

What will you build with real-time IMS data for analytics?



Table of Contents

1 ANALYTICS 101

The importance of real-time data

Protect

Prevent

Promote

Traditional problems in getting IMS analytics

4 INTRODUCING AMI DATA EXTRACTOR FOR IMS

Protect

Prevent

Faster mean-time-to-resolution

SLA compliance for instant payment applications

Promote

5 GET IMS DATA EFFICIENTLY

Real time data

Minimal overhead

Safety

Speed and efficiency

Two-phase intelligent filtering

Integration with other BMC products

7 BMC AUTOMATED MAINFRAME INTELLIGENCE (AMI)

Connect your mainframe to your enterprise

Analytics 101

Many digital businesses are generating terabytes of data - a mix of routine system logs, customer transactions, and application metrics - each day. Mainframes are hubs for some of the most important and rapidly changing data, much of which results from IMS transactions and applications. Business analytics have become an essential component of efficient digital business.

What would you build if you could derive information from IMS operational data and use it to gain new insights that enable you to make optimal business decisions? With the right tools, you can use this wealth of data to prevent problems (rather than reacting to them), improve security, and find new business opportunities. By using the information that's already on your mainframe, you can improve your operations and get ahead of the competition.

How do you start deriving valuable intelligence from ever-growing volumes of data? You need to transform millions of pieces of mundane data into business insights that are based on real evidence, but it can seem daunting. First, you need a strategy for combining the data with the analysis techniques that you are using in your everyday IT operations. Then you combine that with information that's important to your business, for example, customer records and sales transactions.

When you combine IT operational data with real-time user and usage analysis, you can spot anomalies that indicate security breaches, and you can pinpoint potential problem areas so that you can correct the problem before it causes an outage. You can also expose how and when customers use your product, easily discover what changes would improve loyalty and customer satisfaction, and use this information to develop effective promotions and drive revenue quickly.



The importance of real-time data

You can see the benefits of combining the data you already have with user and usage analysis, but the benefits are greatest when you have real-time data. If a security breach was occurring, would you want to know about it when it was happening or 5 minutes later? How much damage could a hacker do in just 5 minutes?

When you analyze data in real time, you get the insights you need immediately. When you use older data, whether it's one hour or one day old, you cannot prevent outages or security breaches. Finding a security breach after the fact does not protect your users' sensitive data. Analytics can be a great tool to see what caused an outage or slowdown, but preventing the outage altogether is more efficient – and user friendly - than spending time and effort investigating the problem after the outage has occurred. You can use older data for analytics to improve customer service and develop marketing plans, but how far could you get ahead of your competition if you offered related products or services to your customers in real time?

Here are some scenarios where real-time data can help you with three Ps (Protect, Prevent, and Promote):



Protect your systems and your users' data from security threats



Prevent slowdowns and outages



Promote products and services to grow your business

Analytics can help in each of these areas in different ways.

Protect

How secure can your systems be if you don't secure the mainframe? Many view mainframes as inherently secure from cyber threats. Before the Internet became prevalent, a hacker had to have local network access or physical interaction with the mainframe to gain access. And even if the hacker could gain physical access, they probably didn't have the training to get very far on the mainframe. Consequently, many IT security professionals overlook mainframes in their IT risk assessments, compliance mandates, and security information and event management (SIEM) systems. The prevailing attitude seems to be, "Why spend people and resources on a platform that's inherently secure?"

But the truth is that mainframes can be hacked, and the data that hackers want, including credit card information, is often on a mainframe. IT security strategists now generally realize that anything that can be hacked, will most likely be hacked. While it's important to prevent intrusions, it is equally important to be notified of a potential hack in real time so that you can immediately remove the threat and collect data that will be required for reporting and/or investigation.

Several mainframe subsystems and facilities, including IMS, track user activity. A user cannot make a move within IMS without audit trails revealing who did what to which mainframe data and when. To prevent security problems, you must be able to feed this data to your SIEM in real time. Even if the hacker has sufficient privileges to erase-wipe an audit trail, you can audit that activity with the right tools.

