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Development of Information Technology Structural Scheme For Monitoring Business Process

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Development of Information Technology Structural Scheme For Monitoring Business Process

E S Soegoto* and R Sani

Departemen Teknik dan Ilmu Komputer, Universitas Komputer Indonesia, Indonesia

*eddysoeryantos@email.unikom.ac.id

Abstract. This paper aims to explain that using the Business Activity Monitoring method in a business process is expected to make the business process better. By utilizing the current information technology, a business process company can be monitored by the company with ease. Through information technology, to monitor the company's business processes, which allows automating the process of formation of representations for business processes provided, it is necessary to integrate all the information technology used. Information technology offered is using the business activity monitoring, in the hope to monitor a business process activities well and effectively. The concept scenario is simplified by the person making the business decision, estimating the place of the company's economy, using specialized software, then based on a series of business decision rules informing the user or other parts of the business activity. The block diagram of this technology is developed and the appointment of its basic elements is considered, conducts a retrospective analysis of business processes, forecasts the business activities of the company, and collects performance statistics for all activities and controls that can change business processes. Information technology offered is using the business activity monitoring.

1. Introduction

The complexity of the development of a company's business processes for a communication information network increases with the types of used equipment and the number of users. Efficiency improvements are the first step of development but will by far not be sufficient for a radical breakthrough toward sustainable development.[1] The more complex a business process a company, then the delivery or control of business processes can be more complex. But system and method for preparing, using, and displaying a state model of a process, as an industrial or business process, as a sequence of discrete steps.[2] Therefore, with the need to monitor business activities, Michael and Ido method real-time is In order to track activities in a computerized system with client-server or other communications, a system configuration is needed which monitors, logs and reports traffic.[3] A model or a measurement called BAM (Business Activity Monitoring) is created. Information from BAM systems are analyzed based on models of the business process and different information filter criteria are assessed for their impact on business performance indicators. Based on this, a filter criterion is chosen which is executed by an information filter. The outputs from the information filter are used as the basis for deciding the inputs for business process execution.[4]

However, it should be noted that in order to use business monitoring activities it is necessary to have a statistical control process, as explained by Jiang et. Al, develops a Statistical Process Control

(SPC) framework to identify important changes deserved in business activity monitoring. [5] Technological development becomes the main foundation in business. The Idea of Henry is a successful business model creates a heuristic logic that connects technical potential with the realization of economic value. [6]

Business Activity Monitoring (BAM) which provides real-time efficiency access has increased rapidly. Recently, strong interests in the real-time performance management are increasing to gain competitive advantages in the rapidly changing business environment. For better business performance or continuous process improvement of an enterprise, real-time measurement and analysis of the performance of managerial activities are essential.[7] and driven by recent trends, effective compliance control has become a crucial success factor for companies nowadays.[8] Business Activity Monitoring (BAM) describes a concept and technology that complements the periodic ex-post analysis of process execution by permanently identifying particular situations at runtime and reacting to them by setting alerts or triggering actions with no or low latency.[9] Implementation and operation of BAM is to promote the implementation of management decisions quickly and clearly which then the result is a competitive advantage obtained by the company, and then producing the required performance reports and recognizing the multiple skills required to measure, compile and analyse the requisite data.[10]

In other respects cannot redo the system in real-time perfectly even cannot achieve the complicated performance level. Then, it does not describe the overall information of BAM development and provides optimization and pattern recognition techniques vary from product to product and solution to solution. This paper aims to explain that using the BAM method in a business process is expected to make the business process better. By utilizing the current information technology, business process companies can be easily monitored by the company. Through information technology, to monitor the company's business processes, which enable automates the process of establishing representations for the business processes it provides, and it is necessary to integrate all of the information technology used for efficiency to be achieved. Information technology adjustment techniques are offered to take into account the concrete business process features presented in the monitoring. The information technology provided is to use business supervision, in the hope that it can monitor business process activities well and effectively view from this technology block diagram is developed and the designation of its basic elements considered, the analysis collects performance statistics for all activities and controls that can change business processes better.

