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Kyndryl´s 2023 State of Mainframe Modernization Survey Report

Contents

Executive summary

This year's fluctuating global economy has challenged many organizations as leaders reconsidered spending choices. While some pilot programs and consumer-facing technology investments have been put on pause, we've seen a continued commitment to enterprise IT spending within companies as they modernize and digitally transform their mission-critical environments. In fact, enterprise technology spending is considered recession-proof because economic turbulence has not impacted organizations' greater needs of driving efficiencies, ensuring agility, and elevating overall resilience.

When considering continued spending and management of core enterprise systems, companies today are looking at how they can protect their current investments—mostly on the mainframe because of the security, reliability, and high-performance computing capabilities it provides—while also exploring new ways to use technologies like cloud computing for a more cost-effective, energy-efficient option that can increase flexibility and innovation.

Each organization's roadmap looks different: the benefits they hope to gain, the challenges they expect to face, and the future of the mainframe they envision.

Kyndryl commissioned Coleman Parkes Research to survey 500 enterprises that rely on mainframes across North America, Latin America, the Asia-Pacific region, Europe, the Middle East, and Africa to understand how business leaders are approaching mainframe transformation and application modernization.

For mainframe decision-makers, Kyndryl's survey provides a bird's-eye view of the efforts underway to transform mission-critical operations across the public and private sectors, including in banking, healthcare, retail, and more. This report also offers three modernization pathways for technology leaders to consider when choosing the path that best suits their needs—either on the mainframe, in a hybrid environment, or completely transitioning to the cloud.

Five major takeaways from the survey

1. Almost all respondents (95%) are moving at least some of their workloads to the cloud or distributed platforms. On average, they are moving 37% of their workloads off the mainframe. Notably, only 1% are moving all of their workloads entirely off the mainframe.

2. Most organizations surveyed (90%) indicate that mainframes remain essential to their business operations. This finding demonstrates that most respondents see the value of remaining on the mainframe due to its high levels of security, reliability, and performance, while providing the flexibility to move to new cloud platforms for efficiency.

3. Organizations report that modernizing on mainframe projects have, thus far, led to a 9% increase in profitability, while both integrating with and moving off projects increased profitability by 11%. On average, surveyed organizations see cost savings of USD $25 million per year—fueling further discussion that a modernization strategy of any chosen path yields a strong return on investment. Collectively, this finding means that organizations in our survey achieved USD $12.5 billion in savings per year from modernizing their mainframe environments.

4. 74% of our survey respondents plan to use external firms to help them on their modernization journey and fill existing skills and knowledge gaps. The skills gap represents a major opportunity for rising technical talent to jump in and fill these gaps as there is a high job placement rate for those who obtain these skills.

5. Security is a major consideration in the strategic decision to transform and modernize. Half of respondents (49%) cited cybersecurity as their top consideration.

Based on the survey results, mainframes remain one of the technological backbones of the world's economy. They enable businesses and governments across the globe to run mission-critical applications while processing massive amounts of data. As was the case decades ago and still remains true today: for many leading enterprises, the mainframe is a powerful, reliable, secure choice.

The role of the mainframe will continue to develop with the advent of new technologies. In the case of mission-critical systems, the greatest risk is inaction. Most IT leaders are strategically transforming their organizations every day to stay competitive, drive profitability, and make the most of their chosen route to transform how they make use of their mainframe's power.

The journey: Three paths to modernization

Enterprises looking to update their mission-critical operations are approaching mainframe modernization in three ways: by modernizing on, integrating with, or moving off the mainframe. Our survey found that most enterprises use a combination of these approaches in their transformation journeys.

How and why technology leaders are modernizing

Today, updating core systems often means tailoring projects to meet business and technical needs. Most enterprises take a hybrid approach: they consider the capabilities of each platform and make selections for their applications and data accordingly.

