



# The Business Value of the Transformative Mainframe

An IDC White Paper, Sponsored by Broadcom Inc. and IBM

**Authors:** Peter Rutten, Matthew Marden



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**Authors:**  
Peter Rutten  
Matthew Marden

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## Business Value Highlights

**>6:1**

ratio of benefits to costs

**\$194 million**

per year higher/protected revenue per organization

**19%**

lower mainframe cost of operations

**64%**

more code releases

**30%**

more efficient mainframe management

**14%**

lower hardware/licensing costs

**43%**

less unplanned downtime

# The Business Value of the Transformative Mainframe

## IDC OPINION

The digital customer experience has emerged as the quintessential business driver today. In response, the mainframe has evolved from siloed to connected to transformative, thanks to continuous innovations in the hardware, software, and partner ecosystem. IDC research has determined that organizations can derive significant value from the mainframe platform's ability to serve as part of a hybrid cloud environment, present easy-to-view graphical interfaces, run open source application development languages, and be highly analytics driven and automated. What's more, even as it is being integrated with the distributed environment and opened up for mobile and cloud connectivity with APIs, the platform continues to be as secure as ever, protecting mission-critical data and applications. Businesses that modernize their mainframe drive greater value because it makes the platform more integrated and agile. As such, they achieve a new operational baseline in which the platform fully participates in their digital transformation — which is why IDC has termed it the *transformative mainframe*.

IDC interviewed organizations that have leveraged the capabilities of today's mainframes and tools alongside new technologies to transform their platforms into a more efficient and business-enabling IT solution. They reported improved system agility, security, and performance, thereby allowing them to tap into new revenue streams, protect their existing businesses, and realize cost and operational efficiencies.

IDC projects that these study participants will realize average benefits worth more than 6x what they invest to transform their mainframe platforms. This will be accomplished primarily by ensuring that their businesses have a platform for expanding and maintaining their revenue base while delivering more flexible, efficient, and cost-effective mainframe platforms. One organization that was interviewed explained: *"Our mainframe initiatives have given us capacity as the business grows ... . We're protecting our business by reacting faster to any changes in business processes, strategy changes, and our competitors."* As a result, these organizations linked significant amounts of revenue — \$194 million per organization on average — to having a transformative mainframe while citing important staff productivity gains and cost optimization.

Digital Transformation requires tools and technologies that contribute to breaking down silos, not create new ones. They need to be open rather than proprietary. They must be commonly used and understood, not requiring rare expertise. They must be deployment agnostic, meaning that they function across private and public clouds with ease. And they need to be core friendly.

As IDC’s research demonstrates, the overall outcome of delivering a “transformative mainframe” platform to study participants’ businesses enables better integration across organizational IT operations, delivery of IT resources and services in a more timely and efficient manner and, ultimately, a competitive advantage to maintain and grow their businesses by meeting or exceeding customer expectations.

## Situation Overview

Not too long ago, technology was a purely supportive business function, but it is the dominant force in organizations today. Every business is a digital business, with few if any exceptions — this reality has dawned on even the most laggard of companies. And customer experience is where the digital battle is being fought.

That means that the CIO or CTO has been put in the driver’s seat, more or less presiding over a company that is going through technology-driven turmoil. Changing focus to the digital realm has been branded “digital transformation.” It involves a significant rethinking of how the business is structured, what skills people need, what kinds of collaborations are required, and how IT is integrated into the organization. It also requires a rethinking of the tools and technologies that IT leverages to bring this new digital business to life.

These new tools and technologies must have a few things in common. They have to contribute to breaking down silos, not create new ones. They need to be open rather than proprietary. They must be commonly used and understood, and not require rare expertise. They must be deployment agnostic, meaning that they function across private and public clouds with ease. And they need to be core-friendly, meaning that they play just as well with the traditional core workloads as they do with next-generation applications.

It is revealing while considering what drives businesses that are going through these structural changes to the cloud. It’s not necessarily what the cloud offers, but rather what the cloud is being perceived to offer. For example, IDC research shows that the most prominent factor considered by organizations that are using cloud services is that the lines of business (LOBs) demand more agility and speed from IT. What they hope to achieve first and foremost from using cloud services is improvement in the experience they provide to their customers.

While the LOBs push for cloud, IT has been gravitating toward a more comprehensive approach, namely, hybrid cloud — bringing a private cloud with the organization’s core data together with the advantages that public clouds offer in terms of ease of provisioning, scalability, access to third-party data/processes, and so forth. Hybrid cloud — and at a later stage multicloud — is the most logical way to

IDC research has determined that around 50% of organizations are using a hybrid cloud model in a relatively advanced fashion.

combine deep, valuable, and secure assets with fast, dynamic availability of third-party resources. This is especially true for organizations whose business depends on very large, high-speed transactional mainframes.

## The State of Hybrid Cloud

IDC research has determined that around 50% of organizations are using a hybrid cloud model in a relatively advanced fashion (IDC's *CloudView* Survey, April 2018; n = 5,740, with 24.4% of businesses responding having 5,000+ employees), while an additional third of organizations say they are planning to implement such capabilities. For example, across the clouds they deploy, organizations perform centralized provisioning with a common service catalog, employ open and integrated delivery pipelines that support workload portability, operate with consolidated management and operations, and have implemented centralized security with process and tools for governance, visibility, and control.

Nearly 50% of organizations have been keenly aware of the processes and skill sets they need to enable such a hybrid cloud model. For example, they have implemented consistent processes to identify which applications can best benefit from public or private cloud. Their staff has the skills to fully exploit cloud management, automation, and monitoring tools. They have the ability to monitor, forecast, and optimize server, storage, and network resources. And, here too, an additional one-third of organizations are saying that they are not there yet but that they have plans to bring these capabilities on board.

As to the tools, between a third and half of businesses say they leverage tools and technologies for service-level monitoring and reporting across their hybrid cloud applications; they run automation, self-service, and orchestration tools; they have mechanisms for measuring the value of the services they provide; they develop custom applications with microservices architecture; and they support Internet of Things (IoT) and other real-time analytics-based initiatives. A little more than a third have implemented DevOps and REST APIs with life-cycle capabilities.

