

DASHBOARD COMPONENT OF A MONITORING FRAMEWORK USING OPEN SOURCE TECHNOLOGIES IN ROMANIAN INFORMATION SYSTEMS MARKET

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Abstract: In last decade, enterprises began to feel the necessity to have better access to information for decision making, through visibility at all times into activities at all levels of business. For this scope, emerged the discipline Business Intelligence (BI) which nowadays covers areas like data warehousing, data integration technologies, query, reporting, and analysis tools for fulfilling the requirements of better and controlled access to business information and processes. The Business Activity Monitoring (BAM) technologies can provide real-time business analysis and alerts on information from sources like Web services, message queues, etc. The present interest of this paper is the stage of real-time monitoring of the processes and the option of intervening automatically for developing of a monitoring framework using open-source technologies.

Key-Words: Business Activity Monitoring, Business Intelligence,

1. Introduction in Business Activity Monitoring

In the early 1990s, emerged the discipline Business Intelligence (BI) to fulfill the necessity of enterprises to have better access to information for decision making, through visibility at all times into activities at all levels of business. Nowadays, the Business Intelligence (BI) which covers areas like data warehousing, data integration technologies, query, reporting, and analysis tools.

Today, time and information are competitive advantage and due to that fact, managers of event-driven enterprises are becoming increasingly stressed as time necessary to process data is increasing and simultaneously the information amount becomes unbearable. For this reason many software heavyweights, such as Microsoft, IBM and Oracle, have joined the struggle for a piece of the BI expanding market.

Staying ahead of the competition requires the ability to predict and respond to trends in the market in real-time. BI products work with historical data gathered from data warehouses, therefore the latency introduced by moving data into a data warehouse is too high to be able to respond in real-time. To be able to catch business activities issues

before or right after they occur companies can't rely only on traditional BI systems.

Emerged in July 2001 by Gartner enterprise, the Business Activity Monitoring (BAM) concept, an event-driven extension of BI defines providing real-time access to critical business performance indicators to improve the speed and effectiveness of business operations. These technologies can provide real-time business analysis and alerts on information from sources like Web services, message queues therefore are solutions becoming more sophisticated.

2. Existing software for Business Activity Monitoring and Platforms required

During the 2010, another concepts like business dashboards emerged, which made BAM solutions a viable scenario in enterprise business management because processing event streams requires robust and quick solutions.

Some vendors have also tried for a complete set of tools to build BAM solutions like: Progress Software's Apama [10], Coral8 (merged with Aleri) [1], Oracle[13] and SL - real time visibility [16]. As an open source CEP solution, there are only few available like Esper and Pion, nevertheless Esper

Tech is widely referred as "the only open source option"[7].

Today's Complex Event Processing CEP platforms in the market are mainly divided into three Event Pattern Language (EPL) different approaches [14]: SQL-like (e.g. Coral8, Esper, Oracle, StreamBase); Rule-based (e.g. AMiT from IBM or Reaction RuleML from RuleML); Abstract user interface and java-like code generation (e.g. Tibco, AptSoft).

Performance dashboards meet the user's requirements when speaking of enterprise business intelligence by reporting and analysis capabilities within an intuitive dashboard interface. Performance dashboards aim to deliver access to the right data to the right people at the right time. In the market, there are some dashboard builders like Progress Software and Coral8, but they are not open source solutions.

BAM solution provides three main features to the user: near real-time business key performance indicators monitoring (using the charts to display

the information in order to ease its reading by the user) called the dashboard component of a BAM solution. The alarmist component alerts to notify target users about important previously defined business behaviors. The third component is report generation with system behavior important information.

Platforms required

We have researched which are requires that an Order Management System (OMS) is a software system for order processing within an organizational business process. This system has to empower the coordination and execution of an order, given the priorities, error handling and data transformation, measuring the results and informing the interested systems.

