Oracle Business Activity Monitoring

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ORACLE

EXECUTIVE OVERVIEW

In today's highly competitive service-oriented business climate, operational managers and executives require real-time visibility into the status of their process networks. Whether their business is shipping widgets or trading electronic assets, operations managers are now guaranteeing customers flawless execution 24x7—for these innovators, instant visibility is the new state-of-the-art for enterprise processes. The demand however, is not for granular visibility into the individual lower level events and exceptions that a process generates in the due course of its execution. The need is for analyzing the emanating process information and computing the higher-level complex event aggregates, thresholds, identifying causal relationships between different event types, complex temporal event patterns, root-cause behavior identification etc. Once the said analytics have been processed, managers expect a channel in place for real-time delivery of the analyzed information and a platform to enable joint-collaborative problem resolution that aid business process optimization. This white paper attempts to detail the types of challenges that exist in the realm of enterprise process optimization and how technologies like Oracle BAM help address the problem.

INTRODUCTION

Oracle Business Activity Monitoring (Oracle BAM) is a key technology component of Oracle Fusion Middleware and Service-Oriented Architecture. Oracle BAM satisfies a growing need to enable Business Executives, and more specifically operations managers, to improve their decision-making processes by first getting a real time view of the business events occurring in their enterprise, and second using the derived intelligence to analyze and improve the efficiency of their business processes. For instance, organizations that run distributed global supply chains with Just-in-Time inventory practices have the need to continually monitor their inventory levels and to correlate them to the bill of materials and replenishment requests they have sent to their suppliers and logistics partner to continually ensure that they have a balanced flow of parts and inventory throughout their entire supply chain. Similarly, telecommunications companies who are provisioning new services and new customers want to continually monitor their provisioning processes that touch hundreds of operational systems to ensure that they have an up-to-the minute view of the status of outstanding customer service requests.

Business Activity Monitoring provides customers with the ability to instrument their ERP/Business Applications, Legacy Systems, and Business Processes to monitor Business Events; to correlate these Business Events with each other; and to understand their impact on the Key Performance Indicators that affect the Business. It, therefore, improves the visibility that Business Executives have on the important operational elements of their business to continually improve the efficiency of their Business Processes.

MONITORING BUSINESS PROCESSES

Business processes can be broadly classified as being either structured or unstructured. Most IT surveys done in the process automation spaces agree that no more than 10% of the business processes in any given enterprise are orchestrated and structured end-to-end using formal BPM methodologies and can be monitored for the expected quality of service (QoS) benchmarks using operational analytics tools. This leaves the other 90% as either partially or completely non-structured, and difficult to monitor end-to-end for strategic key performance metrics. This creates a significant gap between the needs of operational managers for real-time monitoring of business processes end-to-end and what their IT assets aiding process execution can deliver.

The reasons for the slow adoption of structured BPM processes across an enterprise range from political to decentralized global operations centers with different business models and existing legacy applications that have entire processes built within their own components (like, for example, the Oracle E-Business Suite). BPM adoption may require organizations to change or fix parts of their existing process to comply with best practices across groups, and this often creates opposition from audiences resisting change for various reasons. Technologies like business activity monitoring attempt to bridge the gap by helping monitor both structured and unstructured business processes to provide a flexible monitoring framework that can derive the key performance indicators out of unstructured *and* structured processes. The key expectation from such technologies is to monitor the business state in a non-disruptive way and instrument existing unstructured, semi-related business processes without making a change in the way the processes are orchestrated.

While basic application level monitoring types of solutions are good at triggering events or raising flags at the levels of individual applications, they frequently provide no way to correlate these events to other events or to the affected business processes. With a business process level monitoring approach, an administrator who might be confronted by tens or hundreds of alarms and events, all emanating from a single but indiscernible malfunction—a single event (or perhaps even multiple events) hidden by the subsequent triggering of numerous others, will be able to make more prudent and optimal calls on the actions he/she needs to take in response. Did the customers order not get filled because inventory was out-of-stock or because the ordering system was down? Without some way to correlate cause and effect—both among the events themselves and between the events and

the business processes—the management process dissolves into simplistic monitoring that makes it time-consuming for administrators to detect the real business implications of problems.

