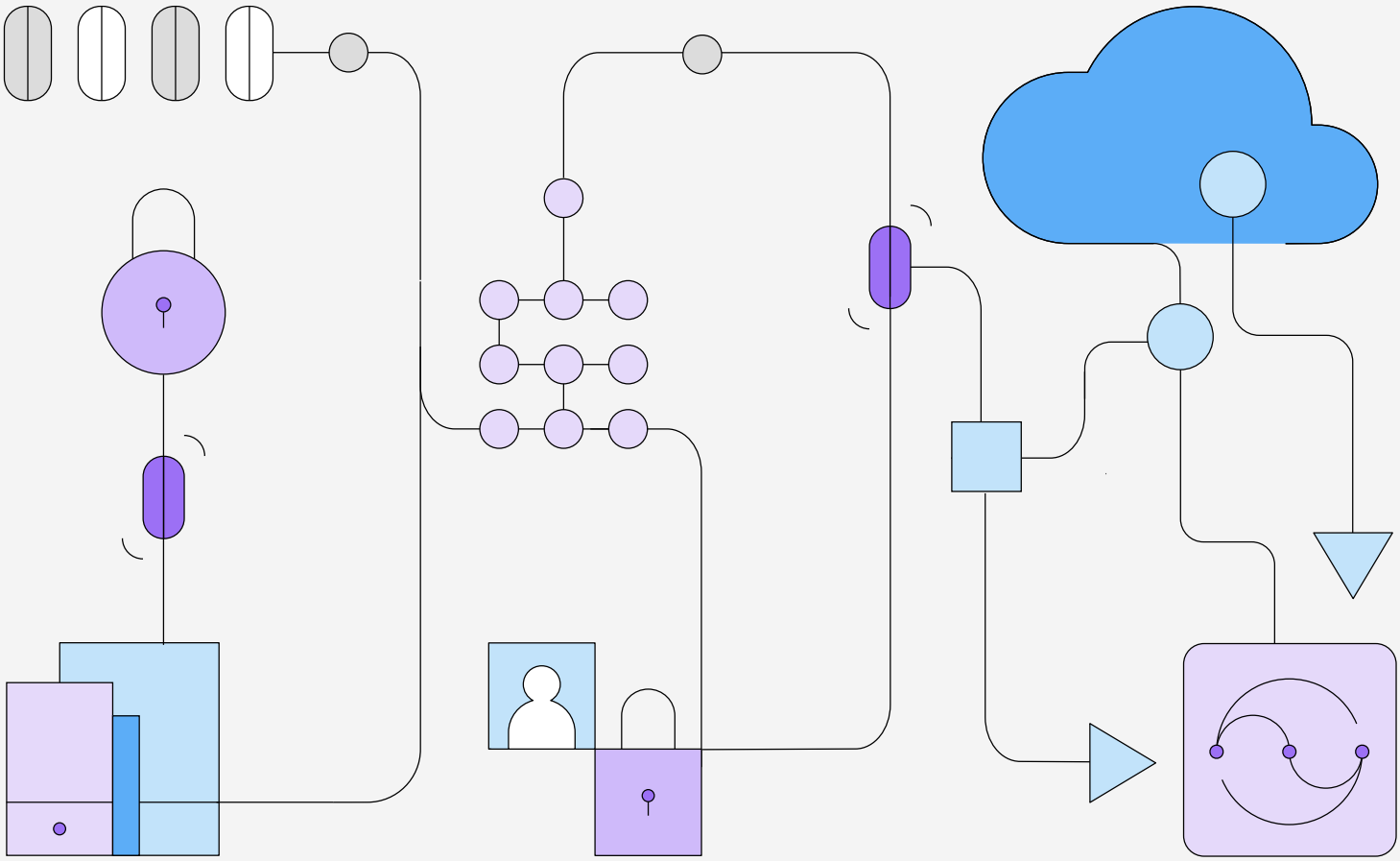
Driving business innovation through application modernization and hybrid cloud

Transform with IBM Z



IBM

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Introduction

Why modernize? Why now?

