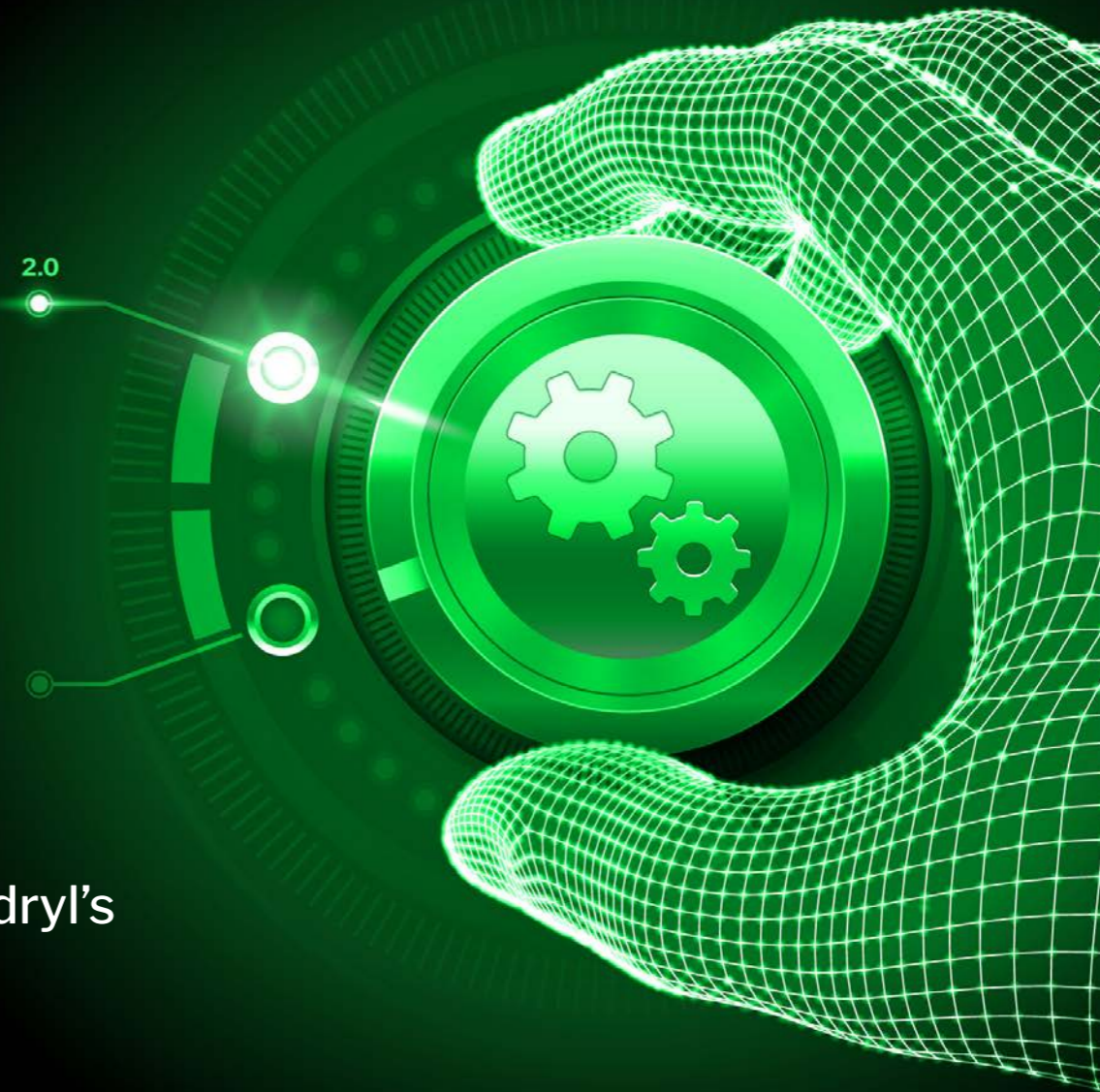


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Streamline IBM Z Modernization With DevOps Approaches and Hyperscalers

