

Business Activity Monitoring: EAI Meets Data Warehousing

By Mark Hellinger and Scott Fingerhut

Gartner's research note, "Business Activity Monitoring: The Data Perspective," defines the new concept of BAM and its capability in "providing real-time access to critical business performance indicators to improve the speed and effectiveness of business operations."

Business Intelligence (BI) tools rely on warehouses and data marts while event notification packages track business indicators, yet there's been little focus on merging data in real-time and from warehouses to track the enterprise's lifelines, maximize efficiency, and provide decision support data in context. BAM requires focused, yet incremental Enterprise Application Integration (EAI) efforts and balancing information requirements in real-time with historical perspectives.

Why BAM?

Failure to identify problems, anticipate opportunities, and respond rapidly is immensely costly. Gartner predicts that, by 2004, BAM will be one of the top four initiatives driving IT investment and strategy in progressive enterprises.

Consider the costs of slow reaction time in a large enterprise such as a manufacturer of automobile tires. Your largest customer places an order for only half the forecasted quantity. How long should you wait until you adjust forecasts and production levels? Each hour can end up costing tens of thousands of dollars, not to mention the excess inventory expenses.

How about reacting to other issues such as bad weather, rising gas prices, a new competitor offering, economic shifts, bankruptcy of a customer, and more? Comparable issues exist in many industries.

New BAM applications need to provide more than just a real-time alert. It's about saying, "There's something going on and here is all the related information that will help you make a well-informed, timely decision." The information may derive from various data sources.

The Simple Anatomy of the Decision

Gartner vice president and research area director, David McCoy, offers this analogy — "When something happens to a car, an alarm goes off. It doesn't wait two weeks. How many business processes have a similar degree of urgency about potentially devastating process breakages? Enterprises need to give the business process the same degree of monitoring we do to our cars and homes. Monitoring is not just the business equivalent of a blaring car horn — in all monitoring scenarios, the circumstances of the alert must be interpreted to see what kind of action is needed — the alert needs context. However, too many processes go without even a simple alerting mechanism, and do not even approach the sophistication of a cross-application BAM model. The business processes at risk due to poor monitoring are worth a lot more than the average car on the street sporting the fancy monitoring system."

Our response is based on several criteria, including input from colleagues, related activities, and historical trends. Without supporting data, a decision maker may have to spend too much time

finding information. With unorganized or poorly presented data, the decision maker may suffer from information overload. Both problems lead to delayed or poor decisions. Without any data, the decision maker may unwisely commit vital resources or the wrong resources. No matter how timely a warning is, if you can't quickly put together relevant data, it's all for nothing.

Why BAM Now?

Until now, the problem has been that business is so complex and the supporting information infrastructure consists of a myriad of applications such as Customer Relationship Management (CRM), Supply Chain Management (SCM), Enterprise Resource Planning (ERP), and Business Process Management (BPM). These generate a lot of data and were not developed to talk to each other — hence the growing demand for EAI. These systems create efficiencies, but in silos. So it's been nearly impossible for decision makers to access and assimilate the right information to make well-informed, timely decisions.

Decision makers either get limited and disjointed access to silos using traditional business intelligence, portals, and reporting tools or attempt to construct data warehouses that put all the information in a single silo. But data warehouses suffer from costly and long implementation cycles, require batch loading, and cannot deal with unstructured data. Most users find these solutions good for diagnosing the minutia but poor for quickly identifying overlying trends and seeing the big picture. A

September 2001 *Wall Street Journal* article noted, "The capacity to produce oceans of data often isn't matched by sufficient tools to sort and interpret it."

The article noted that Justice Department officials have acknowledged in interviews in the days since September 11, 2001 that there's justifiable skepticism about the FBI's ability to handle the massive amounts of information being generated by the current terrorism investigation, let alone head off future attacks."

Successful BAM solutions will fulfill the critical elements addressed earlier — real-time visibility into hot spots across an enterprise and access to related information that helps managers make the right decisions.

Consider the BAM implementation cycle (see Figure 1) in simple terms, then take a deeper look into the BAM architecture. BAM should be a continuous, iterative effort. Auditing current EAI capabilities is important. Is there an installed messaging bus infrastructure? Have Extraction, Transformation, and Loading (ETL) tools already been deployed? If there's an existing real-time EAI infrastructure, BAM can leverage that investment.

BAM can provide value early on. Identifying user groups should be easy since BAM will draw information from applications such as CRM, SCM, and Materials Resource Planning (MRP) systems. Investors in those applications will benefit. Unlike traditional data warehousing efforts, which focus on data normalization, BAM focuses on rapid activity understanding and end user functionality.

