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Authors:
Peter Rutten
Matthew Marden

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The Business Value of IBM Z Enterprise Platform Upgrades

Business Value Highlights

19%
lower five-year cost of operations

28%
improved capacity

26%
more cost-effective hardware

12%
more cost-effective IBM Z enterprise platform licensing

27%
more cost-effective other application licensing

16%
more efficient IBM Z enterprise platform management teams

IDC OPINION

In the past decade, IBM has been increasingly successful with launching new IBM Z enterprise platform generations that provide so much additional value that customers have upgraded to each new generation in increasing numbers (see IDC data in the Situation Overview section), in part because they upgrade more frequently and earlier. In September 2019, IBM launched the z15, 2.5 years after the z14 and nearly 6 years after the z13. Each of these launches has delivered an accumulation of important new capabilities to IBM Z in order for the platform to not just participate in but also drive businesses' digital transformation. Very common today on IBM Z are Java, mobile enablement, APIs, and web enablement. Halfway on the adoption curve, meaning that adoption is strong, are Linux on the IBM Z enterprise platform, DevOps and Agile processes, hybrid cloud, and microservices. Emerging are artificial intelligence (AI) and mainframe as a service (where the platform is managed in a truly cloudlike fashion, with self-provisioning, billing, etc.).

As the research in this white paper shows, new generations of IBM Z can also lower cost of operations, improve capacity to scale and drive new workloads, and make the platform more cost efficient while delivering increased security and resilience. To understand the benefits for organizations of upgrading their IBM Z enterprise platforms, IDC interviewed a sample of IBM customers about their experiences in moving to the z14 mainframe platform. These study participants explained that their IBM Z enterprise platform upgrades have provided their businesses with a more cost-effective, secure, and high-performing platform on which to run business-critical applications and transactions. They linked the following benefits to their mainframe upgrades:

- **Lower the cost of running workloads and transactions** by an average of 19% over five years through more efficient use of hardware, licensing, and staff time
- **Ensure more secure and robust IBM Z enterprise platform operations** through integrated security functionality, enhanced resilience, and improved performance

- **Serve as a competitive differentiator for their businesses** through improved security, availability, performance, and agility

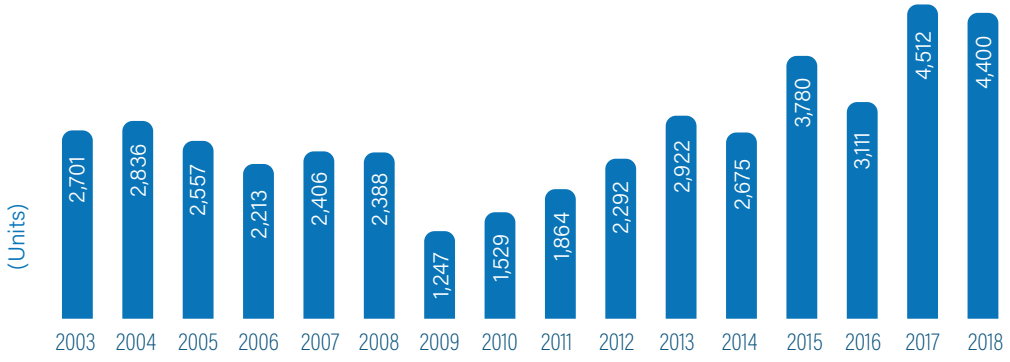
These conclusions are based on interviews with organizations that upgraded to IBM z14 mainframes from an older generation. That said, IDC believes that — apart from various brand-new features that the just-launched z15 offers, which are discussed qualitatively — these quantitative and qualitative results are indicative of how businesses can benefit from the decision to upgrade their mainframe environments in general.

SITUATION OVERVIEW

One of the most common questions that people with an interest in high-end enterprise infrastructure ask is, "How is the mainframe doing?" Current customers want to know whether they are on a platform that continues to be used by their peers or, for that matter, competitors. Potential customers are investigating if there should be a mainframe in their future. The investment community is always looking for opportunities to identify value. The banking industry, which relies heavily on the mainframe, keeps track of how the platform evolves and what its road map looks like. Federal government departments, traditionally heavy mainframe users, have a mandate to go to cloud, which they are trying to interpret — should it be a public cloud, or can it be a private or hybrid cloud on the mainframe as well? Reporters love tracking the mainframe as an epic technology story with a deep history and a compelling future. Cloud service providers need to differentiate themselves or face commoditization, which is why they are aiming to dislodge the core enterprise workloads that run on mainframes as a future cloud workload.