IBM's Peter McCaffrey on the benefits of DevOps approaches in short sprints for modernization; Kyndryl's Jim Zell explains how hyperscalers can help with mainframe modernization



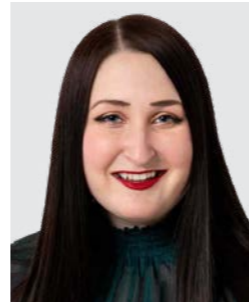
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Rethinking Mainframe Modernization



As technology and business constantly evolve, so do requirements for change—making modernization top of mind for organizations hoping to keep up with key business objectives and needs.

With this in mind, it's more important than ever to develop an effective modernization strategy that specifically fits these needs. We're beyond "one-size-fits all" approaches—instead, enterprises should move toward targeted approaches that take advantage of tools and options tailored to their business objectives. Mainframe-based businesses also need to transition to a DevOps approach, which means teams can fail fast and recover immediately throughout application modernization efforts.

Partnering with hyperscalers like Microsoft, Amazon and Google and offloading physical management of infrastructure can also help during the mainframe modernization process. However, taking advantage of what hyperscalers offer depends on what problem you are solving.

In this e-book, IBM's Peter McCaffrey explores the benefits of DevOps approaches in short sprints for modernization, and Kyndryl's Jim Zell explains how hyperscalers can help with mainframe modernization.

Keelia Estrada Moeller, Senior Editor

A Series of Sprints to Modernize Applications

IBM's Peter McCaffrey on why you should transition from waterfall application modernization approaches, to DevOps approaches in short sprints

BY DAVA STEWART

“You’re probably familiar with the saying that there are two certainties in life: death and taxes. Well, for large enterprises, there are also two certainties: digital transformation and application modernization,” says Peter McCaffrey, IBM Z software product management GTM, IBM.

Both technology and business are ever-evolving and that produces a constant requirement for change. However, modernization just for the sake of it, without a clear business objective, is pointless. The first step in

implementing efforts to modernize applications is defining a clear business purpose. “Often, it’s an effort to enhance the customer experience. It’s trying to enrich the customer experience and compel them to do business with them versus the other guy,” says McCaffrey.

Enriching the customer experience frequently involves having access to real-time information. When a company has information about a customer, they can offer products and services suited to the customer’s situation. “That often requires reaching back to existing applications and

business workflows to get data that can deliver insight at the moment of impact,” says McCaffrey.

Most people have had the experience of shopping for a lower price on auto or homeowners insurance, and that illustrates the kind of situation McCaffrey is describing. A person who has separate policies with two different companies might want to find out if they could get a lower price by bundling their policies with one company.

The customer might sign into a mobile application and make the inquiry. The application needs to know how many automobiles the person has and their customer history. That information likely resides on the core business application, which is probably running on the mainframe. Marrying pricing algorithms with the customer history means the company can offer some dynamic pricing options, so if the customer adds a homeowners policy they might get a particular discount, or if they add a vehicle they get a different one. Some such algorithms are very sophisticated and base the results on numerous factors such as zip code, car model and so on.

In order to provide that rich, personalized experience, the company needs to use modernized applications that have the capability of accessing information in a timely manner. The customer wants to know how much they can save while they are looking, not next week when an agent has time to call them.



Customized Is Better Than One Size Fits All

Once an enterprise has identified a clear business need that application modernization can meet, the question of how to go about it becomes paramount. There are options—and navigating them can be confusing. Simply migrating everything may appear to be the simplest, most comprehensive solution, but McCaffrey says he has seen the “one-size-fits-all approach” become a nonstarter many times. Businesses find that moving everything to the public cloud is costly and complex. Each application can contain millions of lines of code.

A more targeted approach that takes advantage of tools and options and is tailored to the business objective makes much more sense in most cases. “You have to consider the data,” says



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McCaffrey. “There’s very much an 80/20 rule that says basically 80% of the app is probably fine, and 20% probably needs to be modernized and enhanced. Why not just address the 20%, versus a migration approach which involves touching all 100%?”

