PMC103

Business Rules Management with SAP
Overview of BRFplus and SAP NetWeaver BRM

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1. About Business Rules

2. SAP’s Business Rule Management Systems
   - Business Rule Framework plus
   - NetWeaver Business Rules Management

3. Use Cases

4. Usage Recommendation

5. Alignment
What are Business Rules?

Business Rules

A set of decisions / calculation mechanisms applied to a business process:
- Optimized process output
- Adherence to regulations/policies
- Process automation

RFx can be created manually or by a predecessor document. RFx specific information (e.g. submission deadline, suppliers) is maintained.

RFx is sent to the selected suppliers to obtain a bid.

Bids are received and can be evaluated according to different criteria (e.g. best price).

Best source of supply is selected and notification of acceptance is sent to the supplier. Rejection is sent to other suppliers.
Ubiquitous Business Rules

Banking: Relationship based Pricing, Scorecards, Credit Decisioning

Education: Fee Calculations, Course Selections

Healthcare: Claims, Patient Monitoring, Fraud Detection

Logistics and Shipping: Parts Management, Duties Calculations, Pricing Calculations

Public Sector: Tax Calculations, Customs Duties, Land Regulations, License Fee Calculations

Insurance: New Products, Claims Settlement, Agent Commissions
Problems with Conventional Methods

Automated Enforcement
- Rules inside Database
  - Triggers
    - Sales Commissions
    - Premium Calculations
    - ...
  - Stored Procedures

No/Semi Automation
- Rules as Tacit Knowledge
  - Business User
  - Business Analyst
  - Business Expert

Rules inside Code

```
METHOD get_claim_payments.
  IF iv_claim_reason_code EQ 'Shipped wrong Product',
    IF iv_claim_reason_code EQ 'Wrong parts in kit',
      rv_string = 'Forwarder'.
    ELSEIF iv_claim_reason_code EQ 'Parts missing',
      rv_string = 'Forwarder'.
    ENDIF,
  ELSEIF iv_claim_reason_code EQ 'Damaged in transit',
    IF iv_claim_reason_code EQ 'Parts are damaged',
      rv_string = 'Forwarder'.
    ELSEIF iv_claim_reason_code EQ 'Hardware error',
      rv_string = 'Forwarder; Manufacturer'.
    ENDIF,
  ENDIF.
ENDMETHOD
```

Rules in Documents

Agility, visibility for business, changes?

Costs, archiving, backups, compliance?
Business Rules Management in an ideal world
What does C-Level executives, IT specialists and business users expect?

C-Level executives
It is critical that our policies are enforced by rules in our business operations.

IT specialists
For us it’s all about ensuring that business rules are implemented efficiently, transparently and consistently.

Business users
Ideally, we would have greater control over the rules that affect business operations.
Benefits of Using Business Rules Management

- **Model**: Business Rules Management
  - **Benefit**: Agile and maintainable systems
  - **Description**: Separation of business rules and code
- **Refine**: Business Rules Management
  - **Benefit**: Automation of key business decisions
  - **Description**: Modeling of complex business logic
- **Automate**: Business Rules Management
  - **Benefit**: Consistent application of corporate policy and government regulations
  - **Description**: Central management of business rules
- **Manage**: Business Rules Management
  - **Benefit**: Visibility, accountability and error-free business
  - **Description**: Business Experts can find, change and test critical business rules

Additional Benefits:
- Flexible & agile business systems
- Faster turnaround times for changes
- Reduced cost for changes
- Precise & informed decision making
- Improved visibility for the business
“Business processes, in whatever form they take, depend heavily on business rules. Rules drive the activities, coordinate data movement and workflow, and provide decision automation in complex situations.”

“For enterprises, BRMSs provide great agility not only because they automate decisions but also because they enable organizations to modify policies or implement new programs quickly.”

“The quality of rules engines in BPM solutions will likely emerge as a competitive differentiator.”

