IBM ILOG BRMS

20. Mai 2010
Agenda

- Introduction to Business Rule Management System (BRMS)
- IBM WebSphere ILOG Jrules Solution
- Architecture & SOA Integration
- Conclusion
What are Business Rules?

- Declarative statements derived from policies, regulations, and procedures that are embedded into an enterprise system.

- Represented as:
  
  \[
  \text{if } \langle \text{Condition(s)} \rangle \ \text{then} \ \langle \text{Action(s)} \rangle \ \text{else} \ \langle \text{Action(s)} \rangle
  \]

- Examples:
  
  - All coming orders > 500 € must be reviewed by a manager.
  
  - Offer a 10% discount on all SMS if the customer has spent over 50 € over the past 2 months.
  
  - If the applicant salary < 2.000 € and the applicant profession is student then set the score to '003'
What is a Business Decision?

IF the total purchases of Account > $2,500 THEN the enterprise value of Customer is GOLD

= GOLD

IF the enterprise value of Customer is GOLD THEN the discount rate is 5%

= GOLD

IF the enterprise value of Customer is GOLD AND the Loyalty of Customer is LOW THEN the personalization action is “Call” ELSE the personalization action is “email”

= LOW LOYALTY

IF at least 5 Interactions such that order type = Return THEN the Loyalty of Customer is LOW
Business Decisions are everywhere

- Jurisdictional
- Micro-Market Segmentation
- Multichannel

- Up-sell/Cross-sell
- Compensation
- Smart CRM
- Underwriting
- Tax calculation
- Benefit calculation
...

- Fraud
- Risk
- Pricing
- Claims processing
- Eligibility
- Compliance
...

- Change – Need for Agility
- Variation – Need for Flexibility

- Market Driven
- Regulatory
- Mergers and Acquisitions
When business logic is hard coded

- Long change cycle
- Opaque for business users
- Often hidden, scattered and duplicated
Traditional Approach for Managing Decision Change

Business rules are crucial to operational systems, and they change over time. The traditional (ad hoc) approach of dealing with rule changes leads to...

- Reduced organizational agility
- Reduced employee productivity
- Increased load on IT

Where Business Rules Typically Exist

- Applications
- Documents
- People
- Processes

Issues

- Rules are hidden in code or isolated within the organization
  - Changes are hard to track and maintain over time
- Rules used by systems have to be programmed and require IT resources
- Duplication and multiple versions of the same rules
  - Lack of auditability, traceability
- Decision changes cannot be easily tested or simulated
The Smarter Approach – Easy, Safe, Reliable Change with BRMS

- Eliminate decision silos
- Make decision logic accessible to Business and IT
- Allow business users to manage rules
- Implement fine-grained, context-specific decision automation
- Reduce maintenance time/cost

Where Business Rules Typically Exist

- Applications
- Documents
- People
- Processes

Business Rule Management System

- Rules are Defined, Analyzed and Maintained
- Rules are Stored and Shared
- Rules are Deployed, Executed and Monitored

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Rule & Software Development Lifecycles

Software Development Lifecycle

- Design
- Construct
- Test
- Deploy

Rule Management Lifecycle

- Design
- Construct
- Test
- Deploy

Manage and Monitor

- Validate
- Author
- Analyze
- Deploy

Functional enhancements
Platform upgrade

> 4-6 months

< 1 month

Change Request

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- Architecture & SOA Integration

Conclusion
What is an ILOG business rule?

A statement of business logic that:
- Is not cryptic code!
- Can be authored by business users
- Is self-documented, executable, reusable

Quasi-natural language

```
if the yearly repayment of 'the loan' is more than
the yearly income of 'the borrower' * 0.3
then
    add "Too big Debt-To-Income ratio" to the
    messages of 'the loan';
    reject 'the loan';
```

Decision Tables
Rule Editing with Domain Specific Languages

**Business Object Model** → **Rule Vocabulary** → **Business Rule Language**

- **CustomerInfo**
  - name
  - birthday
  - getNumAccidents()
  - isHighRiskDriver()
  - ...

- **“customer”**
  - the name of …
  - the birthday of …
  - the number of accidents of …
  - the … is a high risk driver
  - ...