“Business leaders want to achieve their business objectives at the lowest cost, with the least risk, and without compromising their compliance posture,” notes McCaffrey. By identifying a clear business objective, targeting modernization efforts toward meeting that objective, and using the tools and processes available with precision, enterprises can achieve digital transformation through application modernization successfully.

In the past, application development efforts were often done according to the waterfall method, which involves gathering and analyzing data, designing, developing, then testing and deploying. Each step is dependent on the one before, and the process can be time consuming. Failures represent the loss of a hefty investment of time.

From a Waterfall to a Sprint

Today, mainframe-based businesses need to transition from that waterfall process to a DevOps approach that means teams can fail fast and recover immediately. “DevOps allows for smaller sprints where you add feature and function

continuously over a period of time, in maybe two-week sprints,” says McCaffrey. The team defines a piece of work that can be accomplished in two weeks, they release it, get feedback, and move on to the next piece of work. It’s a much more agile method of modernizing and makes better use of resources and time.

“We work with a number of mainframe accounts today that are transitioning from that waterfall approach to DevOps,” says McCaffrey, noting that the approach also means developers can work in modern programming languages. Many mainframe applications were developed using COBOL, for example, and developers with COBOL skills are becoming scarcer. By taking an approach that simply seeks to enhance and extend an application, rather than migrate it entirely, developers can use a more modern programming language. The process minimizes the amount of change that needs to happen and at the same time leverages existing resources. “Businesses adapt to a cloud-native or microservices-based model using smaller programming units that integrate and work with one another,” says McCaffrey.

As an example of how an enterprise can use information stored on the mainframe in concert with modernized, enhanced and extended applications, McCaffrey describes a pattern he sees developing around event-driven applications. In the banking industry, it’s common for the enterprise to notify a customer if a transaction of more than some defined amount takes place.

“The transfer is the event, and it likely takes place on the mainframe,” McCaffrey notes. “It gets put in a queue that notifies an app, and some logic is triggered. It could be a push notification, like an email or a text. The customer receives a notification that basically asks, ‘Did you make this transaction?’”

“The original applications don’t need to change much in situations like that,” says McCaffrey. “They just need to identify that the event happened. All the rest comes from new applications and services that work together, and that may be in different programming languages or run in different environments.” This method offers an efficient way to modernize existing applications, and can be implemented using a DevOps approach in short sprints.

There’s Always a New Model of Computing

McCaffrey advises enterprises undertaking a modernization effort to keep in mind that things are always changing. “I’ve been in the industry for a long time, and I’ve seen us transition through different models of computing,” he says. Each time, there are people who think they need to transition everything to the new model. “But what they undoubtedly find is that it’s extremely hard to do.”

The Pandemic and Modernizing Your Mainframe

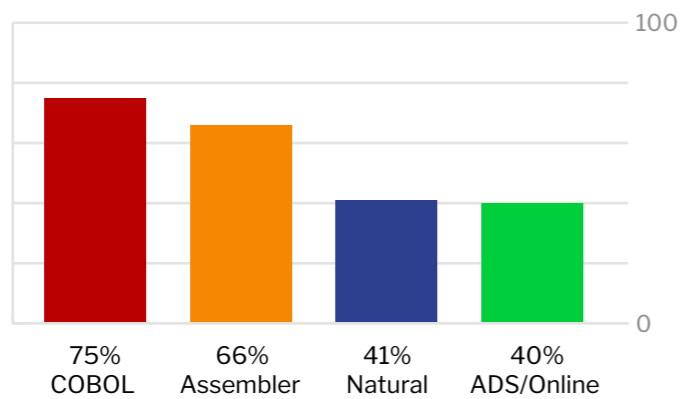
BY TREVOR EDDOLLS

The **2021 Mainframe Modernization Business Barometer Report** from Advanced examines the current mainframe market and the challenges facing enterprises worldwide with annual revenues of more than \$1 billion. It also explores the impact COVID-19 is having, and will continue to have, on modernization plans.

