IMPLEMENTING THE BUSINESS RULES APPROACH - A CASE STUDY: MATERNITY RELATED BENEFITS

... or:
3 things that allowed me to experiment with documentation and implementation of business rules using RuleXpress and SAP BRF+ and the results hereof

Jess Lykke Gramkow
It is easy to understand the need for and the value of the Business Rules Approach
- but it is not easy to carry out in practice
  - And you definitely need a good tool

A tool does not save the world
  - not even SAP

Business and Technical Architecture, requirements and business rules can turn software engineering into a handicraft (not an art form)
  - but it calls for a change of attitude
3 things ...
Me
Degree in Math and Computer Science

A software developer for 10 years
Most time spend developing and maintaining 2 large systems
Both with focus on implementing the rules as accessible and maintainable as possible
First successful, the next with some success (rule maintainability)
Experience: An tool for implementation doesn't do the trick, no matter how good it is

3 years in KMD’s methodology department
Responsibility: How to document and implement business rules

Guiding star: If the requirements and business rules are specified and managed the right way, then
The documentation can be alive and controlling the implementation in all the lifetime of the system
It doesn't matter what tool you use for the implementation (but some are better suited than others)
The situation at KMD
KMD is a large Danish IT company
More than 3,200 employees and annual revenue of more than DKK 3,8 billion
Located in the 4 largest cities of Denmark: Copenhagen, Aarhus, Odense and Aalborg

Mission: To create one complete solution for the digital administration of the public sector (called KMD OPUS)

SAP is KMD’s strategic platform and we cooperate with SAP:
Standard framework for all public sector solutions (PSPF)
Development of e.g. a Citizen object

Strategic partnership with Mahindra Satyam
Most development is done for investment.

Build one solution to fit the requirements for all customers (municipalities).

Possibility for customizations for the individual customer.

Use SAP "out of the box" as widely as possible to get the best business case.

On the terms of SAP - as less modification and extension with function modules.

Requires "high level" requirements: KMD's Public Sector Business Model.
Going from Mainframe (PL1 and DB2) to SAP

Going from monolithic systems to Suite (e.g. 7 systems for doing pay out)

We are used to know the legislation better than our costumers

All the systems developers are used also to be a kind of business specialist

No need to write and maintain the requirement because we got full access to the source code
The Project
The time had come to use SAP to renew the old legacy system for the administration of Maternity Leave related benefits

- As much as possible automation - as many cases solved without involvement of the caseworker
- The decision must be as "self explained" as possible
- The solution must give the caseworker as much guidance as possible

The Maternity Leave project group:
- “Oh, we got so many rules that we need to make up our own methodology”
- “The rules must be executable”
- “We don't believe that the executor organization can implement the rules as we want it if we give them any degree of freedom, so we must give them no freedom at all”
Proof of Concept
Fit the use of RuleXpress into our methodology and framework

Proof that KMD's Business Analysts can use RuleXpress and that it accelerates their work

Show that RuleXpress and SAP BRF+ can work together

Business Rules can be specified so they are a complete guidance for the developer

Business Rules can govern the implementation and corrections hereof (in all the life time of the product and beyond)
KMD’s methodology and framework and RuleXpress
Just like a private business, the public sector can be regarded as a manufacturing company and it is actually constructed in a similar way.

In order to control the implementation of digital administration, it is necessary to have a description of the business architecture of the public sector.

The PSBM is KMD’s proposal for a business architecture for the public sector.
OVERVIEW OF THE LEVELS OF ARCHITECTURAL DOCUMENTATION

Public Sector Business Model contains:
_4 business domains (e.g. Statutory Service Production)
_More than 30 business areas (e.g. Special Social Welfare Services)
_More than 100 business scenarios (e.g. Maternity-related Benefits Administration)

For every business scenarios a Business Area Architecture document:
_Business objects
_Business events and processes
_Actors and roles
_Business interfaces

For implementation a Business Blueprint is created, that:
_Matches the Business Area Architecture with SAP functionality
_Find gaps: Where SAP needs to be enhanced to fulfill the requirements
Requirements are written on the basis of the Business Elements