To maximize value, the majority of enterprises generally modernize on their mainframes, integrate with other platforms, or move certain workloads off the mainframe. With regard to moving workloads off the mainframe, 95% of respondents expressed that they will move some workloads off the mainframe. However, rarely are enterprises choosing to move all their workloads off the mainframe. In our survey, only 2 out of 500 planned to move all of their workloads off the mainframe. On average, respondents were moving 37% of their workloads off the mainframe.

Enterprises report that transforming their mission-critical operations for the future helped them increase their profits by as much as 11%.

Beyond financial wins, respondents listed a range of benefits to be gained by transforming their systems. For instance, respondents who are integrating with the mainframe cited data accessibility (51%), improved innovation (48%), and increased flexibility (41%) as the top three reasons to modernize. Other reasons across all three pathways included accelerated time to market, enhanced performance, and improved innovation. Our survey results show that in today's rapidly changing technological landscape, the biggest mistake an organization can make is to not act at all or to consider their mainframe environment an afterthought.

As for why enterprises choose their modernization approach, those modernizing on the mainframe cite security, performance, and reliability as the main advantages. Those choosing to integrate with cloud say they sought increased data availability and innovation. For those moving off the mainframe, faster time to market and improved performance are often listed as reasons, even though the strategy introduces new security concerns.

Mainframe transformation projects tend to involve similar costs and timelines, but the risks involved can vary depending on a project's scope. Enterprises that seek to modernize on their mainframes can face challenges related to internal expertise and project delivery. As they decide how to balance the three approaches to transformation and manage uncertainties, organizations often seek partnerships: nearly three-quarters of respondents (74%) prefer a partner-led journey in order to ensure their project runs as smoothly as possible and fill in skills gaps where needed. This issue fuels the drive to modernize and protect business-critical infrastructure for the future, which we will discuss in more detail later in the paper.

As organizations across a range of industries take action, this core transformation will continue to evolve. Most respondents (86%) have not yet completed their mainframe modernization journeys.

Proven value: Seeking to optimize through modernization

Nearly all (90%) respondents say that mainframes are key to their operations. When asked which mainframe features they value most, they name security (68%), reliability (60%), and performance (55%). But an evolution is in motion: as digital technologies develop, organizations are transforming the way they use their mainframes to seek improvements in accessibility, efficiency, and profitability.

Businesses looking to update their mainframe strategies expect to see substantial cost savings. These projects also result in a meaningful increase to profitability. Organizations report that modernizing on mainframe projects have, thus far, led to a 9% increase in profitability, while both integrating with and moving off projects increased profitability by 11%.

On average, the organizations in our sample expect to see cost savings each year of USD $23.3 million by modernizing on mainframe, USD $26.6 million by integrating with cloud, and USD $25.6 million by moving off mainframe. Collectively, this means our respondents saved $12.5 billion in one year by modernizing their mainframes.

While it's clear mainframe transformation projects can certainly be worth pursuing, respondents identify risks they must navigate. When considering the prospect of moving away from dependency on a mainframe environment, organizations report concerns around security risks (56%), increased costs (49%), and application compatibility (41%).

"Mainframes have the capacity to handle and process huge amounts of financial data. But moving some of the non-critical applications to cloud has helped us in streamlining the workflow when it comes to capturing data, storing, and interpreting it."

– Chief Technology Officer at a financial services enterprise in Latin America *(approach: modernize on, integrate with)*

"Our aim is to improve system performance, scalability, and reliability while reducing costs."

– Line of business leader in a French government organization *(approach: modernize on, integrate with, move off)*

