The Decision Model: A Framework Linking Business and Technology

David Pedersen
david.pedersen@kpiusa.com
Agenda

• **Current State: Business Rules**
• The Decision Model Bottom Up
• The Decision Model Top Down
• Impact on Business Process
• Recent Advances
• Current State of Maturity
• Case Study
• How to Learn More
All Too Familiar?
Is this Acceptable?
Does this look better?
Where did the business rules go?

Business Process Model
Where did the business rules go?

Decision Model Diagram

Business Process Model

Decision Model
Where did the business rules go?

Decision Model Diagram

Rule Family Table

Business Process Model  Decision Model
Agenda

• Current State: Business Rules
• The Decision Model Bottom Up
• The Decision Model Top Down
• Impact on Business Process
• Recent Advances
• Current State of Maturity
• How to Learn More
The Decision Model is a Model of Business Logic

Business Logic is the means by which the business derives conclusions from conditions.

The simplest case is the evaluation of a single condition, leading to a single conclusion.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person credit rating is less than 650</td>
<td>Person likelihood of defaulting on a loan is high</td>
</tr>
</tbody>
</table>
What is an Atomic Piece of Business Logic?

• One and only one conclusion fact type, such as:
  – Person’s likelihood of defaulting on a loan
  – Claim’s payment amount
  – Student’s eligibility for financial aid packages

• As many conditions as needed, even zero

• All conditions ANDed together

• No Ors, ELSEs, BUTs, OTHERWISEs (these have created the chaos in current systems!)
Why are Atomic Pieces Good?

• Ultimate simplicity
• Everyone reduces conditions and conclusions to exactly the same pieces
• Rigorous principles lead to assembling the pieces in one and only one way
• Easy to SEE errors and omissions
• Extremely easy to validate and maintain
• Extremely easy to implement in technology
Simple Rule Family

“A person who has a credit score below 650, an unstable employment history and a high Other loans assessment is highly likely to default on a loan.”

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person Likelihood of Defaulting on a Loan</td>
<td>is</td>
</tr>
<tr>
<td>Person Likelihood of Defaulting on a Loan</td>
<td>High</td>
</tr>
</tbody>
</table>

Step 1: Discover the conclusion in the sentence or paragraph.
Simple Rule Family

“A person who has a **credit score below 650**, an **unstable employment history** and a **high Other loans assessment** is highly likely to default on a loan.”

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person Credit Score</td>
<td>Person Likelihood of Defaulting on a Loan</td>
</tr>
<tr>
<td>Person Employment History</td>
<td></td>
</tr>
<tr>
<td>Person Other Loans Assessment</td>
<td></td>
</tr>
<tr>
<td>Is less than 650</td>
<td>is</td>
</tr>
<tr>
<td>is Unstable</td>
<td>is</td>
</tr>
<tr>
<td>is High</td>
<td>is</td>
</tr>
</tbody>
</table>

Step 2: Identify conditions leading to the conclusion
Two Rule Families

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person Credit Score</td>
<td>Person Likelihood of Defaulting on a Loan</td>
</tr>
<tr>
<td>Person Employment History</td>
<td>Person Other Loans Amount</td>
</tr>
<tr>
<td>Is less than 650</td>
<td>Is High</td>
</tr>
<tr>
<td>Is Unstable</td>
<td>is High</td>
</tr>
</tbody>
</table>

Step 3: Determine where condition values come from:

Persistent data?
Execution of logic?
Two Rule Families

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person Credit Score</td>
<td>Person <strong>Employment History</strong></td>
</tr>
<tr>
<td><strong>Is less than</strong> 650</td>
<td><strong>Is Unstable</strong></td>
</tr>
<tr>
<td>Person Other Loans Amount</td>
<td><strong>Is High</strong></td>
</tr>
<tr>
<td>Person Likelihood of Defaulting</td>
<td></td>
</tr>
<tr>
<td>on a Loan</td>
<td></td>
</tr>
</tbody>
</table>

