Architectural Perspective on future Dashboards in a Service Oriented and Event Driven World

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As a reminder – Abbreviations and Acronyms

- BPM – Business Process Management
- BAM – Business Activity Monitoring
- CEP – Complex Event Processing
- BSM – Business Services Management
- EDA – Event Driven Architecture
- BEM – Business Event Monitoring
- BI – Business Intelligence
- DWH – Datawarehouse
- BWH – Business Warehouse
- ETL – Extract – Transform – Load
- ODS – Operational Data Store
Some Definitions

**Dashboard**
A digital dashboard, also known as an enterprise dashboard or executive dashboard, is a business management tool used to visually ascertain the status (or "health") of a business enterprise via key business indicators.

**Service Oriented**
SOA is an application framework that takes everyday business applications and breaks them down into individual business functions and processes, called services. A SOA lets you build, deploy and integrate these services independent of applications and the computing platforms on which they run.

**Event Driven**
An Event is a significant (it may affect some action), atomic (happens completely or not at all) occurrence (e.g. fact becoming true, a state transition) in the reality.

An Event is a significant change in state.
Contrasting SOA and EDA (extract)

- **Similarities**
  - Both address Business Problems and Link between Business and IT
  - Both support the principle of separation of concerns
  - Both are architectural styles
  - Both align with a lifecycle (MADM) and a governance model
  - Both can be implemented separately although the combination seems to be promising
  - ...

- **Differences**
  - SOA is about services and EDA about events
  - SOA is loosely coupled and EDA is decoupled
  - SOA is closed to unforeseen input and executed in a linear way
  - SOA benefits apply good to changing business environments. Event Processing Benefits also apply to stable business environments
  - SOA is typically a request /reply model. EDA is typically a fire and forget model.
  - ...

Events → start Services, start processes or perform intelligent routing
Events → may use services to perform event processing
Services → used for event detection, event capture and event processing
Services → generate or consume events
Services → wait for and react on (expected) events
Agenda

- Definitions
- Situations in the past, today and in the future
- Architectural Aspects
  - Active vs. Traditional
  - Usage in SOA, EDA, CEP, BAM
- Recommendations
- Conclusion and Summary
Business Challenges

- **Your business needs** *instant answers* about the state of the business.
  - Process health
  - Customer Service
  - Sales Orders

- **Information is required at** *different levels* by different business owners
  - Operations manager
  - Sales Executives
  - Chief Financial Officers

- **Current methods are** *offline reporting based*, with little or no online real time capability.
  - Reporting
  - Business Intelligence/Data Warehousing
## Evolution of Business Dashboards

<table>
<thead>
<tr>
<th></th>
<th>Traditional Dashboards</th>
<th>Active Dashboards</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Source</strong></td>
<td>DWH, BWH</td>
<td>Multiple</td>
</tr>
<tr>
<td><strong>Latency</strong></td>
<td>Acceptable</td>
<td>Real-time and history</td>
</tr>
<tr>
<td><strong>Architecture</strong></td>
<td>Proprietary</td>
<td>Open and service oriented</td>
</tr>
<tr>
<td><strong>Interaction</strong></td>
<td>Static</td>
<td>Interactive and dynamic</td>
</tr>
<tr>
<td><strong>User</strong></td>
<td>Dozens to hundreds</td>
<td>Hundreds to thousands (role based and personalized)</td>
</tr>
<tr>
<td><strong>Usage</strong></td>
<td>Strategic (Data centric reports, OLAP)</td>
<td>Tactical and Operational (process centric and event centric)</td>
</tr>
</tbody>
</table>

- Traditional Dashboards:
  - Shows, what happened
  - No real time operational data or solution scenarios.

- Active Dashboards:
  - Flexible, role based, easily adaptable and directly linked to the processes and instances of processes. Supports in problem determination and solution finding.
Situation Today and Tomorrow

**Today**

- **Heterogeneous Environment across the industries**
  - Some have Messaging Middleware, some have not
  - Some have started in service orientation, some have not
  - Most of them have BI Systems and DWH/BWH Systems
  - Most of them do not have BSM Systems
  - They all store Data

**Tomorrow**

- **Still heterogeneous environment, but new requirements**
  - Flexible and easier adaptable processes
    → SOA
  - Apply BI principles on Event Streams in combination with historic data.
    → BAM + Interaction and Event Generation
  - Link between infrastructure monitoring and Business Processes
    → BSM
  - Vertical integration including sensor and actor networks, business systems and infrastructure
    → More and More Events

Key Question – What is the added value. Or why should the customer change the environment?
Architectural Perspective – Traditional BI (Business Intelligence)

- Non real-Time
- After the Fact Analysis
- Manage strategic and tactical business plans
- Monitor, report, analyse and improve business performance
- Data centric approach
Increased Real Time Capability

- Manage strategic and tactical business plans
- Monitor, report, analyse and improve business performance
- Data centric approach
- Typically BI Approach to BAM
Another Approach – Business Process Management and today's implementation approach based on a Service oriented Architecture
How can BAM help?

