Existing and Future Standards for Event-Driven Business Process Management

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Regensburg, 08.12.2009
What is the commonality of these things?

Introduction
Agenda

- Why are Standards Necessary or Useful?
- NEXOF-RA with Event Processing Enhancements
- Domain Specific Reference Models for ED-BPM
WHY ARE STANDARDS NECESSARY OR USEFUL?

Definition taken from ISO/IEC Guide 2:2004:

A standard is a document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.

NOTE:
Standards should be based on the consolidated results of science, technology and experience, and aimed at the promotion of optimum community benefits.

Source: ISO/IEC INFORMATION CENTRE (http://www.standardsinfo.net)
## WHY ARE STANDARDS NECESSARY OR USEFUL?

### Benefits of Standards from Different Perspectives

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vendor</strong></td>
<td>Possibility to meet customers demand for interoperability</td>
</tr>
</tbody>
</table>
| **Developer**     | - Leverages the know how of other participants using their frameworks  
                   |   - Implementation speed increases by using frameworks or standard tools |
| **End-User**      | - Reduced costs and risks while adopting a mature and tested technology  
                   |   - Insight into the best practices of the industry                |
WHY ARE STANDARDS NECESSARY OR USEFUL?

Development and operation of modern IT-infrastructure and systems requires generally accepted standards

Early Introduction

Advantage:
- Reduce risk of influencing
- Control innovation process

Disadvantage:
- Hinders the innovation process

Late Introduction

Advantage:
- Growth of different technologies and approaches

Disadvantage:
- Hard controllable innovation process
- Big variety of proprietary vendor aligned solutions
WHY ARE STANDARDS NECESSARY OR USEFUL?

Main objective is not to establish new standards, but developing suggestions for a better adaption of ED-BPM

- First Attempts getting the Benefits of a Standard
  - NEXOF-RA with event processing enhancements
  - Domain Specific Reference Models for ED-BPM

- Extension of Networked European Software & Service Initiative (NESSI) – Reference Architecture with Event Processing Capabilities
- Development of reference models (event models, best practices, etc.) for a subset of ED-BPM use cases in several domains
Existing and Future Standards for Event-Driven Business Process Management

Agenda

- Why are Standards Necessary or Useful?
- **NEXOF-RA with Event Processing Enhancements**
- Domain Specific Reference Models for ED-BPM
NEXOF-RA WITH EVENT PROCESSING ENHANCEMENTS

Source: CITT
NEXOF-RA WITH EVENT PROCESSING ENHANCEMENTS

1. Creating the Event Cloud
   Creating events out of business processes, applications, infrastructure, etc.

Source: CITT
Extension of Networked European Software & Service Initiative (NESSI) – Reference Architecture with Event Processing Capabilities

NEXOF-RA WITH EVENT PROCESSING ENHANCEMENTS

- Service Consumers
- Consumer Adaption
- BPM View
- Composition
- Global Event Cloud
- Abstrated Infrastructure
- Infrastructure

2 Harnessing the event cloud
Routing events to their processing destination, because a produced event doesn’t know its destination(s)

Source: CITT
NEXOF-RA WITH EVENT PROCESSING ENHANCEMENTS

Event Transformation
Provides a component which is able to format the incoming event into a format the consumer can deal with (Translation, Aggregation, Split and Enrichment)

Source: CITT
Extension of Networked European Software & Service Initiative (NESSI) – Reference Architecture with Event Processing Capabilities

NEXOF-RA WITH EVENT PROCESSING ENHANCEMENTS

Pattern Detection (CEP)
Tries to detect a relevant situation based on a predefined event pattern

Source: CITT
NEXOF-RA WITH EVENT PROCESSING ENHANCEMENTS

5 Situation Management and Situation-based Actions
- React on relevant situation, e.g. react on a problem with an alert
- Dynamically change BP

Global Event Cloud

Source: CITT
NEXOF-RA WITH EVENT PROCESSING ENHANCEMENTS

Observation with BAM
Business Activity Monitoring provides insight into the current situation of business processes and systems.
Extension of Networked European Software & Service Initiative (NESSI) – Reference Architecture with Event Processing Capabilities

NEXOF-RA WITH EVENT PROCESSING ENHANCEMENTS

Service Consumers
- Interaction Services
- Enduser Interface
- BAM Views

Consumer Adaption
- Mapping users perspectives to business/ Integration
- (Event Based) Context Handling

BPM View
- BP Execution
- Information Services
- SVN Lifecycle Mgmt.
- Situation-based Action