Working closely with line of business managers, the "activity modeling" process can begin. At its simplest, this is where key performance indicators are identified. Examples include when inventory levels hit a certain point, sales slip, or when there's a problem with manufacturing or a combination of activities. This is also where we ask, "What do you want to continuously monitor and what data is needed to provide context to an alert or notification?" This may consist of historical information, forecasts, and unstructured content such as a Microsoft PowerPoint presentation or Microsoft Word document.

The next step is to provide users with an idea of how they'll interact with a BAM system. Although this isn't where

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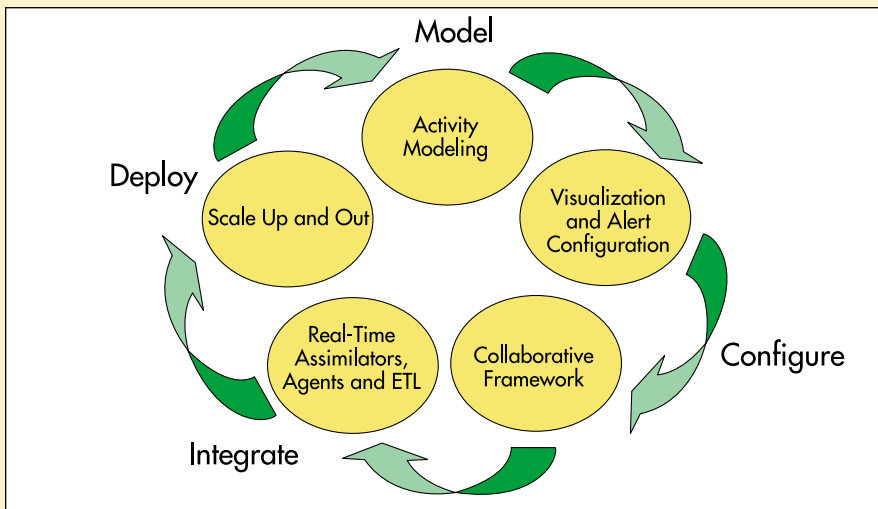


Figure 1 — BAM Implementation Cycle

the heavy lifting occurs, it may be the most important element. Without providing users with the capability to provide real-time visibility and perform historical analysis, BAM implementations risk low user satisfaction and usage. Ideally, users will receive time-sensitive notification, be able to quickly determine the nature of the problem, understand key drivers, and either act directly or collaborate with colleagues.

Giving users a taste of a BAM application early will pay dividends. So consider a pilot effort serving a small user set. Start with a sample set of actual data from pre-determined sources that can eventually move to real-time.

There may be a few iterations in the effort to map user needs. It will also provide a road map for the most time-consuming portion of a BAM implementation, the integration effort. By providing managers and executives with immediate capability, they'll begin to understand what data is useful in formulating rapid responses and priorities for gathering data.

After getting buy-in from the pilot, focus on data integration and deployment. The scope of the integration effort will differ greatly by organization and the deployment effort will depend on the size of the user community and volume of data.

A host of Web services offerings are entering the market. Together with message-based integration software such as TIBCO's Active Portal and IBM's WebSphere MQ Sphere, these offerings promise to greatly simplify and speed integration efforts.

"Web services' main business value

point, currently, is in integrating disparate systems," says Ronald Schmelzer of the analyst firm Zap Think. "Since BAM solutions require information from a variety of heterogeneous data sources, ... Web services will serve as a unifying integration infrastructure for collecting and assimilating data from those data sources."

BAM Products

As business cases for BAM become established and grow, we can expect a host of products to emerge and ultimately streamline, accelerate, and simplify BAM deployments. What might an ideal BAM product architecture look like? Consider Figure 2.

The first component in Figure 2 is a framework for expressing the semantics of the activities that need to be monitored and the supporting data that helps man-

agers make decisions. Are you monitoring sales, inventory levels, demand, or marketing activities? How is it all related?

This is a meta-metadata layer with some level of relational mapping between the data sources. A host of companies provide varying levels of metadata management, but it's critical to focus initially on embedding the highest level of context possible. An example might be that all these elements are related to each other via a physical location and time period. For example, marketing efforts, sales, inventory levels, and news are all closely tied together spatially and temporally.

The activity model will primarily describe and map real-time data and relationships to both supporting and related activities. It's represented in an XML persistence database that serves as a flexible activity mart. It's also the organizing paradigm around which unstructured data may be related to activities themselves.

Second are the user-facing components. Systems that provide real-time alerting have been around awhile, but the combination of real-time notification, hot spot identification, and supporting information in context is critical.

The Gartner analyst note adds that, "As events and trends occur and are captured by BAM, the filtering layer has to have some perspective to make decisions. Determining the importance of a given event may require examination of historical trends, and in such cases, data stored in a data warehouse may be accessed."