Billions of transactions are processed by IMS each hour. For example, credit card transactions take place around the clock. If the organization that processed the transactions was breached, hackers could run up millions of dollars in fraudulent charges before anyone knew that a breach occurred. On the other hand, if the organization fed the IMS log data to SIEM tools immediately, they could identify unusual patterns and detect fraudulent transactions in real time, thereby blocking the thieves before they had a chance steal your customers' money.

A security breach can go undetected for months – or years – even in fully-monitored systems. Yet just one minute of exfiltration could result in devastating losses to personally identifiable information (such as credit card numbers), intellectual property, or sensitive health data. This is why it's imperative to have real-time data for SIEM systems to show you when breaches occur. As soon as you know that something has gone wrong, you can fix it.

It is not only imperative to prevent breaches and fix those that do occur immediately; you must also enable security auditing for compliance requirements. You must be able to collect real-time audit events so you'll know who accessed what data and when. And you must be able to provide an audit trail of input/output events and security violations to comply with regulations such as GDPR, HIPAA, SOX, and others.

Prevent

Problems degrade application availability and performance, and the longer it takes to resolve the problem the longer users are affected. If you have an outage, you can lose revenue and customers. Therefore, many organizations are moving from the traditional reactive approach to problem solving (waiting for a problem to occur and then attempting to fix it) to a proactive approach (preventing problems from occurring).

If you had real-time data that you could feed to analytics engines, you could spot anomalies that could lead to outages – and you could resolve those anomalies and keep your systems available and running smoothly. Without real-time data, all you can do is wait for someone to report a problem. The problem occurs, then your skilled technicians must spend time and resources determining what caused the problem. The longer it takes to solve a problem, the more likely it is that users will be affected; they may even take their business elsewhere, and that could affect your revenue. Unhappy users could voice their concerns on social media and harm your organization's reputation.

Proactive mainframe management using real-time data and analytics tools can prevent problems from occurring. An accurate early warning can alert you to slowdowns and impending problems so that you fix them immediately. If you prevent a problem, your staff will not waste time and resources attempting to find the root cause or even be forced to re-create problems. You can improve availability, mitigate the risk of missing SLAs, and eliminate the cost associated with time-consuming problem diagnosis.

Promote

You can use analytics to see trends and patterns and use this information to make better business decisions. Two areas where analytics can help you improve your business are in customer service and targeted marketing.

Happy customers are often loyal customers, and loyal customers are likely the lifeblood of your business. In many cases, such as in the banking industry, customers have lots of choices of where to go to get similar goods and services. Because it is more expensive to get a new customer than it is to retain the customers you have, it's imperative that you keep your current customers. One of the best ways to do this is to provide superior customer service. With analytics, you can see any outstanding issues with your customers' accounts, and you can address them. For example, let's say that a banking customer lost a debit card. When the customer called to report that the card was lost, you could use real-time analytics to check the customer's account for any fraudulent transactions made with the debit card and immediately cancel those transactions. You could also offer a fraud protection service at no cost for the next six months. By keeping your customer happy, you are more likely to keep your customer.

Another area where real-time analytics can help you promote your business is through targeted marketing. For example, if a customer is ordering one of your products online, you could immediately offer related products or upgraded products. If the customer was ordering a television, you could offer a wall bracket and specialty cables. You could see if this is a repeat customer and, if so, offer free shipping or a reduced-price extended warranty. The possibilities are endless.

Traditional problems in getting IMS analytics

You see the need for IMS data for analytics engines and SIEM, but you may have had unfortunate experiences gathering the IMS data you need. These issues may have been related to when the data is available, the use of the IMS log exit, and the amount of CPU required by the extraction tool.

Some solutions that export IMS data for use by analytics engines use near-real-time data, meaning that the data is extracted after the IMS log switch. On a very busy system, the log switch can occur every 1-2 minutes, but during an off shift this log switch may occur every 30 minutes (or longer). If a problem occurs and you aren't aware of it for 30 minutes or longer, the problem could – and likely will – spiral out of control. You need real-time data to drive real-time decisions.