$23.3 M modernizing on

$26.6 M integrating with

$25.6 M moving off
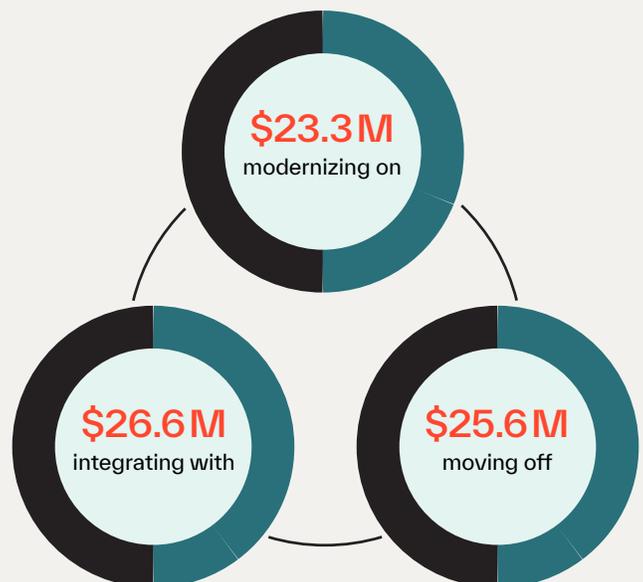
Figure 1: Average annual cost savings per organization as a result of mainframe modernization

A closer look: Three approaches, more ways to benefit

No organization can afford to stand still in mainframe strategy. Nearly all respondents recognize this truth as they combine approaches to realize significant—and surprisingly similar—financial benefits. In the following sections, we'll examine the three main approaches to a modernization strategy:

Modernizing on the mainframe

Organizations that intend to continue running workloads on the mainframe know they must continually modernize to yield benefits in a fast-moving business world. These respondents see three key advantages of modernizing on the mainframe: improved performance (52%), reliability (48%), and improved innovation (43%).

The majority of the organizations surveyed (67%) say their approach to mainframe modernization is to optimize performance and capacity, and rationalize software— choosing which applications to keep, replace, retire, or consolidate. Other popular approaches include DevSecOps integration with the mainframe environment (56%), which brings together development, IT operations, and security for streamlined processes. Nearly half of respondents (48%) are recompiling mainframe programs to the newest version to upgrade performance.

When optimizing applications to remain on the mainframe, many organizations are using containers and microservices—which offer greater flexibility—to enhance the application development process (46%). Containers are designed to make applications more portable and scalable, while microservices can deliver more agility to support innovation.

Enterprises can transform their use of the mainframe—and derive new value from their long-term investment—by taking advantage of its modern capabilities. For example, companies that choose this path are well positioned to:

→ Transform mainframe applications using modern programming languages

→ Open the mainframe by enabling application programming interfaces (APIs)

→ Unlock data

→ Adopt DevOps or DevSecOps

→ Consolidate Linux workloads

→ Implement containers to make applications more portable and scalable

→ Increase automation and introduce artificial intelligence (AI) for IT operations (AIOps)

→ Deploy a site reliability engineering (SRE) model and teams

→ Rationalize, optimize, and consolidate the software stack

→ Optimize performance and reduce the consumption of MIPS (Million Instructions per Second)

→ Preserve the mainframe's robust data security capabilities

67%

Mainframe performance and capacity optimization and mainframe software rationalization