There are many overlapping reasons for pursuing cloud strategies, including the desire to improve staff productivity, lower IT budgets, achieve simplification and standardization of infrastructure and application platforms, and get better time to market. But businesses say that the two most important reasons for their cloud strategy (whether, private cloud, public cloud, hybrid cloud, or multicloud) are improving security and achieving business agility. Anecdotal evidence suggests that the former is a driver for smaller businesses and the latter for larger ones.

## Mainframe Evolution: From Siloed to Connected to Transformative

These trends around pursuing cloud strategies have been evolving on all fronts within most organizations, except for those with a mainframe in the datacenter. Until about five or six years ago, IT had a tendency to “let the mainframe be the mainframe” while the rest of the datacenter went through massive renewal, including the move toward hybrid cloud. The propensity to exclude this platform from the modernization surge ended quite suddenly in the mid-2010s. At that time, the initial migration wave off the platform had subsided, and IBM introduced the IBM z13, which propelled the hardware into the modern era with an abundance of innovations. Moreover, software developers introduced a plethora of modern tools for running the mainframe as an agile and integral part of the overall datacenter.

In 2016, IDC research determined that businesses had started including the mainframe in their rethinking of the datacenter. They began to modernize on the platform, leveraging the new hardware and software capabilities, and subsequently initiated strategies to integrate the platform with the distributed side of the datacenter as well as the cloud. At the time, IDC identified the following common modernization and integration initiatives: running Java on the platform, API usage to connect to external networks, enablement of mobile app access to the mainframe, and web enablement. At the same time, innovators and early adopters among mainframe businesses were engaged in leveraging Linux on the platform, integrating the platform into their DevOps process, supporting agile app development on the platform, and enabling the concept of mainframe as a service. IDC labeled this the era of the “connected mainframe.”

IDC’s latest research, the results of which are presented in the subsequent sections of this white paper, reveals a next stage in mainframe evolution. DevOps and Agile development on the platform have jumped from the early adopter stage in 2016 to becoming common among mainframe businesses. Hybrid cloud, which was only being practiced by innovators among mainframe-operating businesses in 2016, has become common practice, with the platform acting as a private cloud that interacts with other private clouds and — increasingly — with public clouds.

Moreover, businesses have developed important additional capabilities on their mainframes — for example, leveraging microservices as well as performing analytics. Innovators today have started to build IoT capabilities into their mainframes, and early adopters are running machine learning (ML) and blockchain applications on the platform. The business value that these initiatives represent is profound, but what’s even more important is the cultural shift that has taken place. This IDC research shows that the platform is becoming an integral part of the business in the quest for digital transformation. We have therefore labeled it the “transformative mainframe.”

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Businesses also said that they are increasingly developing applications for cross-platform deployment.

## The Transformative Mainframe Is Agile

One of the big jumps that has turned the connected mainframe into a transformative mainframe has been the adoption of agile processes that empowered businesses to respond faster to market dynamics, resulting in a significantly improved customer experience. All the businesses interviewed for this research stated that they understand the importance of agility and that they have implemented agile processes on the platform or are in the process of doing so. One organization said about its mainframe operations: *“Agility is very important because you have to be able to react very quickly to demand. [...] We have implemented Agile development, [...] also automated testing [...], for faster time to market. The benefits are faster [cycles] and higher quality.”* A mainframe staff member from another organization commented: *“[...] We have the Agile development methodology. We do iterations, sprints, etc.; [...] we use agile processes for all our development and follow the agile principles closely.”*

With regard to code releases, one business stated: *“We have one release a month now. It used to be done quarterly. We are looking to reduce it further.”* And another stated: *“We have two-week sprints. We are rolling out new code that’s fit for purpose every two weeks now. At the end of each sprint, we roll out new code. Before we modernized it was probably once a quarter. It’s a big improvement.”* Another business said that its mainframe was now keeping up with the distributed environment in terms of application development cycles. And yet another commented: *“We continue to improve applications and the users don’t even notice.”* Automation is speeding up code releases and at the same time reducing required staff among these businesses.

Businesses also said that they are increasingly developing applications for cross-platform deployment. For example, one organization develops Java applications that run under Linux on both distributed servers and the mainframe. One way this is achieved by not just integrating the platform with the distributed side of the datacenter but also integrating the teams into a single cross-platform application development team.

## Skill Sets Are Transforming Too

Another important factor is skills. There are many sets of skills that mainframe businesses are depending on, but two of them that have been subject of some concern are administrators and application developers. Until a few years ago, mainframe administrators were perhaps a retiring breed, as were application developers in traditional languages such as COBOL.

The results of these efforts are now visible. Organizations that IDC interviewed had junior mainframe administrators to varying degrees, ranging from a few individuals to as many as 30% of the entire mainframe admin staff.

Mainframe hardware and software vendors saw this phenomenon take place among their thousands of customers and aggressively responded in various ways. First of all, they reduced and changed the interfaces while introducing more and more automation, requiring fewer complex human interactions to operate the platform. They modernized the remaining interfaces or opened them up to industry-standard tools, such as Git and Splunk, so that when developer intervention is needed, it can take place in a user-friendly fashion with easy-to-grasp visualizations. They also deployed this capability to work across platforms from mobile to mainframe, on-premise, and in the cloud.

For application developers, the tooling now exists to use Kubernetes, Docker, and other popular cloud orchestration models. Various open source tools that are key to DevOps are available on the platform, such as Jenkins and SonarQube for continuous integration and continuous delivery (CI/CD). Previous difficulties to use Git, the de facto software configuration management (SCM), on the mainframe have been alleviated. Through an industry effort called Zowe, the platform has been opened up to familiar and popular open source languages. IBM, Broadcom (formerly CA Technologies), and Rocket Software launched the mainframe community called the Open Mainframe Project and developed Zowe in 2018, and Zowe 1.0 was released in February 2019. Finally, many vendors and even customers in the mainframe ecosystem launched significant initiatives to introduce computer science graduates and young developers to the platform.

