



WebSphere software

**Business activity monitoring:
Your window of opportunity for better
business operations.**

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Introduction

As companies strive to become leaner and more competitive, the cost of business operations continues to be scrutinized. Manufacturers, for example, struggle to hold product inventories to a minimum while still meeting customer demands. But they lack visibility into realtime supply and demand needs. Their balancing act would become a smooth routine if business managers were able to monitor the supply chain minute-by-minute and adjust manufacturing activities to meet business goals. While many companies have been integrating business processes to gain efficiencies, they want to manage processes more closely for even greater savings.

An evolution in business process management (BPM), called business activity monitoring (BAM), is giving business managers the ability to view processes and events in action and make operational changes as needed to meet business objectives. With this increased insight, managers can make better decisions that improve the way the business is run.

To help companies improve business processes and business decision making as they evolve to e-business on demand™, IBM provides software for business activity monitoring. BAM is a composite market that combines the strengths of three existing software functional areas: business integration, business intelligence and enterprise systems management. IBM provides software for these functional areas and is a market leader in every one.

Business activity monitoring supports IBM's e-business on demand initiative by helping enterprises model, monitor and manage business processes to gain the flexibility and speed to respond to any customer demand, market opportunity or external threat.

This paper is intended for business executives and line-of-business managers who will use software capabilities to improve business operations through BAM. It describes the value of the BAM concept and how it fits into the IBM strategy for WebSphere® Business Integration. Future directions for IBM software for BAM are included.

The value of business activity monitoring

Business activity monitoring could be the next step in improving business operations for many integrated enterprises. The visibility that a BAM solution provides enables a business manager to quickly respond to events, allocating and adjusting resources to improve business operations. Managers can make sound operational decisions quickly for the strongest positive business impact.

Industry analyst Gartner defines BAM as “the concept of providing real-time access to critical business performance indicators to improve the speed and effectiveness of business operations. At its broadest level, BAM is the convergence of operational business intelligence (BI) and real-time application integration aimed at business goals but enabled through advances in IT.”¹

How is BAM different from BPM? BAM solutions can use the capabilities of a BPM infrastructure, though BPM is not required. While BPM includes monitoring, the BAM concept is broader in scope; business information related to process activities is gathered from a number of systems and the results are combined to provide insight into management of the processes and information on exception conditions – in realtime.

Exception conditions are flagged based on metrics defined by the needs of the business manager. Using these metrics, or key performance indicators (KPIs), BAM software identifies the root cause for problem conditions and recommends optimal solution paths to keep the business running smoothly.

A company may have a valued “gold” customer, for example, who should always have high priority order fulfillment. If that customer’s order encounters a condition that prevents it from processing on time, a BAM solution can identify the situation as an exception condition and recommend healing actions to drive this order through the system quickly. In the earlier example of manufacturers trying to minimize inventories while meeting customer demands, if interactions with suppliers are bogged down and preventing a company from meeting production goals, BAM can provide alerts and exception paths with time and cost estimates for the business manager to choose from.

With business activity monitoring, business results are tracked based on the KPIs chosen by business managers, which will vary by industry and operational focus. Some examples of KPIs are noted in the following table:

Business activity monitoring

KPI examples

For distribution processes	Percentage of deliveries on time Delivery days late versus early Delivery days late versus early by location Incomplete deliveries Freight price percentage of revenue
For credit processes	Customer credit exposure Customer average arrears analysis Customer credit limit exceeded Credit risk versus capital reserves
For tracking customers by segment	Change in customer retention rate Customer costs to serve trend by quarter Segments with lower than expected profits Net change in customer satisfaction
For inventory processes	Average stock level and value Zero stock days Inventory stock outs Reserved quantities and values Withdrawn quantities and values Book and physical stock group currency value Full year moving average of top 50 stock item levels
For procurement processes	Open days for request for price quotation, purchase order and requisitions Average purchase order and contract value Days from requisition to purchase order Supplier scorecard of on-time deliveries Supplier scorecard of percentage of goods delivered broken

Business activity monitoring enables business managers in an integrated enterprise to examine and react quickly to operational events, which may be either problems or opportunities to create competitive advantage. Traditionally, for example, managers collect quarterly metrics and can react to problems discovered through this reporting method within a 3- to 6-month time frame. With IBM software capabilities for BAM, managers could receive KPI results regularly, even daily, and could adjust resources immediately to increase output in areas that fall below plan.