As a result of research, such a system can use JBoss Business Process Management, JBoss Enterprise Service Bus, JBoss Messaging technologies and Oracle DBMS.

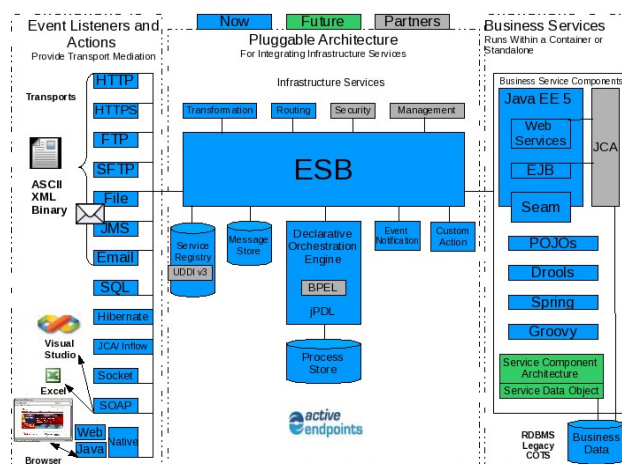


Fig. 1 JBoss ESB architecture Source: JBoss at <http://www.jboss.org/jbossesb/>
JBoss ESB uses a flexible architecture based on Service Oriented Architecture

JBoss Business Process Management is an extensible and flexible framework which through Jboss Process Definition Language (jPDL) expresses business processes graphically in terms of task.

JBoss Application Server (JBoss AS), free software/open-source Java EE-based application server is a platform for developing enterprise Java applications, Web applications, and Portals. JBoss AS supports the addition of some Modules/Enterprise Applications with integration purposes, including clustering, caching, and persistence. [18] Beings a part of a Service Oriented

Infrastructure (SOI), JBoss Enterprise Service Bus (JBoss ESB) can be used like standalone or application server.

JBoss Messaging, composed of several services work together to provide Java Message Service (JMS) API level services to client applications. JBoss Messaging is JBoss's JMS implementation and therefore is a Message-Oriented-Middleware (MOM). [11].

Oracle Database Management System (DBMS) is a database management system produced and marketed by Oracle Corporation.

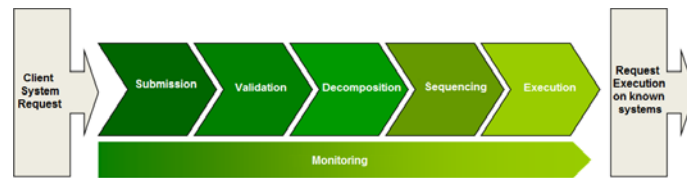


Fig. 2 High level perspective of an Order Management System. Source: XPand-IT documentation

For structuring the BAM solution, the essential requirements that the developed technologies have to fulfill are: the manner to establish connection points for event gathering and processing and the estimated event flow for defining CEP engine. In Xpand-IT documentation their OMS architecture can support an event flow by 10.000 events per day.

Esper, an Event Stream Processing (ESP) and correlation engine Complex Event Processing (CEP) is open-source software and available for Java. Esper enable the development of applications that process very large volume of incoming messages or events and also contain Event Stream Intelligence Fig. 3. being able to use containers, and XML document management [3].



Fig. 3 Esper's event stream intelligence;
Source: <http://www.espertech.com/products/esper.php>

For managing event data storage we have thought that is need to find a fast way for storing data. Now, we are researching the possibilities of using an Oracle Berkeley DB, a family of open-source databases.

In what's regarded the development of classes, as result of our research we can say that Hibernate allows working with inheritance, polymorphism, association, composition on Java collections framework [3].

3. Dashboard component for BAM solution

The dashboard component is the features that provide a near real-time business key performance indicators monitoring using the charts to display the information in order to ease its reading by the user.

The second component, the alarmist component alerts to notify target users about important previously defined business behaviors. The third component is report generation with system behavior important information.