2. Method

The main objective of Business Activity Management (BAM) is to measure the actual parameters of business processes and control business deviations, perform abnormal detection of business processes, personal control of business process workers, and the establishment of warehouses in real time. Business Activity Diagram is closely related to the integration of enterprise applications. To provide full monitoring of business process events in real time in the company, it is necessary to integrate all the information technology used. Troubleshooting by using BAM provides the ability to track the most important business process processes and processes such as adding new customers, changing services provided by operators, changing information systems policies. Implementation and operation of BAM are to promote the implementation of management decisions quickly and clearly which then the result is a competitive advantage obtained by the company. Therefore, the development of information technology BAM is an important scientific application for a company.

All organizations currently do some kind of business monitoring with automation less than 20%. This monitoring is limited to very important business functions, and almost at the end of the value chain through manual process controls such as daily and weekly reports. Now BAM's technology is so mature that organizations can apply it at all critical points, right from the beginning of the value chain (product conceptualization, sales execution, order execution, logistics, and collection) to better control their company operations.

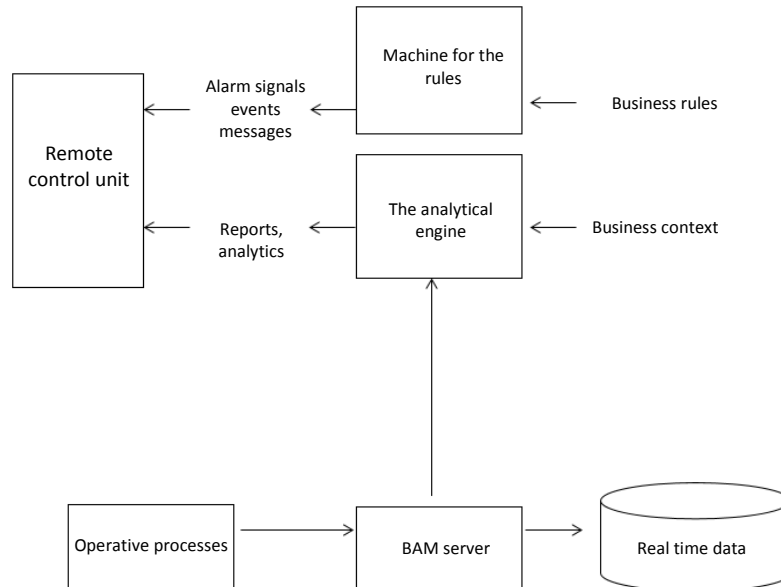Currently, the typical BAM information technology monitoring structure has the form shown in Figure 1.

Figure 1. Sample images. Typical BAM information technology structures to monitor the company's business activities.

The business activity monitoring trip begins after the business process is designed, the essential phase of the common BPM lifecycle. Once the design stage is over, key stakeholders and process owners are responsible for determining what should be considered in the process design. This includes contracts for the expected duration of activities (Service Level Agreements or SLAs).

A good BAM solution requires real-time data about current and past processes and turns them into meaningful information that is enhanced by visual insights (i.e. charts, tables, reports). This information should be accessible through the combined dashboard which also includes an overview of business-related data (account type, client location, etc.). With BAM, the owner and process manager can identify trends and patterns that can be used to optimize the process. This allows decisions to be made based on reliable data, not unreliable intuition.

Strategies for adopting BAM in an organization can vary greatly depending on internal size and complexity. In a corporate environment, where a large number of processes and users are involved, BAM adoption requires careful planning. The potential threat must be explored in detail and attention should be paid to user training and education.

For smaller or less complex organizations, only a few factors are identified in this BAM may be relevant. In this case, roles are often combined and therefore, the need for coordination and internal communication decreases dramatically. In this scientific work, the author focuses primarily on the challenges facing companies in the application of BAM. Important success up to 6 steps, namely: 1) Achieving Commitment from Management The first step towards successful BAM implementation and its implementation in the company is to determine the right managerial role and ensure its commitment. Optimizing business processes with BAM can only be done if management is committed to monitoring the status of the process and identifying critical situations and opportunities. It is important that business activity monitoring initiatives receive the right amount of visibility, and the management is committed to investing the effort it takes to make it successful. Management must be aware of the purpose of the tool to ensure its commitment to its use. Recognizing who needs to be actively involved in the BAM depends heavily on the organizational structure and the specific needs of the project. In some cases, teams using BAM will also lead implementation initiatives.

