Capability as a Service in digital enterprises
Agenda

The general need for capability
Overview of the CaaS project
Overview of the application case at SIV AG
Overview of the development environment
Other work done
Reflection on project related challenges
Motivation:
context changes
businesses need to adapt
Capability as a Concept

- Enterprises must focus on their capabilities: *the ability and capacity that enables an enterprise to achieve a business goal in a certain operational context*

- What is a Capability?

  - The ability to engineer a bridge, e.g. skills, experience
  - The capacity such as money or tools to build a bridge
  - The context in which the bridge must be built and used (location, weather, etc.)
Our Solution

- **Capability as a Service**
- We propose a novel paradigm supported by four cornerstones
Table 11: Medical compliance pattern

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rule Compliance Pattern for medical issues (BPM)</td>
<td>To deal with the need of automated rule compliance of vessels approaching different ports with different legislations regarding medical issues.</td>
</tr>
</tbody>
</table>

Context
- Vessel approaching a new port
- Compliance with local regulations regarding the crew medical status required

Solution
- BPM Pattern

Guidelines
- User can exploit this set of processes for the overall business process of the rule compliance system regarding medical status of the vessel's crew

Keywords
- Rule compliance, Port authorities, Maritime, Business process

5.4.3.2 The Cargo Compliance Pattern (Business Process View)

This pattern is a business process model applicable in the cases where a vessel, approaching a port, is required to ensure compliance regarding its cargo. Table 12 summarizes all the basic characteristics of the proposed pattern.
Key Concepts: Capability & Context

- *Capability* is an ability and capacity for a company to deliver value, either to customers or shareholders, right beneath the business strategy.
- *Context* refers to situational cognition; as such, it is used to describe the conditions of an entity.

- The company wants to *sell ice creams* as long as *it is sunny and the temperature is within a given range.*
Capability Driven Development
- meta-model -

Context

Reuse and Variability

Enterprise Modeling
Capability Driven Development
- life-cycle process -
### Travel management dashboard

**Trip #849-2014**

**Current Context Situation**

- Travel conditions: Normal
- Regulatory requirements: Compliant
- Calendar: Significant conflict
- Weather: Normal
- Traffic: Low

<table>
<thead>
<tr>
<th>KPI</th>
<th>Value</th>
<th>Adjustments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cost</td>
<td>650</td>
<td>Travel day earlier to reduce scheduling</td>
</tr>
<tr>
<td>Days late</td>
<td>0</td>
<td>0 conflicts by 6 hours</td>
</tr>
<tr>
<td>Accommodation cost</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>Severity of scheduling conflicts</td>
<td>8</td>
<td>(click for more details)</td>
</tr>
</tbody>
</table>

**Context indicators**

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Patterns suggested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours scheduled</td>
<td>8</td>
<td>Apply Costs justification pattern to justify</td>
</tr>
<tr>
<td>Temperature</td>
<td>25</td>
<td>Accommodation costs</td>
</tr>
<tr>
<td>Travel conditions</td>
<td>Normal</td>
<td>(click for more details)</td>
</tr>
<tr>
<td>Accommodation cost limit</td>
<td>200</td>
<td>(click for more details)</td>
</tr>
</tbody>
</table>
CDD Development Environment
Architecture Overview
### A Capability-oriented Requirements Engineering Process

<table>
<thead>
<tr>
<th>Objective</th>
<th>Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support specification of concept-wide requirements inherited from EM, and of varying business situations; facilitate specification of patterns of capability delivery that are meant to be sufficiently general and reusable in long-term.</td>
<td>Apply the principles and the activities of the RE process to systematically collect and manage the requirements.</td>
</tr>
<tr>
<td>Integrate EM and MDD to overcome inconsistencies between the final software application and the requirements for capability.</td>
<td>Use a model-oriented approach and an integrated tool platform for documenting the requirements as well as for application development.</td>
</tr>
<tr>
<td>Facilitate rapid application development and efficient support for requirements change.</td>
<td>Apply incremental and iterative RE, as well as agile practices.</td>
</tr>
</tbody>
</table>
Elicitation

