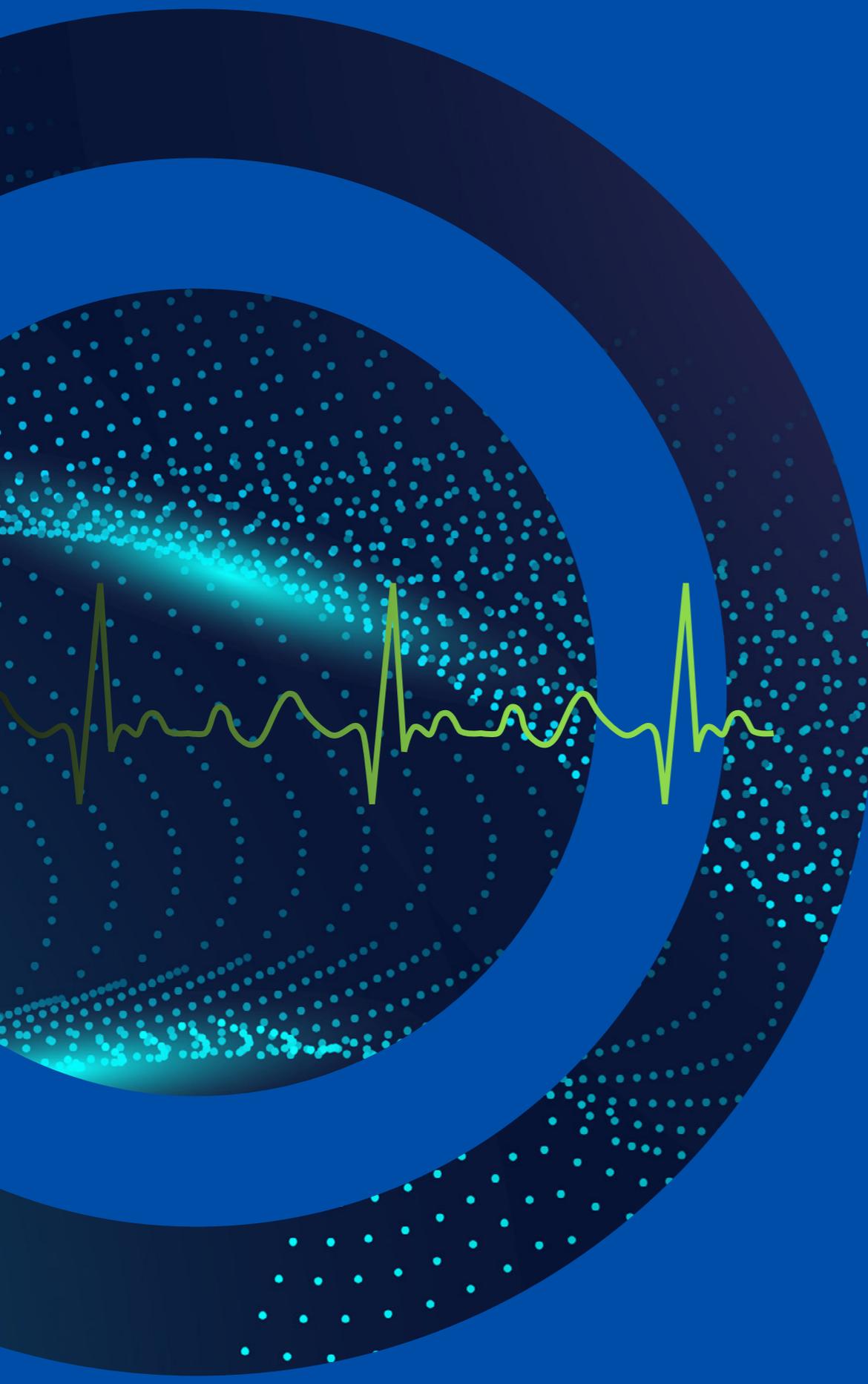


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How Mainframe Health Monitoring

Must Change to Meet
Today's Demands



The IBM Z[®] mainframe and its z/OS[®] operating system are an indispensable part of the overall IT architecture and business model for enterprises worldwide. For decades, the day-to-day operations of finance, government, healthcare, retail, manufacturing and other industries have relied on the mainframe's capabilities.



It's critical that organizations maintain their investment in the platform. IBM Z is continually being upgraded to include the latest technologies, including open source, AI and cloud. As these new technologies become must-have tools for business, they need to be incorporated into the data center, requiring investment from organizations.

