White Paper

Managing Mainframe Performance in Today's Digital Economy: The IBM OMEGAMON Approach

Sponsored by: IBM

Tim Grieser
September 2016

IN THIS WHITE PAPER

This IDC White Paper discusses the role of the mainframe in today's digital economy. The growth of digital-age workloads on the mainframe is presented. The key requirements and benefits for mainframe performance management are identified. An overview of the IBM OMEGAMON approach to mainframe performance management is presented, and its benefits are discussed. Challenges and opportunities for the future are examined.

SITUATION OVERVIEW: THE MAINFRAME IN TODAY'S DIGITAL ECONOMY

The z Systems mainframe provides a rich set of capabilities that make it a favored platform for a wide variety of business and enterprise applications. The mainframe is legendary for fast performance, high availability, security, transaction processing, and database capabilities. Secure data storage has made the mainframe a trusted "system of record" platform for sensitive financial data for many years. The ability of mainframe to scale makes it a natural base for deploying high-volume transaction processing applications. These capabilities form a solid base for enabling new digital-age customer-facing applications where access to mainframe data provides key business value.

Digital Applications Drive Mainframe Growth

The mainframe is playing an expanded role as businesses and IT organizations implement digital business transformation initiatives with strong emphasis on customer-facing applications and digital marketing initiatives. As a result, new workloads are being created to enable digital transformation. Key mainframe areas driven by these digital-age business initiatives include the following:

- **Mobile-to-mainframe transactions:** The demands of the digital economy are driving businesses to transform their go-to-market and customer relationship strategies. Businesses are being forced to change how users consume and interact with applications and how they obtain services – including applications that process critical user data such as healthcare and financial services information stored on the mainframe. Typically, these application changes mean enabling customer-facing apps to access core system of record mainframe data from handheld and mobile devices including tablets and smartphones. In many cases, mobile-to-mainframe connections and interactions have dramatically driven up mainframe transaction volumes as users seek information and perform business functions.
- **Big Data and operational analytics:** Businesses are increasingly using Big Data and analytics for business intelligence – discovering and understanding key business relationships and

gaining insights into customer behavior based on searching and analyzing large volumes of machine-generated data. Mainframe database processing capabilities are widely being used for Big Data and analytics, with increasing requirements for real-time analysis results. Similar capabilities are being used to help analyze and optimize IT operational processes through IT operations analytics, which also benefit from mainframe processing. This increased use of operational analytics is both resulting in reductions in the time to resolution during system outages and helping predict when issues may occur ahead of time so preventative action can be taken.

- **Hybrid clouds:** Organizations are leveraging the value of core system of record assets on the mainframe using application components running in cloud environments. Hybrid applications are based on connectivity between cloud and on-premises components that can include databases and transaction processing applications. By opening up mainframe applications via modern APIs, clients can gain the best of both worlds: utilizing their existing time-tested, mission-critical core applications on the mainframe while developing new applications in the cloud for agility and speed of deployment.

Increased Challenges for Performance and Availability

Customer-facing applications in the digital economy are highly sensitive in terms of the performance perceived by end users, where interactions and responses to inquiries need to occur in seconds to be competitive in the marketplace. Delivering fast performance as transaction volumes increase is an ongoing challenge. Digital applications can generate unpredictable spikes and peak loads as users react to external events, causing performance bottlenecks and slowdowns.

Another critical requirement is high application availability where users typically expect 100% 24 x 7 uptime, often with access from around the globe. High availability is essential for customer-facing applications to meet user experience expectations and provide competitive advantage. Outages or even significant pauses in application availability can seriously impact business results.

Mainframe Performance Management

Mainframe performance management is vitally important to optimize resource utilization, deliver required workload objectives, and provide responsive service to lines of business building system of engagement applications that connect end users using graphical, web, and mobile devices to core back-end applications, data, and subsystems. Monitoring of systems, subsystems, and applications is essential to track service health, measure utilizations, detect impending bottlenecks, and understand the root causes of slowdowns or outages.