Some solutions use the IMS log exit to get real-time IMS data, but the exit causes a delay. Even a short delay (~1 millisecond) can create havoc with your IMS transaction rate. IBM states, "Efficiency of exit routines is a prime concern for IMS™ performance. The amount and type of processing that is done by exit routines can directly contribute to the total path length and time required to complete a unit of work." These performance issues could stem from conflicts when gaining control, wait times as unit of work (UOW) finish processing happens, and abends. Another issue related to the log exit is that multiple vendors could be using the same exit. If they collide, you will see an impact on performance.

When you introduce anything new to your transaction processing environment, you run the risk of using additional CPU. With rising MLC costs, you can't afford to use any more CPU than absolutely necessary.

When gathering IMS data for your analytics engines or SIEM tools, how much data do you extract? How much of that data do you actually need? If you send extraneous data to the analytics engine, you could be charged for unnecessary ingestion fees. You could also spend more time getting the information you need because the analytics engine must go through all of your data, even though you wanted just a small subset of it.

INTRODUCING AMI DATA EXTRACTOR FOR IMS

AMI Data Extractor for IMS provides real-time IMS log information, formatted for your analytics engines, so that you can make instant decisions. Unlike competing products, it does not use the IMS log exit and thereby avoids the risks and costs associated with the exit. AMI Data Extractor for IMS extracts data using virtually undetectable overhead, avoiding additional CPU charges and processing delays. AMI Data Extractor for IMS uses intelligent filtering to extract just the data you need to make decisions and to avoid costs driven by unnecessary data being sent to analytics engines that charge by the amount of data ingested.

Protect

AMI Data Extractor for IMS can extract the data you need to send to SIEM applications for security monitoring, advanced threat detection, forensics and incident response, and a range of security analytics use cases. If your SIEM applications are not seeing your IMS data, they only see part of what is happening in your environment.

Just a few seconds' delay in getting the data needed for threat detections can translate into a loss of thousands of dollars. Therefore real-time data from IMS is crucial for proper security.

AMI Data Extractor for IMS can help in two ways:

- Real-time information leads to faster detection of threats and breaches.
- Intelligent filtering adds logic to help identify potential exceptions.

Prevent

A one millisecond longer response time can be a problem when you are tracking millions of packages a day. If a transaction times out, you need to instantly determine where the delay happened so that you can take corrective action before errors start to snowball.

A transportation and delivery company uses analytics to watch end-to-end response time for transactions coming from IMS Connect. This company correlates input from multiple sources to monitor response time and to get the full end-to-end view of where the transaction spent its time. They can use this information to prioritize how to respond to problems. They look for timeouts and then use an analytics engine to determine whether the timeout occurred when the transaction was in the distributed part of the processing or on the mainframe.

Because this company used near-real-time data (gathered after the IMS log switch processing), they were unable to prevent problems; they could only investigate what went wrong after the timeout occurred. By using AMI Data Extractor for IMS and real-time data, they expect to see these timeouts instantly and can take automated action to fix the problem before the timeouts multiply.

Faster mean-time-to-resolution

No matter how hard you try to prevent them, sometimes problems do occur. When you experience a problem, you need to find the root cause and fix it as quickly and efficiently as possible. By using the two-phase intelligent filtering in AMI Data Extractor for IMS, you can extract just the subset of data you need to quickly pinpoint the root cause of the problem. This not only helps you find the problem more quickly, but it also saves the time and effort that your highly paid staff would need to spend on using less intelligent methods of root cause analysis.

SLA compliance for instant payment applications

In 2017, the European Banking Association, The Clearing House (TCH) Real-Time Payments in the US, and the Australian New Payments Platform (NPP) schemes, went into effect. These schemes enable instant, or initiated in bulk, payments to anywhere in the world.

Many organizations in the financial sector have applications that will participate in these instant payment applications. Meeting service level agreements (SLAs) is imperative for financial institutions due to governmental requirements for the maximum time for completing the payment, 5 seconds in the European Banking Association regulation. Repeated failure to meet the SLA could result in the financial institution being de-certified from the instant payments program resulting in lost revenue and customers. AMI Data Extractor for IMS enables these organizations to get the data they need, with integrity, efficiently, and in real-time.

Promote

Most credit/debit card and ATM transactions touch IMS. When a customer triggers such an IMS transaction, the financial institution that manages the transaction has an opportunity to use the real-time IMS information to present new products or services that are specific to that customer’s situation and needs.