To be effective, business lines and IT must work together. Business lines rely on the data center to provide access to these new tools to keep the business competitive. IT needs to ensure that the systems are running optimally to serve increased business demands.

Mainframe Health Is Business Critical

In today's enterprise business environment, almost every activity that occurs on the mainframe is mission critical. Moving mission-critical workloads off the mainframe is a risk that many businesses don't want to take.

When a workload absolutely must be completed on time, the best option is to run on the mainframe. Service Level Agreements (SLAs) have assigned deadlines that must be met. Organizations that miss an SLA potentially face large penalties as well as big drops in customer satisfaction.

For example, a financial company running a batch cycle to complete its daily financial settlement with the U.S. Federal Reserve System must transmit correctly formatted financial files to the central bank within its deadline window. If the company misses the window and can't settle for a day, it could end up paying interest, or the daily float, on tens of millions of dollars.

When it comes to credit card transactions, the mainframe is the best platform to handle those real-time, online, high-speed transactions. Credit card processors for a card-issuing bank must authorize transactions extremely fast or risk antagonizing the customer if the authorization speed is slowed by even a second or two. The customer may get impatient standing at the point of sale and use the next credit card in her wallet or pay with cash. That results in a loss of revenue for the bank.

The Importance of Monitoring

Monitoring is the key to maintaining good system performance and meeting deadlines. Ensuring that the business has a healthy mainframe – that is, the ability for the system to get work done, correctly and within the time & capacity allotted with good security & operational hygiene – is critical to the enterprise's overall

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VP of Product Management at ASG

commercial health. It may be that the business has excess capacity that goes unused, thereby yielding a cost basis higher than its competitors. Or it may be that the organization has too little capacity, preventing the business from meeting its obligations or SLAs, which puts the business at a competitive disadvantage.

Monitoring the health of the system will identify problems before they balloon into a crisis. Spotting the issues early reduces the mean time to resolution (MTTR) for problems. By discovering and solving problems quickly, the business avoids downtime and its impact on the bottom line.

Personnel Issues Impacting Mainframe Health

Every enterprise in the world using a mainframe is facing a critical inflection point in their staffing. Their most proficient, skilled and experienced professionals are approaching retirement. The COVID-19 pandemic has heightened the personnel situation as many long-term IT professionals are in a high-risk category for the virus.

As seasoned professionals exit the mainframe industry, they are being replaced by millennials in some cases and, in many more cases, Gen Z's who have little to no experience with the mainframe. These sharp and engaged IT professionals need additional support to be successful in the data center.

Automating some of the fundamentals around mainframe health checking can help these younger professionals, and the enterprises who depend on them, succeed. It also helps enterprises continue to take advantage of their significant investments in the mainframe technology stack and all the business rules embedded in the applications that run on mainframe.

“We’re asking these younger professionals to step in and handle all of the intricacy that’s been built into the systems and applications over the years,” says

Rodney Dyson, vice president, development, ASG Technologies. “Professionals who are retiring are leaving behind a wealth of training and documentation. It’s important that organizations make the systems less burdensome to maintain, even though they’re more complex than in the past.”

Senior executives, even though many have never touched a mainframe, understand the impact of the generational shift that's occurring. These executives recognize the value of institutionalizing the learning of these retiring mainframe professionals. The managers also realize they must provide a work experience that is familiar and acceptable to these young professionals. If that’s not done, the millennial IT professionals may find employment elsewhere or may require a higher salary to keep working with an out-of-date user experience.

Replacing a seasoned professional with two or three millennial employees can also increase personnel costs. Those costs can be offset by deploying better mainframe monitoring. Using monitoring technology to track a mainframe’s health will reduce operating costs in the long run. Enterprises then can invest money into new revenue streams that will boost an organization’s top line. Learn how to enable millennial IT professionals in “Creating Success for Younger IT Pros” on page [TK](#).

Creating Success for Younger IT Pros

Organizations want the incoming millennial cohort of IT professionals to succeed. To ensure that success, organizations will need to use more modern tooling and create a user experience that is familiar to them. Many in this generation expect pervasive connectivity, by cell if not by high-speed internet access, and are accustomed to running their lives from their phones. They're used to engaging with tablets and touch-friendly applications.

Organizations must provide modern tools because the mainframe remains a vital part of their IT knowledge base. Useful tools include a GUI that is friendly and easy to adopt, 24-7 availability to the system so employees can work outside regular business hours, and externalized data through publicly documented APIs. These APIs can enable mainframe content to be integrated into cloud consoles or dashboards.