Composition
- Service Coordination
- Mediation
- SLA Negotiation
- Service Discovery

Service Platform
- Service Communication
- Situation Mgmt

Global Event Cloud
- Event Execution
- Lifecycle Mgmt.
- Reasoning
- Pattern Detection (CEP)

Abstracted Infrastructure
- Infrastructure and Data Abstraction
- Event Transformation

Monitoring
- Resources Mgmt
- Data Mgmt
- Event Cloud harnessing

“System” Platform

Engineering Tools
- Context Modelling
- Knowledge
- SVN Business
- Event Processing Modelling
- SBS/SBA Modelling
- Service Modelling
- EPDL

Domain Specific Models for ED-BPM

Source: CITT
Agenda

- Why are Standards Necessary or Useful?
- NEXOF-RA with Event Processing Enhancements
- Domain Specific Reference Models for ED-BPM
**Event-Driven Business Process Management (ED-BPM) is a Combination of two Disciplines**

### Domain Specific Reference Models for ED-BPM

<table>
<thead>
<tr>
<th><strong>Business Process Management (BPM)</strong></th>
<th><strong>Complex Event Processing (CEP)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Deals with the management of business processes</td>
<td>- Concept of dealing with detection, analysis, grouping and processing of events</td>
</tr>
<tr>
<td>- Approach to increase the efficiency, flexibility and technology integration of the business</td>
<td>- Technology for obtaining relevant situational knowledge from distributed systems in real time</td>
</tr>
<tr>
<td>- Business processes describe the unique way of doing business</td>
<td>- Aim is to identify meaningful events, e.g. errors, problems, frauds (as and before they occur)</td>
</tr>
<tr>
<td>- They are seen as the most valuable asset of a corporation</td>
<td></td>
</tr>
</tbody>
</table>

**Event-Driven Business Process Management (ED-BPM)**
Solutions for ED-BPM dealing with CEP are currently not used in many Companies as Production Systems, although they could solve a lot of Business Demands

DOMA IN SPECIFIC REFERENCE MODELS FOR ED-BPM

What is the reason for the rarely use of ED-BPM solutions in companies? How could that problem be solved?

<table>
<thead>
<tr>
<th>Current Situation</th>
<th>Complication</th>
<th>Possible Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of ED-BPM solutions in business domains is mostly - difficult, - time consuming and - expensive</td>
<td>There are no reference models (frameworks) for event based systems in several business domains available</td>
<td>Domain specific reference models with standards, guidelines and best practices for specific use cases</td>
</tr>
<tr>
<td>...</td>
<td>Currently no common notation for modeling and designing of events and ED-BPM solutions available</td>
<td>Common notation for designing events</td>
</tr>
<tr>
<td></td>
<td>No pract. experience and success stories</td>
<td>Research within several business domains to identify valuable use cases for ED-BPM</td>
</tr>
<tr>
<td></td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
Development of Domain Specific Reference Models (Frameworks) Based on NEAR

**DOMAIN SPECIFIC REFERENCE MODELS FOR ED-BPM**

**Notification Event Architecture for Retail (NEAR)**
- **Released**: 2005
- **Interest Group**: ARTS *
- **Aim of NEAR**: simplify real time integration of loosely coupled applications, reduction of time and costs for integration, etc.
- **NEAR provides**:
  - Reference architecture
  - Guidelines and best practices
  - Modeling notation for events based on UML
  - etc.

**Domain Specific Reference Models (NEAE, NEAF, NEAL)**
- Development of reference models for a subset of use cases in several domains
- **Enhancement** with specific parts for ED-BPM has to be done (e.g. event correlation, BAM Views, etc.)

- **NEAE for ED-BPM**: Notification Event Architecture for Entertainment
- **NEAF for ED-BPM**: Notification Event Architecture for Finance
- **NEAL for ED-BPM**: Notification Event Architecture for Logistics
- ...
Development of Domain Specific Reference Models (Frameworks) based on NEAR

**DOMAIN SPECIFIC REFERENCE MODELS FOR ED-BPM**

<table>
<thead>
<tr>
<th>Domain Specific Reference Models for Specific Domains (Retail, Entertainment, Finance, Logistics)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aim: simplify the integration of ED-BPM for a subset of use cases in several domains</td>
</tr>
<tr>
<td>Properties:</td>
</tr>
<tr>
<td>- <strong>Standard notation</strong> for modeling basic events</td>
</tr>
<tr>
<td>- <strong>Event models</strong> for specific use cases of valuable business processes</td>
</tr>
<tr>
<td>(low level events, e.g. “OrderEventModel”, “AccountTransactionEventModel”,</td>
</tr>
<tr>
<td>“CustomerEventModel”, “TrackingEventModel”)</td>
</tr>
<tr>
<td>- <strong>Event Patterns</strong> for detection of relevant situations within the business processes</td>
</tr>
<tr>
<td>(detection of complex events)</td>
</tr>
<tr>
<td>- Possible <strong>actions to react</strong> on relevant situations</td>
</tr>
<tr>
<td>- Possible <strong>BAM views</strong> for observation</td>
</tr>
<tr>
<td>- Etc.</td>
</tr>
</tbody>
</table>