Gartner states BAM's value as follows:

*Business strategists are paying an increasing amount of attention to the importance of time-based competition. It's clear that enterprises with fast reaction times have a competitive advantage. They sell more product, deliver better customer service, have quicker time-to-market for new products, have lower inventory carrying costs, and capitalize on new business opportunities sooner than their competitors do. Emerging business activity monitoring (BAM) and real-time enterprise (RTE) strategies take the goal of timeliness to its logical conclusion; their aim is instantaneous awareness and appropriate response to events across an entire virtual enterprise."*²

BAM solutions need to graphically display business results in an intuitive, easy-to-understand format. Alerts and business results must be displayed to the right people at the right time in a format based on the user's role and the event being monitored and measured. This access to business-relevant data must make it easy to:

- *View business results in realtime based on KPIs.*
- *Receive an alert of an exception condition based on the correlation of multiple process flow behaviors.*
- *Receive related information to qualify business operations alerts.*
- *Respond to an exception condition.*
- *Understand where even a slight change in a business process will bring real business advantage.*
- *Perform a change to a business operation.*
- *Make better business decisions quickly.*
- *Identify new business opportunities.*

IBM enables monitoring and managing of current business events through intuitive views customized for multiple roles in an enterprise, called business activity workplaces. For example, line managers need high-level business metrics and views of collections of events, while IT personnel need to delve into workflow details and individual processes, in addition to using tools for IT systems management. Various roles include executive process owners, line-of-business process managers, and IT performance and operations process managers.

Business activity workplaces must also accommodate the needs of specific industries. IBM software supports key industries, and IBM is working with its Business Partners to help develop industry business activity workplaces.



Figure 1. Business activity workplaces display business results.

Improve business performance through advanced integration

In this economic climate, businesses look to IT infrastructure to produce near-term return on investment as well as long-term operational efficiency. New technology investments are being evaluated for their ability to improve business performance by cutting costs, increasing productivity and profits, and providing the flexibility to change as business needs change. Many companies are realizing these benefits as they integrate across the business.

Companies can improve business performance by evolving from an environment of manual or isolated business processes to automated and connected ones. They can provide higher levels of service to users when they link Web business with back-office systems or synchronize e-commerce with retail business operations. Businesses can be more effective when they also connect intra-enterprise business systems, such as customer relationship management (CRM), enterprise resource planning (ERP) and supply chain management (SCM). Business activity monitoring provides visibility into critical events and activities across these connected business systems.

Unprecedented levels of integration are required to achieve this linkage. This advanced integration can be accomplished through modeling, integrating, connecting, monitoring and managing current and new processes within a company and across the value chain of partners and customers. IBM WebSphere Business Integration provides these five capabilities through its comprehensive, cross-platform middleware. Several of these capabilities – model, monitor and manage – will deliver business activity monitoring benefits. Additional key aspects of the BAM concept are provided by DB2[®], Tivoli[®] and Rational[®] software from IBM, as described in the section, “IBM provides leadership software for BAM.”

IBM software technologies for BAM can be used to eliminate operational inefficiencies and enable time to value. The modeling activity helps to communicate business initiatives clearly so they can be aligned with IT infrastructure considerations. Having a closer view and understanding of customer issues makes it easier to meet customer needs. Visibility into process behavior is gained both within the business and with partners. Through this visibility, businesses are able to improve supplier performance and accountability by measuring service level agreement compliance, leading to reduced costs and increased profitability.

The next sections provide a closer look at the five capabilities of WebSphere Business Integration software from IBM, followed by more detail on those used to implement BAM.