Millennials need to be knowledgeable about the mainframe and organizations must help with this education. Once millennials understand the mainframe, they see how important it is to the business and how it's a powerful and adaptable platform fully capable of running new programming languages and open-source software as well as integrating into Agile and DevOps strategies. This gets millennials excited about the mainframe.



The Current Landscape for Mainframe Health Monitoring

Mainframe health, as noted above, is defined as the ability of a system to get work done. Applications and subsystems may have their own monitors to gauge the capacity consumed by workloads and overall performance. As workloads are increasingly added to the mainframe, it has become more complex to monitor the mainframe's health and enterprises shifted away from granular capacity & performance monitoring to centralized purpose-built monitors.

Over the years, organizations have monitored each mainframe system and subsystem in each LPAR independently and examined the results individually. This worked well when applications didn't change very much. Today's world of rapid change and value stream workloads spanning multiple mainframe LPARS and subsystems calls for a more integrated and holistic approach to monitoring mainframe and overall system health.

Many IT shops use SMF reports generated about mainframe activity to gauge the platform's health. SMF records help IT discover problems, but it takes time to wade through the data. Of the two hundred plus SMF record types that can be generated, typically only the top 20 records are reviewed by IT. A problem lurking lower down in the list won't get remedied until it becomes a bigger problem and makes the top 20. Further, information is gathered and acted upon only within the tech silos, not across the enterprise. IT gets a limited view of the mainframe's health.

Many of today's performance monitors gather and analyze key performance indicators (KPIs) from each tech silo. Most KPIs focus on workload throughput and are used to create a baseline. The business can detect anomalies by comparing the metrics against both the high and the low thresholds from the baseline.

This analysis shows if resources are being used optimally. Perhaps enough resources aren't available to run a workload and it's being processed slowly. Or workloads are running too fast and everything on the system isn't getting completed properly. Either scenario will cause problems.

Unfortunately, KPIs generally aren't gathered in real time. Comparing baseline KPIs with current ones shows where anomalies were occurring. But the lag time between getting KPIs and performing analysis of the anomalies hinders identifying why they are occurring and taking steps to remedy the problem before it triggers more issues.

What's Missing in Today's Monitoring Offerings

Current health monitoring methods don't provide the kind of response and broad view that's needed by evolving applications and work methods. What's needed is constant monitoring of the mainframe's health to reduce the risk exposure for the business. Regularly occurring anomalies can be costly. The better way to handle anomalies is to spot them and remedy them immediately so they don't recur.

Application, downtime, or slow performance issues come at a cost. How much risk is an organization willing to take? Mainframe health monitoring lowers risk to more sustainable levels.

“Organizations need a means to automate the health checking of their mainframes rather than relying on the individual expertise of a mainframe professional, and they need it now,” says Jeff Cherrington, vice president, product management, systems, ASG Technologies.

A more fluid, automatic approach that encourages collaborative working is changing how IT operates. The silos between tech and business units are being broken down to allow ideas and creativity to flow unimpeded within the enterprise. Cross-platform application development, Agile development and DevOps are speeding up how developers, testers, IT and other parts of the business work together. Ideas go from concept to reality far more quickly than in the past.

Advances in process automation and AI are changing how people work. Human workers are delegating tasks to digital workers that can interact with applications, websites, user portals and more. At the same time, emerging IT professionals are entering the workforce with a far different mindset than their predecessors. Their worldview focuses on interconnectedness, not rigid borders.

These shifts call for a more holistic approach to managing and monitoring technology. Health monitoring systems must encompass this broad, inclusive and interconnected perspective. No longer do tech silos exist as separate entities. The health of the entire system must be assessed in relation to all of the components. The status quo no longer serves the enterprise.

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The Future of Mainframe Health Monitoring

Any health monitoring system will need to serve the plethora of mainframe workloads now in existence and those to come. Tomorrow's health monitoring system needs to be flexible and work across the entire mainframe. A health monitoring system built on KPIs is a logical choice.

Instead of focusing vertically on CICS®, Db2®, z/OS or MQ, a successful mainframe health monitor pulls information from all of the workloads into one monitor. The health monitor automatically sifts through the information to detect which KPIs are not being met and need attention.

The health monitor will visually emphasize those areas that need attention. It will notify those who need to know there's an issue. Those roles may be a diagnostician such as a Level 2 help desk person, a systems analyst or a business owner.