Monitoring is a key tenet of DevOps. Performance measurement is important for applications development, test, and operations to ensure applications will perform well and be highly available and that service-level requirements will be met in production environments at scale. With the growth of customer-facing digital apps, monitoring the end-user experience has become an increasingly important priority for ensuring that the response times required for customer satisfaction are being achieved.

Managing mainframe performance requires a comprehensive set of monitoring capabilities that can provide visibility into all aspects of usage on the mainframe platform. The mainframe presents a complex environment with a variety of components including operating systems, databases, transaction processing subsystems, and middleware as well as other environments. Mainframe monitoring must be able to measure and report performance metrics and infrastructure utilization for

individual components and for subsystems and be able to provide systemwide consolidated views and understand context to isolate where the real issues are located.

Performance management capabilities should include the ability to track usage against thresholds, detect exceptional conditions including high utilizations that can cause performance bottlenecks, generate alerts, and support problem identification, root cause analysis, and problem remediation.

Mainframe Service Management

Monitoring is an important part of an overall mainframe service management solution and forms the basis for many service management functions. User-level integration with other service management functions such as application performance management (APM), workload scheduling and automation, and asset discovery and management can be achieved through the use of common user interfaces. Desirable features include a "single pane of glass," which is a top-level dashboard that can provide systemwide views supporting drill downs into specific mainframe service management components. An integrated solution for service management enables faster problem discovery, analysis, and resolution as well as optimizes staff time and makes more efficient use of IT resources.

Performance Management and Cost Control

IT organizations are under increasing pressure to contain or reduce operating costs. Performance monitoring is important for understanding usage levels and helping control costs, especially for optimizing usage-based software license charges. Monitoring can identify peak usage periods and identify utilization trends for capacity management. Since monitoring software consumes system resources, it is important to minimize monitor processor utilization and take advantage of specialty processors to save operational costs. Another area of potential cost savings comes from vendor consolidation where customers choose to standardize on a single vendor's offering, saving operational costs and avoiding duplicate or overlapping license fees.

INTRODUCING IBM OMEGAMON FOR MAINFRAME PERFORMANCE MANAGEMENT

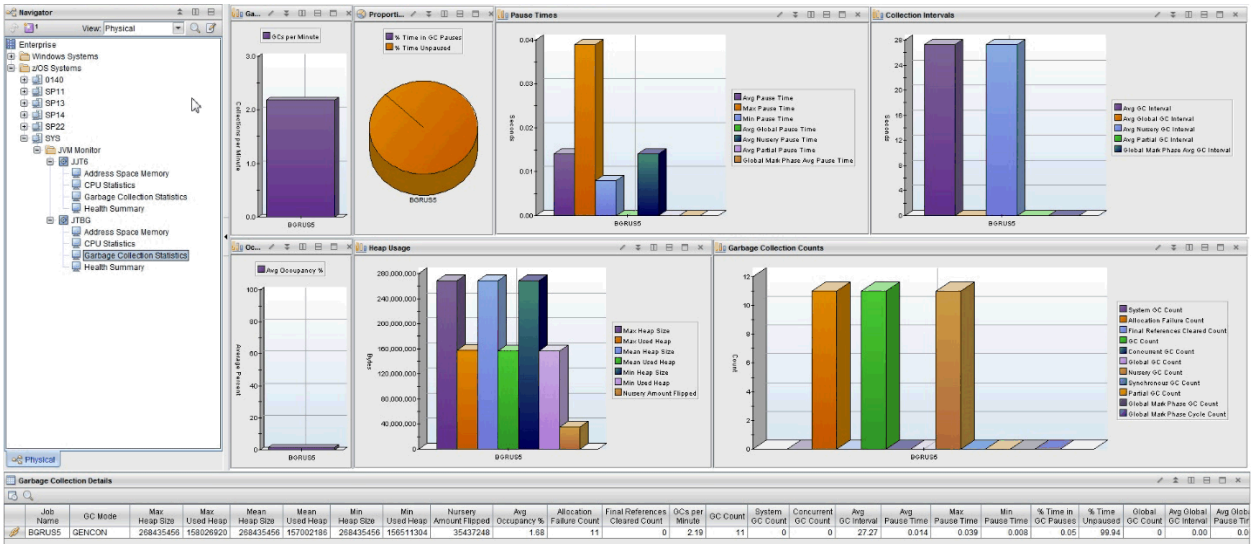
IBM OMEGAMON is a well-known and widely deployed product family for mainframe performance management. IBM OMEGAMON provides a comprehensive set of capabilities for monitoring, visualizing, analyzing, and managing performance across IBM z/OS system and subsystem environments. Key OMEGAMON capabilities include the following:

- Comprehensive monitoring for z/OS, storage, network, Java, CICS, IMS, DB2, and MQ environments
- Support for both graphical and 3270 user interfaces to align with diverse IT skill sets
- Systemwide visualization and drill-down displays with single-pane-of-glass views
- Thresholds for key resources to define normal ranges of operation, detect exceptions and anomalies, and generate alerts for proactive actions
- Contains integrated best practices for problem solving
- Includes tight integration with automation to proactively address performance issues
- Designed for high performance, with minimal impact on monitored environments

Figure 1 shows an example of IBM OMEGAMON's graphical display capabilities.

FIGURE 1

IBM OMEGAMON Graphical Display



Source: IBM, 2016

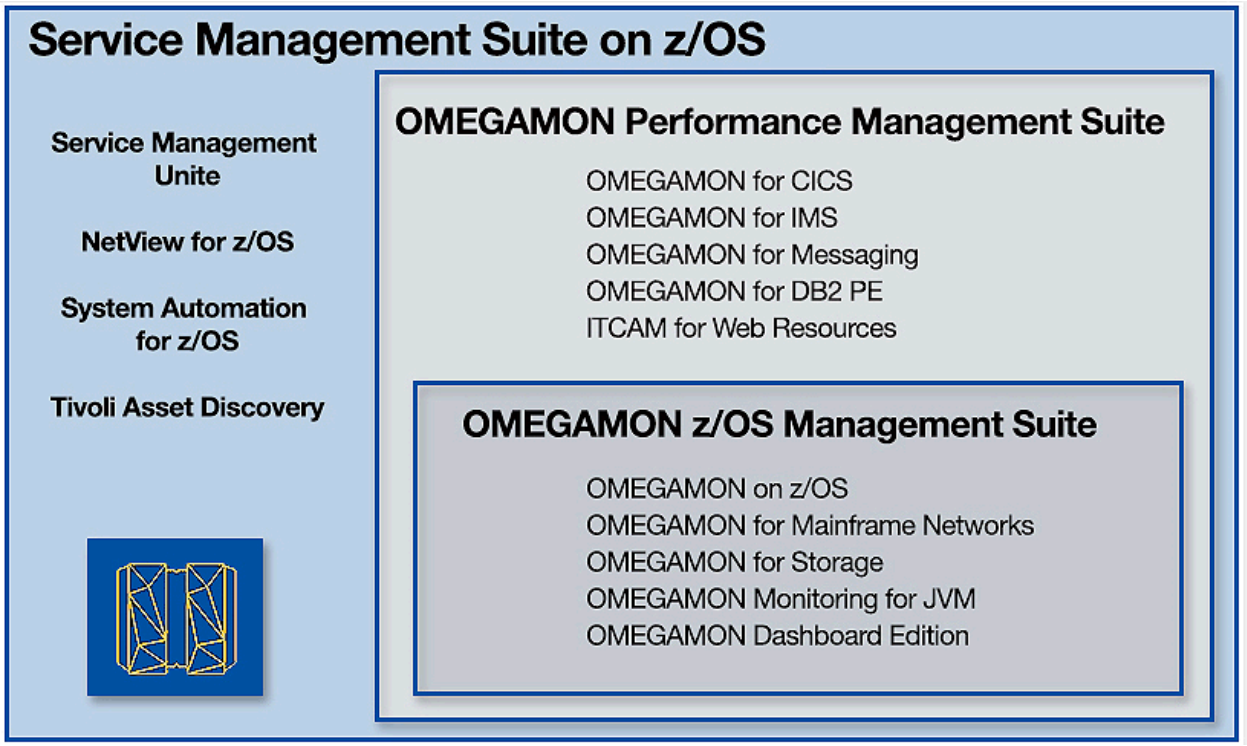
IBM OMEGAMON Product Family

The IBM OMEGAMON product family (see Figure 2) consists of related performance monitoring and management products that address different areas of the mainframe software stack, with both individual product and product suite options available. IBM has recently adopted a suites packaging strategy for monitoring and service management on z Systems, which according to IBM includes the following options:

- **Platform Monitoring:** OMEGAMON z/OS Management Suite – includes z/OS, storage, network, and JVM monitoring capability
- **Full Resource Monitoring:** OMEGAMON Performance Management Suite – adds support for CICS, IMS, MQ, DB2, and WAS monitoring
- **Fully Integrated Service Management:** Service Management Suite – includes system- and resource-level automation, monitoring, and asset discovery; Service Management Unite Dashboard to integrate monitoring and automation; includes IBM Tivoli NetView for z/OS for unique network monitoring and automation capabilities

FIGURE 2

IBM OMEGAMON Product Family



Source: IBM, 2016

KEY CONSIDERATIONS FOR PERFORMANCE MANAGEMENT SOLUTIONS

Performance management solutions for today's complex mainframe environments must address a wide range of issues. Organizational needs include cost control, risk management, and staff skills and agility, and these key considerations when selecting a monitoring solution are discussed the sections that follow.

Cost Control