Oracle BAM is built on a totally new, message-based, event-driven, memory-resident architecture specifically designed for the needs of real-time analytics and reporting applications. Oracle BAM is the first, and only, solution that provides real-time visibility into enterprise operations and gives business users the detailed analytics they need to cut costs and improve processes—as business events are happening. The Oracle BAM architecture utilizes messaging, data integration, advanced data caching, analytics monitoring, alerting, and reporting technology to deliver requested critical information within seconds of an event or change in status. Because the primary source of data is messages, Oracle BAM is able to update reports and generate alerts at speeds that traditional architectures simply can't match. Oracle BAM can accept tens of thousands of updates per second into a memory-based persistent cache that is at the center of the Oracle BAM architecture.

Oracle BAM enables enterprises to benefit from real-time information affordably. It can be implemented for roughly one-sixth to one-eighth the cost of modifying a conventional BI system, and it integrates easily with existing production applications, business process management (BPM) tools Enterprise Application Integration (EAI) system, JMS queues and applications that communicate via web services.

Some specific examples of how enterprises are benefiting from real-time information generated by Oracle BAM are presented below, followed by a more technical explanation of how Oracle BAM makes the real-time enterprise both possible and economically attractive.

BAM SOLUTIONS

The truism that time is money has existed since the beginning of the industrial revolution, but never has it had more applicability than in today's high-speed business environment. Some analysts argue the vaunted New Economy has been supplanted by The Now Economy, where the advent of real-time information delivery can, as Gartner expresses it, "…progressively remove the waste, inefficiency and poor customer service that remains within many organizations." When information arrives faster, it not only means organizations can react faster to problems that need instant attention. It also means there is more time to research and evaluate options, so the quality of decisions improves along with their speed. The following are industry examples where real-time information has made a real difference.

Fixed Income Trading Analytics: Real-time deal performance

An independent financial services applications services provider (ASP) offers online syndication involving relatively large deals ($500M - $2B) of many different types. When deals placed by a syndication manager "go live" they are broken into sub-sections ("tranches"), for which bids ("indications") arrive in real time. Managers offering deals need real-time (<5 second) analytics such as total demand per deal, total demand per tranche, total number of indications, maximum indication, latest indication, and more. Syndicate managers and traders use Oracle BAM to view real-time deal performance, in a monitor framework, with multiple, graduated views of the data, drilling down on text and pictorial depictions of real-time data. Oracle BAM is the only system available today that can handle the complex calculations necessary to provide these analytics at the speed required, and then deliver the results to users in a graphic format via the Web. Oracle BAM offers a commercial, off-the shelf product for delivering real-time trading analytics at a fraction of the cost of custom development.

Leading Auto Insurance Carrier: Intelligent resource planning increases productivity

A major U.S. automobile insurance company wanted to improve the efficiency of its claims adjustment process. The amount of time it takes an agent in the field to evaluate a claim varies greatly based on conditions that are unpredictable in advance. For this reason, on any given day some agents were behind schedule while others were sitting idle, waiting for their next assignment. Real-time monitoring of task status with Oracle BAM has enabled managers to re-assign agents in real time, thus eliminating inefficiency and improving customer service. As claims adjusters finish their assignments, alerts are sent to claims supervisors allowing them to balance the case load in real-time as the day proceeds. Early results indicate a boost in agent productivity of 33%.