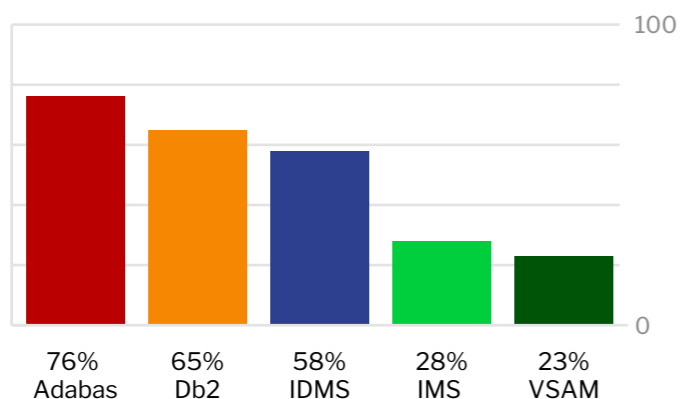
To give a baseline, the report found that the average enterprise consumes 33,286 MIPS every month. And organizations are spending an average of \$4,266 per MIPS annually, factoring in the cost of maintenance, software licensing, hardware, operational and modernization costs. This, the report suggests, equates to an average of \$142 million a year.

The Advanced 2021 survey also found that 64% of organizations use mainframe-based applications that are between 10 and 20 years old. And 28% are between 20 and 30 years old. This, you might conclude, just shows the longevity of mainframe applications—although that wasn’t the survey’s conclusion. The 2021 report found that mainframe-based

applications comprised an average of 8.86 million lines of code—written in multiple languages—across a single environment.



The most prominent languages in mainframe estates



Data/database structures used by mainframes

When it comes to the programming language in use, perhaps not surprisingly, 75% of the enterprises surveyed said COBOL remains the most prominent language in their mainframe estate. Assembler was found at 66%. Natural was at 41% and ADS/Online at 40%. The survey also asked what data/database structures mainframes use. They found that 76% use Adabas, 65% use Db2, 58% use IDMS, 28% use IMS and 23% use VSAM.

A total of 89% of respondents said that they are concerned about having access to the right IT talent to properly maintain and extend their legacy systems. By contrast, 36% are concerned that people entering the workforce only have “modern” skills (i.e., Java, Python, C#, and cloud-native deployment and orchestration tools such as Docker and Kubernetes), while 33% are worried staff are retiring and taking their legacy skills with them. The survey also found that 29% of respondents say their staff don’t want to learn legacy skills, while 28% fear they may lose talent to competitors using more “modern” technologies (i.e., DevOps and cloud ecosystems).

[Read more](#)

An Introduction to Hyperscalers and Mainframes

How popular hyperscalers—including Microsoft, Google and Amazon—relate to IBM Z technology and modernization

BY JIM ZELL

A close friend recently asked me what a hyperscaler is. I explained that at a high level, hyperscalers are technology companies that make huge investments in infrastructure and services to dominate the cloud industry and to have the capability to expand into any market. They can handle truckloads of traffic, have capability to scale up or down quickly, offer infrastructure as a service (IaaS), software as a service (SaaS) and are constantly innovating. They do this for huge corporations, small businesses and individuals.

Organizations can benefit greatly by partnering with hyperscalers and offloading the physical management of infrastructure to them. There are many other advantages but the focus of this article is to explain what