Alternatively, the process owner can initiate the BAM stream but does not actually monitor the performance of the process directly. Sometimes the demand for monitoring and tracking tools comes from operations rather than management. One thing is clear; anyone who has a role in the BAM initiative should collaborate in defining a clear strategy to ensure that the investment is balanced and the tool shaped according to their specific needs, as well as business needs. The productive way to engage managers and achieve their commitment is to show them personal examples of how BAM can be used to solve specific problems they encounter in their daily work. Examples include finding out why a particular activity unfinished, or overcoming persistent obstacles causing delays in task completion. 1) Perform a Timely BAM Analysis The BAM project requires a detailed analysis phase that allows the company to determine which business indicators should be considered to monitor the performance of the process. During the BAM analysis phase, the expected duration of activities and processes should be determined. The expected duration of activity will, at a later stage, be compared with actual activity and process duration. During this stage, the specific user interface requirements for the dashboard must also be specified and included in the BAM implementation or adjustment plan. BAM analysis time is very important. Generally, if the process has not run in production, analysis should be done in parallel with the design process. If the analysis and design of the BAM process are not done simultaneously, then the results may be misaligned or inappropriate. For example, if the process design evolves using agile iterations at the implementation stage, BAM analysis should also be done through agile iterations during implementation.

If the BAM analysis is carried out at the beginning of the design process and is never updated again, if the process of change in the next stage is incomplete or does not meet specifications may occur. Another advantage of doing BAM analysis in parallel with the process design is the amount of time it can save. Use scheduled times for interviews and discussion sessions with various user teams to also determine the average duration of activity and key performance indicators to monitor. If BAM analysis is done at the end of the process design stage, a new round of interviews with the team can be requested. In spite of the obvious inefficiencies and waste of resources, several other complications may occur - such as matching questions about the duration of the process and the activities with work assignments identified in previous interviews. BAM checklist: - Select key performance indicators to measure. Stakeholders should be asked to identify key performance indicators for all business data collected through the process. This indicator will be provided in the report and dashboards and will serve as a way to evaluate the process.

1. Identify and list relevant activity sequences for monitoring purposes, for example, the approval stage of the process is an ideal candidate for measurement, but the duration of a document printing activity that is no more than a technical step is not an appropriate candidate for measurement

2. Agree with the estimated duration for each activity defined in the step above. Service level agreements (SLAs) must be realistic and consistent with the company's typical work style and the overall target duration of the process.

3. A machine / application that regulates policies, refers to the new identification and modification of business policies of the company based on information from the analytics application.

4. Specify dashboard and reporting requirements. Stakeholders should identify the visualization and reporting features necessary to analyse the data, observe trends, and recognize patterns. In some cases, BAM vendors are already offering off-the-box BAM dashboards and reports that can be customized according to project needs. In this case, the purpose of the needs collection phase should identify the gap between the desired outcome and the existing tool and to determine which adjustments will be required.

2.1. Setting Business Goals Realistically
The decision to have BAM running on one or more business processes must occur simultaneously with the definition of a business objective. A popular destination for BAM is to extract business insights right from the execution process. Management may be only interested in observing the ongoing process of finding trends. Once these trends are identified, often in the form of opportunities

and threats, businesses can react. To achieve this goal, be specific about the right business indicators relevant to the process.

The second high-level objective for BAM is to ensure that business processes are optimized. This is achieved by eliminating congestion and reducing idle time. When achieved, this goal leads to more efficient organizations, significant cost savings, and potentially increasing revenue. These high-level goals can be broken down into more specific practical goals:

1. Reduce operational costs

Using BAM to identify congestion and idle time, useful adjustments can be made in redistributing workload and how people work. As a first step towards cost reduction, set goals in terms of cost savings and translate those targets directly into business hours. Then, work backward to determine the target duration of the process and activity. The process can then be optimized using BAM to meet the specified duration. Another approach to achieving cost savings is to use BAM to identify teams that have spare capacity. The teams can be recalculated accordingly and the underutilized team members are assigned to another team or company division. - Speed up the execution process, another major goal of BAM adoption is to speed up the execution process. This can be achieved by identifying bottlenecks that block the critical path to completion of the process. At the activity level, evaluating team workloads and their tasks can reduce the duration of the process. Reducing process duration allows businesses to comply with established formal and informal contracts with clients and partners. This greatly improves the quality of service. In addition, reducing the duration of the process can increase revenue. For example, in the account opening process, the elapsed time between account opening and funding can have a major impact on revenue generated by a particular account. In both cases, make sure that the goal set is realistic and feasible. Setting unexpectedly expected the duration of the process will result in frustration among team members, potentially leading to a decrease in productivity. 1) Establish Service Level Agreements (SLA) to achieve BAM efficiency objectives, it is necessary to establish clear SLAs for processes and activities. Securing the correct values for these indicators is not always an easy task and SLAs that are too generous with respect to the actual duration will not help identify slow activity and congestion. Warnings will not be produced for late cases, and will not be marked as expired on dashboards and reports. In addition, SLAs that are too tight, unrealistic, or overly aggressive will negatively impact employee commitment. 2) Planning BAM Implementation and Testing although clearly visible, many businesses underestimate the amount of time and effort included in the application of BAM. Analysis and related efforts should always be included in the overall project plan to ensure success. Make sure the exact amount of time and resources (e.g. Business analysts) is allocated to complete all activities. Once the BAM analysis is complete, the time, effort and external factors affecting the actual development of BAM should also be estimated.