- Business Activity Monitoring is the presentation of real time information of activities inside organizations and the relationships with external partners and customers.

- This information is role-based, targeted and focused to the status and results of various operations, processes, and transactions.

- This information is used to make informed, quick, business decisions that address problem areas.

- BAM systems collect business events, that are fed directly from applications, integration software or from Business Process Management software.
Architectural Perspectives - BAM

- Real Time
- Focus on Business Events
- Multiple Sources
- Typically Management of a specific Business Process
- Embeds BI Capabilities
Architectural Perspective - The Role of CEP in Dashboards

- Real-Time
- Online Analysis
- Situation Detection
- Temporal Awareness
- Event Centric approach
- Helps to detect situations that could not (easily) detected using BI analysis
- Integrate a multitude of Event channels
What is BSM or Business of IT Dashboard

- **Technology** - “real-time” dashboard, modelled business / technology linkages, event infrastructure

- **Client Transformation** - shift to business focus, enhanced IT process capability; enhanced business monitoring
Why is BSM important? – Business Impact Management

**Business Perspective**

- Business impact high
  - % of incidents very low

**IT Perspective**

- Business impact low
  - % events very high

**BOTTOM UP**

- Systems and applications dependencies are modelled to identify what causes business impact
- Takes into account resilience/redundancy

**KEY**

- **BUSINESS IMPACT:**
  - M1 CRITICAL
  - M2 SERIOUS
  - M3 IMPORTANT
  - M4 NORMAL
  - M5 TOLERANCE

- **TOLERANCE:**
  - Period of time without business impact

- Many IT incidents have no business impact at all
- Many events recorded are just warnings and don’t constitute an incident
BSM need to provide a horizontal and vertical view

**TOP DOWN**
Business information enables IT to operate to business priorities in real time

**BOTTOM UP**
IT information is interpreted so the Business can track their operations efficiently

Dashboards for the business as well as IT
Value delivered by BSM / Business of IT Dashboards

**BUSINESS**

- Enables validation of SLAs
- Shortens problem definition time
- Improves incident reporting
- Improves prioritisation of response – avoids unnecessary callouts
- Improves internal communications
- Incorporates human knowledge to improve systems status reporting

**IT**

- Improved operational efficiency – single source of information
- Business knows the service status when customers call
- Business can track customer status and transaction performance
- Improves internal & customer communications
- Incorporates human knowledge to improve service status reporting
Architectural Perspective – BSM / Business of IT Dashboard

- Real-Time
- Historic
- Online Analysis
- Situation Detection
- Impact Analysis
- Trend Analysis
- IT and Business Information interlinked
Event Processing Solution Segment Overview and their Link to Dashboard requirements

- **Situation Awareness**: Event Processing as part of Information Delivery
- **BAM**: Event Processing as part of Business Observation
- **Active Diagnostics**: Event Processing as part of Problem Determination
- **Predictive Processing**: Event Processing as part of Prediction Systems
- **RTE**: Event Processing as part of Business Logic
Important Considerations

- **You need to determine the right metrics for BAM**
  - Need to provide enough information for determining health or status of the business
  - Allow users to easily search what they are looking for
  - KPIs are measurable objectives, made up of a benchmark, target and time frame. For example: "Increase Average Revenue per Sale from $100 to $1,000 EOY 2008".
  - Based on the value of what is being monitored and to who is viewing them

- **Allow business users the ability to take control of business activities as they are executing**
  - Send Notifications for manual response
    - Email supervisors to inform them of delays of a high value claim
    - Alerts contained within the dashboards that can show all high risk credit requests that require additional approval.
  - … or Invoke automated responses
    - A corrective action process (i.e. BPEL Process)
    - A Business Service that sends a courtesy letter to a customer (Web Service)
Recommendations

- Try to standardize events on to a common event format like CBE/CEI → WEF

- Support and Use Event Adapters for existing Applications to generate standardized Events on a business level

- Embed Business Intelligence Capabilities
  - Analyze KPIs over time and other dimensions
  - Drill up and down, slice and dice business measures to identify trends

- A lifecycle approach (MADM – Model, Assemble, Deploy and Monitor) is ideal, but the monitoring capability must be flexible enough to incorporate Data and Events from various sources

- Include Industry Templates for Monitoring Models and Dashboards to improve adoption.
Summary and Conclusion

- BI and BAM both bring value to the business analysis and address different scenarios today (data driven vs. Process or event driven). Both concepts seem to converge in the future.

- CEP brings additional value in analysing complex situations and bringing the corresponding alerts to the user and the dashboards.

- Only active dashboards provides enough flexibility to the business

- RTE = BI + BAM + BPM + CEP
Thank you.

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