The results of these efforts are now visible. Organizations that IDC interviewed had junior mainframe administrators to varying degrees, ranging from a few individuals to as many as 30% of the entire mainframe admin staff. They also mentioned that, with the modernization of mainframe tools and developer cross training, attracting young talent has become easier, both internally and externally. One organization said: *“We’re using modern technology now, and when you use modern technology it’s easy to recruit people. [...] Also, the people inside who work on the platform feel better about their role because they are using modern technology. All the techies want to use the modern stuff.”*

### **If It’s Not Secure, It’s Not Transformative**

The customer experience has become the central tenet of business today. All technology mandates are geared toward this. As mentioned previously, this is the battlefield where organizations win or lose. One of the easiest ways to lose, regardless of the level of delight that an organization has invoked among its customers, is to expose them to a security breach; personal information, credit card information, social security numbers, bank account data, browsing activity, and

IDC has determined that security is the top concern among IT with regard to private clouds, hybrid clouds, public clouds, and multiclouds.

shopping behavior — with everything becoming digital, everything becomes vulnerable to attack. The potential revenue loss from an attack can be in the tens or even hundreds of millions of dollars, but the loss of trust among customers is nearly irrecoverable. Security therefore is paramount. IDC has determined that security is the top concern among IT with regard to private clouds, hybrid clouds, public clouds, and multiclouds.

Security on the somewhat isolated mainframe has traditionally been greater than in the sprawl of commodity hardware, which can be attacked much more easily. Massive homogeneity can cause an attack to spread like wildfire. But as businesses started modernizing, connecting, and integrating their mainframes with the distributed infrastructure and the cloud in the mid-2010s, mainframes were exposed to increasing security threats. Although some businesses told IDC that they believe their mainframe is “bullet proof” or that the number of attacks they experience is “zero,” attacks on mainframes have occurred at other organizations, and IT wasn’t always immediately aware of them.

With the latest two generations of mainframe hardware, and thanks to new security-targeting tools and software, interviewed administrators at mainframe businesses said they now felt even more secure than before. One organization stated: *“We’re actually more secure. Connecting to other applications didn’t reduce it. In fact, we’ve taken action to be more secure.”* Another said: *“The new machines make it less hard because the software that the machines run just have better quality. There’s new firmware. There’s new microcode. And all of that stuff continues to be enhanced to protect yourself from security exposure.”*

As to the ability to identify and handle security breaches faster, business say that they can respond much faster, thanks to the ongoing monitoring and analytics capabilities that they have installed to identify anomalies. One mainframe business said: *“The monitoring is the part that has been most helpful, and pattern analysis has helped us a lot with anomaly detection. We identify [security breaches] faster to prevent them. [...] Hopefully we can identify 100% now. I would say it’s close to 100%.”* Automation has made a difference. Some businesses say that they were catching every instance of a security breach, but they were doing so by having staff manually go through the logs. These organizations are now using tools that automate the process, freeing up their staff to do more productive work.

## Powering the Business

Being agile, easier to interact with, and even more secure than before — even as the platform is opening up — has changed the way the platform is being leveraged and perceived. One large bank said: *“You can get approved for a loan via an app within minutes. [...] That wouldn’t be possible without the modernized mainframes.”* Another said: *“We can take on any additional workload [...] in a very short period of time. If [the LOBs]*



“[The modernized mainframe] has given us the capacity as the business is growing. We have an algorithm for growth, and it helps us hit our targets and grow.”

“Before there was a push to reduce the presence of the mainframe. Now with the modernized tools, people see more need to stay with the mainframe.”

IDC interviewed organizations with significant mainframe operations (23 mainframes on average). Mainframes are central to these organizations’ businesses, with an average of 65% of their revenue running on or touching their mainframes.

want to do some kind of marketing campaign, [...] it can just happen. They don’t have to worry about [...] the infrastructure.” A third stated: “[The modernized mainframe] has given us the capacity as the business is growing. We have an algorithm for growth, and it helps us hit our targets and grow.” Yet another commented: “We can aggregate data faster. I think it just keeps us in the game. It allows us to get ourselves in a position where we are able to make decisions that much faster [...] so we [...] make more money.”

In the sections that follow, various aspects of the transformative mainframe are further quantified.

## Business Value of Mainframe Transformation

IDC’s research demonstrates the significant impact for study participants from both IT and business perspectives of taking steps to transform their mainframes. Through investment in modern mainframes and tools, adoption of technologies such as APIs, analytics, hybrid cloud, microservices, and containers, and leveraging approaches such as DevOps and agile methods, these organizations ensure that their mainframes can efficiently and robustly address business demand. This not only generates significant value for study participants — including almost \$200 million per year per organization in new and protected revenue — but has altered perceptions of the mainframe and its role going forward for some organizations:

- » **Financial services organization, North America:** “Before there was a push to reduce the presence of the mainframe. Now with the modernized tools, people see more need to stay with the mainframe.”
- » **IT services provider, North America:** “We’ve added new functionality on top of existing mainframe capabilities. There are two things that our business and customers ask for: optimization, meaning running faster, better, and cheaper; and modernization, meaning providing interoperability between the mainframe and the cloud technology.”

### Firmographics of Study Participants

IDC interviewed organizations with significant mainframe operations (23 mainframes on average). Interviews were designed to understand the qualitative and quantitative impact of taking steps to transform their mainframe environments. Study participants provided the experiences of large enterprises (87,409 employees on average) with annual average and median revenue in the tens of billions of dollars (\$31.28 billion and \$12.78 billion, respectively). Mainframes are central to these organizations’ businesses, with an average of 65% of their revenue running on or touching their mainframes. For more details about interviewed organizations, see Table 1.

