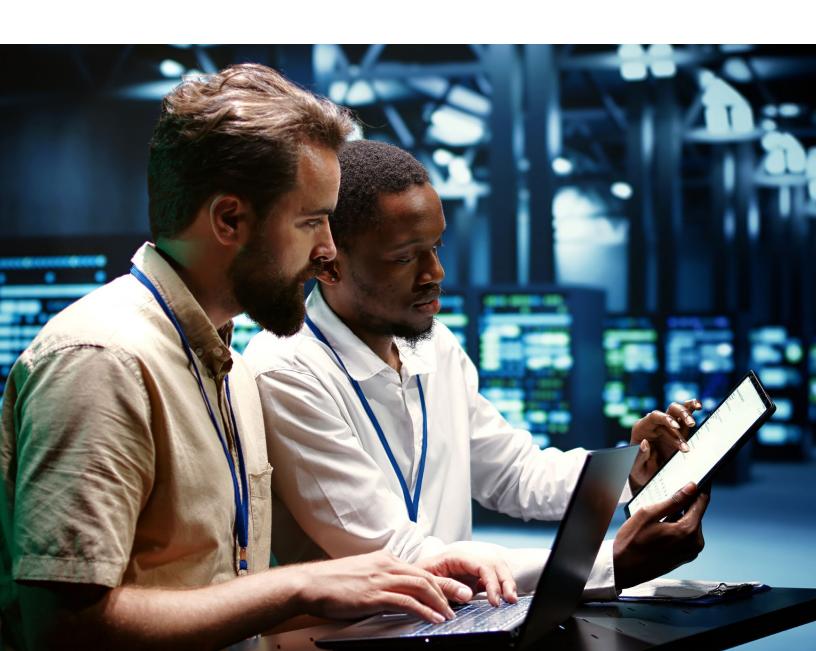
kyndryl.

Kyndryl's 2024 State of Mainframe Modernization Survey Report



Contents

- 2 Executive summary
- 3 Five major takeaways
- Interest in using generative AI on the mainframe is exploding
- Mainframes are the cornerstone of a hybrid IT strategy
- 7 Security is the number one driver of mainframe modernization investment

- 8 The skills gap remains an inhibitor
- 9 Enterprise-wide observability is a must-have
- Occurrence of the conclusion
- 1 About the survey

Executive summary

As technological and business environments become more complex, technology leaders are under increasing pressure. Economic conditions, including lower IT spend, inflation and an uncertain macroeconomic climate, combined with competitive tensions and technological changes, are urging enterprises to seek new value from their technology investments. Cyberattacks are becoming more frequent and more sophisticated. Regulatory pressures demand ever more from security and compliance teams.

Yet the potential for greater efficiency and innovation is unparalleled, as new technologies such as AI and generative AI encourage executive teams to reconsider their capacities and priorities. At the center of many IT environments is the mainframe. Celebrating its 60th anniversary, the platform has become a cornerstone of a hybrid IT strategy that supports the enterprise's most mission-critical workloads. To better understand the role of the mainframe and its ongoing modernization and role in hybrid IT, Kyndryl commissioned Coleman Parkes Research to conduct the second annual global survey of 500 senior leaders at enterprises that make use of mainframes.

This research shows that enterprises are moving quickly to adopt Al and generative Al, and that the mainframe is becoming a prime candidate to host and run Al workloads. In addition, the data residing on the mainframe is becoming important in fueling new Al and generative Al use cases. Generative Al also has the potential to illuminate the inner workings of monolithic applications, greatly aiding in mainframe modernization and potentially helping to alleviate a skills shortage. In short: 2024 is shaping up to be the year of Al on the mainframe.

Our research also found that mainframe modernization continues to yield impressive business results. Collectively, respondents saved \$11.9 billion annually on their mainframe modernization initiatives. When viewed by return on investment (ROI), the results are staggering. One year ROI varied by primary approach: 114% for those who modernized workloads on the mainframe; 145% for those who integrated their mainframe applications with other platforms; and 225% for those who moved applications off the mainframe.