Discrete Manufacturing: Improved business efficiency, cash flow, and operational oversight

A leading U.S. manufacturer of standard and custom windows for residential structures produces 10,000 customer orders a day. They had an ongoing problem managing the distribution (by truck) of finished goods from its five geographically dispersed factories. Under the old system, manifests were drawn up for each truck two days in advance, after which individuals within the factory had to physically verify that standard items listed on the manifests were actually in stock, and that custom items had been built. When items were missing, line managers had to be notified so they could expedite production. These constant small problems had a significant disruptive effect on overall manufacturing operations. Oracle BAM scans for exceptions in the company's operational systems and triggers real-time alerts to operational personnel that give up-to-the-second visibility into all critical aspects of the manufacturing process for expediting orders from factory floor to loading dock to customer delivery. When products scheduled to ship are not available, the system sends an alert to the appropriate line manager for immediate attention. The alert escalates to another pre-defined contact if the manager does not respond. The system also provides information on the progress of custom items through the various stations in the manufacturing process.

The drivers of the delivery trucks are equipped with Blackberry PDAs that enable them to check off items from the manifest once delivered, as well as to report breakage or other problems that will require further action. This instant confirmation of delivery means that the company can invoice its customers immediately, rather than waiting two or three days for the delivery truck to return. The result is a reduction in time-to-invoice from 4 days to 1 day and a reduction in manufacturing cycles by 7—10 days.

ORACLE BAM: A TOTALLY NEW REAL-TIME ARCHITECTURE

Oracle BAM has developed a brand new analytics, reporting and information delivery solution for the enterprise. Unlike traditional, data warehouse-based, query-driven systems, Oracle BAM is uniquely based on an active, messaged-based, event-driven architecture where enterprise information is conveyed via instant messaging and a streaming graphical display within 2—10 seconds from an enterprise event. Oracle BAM is made possible by the advent of new and maturing technologies that are radically changing core business activity and improving operational efficiency and performance. These enabling technologies include:

- Enterprise Application Integration (EAI) Tools— messages from EAI, web services, and/or database triggers
- Inexpensive Memory—96 percent drop in cost since 2000
- Streaming Data Delivery—versus static information delivery
- Instant Messaging—for real-time alerting

By incorporating these key technologies, Oracle BAM optimizes business performance through the effective action of all empowered individuals, both inside and outside an organization. These individuals all make decisions and take actions that positively or negatively impact overall business performance. With Oracle BAM, decision makers can make the right decisions because they always have the information they need, in the format they prefer, right when they need it. Oracle BAM uniquely provides:

Timeliness . . . Information that is Always Current

In order to take effective action and enhance business performance, decision makers require information in real-time, right at the point of decision. Oracle BAM provides real-time alerts and access to live data that is based upon up-to-the-second information—enabling decision makers to be proactive rather than reactive. The streaming data delivery also ensures that real-time reports automatically and continually update themselves as changes occur in the underlying data.

Reach . . . All the Right Decision Makers

Unlike traditional query-based solutions, Oracle BAM combines information from multidimensional and relational data sources, web services, enterprise application data, and presents it in an intuitive browser-based user-interface to any device, driving enterprise-wide availability of real-time information.

Relevance . . . Information Delivered the Way People Work

To be useful, real-time information need to work the way people work. With Oracle BAM, information is personalized so each user gets the information they need in the exact format at the exact time they prefer. Oracle BAM real-time reports also support real-time pen-based group collaboration and closed-loop decision-making, allowing for immediate problem discussion and resolution.

Usability . . . Effective, Efficient and Easy-to-use

Oracle BAM is built to work smoothly with existing information infrastructures and supports just about every commercial database and messaging system. Oracle BAM is affordable and can be fully customized and personalized to the roles, responsibilities, and skills of each user. Both power users and business users find that reports are as easy to design, share and view as PowerPoint slides.