Figure 1 shows the annual unit sales of IBM Z from 2003 to 2018.

FIGURE 1 Annual Unit Sales of IBM Z



Source: IDC, 2019

There' s been strong and growing demand for the platform in the past decade, and the primary reason for this is the relentless innovation that IBM brings to it, which is then extended by the innovation that mainframe software vendors deliver.

The differences between one IBM Z generation and the next are never incremental. They typically include several breakthrough features that, thanks to IBM's Design Thinking approach, are the features IBM Z customers more or less literally ask for.

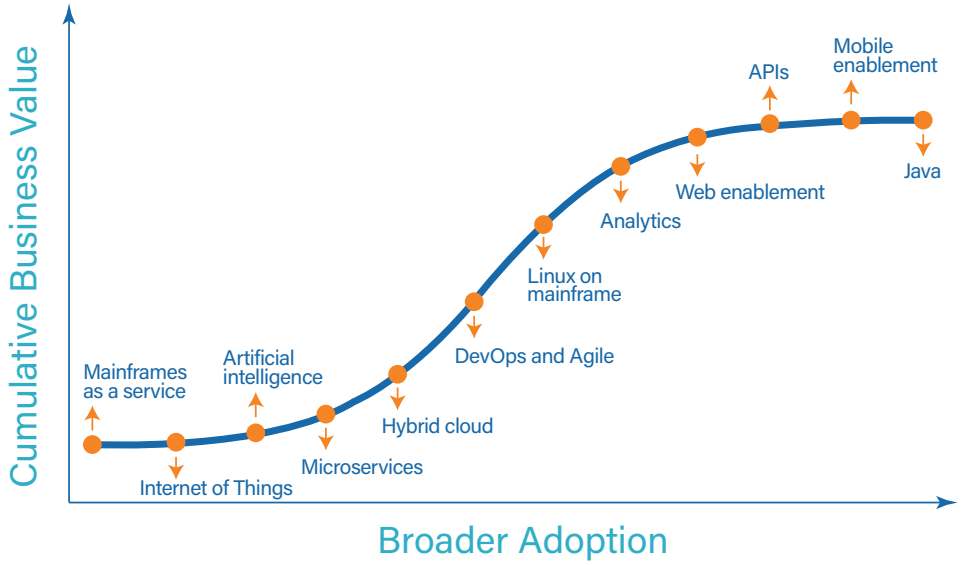
As the data shows, since the 2008-2009 recession, it's been mostly an upward trend for IBM Z, with unit sales of the IBM z13, which was launched in 2014, and the z14, launched in 2017, far exceeding IBM Z unit sales even before the recession. Clearly, there' s been strong and growing demand for the platform in the past decade, and the primary reason for this is the relentless innovation that IBM brings to it, which is then extended by the innovation that mainframe software vendors deliver.

The differences between one IBM Z generation and the next are never incremental. They typically include several breakthrough features that, thanks to IBM's Design Thinking approach, are the features IBM Z customers more or less literally ask for. Design Thinking is a methodical process of involving hundreds of customers in articulating the design features for the next generation of an IBM technology or platform. The technique was used to build the z14 and, on an even larger scale, for the just-launched z15.

The z14 introduced pervasive encryption, an industry first; the z15 features Data Privacy Passports, also an industry first — data that leaves the platform travels embedded in a security envelope that controls who has access to it, regardless of where the data is (i.e., on the IBM Z, on an x86 system in the distributed side of the datacenter, or in a cloud). The z15 also introduces IBM Z Instant Recovery, yet another industry first, in which restarting the platform and restoring service after planned or unplanned downtime is greatly shortened by involving specialty processors and dark cores in the process. These are just a few of the dozens of features that each generation has introduced.

Over the years, IDC has performed extensive research into the implications of modernizing on the mainframe platform, meaning the business value organizations generate by leveraging the mainframe's new capabilities to drive digital transformation either on the mainframe or with the participation of the mainframe. Figure 2 shows the various mainframe capabilities that IBM has delivered in the past several years and the adoption stage the capabilities are in today (x-axis) versus the cumulative value that businesses generate with those capabilities (y-axis).

