New Possibilities for the Digital Era:

Enabling Innovation and Competitive Advantage
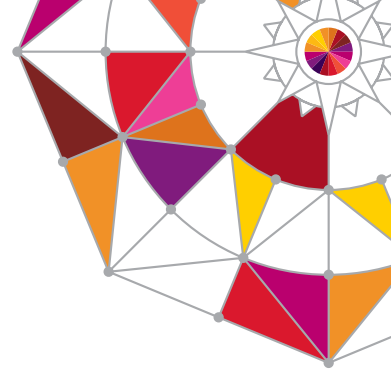
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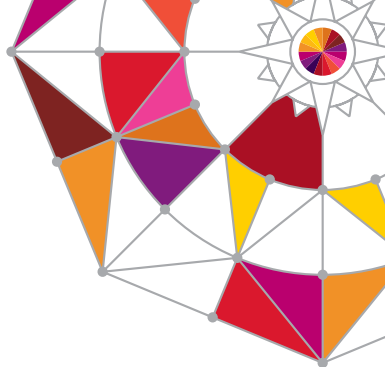
Overview

About This eBook

Derived from several in-depth interviews with IBM and industry experts and analysts, this eBook explains IBM's point of view on how System z® affects enterprise development and competition today, and how it will play an increasing role as technology evolves in the coming years.

These experts explore the **business, economic and technological trends that drive System z's increasing significance, the role IT can play in using System z to enable an enterprise to meet its potential,** and a detailed view of the benefits System z offers to an enterprise with a vision for its future.
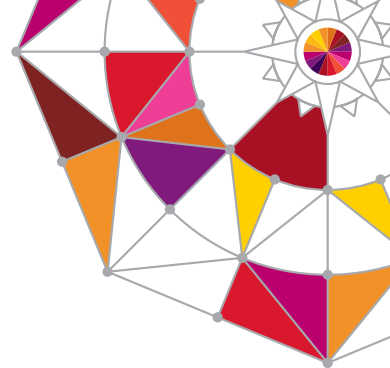
Trends and Challenges, Today and Tomorrow

The speed of technological evolution today would astound even the most imaginative futurists of the previous generation.

Every year, mobile, cloud and analytics tools and resources become increasingly more promising, more powerful and more prevalent in the way we live and work.
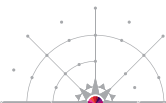
And this rate of technological change is fueling a number of highly disruptive business, economic, political and cultural trends unfolding around the world today. Organizations that continue to conduct their

business as usual, without embracing this rapid change, risk being overtaken by their competitors.

The Power of the Consumer…

Expectations

Twenty years ago, business enterprises drove their consumers' behavior: individuals' purchasing habits and expressions of satisfaction. Today, the roles have reversed. In essence, it's the customers who are driving the products and services that enterprises deliver. Mobile and social technologies are changing expectations for how quickly individuals can access information— and these individuals demand the same speed and reliability from the enterprises they interact with.

Transparency

Customers are also demanding greater transparency from the enterprises they do business with, as well as more personalized and more seamless interaction with those enterprises. That demand requires enterprises' IT professionals to support and

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integrate robust social communications as part of the new client engagement model, even as they keep pace with changes in regulation and compliance, and with security measures. And with consumers empowered to switch providers on a dime, every employee must be empowered to interact with customers.

…and the Power of Knowledge

Access and Analytics

Leading enterprises can access and analyze a wealth of incoming customer data with greater precision than they could even two or three years ago, which helps them understand customer needs and meet those needs more efficiently.

That change isn't limited to an organization's interaction with its customers. It also affects how an organization interacts internally. As data and analytics no longer need to be confined to specialists, knowledge can be better shared through an organization's social channels.

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"Today's data-center customer base is increasingly hybrid," says Krista Macomber, an analyst in the data-center practice at Technology Business Research. "Not only are vendors having to engage with IT managers, but also they're having to engage with C-suite executives. Trends like mobile computing, cloud computing and analytics are causing the influence of IT to spread outside of the IT department and to have a greater impact on the business bottom line."

When IT departments can more seamlessly interact with the C-suite, everyone within the organization can support the efficiency and productivity. But when an organization isn't interacting efferently, one of its competitors will fill the vacuum.