TABLE 1

Demographics and Mainframe Environments of Interviewed Organizations		
	Average	Median
Number of employees	87,409	25,000
Number of IT staff	22,376	2,500
Number of business applications	1,679	1,000
Revenue per year	\$31.28 billion	\$12.78 billion
Number of mainframes	23	15
Number of MIPS	101,387	88,000
Revenue running on mainframes	65%	60%
Countries	United States (6), United Kingdom (2), Canada, Switzerland, Israel	
Industry	Financial services (5), insurance (3), government, managed services, retail	

n = 11  
Source: IDC, 2019

## Mainframe Transformation Initiatives

For purposes of this white paper, IDC asked study participants about the impact of investment in and use of new technologies and approaches for their mainframe to optimize use and better support innovation and transformation. Overall, these investments and initiatives fall into four broad categories related to transforming their mainframe platforms.

Investment in **new mainframe hardware and/or software** including:

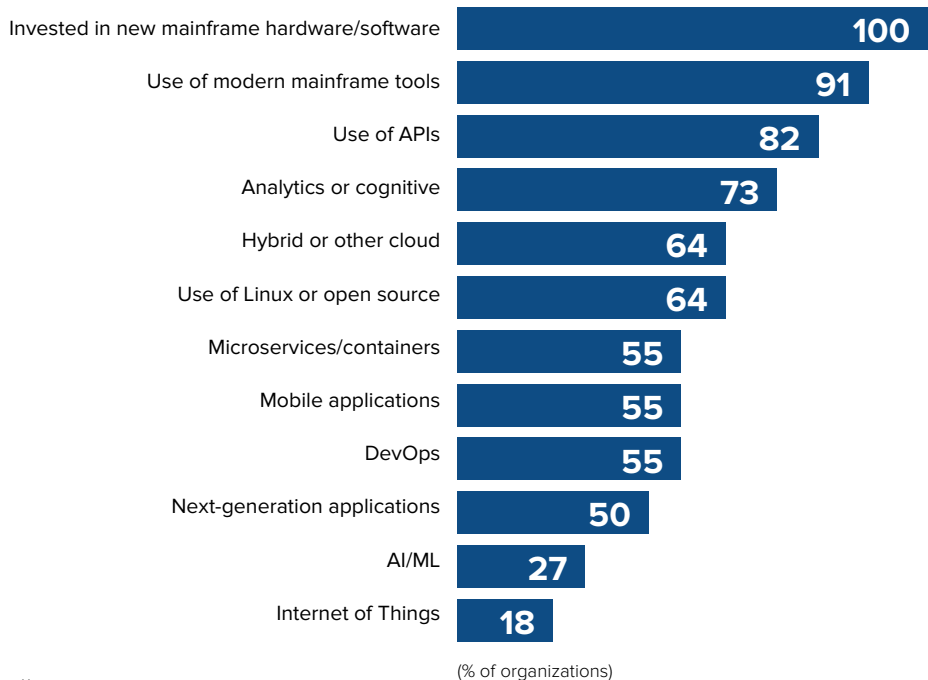
- » Mainframe **hardware**
- » Use of software **tools** from the mainframe ecosystem, including third-party ISVs and IBM, designed to optimize mainframe use and performance
- » Adoption of **approaches and solutions that connect the mainframe to broader IT environments** and bring new technologies to the mainframe (e.g., APIs, Linux, open source, microservices/containers, DevOps)
- » Use and delivery of **new technologies through applications running on the mainframe** (e.g., analytics/cognitive, hybrid or other cloud, mobile applications, next-generation applications, artificial intelligence (AI)/machine learning, Internet of Things)

Transformation has different specific connotations at each interviewed organization but shares a commonality in investing in technologies and approaches for improved performance, greater agility, and efficiencies.

Figure 1 demonstrates the extent to which interviewed organizations have undertaken these investments and initiatives designed to help them strike the right balance between innovating and continuing to run their mainframe platforms. All interviewed organizations have undertaken at least five of the investments/initiatives (maximum of 10 for any one organization), and at least half of interviewed organizations have undertaken every type of investment/initiative except for two of them, showing the depth and breadth of mainframe platform transformation efforts among study participants. Thus transformation has different specific connotations at each interviewed organization but shares a commonality in investing in technologies and approaches for improved performance, greater agility, and efficiencies.

**FIGURE 1**

### Mainframe Transformation Initiatives Undertaken by Interviewed Organizations



n = 11  
Source: IDC, 2019

Overall, IDC projects that study participants can expect 6.2x more benefits than investment costs in transforming their mainframe platforms.

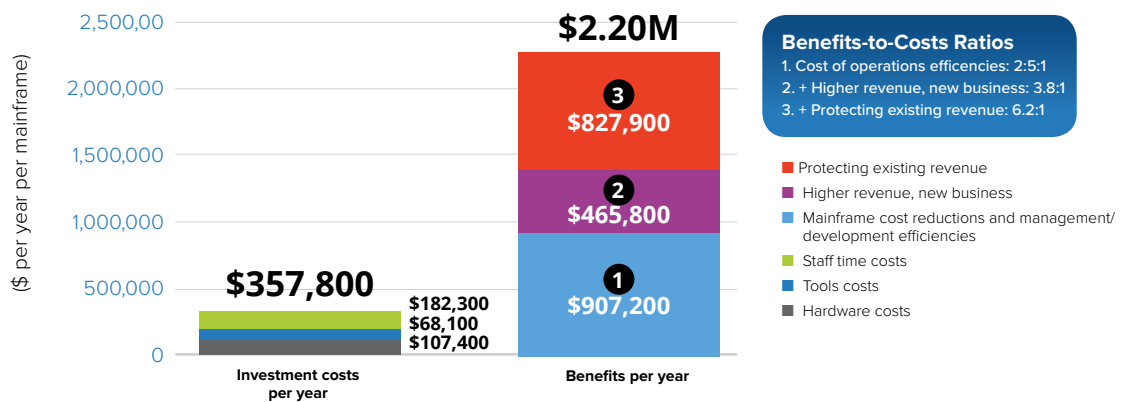
### Quantifying the Value of Mainframe Transformation

