

Event-Driven Business Process Management

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ABSTRACT

«Event-Driven Business Process Management» (EDBPM) is a combination of actually two different disciplines: Business Process Management (BPM) and Complex Event Processing (CEP). In this paper we present a general framework for EDBPM as well as first use cases in the context of logistics and financial services.

1. EVENT-DRIVEN BUSINESS PROCESS MANAGEMENT

«Event-Driven Business Process Management» (EDBPM) is a combination of actually two different disciplines: Business Process Management (BPM) and Complex Event Processing (CEP). *Complex Event Processing* (CEP, [1]) is a discipline that deals with event-driven behavior. It is an emerging technology for obtaining relevant *situational* knowledge from distributed systems *in realtime or almost realtime* by selection, aggregation, and event abstraction for generating higher level complex events of interest. The common understanding behind BPM is that each company's unique way of doing business is captured in its business processes. For this reason, business processes are today seen as the most valuable corporate asset. BPM software platform provide companies with the ability to model, manage, and optimize these processes for significant gain. As an independent system, CEP is a parallel running platform that analyses and processes events. The BPM- and the CEP-platform correspond via events which are produced by the BPM-workflow engine and by the IT services which are associated with the business process steps.

In this paper we outline EDBPM and introduce a conceptual reference model for it (section 2). We report on currently running industrial use cases which are intended to demonstrate feasibility and business value of EDBPM (section 3).

2. REFERENCE MODEL FOR EVENT-DRIVEN BPM

In the following, we describe the basic components needed for operational EDBPM systems. As shown in Fig. 1, basic elements can be taken from BPM platforms as well as CEP applications.

Figure 1 shows the principle of how a BPM- and BAM (Business Activity Monitoring) /CEP platform work together on the basis of events. Grey components show workflows with respect to BPM, while blue components deal with real-time BAM/CEP phenomena. There will be two different kinds of EDBPM specialists in the future: *Workflow modelers* or business analysts and *event modelers*. The *workflow modeler* identifies business processes, starting from the value chain of an enterprise. He analyses and reengineers or optimizes the business processes.

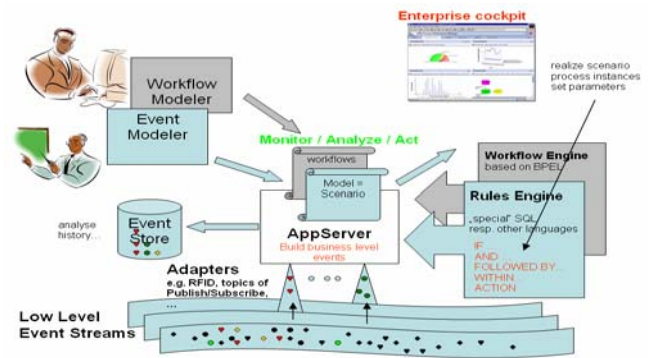


Figure 1 A reference model for a CEP/BAM/BPM platform [2]

The *event modeler* acts with different kinds of events which are produced by the business process instances themselves or by other event sources, like SNMP traps, RFID tags, log file entries etc. By cooperating with the process owners of the operating departments or even with the C-level management of an enterprise, the event modeler has to define which BAM view has to be monitored in a dashboard, which alerts are to send to which roles in the organization and which actions shall be started automatically if a certain event pattern occurs. Derived from such BAM views, the event modeler looks for the event types needed and their instances flowing through the event streams of an enterprise or which are saved in an event store.

3. USE CASES FOR EDBPM

We are currently working on several industrial use cases for the reference model sketched above: Prototype EDBPM implementations are under way in different business environments (logistics, financial services, automotive, see [3], [4] for detailed descriptions of these use cases).

3.1 A Logistics Use Case for EDBPM

This logistics use case [4], which is developed in cooperation with *Deutsche Post AG*, investigates the feasibility of combining tools for CEP and BAM with the latest *Sopera Enterprise Service Bus* (ESB) infrastructure technology which is used to efficiently deploy and manage business and IT services as a distributed service oriented architecture (SOA). This use case serves as a proof-of-concept implementation for a solution combining the goals of a SOA with the advantages of CEP. At the same time it is a first implementation of the reference model described above.