- **Rule: High risk driver**
  if
  the birthday of **customer** is after 12/9/1975 and
  the number of accidents of **customer** is at least 3
  then
  set the **customer** as a **high risk driver**

- **“client”**
  - le nom du …
  - l'anniversaire du …
  - Le nombre d'accidents du …
  - le … est un conducteur à risque
  - ...

- **Rule: Conducteur à risque**
  si
  l’anniversaire du **client** est après le 12/9/1975 et
  le nombre d'accident du **client** est au moins 3
  alors
  classer le **client** comme **conducteur à risque**

- ✔ Automatic generation of the rule vocabulary
- ✔ Comprehensive industry focused business terms to define its data and associated actions.
- ✔ Localizable vocabulary
### Intuitive Rule Authoring - Advanced Decision Tables

<table>
<thead>
<tr>
<th>Grade</th>
<th>Amount of loan</th>
<th>Insurance required</th>
<th>Insurance rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt; 100,000</td>
<td>false</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>100,000 - 300,000</td>
<td>true</td>
<td>0.001</td>
</tr>
<tr>
<td>2</td>
<td>300,000 - 600,000</td>
<td>true</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>≥ 600,000</td>
<td>true</td>
<td>0.0075</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>&lt; 100,000</td>
<td>true</td>
<td>0.0035</td>
</tr>
<tr>
<td>9</td>
<td>100,000 - 300,000</td>
<td>true</td>
<td>0.006</td>
</tr>
<tr>
<td>10</td>
<td>300,000 - 600,000</td>
<td>true</td>
<td>0.0085</td>
</tr>
<tr>
<td>11</td>
<td>≥ 600,000</td>
<td>true</td>
<td>0.0145</td>
</tr>
<tr>
<td>12</td>
<td>Otherwise</td>
<td>true</td>
<td>0.022</td>
</tr>
</tbody>
</table>

**Built-in Gap/Overlap Checking**

**Actions**

```
if
    all of the following conditions are true:
    - the loan grade in 'the loan report' is "C"
    - the amount of 'the loan' is at least 600000
then
    set insurance required in 'the loan report' to true;
    set the insurance rate in 'the loan report' to 0.0145;
```
Intuitive Rule Authoring - Advanced Decision Trees

- **Rule 0**: If the corporate score in 'the loan report' is greater than 0.5, set the corporate score in 'the loan report' to 20.
- **Rule 1**: If the corporate score in 'the loan report' is greater than 0, set the approved of the loan report to false.
- **Rule 2**: If the loan amount is greater than 1000, set insurance required in 'the loan report' to true. If the loan amount is between 1000 and 100, set the corporate score in 'the loan report' to 30.
- **Rule 3**: If the loan amount is between 0 and 100, set the corporate score in 'the loan report' to 15. If the loan amount is less than 0, set the corporate score in 'the loan report' to 20.
- **Rule 4**: If the corporate score in 'the loan report' is greater than 40, set the corporate score in 'the loan report' to 50.
- **Rule 5**: If the corporate score in 'the loan report' is greater than 50, set the corporate score in 'the loan report' to 70.

- **Values**: [E, D, C] (Error(s) on partition: Partition have gap(s)).
- **Condition**: Loan amount.
- **Actions**: [A, B, C] (set the corporate score in 'the loan report' to value).
Rule Authoring: Visual Decisioning Flow

- Graphical editor to model and control rule execution sequence (ruleflow)
Rule repository key capabilities

- Rule Governance
- Meta-data
- Lifecycle management
- Versioning
- Role-based permissions
- Consistency checking

Who can change what?
When will this rule take effect?
How do I undo a change?
What has changed?
What rules do I need to deploy?
What rules do I need to validate?
What is the impact of changing this rule?
What rules do I need to deploy?
What rules do I need to validate?

Rule repository
Rule execution key capabilities

- Integration
  - Multiple platforms
  - Multiple invocation options
- Performance & scalability
  - Fast algorithms
  - Integration with Application Servers
- Management
  - Versioning
  - Auditing
  - Monitoring

How do I invoke a decision service from Java/.NET/COBOL?

What is the version of the deployed rules?

Can I deploy several versions of the same rule?

How do I make it scale?

