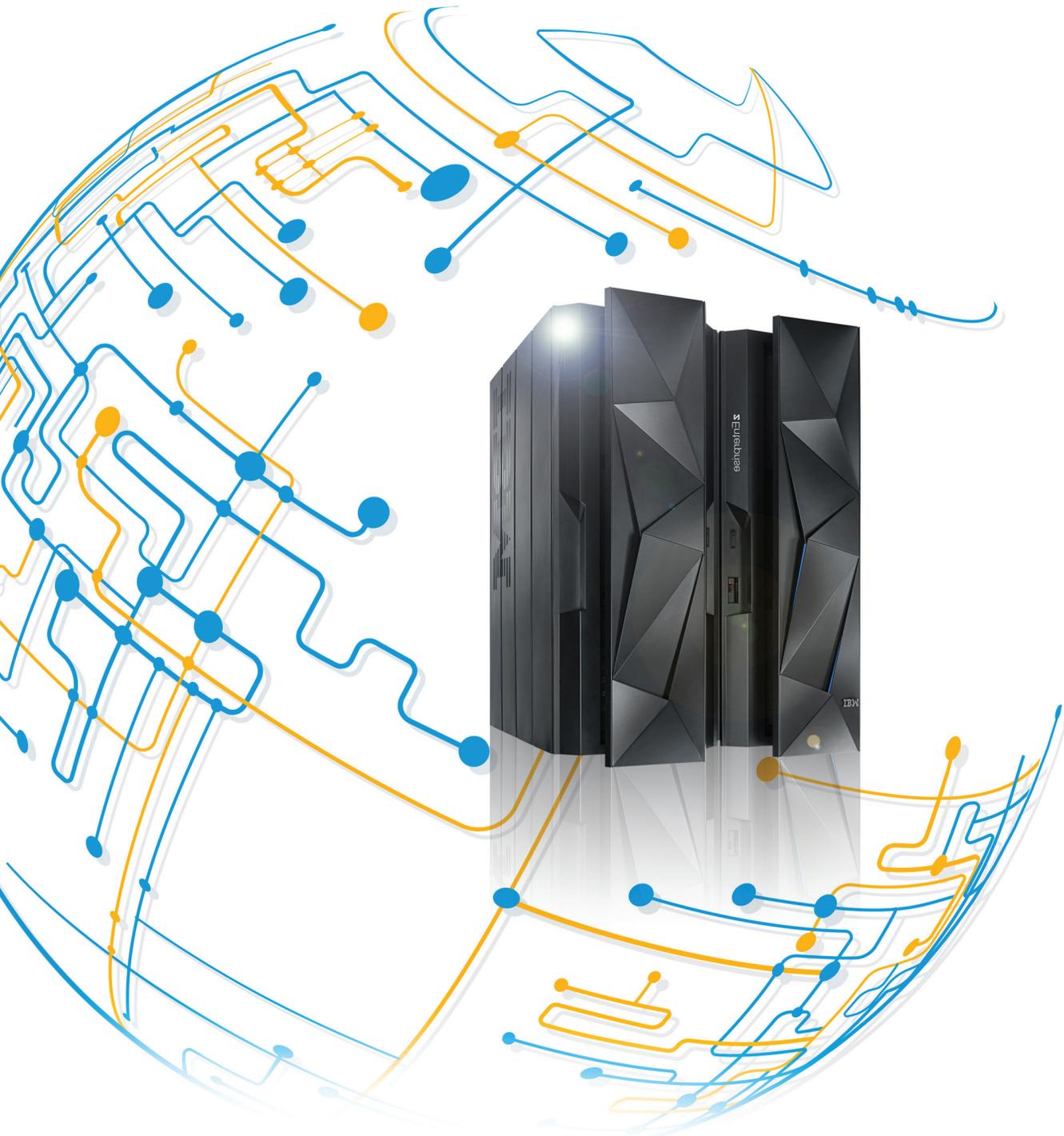


"THE NEW WORLD OF MAINFRAMES" CIO SURVEY

Mapping the Platform's Future in a Mobile, Big Data World



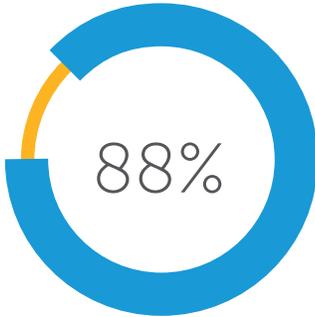
Compuware

The Mainframe Software Partner For The Next 50 Years

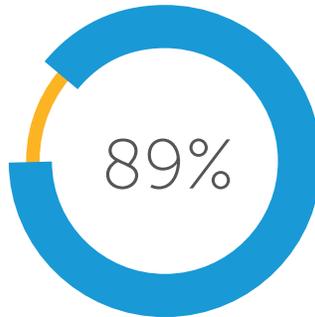
Executive Summary

Compuware recently commissioned a global study of 350 CIOs from enterprise organizations to better understand their perspective on the mainframe's role in future digital businesses.