FIGURE 2 Adoption Stage of Mainframe Capabilities Versus Cumulative Business Value



Source: IDC, 2019

The figure can be interpreted as follows: Java has seen the broadest adoption, whereas managing mainframe as a service is still in the early adopter stage. As features move to broader adoption, they deliver more business value, quite literally in terms of revenue dollars.

Therefore, there is a case to be made that upgrading the mainframe to the next generation can deliver significant value, which is what IDC sets out to test with the research that underlies the Business Value of Mainframe Upgrades section in this white paper. Since the z15 has just become available, the only way to measure the potential business value of upgrading to the z15 is by determining the business value that businesses have generated by upgrading to the z14 from an older-generation mainframe. Over time, as the z15 becomes operational in thousands of businesses, additional value may become evident thanks to various new z15 features, which are discussed in the section that follows.

IBM z15

The IBM z15 has been built on a 19in. frame (just like the z14 ZR1 model) that scales from one frame to four frames, with new power distribution units that allow for standard datacenter sizing. The z15 comes with 190 configurable cores, consisting of general processors and

specialty engines such as zIIPs and IFLs. IBM says that the single-thread performance of the z15 processor was improved by 14% compared with that of the z14 processor.

The IBM z14 was the first generation to come with encryption engines built into the processor, speeding up encryption and enabling it across the platform. The z15 has a compression engine built into the processor. With a claimed 6:1 compression ratio, the compression engine improves bandwidth and transfer times while reducing storage needs without application changes. Compression on chip becomes even more important as organizations continue to adopt pervasive encryption since it is not possible to compress on disk later once the data is encrypted and gain the same efficiency savings.

IBM has introduced IBM Data Privacy Passports on the z15, which lets organizations integrate encryption into their applications and create policies for data access and change privileges.

IBM has introduced IBM Data Privacy Passports on the z15, which lets organizations integrate encryption into their applications and create policies for data access and change privileges. The data is transformed into a single copy of Trusted Data Objects that are protected wherever they travel, whether in on-premise private clouds or public clouds; subjected to different levels of access approval; and monitored to ensure that the data is not misused.

A new feature called System Recovery Boost is aimed at enabling businesses to recover faster. The solution will turn cores that run at sub-capacity to full capacity and activate any zIIPs that are available to provide additional compute capacity for the subsystems that are being shut down. Once the outage is complete and workloads need to catch up, the sub-capacity cores and zIIPs will run at full speed, while up to 20 dark cores can be brought online at full speed. The solution thus delivers both additional speed in sub-capacity cores and more cores for more parallelism. IBM claims that, as a result, businesses can return to pre-shutdown levels twice as fast.

With the z15, IBM brings Red Hat OpenShift to the platform, enabling the mission-critical workloads on IBM Z to become part of a more flexible cloud model. OpenShift and containers abstract away the underlying platform, which allows developers to work with Z like they would on any other platform.

Businesses with IBM Z are increasingly seeking to make their traditional workloads more cloudlike and benefit from the economies of the cloud. IBM has brought forth a wide variety of open source software solutions on the z13 and z14, but the IBM Z still needed a common platform service layer. With the z15, IBM intends to address this need by bringing Red Hat OpenShift to the platform, enabling the mission-critical workloads on IBM Z to become part of a more flexible cloud model. OpenShift and containers abstract away the underlying platform, which allows developers to work with Z like they would on any other platform.

In August 2019, IBM launched multiple software products called IBM Cloud Paks that have been prepackaged in containers and that are integrated into various OpenShift services for fast and easy deployment onto OpenShift. The Cloud Paks offer developer tools and data and AI services, along with open source middleware software. They run on the Red Hat OpenShift Cloud platform. There are Cloud Paks for data, applications, integration, automation, and multicloud management. A Cloud Pak for security is also expected.

BUSINESS VALUE OF MAINFRAME UPGRADES

Study participants can run greater volumes of IBM Z enterprise platform workloads and transactions more cost effectively, which IDC puts at a 19% lower cost for like workloads over five years.