“Enterprises that create value through rapid process changes are beginning to define a market opportunity for a pre-integrated suite of tools that supports intelligent business performance management.”
Agenda

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Mandate for Business Rules at SAP

Business User Empowerment
- Graphical approach for intuitive rule composition (modeling instead of programming)
- Transparency of rule execution and tracing for audit

Rapid Time-to-Value
- Significant reduction in creation and change life-cycle
- Rules in business semantics while IT experts may technically enhance rules

Reduced TCO
- Seamless integration with core (ABAP) and composite applications (Java)
- Highest performance

Better decisions, better results, … at lower costs!
Components of a Business Rule Management System (BRMS)

Business Rules Authoring
- Provides the ability to define/model business logic without coding
- Various rule representation formats
  - decision tables/trees
  - rule flows
  - text rules (IF-THEN-ELSE)
- Testing, validation and refinement of business rules
- Different views for user roles such as developers, architects and analysts

Business Rule Repository
- Life-cycle management
  - Access, change and usage control
  - Versioning Services
- Organization and grouping
- Search and browsing
- Auditing and reporting services

Business Rule Engine
- API for invocation by applications
- Rules evaluation, inference and execution
- Logging and tracing of rules execution
Business Rule Representations

Decision Tables
- Powerful visualization - compact and structured
- Completeness and consistency - error prevention made easier
- Modular knowledge organization - rules grouped into a single table

Decision Tables example:

<table>
<thead>
<tr>
<th>Number of Products</th>
<th>Num. of Delayed Pay</th>
<th>Intermediate Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>10</td>
<td>500</td>
</tr>
<tr>
<td>4</td>
<td>15</td>
<td>300</td>
</tr>
<tr>
<td>3</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>1</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>0</td>
<td>35</td>
<td>20</td>
</tr>
<tr>
<td>0</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>0</td>
<td>45</td>
<td>10</td>
</tr>
<tr>
<td>0</td>
<td>50</td>
<td>5</td>
</tr>
</tbody>
</table>

Flow Rules
- Rules laid out in a flow like structure
- Perfect overview of the rule implementation
- Gateways and iterations

Flow Rules example:

Start -> Add Marks to Total -> Calculate Percentage
<table>
<thead>
<tr>
<th>Add Marks to Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculate Percentage</td>
</tr>
</tbody>
</table>

Text Rules
- IF-THEN-ELSE format
- Easy to learn and use
- Rules in natural language

Text Rules example:

If Promotion Discount is greater than Customer Discount
Then
Perform the following operations
(1) Change Final Price after processing Formula Apply Promotion
Else
Perform the following operations
(1) Change Final Price after processing Formula Apply Cus Discount
End
SAP Business Rules Offerings
Taking Control of the Rules of Your Business

NetWeaver BRM

Validation
Calculation
Decision
Suggestion
... \(\text{Rules}^{\text{ABAP}}\)

Validity
Versioning
Testing
Security
... \(\text{ABAP}^{\text{Java}}\)

Supporting your preferred technology environment

SAP NetWeaver Composition Environment &
SAP NetWeaver Business Process Management

SAP NetWeaver BRM

SOA-enabled
SAP Business Suite

Enhancement Packages

3rd party
Business Rule Framework plus Components & Key Features

Business Rules Authoring
- Web-based User interface (BRFplus Workbench)
- Support for business user and expert modes
- Organize rules in rule catalogs
- Multiple visualizations; support for custom types
- Logs and views for change and execution tracking
- Tool support for dependency analysis, consistency checks, variant simulation, Microsoft® Excel up- and download…)

Business Rule Repository
- Full ABAP Server support
  - Change and Transport System
  - Access control
  - Client concept
  - Data Dictionary
- Various table types for system, customizing or local rules
- Rules organization and grouping by use cases
- Fully versioned repository

Business Rule Engine
- Convenient ABAP Objects API for invocation by ABAP applications
- Web service and RFC module generator for remote invocation
- On demand code generation with unmatched performance
- Runtime traces/logs

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Mode of Operation

Application Code

```java
lo_function = cl_fdt_factory->if_fdt_factory->get_instance();
lo_function = lo_function->get_function( lv_function );
lo_context = lo_function->get_process_context();
lo_context->set_value( lv_id = lv_object_id ,
                     ia_value = lv_value );
lo_function->process( EXPORTING lo_context = lo_context
                      IMPORTING lo_result = lo_result );
lo_result->get_value( IMPORTING ea_value = lv_result );
```

Context input data

Result output data

Ruleset

Rules can evaluate conditions, change data and perform actions

BRFplus Function processes rules from assigned ruleset(s)

Application Code calls BRFplus Function

Only 6 lines of code needed
Ruleset

Ruleset precondition, priority, function assignment

Variables for intermediate values, initializations (code, DB, values, rules)

Rule validity information and description

Rules to change data by value assignment, variable assignment and expressions (decision tables, formulas, ...)