The study found that:



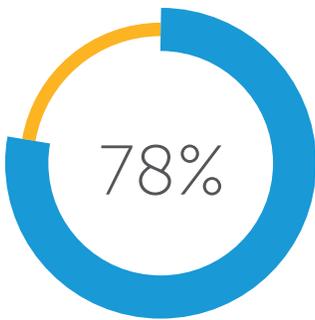
of CIOs believe the mainframe will be a **key business asset** over the next decade.



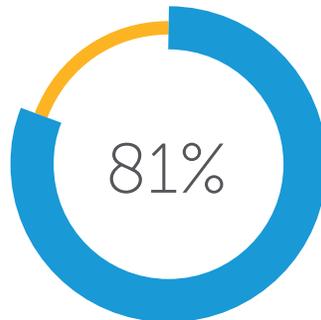
of CIOs consider their organization's mainframe code to be **valuable intellectual property**.

Investments in mainframe security outpace investment in mainframe intellectual property by a factor of more than

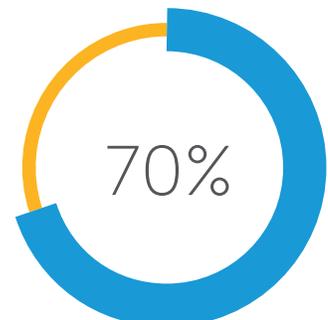
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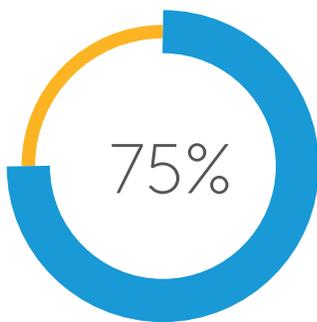
of CIOs see the mainframe as a **key enabler of innovation**.



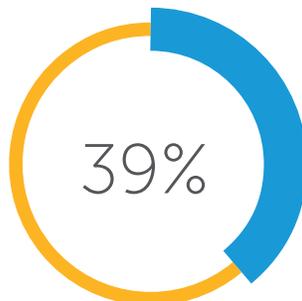
of CIOs say the mainframe can deliver **greater Big Data throughput** than commodity hardware alone, with 61% using it for this purpose.



of CIOs are concerned that lack of mainframe documentation will **hinder knowledge transfer and create risk**.



of CIOs admitted that their distributed application developers have **little understanding of the mainframe**.



of CIOs have **no explicit plans** for addressing mainframe developer shortages.

These findings indicate that IT leaders need to re-think their investments in the mainframe to continue making the most of their high-value intellectual property (IP) in a world where success increasingly depends on aggressive technological innovation. To this end, it also behooves them to be more aggressive about successfully transitioning stewardship of that mainframe intellectual property to the next generation of IT professionals—who do not currently have the mainframe-related capabilities that companies will require over the next decade.

The Role of the Mainframe in the Digital Age

Information technology has changed dramatically since the advent of the mainframe. The technology in people's hands today is exponentially more powerful than that in the most advanced enterprise data centers 50 years ago. That's why today's consumers can glide from one device to another—and have come to expect a seamless and instant service on any platform at any time.

Businesses, too, have become wholly reliant on their IT systems. One glitch can bring a company to its knees. And technology has become a critical competitive differentiator across all industries.

Yet even though IT has evolved drastically, one thing has remained constant: the dominance of the mainframe.

This is not to say the mainframe has remained unchanged. Far from it. The mainframe has constantly adapted to the needs of the enterprise. This adaptability is what has allowed it to endure for the past five decades. In fact, while many have predicted the demise of mainframe computing for years, it is actually being used more than ever for an even broader variety of workloads. The mainframe actively enables all kinds of innovation—from Big Data to mobility—and works well within the context of cloud computing models. And with the introduction of Linux and Java on the mainframe, its possibilities are greater than ever.

Beyond its adaptability, the reason the mainframe is still so dominant in enterprises today is that it is the world's most reliable, scalable and secure computing platform. It also offers vastly superior performance and lower marginal costs than any other platform.

Perhaps most important of all, mainframe applications are the repository for the business rules and processes that comprise a company's DNA. Companies have invested in this application code for decades—so it has become intellectual property of irreplaceable value.

This is why mainframe intellectual property (IP) not only needs to be preserved, but aggressively advanced. Companies need to leverage their mainframe-resident intellectual property to excel in today's digital economy. Conversely, organizations will be in danger if they fail to ensure that this IP is effectively maintained and leveraged for digital innovation.