IDC’s analysis shows that study participants are realizing significant value with the transformational capabilities of today’s mainframes and tools. They can tap into new revenue and protect their existing business while running transactions uninterrupted, faster, more securely, and at lower cost. This results in the realization of significant value relative to their investment in hardware, tools, and other initiatives designed to transform their mainframes. As shown in Figure 2, the relative value of expected benefits increases as they leverage mainframe transformation to expand and protect their businesses. Overall, IDC projects that study participants can expect 6.2x more benefits than investment costs in transforming their mainframe platforms (see Appendix for more details about how benefits were calculated):

- » **Mainframe cost and operational efficiencies, 2.5x benefits to costs:** Study participants will realize mainframe-related cost savings, management team efficiencies, and developer productivity increases that outweigh costs by about a 2.5:1 ratio.
- » **Efficiencies and higher revenue, 3.8x benefits to costs:** Study participants will increase their revenue through the delivery of new and more timely, robust, and functionality services and products that will bring this ratio of benefits to costs to closer to 3.8:1.
- » **Efficiencies, higher revenue, and protected revenue, 6.2x benefits to costs:** Study participants further increase the relative value of their efforts to transform their mainframes by protecting existing business through improved agility and performance, which would bring the total benefits to costs ratio to around 6.2:1.

FIGURE 2

### Annual Benefits Versus Costs per Mainframe from Transformation Initiatives



n=11  
Source: IDC, 2019

Interviewed organizations reported that their investments and initiatives designed to transform their mainframe platforms — including greater use of APIs and DevOps approaches and automation of changes and updates to applications — have gone a long way to instilling needed agility.

“We now have two-week sprints in which we are rolling out new code. Before, it was probably once a quarter — it’s a big improvement.”

—An EMEA insurance company

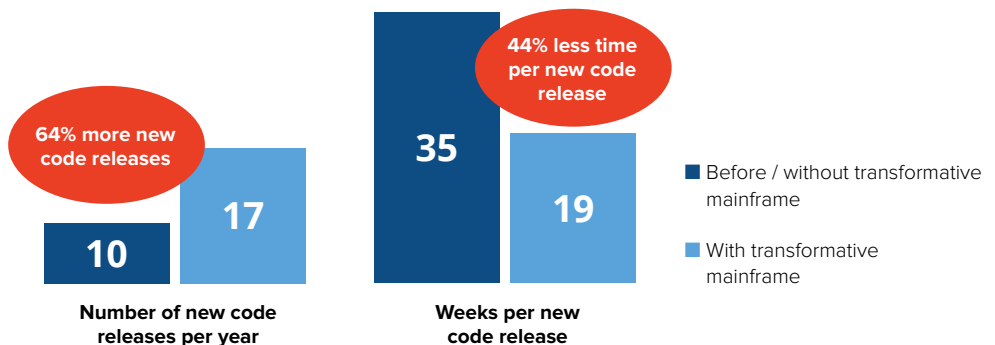
### Agility and Development Benefits

Study participants explained that the need for greater mainframe agility was a key consideration in deciding to transform their mainframe platforms. They understand that demand for more frequent releases and updates to applications and features requires having more agility, openness, and flexibility. An EMEA financial services organization commented: *“Agility in development is getting more important because everything’s moving faster. We need to keep up [and] release new features faster and closer to real time.”*

Interviewed organizations reported that their investments and initiatives designed to transform their mainframe platforms — including greater use of APIs and DevOps approaches and automation of changes and updates to applications — have gone a long way to instilling needed agility. This is especially true in terms of code releases at the heart of development activities. An EMEA insurance company commented: *“We now have two-week sprints in which we are rolling out new code. Before, it was probably once a quarter — it’s a big improvement.”* A North American financial services organization echoed this level of improvement: *“We have a lot of new development into new products for the financial services vertical ... .We’re now releasing new code monthly, and before, being generous, we were releasing code once a quarter or twice a year.”* Interviewed organizations also mentioned using DevOps tools such as Jenkins and Splunk on their mainframe platforms. Overall, study participants now have more code releases (64% more) and need less time per code release (44% less time), thereby providing agility for a key component of development efforts (see Figure 3).

**FIGURE 3**

### Impact on Code Releases



n = 11  
Source: IDC, 2019

Study participants have translated increased agility into significant efficiencies related to application development activities on their mainframe platforms. As shown in Table 2, these benefits relate to delivering more functionality to the business (59% more new applications, 112% more new features) at a faster cadence (27% faster development life cycle for new applications, 52% faster for new features). A North American financial services organization explained: *“We’ve implemented Agile development on our mainframe and several tools ... . We still schedule releases in production for every month, but we now have automated testing, which has been a major impact and ultimately the users get the changes a lot quicker.”* Ultimately, the ability to deliver new functionality in a robust and timely manner means that developers working on these organizations’ mainframe platforms deliver more value to their organizations, which IDC quantifies as a 17% average productivity gain (see Table 2).

**TABLE 2**

Application Development KPIs				
Number of new applications/ features developed	Before/Without Transformative Mainframe	With Transformative Mainframe	Difference	Benefit with Transformative Mainframe (%)
Number of new applications per year	5	8	3	59
Number of new features per year	296	626	330	112
<b>Development life cycle (weeks)</b>				
New applications	69	51	18	27
New features	20	10	10	52
<b>Developer productivity</b>				
Equivalent value of development team	426	497	71	17

n = 11  
Source: IDC, 2019

### Management and Economics Benefits

Study participants also tied their mainframe transformation efforts to establishing more efficient and cost-effective mainframe operations. For organizations relying on the mainframe to deliver significant numbers of business applications to users and customers, changing baseline mainframe economics is quite important.

With interviewed organizations’ businesses relying heavily on their mainframe platforms (65% of revenue running on or tied to the mainframe, refer back to Table 1), they have sizable teams managing and supporting their mainframe environments. Thus they face dual imperatives: they not only need to make their mainframe environments as efficient as possible but also ensure that they are able to hire and retain talented staff for whom there is often significant competition.