The evolving IT landscape profoundly impacts businesses striving to meet the demands of an always-on digital world. Prioritizing modernization of critical processes remains paramount for IT leaders seeking advantages, particularly in harnessing generative AI. Despite acknowledgment of this need by 83% of surveyed C-suite executives, 64% of them still lag in modernizing apps for AI integration.[1]

The imperative to adapt swiftly presents challenges in tool, process and cultural shifts for IT providers. Ensuring resources for adaptation is crucial to meet the evolving business landscape.

Lower technical debt and fuel innovation through technology investment
Both private-sector corporations and public-sector corporations must modernize applications and infrastructure to remain competitive and meet stakeholder needs. However, grappling with existing technical debt can impede growth ambitions, stifling innovation and agility. Lowering technical debt demands ongoing investment and strategic partnerships to protect existing investments while embracing new innovations.

Achieving software and hardware currency and leveraging IBM Z platform innovations optimize mainframe environments, laying the groundwork for modernization and AI integration. This approach can reduce technical debt by replacing outdated components, enhancing code quality and streamlining architecture, facilitating application enhancement and innovation.

A continuous approach
As businesses transform, they often need to assess or modify existing applications and data to remain competitive, secure and innovative. The question for your business, then, is not if you need to modernize mainframe applications—but rather, how?

Where do you start? What are the best ways to deliver the business outcomes with the least cost and risk?

An expert approach
Explore best practices and the latest solutions for modernizing mainframe applications embracing hybrid cloud and generative AI. You'll also learn about an approach that's designed to be agile, secured and economical.

Overcome common challenges
Identify and avoid some of the common pitfalls that enterprises often face so you're ready to embark on a successful application modernization journey.

What's inside?

This guide provides a high-level overview of IBM's strategy to help you modernize applications faster, at lower cost and risk, using the IBM Z® platform and public cloud solutions together as a catalyst to your modernization journey.

Learn it
You'll explore application modernization strategies that incorporate IBM Z technologies and generative AI.

Get started
Jumpstart your journey with actionable insights, innovative solutions and expert-driven next steps.

Learn it

Build your business case for modernization

Application modernization is the process of updating an application so that it can be maintained, extended, deployed and managed in a way that enables businesses to meet their current and future needs. This endeavor opens the door to several business and technical benefits for organizations. Let's take a look at some of them.

83% of surveyed executives say that mainframe-based applications are central to their business strategy.[1] Additionally, 79% of executives say using generative AI in app modernization projects will increase business agility.[2]

Accelerate digital transformation

More than ever, organizations need to find new ways to provide innovative and engaging experiences that satisfy existing customers, attract new prospects and gain a competitive edge. This innovation can accelerate speed to market, a key benefit when trying to gain a competitive advantage.

Increase developer productivity

Your organization's most valuable assets are its people. To gain a competitive advantage through IT, application developers must have the right set of technologies—and the most up-to-date tools—at their fingertips to unleash their creativity and build amazing applications. Here's where generative AI can help.

Fully integrate a hybrid cloud architecture

At a basic level, hybrid cloud combines a mix of public and private clouds and on-premises infrastructure. By design, it's the best architecture to modernize mainframe applications while driving speed and lowering cost and risk.

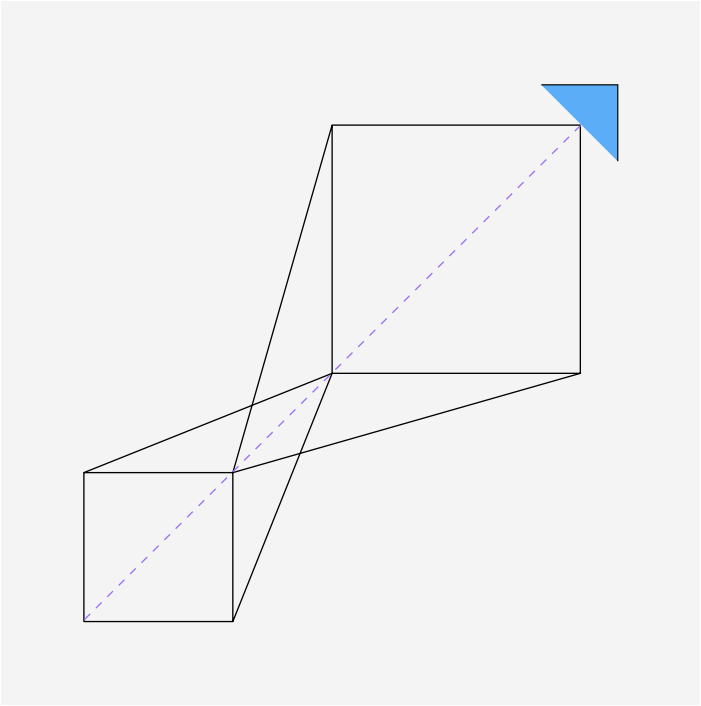
At IBM, we take the hybrid cloud approach one step further, allowing our clients to build applications on a strong foundation built with the Red Hat® OpenShift® Container Platform. This open source-based, Kubernetes-powered container platform helps create a unifying experience to manage the complete IT estate seamlessly and in a more horizontal way.