Every requirement has got acceptance criterions

Some of these acceptance criterions demands decisions, that needs to be automated

The automated decisions are made on the basis of business rules

RuleXpress Speech Communities:
  One for KMD, one for every Business Domains, one for every Business Areas and one for every Business Scenario

Rules are grouped to match acceptance criterions (among others)
RuleXpress can accelerate the work of the Business Analyst
**EXAMPLE OF HOW THE PROJECT DOCUMENTED THEIR RULES**

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**RE-WRITE THE RULES USING RULEEXPRESS**

<table>
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<tr>
<th>Name</th>
<th>Rule Statement</th>
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| 1. 6-1 determination initial | Benefit 6-1 must be assigned to a social benefit applicant, if one of the following situations apply: - an application for benefit 6-1 is received from the social benefit applicant. - one or more of the following social benefits are assigned to the current case of the social benefit applicant:  
  - benefit 6-2a,  
  - benefit 6-2b,  
  - benefit 6-2d. |
| 2. C benefit 6-1 determination | None of the following application forms must be used for application for benefit 6-1:  
  - DP400A  
  - DP401 |
| 3. C benefit 6-1 application | The listed mother must be female, if the application for maternity leave benefit lists the person as listed mother. An application for maternity leave benefit is an application for benefit 6-1. |
| 4. 6-1 determination constraints | Benefit 6-1 must not be assigned to a social benefit applicant, if actual date of birth listed by the application is more than 4 weeks before expected date of birth listed by the application. |
| 5. C benefit 6-1 actual birth | The civil registration number of the person is equal to the civil registration number of the person. |
| 6. D person listed mother | The listed mother must be female, if the application for maternity leave benefit lists the person as listed mother. If the application for maternity leave benefit lists the person as listed mother, the person is female if the civil registration number of the person is even. |
| 7. D person female | The start date of maternity leave listed by the application for maternity leave benefit must be before the expected date of birth listed by the application for maternity leave benefit. |
| 8. C maternity leave start date 1 | The start date of maternity leave listed by the application for maternity leave benefit must be before the actual date of birth listed by the application for maternity leave benefit. |
| 9. C maternity leave start date 2 | An application for benefit 6-1 must be rejected, if any rule in rule group "6-1 determination constraints" is violated. |
| 10. D benefit 6-1 rejected | The start date of benefit 6-1 must before the child is born be considered as the last date of the following:  
  - first day of absence of maternity leave of the social benefit recipient  
  - expected date of birth of the social benefit recipient's pregnancy plus 4 weeks. |
| 11. D benefit 6-1 start date 1 | The start date of benefit 6-1 must after the child is born be considered as the last date of the following:  
  - actual date of birth of the social benefit recipient's pregnancy minus 4 weeks  
  - actual date of birth of the social benefit recipient's pregnancy plus 4 weeks. |
| 12. D benefit 6-1 start date 2 | The end date of benefit 6-1 must be considered as the first of the following dates:  
  - expected date of birth of the social benefit recipient's pregnancy plus 4 weeks  
  - actual date of birth of the social benefit recipient's pregnancy. |
RuleXpress and BRF+
INTEGRATION BETWEEN RULEXPRESS AND BRF+ (SAP BUSINESS RULES FRAMEWORK PLUS)

_Got the people behind BRF+ to talk to the people behind RuleXpress
_Agreed to invest in a prototype for an integration tool

_SAP developed a "showcase" prototype – up to KMD prove the value
_RuleXpress already capable of exporting and importing metadata

Metadata exchange between RuleXpress and BRF+
_Rule definition and more from RuleXpress
_Rule id and more from BRF+
MY EXPERIMENTS WITH SAP BRF+

- Implement the re-written RuleXpress rules as close as possible using BRF+

- Exchange metadata between RuleXpress and BRF+
LINKING A RULE TO PSBM AND BRF+

- **Rule Statement**: The start date of benefit 6-1 must before the child is born be considered as the last date of the following:
  - First day of absence of maternity leave of the social benefit recipient
  - Expected date of birth of the social benefit recipient’s pregnancy minus 4 weeks