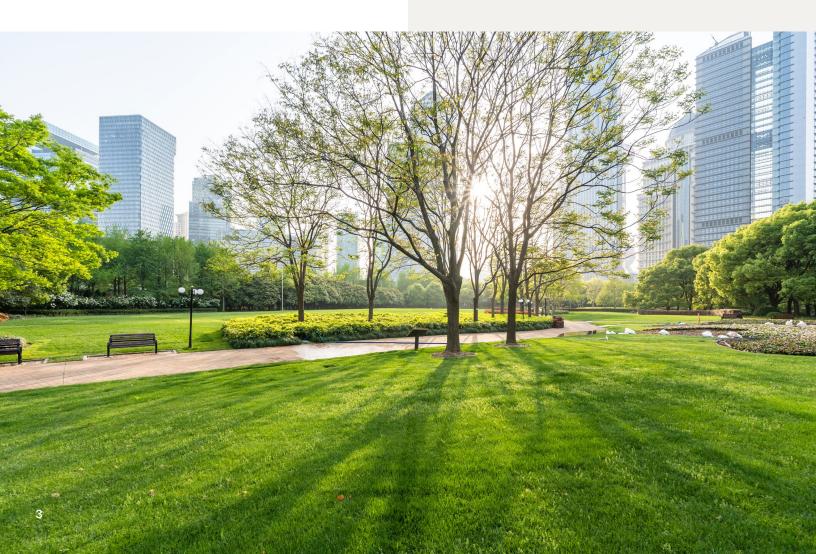
In this report, we will discuss these and other findings in more depth, including the influence of security concerns on modernization plans, the ongoing skills gap, and the need for enterprise-wide observability in a hybrid IT environment.

Regardless of modernization strategy, the mainframe continues to occupy a central role in hybrid IT thanks to its high levels of security, reliability and performance. And it continues to evolve, serving the changing needs of the professionals and organizations that rely on it every day.

Five major takeaways from our survey

- Interest in using generative AI on the mainframe is exploding, and it is a game changer. We found that 86% of respondents are deploying or planning to deploy generative AI tools and solutions to their mainframe environments. The rise of generative AI has the potential to reshape and reinvigorate how organizations leverage their mainframes as part of a hybrid strategy.
- 2 Hybrid IT is the way forward for almost all organizations. Businesses are modernizing their mission-critical operations with hybrid strategies, integrating the mainframe with public and private cloud platforms. Ninety-six percent (96%) of respondents are moving some workloads off the mainframe on average 36% of their workloads.
- 3 Security is the number one driver of mainframe modernization investments. Spurred in large part by the need for regulatory compliance, organizations factor security and resilience into almost every decision related to the mainframe. Two-thirds (66%) of respondents say that security is the most important feature offered by mainframes, and 92% of respondents say that regulatory compliance influences their decision-making related to mainframe modernization.

- The skills gap remains an inhibitor, especially in new areas and technologies. More than 1 out of 4 organizations still have significant skills gaps. Most other organizations have skills gaps that have only been solved with the help of external firms (77%).
- Enterprise-wide observability is a must-have; however, it is often lacking in hybrid IT environments. Many organizations are struggling to gain enterprise-wide operational insights that can help them improve operations. Ninety-two percent (92%) say it's important to have a single dashboard that operates across the hybrid environment. Such a dashboard could help improve performance, and an integrated dashboard would provide a single source of truth to help unlock and leverage mainframe data.





"Generative AI models integrated within our mainframe environment help us analyze complex data relationships within our insurance data sets.

By leveraging generative AI within our mainframe systems, we are uncovering hidden patterns and insights in our data that may not be immediately apparent, and it even helps us make more informed decisions regarding risk assessment, pricing, and targeted marketing campaigns."