Model: To model business processes by designing innovative business workflows, complete with a projection of the business benefit, such as improvements in return on investment. Modeling enables “what if” analyses for continuous process improvement. A computer simulation graphically represents the flow of work across people and application systems. The ability to simulate business process execution means that business processes can be more closely aligned with organizational goals before being deployed.

New designs can be passed automatically to the Integrate capability or to complementary modeling tools for software development, creating rapid time-to-value through smooth implementation of business processes.

Integrate: To integrate the business activities of a company across people, policies and application software systems for greater process effectiveness. This business integration extends beyond enterprise application integration (EAI) capabilities by enabling companies not only to connect applications to share information, but also to redesign business processes across those applications and the flow of work among people who use them.

Connect: To extend business processes to partners and suppliers within a value chain. Connecting multiple enterprises helps to reduce transaction cost and improve productivity. The companies’ business processes are exposed and integrated for more efficient business-to-business (B2B) interaction. Security functions control access to specified business assets by authorized users. Use of key B2B standards enables broad integration now and removes barriers to integrating across organizations in the future.

Monitor: To actively track the business events of the company while they execute in internal software systems and across the value chain. KPIs, or business measures, that were assigned under the Model capability are viewed in real-time. Monitor is the window into your business processes, used to identify opportunities to improve business effectiveness.

Manage: To show immediate operating results of the company by process and to generate alerts to management for unfavorable conditions through business activity workplaces. The features of business activity workplaces are interactive to enable initiating corrective business actions – putting business managers back in the driver’s seat. The Manage capability leverages the Monitor capability and provides the operating view of the company to line executives, complementing conventional systems management software.

Through business intelligence and information integration, current performance of business operations is compared with historical trends and external factors to provide valid, relevant information upon which to base business decisions and to focus business process management action. Manage helps you to continuously improve process effectiveness and transform the way the company performs.

Achieve faster, less costly processes with BAM

To improve operational efficiency, companies need business processes to work faster and at lower cost. Business managers can optimize business operations through the model, monitor and manage capabilities of WebSphere Business Integration software.

Modeling, analyzing, improving and monitoring a company’s processes are not new techniques. In the past, executives have tried to improve productivity and process control through numerous initiatives, including just-in-time manufacturing, supply chain management and ISO 9000. With today’s fast pace of change, how many companies can say that their processes are currently delivering competitive advantage? How many can:

- *Identify the key processes their company is using?*
- *Show that the costs and operations of these key processes have been optimized?*
- *Be sure that IT and other systems are properly supporting smooth business operations?*
- *Show how monitoring processes and systems has been used to increase productivity and establish better business control?*

In previous initiatives, modeling and costing a process were often done “by hand,” perhaps using a drawing tool and a spreadsheet. Monitoring and managing the process by using accurate and current information may not have been possible due to the complexity of gathering the data. Using these earlier approaches made it difficult to do accurate and complete modeling. The ability to determine, *Are we really executing the way we planned?* was not possible.

The advent of business activity monitoring is changing all that. The following procedure snapshot shows how IBM envisions business professionals using BAM solution capabilities for process optimization:

Defining business metrics – First, line-of-business managers not only set the business goals, but they also define the business measures, or KPIs, to be evaluated while business processes are executing.

Modeling the process – Next, a line-of-business analyst can describe a new process or alter an existing one and model it by using business-oriented graphical tools and a library of processes, interfaces and business definitions, without need for Java[®] programming skills. The documented process can be used to clearly communicate business requirements to others in the organization.

Simulating and optimizing – The operation of the process can be simulated for a short period of time by running transactions through the process to view the possible business results. Then adjustments can be made to improve the process before it is deployed.

Assembling and testing – When the business analyst is satisfied with the process model, a process assembler can use the graphical tools to pull the services needed from a palette into the process map. The assembler can also drag and drop relationships among data, people, systems and services. The measurement points can be identified and marked. Throughout this process assembly, Java programming skills are not required. The completed module can then be tested to ensure it runs as expected.