Developers can move faster with the speed and agility of the cloud while maintaining the security and scalability of an on-premises infrastructure—unlocking more value with a hybrid cloud strategy.

It's critical that applications are deployed on the best-fit platform and interoperate to reap the full benefits. Businesses should also secure access to mission-critical applications and data with a common set of tools to bring greater value to customers. It's all needed for competitive differentiation in today's market.

A hybrid by design approach can break down significant barriers and overcome challenges resulting from a complex and often disconnected IT estate. Hybrid by design unlocks value by providing consistency and being intentional across platforms, processes and people—and can deliver upwards of 3.3 times ROI.[3]

This integration can enable faster time to market and more frequent delivery of new capabilities. Businesses can also react quickly to changes in the market and emerging competition. In an effort to deliver new capabilities faster, developers can increase productivity with DevOps-based approaches that leverage generative AI , thanks to common tooling and automated continuous integration and continuous delivery (CI/CD) pipelines.



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In addition, the key technology differentiation of the IBM Z platform can drive cost efficiency, offering low total cost of ownership (TCO) for transactional workloads at enterprise scale. This platform can also provide sustainability advantages, as well as prioritizing security and resiliency.

A continuous modernization journey

Because the IT landscape is continually changing, IBM encourages businesses to consider application modernization an ongoing journey—an initiative that maximizes the potential of existing investments. With this need for flexibility in mind, businesses can evolve and grow to continuously align with current and future business needs.

Let's explore IBM's approach toward application modernization, broken down into a series of value-driven entry points and accelerators. We'll then take a deeper dive into each one.

Build the right foundation by optimizing hardware and software costs while streamlining application management and performance. Businesses can integrate the IBM Z platform into a hybrid cloud solution to maximize cloud-native development. Furthermore, organizations can unlock additional revenue by increasing access to data for analytics and AI through an application programming interface (API) and data modernization strategy—while still helping to ensure security and compliance.

Increase business agility and productivity by moving to an enterprise DevOps process and an automated CI/CD pipeline. You can fully align this approach to meet present priorities while being open and standard across the business.

Accelerate your journey and reduce time to value with application modernization patterns, tools and best practices. These resources include how-to guides and showcases for working with IBM® z/OS®, Linux® on IBM Z and public cloud together. Taking a continuous approach to modernization with the IBM Z platform alongside public cloud can be the catalyst for lowering costs and increasing ROI—more so than migrating applications to public cloud alone. In fact, a public-cloud-only approach can incur a TCO up to 80% higher than those that integrate IBM Z.[3]

Build the right foundation

Optimize existing applications while gaining cost efficiency

Use current software and hardware and take advantage of performance optimization tools, specialty processors and newer cloud-like consumption-based pricing models. Let's explore some ways IBM is helping businesses that are looking to modernize existing applications:

Specialty processors on the IBM Z platform are built to help businesses lower the cost of running applications while taking advantage of platform strengths in security, availability and scale.

- **IBM z Integrated Information Processor (zIIP)**—a dedicated processor for eligible z/OS applications that don't impact the software usage charges of existing applications. A zIIP solution can provide a cost-effective way to add new applications to the IBM Z platform, supporting Java, IBM z/OS Container Extensions (IBM zCX), including Red Hat® OpenShift®, data virtualization, machine learning, APIs, independent software vendor (ISV) software and more.

- **IBM S/390 Integrated Facility for Linux (IFL)**—a processor for Linux application workloads,supported by the Linux operating system for IBM Z—including Red Hat—IBM® z/VM® and kernel-based virtual machines (KVMs).