IDC's research covered organizations' decisions to upgrade from previous-generation IBM Z mainframes to the IBM z14 mainframe platform. Study participants reported benefiting from the power, performance, and efficiency of the IBM z14 platform relative to their established mainframe environments. As a result, they can run greater volumes of IBM Z enterprise platform workloads and transactions more cost effectively, which IDC puts at a 19% lower cost for like workloads over five years. In addition, they have leveraged new features and functionalities of the IBM z14 platform to establish more secure and robust IBM Z enterprise platform operations, which limit their business risk and provide a platform from which they can offer products and services that can be differentiated on performance, scalability, and security.

Firmographics and IBM z14 Use

IDC interviewed seven organizations about upgrading to the IBM z14 mainframe platform and the impact of their upgrades. Organizations were relatively large both on average (5,164 employees, $1.67 billion in average annual revenue) and in median terms (3,000 employees, $411.9 million in revenue). They provided experiences from a mix of geographical locations (United States [3], Canada, Germany, Sweden, and South Africa) and industry vertical perspectives (computer services, financial services (2), food processing, government, insurance, IT services). (For more details, see Table 1.)

Study participants upgraded to the IBM z14 platform from various previous-generation IBM Z mainframes. On average, they had deployed one new z14 mainframe machine that runs significant and important core business workloads, including customer-facing banking applications; payroll, SAP, and ERP workloads; various databases; and transactional batch activities. As shown in Table 1, almost all revenue touches their IBM z14 platforms, with an average of 90% and a median of 93% running on their IBM z14 platforms to some extent.

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TABLE 1 Demographics and IBM z14 Environments of Interviewed Organizations

	Average	Median
Number of employees	5,164	3,000
Number of IT staff	943	130
Number of business applications	568	200
Revenue per year	$1.67 billion	$411.9 million
Number of IBM z14 mainframes	1	1
Number of MIPS on IBM z14 mainframes	4,361	810
Revenue running on IBM z14 mainframes	90%	93%
Countries	United States (3), Canada, Germany, Sweden, and South Africa	
Industries	Computer services, financial services (2), food processing, government, insurance, IT services	

n-7 Source: IDC, 2019

Drivers of Mainframe Upgrades

Study participants spoke to IDC about different reasons for deciding to upgrade their IBM Z enterprise platform environments with the IBM z14. They fundamentally realized that upgrading would improve the performance and capacity of their mainframes so as to run IBM Z enterprise platform workloads more efficiently and cost effectively. Further, they grasped that upgrading would provide their business with the best possible performance levels and security capabilities, which they believed would allow them to offer differentiated products and services. Study participants provided specific details about the factors they considered:

"We primarily chose to upgrade to the IBM z14 because of cost savings. … With the z14, we came up with a configuration that not only was able to handle both workloads on a single mainframe, but we were also able to anticipate growth and build growth into the initial size estimate."

- **Ability to consolidate in a cost-effective manner:** *"We primarily chose to upgrade to the IBM z14 because of cost savings. … With the z14, we came up with a configuration that not only was able to handle both workloads on a single mainframe, but we were also able to anticipate growth and build growth into the initial size estimate."*
- **Need to accommodate business growth:** *"It was just growth. We had run the previous IBM Z mainframes for over five years, and our mobile environment continues to grow, so we needed more capacity to withstand the growth in that area."*
- **Performance and more cost-effective business platform:** *"In our investigations, the mainframe with the IBM z14 still came out tops. Nothing beats the transactions per second that we can achieve as well as simplicity in managing the environment. … Also, it's actually now cheaper than to build up a new open systems fault-tolerant environment."*

For interviewed organizations, the cost advantages of the IBM z14 offer the financial justification for making the upgrade, while benefits in terms of reducing risk and enabling business benefits — while real and impactful — are often more challenging to quantify.

For interviewed IBM customers, this interplay between growth, performance, and cost is at the foundation of their decisions to upgrade and the benefits they are achieving through their upgrades to the IBM z14 platform.

Benefits of IBM Z Enterprise Platform Upgrades

Study participants cited as core benefits of upgrading to the IBM z14 their ability to run like workloads and transactions volumes more cost effectively while putting in place a more secure and scalable IBM Z enterprise platform infrastructure. For interviewed organizations, the cost advantages of the IBM z14 offer the financial justification for making the upgrade, while benefits in terms of reducing risk and enabling business benefits — while real and impactful — are often more challenging to quantify.