Economics, Disruption and Threats

Competition and Security Threats

Today, organizations and individuals have come to expect the unexpected. **New businesses sidestepping traditional models and processes often compel their existing competitors, and even industry leaders, to change the way they work.**

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And disruption comes not just from competing businesses, but also from competing models in other sectors entirely. A game-changing business in the retail sector can have lasting implications for finance, health, transportation and other differentiated industries.

Unfortunately, disruption can also come from more malicious sources, such as sophisticated criminal enterprises preying on security vulnerabilities to steal customer and corporate data.

Thinking Globally

Disruptions around the globe can create greater and more immediate ripple effects than ever before.

The past decade has been an era of economic turmoil in North America and Europe, and substantial growth in developing markets in Asia, Africa and Latin America. These regions are bonded tightly by trade, and interruptions in the supply chain can be significant. In 2011, a tsunami and nuclear emergency in Japan interrupted the worldwide manufacture and distribution of products ranging from car brake valves to computer silicon

wafers. But IT staffs have the means to protect their enterprises' valuable data against such unforeseen events.

Mobile First

The intersection of individuals and technology is shifting quickly from an online model, driven by Web-based experiences, to a mobile-first approach.

"A style of interacting with IT infrequently, during the course of a day or a week, is radically different from having something in the palm of your hand that you can use at an instant's notice, wherever you are, whenever a thought comes into your head,"

— Bruce Anthony, Distinguished Engineer & CTO STG Mobile and Wireless Systems.

"That difference of interacting with applications on a real-time basis offers the ability for disruption in almost every type of industry,"

Anthony says. "When you have the ability to interact with your customer continuously, that gives you the opportunity to better add value to that customer. But if you're not paying attention, mobile also offers your competitors the opportunity to sneak in and offer a better value."

Even the "normal" evolutionary pattern of technological adoption is being disrupted in emerging markets that may lack existing infrastructure parallel to that of mature markets.
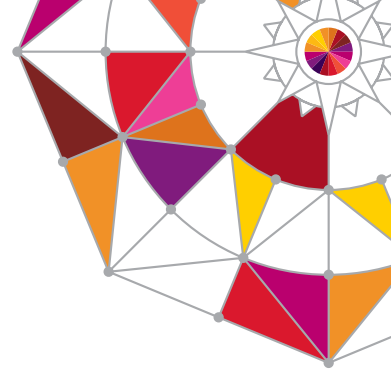
The mobile-first wave of business in India, Latin America and Africa may lead the online-first markets of North America, Europe and developed Asian economies in changing business and economic patterns and standards.

In some African markets, mobile banking has leapfrogged traditional financial infrastructure, as peer-to-peer cashless payments via standard mobile phones have become the norm. South Africa's First National Bank handles 234 million mobile-banking transactions every month, with 30-millisecond response times.

To view a video clip about South Africa's First National Bank mobile lending and banking, click here.

Why z?

For many industries central to society—health, finance, retail, travel, academia, government and the public sector—the IBM System z mainframe can largely solve many of today's constant and rapidly changing demands on IT. The shift in customer needs toward greater service and transparency, the increased ability of an organization to share knowledge, the reliance of entire societies on mobile-first platforms—all of these challenging new realities can be addressed with the IBM System z mainframe.

System z was one of the world's first cloud platforms. System z's influence on our world has been both immeasurable and invisible as the foundation of technological innovations that much of society now takes for granted. **Today, most of the world's operational systems are mainframe-based.**

Powerful and Invisible

Like a powerful car engine, most of the mainframe's mechanisms and capabilities benefit its customers without being apparent

to most them. Without the mainframe's presence, though, end consumers would feel the difference acutely.

"System z typically processes hundreds of thousands of transactions daily. Without the mainframe's presence, consumers would notice an inability to conduct transactions," says John Dayka, an IBM Distinguished Engineer focused on System z security. "The security provided by System z's hardware cryptography can help protect the privacy and security of these banking and financial transactions. Without System z, compromise and the erosion of confidence would likely result."