Tailored Fit Pricing for IBM Z is a flexible pricing model that can simplify an existing pricing landscape through cloud-like software and hardware consumption-based pricing options for on-premises computing. This model can enable your business to improve pricing predictability and transparency as you manage existing applications and introduce new ones to your environment.

Enhance and extend applications

Enterprises require the effective maintenance, extension, deployment and management of their applications to meet market demands and facilitate business growth.

The following capabilities enable the modernization of mainframe applications to accommodate new business requirements:

- Driving generative AI-powered code transformation
- Addressing skills with a choice of programming languages
- Colocating cloud-native applications with IBM Z

With the advent of generative AI and large language models (LLMs), it's now possible to refactor and transform applications faster by increasing developer productivity. IBM watsonx™ Code Assistant for Z is a generative AI-assisted product built to accelerate mainframe application modernization at a lower cost and with less risk than today's alternatives.

This product is built to provide an end-to-end application developer lifecycle that includes application discovery and analysis, automated code refactoring and COBOL to Java conversion. Developers can automatically refactor selected elements of an application and continue modernizing in COBOL, or selectively transform code to Java leveraging generative AI using a highly tuned state-of-the-art LLM.

When it comes to new development, there are now choices in the technology used for implementing new functions. The IBM Z platform offers mixed-language support, enabling the use of the same programming language or another language that better aligns with the development team's preferences or the characteristics of the specific function. This can help expand the talent pool of programmers and address skills challenges.

According to a case study with IBM and Atruvia, Pascal Meyer, Senior Enterprise Architect at Atruvia, said the ability to use Java alongside COBOL helps the bank stay ahead of the market for customers: "We see Java on [IBM Z] as a key technology in driving competitive advantage for our clients."

Furthermore, Thomas Bauer, Team Leader and IT Architect at Atruvia, added, "We wanted to cut time-to-market by deploying modern, reusable software components—and, at the same time, protect our investment in existing business logic by Java-enabling it."

Cloud-native applications running on Kubernetes often are used to build scalable applications that can be deployed in a multiple-cloud environment. The IBM Z platform can provide a runtime environment for cloud-native applications, traditional z/OS workloads and distributed applications.

The degree of latency and interoperability are key drivers in determining the environment. Cloud-native applications running on public cloud might encounter an order of magnitude higher latency while accessing core functions and data on the IBM Z platform. Collocating cloud-native applications on IBM Z using Red Hat OpenShift can significantly reduce latency, helping to meet service-level objectives.

Integrating across hybrid cloud

Create open APIs to increase access to applications on IBM Z
A popular way to accelerate business value is to increase access to IBM Z applications and data to support digital transformation initiatives. Creating APIs using the IBM z/OS Connect can provide a simple and intuitive way to API-enable your platform's applications and data. This solution is built to empower clients to unlock the value of their applications as open-standards-based APIs in minutes to make IBM Z applications and data central to your hybrid cloud strategy.

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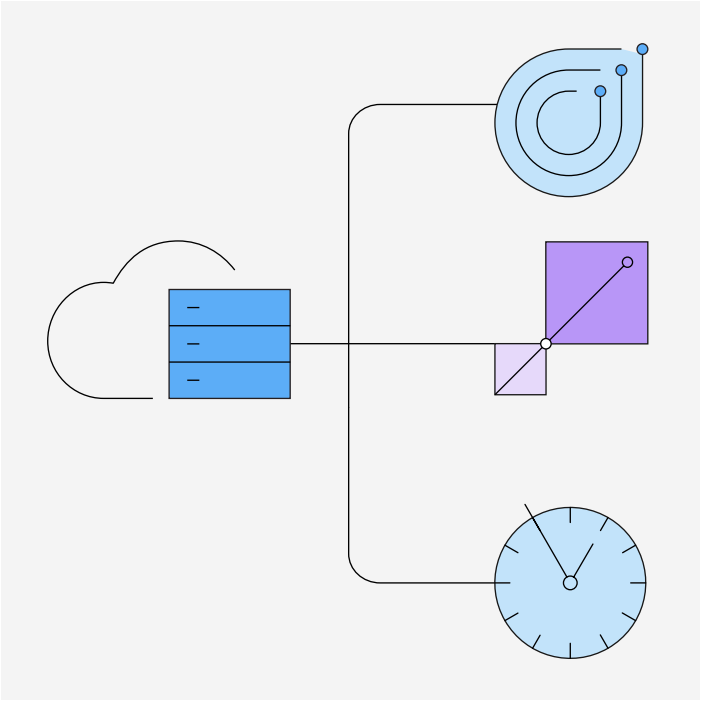
Because these APIs are open-standards-based, they can be integrated with security and managed in enterprise API management offerings such as IBM Cloud Pak® for Integration.