Monitoring and managing – Once processes are deployed, these can be displayed in a business activity workplace so the business operations team can view the running process and respond to alerts related to the KPIs established by the line-of-business management. IBM software for BAM enables diagnosis of the root cause of a business operational failure. Business managers can view data that is correlated from separate sources and relevant to the current process event, and they can make informed decisions regarding business operations. Having integrated views of separate data sources simplifies information access and analysis. Finally, the realtime operational results collected over a set period of time can be analyzed and compared with the simulated results so that the process itself can be improved over time.

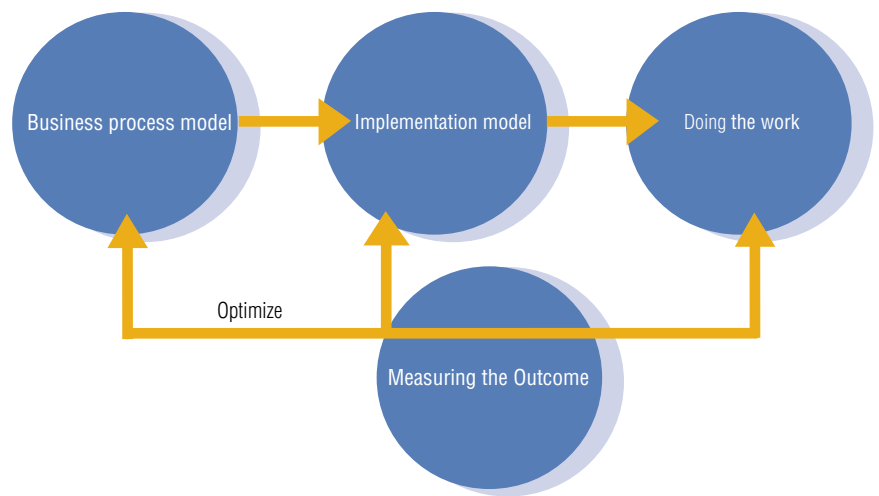


Figure 2. Optimize business processes by using WebSphere modeling, monitoring and managing capabilities.

IBM software for business activity monitoring enables a sense-and-respond closed loop environment to answer the question, *Are we really executing the way we planned?* Business managers can even design processes so they don't have to intervene to make adjustments when processes go beyond the predetermined settings. These adjustments can be handled automatically so that business managers can devote their attention to a smaller set of process adjustments that require realtime human decision making capability.

A bank, for example, could choose to monitor the monetary amounts that flow through the foreign exchange desk on a twice-hourly basis. Then a currency process would automatically activate the exchange on the open market of only the amount actually necessary to cover the net of the incoming and outgoing monies in a given currency. This would optimize the amount of funds used for foreign exchange transactions.

BAM supports the unique needs of different industries. For example:

Automotive manufacturers that need to control an inefficient and costly after-market parts business in a complex distribution environment, subject to seasonal fluctuations and changing product releases.

Telecommunications providers that need to overcome hurdles to managing the costly, complex network services business so they can be more competitive and provide best-of-breed capability. They need to move to a service-level-agreement driven business.

Financial services firms that face the commoditization of the business plus increasing risk of their credit portfolio. They need to grow revenue and profits within a certain credit risk tolerance.

Retailers that need to curtail frequent out-of-stock situations that cause revenue shortfalls and higher logistics costs across a multitiered distribution network.

IBM provides leadership software for BAM

IBM shares capabilities across its brands to deliver comprehensive software for business activity monitoring. IBM's strategy is to shape its software offerings from shared components that use a single technology base. While each IBM brand covers a specific segment of e-business infrastructure, IBM is reusing capabilities from these brands across the entire product portfolio. New solutions deliver mature technology in the first release because the capabilities have already been tested and used in numerous environments, as components of various IBM production products.