If the process design is carried out in parallel with the BAM implementation, carefully consider the precedents and interdependencies between tasks included in the two streams. For example, an SLA definition must be performed after the activity content is identified in sufficient detail.

In addition to standard functional testing, BAM testing should also include business simulations of SLA behavior with real-life process data. Depending on the preferred SLA definition method (see the previous chapter), SLAs may require a trial round to ensure that the expected time period is realistic and will not result in most processes being very early or too late. This step can be skipped if SLA is defined starting from real life duration.

2. Invest in Communication and Training, Another important factor to consider when setting BAM adoption strategies is the investment in communication and training for end users and managers. As with new tools/applications and business process reengineering practices, BAM can face resistance from users; Common obstacles include misunderstanding of what tool/application it is and why it is needed. The proper type of communication and training should be tailored to the audience and depending on whether they fall into the end user category or the manager and process owner.

End users, this group consists of people whose daily work is monitored by BAM. The first and most important task when presenting BAM to the end user is to clearly explain the various purposes of this tool/app to avoid fear-induced resistance to "monitor." BAM identifies teams and individuals with low workloads. Therefore, resistance is common and is a strong barrier to this group. Perhaps the best way to convince end users that they are not at risk is to emphasize that BAM's main goal is to improve organizational efficiency and improve service quality, not create redundancies. End users should be trained on BAM as well as business processes. They must receive clear information about the SLAs established in each process and activity so that they know what is expected of them and also must know about the data to be measured. Finally, they may be interested in a quick overview of the dashboard and this report will help them understand the purpose and reasons behind the use of BAM.

The manager and process owner, this group consists of individuals who will use BAM to monitor and optimize the process. The focus of this type of training and communication is to encourage the proper use of BAM software. This audience may feel threatened by the monitoring tool. Comprehensive training on the dashboard and reports available to them is highly recommended. If they are not involved in the SLA definition, they must also receive clear information about the SLAs that have been established in each process and activity. Most importantly, the managers and process owners must be trained on optimization practices and supplemented by an example of bottleneck identification, so they are aware of how to take full advantage of the full potential of the tool. Of course, optimization and pattern recognition techniques vary from product to product and solution to solution.

3. Results and Discussion

Having explained that by using BAM can benefit a company's business processes, then the main task or problem that is generally done by BAM technology are:

1. Allows forecasts of unexpected situations/activities to occur suddenly that will pose obstacles to future business processes. Examples are network failures, database failures, and changes in the website.
2. Have an approximate situation in making decisions, and do controls that can change business processes.
3. Fixed violations or attempted policy violations and agreements at the service level.
4. Cached reports, an analysis collects performance statistics for all activities.

Such tasks constitute an approach to the development of information technology monitoring of the business processes of the enterprise, the basis of such information technology:

1. A real-time data warehouse that stores activity descriptions in hardware and software applications, as well as other data relating to business processes.
2. BAM servers, manages real-time data warehouses according to developed process models and manages data forwarding processes from CDs in the cache memory and data availability for analysis tools and reporting tools.

a. **Operational processes**, defined as functional tasks and information systems project management (IPMS) modules, in particular, ERP, SCM, CRM, human resource management systems, etc., which are sources of activity description in hardware and software applications as well as data others that deal directly with business processes.

b. **Analytical Engine**, which is based on data from a data warehouse by calculating the KPI (Key Performance Indicator), determines the level of achievement of the company's objectives before the business process and conducts a retrospective analysis of business processes and forecasts the business activities of the company.

c. A machine/application that regulates policies, refers to the new identification and modification of business policies of the company based on information from the analytics application.

d. The control panel is a set of visualization tools and tools of the application results and analytics applications for the policy and is designed to showcase the latest activities of business processes,

analysis, and prognosis of business processes, as well as a network of new emerging business activities and emergencies.