Unfortunately, there is a ticking time-bomb that seriously threatens the ability of companies to preserve and advance their mainframe IP. The generation of Baby Boomers who created the code that makes the mainframe so valuable will soon pass the reins to a new generation that lacks mainframe skills and experience. This is not going to be an easy transition. The mainframe environment is complex, and decades-old code often lacks adequate documentation. Also, mainframe and distributed developers have historically worked in separate silos. These factors and others pose significant obstacles to the transfer of mainframe expertise. IT leaders therefore have to be highly intentional and proactive about executing this inter-generational shift. And they don't have much time.



What CIOs Think

Based on the results of the survey Compuware conducted, it is clear that CIOs fully recognize the power and value of the mainframe platform. They clearly also believe that it will remain a fixture in the enterprise for years to come. That's why 88% of respondents indicated that they believe the mainframe will remain a key business asset for at least the next ten years (see chart 1).

As noted above, mainframe applications have been developed and refined over several decades and have thus become highly customized to meet the specific needs of individual companies. This huge investment of capital and human energy has generated 220 billion lines of active code that comprise this highly-valuable intellectual property. Surveyed CIOs clearly acknowledged this reality in their responses (see chart 2).

The survey also revealed that—far from fading into oblivion—the mainframe is taking on new and different workloads. According to respondents, these workloads are being driven by digital imperatives such as mobile customer engagement and supply chain automation. Many of these workloads include a distributed application component. However, rather than replacing mainframe code, these distributed applications actually generate their own mainframe workloads. They also often require modification of existing mainframe code (see charts 3 and 4).

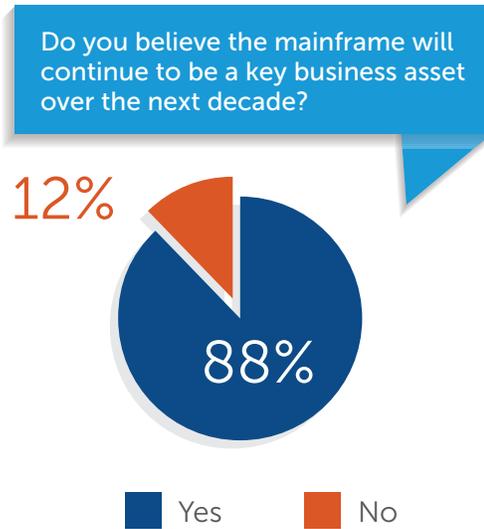


Chart 1: An overwhelming majority of CIOs recognize the persistent value of the mainframe and have no plans to retire the platform in the near future.

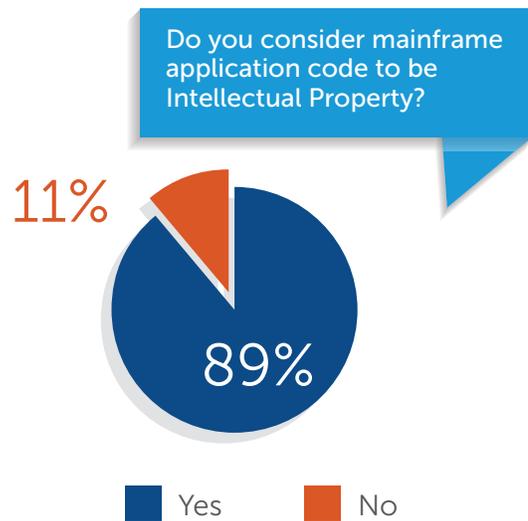


Chart 2: CIOs understand that the application code running on their mainframes is more than just an IT resource. In many respects it is a company's "digital DNA."

Do you agree that the mainframe is running more new and different workloads compared to five years ago?

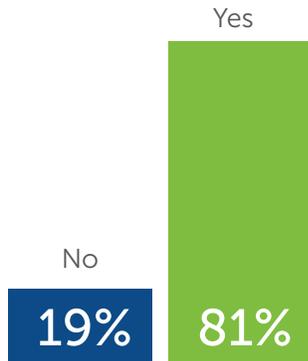


Chart 3: CIOs affirm that the workloads running on their mainframes continue to evolve as digital requirements of the business evolve.

By what percentage would you estimate distributed applications have increased workload on the mainframe over the last five years?

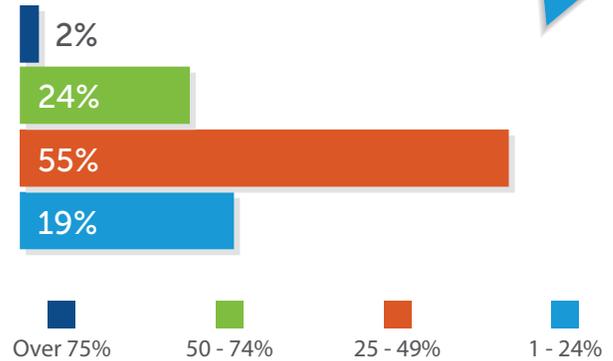


Chart 4: Surveyed CIOs confirmed that their mainframe workloads continue to grow with an overall average growth of approximately 39%.