Performance & capacity optimization

56%

DevSecOps Integration with mainframe environment

DevSecOps Integration

48%

Mainframe programs recompile to newest version

Recompiling programs

43%

Security optimization

Security optimization
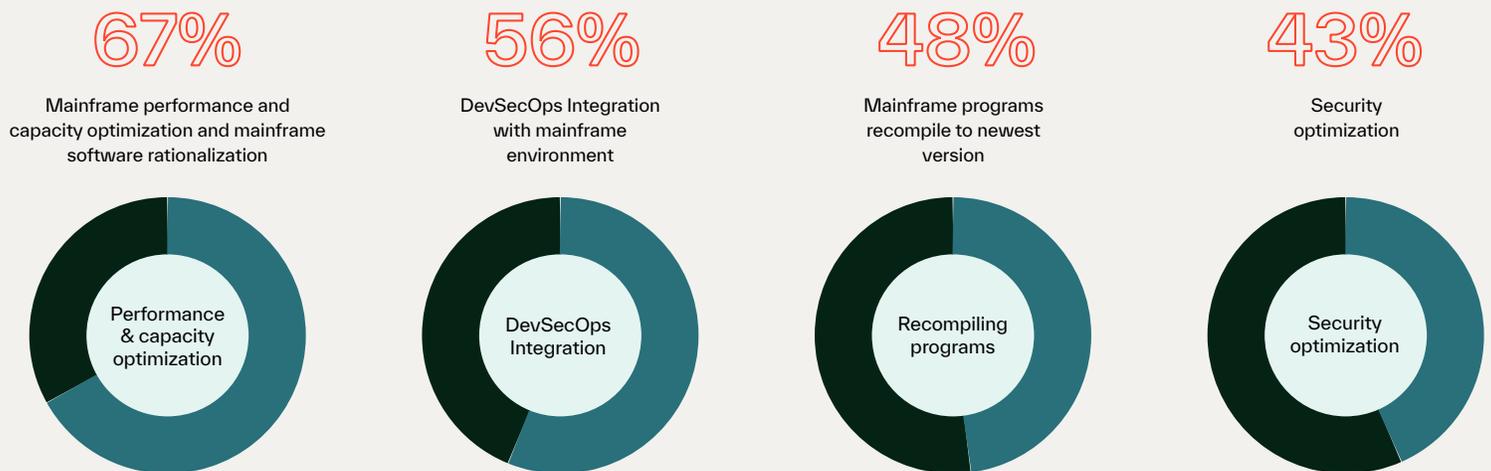
Figure 2: The main approaches to modernizing on the mainframe

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Integrating with other platforms

This approach involves integrating mainframe applications, data, and infrastructure with other platforms, including the cloud, to expand an enterprise's technological possibilities. According to respondents, three major advantages of using an integrated approach is that organizations innovate more quickly (48%), increase flexibility (41%), and unlock valuable mainframe data so it can be accessed by cloud applications (48%).

About a quarter of organizations (24%) are integrating mainframe applications with cloud while 19% are opting to employ additional as-a-service options alongside the infrastructure-as-a-service (IaaS) cloud computing model.

Businesses can integrate the mainframe with large-scale public cloud providers, private clouds, or distributed environments.

Use cases for integrating with mainframe include:

→ Application and DevOps integration

→ Data integration

→ Management integration

→ Physical proximity—for example, high-bandwidth network connectivity, potentially while locating the mainframe and cloud in close proximity to each other

"We have still kept mainframe for core applications like processing of transactions, as the number of transactions taking place daily are huge. We will not move away from the mainframe completely. We want to maintain mainframe for core applications; at the same time, we want to integrate our mainframe architecture with cloud and get all the benefits of cloud architecture."

— Chief Technology Officer at a financial services enterprise in Latin America *(approach: modernize on, integrate with)*

Moving off mainframe

An unexpected finding of our survey: how rarely respondents choose to fully move off the mainframe. Only two respondents out of 500 (less than 1%) say they have moved or intend to move every single application off the mainframe. That being said, 95% intend to move some applications off the mainframe. On average, respondents are moving more than a third (37%) of their applications off the mainframe, presumably as they continue to maintain and modernize their mission-critical applications on the mainframe. Enterprises that choose to move off the mainframe name three key advantages of this approach: faster time to market (51%), improved performance (47%), and improved innovation (44%).

Pursuing benefits and weighing risks:
The pull of the cloud

Enterprises that choose this path opt to move applications and data from the mainframe environment to the cloud for multiple reasons, including optimizing costs, increasing scalability, exiting the data center business, or making use of benefits offered by other platforms.

As more and more businesses pursue the accessible, flexible, and scalable services of the cloud, our respondents are following suit. Nearly all (95%) have plans to move at least some of their workloads to the cloud. With about three-quarters (74%) reporting that their move to the cloud is underway or complete, many organizations are already seeing the benefits. Almost half (43%) say that the switch resulted in technology consolidation, which tends to make an organization more efficient. More than 40% are integrating with cloud-native services, which can make applications and data more easily accessible and facilitate more flexible ways of working. Other benefits include faster continuous development (41%), greater agility (40%), improved scalability (40%), and improved sustainability (39%).