The information technology scheme of enterprise business process monitoring is based on the following main methods of formal representation of business processes namely:

a. The visual representation used in the operation of the control panel to visualize machine operating results and analytics applications for policy.

b. The analytical representation used in the operation of the analytics application and in some cases for applications in the policy.

c. Representation at the level of stored data or data representation used in the operation of real-time data storage and BAM servers.

To enable the representation of a company's business processes, the author modifies the diagram shown in Figure 1. Considering the results of developing a formal description of the business process, which determines the possibility of automatic conversion on representation. Information technology diagram monitoring business process activities shown in Figure 2.
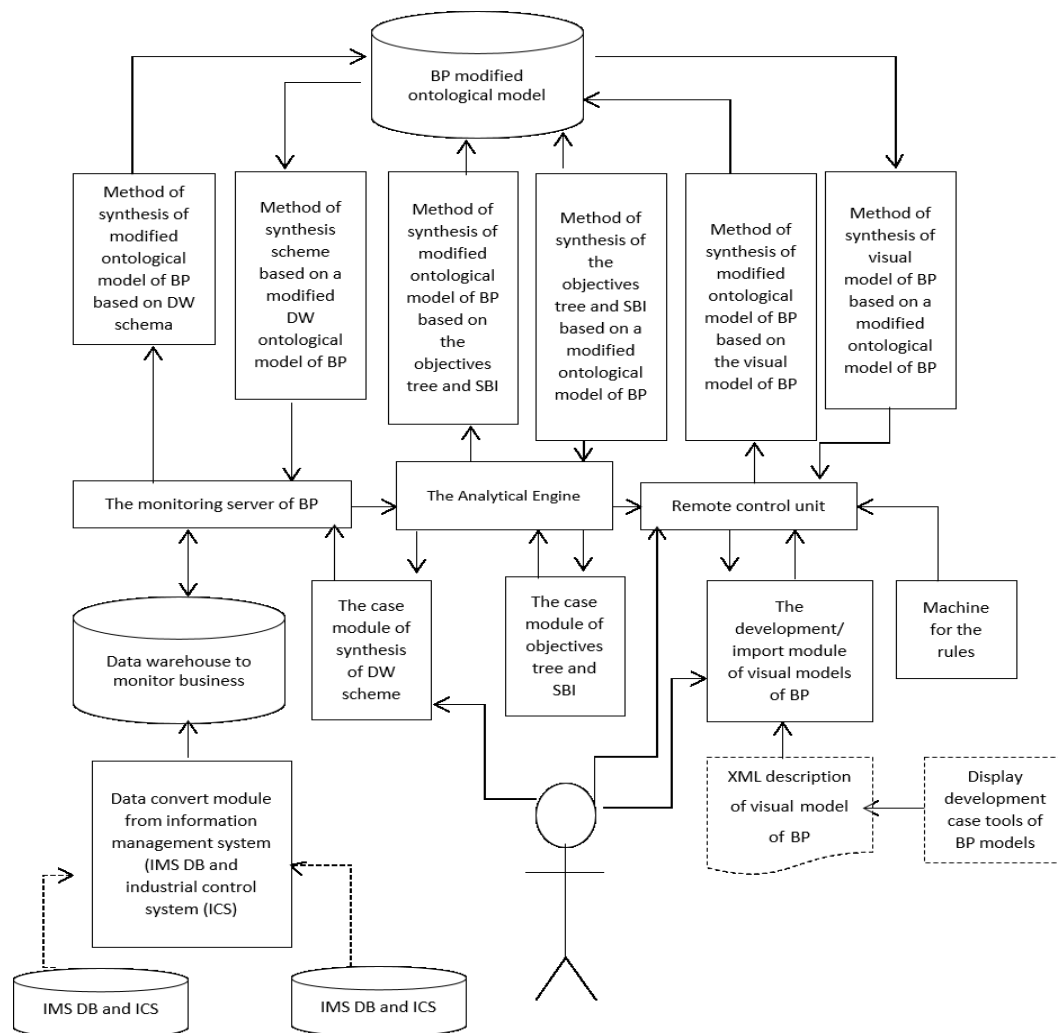

Figure 2. Interaction scheme. The main structural components of information technology for business process monitoring.