Step 4: If from other logic, create another Rule Family

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person Years at Current Employer</td>
<td>Person Number of Jobs in Past Five Years</td>
</tr>
<tr>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Person Employment History</td>
<td><strong>Is Unstable</strong></td>
</tr>
<tr>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>
## Two Rule Families

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person Credit Score</td>
<td>Person Likelihood of Defaulting on a Loan</td>
</tr>
<tr>
<td>Is less than 650</td>
<td>Is High</td>
</tr>
<tr>
<td>Is Unstable</td>
<td>is</td>
</tr>
<tr>
<td>Person Employment History</td>
<td>High</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person Years at Current Employer</td>
<td>Person Likelihood of Defaulting on a Loan</td>
</tr>
<tr>
<td>?</td>
<td>Is Unstable</td>
</tr>
<tr>
<td>Person Number of Jobs in Past Five Years</td>
<td>?</td>
</tr>
<tr>
<td>?</td>
<td>Is</td>
</tr>
<tr>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>

Step 5: Notice the “inferential relationships” appear as a decision model unfolds.
Agenda

• Current State: Business Rules
• The Decision Model Bottom Up
• **The Decision Model Top Down**
• Impact on Business Process
• Recent Advances
• Current State of Maturity
• Case Study
• How to Learn More
Determine Policy Renewal Method

Decision Model Notation
Determine Policy Renewal Method

Policy Renewal Method
Policy Pricing Within Bounds
Policy Underwriting Risk
Manual Underwriting Indicator

Decision Model Notation
Decision Model Notation

Policy Renewal Method
Policy Pricing Within Bounds
Policy Underwriting Risk
Manual Underwriting Indicator

Pattern | Policy Underwriting Risk | Policy Pricing Within Bounds | Manual Underwriting Indicator | Conclusion
--- | --- | --- | --- | ---
1 | Is Nonstandard |  |  | Is Manual Renewal Process
2 |  | Is No |  | Is Manual Renewal Process
3 |  |  | Is On | Is Manual Renewal Process
4 | Is Standard | Is Yes | Is Off | Is Automatic Renewal Process
Decision Model Notation

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>≤ 1</td>
<td></td>
<td>Is</td>
<td>Nonstandard</td>
<td>Is</td>
<td>Manual Renewal Process</td>
</tr>
<tr>
<td>2</td>
<td>≤ 1.5</td>
<td>&gt; 10%</td>
<td>Is</td>
<td>No</td>
<td>Is</td>
<td>Manual Renewal Process</td>
</tr>
<tr>
<td>3</td>
<td>≤ 2</td>
<td>&gt; 20%</td>
<td>Is</td>
<td>On</td>
<td>Is</td>
<td>Manual Renewal Process</td>
</tr>
<tr>
<td>4</td>
<td>≤ 2.6</td>
<td>&gt; 22%</td>
<td>Is</td>
<td>Yes</td>
<td>is</td>
<td>Off</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Policy Tier</th>
<th>Policy Discount</th>
<th>Policy Pricing Within Bounds</th>
<th>Policy Renewal Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&gt; 1</td>
<td>≤ 0%</td>
<td>Is</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>&gt; 1.5</td>
<td>≤ 20%</td>
<td>Is</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>&gt; 2</td>
<td>≤ 22%</td>
<td>Is</td>
<td>Yes</td>
</tr>
<tr>
<td>1</td>
<td>&gt; 2.6</td>
<td></td>
<td>Is</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Agenda

• Current State: Business Rules
• The Decision Model Bottom Up
• The Decision Model Top Down
• **Impact on Business Process**
• Recent Advances
• Current State of Maturity
• Case Study
• How to Learn More
Option 1

Option 2

Option 3:

The Decision Model Difference in Process Models

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person's Debt</td>
<td>Person's Employment History</td>
</tr>
<tr>
<td>Low</td>
<td>Good</td>
</tr>
<tr>
<td>Low</td>
<td>Bad</td>
</tr>
<tr>
<td>High</td>
<td>Good</td>
</tr>
<tr>
<td>High</td>
<td>Bad</td>
</tr>
</tbody>
</table>
Process Models vs Decision Models

What is the difference?