- CTO of an insurance company in Brazil
- "Al is a new technology with massive potential. So, as we move forward, integrating Al capabilities and functions into our mainframe systems will play a pivotal role in shaping their relevance and significance in the technical and changing landscape. The synergy between Al and mainframes will open new avenues for innovation and optimization."
 - Director of ICT at a government agency in Australia

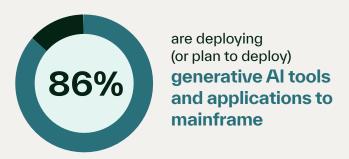


Figure 1: Deploying generative AI tools and applications on the mainframe

1 Interest in using generative AI on the mainframe is exploding, and it is a game changer

Al and generative Al can transform the mainframe environment by delivering insights into complex unstructured data, augmenting human action with advances in speed, efficiency and error reduction, while helping to understand and modernize existing applications.

Enterprises clearly see the potential. Eighty-six percent (86%) of respondents confirmed they are deploying, or planning to deploy, generative AI tools and applications in their mainframe environments, while 71% say that they are already implementing generative AI-driven insights as part of their mainframe modernization strategy. When asked about the business conditions driving their mainframe modernization investment decisions over the next 12 months, more than a third (36%) named the opportunities offered by AI (including generative AI) as a top investment decision.

Last year, we saw that respondents choosing to modernize on the mainframe cited security, performance and reliability as the main factors in their decisions. This year, a third of respondents (33%) state that the advantage of this approach is the opportunity to use AI capabilities on their mainframe data and applications.

Our research uncovers several primary drivers for the deployment of generative AI. Four in ten respondents (41%) say they are using generative AI to create faster, repeatable operational actions that are less prone to human error. Thirty-three percent (33%) are using the technology to improve the customer experience (for example, through increased personalization).

Forty-four percent (44%) of respondents report that their use of generative AI has a similar purpose: unlocking their mission-critical data and transforming unstructured data into actionable information. One-third are using generative AI to uncover business insights from mainframe-managed data to aid the development of new products or services.

Not surprisingly, most organizations have only recently embarked on their generative Al journeys. The majority (80%) are in the early or mid-stages of Al integration. Businesses are still exploring the possibilities, with over a third (36%) of respondents currently identifying new generative Al use cases.

Like any emerging technology, there are laggards. For the small minority (14%) of those not planning to use generative AI, security concerns (41%), other priorities taking precedence (38%) and regulatory concerns (35%) are the key reasons for their reluctance.

Modernize On		Integrate With		Move Off	
35%	Increased security	40%	Increased reliability	45%	Data accessibility
35%	Cost savings	35%	Cost savings	37%	Increased flexibility
33%	Use of AI capabilities	34%	Improved performance	34%	Increased reliability

Figure 2: Each modernization approach has its own advantages

2. Mainframes are the cornerstone of a hybrid IT strategy

Organizations are increasingly seeking to take advantage of the performance of the mainframe while enjoying the flexibility offered by the cloud. Similar to last year, the vast majority (89%) of enterprises indicated that mainframes remain essential to their operations. Almost all respondents are moving some workloads off the mainframe (96%). On average, they are moving 36% of their workloads off the mainframe to leverage the benefits of both mainframe and cloud, the hybrid environment is here to stay.

We typically see three strategic approaches or patterns to mainframe modernization, and most organizations use a combination of these in a hybrid model. An assessment can help to determine the right platform approach for the right workload.

Pattern 1: move off the mainframe

Organizations can choose to move off the mainframe, either transferring some applications and data or moving completely to the cloud or an on-premises solution. They can do so by moving and retaining the existing application programming languages, or by refactoring them to more modern languages such as Java or C#. They can also rearchitect the application code or rewrite the application and migrate the data to the new application.

Pattern 2: integrate mainframe with other platforms

Organizations can integrate mainframe data and applications with other platforms, so they can be accessed by new cloud-based applications. Depending on their specific needs, businesses might integrate their mainframe with large-scale public cloud providers, private clouds or distributed environments. We expect to see the frequency of this pattern increase with the continuing evolution of Al and generative Al.