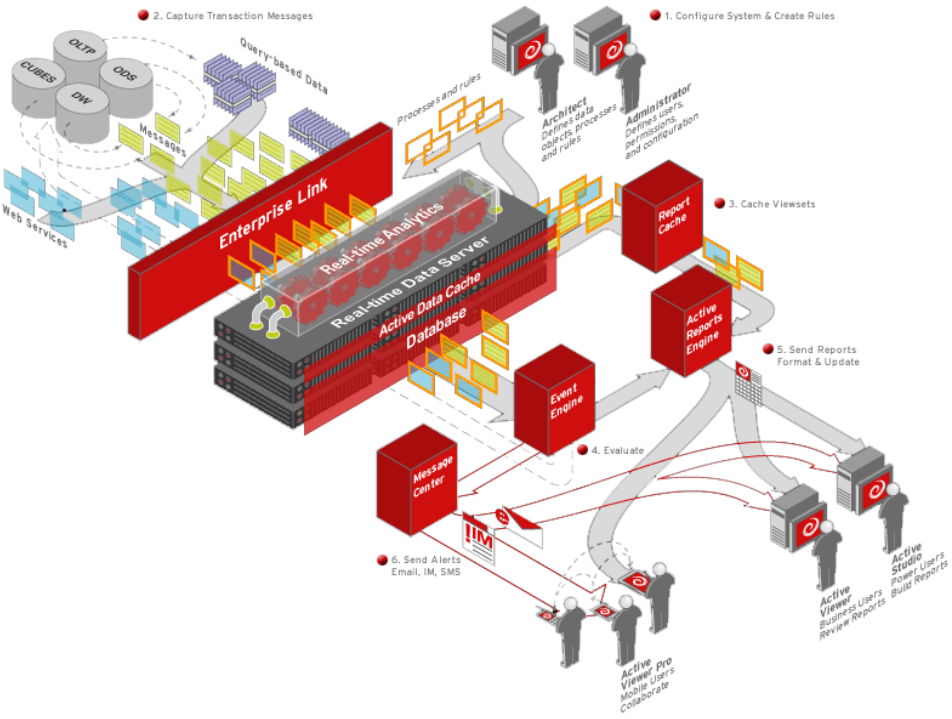
ORACLE BAM COMPONENTS

Oracle BAM is comprised of six components that seamlessly interact to provide real-time:

- Data Integration
- Data Caching
- Analytics
- Monitoring

- Alerting
- Reporting

The relationship among these components is shown in the architecture diagram below.



Oracle BAM Enterprise Link

Oracle BAM Enterprise Link is the real-time data integration engine for Oracle BAM. It is based upon a proven, scalable, data flow technology and provides the ability to move, transform and load source data into the Oracle BAM Active Data Cache. The source data can be retrieved from transactional systems, data warehouses, operational data stores, web services, message queues, most of the commercially available database servers, mainframe-based flat files, and XML sources.

In addition to the above data sources, Enterprise Link can draw historical data from conventional data warehouses via relational queries. This capability is important because it enables Oracle BAM to generate alerts based on comparisons between real-time data and rolling averages or other historically derived thresholds.

Oracle BAM Active Data Cache

The Oracle BAM Active Data Cache is a high-performance, persistent, transacted, memory-based storage system designed from the ground up to support active data and monitoring. This active data, organized in the form in which the end user wishes to see it, is the data that is extracted from the enterprise systems and kept

synchronized with those systems. In addition, the Active Data Cache contains the definition and configuration information used for operation of all portions of the Oracle BAM Real-time Server.

Although the data is persisted to disk for backup and recovery purposes, the Active Data Cache is designed to take advantage of the large amounts of real memory (DRAM) that are becoming commonly available. It is secure and scalable. In addition the Active Data Cache supports a documented API that allows customers and third parties to develop custom applications.

Oracle BAM Event Engine

The Oracle BAM Event Engine monitors complex changing conditions in the data and the system in real-time and based upon user-defined rules. It takes a variety of actions in response to those changes, including notifying the appropriate user with an alert and/or report. This allows users to effectively monitor their business for key conditions and sends the right information to the right person at the right time.