Financial services corporation Visa relies on System z to help enterprises trade with other businesses and individuals who expect and depend on always having an easy, safe, secure transaction. "It has to go through, and it has to work every time," Jim McCarthy, Visa's Global Head of Product Innovation, said recently. **"While that's core to who we are at Visa, it clearly is a direct testament to the platforms we run. They've got to be up, they've got to run, they've got to be secure, and they've got to be trustworthy—and all of that comes with the IBM mainframe."**

To view a video clip about how Visa uses System z to ensure that its customers can always engage in commerce, click here.

Security, Accessibility, Analytics

The primary attributes of System z include its security—including its ability to efficiently gather, distribute, and preserve data—and its always-on availability. As these attributes grow more significant to conducting business in the coming years, other features of System z, such as its powerful in-transaction analytics capabilities, will give it an increasingly vital role in helping enterprises stay competitive and viable.

The mainframe also supports seamless integration between systems of engagement (SOE) and systems of record (SOR).

- SOE are the systems that connect companies with their customers and business partners to transform the customer experience and drive competitive differentiation.

- SOR are the core data and transactional systems of the business that support such operations as enterprise resource
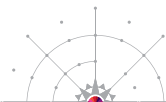
planning (ERP), manufacturing, and customer relationship management (CRM).

System z is the premier system of record, an integrated data cloud that acts as an IT service-delivery vehicle for all corporate data and transactions delivered to systems of engagement.

This seamless integration enabled by System z is critical in helping businesses respond and meet the changing demands of today's consumer engagement model.
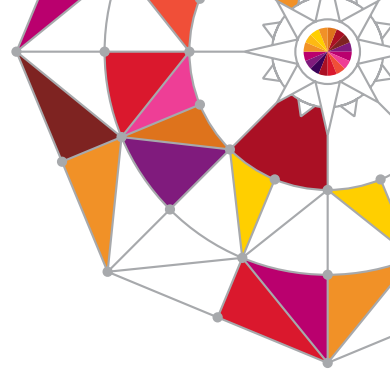
System z Benefits

As the cloud-based foundation of any enterprise, System z has core values that offer several distinct advantages and benefits over other platforms:

- security

- reliability and scalability

- robust analytics capabilities

- integration

- efficiency

- economic value

Beyond its core competencies of security, reliability and scalability, and its robust analytics capabilities, System z is a fully integrated CAMS platform that consolidates all processing under one roof. System z's simplification and efficiency can fuel innovation, operational excellence and economic growth for large data-driven enterprises.

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Security

More Security, Fewer Parts

"Traditionally, data has been a very locked-up resource. It's only been accessible to a certain few people," says Paul DiMarzio, Big Data and Analytics Offering Manager for System z.

"As you have to start to loosen that up, you have to be sure that you're only giving access to the people who have a right to see it — think about things like WikiLeaks," he says. "And that's where the mainframe really comes into play. We already know how to keep data safe and secure."

Data security may be the top concern of the many types of enterprises that rely on System z: banks, hospitals, universities and governments. It's also been one of the primary features of System z hardware from the very beginning.

Evolving Safety

"Over the decades, we've added more and more layers of security," says John Petreshock, System z Security Product Manager. "We've

always had security built into the platform and added to that over the years, and what that really brings is layers of defense to System z that make it one of the most secure platforms in the marketplace."

System z offers the benefit of being a complete integrated package—with security built in from the ground up.

"To attempt similar security levels, distributed environments have a lot of bolt-on products that you need to manually add in," Petreshock says. "You have external hardware security modules you need to put in for encryption. Things like that are all built into System z."

> **To read an IBM-commissioned Forrester Report about securing enterprises with consolidated mainframe infrastructure, click here.**

Combating Cybercrime

Cyberattacks on data centers have become increasingly persistent and sophisticated in the past few years, as criminals or saboteurs exploit weak spots in social networks and doors left open by vendors and partners. That makes an enterprise's infrastructure security of even greater concern than ever.

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"The trend has been for stronger and stronger cryptographic algorithms that can maintain data privacy over the long haul," Dayka says. "We've continued to foster this strength and the quality of these algorithms with System z."