Interviewed organizations consistently attributed efficiencies in managing their mainframe environments to their transformation efforts. Investment in new hardware, tools, and technologies has brought them new functionality and capabilities that their mainframe management teams can leverage to work more efficiently. A North American financial services organization tied staff efficiencies to machine learning–driven pattern analysis: *“With machine learning and pattern analysis, our mainframe management team can access and identify data much faster ... . We’ve avoided hiring probably 250–300 staff members as a result.”* Meanwhile, an EMEA retail company related its transformation efforts to improved staff recruiting and satisfaction: *“We’re using modern technology now, which makes it easier to recruit staff ... . Also, the people inside who work on the mainframe feel better about their role because they are using modern technology.”* IDC calculates that interviewed organizations’ management teams are 30% more efficient (see Table 3).

“With machine learning and pattern analysis, our mainframe management team can access and identify data much faster... We’ve avoided hiring probably 250-300 staff members as a result.”

– A North American financial services organization

TABLE 3

Impact on Mainframe Management				
FTEs per Organization Equivalent Workloads	Before/Without Transformative Mainframe	With Transformative Mainframe	Difference	Benefit with Transformative Mainframe (%)
FTEs per organization to manage mainframes	211	147	64	30
Hours of staff time per mainframe per year	17,604	12,251	5,353	30
Hours of staff time per 100 users per year	1,332	927	405	30

n = 11  
Source: IDC, 2019

“We’re using tools like specialty engines to optimize our mainframe costs [and] saving anywhere from 20% to 30% on mainframe licensing.”

– A North American managed services provider

IDC finds that at this level of mainframe management and cost efficiencies, study participants will reduce the cost of operating their mainframe platforms by an average of 19% over five years.

Meanwhile, study participants have also reduced direct licensing costs of using their mainframe platforms. They described leveraging tools such as specialty engines and efficiencies from hardware and technological upgrades. Modern tools enable these organizations to run mainframe workloads more efficiently, which helps them optimize licensing use. A North American managed services provider noted: “We’re using tools like specialty engines to optimize our mainframe costs [and] saving anywhere from 20% to 30% on mainframe licensing.” Further, upgrades to new mainframe hardware, including deployment of the IBM z14 by a number of interviewed organizations, mean better performance-to-cost ratios, allowing for more cost-effective running of mainframe workloads. IDC calculates that study participants reduce hardware and licensing costs by 14% on average.

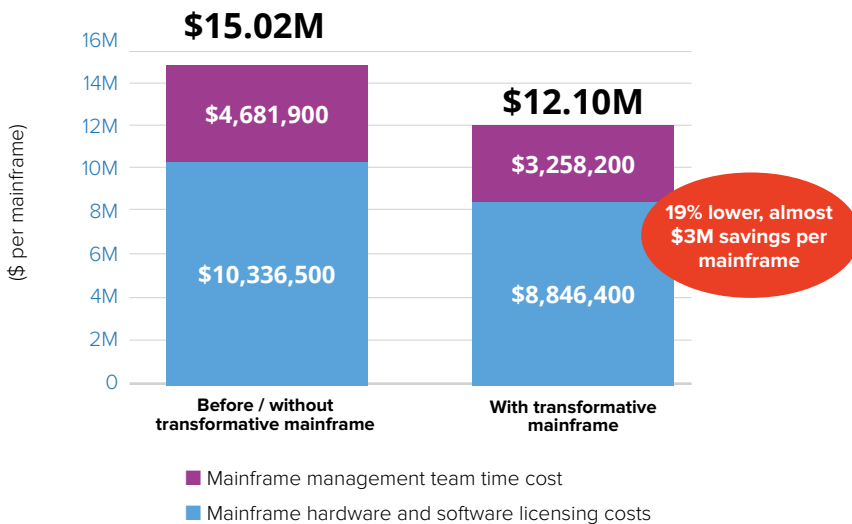
IDC finds that at this level of mainframe management and cost efficiencies, study participants will reduce the cost of operating their mainframe platforms by an average of 19% over five years through their mainframe transformation efforts, by:

- » Using mainframe and application licenses more cost effectively
- » Requiring less management team time to manage and support equivalent workloads

IDC calculates that over five years, this would equate to direct licensing cost savings and staff time efficiencies worth almost \$3 million per mainframe (see Figure 4).

**FIGURE 4**

### Five-Year Cost of Operations per Mainframe



n=11  
Source: IDC, 2019



Interviewed organizations have brought down already low levels of unplanned outages by an average of 43%, thereby not only reducing productive employee time lost to unplanned outages but also minimizing business and reputational risk associated with outages.

### Security and Performance Benefits

Study participants also described improving the security, availability, and performance of their mainframe platforms through their transformation efforts. As the platform for their systems of record and core business applications, interviewed organizations can ill afford outages or high risk related to security breaches and compliance issues. Study participants described various ways that they have leveraged new technologies, including pervasive encryption and pattern analysis, and approaches to improve security and performance:

- » **Leverage cryptography capabilities, a North American financial services organization:** *“We now have cryptography cards on our mainframes, so our virtual tapes and our mainframe discs are encrypted at rest ... . We’re more secure as a result.”*
- » **Significantly faster identification of threats, a North American financial services organization:** *“Improved monitoring has been most helpful for security — pattern analysis has helped us with anomaly detection. We’re able to identify threats to prevent them from becoming impactful incidents ... . It used to take us days to identify threats, and now we can pre-alert to identify within an hour before the actual breach happens.”*

Table 4 demonstrates how study participants have reduced operational risk related to outages and security breaches through the mainframe transformation efforts. Interviewed organizations have brought down already low levels of unplanned outages by an average of 43%, thereby not only reducing productive employee time lost to unplanned outages but also minimizing business and reputational risk associated with outages. Meanwhile, they reported making substantial strides in identifying potential security breaches in near real time, going from needing a full day or more to less than half an hour (96% faster). For interviewed organizations, this faster identification may provide the opportunity to prevent a security threat from exerting a negative effect on employees, business results, and reputations.