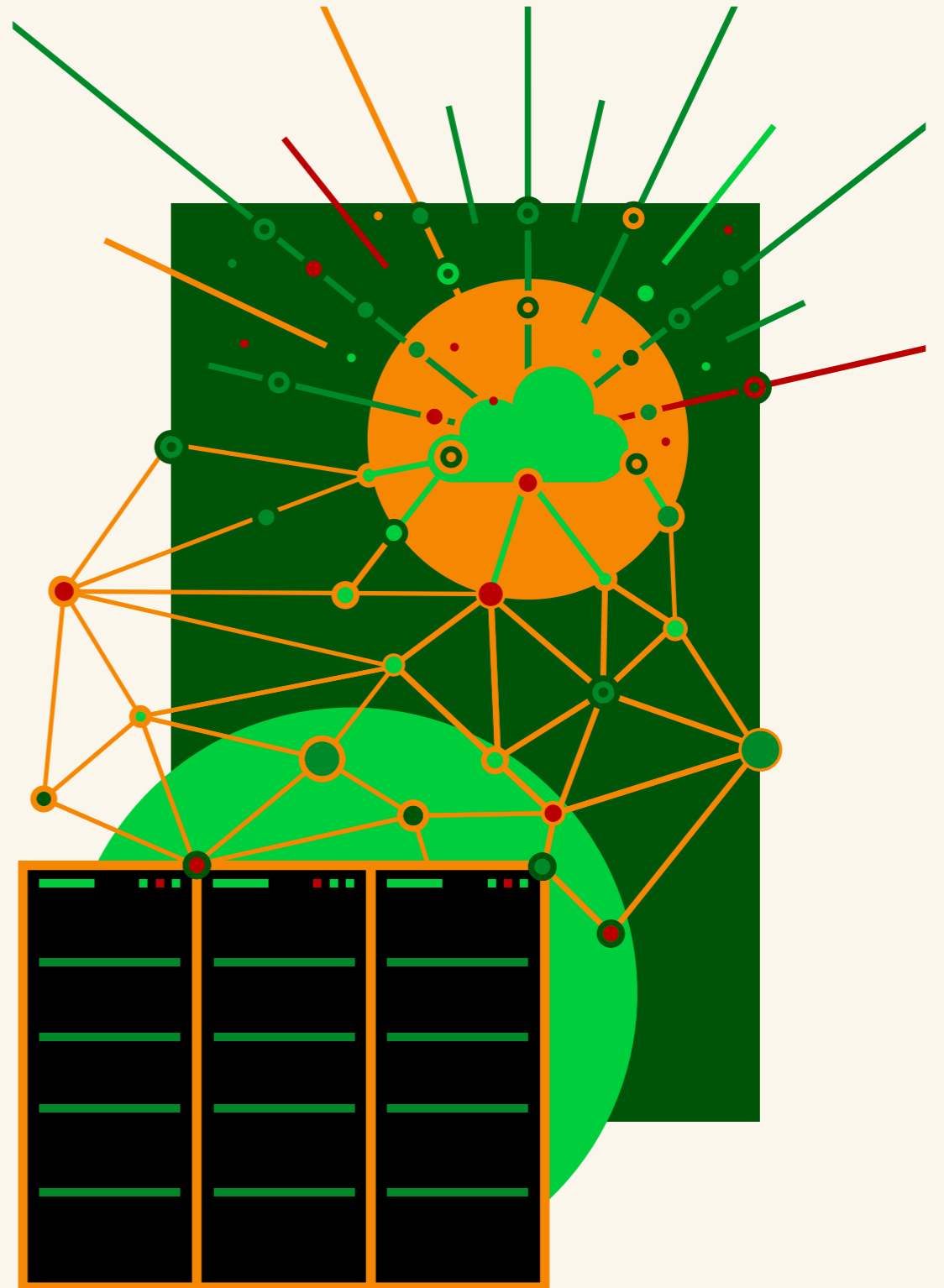
the hyperscalers are doing that relates to mainframe technology. There are also dozens of companies in the hyperscaler category but these three have made a particularly significant impact in the world of mainframe transformative technology: Microsoft, Amazon and Google.

These companies advertise their services as mainframe modernization, but they're not in the business of modernizing the mainframe platform in any way. Instead, they have established use cases for migrating workloads away from the mainframe and in some instances have created business intelligence and analytics tools that use mainframe data. Here's how Microsoft, Amazon and Google pertain to the mainframe:

Microsoft

Microsoft's focus is mainframe workload migration to their cloud platform, **Azure**. "The Mainframe Transformation program" is Microsoft's new mainframe modernization initiative. Microsoft's goal with this initiative is to replace the mainframe with their own cloud services and technology. They're accomplishing this through different transformation paths to Azure: rehosting (lift-and-shift), rebuilding (refactoring), replacing and retiring. You can rehost or migrate applications to Azure by utilizing rehosting software.