Mainframes as part of an event-driven architecture
To enhance their decision-making capabilities and responsiveness, organizations rely on real-time data for critical business processes. Efficient communication, action and processing of events within these processes are essential for deriving insights and intelligence. Therefore, there's a need for fast, efficient and flexible information sharing that supports decision-making and reporting to consumers.

To achieve real-time delivery of relevant information, many organizations are implementing event-based architectures and backbones throughout their enterprises. Mainframe applications play a crucial role in this event-based architecture as they provide critical business data and serve as systems of record.

Apache Kafka is a popular choice for event-driven applications. Kafka-based event backbones, such as IBM® Event Streams, can be utilized in both cloud and on-premises environments, including the mainframe running Linux on IBM Z.



Simplify information sharing and data access.

Explore data fabrics to help modernize your data architecture
To become fully data-driven, organizations can incorporate an integrated data strategy and architecture that overcomes data complexity challenges and includes IBM Z data.

Organizations often need new data architecture to help organize data and provide a means to access it from anywhere without the potential costs and risks that come with duplicating or moving data. This approach is called a data fabric, which can help improve decision-making while simplifying your modernization approach. Use data fabrics for data management and governance in hybrid cloud data landscapes while reducing costs and risks.

Optimized real-time information at scale
Outdated information can lead to poor business decisions, client dissatisfaction and loss of revenue. To respond more quickly to client expectations and transform your business, you need a system in place for sharing real-time data from your applications across multiple environments.

With IBM Z Digital Integration Hub (zDIH), you can achieve real-time information flow at scale between your systems of record and hybrid cloud applications, ecosystem partners and end users. It seamlessly integrates your core business applications running on IBM Z with your hybrid cloud applications for efficient handling of inquiry traffic to your systems of record.

Increase business agility and productivity

Adapt enterprise DevOps and observability

A DevOps culture can not only save your team precious time by automating boilerplate tasks, it can also increase quality by doing everything in a repeatable, reliable fashion.

By moving from a waterfall development methodology to an enterprise DevOps process and CI/CD, organizations can achieve more-frequent, high-quality software deliveries. Developers and IT operations staff can use the same agile processes and open-source-based tools they use across the enterprise on IBM Z. Technologies that work in tandem with IBM, such as Git, Jenkins or Red Hat OpenShift, can be used to create standard enterprise DevSecOps toolchains, both on-premises and in the hybrid cloud.