Further evidence that these workloads are being driven by new applications that are helping to transform the business can be found in the fact that 78% of respondents believe their mainframes play a strategic role in enabling digital innovation (see chart 5).

More specifically, CIOs see the mainframe as particularly useful for delivering Big Data capabilities to the business. This makes sense given the platform's exceptional performance, scalability and economy (see chart 6).

Do you see the mainframe as a strategic platform that will enable innovation within your organization?

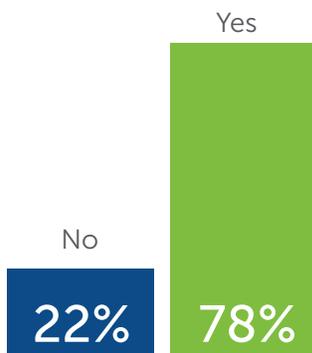


Chart 5: Far from seeing the mainframe as merely a "legacy" platform, CIOs believe it plays a central role in the digital transformation of their organizations.

Do you believe Big Data applications would achieve higher throughput rates if they were running on the mainframe, rather than commodity hardware?

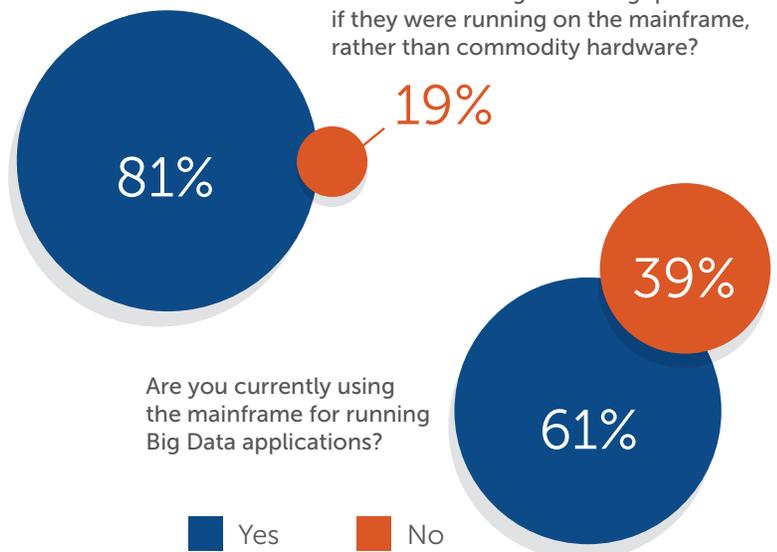


Chart 6: CIOs believe that the mainframe has an especially important role to play in the Big Data operations in their organizations.

What CIOs Are Doing

While IT leaders clearly hold the mainframe in high esteem, the study revealed that their actions don't currently align with their perceptions. When it comes to prioritizing investments, for example, application advancement comes at the bottom of the list—despite the fact that CIOs plainly recognize the value of that IP (see chart 7).

Which of the following do you believe are the most important areas for investment in the mainframe?



Chart 7: While CIOs acknowledge the strategic role of the mainframe, they tend to prioritize investment in non-strategic platform attributes such as security and system management over the applications that actually comprise their companies' IP.

The survey also found that while CIOs continue to build out their distributed and web environments, they simultaneously realize that they are not able to achieve what they can with the mainframe in terms of stability and security. This again indicates a disconnect between what CIOs know to be true and the way their organizations wind up allocating resources (see chart 8).

The continued build-out of non-mainframe environments also seems suboptimal given how much lower marginal costs are on the mainframe—where workloads can be increased by 50% or more without adding staff (see chart 9).

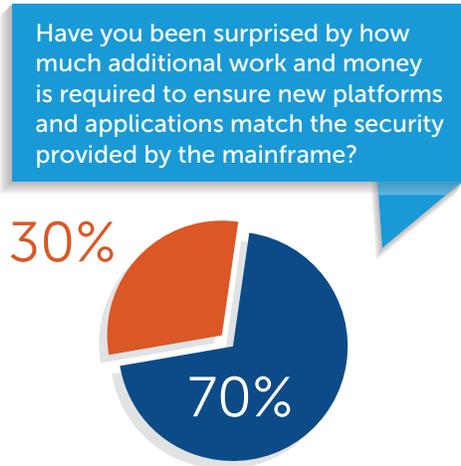


Chart 8: Non-mainframe platforms often disappoint CIOs when it comes to achieving security within projected budgets.