Microsoft uses Micro Focus and TmaxSoft OpenFrame as their rehosting platform choices. Rehosting can keep some or all of your code intact. The process it goes through enables you to run it in a z/OS emulation environment in Azure. Refactoring enables your applications to move by altering the source code to operate in Azure but keeps the business logic intact. Refactoring can be done all at once or gradually by application. Lastly, you can re-engineer (rewrite) your applications, perhaps splitting larger applications into microservices. In some cases, it may be possible to replace applications with ISV software. Microsoft has multiple solution architectures, references and business partners in this space—all of which you can view on their website.



Google

Google also explains mainframe modernization as moving mainframe applications to the cloud, Google Cloud Platform (GCP). They too provide services to rehost (mainframe as a service), refactor (code conversion), replace (green-field development), or retire mainframe

software. Google boasts proprietary automated code called G4 that is conversion tooling to aid in mainframe application discovery and getting your software into GCP.

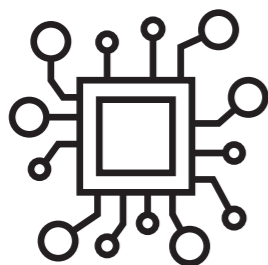
Google is clear that its approach is business-need and data-first focused. Additionally, Google has a lengthy list of cloud products that can be leveraged by adding value

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Taking advantage of what hyperscalers offer depends on what problem you are solving. That, plus determining if your challenges align with their offerings. Like any strategic direction you must investigate all your options, see how they align with your vision, and then decide.

to existing applications. Google's acquisition of the Dutch company Cornerstone Technology in 2020 illustrates its desire to lead this market. Cornerstone Technology brings the ability to build migration roadmaps, code conversion technology and data migration tooling to Google, improving the company's position in the market greatly.

Amazon


Amazon provides mainframe modernization via **Amazon Web Services (AWS)**. Amazon also has the AWS Migration Acceleration Program (MAP) for mainframe. MAP is designed to help organizations reach their migration goals with AWS services. AWS also has a mainframe competency program that identifies, validates, and promotes AWS partners with proven expertise and success stories.

Amazon provides methods for migrating workloads to AWS via application refactoring and migration services

like Microsoft and Google but also provides other services that enable customers to be more selective about which outcomes they choose. Amazon provides development and testing capabilities by emulating mainframe environments in AWS. There are also business analytics and business intelligence tools that can be utilized by streaming mainframe data directly to AWS. For customers that aren't ready to push their mainframe data off-prem, Amazon provides a scaled down AWS platform called Outpost that can be installed in a customer's data center rack. While providing options to replace the mainframe, AWS also provides tooling to help customers take advantage of cloud services without changing the underlying infrastructure.