Equally crucial to the strength of cryptographic algorithms is the ability to ensure that the results of the cryptography algorithms are always correctly calculated, Dayka says, and to detect errors and immediately correct the calculation. "If a hardware error is injected into either an instruction or in cryptography operations, System z will detect that and will not corrupt the data. And that's unique to System z cryptography in the marketplace."

Fighting Fraud

For a sector that calculates a degree of fraud and financial crimes

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as a business write-off, **System z's intelligence and analytics can introduce tremendous cost-saving efficiencies for enterprises that don't expect them.**

The insurance industry accepts a prevailing standard loss of 10 percent of claims to fraud. But insurance companies using System z can reduce that loss without changing business systems or claims-processing times, DiMarzio says.

"We come to the business units and we say, 'How about if I can put some technology on the floor that could detect a greater percentage of fraudulent claims?'" If System z can reduce the "standard" 10 percent rate of fraud by even a percentage or two, the dollars saved by avoiding payment on fraudulent claims are very big numbers.

"And it takes enterprises from a place of accepting that the way they do business is the only way they can do business to a circumstance where System z can do it a different way—and save them a lot of money," he says. "And it all has to do with the fact that we hold the operational data and the transactions are flowing through us. **We're adding intelligence directly within the transaction.** Nobody else can do that because they don't own the operations."

"We all too often see headlines about breaches and loss of data," Petreshock says, "and our clients and their customers want to make sure that all their data is protected. So we've seen a growing need in the marketplace for additional security and encryption solutions for data at rest, and we have built those on System z."

There's a growing awareness among enterprises of all sizes that they need to ensure they have configured their systems optimally to help prevent breaches and abuse, Dayka says. It's important to implement security policy that focuses on the processes, people and how the available relevant technologies are used to provide optimum protection for business assets.

To read a Clabby Analytics report on System z's features built to minimize and prevent security breaches of sensitive data, click here.

Reliability and Scalability

The Always-On Platform

A crucial characteristic of the System z platform is reliability. **For any enterprise, the always-on availability of the mainframe counters the threat of disruption at any time.** And System z's

flexibility in adapting to changing technology counters the threat of obsolescence in the future.

"The performance and reliability of the mainframe can potentially help organizations that are leveraging the platform for analytics, to respond faster than those using other platforms," TBR analyst Macomber says.

"The way System z customers tend to view the mainframe," Dayka says, "is that it serves as a utility that's always there. System z customers typically don't have to worry about its availability. Whether you have business-to-business or business-to-consumer relationships, a service provider needs to provide value to customers. Without availability, you have a much more difficult time maintaining that value proposition and keeping clients satisfied and engaged."

(>) **To view a video clip about how Walmart supports customers' anytime-anywhere access with System z's scalability and reliability, click here.**

The Mobile Wave

The advantage of mainframe reliability, scale and security has never been more significant than in the rapid and ongoing shift toward

mobile technology as the preferred platform of enterprises and individuals alike.

And while mobile platforms benefit businesses as well as their customers, an enterprise without a mainframe-powered infrastructure risks being unprepared for a high volume of customer activity, Anthony says.

The power of System z is being always on, because customers are always on—using mobile in real time, at all times.
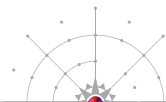
"When an enterprise comes up with a really great idea that resonates in the marketplace, mobile lets that idea rapidly propagate—to the point where you can literally see millions of people signing up and using it," he says. "Instagram and OMGPop were both written for mobile devices, and they went from zero users to tens of millions of users in a matter of a few weeks or months. So an enterprise has to have an infrastructure that can scale to many hundreds of thousands of new users a day."

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To read how Istanbul-based Halkbank used System z to extend its service to Web and mobile channels seamlessly and with minimal risk, click here.

Future Data Centers

One of System z's key features is its ability to address changing workloads and business needs.

"Performance and reliability of underlying hardware are absolutely essential to mission-critical workloads that run on the mainframe," Macomber says. "And that's a big reason why customers are staying with the platform."

"Since the mainframe can scale elastically, provide services to new clients quickly, and meter usage at a detailed level, it has all of the basic components needed to build cloud solutions that will make the data center competitive to external cloud solutions," says Frank J. De Gilio, Chief Architect for Cloud and an IBM Distinguished Engineer.