A typical business process at *Deutsche Post*, addressing “shipment”, “monitoring/investigation” and “claim” of packages, has been modeled and implemented as a test bed for the evaluation of the advantages of combining CEP and SOA. The *Sopera* services implementing the process functionalities are capable of sending

process and service status information as event streams directly to the BAM and CEP components. The CEP engine queries the event streams according to predefined CEP patterns for detecting relevant complex events. These complex events are displayed within the BAM component in dashboard views and are used to create alerts for predictive business.

Currently, the integration prototype is able to detect possible errors within a current business process by using the CEP technology to extract relevant complex events from an event stream and alert responsible persons by using BAM dashboard visualizations.

3.2 Financial Services Use Case

This use case (see [3] for details) is primarily intended as a test of functionality demonstrating the applicability and usability of EDBPM for real-time monitoring of online business processes, helping companies to gain a better IT-insight. Its application domain is the monitoring of credit applications which potentially might be cancelled.

As use case we have chosen the *easyCredit*-Internet service of the *TeamBank* Company, with special focus on the real-time monitoring of potential cancelling of credit applications, the monitoring of performance and status of the deployed components implementing the business logic, as well as the front-end components based on metrics and key performance indicators (KPIs) which are visualized via BAM dashboards. The browser-based *easyCredit*-Internet application of *TeamBank* is a German online credit system featuring instant credit application confirmation. The use case specifically addresses the monitoring of the potential loss of sales volumes by cancelled credit applications.

According to the user's interactions with the *easyCredit* application, events will be generated and monitored by the operators depending on their roles and their specific needs. For the prototypical implementation of this real-time monitoring use case different CEP, BAM, and Event Processing Languages (EPLs) have been analysed and used for implementing the use case, among them *AptSoft*, *Tibco*, *StreamBase*, *Apama*, and *Aleri*.

3.3 CEP based Continuous Planning

Our third use case demonstrates the (business) value of applying CEP-based *Continuous Planning* based on EDBPM by means of concrete applications in the financial industry.

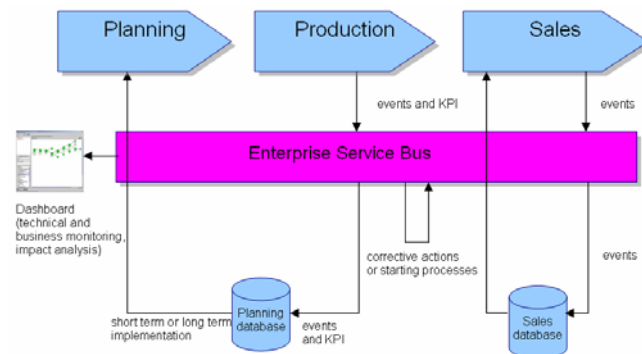


Figure 2: CEP-based Continuous Planning

Especially for the finance industry it is important to identify the potential revenue on daily business and estimate the potential loss

in the daily business. Events have to be analyzed in real time to find pattern in customer behavior and react on them or to optimize the implemented process continuously. The use case is currently under review. A general architectural implementation framework has been worked out as illustrated in figure 2.

4. CONCLUSION

In this paper, we have established a first link between the flourishing area of modern BPM and BPM platforms on the one hand and CEP and CEP media, on the other hand. We have related the main concepts of both technologies in a general reference model for EDBPM and identified new specialized roles in the engineering process. By means of selected industry use cases the integration aspects, the added functionality as well as the business value of EDBPM will be evaluated and demonstrated.

In summary, currently event-driven BPM is able to detect possible errors within a business process by using the CEP technology and alert responsible persons by using e.g. BAM. This leads to an added business value as compared to pure BPM solutions. However, in future solutions business processes have to react automatically to such errors, e.g. based on a conditional decision and reaction logic. Additional use cases can be defined for various domains and first projects on the basis of such « Event Driven BPM »-platforms start in 2008:

- Logistics applications, e.g. at *DHL/Deutsche Post* [4]
- Finance applications, e.g. *Deutsche Bank*, *TeamBank* [3]
- Telco applications, e.g. *Deutsche Telekom*, *T-Mobile*

Future research projects, e.g. “Domain specific reference models for event patterns for a faster set-up of BPM/BAM applications” are currently under preparation [2]. Obviously, there are a number of further steps to be taken, among them:

- The practical evaluation of relevant use cases in additional domains.
- The development of adequate description formats for complex events and event patterns.
- Theoretical models and description formats for the full EDBPM cycle (business process modeling – observation / monitoring – redesign/optimization).

5. REFERENCES

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