Cost of Operations Benefits of Upgrading

Study participants are running their most important workloads and transactions on their IBM Z enterprise platforms. Therefore, their IBM Z enterprise platforms must be able to handle growth in terms of maintaining and even improving performance and also in absorbing growth without commensurate increases in cost. For interviewed IBM customers, this interplay between growth, performance, and cost is at the foundation of their decisions to upgrade and the benefits they are achieving through their upgrades to the IBM z14 platform.

One interviewed organization noted the friction it faced in terms of development and business activities and explained how its upgrade to the IBM z14 had alleviated these concerns: *"Our previous mainframe could not handle the load. We were basically in the process of rolling out new features and functions, and we had to halt that because it couldn't handle it. Our peak now with the IBM z14 is about 500 transactions/second, while the previous box peaked at 350 transactions/second."* The experience of this organization — that its upgraded IBM Z enterprise platform can handle increased workload and transaction volumes — was common across interviewed organizations. Another interviewed IBM customer noted: *"Our previous mainframes would have never been able to take on this new application push, and it would have run them dry. We would have been out of memory and out of cycles really quickly. With the z14, we have growth in the box."*

Improved capacity through upgrading serves as the foundation for interviewed IBM customers to capture cost efficiencies by running growing workload and transaction volumes without an equivalent increase in hardware or licensing costs. As shown in Figure 3, IDC calculates that interviewed organizations can handle the equivalent of 28% more workload or transaction volume without increasing their mainframe hardware requirements as a result of their upgrades to the IBM z14.

FIGURE 3 Impact on IBM Z Enterprise Platform Ability to Handle Increased Workload Volume

n=7 Source: IDC, 2019

As a result, study participants can run like applications and business activities at a lower cost in terms of hardware, licensing, and direct staff time. Study participants spoke to IDC about various ways that upgrading to the IBM z14 mainframe platform has delivered cost efficiencies such as:

> *"With the IBM z14, we've cut software and hardware maintenance costs by half. We had to pay a bit more because we upgraded to a different model, but we estimated that in 10 months we made that cost back."*

- **Optimizing maintenance costs by upgrading to a new platform and consolidating**: One study participant has cut its maintenance costs in half by upgrading: *"With the IBM z14, we've cut software and hardware maintenance costs by half. We had to pay a bit more because we upgraded to a different model, but we estimated that in 10 months we made that cost back."*
- **Lowering licensing costs through more efficient use of capacity:** One study participant described how upgrading has optimized licensing costs: *"Our overall software costs went down with the IBM z14 because we're on a pay-as-you-use or pay-for-what-you-use approach. Since we're doing that, the new mainframe is utilizing fewer strokes or fewer MIPS, fewer MSUs, so our operational costs went down by about 20%."*
- **Improving the ability to extend and optimize mainframe workloads:** One interviewed IBM customer commented on how it can lower licensing costs through better managing use: *"With the z14, we can balance workloads so we can optimize the four-hour rolling average on batch processes and everything, and we can work within the parameters a lot more."*

- **Providing ongoing operational cost savings**: One interviewed organization commented on how consolidating its footprint results in operational cost savings: *"We're definitely saving on power and cooling costs with the IBM z14. The footprint of the z14 is now one standard rack footprint, and the size of the mainframe itself is almost half a rack and uses less electricity and cooling."*

As shown in Figure 4, IDC calculates that these efficiencies yield a 19% cost advantage from upgrading in terms of IBM Z enterprise platform hardware and licensing requirements, saving study participants an average of over $2 million per organization per year.

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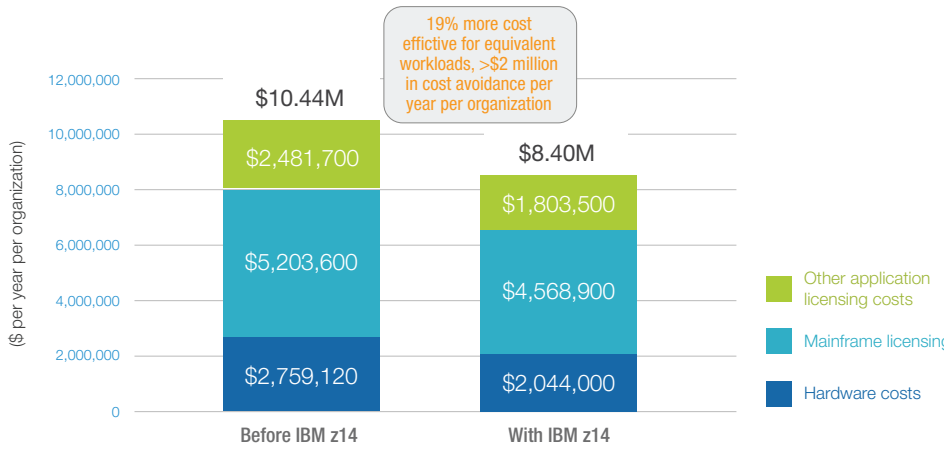
FIGURE 4 Annual Hardware and Licensing Costs per Organization