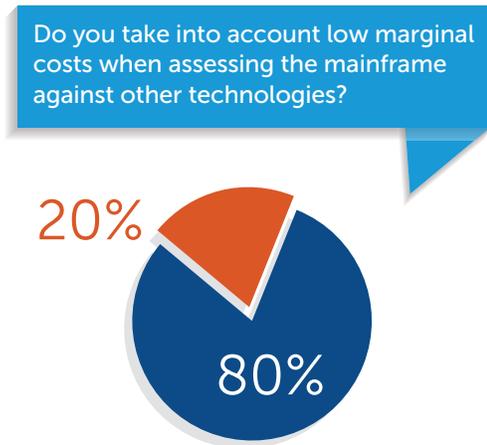
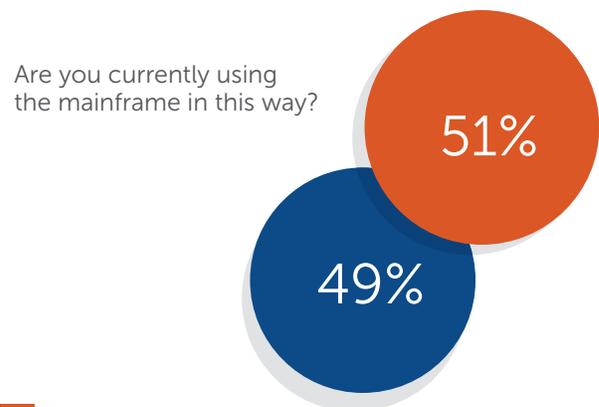
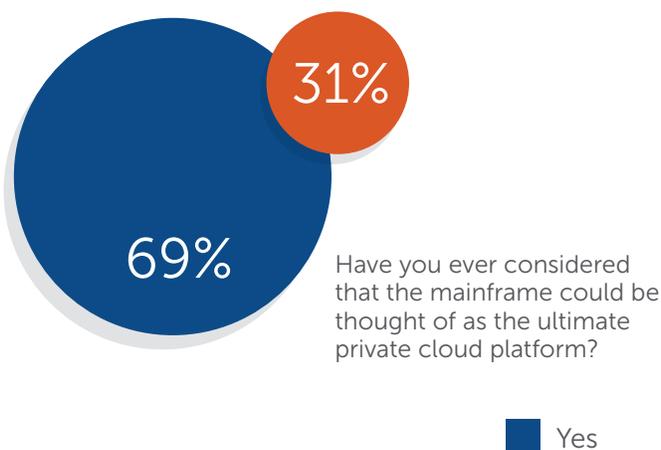


Chart 9: CIOs claim to factor marginal costs into their platforming decisions—yet continue to invest in platforms where those costs are higher.

■ Yes ■ No

This disconnect is also evident when it comes to CIOs’ cloud strategies. With its sophisticated virtualization and workload management capabilities, the mainframe is extremely suitable for provisioning private clouds. Yet less than half of the CIOs surveyed use it for this purpose—even though seven out of ten agree it would be a good idea (see chart 10). This suggests that other factors besides common sense are driving platform investments.



■ Yes ■ No

Chart 10: Most CIOs believe the mainframe could be considered the “ultimate private cloud platform”—but less than half are acting on that belief.

The claim by survey respondents that they appropriately value mainframe-resident IP seems to be contradicted by their susceptibility to the false savings offered by consolidation on fewer vendors' mainframe tools. Such consolidation, after all, requires organizations to choose licensing discounts over best-of-breed technology—which, in turn, means sacrificing platform capabilities (see chart 11).

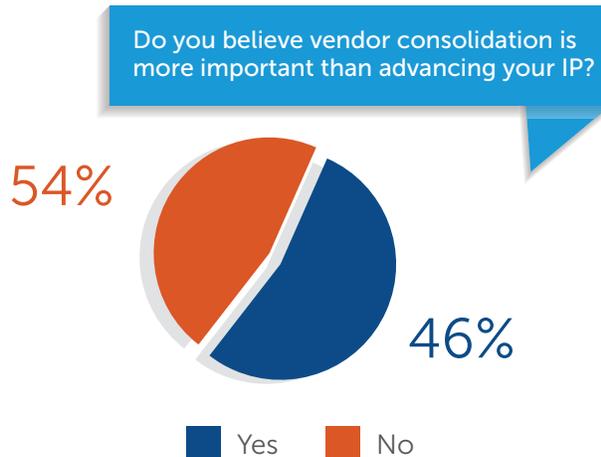


Chart 11: CIOs seem willing to sacrifice the long-term value of their mainframe IP for short-term software discounts.

Navigating the Generational Shift

Organizations have invested heavily in mainframe applications over the decades, spending millions, if not billions, of dollars to maintain and advance them. Mainframe code is constantly evolving to meet the demands of today's digital business. And, they have been customized over decades with trillions of lines of unique code, making them highly tailored and valuable. This customization is both a blessing and a curse as there are often gaps in documentation because of the code's longevity. Most CIOs are concerned that this inadequate documentation will hinder knowledge transfer and create risk (chart 12).