• Process is **procedural** (all about sequence)
• Decisions are **declarative**, (sequence irrelevant)

Why is it good to separate them?

• Update them independently
• Simplify process models (drastically)
• Reuse decision logic across processes
• Manage different views of the same decision
To Think About

“I have read the book entitled “The Decision Model: A Framework for Business logic and Business-driven SOA" with great interest. I think that the ideas in this book to have the right set of abstractions in the business logic level as a starting point and emphasis on simplicity of thinking, is exactly what is needed as the next generation of SOA and enterprise software tools as it is provides a missing link.

This book can become one of the classic books of a new era in computing that will have much traction in the next few years.”

Dr. Opher Etzion,
IBM Senior Technical Member, Master Inventor
Event Processing Scientific Leader
Chair – Event Processing Technical Society
Agenda

• Current State: Business Rules
• The Decision Model Bottom Up
• The Decision Model Top Down
• Impact on Business Process
• Recent Advances
• Current State of Maturity
• Case Study
• How to Learn More
Rate of Adoption of The Decision Model

• Growing KPI Practice, STEP methodology
• Volume of adopter emails
• The Decision Model LinkedIn membership
• Attendance at webinars soaring
• Rising book sales
• Object Management Group DMN subcommittee
• Universities incorporating Decision Model Training in Certificate Programs
Advances in The Decision Model

• Decision Model Views, Decision Model ViewGroups and Communities
• Decision Model Test Case Theory and Generation
• Decision Model Messaging
• Additional Decision Model Notation
  – Fact types hidden in cells
  – Formulas
  – Conditions and conclusion fact types that are lists/sets
• Supporting technology
Technology for The Decision Model

• Requirements Tool (inteGREAT from eDev)
• Business Rule Repository (RuleGuide from NewWisdom)
• Business Rule Engine (OpenRules from OpenRules)
• Business Decision Management System - BDMS (DECISION from Sapiens)
  – Enterprise-grade
  – Federated glossaries
  – Test case management
  – Testing against input data
  – Full lifecycle support from business steward to automation
  – Deployment in target BRMS
Graphical Modeling using the Decision Model Notation (Sapiens DECISION)
Agenda

• Current State: Business Rules
• The Decision Model Bottom Up
• The Decision Model Top Down
• Impact on Business Process
• Recent Advances
• **Current State of Maturity**
• Case Study
• How to Learn More
The Business Logic Crisis

- Business logic is pervasive and powerful
- But it drives business decisions but it is invisible
- At its lowest level of detail, it is a “business rule”
- At its highest level of business value, it is a holistic and agile “business decision”
The Business Decision Maturity Model (BDMM)

• Aligns business objectives with optimum business decision management practices for achieving them

• Defines five incremental maturity levels, each level being a well-defined destination on the way to achieving organizational excellence

• Can be applied to organizations of any size and complexity
Three Important Vectors

• Business Value
  – Business consequences (benefits, risks) achievable at each level

• Business Architecture
  – Business-Technology Integration achievable at each level

• Business Stewardship
  – Business Empowerment achievable at each level
The Business Decision Maturity Model (BDMM)

**Level 0: Unmanaged**
- **RED**
  - Risk of loss of business control high. Risk of business change is high. Ability to predict business impact of change is low. Cost of change is high.

**Level 1: Visible**
- **MAGENTA**
  - Risk of loss of business control and business change is lower. Cost of changes is lowered. Ability to predict business impact of change is still low. Analysis of business decisions is possible, but is manual.

**Level 2: Agile**
- **BLUE**
  - Risk of loss of business control (greatly reduced at the project level; business change becomes possible through automated analysis. Ability to predict business impact of change is still low.

**Level 3: Aligned**
- **GREEN**
  - Risk of loss of business control greatly reduced across projects. Ability to predict business impact of change is improved. Consistency between business units improved. Cost of change and testing reduced further.