In moving off the mainframe, businesses migrate workloads to cloud service providers, dedicated distributed platforms, or private clouds.

"With cloud-based solutions, we are now able to quickly develop and deploy new applications, services, and features without having to worry about infrastructure constraints or compatibility issues. This is helping us stay ahead of the competition."

— VP of IT at a multinational corporation
(approach: modernize on, integrate with)

"Cloud computing is a greener technology than other traditional IT solutions. By migrating to cloud, we reduce almost all our energy consumption and carbon footprint."

— Operations manager at a North American retail enterprise
(approach: modernize on, integrate with, move off)

The wide-ranging benefits of moving some or all workloads to cloud are attractive, but organizations are also on guard against possible risks. More than half (56%) have security concerns. And nearly half (46%) worry that costs might be unpredictable or difficult to manage—a surprising source of anxiety as data shows that modernizing the mainframe generally results in cost savings. More than a third (38%) fear that moving off mainframe will be complex and time-consuming, a more understandable concern considering the extent and ambition of such projects.

In moving off the mainframe, businesses migrate workloads to cloud service providers, dedicated distributed platforms, or private clouds.

"Despite numerous benefits associated with cloud computing, it is very important to plan and strategically map out the modernization process, because if usage is not carefully monitored and managed, it could result in unexpected costs."

– Head of IT at a financial enterprise in the Netherlands
   (approach: move off)

"Security is one of our primary concerns when moving to a cloud environment. We will need to ensure that data is protected from unauthorized access, theft, or loss."

– VP of IT at a multinational corporation
   (approach: modernize on, integrate with)

"When it comes to security, both mainframe and cloud environments have their own strengths and weaknesses. It is difficult to make a direct comparison between the two as they are fundamentally different in terms of architecture and design."

– VP of IT at a multinational corporation
   (approach: modernize on, integrate with)

Security and success: A shared concern

Enterprises shared one prevalent concern on the transformation journey: security.

In fact, security is the primary driver behind most organizations' modernization approaches, with 85% of respondents naming security as the main influence on their choice to modernize on the mainframe. Across the board, respondents list security as one of the top two elements most crucial to the success of a mainframe transformation project. 61% of organizations are currently investing in training on mainframe security and access controls—the most popular upskilling project involving mainframes.

Mainframes often function as the hub of complex business operations, and organizations worry that security incidents could have massive ramifications. Fears include breaches, regulations, legal consequences, and reputational damage. Respondents identify their top security concerns across all environments as data loss and account hijacking. For cloud environments, they name data breaches (51%), account hijacking (42%), and data loss (38%) as their top three security concerns. For mainframe environments, respondents' major concerns include data loss (43%) and account hijacking (33%).

To update their systems with confidence, enterprises must carefully evaluate the cybersecurity risks associated with their chosen platform. The vast majority (95%) of respondents say they are implementing end-to-end encryption to protect data. Nearly three-quarters (74%) are working with an external supplier or partner with cross-platform security expertise to alleviate some security concerns as they update applications.

"We were very reluctant in the initial phase of our modernization journey. Then our service partner showcased all the security measures they have in place, and we went ahead with our modernization journey without any worries."

– Chief Technology Officer of a financial enterprise in Latin America
   (approach: modernize on, integrate with)

"One of the most important factors for us was to carefully evaluate the security measures of various cloud providers, like their levels of data encryption protocols, access controls, and security certifications."