Many IT organizations are faced with flat or declining budgets even though the need for monitoring is more important than ever to ensure end users are getting positive experiences as transaction volumes grow and environments become more complex. Reducing the cost of monitoring is a key objective for managing these growing environments.

Key cost control considerations include the following:

- Is the licensing structure simple and cost effective?

- Does monitoring operate efficiently with minimal overhead and make effective use of zIIP processors?
- Does monitoring cost and performance include the impact on monitored subsystems?

Risk Management

Growth in critical business applications deployed in hybrid cloud environments is driving the need to extend applications performance management to ensure that customers are experiencing fast response time and that there are no slowdowns or outages in these complex environments. This makes it even more important to see all the components of an application and to be able to leverage existing mainframe infrastructure data as part of an overall APM solution for hybrid applications.

Key risk management considerations include the following:

- Are new hardware and software updates supported from Day One?
- Are all z/OS components visible?
- Does the solution integrate with application performance management environments?

Staff Skills and Agility

IT organizations are faced with supporting both long-term mainframe experts and new mainframe users. At the same time, organizations are under pressure to accelerate delivery of new applications as digital business needs increase.

Key staff skill and agility considerations include the following:

- Are graphical user interfaces available for new mainframe users?
- Are high-performance 3270 UIs available for expert users?
- Is there integration with analytics for reducing downtime and outages?
- Is there integration with DevOps tools for faster production deployments?

IBM Initiatives for Optimizing OMEGAMON

As transaction volumes grow and user needs evolve, IBM has extended and optimized OMEGAMON to help organizations monitor and improve the experience their customers are receiving. IBM has developed key initiatives to support organizations responsible for managing critical application environments. According to company information, these include the following capabilities:

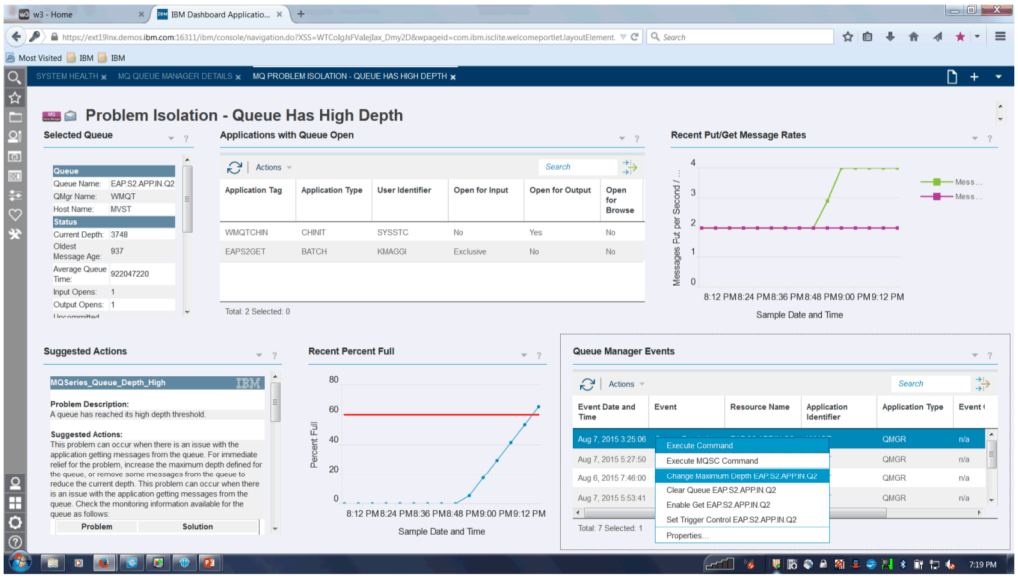
- **Cost control initiatives:** IBM has addressed controlling the cost of monitoring by offering simplified licensing options and by implementing a number of product efficiencies.
  - *Simplified pricing structure for cost savings.* IBM offers simplified suite pricing options for monitoring on z Systems. These include options for the Platform Monitoring, Full Resource Monitoring, and Fully Integrated Service Management suites.
  - Conversion of the NetView monthly license charge (MLC) to a onetime charge can save MLC costs.
  - *Operational efficiencies.* A number of product enhancements have been made to improve monitoring performance and reduce operational costs.
  - Enhanced use of zIIP specialty engines reduces CPU costs. "Smart zIIP" optimizes offloading by taking into account the overhead required to access specialty processors versus the savings from using zIIP.

    - Architectural changes with the enhanced 3270 feature reduce the number of address spaces needed for 3270 interfaces, reducing CPU costs.
    - Numerous improvements to data collectors and agents improve performance and increase efficiency.
- **Risk management initiatives:** IBM OMEGAMON's approach to risk management is to "reduce blind spots" by extending visibility into more application components and subsystems and by enabling management of hybrid applications. These capabilities include the following:
    - *Application monitoring:* IBM is announcing *z Systems Support for IBM Application Performance Management v8* for monitoring and ensuring positive end-user experience for hybrid applications spanning mainframe, distributed, and public cloud environments. According to the announcement, key capabilities include the following:
        - Provides a single hybrid application view by integrating z Systems and middleware information
        - Supports OMEGAMON z/OS, CICS TS, DB2, IMS, JVM, and messaging
        - Allows users to build dashboards for applications partly deployed on z Systems
        - Enables application owners, who may not be mainframe experts, to quickly identify which resource on the mainframe is the source of performance issues, thereby reducing costly problem analysis in non-affected mainframe areas
    - IBM has recently introduced OMEGAMON for JVM monitoring to provide visibility into Java environments on the mainframe. This provides resource monitoring of all JVMs on z/OS across subsystems, with drill downs for detailed JVM environment information.
- **Staff skill and agility initiatives:** IBM has developed several approaches to address staff skill and agility issues:
    - A key initiative is IBM's Service Management Unite product that provides prebuilt, customizable dashboards and an integrated management console to bring together management information from multiple sources to monitor overall system health and initiate corrective actions to simplify operations. Figure 3 provides an example of a Service Management Unite dashboard.
    - Integration with IBM Operations Analytics for z Systems provides faster and simpler problem identification and resolution, reducing slowdowns or outages and saving staff time.
    - Integrations with DevOps solutions (IBM Applications Performance Analyzer for z/OS and EZSource) provide line-of-code diagnostics and better understanding of applications structure.

Together, these initiatives are designed to benefit clients using OMEGAMON by lowering operational costs, reducing risks, simplifying skills for new mainframe users, and reducing time to identify and solve problems.