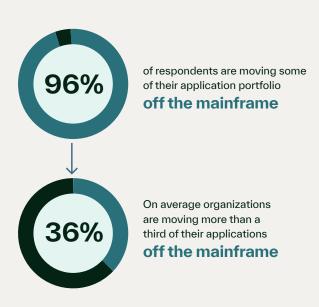


Figure 3: Businesses are moving some of their application portfolio off the mainframe

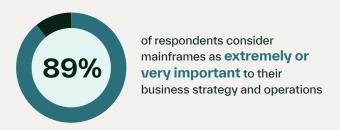


Figure 4: Mainframes remain essential to business strategy and operations



Pattern 3: modernize workloads on the mainframe

The third pattern is to modernize workloads on the mainframe—for example by defining which applications to keep, replace, retire or consolidate (software rationalization), modernizing application source code or using modern languages, or exploiting new technologies available on the mainframe such as Al and containerization. Organizations currently have an average of 56% of their critical workloads on the mainframe.

In all three patterns, organizations can integrate enterprise-wide DevSecOps (Development, Security and Operations) tools and processes with the mainframe environment, to enable a consistent, enterprise-wide approach for their development and operations teams.

Enterprises' approach to mainframe modernization seems to be shifting slightly. In 2024, more respondents confirmed they are focusing on modernizing on the mainframe or integrating with cloud, and fewer are choosing to move workloads off the mainframe as their primary strategy—a five percentage point drop from last year (30% to 25%). Additionally, 53% of respondents saw their usage on the mainframe increasing this year, with 49% saying their mainframe usage will increase again in the next 12 months.

Mainframe modernization initiatives continue to drive considerable cost savings and profitability in 2024. Respondents undertaking a modernization project reported that the average cost of those projects decreased compared to last year, while profitability of these projects remained the same or even slightly increased. Organizations report that modernizing on the mainframe has led to a 9% increase in overall profitability, integrating with other platforms led to a 10% increase in profitability, and moving off the mainframe drove a 12% increase in profits. Additionally, as mentioned earlier, the ROI for these projects is staggering, yielding one year returns between 114% and 225%.

"Mainframes play a significant role in hybrid environments and will continue to do so. We rely heavily on mainframe systems for critical functions like inventory management, supply chain operations, and financial transactions. We also embrace cloud services for different purposes, leading us to a hybrid environment where traditional mainframes coexist with modern cloud technologies."

- Head of IT at a retail company in the UK

3 Security is the number one driver of investment in mainframe modernization

Our 2023 survey found that security was the primary driver of modernization for most organizations. Given the ongoing threat from cyberattacks, increasing regulatory pressures, and an uptick in exposure to IT risk, security remains a key focus for respondents this year. Almost half (49%) of the survey respondents cited security as the number one driver of their mainframe modernization investments in the year ahead.

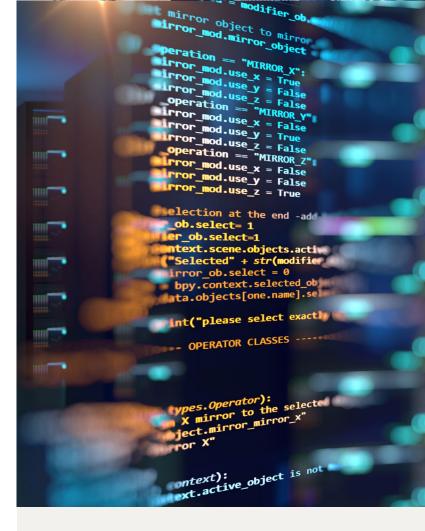
Two-thirds (66%) of respondents stated that an unparalleled level of security is the most important feature offered by mainframes, and 35% reported that increased security is an advantage of modernizing on the mainframe. Organizations that do not modernize their mainframe can risk security and resiliency challenges and, in today's threat environment, no organization can afford to uphold the status quo.