TABLE 4

Impact on Unplanned Downtime and Security				
Unplanned downtime	Before/Without Transformative Mainframe	With Transformative Mainframe	Difference	Benefit with Transformative Mainframe (%)
Unplanned outages per year per organization	4.7	2.6	2	44
Minutes of lost productive time per year per user	21	12	9	43
FTE impact, lost user productivity per year	5.6	3.2	2.4	43
<b>Security</b>				
Time required to identify potential security breach (hours)	10	0.4	9.6	96

n = 11  
Source: IDC, 2019

Interviewed organizations rely on their mainframe platforms to support and drive significant parts of their overall businesses (65% of revenue on average), accounting for tens of billions of dollars of revenue per year.

IDC calculates that this group of organizations links almost \$200 million in revenue per year to their mainframe transformation investments and initiatives. In short, their mainframes are better able to serve as a platform from which they can drive new business and maintain existing customers.

“We’ve improved business results as the result of our mainframe initiatives (...) we aggregate data faster, (...) make decisions that much faster (...), and make more money — probably 10–15% higher revenue.”

– An EMEA insurance company

## Business Enablement Benefits

Interviewed organizations rely on their mainframe platforms to support and drive significant parts of their overall businesses (65% of revenue on average), accounting for tens of billions of dollars of revenue per year. Their platforms must have the functionality, performance, and scalability to not only maintain this existing business but also allow for addressing business growth opportunities as they arise. For study participants, this means having a mainframe platform that can accommodate growth and adapt to changing customer demand patterns. According to study participants, their efforts to transform their mainframe environments have positively impacted their ability to maintain and grow their businesses through improved agility, performance, and economics.

IDC calculates that this group of organizations links almost \$200 million in revenue per year to their mainframe transformation investments and initiatives (see Table 5). In short, their mainframes are better able to serve as a platform from which they can drive new business and maintain existing customers. Study participants provided specific examples of how their “transformative mainframes” have enabled these types of business gains:

- » **Leverage data to drive business, an EMEA insurance company:** *“We’ve improved business results as the result of our mainframe initiatives (...) we aggregate data faster, (...) make decisions that much faster (...), and make more money — probably 10–15% higher revenue.”*
- » **React more quickly to market-driven changes, an EMEA retail company:** *“Our mainframe initiatives have given us capacity as the business grows ... . We’re protecting our business by reacting faster to any changes in business processes, strategy changes, and our competitors.”*
- » **Improved performance to handle more transactions, a North American financial services organization:** *“We can execute more transactions, so we can process more data or more contracts, which means increased revenue. It’s probably around 1% more revenue.”*
- » **Able to easily handle business demand, a North American financial services organization:** *“The business can now run new workloads in a very short period of time. So if we want to do a new marketing campaign or add a new product, it can just happen ... . For example, with marketing campaigns, we ran one earlier in the year that could increase business significantly — by millions of dollars per year.”*

TABLE 5

Revenue Impact: Growing and Protecting Revenue Base		
Revenue impact, better addressing business opportunities	Per Organization	Per Mainframe
Additional revenue per year	\$70.00 million	\$3.11 million
Recognized revenue per year — IDC model*	\$10.50 million	\$465,800
Protecting existing business		
Revenue protected per year	\$124.44 million	\$5.52 million
Recognized revenue per year — IDC model*	\$18.67 million	\$827,900
<b>Total revenue impact</b>	<b>\$194.44 million</b>	<b>\$8.63 million</b>

n = 11

\* IDC model assumes a 15% operating margin for all additional revenue  
Source: IDC, 2019

## Challenges/Opportunities

### For Organizations

Most mainframe organizations are leveraging the hardware and software innovations that continue to evolve on the platform. For some businesses, however, the mandate to lift themselves up and evolve their mainframe into what IDC has labeled a *transformative mainframe* platform is not trivial. They are looking to:

- » Overcome the culture and status quo of doing things the way they've always been done.
- » Gain a comprehensive understanding of the platform's modern capabilities.
- » Articulate a vision to integrate the platform into the overall IT strategy for modernization, including a return on investment (ROI) from modernizing.
- » Develop insights into the tactical steps needed to modernize on the mainframe.
- » Allocate budget for investments in new mainframe hardware and software.
- » Recruit new staff with mainframe innovation skills.
- » Modernize important, but deeply embedded custom applications.

For these organizations, the strategic discussion around their mainframe has many variables, complicating an evaluation of the benefits of transforming on the mainframe. What this business value study demonstrates is that using their mainframe as the very foundation for IT and business renewal will pay off significantly in terms of agility, productivity, cost, customer experience, and new revenue.

The quantified business value results in this study unambiguously confirm that there is a distinct return on investment to be achieved from investing in the mainframe. Investments should be targeting analytics, machine learning, IoT, microservices, hybrid cloud, DevOps and Agile development, API usage, web enablement, and Linux on the mainframe. Most of all, businesses should not shy away from asking their mainframe vendors to support them in these initiatives.

## For Broadcom and IBM

The industry has made tremendous strides, innovating the mainframe from a siloed system into a connected and now a transformative platform. IBM has evolved the mainframe into a tens-of-thousands-of-transactions-per-second platform that has IDC's highest availability rating, and — with pervasive encryption — the industry's most innovative solutions for security.

In addition, both IBM and Broadcom have introduced many software innovations to evolve the mainframe into an open, agile enterprise computing platform that plays well in a hybrid cloud deployment model, requires no special skill sets from developers, and provides many options for leveraging the core data it harbors in new ways, such as with machine learning.

With IBM doubling down on the platform and Broadcom reemphasizing mainframe innovation after the CA Technologies acquisition, we expect this flow of new tools and technologies to open up the mainframe to continue far into the future. These vendors' greatest challenge is to help their customers overcome the aforementioned hurdles they face toward mainframe transformation.