FIGURE 3

Service Management Unite Dashboard



Source: IBM, 2016

OMEGAMON PROVIDES STRATEGIC MONITORING AT INTERNATIONAL FINANCIAL SERVICES ORGANIZATION

A large global financial services institution that provides banking, investment, life insurance, and pension services to customers in over 40 countries relies on IBM OMEGAMON to monitor and manage performance for its mainframe environments, which support over 3,000 applications. The company is actively developing applications on the mainframe with over 40 application DevOps teams. New applications are adding online capabilities to improve account management functions.

The company was having problems keeping applications up and running. It needed a monitoring solution that could track mainframe performance at an application level and could monitor on a service-level basis. OMEGAMON was chosen to replace a previous monitoring solution based on its ability to detect outages and speed up root cause analysis – not just simple alerting.

The company uses OMEGAMON to monitor a variety of mainframe components and subsystems including z/OS, storage, MQ, IMS, CICS, DB2, and batch workload scheduling. Monitoring is enabled for key mainframe environments including development, test, acceptance, production, and disaster recovery. Data collection is performed for all systems, and data is retained for 30 days.

According to the solution architect, OMEGAMON helps control costs at the institution by avoiding performance slowdowns, service interruptions, and downtime. Comprehensive coverage of systems, subsystems, and applications helps quickly pinpoint solutions saving staff time and resources.

Monitoring of processor utilization is used to identify and redistribute load during peak times, resulting in reducing monthly license charges.

The increased level of control using OMEGAMON helps reduce risks at the institution. Dashboarding and event alerting are performed on a service-level basis to ensure service quality and reduce business risks. Monitoring is used to determine whether channels and service providers are meeting their contracted performance and availability requirements. Monitoring is important for rapid problem detection and resolution, reducing the risks that will affect users.

The company has built on OMEGAMON to enable dashboarding that allows Agile development teams to define monitoring parameters for their own applications on a self-service basis.

Monitoring supports a wide range of staff activities and skills — both for mainframe experts using 3270 interfaces and for new users using graphical interfaces. According to the solution architect, monitoring is not just for production environments — it is an important capability for development teams also and is part of the application software development life cycle at the company. Design specifications are used to set performance requirements. The data collected is used to determine whether design objectives are being met at a functional level. During acceptance performance tests, OMEGAMON is used to see how much system load is contributed by the application. The results are used in production to determine thresholds for load, performance, throughput, and response time monitors.

According to the solution architect, using OMEGAMON has led to improvement in efficiency, reliability, and customer experience.

CHALLENGES AND OPPORTUNITIES

The demands of digital business will continue to drive growth of customer-facing applications on handheld and mobile devices that will need to access critical "system of record" data stored on the mainframe. These digital business workloads bring increased challenges for mainframe monitoring and performance management. The challenge IT and business organizations face is being able to deliver consumerlike fast response time and always-on availability to end users in the face of increasing transaction volumes and unpredictable usage patterns, often with sudden bursts of peak activity.

Mainframe monitoring must be able to track, analyze, and manage ongoing system, subsystem, application, and device performance with alerting and diagnostic capabilities while not impacting the environments being monitored. The opportunity for effective monitoring solutions is to be efficient in terms of operational costs and resource consumption, even as transaction volumes and application complexity grow. Automation of monitoring tasks to reduce the time needed for staff intervention — especially for routine actions — is another opportunity to gain operational efficiency.

As IT skill sets continue to evolve, effective mainframe monitoring must continue to support both classical "power user" interfaces and graphical "new user" interfaces. Monitoring must extend to cover "new age" applications and infrastructure on the mainframe as they evolve — such as those developed in modern languages like Java. Other opportunities include increased integration of monitoring with other service management functions and increased use of operational analytics for troubleshooting and to anticipate and prevent performance problems. Extension of monitoring to include non-mainframe application components for full "end to end" views is another opportunity.

About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

Global Headquarters

5 Speen Street
Framingham, MA 01701
USA
508.872.8200
Twitter: @IDC
idc-community.com
www.idc.com