Rules to trigger actions (email, workflow, message log)

Name, text, documentation, version overview, change tracking, release information, technical ID
Customization and Configuration

- Simple configuration
- Limited scope
- Too many tables

- Sophisticated configuration
- Inappropriate for simple cases
- Locks out Business Experts, Developer needed

**BRFplus**

- From simple to complex configuration
- Addresses business and IT requirements, models logic instead of coding
- Multiple visualizations (decision tables, trees, formulas, text rules..)
- Tools for versioning, simulation, consistency checks, …

**Migration**

Consolidation of tools and engines towards BRFplus for next generation business rules management in ABAP applications with better user experience and performance at lower TCO.
NetWeaver Business Rule Management
Components & Key Features

Business Rules Authoring
Rules Composer
- Business friendly rich rule formats
- Support for multiple data formats for rules vocabulary
- Validation, testing and refinement of business rules

Rules Manager
- Web-based interface for business users
- Support for import/export of Microsoft® Excel

Business Rule Repository
- Supports end-to-end change management
  - Rules versioning
  - Access Control & Governance
- Design time repository integrated to NWDI

Business Rule Engine
- High-performance rules engine
- Rete-based inference and sequential engines
- Integrated with NWA to support monitoring and logging
- Rules engine can be invoked as:
  - Stateless session bean
  - Web service
Authoring, Deploying and Managing Business Rules

- **Rules composer**
- **Rules engine**
- **Rules Manager**

- **Business Rule Authoring**
- **Deploy & Manage**
- **Business User Rule Authoring & Management**

![Decision Table: "EMI Table"](image)

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End-to-End Change Management

- End-to-end development support using the Eclipse based Rules Composer
- Web based collaborative business user interface with role based access to manage and deploy business rules at runtime
- Manage access permissions using SAP NetWeaver Administrator
- Version management
- Business rules reports & rules traceability
**Business Rules & BPM**

Various ways of modeling rules:
- Model with rules composer and use as a rules service
- Model in the context of a business process

And, many ways to integrate:
- Rules services through an automated activity
- Use rules as mapping transforms
- Use rules through EJB functions
- Use rules from human-task user interfaces
- Use rules as gateway conditions
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BRFplus in SAP Applications

Ever-growing List

**CRM**
- Loyalty Management
- Territory Management
- Real-Time Offer Management

**Business ByDesign**
- Field Control (dynamic UI attributes)
- Automated Incident Dispatching
- Human Capital Management (standard working time)
- Expense Report (determination of provision variant)
- Service Request & Order Management (service level objectives)

**Transportation Management**
- Freight unit filtering
- Loading/Unloading duration determination of freight units
- Printer determination
- Freight Costs Calculation

**Social Services (migration from BRF to BRFplus)**
- Benefit Decision Making Process
- Grants Management for Grantor
- Entitlement Calculation
- Social Application Processing
- Social Service Plan Processing
- Deduction Plan Processing

**Other**
- Advanced Metering Infrastructure (rule based event management)
- Business Context Viewer
- Incentives and Commission Management
- Access Control
- Tax and Revenue Management (migration from BRF to BRFplus)
- Master Data Governance
- Risk Management
- Dunning
Goals of tax authorities …

- Maximize tax revenue without an increase of taxes
- Maximize compliance rates and fight tax fraud
- Minimize taxpayer burden to create competitive advantages for the country
- Maximize their responsiveness to taxpayers to further increase their services
- Deal with decreasing budgets by optimizing the revenue / cost ratio

BRFplus Use Cases

- Rules for filling in and validating tax forms
- Tax registration, including creating Business Partners, Contract Objects, Contract Accounts, Billing Documents, ...
- Tax portals (e.g. ELSTER) registration
The Grants Management for Grantor solution meets the requirements of all levels of public sector organizations that fund grant programs. Business processes include program definition, application, assessment, agreement, grant payment, claims processing and monitoring, analysis, grant application processing, workflow authorization and notification in addition to case, correspondence and records management functionality. Delivering robust reporting capability and content.