One of the most egregious disconnects uncovered by the survey relates to the impending retirement of veteran Baby Boomer mainframe staff. Despite the fact that enterprises are staring down the barrel of a profoundly problematic skills shortage—and that, as noted above, 89% intend to continue relying on the mainframe for at least another decade—four out of ten CIOs have no transition plan in place (see chart 13).

Are you concerned that the lack of documentation on custom mainframe applications will make knowledge transfer problematic and create risk for your business?



Chart 12: CIOs are concerned about the impact that inadequate documentation of mainframe applications will have on knowledge transfer and operational risk.

Do you have formal plans in place today to address mainframe developer shortages?



Chart 13: A surprisingly high number of CIOs are still not taking steps to protect their organizations from the massive loss of mainframe talent that will inevitably result from the retirement of Baby Boomers.

Among CIOs who do have a plan, the most common tactic is to deploy tools that help operations teams troubleshoot mainframe problems. While this isn't necessarily a bad thing to do, it is certainly a very reactive approach—and a troubling one given how critical mainframe applications are to the business. A more proactive approach is to invest in training existing developers to work on the mainframe and/or to deploy tools that make it easier for less experienced developers to work on the mainframe.

Many CIOs said that they planned on simply hiring new staff. These CIOs, however, still need to train that new staff so they can efficiently deliver quality work (see chart 14).

Which of the following have you put in place to address mainframe developer shortages?

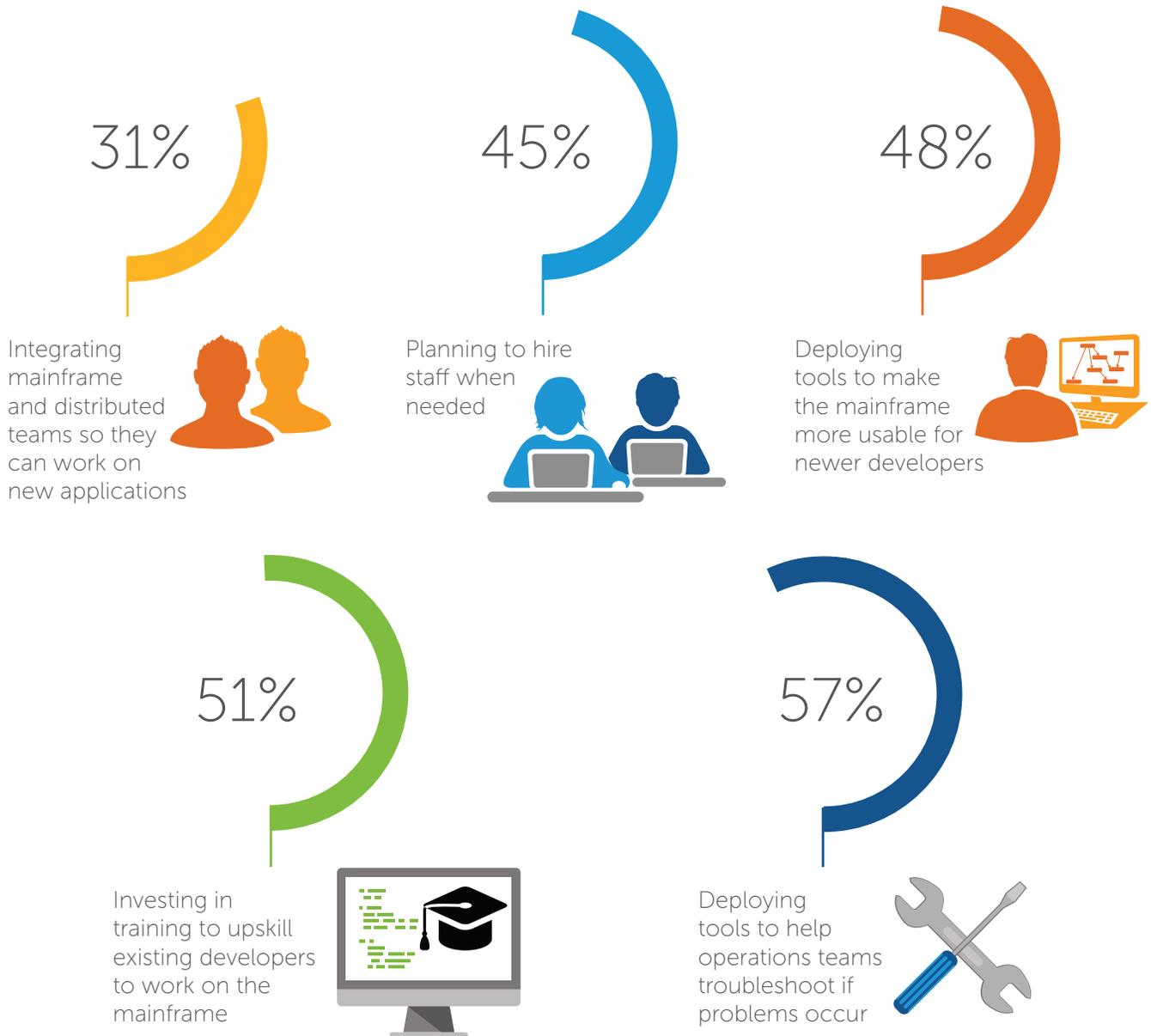


Chart 14: CIOs are taking a variety of approaches to the generational shift in mainframe stewardship.