Oracle BAM Active Report Engine

The Oracle BAM Active Report Engine assembles and formats the data for a live report to be displayed in Oracle BAM's thin and rich clients, Oracle BAM Active Viewer and Oracle BAM Active Viewer Pro, respectively. Reports are available in a variety and combination of view types including charts, columnar, cross tab, spreadsheets, Key Performance Indicators (KPIs), lists and more.

When the user requests a report, the Oracle BAM Active Report Engine obtains a "snapshot" of the most current data and establishes a change stream. Using the snapshot, it creates an initial display and sends it to the browser. Once the browser has rendered the initial display, it continually processes data as it changes, and integrates those changes into the live display—allowing for up-to-the-second information delivery.

Oracle BAM Active Data Architecture

The Oracle BAM Active Data Architecture allows Oracle BAM to directly access live, active data from the point of transaction and deliver it to end users within seconds through the following process:

1. A change or event within an enterprise application causes that application to generate a notification or message describing the change.
2. Oracle BAM Enterprise Link receives the notification and invokes the defined process to handle that specific type of notification.
3. The Oracle BAM Active Data Cache updates the datasets, which contain the enterprise data in the form in which end users wish to view it. It then notifies the Oracle BAM Event Engine (step 4), and the Oracle BAM Active Report Engine (step 5) of the change.

4. The Oracle BAM Event Engine checks to see if any rules defined, directly or indirectly, by Oracle BAM Architect or the business users should be invoked as a result of the changes. If so, it invokes the appropriate actions, such as instructing the Oracle BAM Message Center to send an alert to one or more users.

5. If there are currently any active reports being viewed by business users in Oracle BAM Active Viewer that display or involve in any data that was changed, the Oracle BAM Active Report Engine continually updates the active report until the user closes the report.

USERS AND CLIENTS

Oracle BAM offers two options for end user information delivery: a thin client for those who demand a completely thin user interface, and a rich client which includes additional features not available in the thin client.

Oracle BAM Active Viewer

Oracle BAM Active Viewer is the thin user interface for the business user. When new, pertinent information is available, the user receives an instant message that contains a link to the information. The user opens Active Viewer through this link and a report is displayed. Report formats include charts, columnar, cross tab, spreadsheets, KPIs, lists and more. These different formats can be combined in one report or viewed in separate reports.

Oracle BAM Active Studio

Oracle BAM Active Studio is the thin user interface for the power user. Through Active Studio, the power user can create and edit reports. Report creation includes field selection, formatting, filtering, calculated fields, and summaries. Reports may be published and rules can be created for determining the scheduling and delivery of the reports. View types include: charts, columnar, cross tab, spreadsheets, KPIs, lists and more.

Oracle BAM Architect

Oracle BAM Architect is the thin user interface for the data designer focused on creating data objects in the Oracle BAM Active Data Cache so that power users can create reports. Through Oracle BAM Architect, the data designer creates data objects, creates and schedules data flow plans, imports and creates metadata, and maintains the data objects and rules. Oracle BAM Architect is seamlessly integrated with Oracle BAM Active Studio.

Oracle BAM Administrator

Oracle BAM Administrator is the thin user interface for the system administrator who is responsible for user management and overall server management. Through Oracle BAM Administrator, the system administrator can add or delete users, define security levels for users and objects, manage the Oracle BAM Active Data Cache, and maintain and configure Oracle BAM services.

CONCLUSION

Oracle BAM provides operational managers a versatile process monitoring and analytics tool that can help them better analyze the emanating business process information in real-time by computing the higher-level complex event aggregates, thresholds, identifying causal relationships between different event types, complex temporal event patterns, root-cause behavior identification etc. Once the said analytics have been processed, Oracle BAM provides for real-time, multi-channel delivery of the analyzed information and a platform to enable joint-collaborative problem resolution that aids business process optimization.

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