Consider the following scenario of a user visiting a branch of a bank to make a cash payment on his credit card. The user transaction triggers 10 system transactions.

	Transaction description	Details
1	Identify customer	Name, account number
2	Retrieve products/line credit accounts	Account details for all accounts held by customer
3	Validate credit card	Validated
4	Retrieve customer status	Active customer
5	Retrieve email address	Email address
6	Retrieve postal addresses	All addresses for customer (home, work, etc.)
7	Retrieve customer details	Date of birth, home phone, occupation, employer, etc.
8	Retrieve balances	Accounts and balances
9	Credit card authorization	Authorize payment
10	Credit account transaction	Credit card payment amount

The bank teller swiping the customer’s credit card triggered transactions 1-8 within milliseconds. These transactions provide a wealth of information about the customer, including all of his contact details, accounts, balances, addresses, job, and so on. During the 7 seconds it took for the teller to count the customer’s cash, the bank could have offered the customer additional products or services, such as insurance policies, loans, or additional credit cards. The bank could use those same 7 seconds to review the customer’s history to see if they could rectify any outstanding service issues.

Having real-time IMS data provides a number of opportunities for you to promote your business.

GET IMS DATA EFFICIENTLY

AMI Data Extractor for IMS provides a very low overhead way to extract data from the IMS logs in real time. The product enables you to filter the data and provide only the fields and values needed, thus reducing the volume of data that must be transported to the analytics engine and reducing usage costs for analytics engines that charge by the amount of data ingested. AMI Data Extractor for IMS normalizes the data and formats it for a variety of popular analytics engines.

Real time data

AMI Data Extractor for IMS gathers IMS log data in real time. As noted above, real-time data is necessary to effectively protect, prevent, and promote. Near real-time information can be useful, but to make real-time business decisions, you need real-time data.

Minimal overhead

A key differentiator for AMI Data Extractor for IMS is that it avoids the IMS log exit, thereby avoiding problems associated with the exit. AMI Data Extractor completes most of its processing outside of IMS, dramatically simplifying operations and improving storage usage and performance. Compare the number of tasks performed – and associated overhead – with programs that use the exit and AMI Data Extractor for IMS:

Programs that use the IMS log exit	AMI Data Extractor for IMS
IMS allocates save area	Establishes presence in IMS log area
IMS passes control to vendor log exit program	
IMS waits	
The vendor log exit program <ul style="list-style-type: none"> • Saves off IMS registers and required data areas • Switches addressing mode switch from 31 bit to 64 bit • Allocates any storage it needs for its processing • Accesses IMS log record to determine if it is one of interest • Applies selection criteria to get fields of interest • Moves fields of interest into storage area allocated above • Writes out information from storage area • Cleans up, releasing (hopefully) any storage it allocated • Switches addressing mode back to 31 bit • Restores IMS registers and data areas • Sets return code • Passes control back to IMS 	<ul style="list-style-type: none"> • Sees log record of interest (phase 1 filter quick check) • Moves information to pre-allocated buffer • Completes AMI Data Extractor for IMS processing • IMS continues processing until next log record is processed
IMS resumes processing	
Completes process – until the next log record is found	

AMI Data Extractor for IMS gathers real-time IMS log data with no detectable increase in overhead, thereby removing the performance risk when getting the data you need for analytics processing.

AMI Data Extractor does not perform any I/O in the IMS control region, and it uses minimal CPU in the IMS control region, further reducing CPU consumption. Extensive testing has shown that most users will not be able to measure additional CPU time caused by the product.

Safety

AMI Data Extractor for IMS is less risky than products that use the IMS log exit because multiple vendors could be using this same exit and potentially collide, affecting IMS and IMS performance.

In addition to not using the log exit, AMI Data Extractor is designed to do no harm to IMS. If something happens inside of AMI Data Extractor such that it cannot continue, it reacts to that event by shutting itself down and getting out of the way of IMS.

If AMI Data Extractor runs out of the buffers used to move data from the IMS control region to the AMI Data Extractor for IMS server where the intelligent filtering happens, it is designed to lose data rather than slow down IMS while it waits for more buffers. Customer input during the design of the product shaped this approach.