The Gartner report cites the following example: "A manufacturing-oriented BAM application might be designed to provide management with advance warning of supply chain bottlenecks. Incoming orders might be analyzed against stock levels for raw materials, machine production schedules, and outbound shipping capacity (all drawn constantly) from multiple applications, and held in an operational data store. Alerts may be presented to users when delivery dates exceed acceptable levels."

Notifications and supporting information may come from various applications or a data warehouse, so most companies implementing a BAM solution may consider a portal approach. Portals can act as an effective mechanism for which an alert is delivered and may be leveraged for back-end data integration

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capabilities. Although some portals can push data from multiple systems, they provide little or no front-end correlation and context between data. They lack an activity model.

For example, you may be able to see sales data in one window within a portal, marketing information in another and inventory in yet another, but there's no way to simultaneously query information across these systems and dynamically see relationships. BAM should provide users with the capabilities to:

- Visually and intuitively discover hot spots and trends
- Constantly build automated notifications based on complex activities (the intersection of multiple events)
- Drill into associated structured and unstructured data
- Share insights with colleagues and partners.

BAM is the ideal environment to leverage interactive, Web-enabled visualization tools that can move beyond “click and wait” querying and reporting to provide much-needed hot spot identification and rapid hypothesis testing. Many business users have been discouraged with typical ad hoc reporting capabilities present in current business intelligence and analytical application packages. BAM also provides compelling reasons to introduce wireless notification capabilities, which can further speed response and resolution. While today's mobile devices don't provide the same level of navigation and drill-down capabilities of a PC, basic notifications can be delivered, prompting a user to explore the nature of the issue further on a PC.

The next element of the BAM architecture is the set of data integration capabilities that:

- Map required data into the activity model
- Subscribe to messages
- Move appropriate data into the activity mart
- Link directly into applications and warehouses for supporting content.

Traditionally, the data integration effort has always been the most labor-intensive. Until Web services or clear standards become common, either an internal technical team or outside systems integrator may be required.

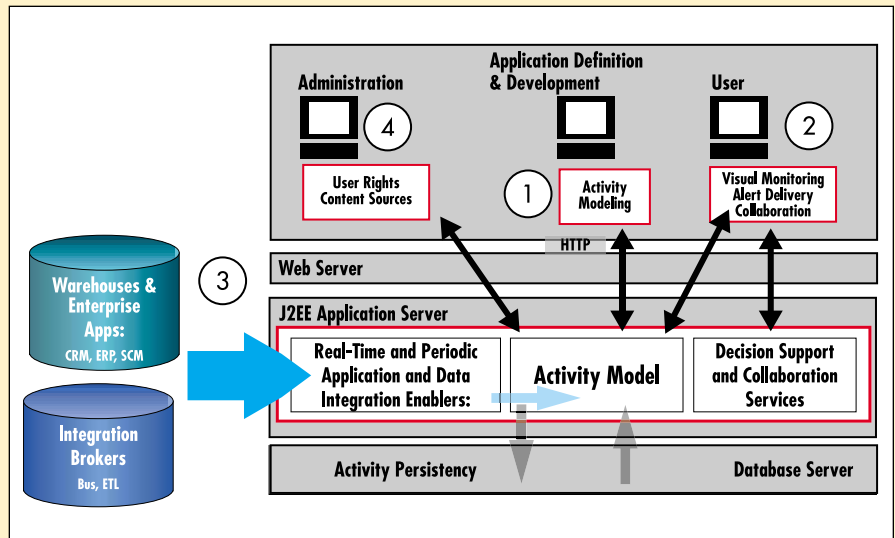


Figure 2 — BAM Product Architecture

To deal with data coming from various systems with different architectures, a BAM product will need to provide multiple integration methodologies and tap any available EAI capabilities, including a messaging bus, ETL tools and agents. Such a suite of integration components might include messaging assimilators, aggregators for agents, direct and XML-based Application Program Interfaces (APIs), and logging through Java Database Connectivity (JDBC) and streams.

Finally, an administrative layer provides mechanisms to manage user security (access rights), monitor, modify content sources, and continually expand the scope and value of a BAM solution. The administrative capabilities will be crucial once the BAM solution is deployed, so a system must be able to modify the activ-

ity model and other elements as users will request customizations that fulfill Return on Investment (ROI).

The Gartner research note concludes: “Success with BAM may require a combination of real-time and historical data perspectives. Enterprises seeking to deploy a BAM architecture should plan to tap into a range of database styles, depending upon the needs of specific BAM applications, including data warehouses, operational data stores, and application databases. Be wary of vendors touting a “one-size-fits-all” data architecture in support of BAM.”

That's advice everyone should heed. **eAI**

About the Authors



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