Towards an Event-Driven Architecture:
An Infrastructure for Event Processing Position Paper

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Abstract. Multiple business factors have emerged to accelerate the necessity of
event-driven functionality and make it part of the main-stream computing, in-
stead of a niche technology. Consequently, there is now focus on using high-
level software constructs to build these applications. This paper presents a vi-
sion for such high-level features and architecture. This paper explains why
“event-driven applications” becomes an emerging area, explains the basic ter-
minology of EDA, explains the relationship to business rules, and sets some di-
rections for the future of this discipline.

1 Introduction and Motivation

Event-driven applications are those which respond to the occurrence of events. This
type pf processing is not new, and can be found over the history of computing, start-
ing from exception handling in programming languages, passing through concepts
and disciplines such as: active databases [1], publish/subscribe systems [2], network
and system management [3] and business activity management [4]. Recently there is
an increase in the interest in industry in this area, indicated from analysts’ reports,
from the sharp increase of start-ups in this area, and product announcements by appli-
cation middleware and database vendors. This is an indication that event-driven pro-
gramming moves from being used at some niches to the main stream of program-
ing, and thus it is cost-effective to construct general tools that enable easy
construction and maintenance of such applications. The contemporary business driv-
ers for these directions are:

1. Enforcement of compliance with regulations inside the process (some times in
   “right-time” fashion)
2. The drive for expense reduction in back offices that increase the demand for more
   automation (e.g. automated exception handling)
3. Increasing complexity of inter process integration that require agility and flexibil-
   ity;
4. Technology developments such as RFID that increase the scale and scope of event
   based data
5. Industry trends such as Business Activity Management, Real-Time Enterprise,
   Business Performance Management that place a demand on software infrastruc-
   ture to deliver the event data to drive these high level objectives.

The rest of this position paper is structured in the following way. Section 2 ex-
plains the type of applications, and shows a case study. Section 3 explains the prin-
ciples of EDA, Section 4 discusses relation to business rules technology, and Section 5
concludes the paper with some future predictions.


2 Event-Driven Applications

Event-driven functionality is an enabler for the IBM’s vision of the “on demand” enterprise, it enables enterprises to make “just in time” reactions to eliminate “worst case” expenses, it enables enterprises to improve control over their operations, and eliminate getting to critical situations, it enables to save cost by providing automation to exception handling, and it is enables loosely coupled integration among processes and systems, improving the agility of application integrations.

Table 1 shows classification of these applications along with the associated business value.

<table>
<thead>
<tr>
<th>Type</th>
<th>Examples</th>
<th>Business Value</th>
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<tbody>
<tr>
<td>1. Agile Process Integration</td>
<td>➢ Time Critical Targeting (Military)</td>
<td>Providing integration between various systems based on event input. Enables to support applications that require dynamic composition of various business processes, based on event processing. Enables to perform operations just-in-time and not in advance, thus eliminates excessive cost.</td>
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<tr>
<td></td>
<td>➢ EAI Integration hub (Telco)</td>
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<td>➢ Just-in-time car rental (Travel and Transport)</td>
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<td>➢ Trade processing (Financial Markets)</td>
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<td></td>
<td>➢ Automatic policy setting (Operational Resilience)</td>
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<td>➢ Loan and mortgages decision support (Banking)</td>
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<td></td>
<td>➢ Automated shipping and receiving based on RFID (Distribution)</td>
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<td></td>
<td>➢ London Congestion billing (Travel and Transportation)</td>
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<td>3. Awareness to Business Situations</td>
<td>➢ Anti Money Laundering (Banking)</td>
<td>Providing the ability of timely identification of Business situations that requires reaction, and avoid critical situations. This is an enabler for run-time enforcement of regulations.</td>
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<tr>
<td></td>
<td>➢ Fraud Detection (multiple industries)</td>
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<td></td>
<td>➢ e-Pedigree (Pharmaceutical)</td>
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<td>➢ Promotion Evaluation (Retail)</td>
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<td>4. Change Management/Impact analysis</td>
<td>➢ Design collaboration (PLM / Automotive)</td>
<td>Provides the impact of a change, allows automatic propagation of system and ensuring consistency throughout systems.</td>
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<td>➢ Authorization management (Security)</td>
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<td></td>
<td>➢ Compensation management (Insurance)</td>
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