n=7 Source: IDC, 2019

In addition to hardware and licensing cost savings, study participants reported realizing efficiencies for management and development teams by upgrading to the IBM z14. These teams benefit from having more streamlined IBM Z enterprise platform environments (i.e., greater relative capacity and new capabilities and features such as integrated security and container-based pricing). Interviewed organizations described these benefits of upgrading in more detail:

"Before upgrading, we had two teams: one on the open systems and one on the mainframe. Now, we're saving on resource staff costs by combining them."

- **Ability to use staff resources across platforms:** *"In terms of management, the team that manages the IBM z14 is saving on staff. Before upgrading, we had two teams: one on the open systems and one on the mainframe. Now, we're saving on resource staff costs by combining them. … Otherwise, we would have needed two additional staff members."*
- **Higher developer productivity through container-based consumption:** *"We don't have container-based pricing fully implemented yet with the z14, but container pricing will allow us*

to let developers run and develop more during the day because we won't have to worry about them impacting our four-hour rolling use average."

As shown in Table 2, study participants attributed an average 16% improved efficiency for their IBM Z enterprise platform management teams from their mainframe upgrades, thereby managing like workloads and volumes with almost three fewer staff members than they otherwise would have required. For several interviewed organizations, this has given teams more time to take on other activities, with one study participant noting that it is reallocating staff time to projects such as pervasive encryption and adoption of Linux on Z. Meanwhile, they also spoke to enabling development activities, resulting in an average 3% gain in productivity across development teams with 180 developers on average.

TABLE 2 IBM Z Enterprise Platform Management

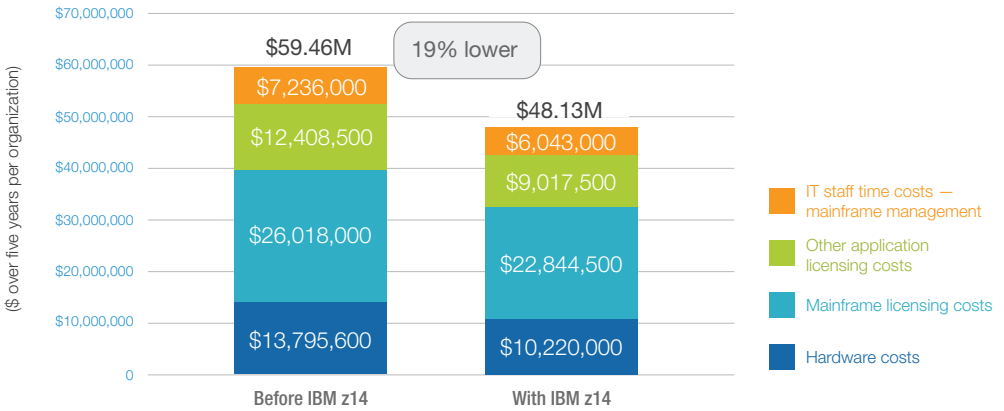
	Before IBM z14	With IBM z14	Difference	Efficiency with IBM z14 (%)
Staff time to manage IBM Z enterprise platforms (FTEs per organization)	17.6	14.7	2.9	16
Value of staff time per organization per year	$1.45 million	$1.21 million	$0.24 million	16

Source: IDC, 2019

Through optimization of IBM Z enterprise platform hardware and licensing costs and enabling more efficient management, study participants have established significantly more cost-effective mainframe infrastructure platforms through their upgrades to the IBM z14. As shown in Figure 5, IDC calculates that interviewed organizations will run like workloads and transactions volumes on their IBM z14 platforms at a 19% lower cost over five years, saving over $11 million per organization.