Security also is central to regulatory compliance. Data sovereignty requirements create an interweaving of compliance and security, which respondents say influences their mainframe modernization decisions. Our research reveals that 92% of respondents factor concerns regarding regulatory compliance (such as with DORA, NIS2, and SEC cyber regulations) into their mainframe modernization strategy. Regulatory concerns lead 28% of respondents to modernize more on the mainframe, 45% to integrate with distributed or private cloud environments, and 19% to address regulatory concerns by moving workloads off the mainframe.

Because 68% of organizations that state security is a driver of their investment in mainframe modernization also report that they are in the early or middle stages of addressing security, security topics will likely be a significant driver of modernization projects for some time to come.

"We often opt for hybrid cloud solutions because they help maintain sensitive data within the umbrella within a secure mainframe environment while leveraging the cloud for less critical workloads. This hybrid approach, which combines the security and reliability of mainframes with the agility and cost-efficiency of cloud computing, provides a balanced solution that meets operational and security requirements."

- VP/Head of IT at a wholesale enterprise in the US





49%

rated security as one of their top 3 business demands driving mainframe modernization investment decisions.

Figure 5: The need for security is driving mainframe modernization investment decisions

To help meet regulations:

45% are integrating more with distributed or private cloud environments

28% are modernizing more on the mainframe

are moving more workloads off the mainframe

Figure 6: 92% of businesses factor regulatory concerns into their mainframe modernization strategy

The skills gap remains

Skills challenges continue to be a focus in this year's survey. We see that the broadest skills challenges and shortages are in new and rapidly evolving areas such as Al/generative Al and cybersecurity.

"We're worried about a shortage of the requisite skill sets required to navigate and implement complex technologies effectively. It's a commonly known fact that finding individuals proficient in both mainframe systems and cutting-edge Al development is a very difficult task."

- VP at a wholesale company in the US

The skills deficit can hinder mainframe modernization projects. Eighteen percent (18%) of business leaders who are integrating the mainframe with other platforms report that insufficient expertise has been the main challenge to project success. And more than a quarter (28%) of respondents are concerned that they do not have the right level of skills to effectively modernize their mainframe.

Fifty percent (50%) of businesses reporting a skills shortage are addressing the issue by hiring or upskilling employees. There is widespread investment in training relating to cybersecurity and regulatory compliance (43% of respondents), and analytics, Al and generative AI (38%).

"We are a government department, and we always have shortages regarding specific skills. We have people working on ZoS, COBOL, Python, and Java. We have partners who manage integration and those who have cloud skills. Even if we don't have a person with relevant skills, we take the help of our providers."

- Director of ICT at a government agency in Australia

Interestingly, generative AI can help address the mainframe skills shortage by enabling developers to untangle, modernize and convert complex legacy code, identify dependencies between applications, and generate technical documentation. However, 43% of respondents indicate that they lack the skills to use AI and generative AI capabilities for their existing mainframe applications and data. And finding people with the right cybersecurity skills has been a challenge for 45% of respondents.

Enterprises face two significant difficulties as they strive to maintain a skilled workforce—people entering the workforce lack mainframe skills (53%) and experienced staff are retiring and taking their skills with them (49%).

In response, organizations are enlisting external support. Compared to last year, slightly more organizations (77%) are using external providers to deliver mainframe modernization projects. While a scarcity of talent remains an issue, enterprises appear confident that they can access the skills they need to embark on modernization.

"Modernizing our mainframe infrastructure requires cutting-edge technologies and methodologies, which external providers are equipped to deliver. By partnering with these providers, we can access state-of-the-art solutions and innovative approaches that may not be available internally. Collaborating with external providers enhances our ability to drive technological innovation and achieve our modernization goals effectively."

- Head of IT at a travel company in Germany



53% of people entering the workforce do not have mainframe skills



49% of staff are retiring and taking the skills with them

Figure 7: Top challenges for maintaining a skilled workforce



of respondents are using an external provider to modernize applications

Figure 8: Use of external partners to modernize applications





"The future mainframe technology will have a bright future within a hybrid environment, blending traditional on-premises systems with cloud-based solutions. In this scenario, monitoring the systems becomes very important. Since we started our mainframe modernization journey, we have made many changes to consolidate insights around events, performance, and integration."