BRFplus

**Application**  
**Assessment**  
**Agreement**  
**Financials**

**BRFplus Use Cases**

- Assessment / eligibility determination of grant applications and claims to decide whether an applicant is eligible and for how much
- Real time data validation during form entry. Pre-screening to determine eligibility and also to ensure all required data is entered on the form
The Monetary Social Benefits scenario combines front office social decision making processes with an automated back-office solution to execute financial aid.

The solution leverages key functionalities of the Social Case Management component in SAP CRM and the Public Sector Collection and Disbursement (PSCD) component in SAP ERP.

**BRFplus Use Cases**

- All decision making processes are BRFplus enabled
  - Social Application Processing
  - Social Service Plan Processing
  - Deduction Plan Processing
Business Rules in a Warranty Claim Process for a large Handset Manufacturer

Rules to check that claim request is valid and complete

Rules to analyze the nature of the defect and the responsible department/supplier
Business Case: Leading Truck Manufacturer

Company
- Fortune 500 company
- Leading truck engine manufacturer

Challenges
- Warranty Claims process took 1 week to process a single warranty.
- Several parts were not even sent to suppliers due to complex warranty arrangements with suppliers

Benefits
- Cost reduction of up to 1.87 million USD
- Reduction in process time by 80%
- Reduction in IT personnel costs
- Reduction in inventory storage losses
- Reduction in losses arising out of unrecovered claims

Business Rules
- Contracts Management – Liability Assessment
- Claims Processing – Settlement Rules
- Product Returns – Q Inspection Rules
- Reports Generation

Major Process Challenges
- Hard coded rules – Low Visibility
- Loss of Domain & Application Knowledge
- Slow Turnaround Times

Value Proposition Breakdown
(1.87 million (USD))

- Claims Losses (Unrecovered Claims): 1107585.05
- Inventory Storage Losses: 260000
- IT Personnel Costs: 450000
- 61%
- 25%
- 14%
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Usage Recommendations

Quadrant 1
- Extending core business applications in the Suite by externalizing business rules

Quadrant 2
- Reuse of existing business rules in composite applications and modeled business processes
- Data on which business rules are supposed to be invoked is in the suite

Quadrant 3
- Loosely coupled composite applications, modeled business processes
- Rules embedded in Business Process model to support gateway decisioning (to control process flow)

Quadrant 4
- Solving decisioning problems using Rete rules (not available yet in BRFplus)
- ABAP applications in a heterogeneous landscape having tight integration with 3rd party applications
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Alignment
NW BRM / BRFplus Alignment Themes

Vocabulary Alignment for Rule Modeling
- Common vocabulary for modeling rules
- NW BRM to leverage BRFplus data objects infrastructure
- Vocabulary value help

Harmonized User-Experience
- Harmonized user experience for business users
- Focus areas: decision tables, text rules, flow rules

Search for Rule Artifacts
- Global search for business rules and artifacts in NW BRM and BRFplus

Central Rules Management Console
- Lifecycle management, authorization, rules exchange (NW BRM/BRFplus)
- Rules monitoring and analytics
- Management of pre-shipped content packages

Exchange and Invoke Rule Artifacts
- Deploy rules artifacts from BRFplus into NW BRM and vice versa
- NW BRM to invoke BRFplus functions (FIND-INVOKE model)
Further Information

SAP Public Web:


Related Workshops/Lectures/Pods at SAP TechEd 2010

PMC100, Overview of SAP NetWeaver BPM and SAP NetWeaver BRM, Lecture
PMC163, Own Your Business Logic With Business Rule Framework plus, Hands-on
PMC260, Accelerating Business Rules with SAP NetWeaver BRM, Hands-on
PMC301, Orchestration using SAP NetWeaver BPM and SAP NetWeaver BRM, Lecture

Thomas Albrecht, Carsten Ziegler
**BRFplus – Business Rule Management for ABAP Applications**
Please complete your session evaluation.

Be courteous — deposit your trash, and do not take the handouts for the following session.

THANK YOU!
Thank You!

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