For creating the dashboard component, we have proposed to monitor the processes, such as to be able to detect the anomalies and react to unexpected

events in right-time. The solution must be able to monitor the processes and must have the option for intervening directly, after the analysis of these events.

We have used JBoss Business Process Management for defining reports based on the events generated by the process engine, and possibly direct intervention in specific situations using complex event processing rules.

All relevant events are stored in a database through adding a history logger to the process engine. This history log is used to monitor and analyze the execution processes. To create reports we are using the Eclipse IDE for Java and Report Developers that show key performance indicators. We have defined our reports using the predefined data sets containing all process history information.

The Eclipse IDE for Java and Report Developers – Eclipse BIRT Designer allows us to define data sets, create reports, create charts, preview reports and export them on the web pages. The reports could indicate the number of requests per hour and the average completion time of the request during that hour. The charts are used for to check for an unexpected drop or rise of requests or an increase in the average processing time, signaling the problems

before the situation in which these couldn't be resolved.

Reports can be used to visualize an overview of the current state of your processes, but they rely on a human actor to take action based on the information in these charts. For processing large sets of events, the monitoring of the process engine can be achieved by adding a listener to the engine that forwards all related process events, such as the start and completion of a process instance, or the triggering of a specific node, to a session responsible for processing these events.

Complex Event Processing (CEP) rules could then be used to specify how to process these events. The rules could also specify how to respond to specific situations. A sample rule that accumulates all start process events for one specific order process over the last hour, using the "sliding window" support. This rule prints out an error message if more than 1000 process instances were started in the last hour (e.g., to detect a possible overload of the server).

These rules could even be used to alter the behavior of a process automatically at runtime, based on the events generated by the engine. For example, whenever a specific situation is detected, additional

rules could be added to the Knowledge Base to modify process behavior. For instance, whenever a large amount of user requests within a specific time frame are detected, an additional validation could be added to the process, enforcing some sort of flow control to reduce the frequency of incoming requests. There is also the possibility of deploying additional logging rules as the consequence of detecting problems. As soon as the situation reverts back to normal, such rules would be removed again.

4. The Actual Stage of Romanian Information Systems Market in Small and Medium Romanian Enterprises

For identify the actual stage or Romanian information market in small and medium enterprise we have begun a research began between 16 May and 25 June 2010, totalized 22 questions and it had a number of 440 respondents [2].

The investigated organizations were in proportion by 93% enterprises with less than 150 employees remaining 7% enterprises with over 250 employees.

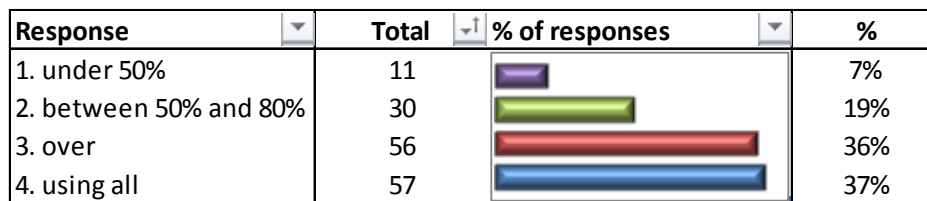


Fig. 4. The level of using of soft resources in Small and Medium Romanian Enterprises

The investigated enterprises have used in that period the software of the following Software producer: Total Soft, Wizrom Software, Senior Software, EBS, WinMentor or Alfa Software. These types of software are designed especially for Small and Medium Enterprises, that stage of research revealed some very important results.

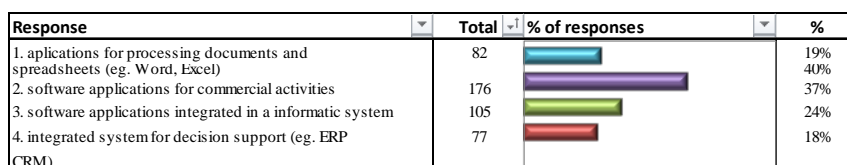


Fig.5 The level of using of ERP and BI module

We can say that although 36% uses soft resources, only 15% of enterprises are using module of Business Intelligence in their organization.

