like COBOL, into English, making it easier to extract and document business rules and trace data and logic through their corresponding systems as if the application documentation had been maintained over decades of changes.

Automate intellectual property (IP) extraction and decompose the monolith: Automate processes to extract IP from mainframe code and break down monolithic applications into smaller services, enabling the construction of a scalable, flexible future-state architecture.

Use a modernization management control center: Use advanced visualization tools to monitor and manage the modernization process in real time, ensuring transparency and informed decision-making throughout the transformation journey. Post transformation, use the control center to monitor ongoing modernization and operations activities.

Two caveats

No matter the chosen modernization approach, the use of automation should be foundational to how organizations think about not just modernization, but about how they can innovate while tailoring their modernization efforts to their business needs based on their industry and sector.

Also, to get started on the right path, it's essential to establish credibility from the outset, understand the legacy technology's complexity, and clearly prioritize the modernization initiative to business goals and technical capabilities.

Challenges and mitigation strategies for mainframe modernization

Mainframe modernization initiatives don't come without significant challenges. Effectively addressing these challenges is crucial to successful implementation and an improved likelihood of reaping benefits from modernization.

Challenges

Complexity: Modernizing mainframe systems can be challenging because they are complex and deeply embedded in the organization. Without a clear understanding of mainframe systems, planning and execution can be difficult, leading to unforeseen issues and delays.

Fear of business disruption: Organizations may hesitate to modernize because of fear of operational disruptions. Mainframes typically support the most critical business functions, so disruption can have serious consequences, both in time and costs.

Budget constraints: Finding (and keeping) adequate funding for modernization initiatives can be difficult, especially in an uncertain economic climate. However, budgetary issues can reduce the modernization scope, which could potentially diminish the initiative's effectiveness.

Talent: Finding the right talent to adequately staff a modernization initiative can be difficult due to an aging mainframe workforce and an ongoing shortage of workers skilled in both mainframe and modern technologies like the cloud.

Mitigation strategies

Stay strategic: Engage stakeholders at all levels throughout the process and ensure clear, constant communication about benefits and progress. Business and technology stakeholders must also be aligned on strategy as organizations transform the heart of the business and technology foundation.

Prioritize: Adopt a measured, targeted approach to modernization to manage risk and minimize disruption. Every organization has a different starting point, and it's likely different stakeholders within the organization will as well. So, it's essential to discuss and prioritize which business functions and corresponding applications should be modernized first with the organization's mission in mind.

Rely on automation: Use automation to alleviate the need for legacy skills with business domain knowledge that are in short supply and high demand, reduce costs, and shorten the modernization timeline.

Mainframe modernization in action

Mainframe modernization can deliver high-impact results—from improved operational efficiency, to significant cost avoidance and/or savings, to improved customer experiences.

A leading US-based global financial services firm

The bank faced legacy technology hurdles to drive growth and provide superior experiences to its high-net-worth clients. It was also having difficulty in addressing talent risk and institutional knowledge. To overcome these challenges, the bank needed to drastically modernize its technology, including maintaining and moving off the mainframe, which would afford significant autonomy, innovation (FinOps, GenAI, etc.), speed to market, and enablement of its strategic priorities. To assess potential modernization benefits, the bank performed a detailed analysis of current spend on its mainframe, then benchmarked those costs to potential modernization costs. The analysis showed that a business value-based approach to mainframe modernization could lead to reducing mainframe talent dependency by approximately 75% and decrease time to market by about 40% overall via improved developer productivity with modern engineering practices by 2028.

Modernizing the child support system for the state of Utah

The state of Utah undertook an initiative to modernize its mainframe-based ORSIS Child Support system that was deployed on a mainframe platform using COBOL, which presented innovation, scalability, staffing, and other challenges. Rewriting the application would have cost US$200 million, required federal agency certification, and added five to 10 years to the modernization process.

Through automated code conversion, however, the state successfully transferred 2.5 million lines of COBOL, 250 screens, 400 batch jobs, and 2 TB of data to the cloud. The cloud migration benefits were clear: The flexibility and scalability provided by a more modern architecture gave it the ability to process 600,000 transactions per day for the thousands of families who depend on child support in Utah.

Generating buy-in for mainframe modernization

The benefits of modernization are clear, but gaining stakeholder buy-in requires building a strong business case. Stakeholders should trust the technology, so it's essential to communicate effectively and be transparent throughout the effort.

Additionally, an emphasis on cost savings can justify initial investments, but ongoing support will require continued alignment with business strategies and goals. Finally, it's crucial to address technology needs and reduce technical debt, but continued leadership backing requires a clear roadmap that accounts for technical complexities while having achievable goals, showing quick wins, and building on successes.

Modernize to thrive

Why mainframe modernization, and why now? Modernization isn't simply a technical enhancement; it's a strategic imperative. By adopting a tailored approach that aligns with business strategies and sector demands, organizations can modernize efficiently and effectively. Failure to modernize, however, has potential risks that could leave organizations unable to leverage modern technologies to innovate and provide better customer experiences. It can also put them at potential risk of falling behind more agile competitors. In short, to thrive in an increasingly competitive market, modernization isn't an option; it's a necessity.

Get in touch

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Endnotes

1. Mike Bechtel and Bill Briggs (executive eds.), *Tech Trends 2024*, Deloitte Insights, 2023.
2. Stefan Van Der Zijden et al., *How to prioritize and sell technical debt remediation*, Gartner Research, September 27, 2023; Adam Tornhill, *Business costs of technical debt*, CodeScene, 2023.

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