FIGURE 5 Five-Year Cost of Operations per Organization

As shown in Figure 5, IDC calculates that interviewed organizations will run like workloads and transactions volumes on their IBM z14 platforms at a 19% lower cost over five years, saving over $11 million per organization.



n=7 Source: IDC, 2019

IDC ANALYZE THE FUTURE

Improved Security and Performance

Running large numbers of mission-critical workloads on IBM Z enterprise platforms carries risk for study participants by the nature of the workloads because continuity and security are so important. Interviewed organizations must not only ensure absolute continuity but also minimize risk related to breaches and data loss. While interviewed organizations reported that they have historically had few, if any, issues related to business interruptions stemming from unplanned outages affecting their IBM Z enterprise platforms, they nonetheless reported that their upgrades to the IBM z14 platform have brought important functional upgrades in security related to pervasive encryption and the ability to maintain extremely low operational risk from capacity-related disruptions.

Study participants described a number of ways in which upgrading to the IBM z14 has delivered robust new security functionalities that have lowered operational risk or enabled cost-effective improvements to their IBM Z enterprise platform security:

- **Lower costs as a result of integrated encryption:** *"The IBM z14 has bundled data encryption, whereas it wasn't integrated previously, so if we used the mainframe encryption there was a performance hit. … Also, we don't need to use expensive software to effect database encryption because the pervasive encryption is now integrated. We can encrypt system volumes, transactions in flight, and data at rest without any increased software costs."*
- **Much-improved baseline security position through pervasive encryption:** *"Security is the biggest change between [our previous IBM Zs] and the z14. … Previously, none of our data was encrypted. It was just secured behind firewalls and physical and logical access prevented to the data, but it wasn't encrypted. Now with the z14, we are encrypting all of data in flight, the transactions coming in and out, as well as the system data."*
- **Importance of zSecure:** *"Thus far we haven't had any breaches, but the z14 allows us to monitor even more effectively with zSecure. … Tool sets like zSecure allow us to stay one step ahead of hackers to monitor changes in authority levels and other policies."*

Likewise, study participants linked upgrading to the IBM z14 to even better stability and robustness of their IBM Z enterprise platforms. While every interviewed organization reported that IBM Z mainframes have provided a robust and highly available platform across Z generations, they also noted that upgrading has further diminished risk associated with unexpected outages. One study participant reported: "The IBM z14 is very stable. We've had zero downtime due to issues with hardware."

> *"The IBM z14 has bundled data encryption, whereas it wasn't integrated previously, so if we used the mainframe encryption there was a performance hit."*

> *"Security is the biggest change between [our previous IBM Zs] and the z14. … Previously, none of our data was encrypted. It was just secured behind firewalls and physical and logical access prevented to the data, but it wasn't encrypted. Now with the z14, we are encrypting all of data in flight, the transactions coming in and out, as well as the system data."*

Improved Ability to Conduct Business

Study participants also linked their IBM Z enterprise platform upgrades with the IBM z14 to better positioning their businesses. They cited improved security, better performance, and enhanced agility as especially beneficial in presenting their capabilities to existing customers and potential customers. Given the significant share of their businesses running on IBM Z enterprise platforms, achieving these benefits through upgrading their mainframes in terms of both internal operations and customer perception is an invaluable differentiator as they navigate their competitive market environments.

Interviewed IBM customers have realized the following benefits as a result of upgrading:

- **Pervasive encryption for business:** *"We have Cryptocards in the z14, and we do pervasive encryption. This has opened up new business opportunities for us. For example, we can move information within the mainframe with pervasive encryption."*
- **Increased customer trust:** *"Data security and protection, with the new GDPR laws, is very relevant and top of mind. With pervasive encryption on the IBM z14, we are providing clients that trust that even if there's a breach, their data will be protected. … The result is higher customer satisfaction and the ability to attract new clients. I think our competitors cannot provide that level of trust, and hopefully clients will choose us."*
- **Absence of risk to customers:** *"Security is the cornerstone for us in [our industry]. The functionality that the z14 brings in terms of pervasive encryption has increased security, which gains more trust from our clients and the ability to build a system that is more secure."*
- **Improved performance**: *"Our transaction load has not increased with the z14, but it feels like things run better and we hit our soft cap less often. Transactions have always had great response times with Z mainframes, but they seem to be better than ever with the z14."*
- **Ability to deliver needed functionality to business:** *"Previously, we weren't able to roll out new applications with additional features/functions because the old box couldn't handle the additional workloads. The z14 has given us the ability to scale up and put more out on the market so that we're competitive."*
- **Better performance and meet business demand for higher security standards:** *"With the IBM z14, we have better performance and have allowed the business to answer RFPs coming that require the new standard of security."*