The appointment of such components in information technology developed to monitor the company's business processes as monitoring data warehouses, monitoring servers, analytical tools,

controls, and control panels coincides with the appointment of similar components of a typical BAM information technology illustrated in Figure 1. The information technology component in the data warehouse scheme module is intended for visual design and adjustment of data warehouse scheme or data mart which is a formal description of the representation of business process information observed. The components of information technology developing in the case module of objectives tree and SBI are intended for visual design and goal adjustment and in accordance with each target a substance of achieving a balanced scorecard. The results of this module are related to the description of analytical representations of the observed business processes. The components of information technology development "the development/import module of visual models of BP" are designed to perform the following functions: a. The design of visual business process patterns is observed in one of three visual modeling notations of business processes. b. The visual pattern of observed business processes developed as a result of the initial investigation of the facility and automated use of conventional business process case tool. The component of the evolving technology "business process ontological modification module" is a metadata describing the observed business process as a set of compatible attributes. These attributes make the business process observed in terms of information, analytical and visual presentations. The establishment of this attribute value occurs based on the component result of the "data warehouse scheme case module". Components of information technology development "the case module of objectives tree and SBI", "The development / import module of visual models of BP", represent a set of SQL queries and software implementing a data processing procedure that ensures the transformation of a data warehouse scheme, SBI, or a business process visual model in a set of metadata attribute values that describe a business process. The components of the "method synthesis" scheme are developed based on a modified data warehouse ontology model of the business process. The components of the growing IT data management module of the DB Information System (IMS) and the Industrial Control System (ICS) are intended to implement automated sampling procedures of operational data on the current state of the business process observed from IS and ICS databases. The operational data sample procedure of the current state of the business process observed is one of the major structural elements of the proposed monitoring scheme of the business process. From timeliness (efficiency), completeness (detail), update capability (arrival rate and new data read) depends on the quality of business process monitoring.

In addition, there are three models for companies to implement BAM solutions. Companies must choose the right model based on their current condition. This section describes a high level of practical approach to implementing BAM solutions.

1. Big Bang model, Organizations are trying to implement BAM solutions by Big Bang, through various corporate initiatives that cover most business units and geographies. This model is suitable if the organization/company is new or stable but has an aggressive growth target as a medium for long-term goals.

2. Selective Model, This model tries to focus on small sample processes with maximum loss areas and is quickly rolled out to other priority stream flow processes. This model is suitable for organizations/companies that are under tremendous pressure to improve operational performance.

3. Hybrid Model, This model focuses on processes that are in great need of attention as well as some processes of value streams. This model is suitable for a rather stable organization and has an aggressive growth target. With the development of BPM and enterprise application integration technology, it is easy to implement Business Activity Monitoring (BAM) solutions. Vendor BAM also designs the product keeping in mind the closed loop solution. Features such as dashboards, complex event correlations, and predictive analysis, once available in custom products, are slowly available to most vendors at an affordable cost. There are two different types of BAM solutions: Real-time business monitoring with analysis and dashboard. More advanced BAMs can perform automatic correlation of complex events and predictive analyses through the predefined pattern and opportunity experiments.

The BAM platform may be aligned or potentially integrated with other applications, such as business modelling applications or enterprise service buses, but does not require their use. Additional characteristics of the BAM platform include (Table 1):

(1) Access to various activities/activities and change data sources through the use of messages, adapters, and agents/sections.
(2) Dashboards for real-time metrics view and reminder alarms.
(3) Optional companies in historical operational data for trend analysis.

Table 1. Top BAM vendors.

BAM Vendor	Product
Systar	Business Bridge family product
Oracle	Oracle BAM
Web Methods	BAM is part of full-featured webMethods BPM suit
Tibco	Tibco BAM
Cognos	Cognos 8 Business Intelligence
Axway	Synchrony Sentinel

4. Conclusion

The conclusion is a proposed structural scheme of developed business process monitoring makes it possible to integrate this into existing technological information resources of enterprise management without reengineering. This reduces the cost of time and money to prepare a commission of the developed object of information technology in action. Conducting activities or a job to prepare the proposed information technology business process monitoring of a company in accordance with this methodology significantly reduces the time of commissioning of information technology proposed.

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