- **PSBM Business Area**: AR Labour Market Benefits
- **PSBM Business Scenario**: ARB Maternity-related Benefits Administration
- **K2. BRF+**
  - **BRF+ Application**: Z_KMD_RXP_PROOF_OF_CONCEPT
  - **BRF+ Expression**: D_BENEFIT_6_1_START_DATE
Rule D_BENEFIT_6_1_START_DATE

Change Mode: Active

Source: Free text input
Dependancy: Independent of language and version
Documentation:

the start date of benefit 6.1 must before the child is born be considered as the last date of the following:
- first day of absence of maternity leave of the social benefit recipient,
- expected date of birth of the social benefit recipient’s pregnancy minus 4 weeks

Detail

If

Template <1> Invert Condition Result

CHLD IS BORN

Then

(1) Change, DETERM...BENEFIT 6_1_START after processing expression MAX START DATE AND ACTL M 4 WK

Else

(1) Change, DETERM...BENEFIT 6_1_START after processing expression MAX START DATE AND EXPT M 4 WK
SUMMARY: MY OWN RESULTS

 Possible to document the business rules effective using RuleXpress

 Possible to implement the Business Rules in BFR+ "almost" one-to-one

 Possible to exchange metadata between RuleXpress and BRF+

 Possible to use Rule Groups an "plug ins" to KMD's Public Sector Business Model
The project got the right mindset to write business rules without them being executable

The reports from RuleXpress is handed over to the developers for implementation

All their all Excel sheets with rules are converted into rules in RuleXpress
CONCLUSIONS - REVISITED

It is easy to understand the need for and the value of the Business Rules Approach
– but it is not easy to carry out in practice
  - And you definitely need a good tool

A tool does not save the world
  – not even SAP

Business and technical Architecture, requirements and business rules can turn software engineering into a handicraft (not an art form)
  – but it calls for a change of attitude
Q: How much does this approach speed up a rule change?
A: That depends on the kind of change. But the magnitude will be from weeks to days.

Q: How was the process going from spreadsheet to RuleXpress?
A: Initially I did the transformation by reading and structuring the information from the spreadsheet. At first the project group thought that they would lose control, if the rules were “just” declarative statements. But after awhile, when they had become familiar with the way of expressing the rules, they realized that the sequence they thought then needed, was implied from the declarative statements and the given situation. They also realized that the declarative statements was much more flexible and that it gave them all the control they needed.
Q: Why RuleXpress?
A: I was looking for a tool that didn’t put any technical restraints to the user and that gave the user the freedom to express whatever wanted without being stopped e.g. from a required syntax. The tool though had to support the user in writing good well structured rules and it had to be repository based. RuleXpress was the only tool I found that could find satisfied this.

Q: Why putting so much effort in the integration between RuleXpress and BRF+ if it wasn’t essential?
A: At the beginning the idea was that it would be hard to do the transformation from the RuleXpress rules to the BRF+ rules and that we needed as much technical support that we could get. It ended up that it was very easy to implement the rules correctly in BRF+ when the RuleXpress rules was well documented and that navigation between the two versions was easy due to naming. So it ended up that the integration between RuleXpress was more a nice to have than a need to have feature. Maybe we will look more into it in the future.
Q: What is the process in changing a rule and what are the requirements for this process?
A: That depends on what initiates the rule change. If e.g. an error is found in a RuleXpress rule, then the rule must be corrected and afterwards all the implementation (potentially more than one) must be corrected. If an error is found in the implemented rule, then it must at first be checked if it is the implementation that is not correct or if it is the RuleXpress rule. If the error is in the implementation then this is just corrected; if the error is in the RuleXpress rule, then we have the situation described above.

The requirement is that every rule change must be verified using the RuleXpress rules, so that the “truth” is always found in the RuleXpress rules. Else the chain is broken.

Q: Why not only just use BRF+?
A: Because then the business analyst will be too much distracted by technical stuff instead of getting the rules right.