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CHALLENGES AND OPPORTUNITIES

For Organizations

Upgrading critical, high-end enterprise infrastructure such as the IBM Z enterprise platform is a routine exercise for relatively few organizations — those that operate on a fixed renewal cadence. Most businesses thoroughly evaluate the need to upgrade and then — based on ascertained benefits — decide to either continue extracting value from their existing investment or initiate an upgrade. In both scenarios, in-depth cost versus benefits information is of high importance. Too often, however, IDC has found that organizations continue to postpone an upgrade for a multitude of (understandable) reasons, such as the current system is humming along fine; concerns about the impact of an upgrade on workloads, staff, and day-to-day business; and perceived cost of an upgrade versus not fully understood benefits.

As this study shows, the benefits of an upgrade can be substantial, and they are important.

Most importantly, new capabilities drive deeper integration between the enterprise platform and the cloud and the distributed side of the datacenter, allowing enterprise platforms such as IBM Z to become unsiloed.

As this study shows, the benefits of an upgrade can be substantial, and they are important. New features resolve newly emerged issues, such as with security; they bring solutions for old pain points, such as time required for unplanned downtime; or they continue on the trajectory of ongoing performance improvement, such as with faster processors for transaction processing. Most importantly, new capabilities drive deeper integration between the enterprise platform and the cloud and the distributed side of the datacenter, allowing enterprise platforms such as IBM Z to become unsiloed.

For IBM

Every new generation, IBM Z represents a major investment for IBM and is in the works for multiple years. Typically, a next-generation mainframe delivers hundreds of new features with a handful that can be considered critically important. Lately, IBM has done groundbreaking work on security, for example, with Pervasive Encryption and Data Privacy Passports.

This constant drive to innovate invariably runs into a certain level of marketplace inertia. Organizations like to drag out writing off their capital investments to the point where the disadvantages of continuing to run on the older platform have become abundantly clear in terms of performance, competitiveness, and capabilities. It is fair to say that the decision to upgrade is often made beyond the point where the old system has started to cost more and enable less than should be considered acceptable.

The challenge for IBM, therefore, is to either convert customers into an upgrade cadence or convince them of the disadvantages of continuing to operate their business on an older-generation system. By delivering a few industry firsts with regard to critical capabilities with every new-generation IBM Z enterprise platform, IBM should have plenty of opportunities to make a case for timely upgrading.

CONCLUSION

This study demonstrates the potential benefits of upgrading IBM Z enterprise platforms as expressed by understanding the benefits for interviewed organizations that have upgraded to the IBM z14 platform. Study participants reported that their upgrades have brought important capacity and performance improvements that have enabled them to run equivalent workloads on their IBM Z enterprise platforms more cost effectively in terms of hardware, licensing, and staff time requirements. Equally important but often more challenging to quantify is the positive impact of upgrades on business operations. More robust security, greater agility, and improved performance for IBM Z enterprise platforms running significant numbers of business-critical workloads and applications help organizations create differentiation for their products and services in competitive markets. IDC believes that timely upgrading on the IBM Z enterprise platform is important to the ability of an organization to optimally serve its customers and/or constituents. The benefits from upgrading as quantified in this study ultimately contribute directly to the end-user experience, which is where the competitive battle is being fought in most industries today.

APPENDIX

Methodology

IDC used the following approach for conducting the analysis informing this study's results, and conclusions are based on gathering data from organizations that have invested in upgrading to the IBM z14 mainframe platform. Based on interviews with seven organizations using IBM z14 mainframes, IDC:

- **Gathered quantitative benefit information during the interviews using a before-and-after assessment for interviewed organizations of upgrading to IBM z14 mainframes from previous-generation Z mainframes.** In this study, the benefits of upgrading to the IBM z14 included hardware and licensing cost savings and higher staff productivity.
- **Created an 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 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.

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
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