By displaying the information gathered from across the technology stacks in one place, it will be possible to see patterns. Perhaps a performance degradation in one area might have been caused by a performance degradation in another area. Were there interactions that affected performance? If that's the case, it would be possible to reduce the MTTR for at least one of those areas because it was found elsewhere. Reducing MTTR remains a key goal for health monitoring.

Presenting all of the relevant information in one place will assist new IT professionals in getting to the heart of the problem. Seasoned professionals who grew up with the mainframe are used to pulling in multiple pieces of information from different monitors together to connect the dots. Younger IT professionals, however, haven't had that same level of experience. In addition, they're used to seeing information as dashboards – graphically instead of textually. Any future health monitor must pull relevant information together, correlate it and highlight what's important graphically so a newer user can be effective and efficient.

Seasoned Pros Benefit from New Monitoring Paradigm

Seasoned professionals also will benefit from an all-encompassing view of the mainframe's health as they are asked to do more with less. In the past, IT professionals tended to be dedicated to a technology stack such as the database or the OS. This focus enabled IT pros to become well versed in one portion of the system and know it in detail inside and out.

These days, IT pros are expected to be knowledgeable about all of the technology stacks. They can't focus on just one particular area anymore. A health monitor that provides relevant information and alerts when thresholds are breached will make the seasoned pros more efficient and effective, too. They can let the smart health monitoring system do the analysis and then step in to troubleshoot.

The health monitor that enterprises need will assess technology stacks continuously on a minute-by-minute basis, looking for anomalies across the board. Performance is constantly changing and if a person is only checking the system once an hour, some anomalies may be missed. It's possible that those abnormalities can recur and become a bigger problem.

Tomorrow's health monitor will feature dynamically created baselines from the data being collected. This is similar to a moving average over time. The system will use that dynamic baseline to determine anomalies.

"Constantly monitoring, analyzing and issuing alerts when something is abnormal makes sense," says John Crossno, director of product management, ASG Technologies. "Instead of checking once an hour, a health monitor can check once a minute. That way the abnormality will be caught sooner, and remediation can begin immediately."

Having all of the information in one place benefits the business. By giving a holistic view of the mainframe's health, it's simpler to assess how performance is affecting the organization across business lines.

Making Information Relevant to the Business Lines

The future health monitor will show resource information in a way that's relevant to each business entity. The health monitor should be able to tailor reports on resources used by a particular business entity. Take CICS, for example. It's a resource used by many business units across an enterprise. A business unit will want to see reports on how it is performing for its sector, not CICS everywhere.



Designing A Better Health Monitor Checklist

Any future health monitor must:

- ✓ Provide a holistic view of the mainframe's health
- ✓ Focus on KPIs
- ✓ Collect and correlate information across tech silos
- ✓ Monitor the system minute-by-minute
- ✓ Dynamically create baselines on the system's health
- ✓ Show health information in an easy-to-read and understand format
- ✓ Use modern tools
- ✓ Issue alerts based on health issues
- ✓ Provide information based on business views

Further, certain business lines, such as those involved in online transactions, may need to be prioritized versus a batch process. A business view will help get priorities in alignment.

Business owners can use business views to check how their units are performing. If too many anomalies are occurring, it may be due to resource problems. The business owner can assess resources, look at their budget and how the unit is organized to create solutions.

Any future health monitor needs to be designed to visually show the status of the mainframe in addition to lists of anomalies. The visuals can include heatmaps, line charts, histograms, bubble charts, tree and street maps. The visual material will help diagnosticians, systems analysts and business owners to quickly focus on areas of concern.

The health monitor needs to be holistic to provide the best value for an organization. Currently, performance monitors are great at granular data. They identify individual problems within a technology stack. A better way is to step back and see the bigger picture, to give a meaningful view of health. “Looking holistically across the entire mainframe system will spot general issues as well as individual ones,” says Dyson. “Visual tools like heat maps will show general problems across the enterprise that can affect performance and will direct attention to those issues.”

A well-performing mainframe enables the organization to grow. At the same time, mainframe costs tend to stand out in the budget. It’s incumbent on an organization’s executive leadership to ensure that its investments are right sized. “The health monitor of the future will provide good information to the leadership so they can make informed decisions about budget allocations,” says Cherrington. “It will prevent overspending or underspending on the system. This is especially important as organizations see a generational shift in IT operations.”