Speed and efficiency

As shown above, the IMS log exit requires a lot more processing than the direct access to the log data provided by AMI Data Extractor for IMS. In-house tests have shown that AMI Data Extractor for IMS extracts data up to 50% faster than the IMS log exit and/or typical user exits.

Two-phase intelligent filtering

Perhaps the most important feature of AMI Data Extractor for IMS is its extensive filtering that use advanced logic and exception-based data capture. AMI Data Extractor for IMS provides both filtering and extraction selection components as part of the intelligent filtering functionality.

Two-phase intelligent filtering provides the following benefits:

- It limits the amount of data that you send to an analytics engine. For analytics engines that charge by the amount of data ingested, limiting the amount of data can greatly reduce licensing costs.
- Using exception-based capture keeps CPU resource usage at a minimum.
- When you are trying to determine what caused a problem, you can specify data selection criteria so that it has an immediate and high use value rather than filtering at the target and interpreting data, which could result in misleading information. This is particularly important for those who are not mainframe experts.

Here's how two-phase intelligent filtering works:

- Phase 1 – AMI Data Extractor for IMS extracts the user-specified log records and sends them to the AMI Data Extractor server.
- Phase 2 – Once the records are in the AMI Data Extractor server, you can select subsets of data (individual field selection) to decrease the amount of data sent to the analytics engine or data lake.

Integration with other BMC products

AMI Data Extractor for IMS integrates with the following BMC products:

- **MainView for IMS** – AMI Data Extractor for IMS captures x'FA' and x'F9' log records. These log records allow you to see who accessed individual IMS databases, including read access without doing a change, which can be important in fraud prevention and unauthorized access scenarios. Although other products may be able to also capture the MainView-specific records, the AMI Data Extractor for IMS and MainView teams work together to pinpoint the exact format of the records and enable better filtering and field selection functionality.
- **Message Advisor for IMS** – You could use the real-time data extracted from Message Advisor for IMS to proactively analyze message queue usage and growth and, if necessary, prepare for future adjustments. Message Advisor for IMS provides real-time notification of a queue protect phase invocation signifying an immediate problem; Message Advisor for IMS addresses the problem, but other areas of your data center may want to be notified.

BMC AUTOMATED MAINFRAME INTELLIGENCE (AMI)

Reinvent your enterprise IT with intelligent automation driven by AI, machine learning, and predictive analytics to future proof your business. BMC Automated Mainframe Intelligence (AMI) solutions deliver on the promise of the self-managing mainframe by predicting and solving problems before they affect your users and by taking swift action to avoid any impact to performance, cost, and service levels.

AMI automatically manages, diagnoses, heals, and optimizes your mainframe to ensure the highest availability and performance at the lowest possible cost. With AMI you can free up teams to work on high value projects, such as deploying new customer services. AMI employs these key AI technologies:

- Machine learning to quickly analyze large amounts of historical data and fuel predictive analytics that prevent or resolve problems, and attach business impact to issues resolved or avoided
- Intelligent automation with integrated domain expertise that anticipates and remedies issues when they arise, without the need for manual intervention

Investing in AI and machine learning without connecting it to intelligent automation is an incomplete approach. You would still need to maintain a highly skilled technical staff and data scientists to interpret data, identify root causes, and define the correct manual steps to implement on your mainframe. AMI marries AI and machine learning with intelligent automation to optimize your investment.

Connect your mainframe to your enterprise

Instead of deploying older technologies and silos of automation, AMI lets you leverage the modern technologies that free up your staff time and make mainframe management more efficient. It helps you break down silos between your mainframe and the broader enterprise with connectors to enterprise operations and analytics tools. You can manage end-to-end application performance and run real-time, predictive analytics on the mainframe.



FOR MORE INFORMATION

To learn more about AMI Data Extractor for IMS, please visit bmc.com/it-solutions/ami-data-extractor-ims

About BMC

BMC helps customers run and reinvent their businesses with open, scalable, and modular solutions to complex IT problems. Bringing both unmatched experience in optimization and limitless passion for innovation to technologies from mainframe to mobile to cloud and beyond, BMC helps more than 10,000 customers worldwide reinvent, grow, and build for the future success of their enterprises.

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