Identification of relevant stakeholders:

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business analyst</td>
<td>Identify new, or change/improve existing enterprise sub-models, i.e. goals,</td>
</tr>
<tr>
<td></td>
<td>processes, resources, and KPIs.</td>
</tr>
<tr>
<td>Context analyst</td>
<td>Identify the context-sub model.</td>
</tr>
<tr>
<td>Requirements engineer</td>
<td>Has the knowledge of CDD</td>
</tr>
<tr>
<td>Customer</td>
<td>Has benefits of delivered capabilities</td>
</tr>
<tr>
<td>Capability User</td>
<td>Is directly involved in the interactions of a delivered capability</td>
</tr>
</tbody>
</table>
Elicitation

Capability elicitation, starting perspective:
- *Goal-first*: business strategy
- *Service-first* customer needs
- *Context-first*: business conditions
Elicitation – A Case at SIV

- The CaaS partner SIV is a Germany-based independent software vendor (ISV) and a business process outsourcing (BPO) provider for the utilities industry.
- SIV has developed a domain-specific ERP platform kVASy® that supports all relevant value-added processes of market players.
- All BPO services offered to SIV’s customers – mostly grid access providers and balance suppliers – are based on the functionalities of kVASy®.
- SIV’s business goal is to deliver a maximum of business value to its customers by combining best practice business processes with compliance to the market’s ever changing business rules and regulatory requirements.
Elicitation – A Case at SIV

Goal 9
To increase the degree of automation of case handling

Goal 5
To support any communication protocol between market partners

Goal 1
To constantly deliver business value to its customers

Goal 1.1
To implement change requirements for the kVASy® platform in an agile way

Goal 1.2
To run the kVASy® platform as a cloud based service

Goal 1.3
To significantly reduce the complexity of the kVASy® platform

Goal 6
To support new market roles

Goal 2
To efficiently control the business processes

Goal 10
To reduce process costs

Goal 2.1
To optimize case throughput

Goal 2.2
To achieve high process quality

Goal 3
To implement customer change requests in an agile way

Goal 4
To quickly adapt to regulatory changes that affect market communication

Goal 8
To transform kVASy® into a SOA based platform

Goal 7
To reduce time-to-market of product enhancements

Capability 1
Dynamic BSP Support

Goal 2.1
To optimize case throughput

Process 1
Message validation process

Iteration

supports

supports

requires

motivates

requires
Elicitation – A Case at SIV

“Message Validation” business process:
...the recipient is supposed to validate each message (such as “energy consumption data”) against the underlying message specification. The sender is to be notified about any invalid message within a deadline specified by the regulatory authority.

Given the large number of messages to be processed, there are usually many concurrent cases that need some clearing. Hence, the size of the backlog can grow considerably over time leading to missed deadlines and/or overtime work. Thus - customer’s workload, the current backlog size, message type, exception types, and other, are represented by (different) context models, and (different) capabilities are elicited to handle those contexts.
Depending on the concrete context situation, the task “Remedy case” can be dynamically routed to the external business service provider (BSP), or left with the customer.
Documentation

- Model-oriented, with natural language for annotations
- Open to different modeling languages
- Intra- and inter-model links can be defined for traceability
Analysis, Validation, Change Management

- Analysis: Necessity, Feasability, Redundancy, Consistency
- Validation: Group-review meetings (per iteration), expert reviewing.
- Change Management: act upon a change.
Summary of experiences

• The main objective of the process is to facilitate the specification for capability requirements in an integrated way following the multi-perspective views defined in the CMM to facilitate further application development.

• From business goals, services, or from relevant business contexts. In any of the three strategies, both the functionality and the quality aspects of capability are captured, where the first are dictated by the CM, and latter by the setting of the goals and KPIs.
Summary

CaaS to market

Year 3: Business feasibility

Year 2: Technological feasibility

Year 1: Conceptual feasibility