IBM draws core function for BAM from three of its market leading middleware areas:

Business integration – through WebSphere Business Integration software

Business intelligence and information integration – through DB2 information management software

Enterprise systems management – through Tivoli enterprise management software

These IBM software capabilities can be used as an end-to-end solution or an extension of your current e-business infrastructure, even if you already have systems in place for application integration, business process management or business modeling and analysis. IBM software is based on open standards to enable you to select products for their value rather than being limited by proprietary constraints.

IBM has also enabled its software for Web services, an emerging technology that can reduce the cost and time involved in integration. In 2002, IBM led efforts to develop new specifications, including Business Process Execution Language for Web Services (BPEL4WS), to describe how to reliably define, create and connect multiple business processes in a Web services environment. These specifications help organizations coordinate business processes and transactions within a company and with external partners and customers across diverse systems.

IBM is using WebSphere Business Integration to optimize inventory

IBM is using WebSphere Business Integration capabilities to improve its own internal business processes. The IBM Microelectronics Division is proactively managing its supply chain with KPIs, such as inventory turns, on-time delivery, and demand and forecast. The major benefit of monitoring and managing the supply chain's performance is to achieve customer service requirements with the minimum possible inventory. The first internal implementation in one of the Microelectronics product lines is underway and is planned to be live by the end of 2003.

The IBM business managers will be able to make adjustments to optimize inventory based on monitored performance and to reduce the response time by using decision analysis support. The business managers, for example, could take timely action based on below-target projected delivery performance. These activities will help reduce inventory costs and improve customer service.

WebSphere Business Integration software: Provides comprehensive business process integration capabilities, including handling human workflow, long-running transactions, data transformation and routing. Modeling and monitoring capabilities from IBM's recent acquisition of Holosofx[®] software are provided in the new IBM WebSphere Business Integration Modeler and Monitor, Version 4.2.3 offerings.

Workflow technologies are used to integrate and automate human interactions. Integration broker middleware is used to transform, augment and apply rules to message-based data, and then route and distribute it between high-performance systems. IBM WebSphere MQ is the transport software being used across IBM business integration software. The WebSphere Business Integration offering also provides B2B process integration and data sharing among trading partners of all types.

Predefined business process logic is provided for easily integrating and automating business processes across industries, such as for sales processing, e-Procurement and inventory management. Predefined business process templates are also provided for specific industries. To accelerate enterprise integration, WebSphere Business Integration includes numerous adapters to popular business applications, for example, SAP, Clarify, BroadVision and Oracle. IBM adapter software is converging on a common adapter framework across the WebSphere product family.

WebSphere Business Integration software will use as its foundation IBM's common runtime platform, IBM WebSphere Application Server. Development tools are integrated with IBM WebSphere Studio workbench, which is based on the Eclipse open development framework. Model data can be shared between WebSphere Business Integration Modeler and Rational tools for application development.

DB2 information management software: Provides both business intelligence and information integration capabilities for BAM. Easy and quick access to multiple data sources is required for realtime event analysis and management. DB2 software can analyze and integrate most digitized information types spread across major operating environments associated with a process.

DB2 software provides next generation warehousing and analytics for multidimensional reporting and analysis, enabling business insight to be extracted from raw data. DB2 offers powerful query capabilities run via parallelism for fast response to complex business trends such as year-to-date inventory turns, profit forecasts and customer analytics. DB2 data warehouses offer full analytic capabilities, such as Online Analytical Processing (OLAP) extensions to summarize KPIs and data mining for pattern detection and prediction.

DB2 information management software also has built-in extract, transform and load (ETL) capability that integrates data from multiple production applications into the system of record, providing a common vocabulary and understanding about the health of the business. The most scalable database management system in the data warehousing industry, DB2 software is central to making IBM the worldwide database market share leader. Leading independent software vendors support DB2 data warehouses, and several offer portlets to deliver KPIs from a DB2 data warehouse to IBM WebSphere Portal.