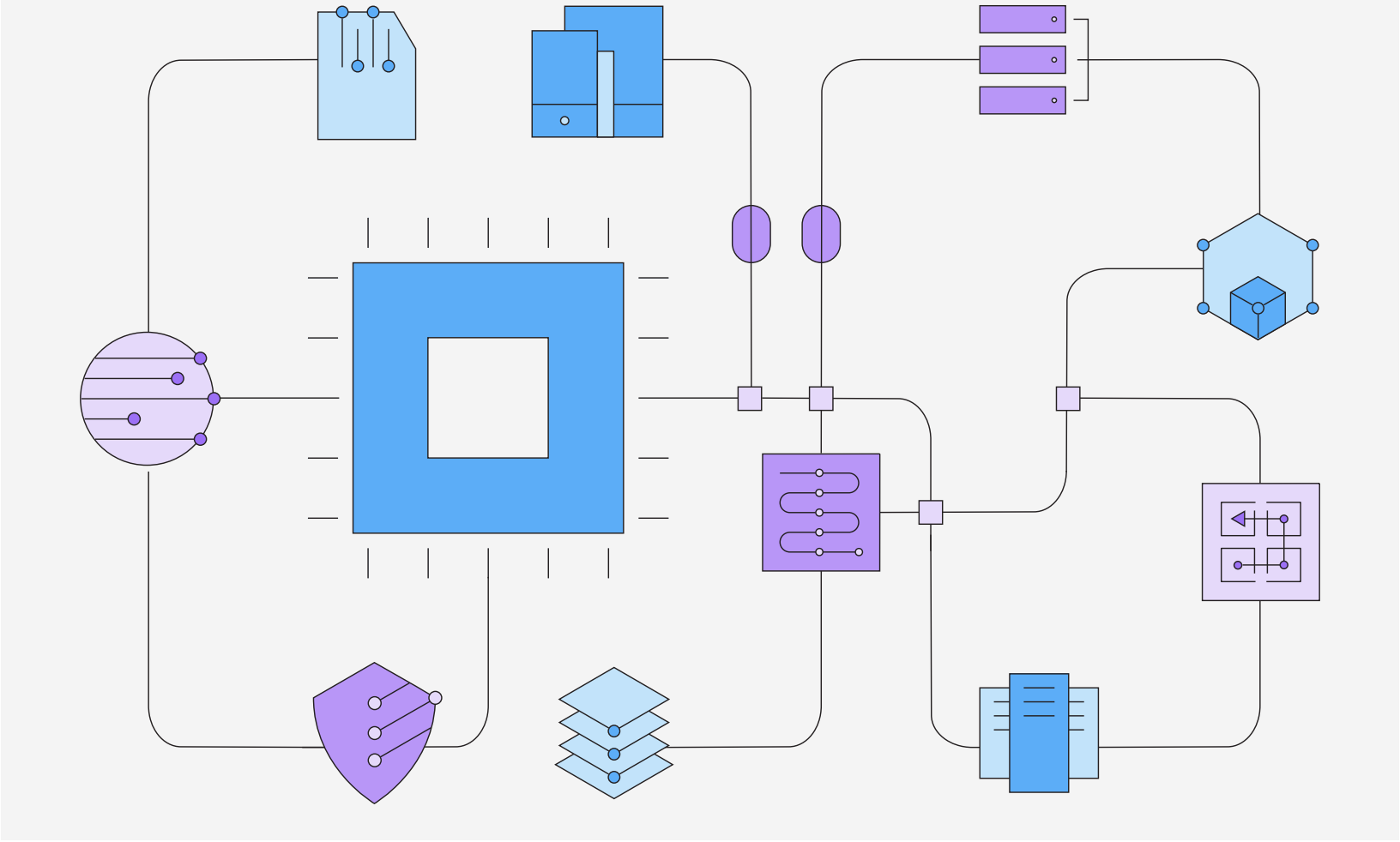
By moving from a waterfall development methodology to an enterprise DevOps process and CI/CD, organizations can achieve more-frequent, high-quality software deliveries.

Make AI-driven decisions at scale

Despite AI often offering real-time insights, businesses frequently have challenges getting the data where and when they need it. This challenge is many times the result of AI-driven tasks performing on a different platform than the transactional workloads using copies of data.

IBM is focused on enabling AI on IBM Z to help ensure clients have the most reliable, secured and high-performing environment that can deliver critical business insights in the moment. IBM enables data scientists to develop and train models anywhere, port data science assets and deploy seamlessly with production qualities of service in a consistent, repeatable manner.

The IBM z16™ mainframe, built with the new IBM Telum® Processor, is designed to enable low latency for faster insights at scale and at lower cost. Build and train AI models with open-source tools for framework interoperability and deploy on the IBM Z platform.



Automate and standardize IT

Application discovery and business alignment
Automation is crucial for organizations that adopt hybrid cloud environments. By codifying business processes and IT workflows, automation enables efficient operations within enterprises. When combined with automated operations and provisioning, it facilitates quick fulfilment of everyday business and technical tasks. Even a small investment in automation can lead to significant cost savings, allowing highly skilled resources to focus on more modernization efforts.

Taking a narrow approach to automation can result in the need for expertise across multiple domains, duplicated efforts and silos within teams and departments. For application modernization, it's essential for enterprises to implement robust and efficient IT automation that can handle increasing complexity and meet consumer expectations. A standardized approach is necessary, spanning from the edge of the IT infrastructure to the central backbone of the enterprise, such as the IBM Z platform.