From the perspective of very serious effect, a critical analysis induced flaws that show system and

causes major damage especially hard and a low involvement of the implementer (possible service contracts, warranty and post warranty concluded against the beneficiary).

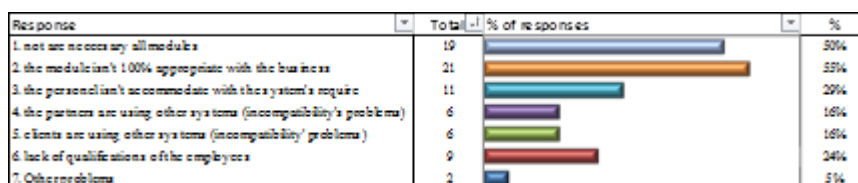


Fig.6. Causes of inefficient use of an Integrated Information System

Perhaps the most important question of the questionnaire which focused on integrated systems deployment in Romanian Small and Medium Romanian Enterprises (SME) proved if proof were

needed that organizations try to gain competitive advantage in the market and advanced management methods are an essential element of these strategies.

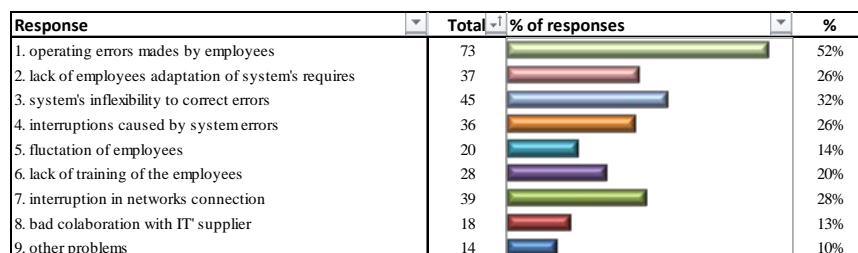


Fig. 7 Problems encountered in using SII

Another conclusion was that the most important obstacle to the use of advanced management methods in an economy that we face an increased

poverty is certainly lack of money, and less acceptance of the new.

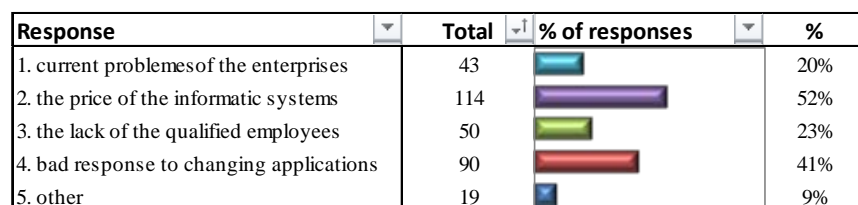


Fig.8. Obstacles arising in the implementation of IBS

Market applications for Business Intelligence (BI) increased by 13.4% worldwide in 2010 compared to 2009, according to a recent study by U.S. consulting and IT research Gartner. According to Gartner, reflecting increased customer interest for solutions to streamline business and to obtain competitive advantage in economic crisis.

Moreover, BI applications have increased in 2009 compared to 2008, even if worldwide software spending with business applications fell. BI market is controlled in proportion of 59% of major vendors: SAP, IBM, Oracle and Microsoft. [Gartner Source]. Trying to develop solutions of Business Activity Monitoring on open-source framework can represent a real solution for small and medium enterprises to accomplish the process of making decision.

4. Conclusions

Under current conditions in the private sector in Romania is trying to survive, and the lack of money

is more acute, we're trying to come to support SMEs with solutions to help them in decision-making process.

The research show clearly BI modules and need to open their presence in daily activities.

We believe that Business Activity Monitoring development solutions built on open source would solve a part of the problems facing small and medium Romanian enterprises.

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