How do I orchestrate decision services with my BPM tool?

What rules were executed to make this decision?
User tool key functions

- Integration in the user’s familiar environment
- Language technology
  - Business vocabulary & syntax
  - Assisted editors
Decision Validation Services

- Unit and regression testing to ensure rules execute as expected

- Functional testing to execute sets of rules ("rulesets") with data and capture the results

- Simulation to measure or verify rulesets against either historical or test data

- Rule execution auditing to review decision outputs

DVS gives business users the ability to:
- Input data from either Excel or enterprise data sources
- Easily modify test cases and expected outputs
- Run simulations against KPIs and what-if scenarios
- Send results to Excel or HTML
Decision Warehouse

- Gives end users a detailed overview of all rules that have been applied to a product
- Gives developers, testers a way to easily test that their business rules work fine
- Allows the details of every rule-based decision to be automatically logged to a database, for example compliance purposes.
- Provides extension points to allow integration with existing analytics databases and 3rd-party business intelligence tools.
JRules Architecture

Rule Designers
- Business vocabulary and syntax
- Multi-locale
- Generic, multi-platform and modular

Rule repository
- Robust and secure
- Collaborative
- Governance support: metadata, permissions, versioning, queries, etc.

Rule execution platform
- Platform-neutral
- Fast
- Standard based
- Fully managed

- IT
  - Rule Studio (Eclipse)
  - Rule Team Server
  - Rule Solutions for Office
  - Decision Validation Services

- Business users
  - Rule Repository
  - Deploy rules
  - Code Generation

- Distributed platform
  - Rule Execution Server
  - Transparent Decision Services
  - Mainframe
  - Rules for COBOL

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JRules in the SOA reference architecture

Rule integration
Rule authoring, governance, testing and simulation

Rule Team Server for business users
Rule Solutions for Office for business users

Business Innovation & Optimization Services

Interaction Services
- Personalization

Process Services
- Process routing

Information Services
- Data processing

Partner Services

Business App Services

Access Services

Facilitates communication ESB between services

Rule Execution Server

Complex decision automation

QoS

Infrastructure Services

IT Service Management
Integration options

Use in web services infrastructures, SOA

Exposed as Web Services (dynamic or generated via JAX-WS) or SCA

Use in Web app, JEE app, batch.

Stateless & stateful synchronous APIs
Asynchronous MDB

Pooling & caching of low level execution connections

« Embedded » use in application.
Core component with execution algorithms
Business Rules as Decision Services

boolean checkEligibility (Customer cust)
Risk getScore (CreditRequest request)

Rule Execution Server allows to expose any ruleset that processes XML as a Web Service without code deployment makes these SOA-style integrations very easy.
The business logic within business processes changes more frequently than the business processes themselves.
Integration with WID/WPS
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IBM ILOG JRules - Manage Change with Confidence

- Implement change in a way that is easy, safe and predictable
- Reduce the time and cost required to develop and maintain operational systems that are affected by change
- Provide a way for IT and Business functions to work collaboratively on defining and updating the decision logic that drives operational systems
- Increase the visibility of how systems use and are affected by decision logic
Business Rule Management: Why?
The « hard coded » rule does not equal its requirement

- A driver is considered as a young driver when he is younger than 21
- A 8$ surcharge is applied to any young driver who has been involved at least in 1 accident and has received at least 1 traffic ticket

Technical Rule

WHEN {
    young_driver : Driver (this.age in [18;21]);
    evaluate(youngDriver.numberOfAccidents >= 1 && youngDriver.numberOfTrafficTickets >= 1)
}

THEN {
    young_driver.rentalAmount = young_driver.rentalAmount + 8;
}
Business Rule Management: Why?

The business rule does equal its requirement

- A driver is considered as a young driver when he is younger than 21
- A $8 surcharge is applied to any young driver who has been involved at least in 1 accident and has received at least 1 traffic ticket

**definitions**

set 'young driver' to a driver

where the age of this driver is between 18 and 21

if

the number of accidents 'young driver' has been involved is at least 1
and the number of traffic tickets 'young driver' has received is at least 1

then

add a $8 surcharge to 'Auto Quote Response', reason: "Young driver surcharge"