The need for reskilling and new tools is highlighted by the fact that distributed application developers have little understanding of the mainframe (see chart 15).

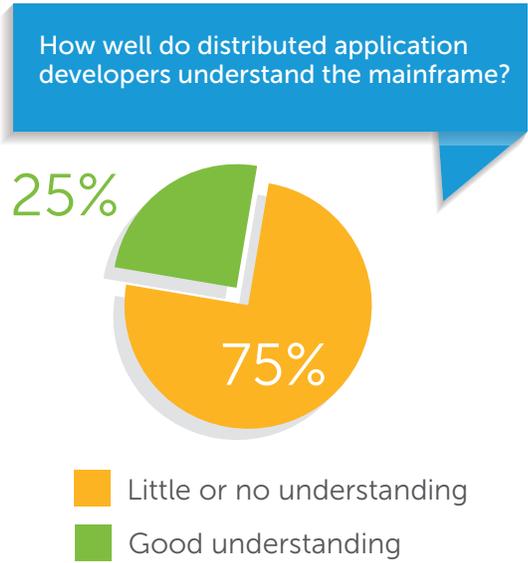


Chart 15: Developers who lack hands-on mainframe experience will need significant assistance if they are to assume stewardship of mainframe IP.

Increasingly, organizations must build applications by mixing and matching components from diverse platforms. This approach enables them to deliver new capabilities to customers, employees and other constituencies faster and at lower cost. However, it also means that mainframe and non-mainframe teams must collaborate more closely. For example, most non-mainframe developers are unaware of how MIPS affect mainframe costs—so they may code their application in ways that drive up MIPS unnecessarily. These kinds of consequences can only be avoided through a more unified approach to the development of multi-platform applications (see chart 16).

Here, again, there is a clear disparity between what CIOs know to be ideal and what is actually occurring in their organizations. Their businesses tend to have different development teams for different platforms (see chart 17). This problem will eventually have to be solved through Eclipse- and/or web-based frameworks that enable developers to work on multiple platforms using a common set of tools.

Is the convergence of new technologies driving the need for web/mobile/distributed development teams to better understand the mainframe?

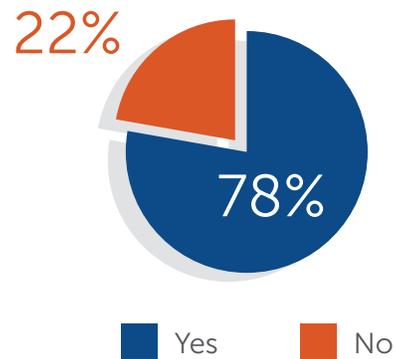


Chart 16: CIOs believe that mainframe and non-mainframe teams have to work together in a more unified way to maximize productivity and control costs.

Are your development teams organized into technology/language silos?

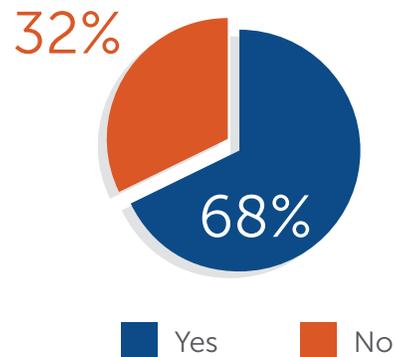


Chart 17: Organizations have a long way to go before they can develop applications across platforms as seamlessly, flexibly and efficiently as they would like to.

Above and beyond the technical issues that isolate the mainframe from the rest of the IT organization, underlying cultural issues also pose a challenge for CIOs. Mainframe teams, for example, have built a “culture of excellence” over decades that admirably achieves high reliability through a highly-cautious approach to testing and updates—but that can also create business risk by failing to respond quickly enough to changing business needs. IT leaders must therefore think about the skills and tools that a new generation of developers will need in order to make the most of mainframe-resident IP, and bring a Lean/Agile mentality to the mainframe workplace to facilitate innovation and responsiveness to relentlessly changing market conditions (see chart 18).

Finally, it is worth noting how high CIOs believe the stakes are when it comes to the health of their mainframe environments. Any failure to sustain mainframe IP represents a huge risk to the business in terms of lost revenue, lost productivity, reputation damage and non-compliance (see chart 19).

Is mainframe culture an obstacle to Agile cross-platform development?