Investigate Your Hyperscaler Options

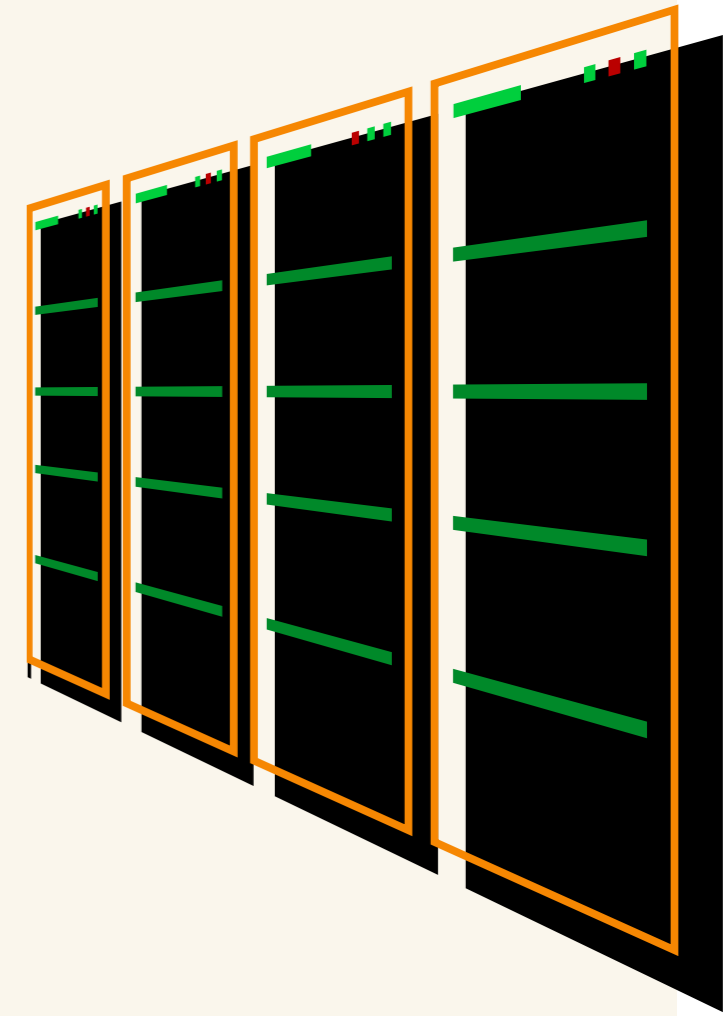
It can be debated that mainframe modernization would involve modernizing the mainframe itself opposed to



simply not using it. For example, I wouldn't modernize a bicycle by driving a car. If my problem is a lack of speed to get somewhere then I might go with the car. The bicycle is still modern with plenty of innovations, but if it's not solving my problem, I'll develop a strategy and adjust my situation. Maybe I'll go hybrid and get a motorcycle. Similarly, a hybrid IT environment that co-hosts mainframe workloads alongside cloud-native workloads on the same IBM Z platform provides network at the speed of memory and latency removal between applications.

The mainframe has always been modern in that innovations have been made continually—yearly, in fact—since its inception. Today, cloud native, containerization, Linux, use of modern languages, and seamless DevOps can all be done on the mainframe as they have for years. Taking advantage of what hyperscalers offer depends on what problem you are solving. That, plus determining if your challenges align with their offerings. Like any strategic direction you must investigate all your options, see how they align with your vision, and then decide.

JIM ZELL is a Kyndryl chief engineer and executive architect, and the public sector leader for Z platform architecture at Kyndryl



When Mainframe Modernization Is Actually an Improvement: Building on Success

BY REG HARBECK

In the world of computing, the System/360 mainframe did not arise spontaneously out of the minds of its inventors. Instead, it was built on nearly two decades' worth of lessons about what was possible and desirable in business computing. Where it could, it enhanced and advanced, and in some very important ways it consolidated.

But its strengths were much more evolutionary than revolutionary, even though the resultant platform, and the decision to make it compatible across models and into the future—not to mention the \$5 billion investment—were certainly revolutionary.

System/360 grew up in the greater context of human history, society, culture and business, all of which continued to develop alongside it. And so, after all of the design work that led to this excellent, lasting platform, it turned out that what had been created was more of a floor—basement,

even—than a roof or ceiling. Even the walls, such as security, had to be further developed and elaborated over the coming years and decades. Still, guess which platform has the most room for “improvement” of every kind.

So, what does that have to do with modernization? When “modernization” is used as a synonym for “out with the old and in with the new” it is, as I have just illustrated, trying to achieve escape velocity from the very context that defines it and gives it value.

But, when modernization is descriptive, rather than prescriptive, and recognizes the way that a great platform continues onward and upward to meet the evolving needs and opportunities of the humanity it was designed for, then it's not merely responding with bells and whistles to someone else's dance. It's an active participant, shaping the very context to which it is responding, for the better.

[Learn more in the full article](#)

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