"Since the mainframe can help IT bring services to the lines of business faster while maintaining enterprise-class quality of service, allowing lines of business to build applications rapidly while maintaining the necessary qualities of service will allow a company to be a disruptor in the industry," he says.

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De Gilio predicts a future for the mainframe as the connection point between mobile devices and enterprise business services, and as the security bastion that protects mobile data and allows mobile devices to be used for personal and enterprise business simultaneously.

"The marketplace is changing so rapidly that it's almost difficult to say what businesses will be capable of when we look out from a five-year trajectory," Macomber says. "But we do know that data centers are going to look very different from the way they do today." For example, she says, customers will continue to deploy traditional IT architecture, but enterprises are beginning to test the waters with deployments of hyperscale servers to achieve cloud-like simplicity and agility.

"And all of this goes back to saving money," she says. "So customers can funnel the savings back into higher-value projects," such as using analytics for greater competitive value.

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Analytics

Security and reliability are widely known as System z's chief advantages over competing platforms. But another feature that's growing in importance is the mainframe's analytical power. In almost every industry, the value for an enterprise comes from its data. And System z is essential to helping data-driven enterprises understand what individual customers need.

The rapid evolution of System z's analytics capabilities parallels the ever-increasing volume of data generated by mobile devices, including queries, geolocation, social messaging and financial and retail transactions. "That's a great opportunity for IT vendors," Macomber says, "but the solutions to these problems are complex. It's a difficult task to boil all these different technologies into simplified messaging that highlights improved business outcomes for customers."

To read a Clipper Group report on the advantages of running business analytics workloads on System z, click here.

Customers and Constituents

"Think of the mainframe as the personal shopper for the user," De

Gilio says—gathering and analyzing mobile data's "wish lists" and prior purchases so it can lead customers to products and services of particularly likely interest, and can even look after a customer's finances and plans.

With the rapid advance of mobile devices, DiMarzio says, customers suddenly can access an enormous amount of information—and enterprises need to be ready for this shift in power. And the mainframe is essential for mobile engagement strategy. "We have to make sure that the client has access to the data that they want, when they want it and when they need it," he says.

In essence, the mainframe resurrects the lost practice of an enterprise and its customers building close relationships. And those

"And we have to make sure that only the people who have the authority to see that data and access it are the ones getting at it. Mainframe has a very strong role to play in that strategy."
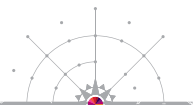
relationships don't only influence business transactions; they define public policy.

"Understanding sentiment and people's positions helps the government understand the nation's perspective in much greater detail, and with greater accuracy, than random sampling of data," De Gilio says. "Mainframes will provide the government a greater capacity to understand the will of the people."

(>) **To view an infographic illustrating New York State's projected budget decreases after moving its distributed infrastructure to a cloud-based mainframe, click here.**

The Secure Platform

Enterprises in industries with highly sensitive data, such as healthcare and finance, can't easily push their highly sensitive data sets to distributed platforms for storage and analysis without risking security exposures, DiMarzio says.

"It creates multiple security domains. It creates multiple sets of credentials. You have the risk of the data being compromised as it's moving from one place to the other," he says. "Every time you take

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that data and push it somewhere else, you've exposed it. The less that you move data around, the more safe it's going to be."

Enterprises that extract, transform and load data off-platform to perform analytics in the name of cutting costs may be achieving the opposite result, DiMarzio says.

"We've so changed the mainframe itself, as well as the technology on it, and even the pricing models that we use for some of these types of processes, that you're not saving much at all," DiMarzio says. "In fact, in some cases, you're actually losing money by moving that stuff off, and you're exposing your data to unnecessary risk."

The Economic Value of System z

Clients of all sizes across all industries often wonder whether they can afford to implement mainframe technology in their business plans. Today, a better question is whether they can afford not to implement it.

For consolidating an enterprise's processes, keeping its data secure and accessible, and applying analytics against that data, the value of System z greatly surpasses that of an ad hoc

infrastructure assembled from independent parts.