– Head of IT at a financial enterprise in the Netherlands
   (approach: move off)

4.3%
of IT budget
Modernizing on

3.8%
of IT budget
Integrating with

3.7%
of IT budget
Moving off
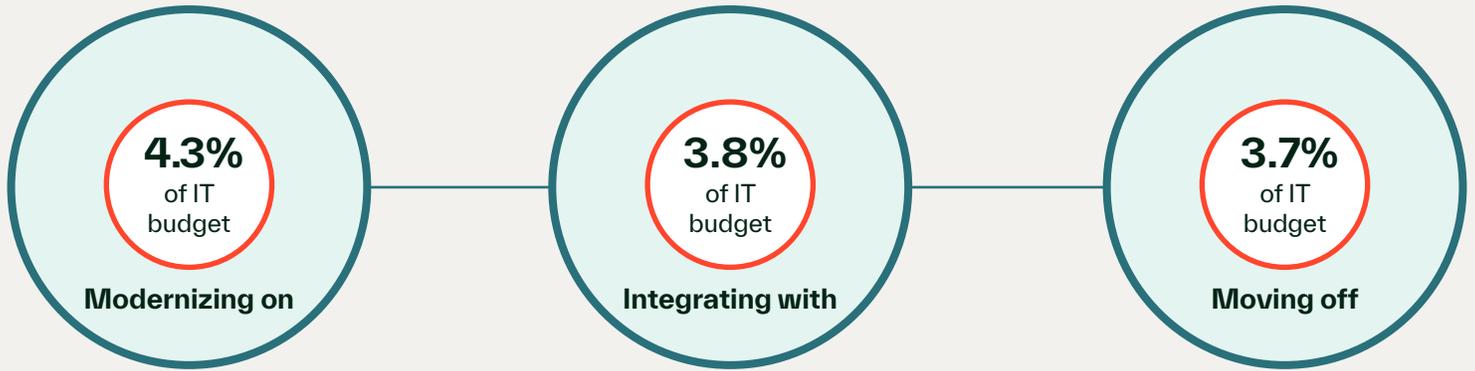
Figure 3: Average modernization budget as a proportion of overall IT budget across the organizations surveyed

Predictability and consistency: Commonalities across approaches

One of the most surprising discoveries of this survey is how consistent mainframe transformation projects are in terms of costs, savings, and timeframes. Even though many enterprises worried about staying on budget, most respondents say they found the cost of modernization to be very similar to their predictions.

Organizations are seeing substantial cost savings as a result of their transformation projects. Timeframes have also been comparable: whichever approach they choose, respondents report that these projects take an average of 24 months to complete. The average cost of a mainframe transformation project is 3.9% of an organization's IT budget. Cost savings averaged at about USD $25 million, and organizations saw up to an 11% increase in profitability.

Similarities also emerge as respondents reflect on the challenges faced in their transformation projects. Those modernizing on the mainframe say they struggled with a lack of planning (20%), overcoming performance issues (18%), and code quality challenges (16%). In integration projects, the main challenges include insufficient expertise (22%), inadequate vendor solutions (18%), and the scope creep that occurs when a project overruns its budget or timeline (15%). When moving off the mainframe, respondents also report scope creep (20%), as well as insufficient expertise (17%), and the burden of testing (15%).

Perhaps because of these challenges, only about a quarter (26%) of organizations attempt the transformation project on their own. Three-quarters of respondents (74%) worked with a partner to guide or support their journey. As the line-of-business leader in a **French government organization noted:** *"We are using external partners for updating mainframe applications because I feel that they have specialized expertise and experience, which may not be available in house at our organization. This expertise can help ensure that the transformation project is done efficiently and effectively."*

They went on to say: *"Our external partners ensure the reliability of critical applications and their environment [and] they may have access to new technologies and tools which will accelerate the modernization process and deliver us... better results. Our external partners provide additional resources and support to help ensure the project is completed on time and within budget. And not only this, but they also help us in managing these risks by providing a structured approach to the modernization process and ensuring that the new systems are thoroughly tested and validated before deployment."*

A lack of skills and a lot of change: Looking to the future

There are some uncertainties ahead as technology leaders plan for the future. The lack of skilled workers who can support mainframe environments is a significant concern for survey respondents. The majority (56%) lament the fact that most people entering the workforce do not have mainframe skills. Nearly half (47%) note that staff with mainframe expertise are retiring. This problem is prompting organizations to adopt new development languages and methods, which 54% believe will attract more early professional hires.