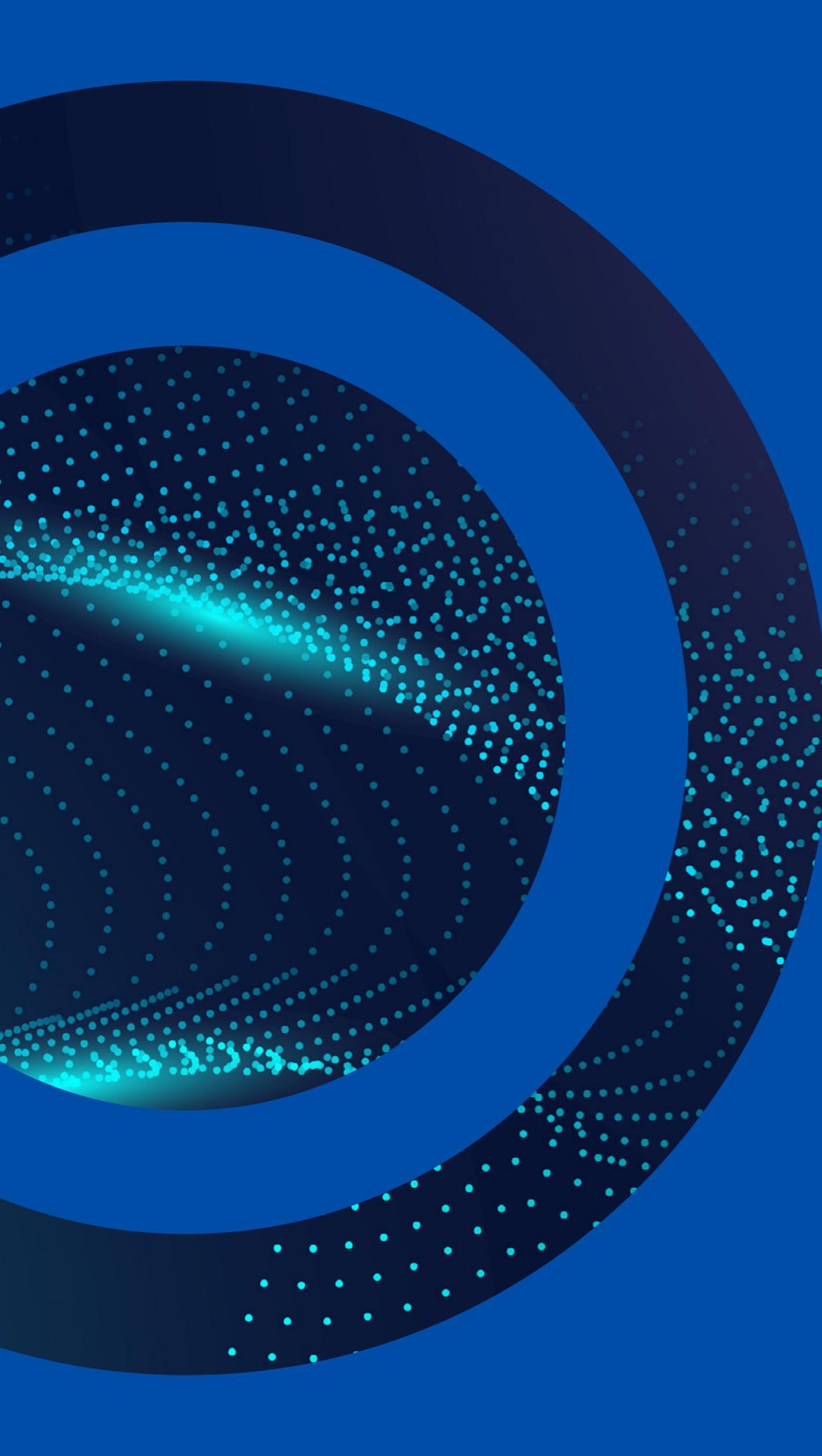
Evolving to Meet New Challenges

IBM Z and z/OS continue to be an important part of the overall IT architecture and business model for enterprises around the world. Monitoring and sustaining these systems’ health is paramount for the business and those who rely on the system.

Business applications are changing rapidly to meet demand. This puts increasing demands on IT infrastructure for better performance. The old ways of monitoring aren’t sufficient for today’s ever-changing IT landscape.

Mainframe health depends on a dynamic monitoring system that works across systems, subsystems, and LPARs, spots interrelated performance issues and provides IT personnel with real-time data on performance problems. Health monitoring must be easy to use and able to handle complex mainframe deployments. It’s about more than just the health of the system. It’s about keeping businesses running and thriving. Those are goals that everyone can agree on.

FOR INFORMATION on how you can proactively monitor and manage the health of your z/OS systems in real-time, **[visit asg.com](http://asg.com)**.



About ASG Technologies

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