- Investor and Strategic Advisor at a banking institution in the US

5. Enterprise-wide observability is a must-have

As most respondents have chosen a hybrid approach, they have also faced a common challenge: monitoring operations across a hybrid environment. Ninety-two percent of respondents say it is important to have a single dashboard to monitor operations across a hybrid environment, yet 85% find it difficult to do this. Survey respondents say such a dashboard would help them oversee infrastructure performance (54%), integration with IT service management (49%) and application performance (45%).

Embedding observability across a hybrid IT environment with multiple platforms has numerous benefits. By gaining real-time insights and expanded control over their IT infrastructures, organizations can increase productivity and efficiency, and drive better business outcomes.

Increasing visibility can facilitate data collection, event processing, analytics and automation. Such continuous operational improvement enables organizations to gain insights into their software inventory to remove redundancies or automate commands for faster troubleshooting. Finally, observability across the IT environment can help to improve day-to-day performance and ensure that technology and business priorities align.

Conclusion

After 60 years of service, the mainframe remains a critical pillar of many enterprises' hybrid IT environments. In an era of AI, generative AI, distributed computing and public cloud, the characteristics that have made the mainframe appealing for so long – its high levels of security, reliability, and performance – continue to encourage respondents to drive mainframe modernization within their organizations.

Thanks to widespread transformation initiatives, the mainframe is changing to serve new use cases with new technologies, often within a hybrid environment. The goals are often strategic: to take advantage of the mainframe's strengths while simultaneously leveraging the flexibility and scalability of the cloud. But the immediate business benefits are also impressive, with organizations reaping triple-digit returns in just one year of their mainframe modernization initiatives. This dynamic only increases the appeal and urgency of mainframe modernization, ensuring that the mainframe continues to evolve as it serves as the core foundation for the enterprise's most mission-critical technology needs.

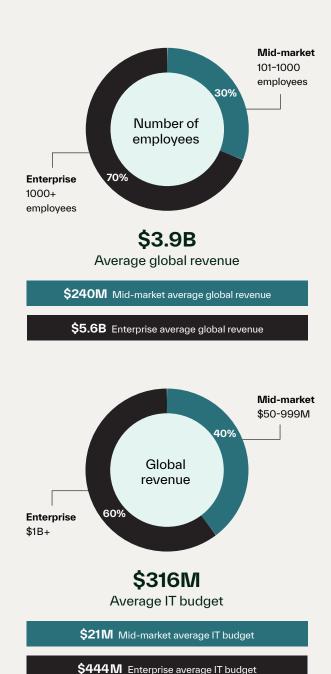


Figure 9: Demographics of mid-market and enterprise organizations included in the survey

About the survey

The 500 leaders surveyed include senior IT decision-makers and line-of-business leaders working in enterprise and mid-market organizations with an average global revenue of USD \$3.9 billion. They work for organizations based in North America (25%), Latin America (24%), the Asia-Pacific region (26%), and Europe (25%). The leaders work in banking and financial services, retail, communications and media, healthcare, insurance, manufacturing, automotive, chemicals, oil and gas, travel and transportation, and federal and government organizations. They hold roles such as Chief Information Officer, Chief Technology Officer, VP/Director of IT, and line-of-business positions within areas like operations and management. Forty-eight percent (48%) of respondents sit within the C-suite. All are either the final decision-maker, part of the decision-making team, key influencer, or partial influencer in relation to mainframe strategy and operations.

Kyndryl is the world's largest provider of IT infrastructure services serving thousands of enterprise customers in more than 60 countries.

Learn more at kyndryl.com/us/en/services/mainframe



© Copyright Kyndryl, Inc. 2024

Kyndryl is a trademark or registered trademark of Kyndryl, Inc. in the United States and/or other countries. Other product and service names may be trademarks of Kyndryl, Inc. or other companies.

Kyndryl commissioned Coleman Parkes Research to survey 500 enterprises that rely on mainframes. This paper outlines the key findings of this survey and the implications for mainframe decision-makers.