IDC continues to believe that one important step to help businesses that are on the fence about transforming on their mainframe is a consumption model for the hardware. IBM has just introduced a dramatic change in software pricing with Tailored Fit Pricing, making it consumption based, much like a cloud pricing model, or optionally capacity based. At the same time, Broadcom recently introduced "Frictionless Value-Based Licensing" for z/OS software, which bases the licensing costs on actual MSUs consumed and improves customers' visibility and predictability of the software licensing costs, with several clients already onboarded.

For IBM, a future step could be making the hardware pricing more cloudlike as well. Other server OEMs have generated success with this model, albeit with much simpler products that have traditionally had simpler pricing models.

For Broadcom, there's an opportunity to take advantage of the increasing use of Linux on z. The company's z/OS software prowess and intentions to open the platform up would point in that direction — for example, by opening up its APIs so as to make it easier for customers to interact between Linux on z and z/OS as well as providing extensions beyond Zowe.

Another step for all mainframe ecosystem partners could be a clearly defined 10-step or 12-step packaged plan, ideally as a collaboration between them, that is affordable and transparent and that moves their customers along the path toward a transformative mainframe. Such a plan should not look and feel like an expensive, custom consulting offer. The barrier for customers to adopt such a plan should be minimal and the reasons not to participate hard to defend. It could enable customers to see the latent value of their mainframe and encourage them to unleash it.

## Conclusion

IDC has performed extensive research into the business value of modernizing on the mainframe, first three years ago and again with this current white paper. Our quantified findings consistently point to a profound business impact for any organization that makes the mainframe a driver for transformation in terms of revenue, productivity, and cost. The ROI of their mainframe transformation initiatives is significant and unambiguous. At the same time, IDC's qualitative findings tell a narrative of mainframe customers that have quite matter-of-factly built their digital transformation processes around the mainframe. They leverage the platform's tremendous capabilities in terms of hybrid cloud, DevOps, agility, open source tools and languages, APIs, AI, and so forth. For these organizations, the mainframe is a distinct platform of choice, one that combines critical capabilities that cannot be replicated and that is allowing them to be hypercompetitive and disruptive in their markets. While IDC cannot name the organizations that participated in this research, it is fair to state that all of them are widely admired for the customer experience they provide — thanks to their business models and transformation efforts.

## Appendix

### Business Value Calculations

Table 6 provides more detail about the areas of value that IDC has quantified that interviewed organizations are achieving through the transformation of their mainframe platforms (also refer back to Figure 2).

**TABLE 6**

Overview of Quantified Benefits Related to Transformative Mainframe Initiatives		
Type of Benefit	Description of Benefit and Assumptions	Value per Year per Mainframe
Mainframe cost reductions	Mainframe and application licensing cost reductions and avoidances related to optimization and improved performance of mainframe platform	\$298,000
Mainframe management efficiencies	Requirement of less staff time for day-to-day activities related to running and managing mainframes — average of 2.84 fewer full-time equivalent (FTE) staff members per mainframe — quantified with salary assumption of \$100,000 per FTE	\$284,700
Development staff efficiencies	More productive and efficient development teams working on mainframe platform due to increased agility and improved performance, quantified as worth 3.25 FTEs per mainframe, worth \$324,500 per mainframe per year using \$100,000 salary assumption	\$324,500
Higher revenue, new business	Better addressing and winning business opportunities with improved agility and performance, worth \$3.11 million in higher revenue per mainframe per year, quantified for model with a 15% operating margin assumption	\$465,800
Protection of existing revenue	Better maintaining existing business and ensuring that IT operations can meet changing business demand, value of potential revenue loss avoided of \$5.52 million per mainframe, quantified for model with a 15% operating margin assumption	\$827,900
Total quantified benefits per year per mainframe	See descriptions by individual category	\$2,200,900

n = 11

\* IDC model assumes a 15% operating margin for all additional revenue

Source: IDC, 2019

## Methodology

IDC used the following method for conducting the analysis informing this study's results and conclusions:

- 1. Gathered quantitative benefit information** during the interviews using a before-and-after assessment for interviewed organizations of their efforts to transform their mainframe platforms as described in this study. In this study, the benefits of transforming their mainframes included cost savings, IT staff time savings and efficiencies, higher user productivity, higher revenue, and revenue protected.
- 2. Created a complete investment profile based on the interviews.** Investments go beyond hardware and tool costs and can include additional costs related to migrations, planning, consulting, staff or user training, and staff time required to implement new technologies and approaches.

IDC's standard ROI methodology was utilized for this white paper. This methodology is based on gathering data from organizations that have undertaken steps designed to transform their mainframe platforms. Based on interviews with 11 organizations, IDC calculated the benefits related to these mainframe initiatives:

- » Measure the benefits from transforming their mainframes, including cost savings, IT staff time savings and efficiencies, higher user productivity, higher revenue, and revenue protected.
- » Ascertain the investment made in these mainframe transformation efforts.

IDC bases financial benefit and cost calculations on assumptions that are summarized as follows:

- » Time values are multiplied by burdened salary (salary + 28% for benefits and overhead) to quantify efficiency and productivity savings. IDC assumes a fully burdened salary of \$100,000 per year for IT staff, including developers, and \$70,000 for other employees, with an assumption of 1,880 hours worked per year.
- » Downtime values are a product of the number of hours of downtime multiplied by the number of users affected.
- » The impact of unplanned downtime is quantified in terms of impaired end-user productivity and lost revenue.
- » Lost productivity is a product of downtime multiplied by burdened salary.

- » Because every hour of downtime does not equate to a lost hour of productivity or revenue generation, IDC attributes only a fraction of the result to savings. As part of our assessment, we asked each company what fraction of downtime hours to use in calculating productivity savings and the reduction in lost revenue. IDC then taxes the revenue at that rate.

*Note: All numbers in this document may not be exact due to rounding.*

#### **IDC Global Headquarters**

**5 Speen Street  
Framingham, MA 01701  
USA  
508.872.8200  
Twitter: @IDC  
idc-insights-community.com  
www.idc.com**

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