IBM DB2 Information Integrator, announced in February 2003, supports IBM's e-business on demand initiatives, enabling organizations to reduce the time and costs associated with integrating their diverse data environments. Using federation technology reduces the need for organizations to move their data into other databases or replace their current IT infrastructure.

IBM's federated technology leadership enables companies to speed up activity monitoring deployments. Using a single query, a user can access and integrate relational data in the process monitor log with other data in DB2 and Oracle databases, images in Documentum, e-mail in IBM Lotus Notes®, spreadsheets in Microsoft® Excel and Web services generated by WebSphere Application Server. This data is then presented to the user in a consolidated view. No other software vendor offers this level of federated data management.

Tivoli enterprise management software: Enables companies to ensure the economic performance of IT resources by managing IT in the context of business objectives. Today's e-business infrastructures require sophisticated management tools that look beyond the sum of all parts to ensure overall peak system performance and availability while reducing support costs. Tivoli software solutions manage complicated e-business landscapes by constantly gathering information on hardware, software, network devices, application transactions and business activities. Armed with this information, Tivoli solutions can provide the automated responses required to keep your e-business running at peak performance.

Tivoli intelligent solutions monitor e-business infrastructure at the component, business system and enterprise levels. Tivoli technology identifies critical problems as well as misleading symptoms and effects, and then it either notifies IT support staff with the appropriate response, or automatically heals or optimizes the infrastructure.

Future directions

In the future, IBM plans to extend its software to provide additional BAM functionality, including:

- *Business activity workplaces customized for different user roles available on WebSphere Portal. Today WebSphere Portal can be used to provide access to separate business activity workplaces for business and IT users.*
- *Business activity workplaces to support the BAM requirements of specific industries, an extension of WebSphere Business Integration Industry Solutions.*
- *Enhanced multidimensional analysis completely within the DB2 data warehouse, using advanced optimization to simplify KPI creation and access.*
- *Event feeds from sources such as pervasive devices (mobile phones, pagers and PDAs) based on IBM pervasive computing software. These devices can also be targets for alerts.*
- *Autonomic computing capabilities to help businesses build more automated IT infrastructures that need less human intervention for process flows and are more self-managing, self-configuring, self-healing, self-optimizing and self-protecting. Autonomic computing helps to improve return on investment, accelerate deployment and improve resiliency.*

Summary

The longer you wait to fix problems or correct bottlenecks in business operations, the harder it will be to compete in today's fast paced marketplace. The software technologies are becoming available to help you gain insight into your critical business processes in realtime so you can correct problems as they occur and capitalize on new opportunities. You can make products available when needed, optimize monetary transactions, serve customers better, save inventory costs and improve supplier performance.

Consider adding business activity monitoring capabilities to optimize your most critical business processes. BAM can help lower the costs of business operations and speed time to value. Industry analysts are advising companies to build a BAM awareness team now to identify what activities and business processes drive their revenue and profit. Then business managers can determine what metrics to use to optimize this set of critical business activities. Using a proactive approach will jump-start the development of an agile and flexible environment for e-business on demand.

IBM can help you get started modeling, monitoring and managing business processes. IBM's market-leading software extends your existing infrastructure to provide the benefits of BAM in a single area of your business or throughout the enterprise. IBM also has offerings to meet the unique needs of specific industries.

Our comprehensive and open standards-based middleware is complemented by a wealth of partner offerings and services to help you build an on demand business. IBM is uniquely an innovator and market leader in every area that contributes to a BAM solution – business integration, business intelligence and enterprise systems management. Most of the world's transactions run on IBM software, and more companies choose WebSphere software over its competitors for their integration needs.

For more information

To learn more about IBM's business integration solutions for modeling, monitoring and managing business processes, visit ibm.com/software/integration.



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All statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only. This information is for planning purposes only.

- ¹ Gartner Commentary, "Business Activity Monitoring: The Promise and Reality," July 11, 2001
- ² David McCoy, Gartner, from the 2003 presentation, "Business Activity Monitoring Scenario: Killer Application for Integration Technology"