So how does System z compare with other models for deploying a cloud-computing environment? IBM has analyzed System z performance as compared with x86 and with service performed by public-cloud vendors:
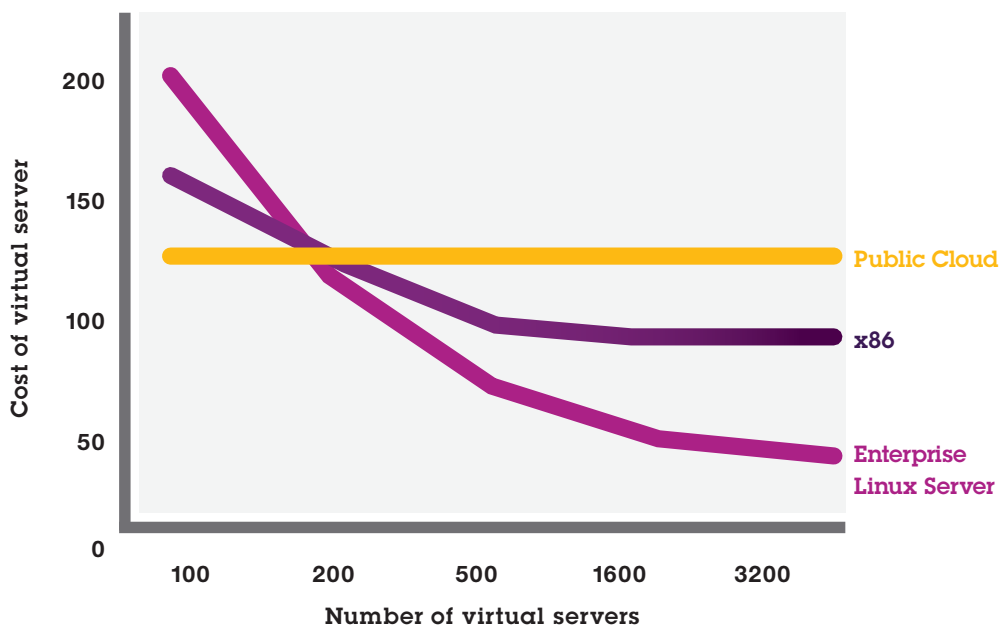
IBM Dare to be Different Analysis, based on IBM measurements and projections.

The analysis reveals that a business scaling up to about 200 virtual machines (VM) gets far more efficient and economical results by using the Enterprise Linux Server as an enterprise cloud than with a virtualized x86 or public-cloud model.

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As a business scales up further—to 400 VM, 600 VM and beyond—the benefits of System z continue to grow. Between 1,000 and 1,600 VM, the cost of System z architecture is almost half that of a single virtualized x86 environment, and half of a typical major cloud provider in the marketplace.

When **Nationwide Mutual Insurance Co. recently consolidated 3,000 distributed servers, it reduced its power, cooling, and floor-space requirements by 80 percent**. The insurer now sees 30 percent annual growth in computing requirements, most handled through the provisioning of new virtual servers on the existing mainframe footprint.

"The ability to develop new offerings faster and at a lower cost means that we can bring valuable new services to market ahead of our competitors," said Jim Tussing, Nationwide's chief technology officer for infrastructure and operations, in a recent case study.

To read how Nationwide saved costs by consolidating its distributed server landscape to System z mainframes, creating an optimized multiplatform private cloud, click here.
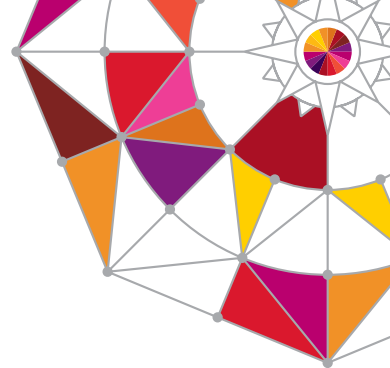
System z, for Today and Tomorrow

Today and in the coming years, the most heavily data-driven industries—finance, healthcare, retail, the public sector—will continue to be led by enterprises built on System z. Given the ever-increasing volume of data being generated today, System z's capabilities for offering data security, infrastructure reliability and powerful analytics combine to significantly advance the way enterprises work, and to bring them a far greater understanding of their customers' needs, which will help these enterprises lead their industries forward.

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