**Progress:**

- NEAR for ED-BPM: 0%
- NEAE for ED-BPM: 100%
- NEAF for ED-BPM: 0%
- NEAL for ED-BPM: 100%
Example for a Event Model (NEAF: “AccountTransactionEventModel”)

Domain Specific Reference Models for ED-BPM

“Account-Transaction-EventModel” as an example for an event model of NEAF
DOMAIN SPECIFIC REFERENCE MODELS FOR ED-BPM

1. Name of the data element (data element can also be a low level event)

Source: Excerpt of „AccountTransactionEvent“ of NEAF
Common data elements
Common data elements which can be used multiple times within the domain model are colored blue.
DOMAIN SPECIFIC REFERENCE MODELS FOR ED-BPM

Source: Excerpt of “AccountTransactionEvent“ of NEAF
Modeling of Low Level Events Based on the Notation of the NEAR standard

DOMAIN SPECIFIC REFERENCE MODELS FOR ED-BPM

- **Content element**
  - Content element describes the content and the number of occurrence (e.g. [0..1] means it occurs not or one time)

Source: Excerpt of „AccountTransactionEvent“ of NEAF
Domain Specific Reference Models for ED-BPM

Source: Excerpt of "AccountTransactionEvent" of NEAF
DOMAIN SPECIFIC REFERENCE MODELS FOR ED-BPM

6 Composite element
+ indicates a composite element within a data element
(e.g. Name consists of title, name and first name)

Source: Excerpt of „AccountTransactionEvent“ of NEAF
DOMAIN SPECIFIC REFERENCE MODELS FOR ED-BPM

Choice

<choice> describes the possible selection of exactly one element. The element can vary from instance to instance.

Source: Excerpt of „AccountTransactionEvent“ of NEAF
MODELING OF LOW LEVEL EVENTS BASED ON THE NOTATION OF THE NEAR STANDARD

DOMAIN SPECIFIC REFERENCE MODELS FOR ED-BPM

AccountCommonData
- AccountNo [1]
- @AccountType [1]
- BankCode [1]
- IBAN [1]
- BIC [1]
- @AccountType
  - Checking Account
  - Interest Checking Account
  - Money Market Account
  ...

InternalAccountCommonData
- AccountNo [1]
- @AccountType [1]
- BankCode [1]
- IBAN [1]
- BIC [1]

ExternalAccountCommonData
- Name [1]
- @AccountType
  - Checking Account
  - Interest Checking Account
  - Money Market Account
  ...

EventCommonData
- @Severity [0..1]
- @Priority [0..1]
- @Mode [0..1]
- SequenceNumber [1]
- EventDateTime [1]
- EventDescription [1]
- SensorID [1]
- Instance [0..1]
- BusinessUnit [0..1]
- @OrganizationalHierarchy [0..1]

AccountTransactionType
- TransactionID [1]
- @TransactionType [1]
- @Name [1]
- Description [1..4]
- Amount [1]
- @PostingType [1]
- PostingDate [1]
- ValuataDate [0..1]
- @TransactionState [1]
- AccountSource [1]
- AccountDestination [1]
- Customer [1]
- AccountBalance [0..1]
- Card [0..1]

Source: Excerpt of “AccountTransactionEvent” of NEAF
Modeling of Low Level Events Based on the Notation of the NEAR standard

DOMAIN SPECIFIC REFERENCE MODELS FOR ED-BPM

Generalization of choice is described by lines with white diamond heads and only one choice can occur per instance.
CONCLUSION

- Extension of Networked European Software & Service Initiative (NESSI) – Reference Architecture with Event Processing Capabilities
- First attempt for reference models for a subset of use cases in several domains (Entertainment, Finance, Logistics, Retail)
- A approach to describe and model low level events

Content of the Paper

NEXOF-RA with Event Processing Enhancements

Domain Specific Reference Models for ED-BPM

First attempts to Model Basic Events
Thanks for your attention.

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