Red Hat Ansible® Automation Platform is a versatile solution that can run on multiple clouds as well as IBM Z, and serves as a foundation for scaling automation across organizations and IT environments. The Red Hat Ansible Certified Content for IBM Z includes collections that accelerate productivity and automate specific knowledge for the z/OS operating system, z/OS middleware products and other automation software specific to IBM Z is a versatile solution that can run on multiple clouds and serves as a foundation for scaling automation across organizations and IT environments. It integrates the necessary capabilities for implementing enterprise-wide automation across multiple clouds, including the IBM Z platform.

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Accelerate your application modernization journey

Application discovery and business alignment

An important step in your journey is to establish a baseline of your current application estate for analysis and dependency mapping to lower risk and maximize ROI by determining the right modernization increments. It can be common for an enterprise's business-critical applications to have been written and modified over time with only manual documentation or no documentation at all.

With millions of lines of code, hundreds of dependencies and dated documentation, developers can spend weeks or months trying to understand all the changes needed. IBM watsonx™Code Assistant for Z your essential code analysis solution for application modernization. Discover dependencies in a click, make changes with confidence and keep your documentation current and accurate.

Open-source tools and ecosystem

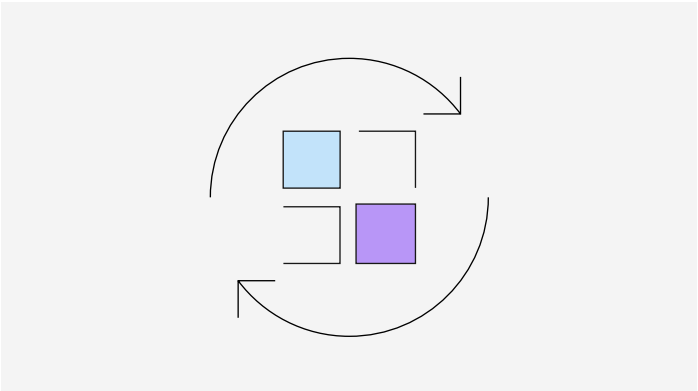
The IBM Z platform has an extensive and growing ecosystem of open-source-based ISVs and partners that can be used to accelerate application modernization initiatives at every level of the application stack. For example, the ability to work with open-source programming languages, such as Java, Node.js, Python and Go, on z/OS allows you to expand the pool of available developers that can modernize and extend platform applications using the tools and languages they're most familiar with.

Application modernization patterns

One of the best ways to accelerate your journey is with a core set of application modernization patterns that can be used across the IBM Z platform and cloud.

These patterns come together in support of reference architectures used to addresses specific business use cases. Application modernization patterns aren't unique to the IBM Z platform and, in most cases, are industry standard in nomenclature and definition. Our focus is to demonstrate how they can be implemented and deployed in an IBM Z environment—both z/OS and Linux—and under what circumstances represent the best choice for your application modernization initiative.

Application, data and event-driven patterns provide the technical building blocks to modify and enhance existing application functions and services. These enhancements happen while providing timely and secured access to data. At the same time, they make it more consumable, and produce and respond to events in real time across loosely coupled applications.



Co-create using IBM Garage methodology

IBM Garage™ methodology can help clients generate innovative ideas and equip them with the resources, technologies and expertise to rapidly turn those ideas into business value.

The experts at IBM Garage can help bring customer pain points into focus. Clients can empower their IT teams to take manageable risks while adopting leading technologies, speed up product development and measure the value of everything they do. They can chair their transformation journey with an iterative framework that guides success from ideation, to build, to scale.

Getting started

Jumpstart application modernization with the IBM watsonx Code Assistant for Z

With IBM watsonx Code Assistant for Z, increase developer productivity and agility through the application modernization lifecycle with application discovery and analysis, automated code refactoring and COBOL to Java conversion capabilities.

Start exploring the benefits and use cases →

Put AI to work with IBM Z

Discover how to create new value within your existing workloads with the power of AI for IBM Z technology.

Read more to see what's possible →

Learn more about applying AI and machine learning to your most valuable enterprise data.

Get started on your journey →

Endnotes

1 Modernizing applications on hybrid cloud, IBM Institute for Business Value, 4 May 2023.

2 A new way to run the business, IBM Institute for Business Value, 15 August 2023.

3 Based on an IBM Consulting 5-year ROI model projection for hybrid by design journey built on 50-plus client engagements. ROI methodology: top-line growth, productivity gains and cost reduction. IBM Consulting Economic Value Model.

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