One certainty: change is sweeping mainframe IT. These transformation projects are likely to drive further evolution as digital technologies advance. Only 14% of organizations surveyed say their mainframe modernization project is complete. About half (55%) say their modernization is in progress. And for almost a third of all organizations surveyed (30%), the transformation journey has only just begun.

Conclusion

Beyond cost savings and profitability, organizations are gaining competitive advantages by recognizing that mainframe transformation is not an all-or-nothing bet—meaning an all-or-nothing strategy is unlikely to be the best solution.

All applications are not equal: they do not share the same requirements for scalability and performance, nor the same need to accelerate development speed to market. Increased agility is not a benefit for applications that do not change, and low-transaction applications may not need to be updated for mass scalability. Each application and its associated data must be examined individually in the context of cost and business and technical requirements.

As enterprises accelerate their transformation journeys, the vast majority rely on providers and partners to ensure they have the skill sets needed to accomplish their goals. Finding a trusted advisor and integrator with deep expertise and experience is essential to success. Such providers can help identify optimal strategies, advise on the right platform decisions, execute modernization projects, and manage the resulting environment—on, with, or off the mainframe.

"I believe that mainframes have been an integral part of the IT infrastructure for several decades; they are known for their reliability, security, and scalability. Despite the emergence of new technologies, mainframes continue to play a critical role in many industries, including banking, insurance, healthcare, and retail. It is difficult to predict the future of technology with certainty. However, based on current trends and industry practices, it is safe to say that mainframes will continue to have a place in the IT infrastructure in our organization."

– VP of IT at a retail enterprise in India
 (approach: modernize on, integrate with)

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

About the survey

The 500 business leaders surveyed include senior IT decision-makers and line-of-business representatives working in enterprise and mid-market organizations with an average global revenue of USD $4.4 billion.

The respondents work for organizations based in North America (27%), Latin America (24%), the Asia-Pacific region (24%), and Europe, the Middle East, and Africa (25%). They work in banking and financial services, retail, healthcare, insurance, travel and transportation, and federal and government organizations. They hold roles like Chief Information Officer, Chief Technology Officer, VP/Director of IT, and line-of-business positions within areas like operations and management.

Mid-market
101–1000 employees

32%

Number of employees

Enterprise
1000+ employees

68%
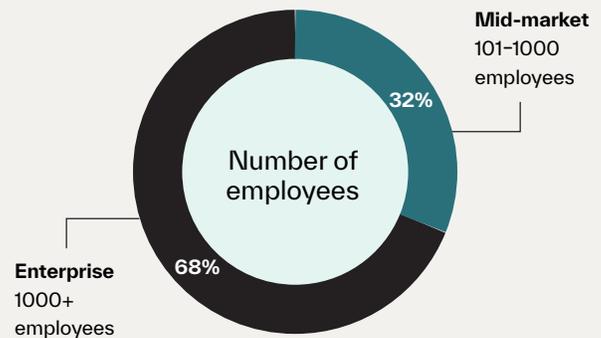
$4.4B
Average global revenue

$365M Mid-market average global revenue

$7B Enterprise average global revenue

Mid-market
$50-999M

40%

Global revenue

Enterprise
$1B+

60%
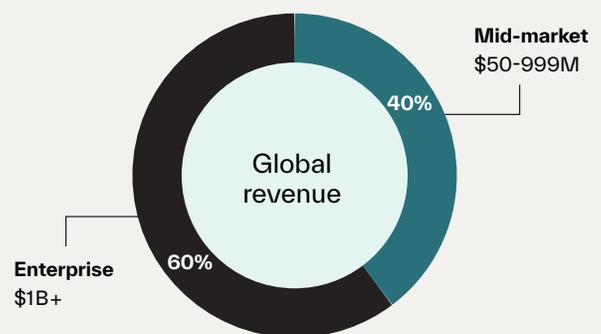
$334M
Average IT budget

$33M Mid-market average IT budget

$532M Enterprise average IT budget

Figure 4: Demographics of mid-market and enterprise organizations included in the survey

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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.

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