**Level 4: Predictive**
- **ORANGE**
  - Firm control of business policy established. Ability to predict short-term futures, ability to assess the impact of change on the future is possible.

**Level 5: Autonomic**
- **AMBER**
  - Optimize business policy to changing conditions in real time and against predicted changes in business models and metrics. Management focus on evolving business objectives and policy with a firm business control; birth of the Agile Enterprise.

**MINIMUM**
- Risk of loss of business control. 
- Cost of changes is lowered. 
- Ability to predict business impact of change is still low. 
- Analysis of business decisions is possible, but is manual.

**MAXIMUM**
- Firm control of business policy. 
- Ability to predict short-term futures.

**IMMATURE**
- No Business Decision Management architecture to speak of.

**MATURE**
- Cross project level process and business decision standards defined with broader architectural standards.

**NOT PRESENT**
- No Business Decision Management stewardship.

**ENTERPRISE**
- Continuous improvement of process and Business Decision architecture with the broader architectural process.

**BUSINESS ARCHITECTURE**
- Project level process and business decision standards established within broader architectural standards.

**BUSINESS STEWARDSHIP**
- Integration of Business Decisions with use cases and process flows with business metrics.

**DECISIONS SHARED ACROSS:**
- **PROJECT LEVEL ONLY**
- **PROJECTS**
- **ENTERPRISE**

Copyright 2011 Knowledge Partners International, LLC - www.kpiusa.com - phone: (973) 543-1339
Agenda

• Current State: Business Rules
• The Decision Model Bottom Up
• The Decision Model Top Down
• Impact on Business Process
• Recent Advances
• Current State of Maturity
• **Case Study**
• How to Learn More
Project #1: Better, Faster, Cheaper Part II

Problem

• $8 Billion of backed-up transactions
• Process documented in an 80 page document
  – Documentation was incomplete, incorrect, and ambiguous
  – Most of the business logic resided in the heads of SMEs
• Tribal knowledge was used extensively to execute the process
• Previous projects tried to fix this problem but were abandoned
• It took between 30 and 90 hours to process 200 transactions

Result

• 200 Transactions were reduced to 3 minutes 30 seconds
• Project completed in 10 weeks which included
  – Documenting the Decisions and new process
  – Programming all of the Decisions and process
  – Created and performed Testing
• Transparency, the process no longer relied on tribal knowledge
Project #1: Better, Faster, Cheaper II (Cont.)

• Executive easily understood the business logic

Results (Cont.)
• Messages delivered the reason for every conclusion
  – Every rule family row suggests a message

• Created Test Cases, testing 100% of the logic

• IT hard coded the Decisions
Project #1: Better, Faster, Cheaper II (Cont.)

Client Comments

- **Comment 1**: A SME said; We have worked for years to accomplish what this project accomplished in a few weeks. We previously could not envision a method to accomplish this project because so many previous attempts had failed. The business logic is easy to understand, can only be interpreted one way, and it is not going to get buried in the code.

- **Comment 2**: A SME said; This was the most exciting project he had worked on since he was hired. He was excited because all of the logic was visible and easy for everyone to understand. This project quickly accomplished real results where other projects seemed to drag on and on, only to be abandoned or not achieve the project goals.

- **Comment 3**: Within the first two weeks of another project, a SME told commented that she had learned and accomplished more in two weeks than she had done in a previous project that took six months and failed.
Agenda

• Current State: Business Rules
• The Decision Model Bottom Up
• The Decision Model Top Down
• Impact on Business Process
• Recent Advances
• Current State of Maturity
• Case Study
• How to Learn More
How to Learn More

Visit [www.kpiusa.com](http://www.kpiusa.com)
- FREE PRIMER
- Updated Events
- Download White Papers
- News

Become a member of the open LinkedIn The Decision Model Group

Read our articles and buy our books

Join our presentations

Contact us

Michael Grohs
[mgrohs@kpiusa.com](mailto:mgrohs@kpiusa.com)
Phone +1 (919) 606-6711