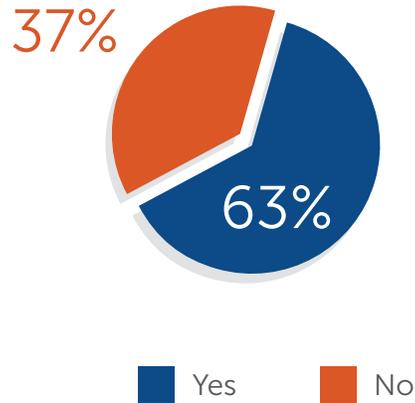


Chart 18: Integration and optimization of mainframe development is a cultural issue as much as a technical one.

How much would a single major mainframe outage cost your organization?

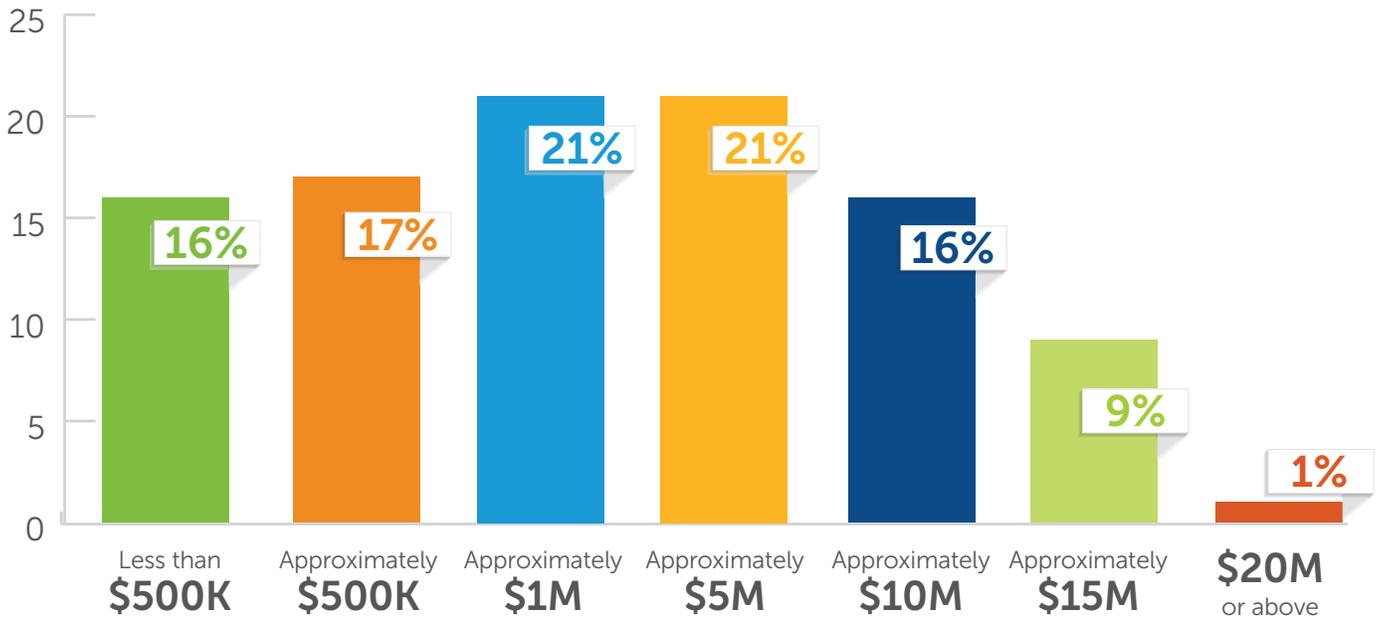


Chart 19: The potential financial impact of mainframe problems makes it imperative to diligently protect the platform’s IP.

Conclusion

CIOs value the mainframe. They value its power, its economy and—most important of all—the magnitude of the investment their organizations have made in the intellectual property it hosts in the form of application code.

CIOs also recognize that there are challenges ahead as responsibility for preserving and advancing that intellectual property shifts from veteran mainframe developers and operators to a new generation of technical staffers who are far less familiar with the platform's technical complexities and who will likely not have sufficient documentation for the applications they will be required to manage.

However, CIOs clearly need to accelerate their preparations in anticipation of this generational shift. Too many are not yet engaged in facilitating the transfer of mainframe responsibilities from Baby Boomers to the incoming generation of developers—and even those who are engaged may not be putting the right tools, processes and culture in place to ensure that their organizations can fully leverage their mainframe IP to optimize their competitiveness in the digital economy.

This acceleration has to happen now. The clock is ticking on the generational shift. Those who beat the clock will be glad they have done so. Those who don't will probably regret not having acted sooner and more decisively.

SURVEY METHODOLOGY

Commissioned by Compuware and conducted by independent research company Vanson Bourne, the survey was administered to 350 CIOs at large companies covering a cross-section of vertical markets in Australia, Benelux, France, Germany, Italy, the U.K. and the U.S.

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