Augmenting BPMN with DMN:
Documenting Process Decision Logic

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Monteleone Consulting, LLC
Mark A. Monteleone
Independent Consultant and Author
AUGMENTING BPMN WITH DMN:
DOCUMENTING PROCESS DECISION LOGIC
ABSTRACT

Via two examples and basic tutorials, this webinar reviews two Unified Model Language (UML) techniques: Business Process Model and Notation (BPMN) and Decision Model and Notation (DMN).

The webinar starts with a simple sequential flow application (Peritoneal Dialysis) using a BPMN model with multiple pools, lanes, orchestrations, collaborations, and choreography. After this example, the webinar cites and explains a working set of BPMN elements for business analysts (15 out of 150 elements).

The webinar then expands the topic with a more complex BPMN model with alternate flow gateways. This application involves a project selection of software development methods (Waterfall, Agile, or Hybrid). In this example, DMN augments the BPMN model by documenting the business rules used in the decision process. After this example, the webinar provides an explanation of DMN elements and requirements.

Note: This webinar does not cover business process management nor is it a substitute for formal BPMN / DMN training.
Mark Monteleone is an independent consultant and author of “The 20 Minute Business Analyst: a collection of short articles, humorous stories and quick reference cards for the busy analyst.” He has also written several articles in BA Times, BA Connection, International Association of Facilitators (IAF) Global Flipchart and Modern Analyst. With more than 40 years of experience, he has conducted strategic enterprise analysis and consulted on business applications and project management in more than 35 countries.

Mr. Monteleone holds a B.S. in physics and an M.S. in computing science from Texas A&M University. He is certified as a Project Management Professional (PMP®) by the Project Management Institute (PMI®), a Certified Business Analysis Professional (CBAP®) by the International Institute of Business Analysis (IIBA®) and a Certified Scrum Master (CSM™) and Scrum Product Owner (CSPO™) by the Scrum Alliance.
TODAY’S BUSINESS ENVIRONMENT

Suppliers
Governments
Service Providers
Consultants
Customers
Stock Holders
Offices
Distributors

Business Interaction Model
TODAY’S BUSINESS ENVIRONMENT

Retirement
AGENDA – PART 1

I. Background
   + BPMN/DMN appropriate for today’s environment

II. Part 1
   + First BPMN Model Example – Sequence and Message Flows
     ❖ Peritoneal Dialysis Application
     ❖ Pools, Lanes, Orchestrations, Collaborations, and Choreographies
   + BPMN Basic Tutorial
     ❖ Model Background
     ❖ Business Analyst Working Set of BPMN Elements
     ❖ Events, Tasks, Process, Flows, Gateways, Annotations / Associations

III. Part 2 (Second BPMN Example, DMN – about halfway thru the deck)

IV. Part 3 (Wrap-up, Questions / Answers)
   + References
   + Optional Example Slides on DMN use of Business Knowledge Element
Peritoneal Dialysis (PD) – treatment for kidney disease that uses the patient's stomach peritoneum.

Cycler – machine that forces a cleansing fluid through an abdominal catheter and flushes out the fluid every night while the patient sleeps. This is called Automatic Peritoneal Dialysis (APD).

APD is a straightforward sequence process that involves four participants or “actors”:

+ the patient,
+ the cycler machine,
+ the dialysis nurse,
+ and the dialysis equipment supplier.
BPMN MODEL OF APD – “BIRD’S EYE” VIEW
BPMN SUBPROCESS COLLAPSED AND EXPANDED [+]

Child Tasks for Subprocess Take Vital Signs

- Measure Weight
- Measure Blood Pressure
- Measure Temperature
- Record Vital Signs
BPMN MODEL OF APD – CHOREOGRAPHY

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BPMN CHOREOGRAPHY SUBPROCESS COLLAPSED AND EXPANDED [+]

Conduct Dialogue with Cycler

1. Patient connects Drain Line.
2. Patient connects Easy Lock Extenders to Primary Line.
3. Patient breaks the Cone on each bag.
4. Patient disinfects hands.
5. Cycler may need to reprime the Patient Line if Extenders are used.
6. Patient needs to wear surgical mask when removing MiniCap.
7. Patient opens clamp on transfer set.

Start
Patient Load the Set Cycler
Patient Press Go Cycler
Patient Ensure All Clamps are Open and Connect Bag(s) Cycler
Patient Press Go Cycler
Patient Check Patient Line and Connect Patient Cycler
Patient Press Go Cycler
Patient Verify IDrain Volume Cycler
Patient Press Go Cycler
End of Dialogue

Conduct Dialogue with Cycler
(Graphic Use Case)

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BPMN MODEL OF APD – SUPPORTIVE PROCESSES

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BPMN MODEL OF APD – SUPPORTIVE PROCESSES

1. Order Dialysis Supplies
   - Patient
   - Once a Month
   - Inventory Dialysis Supplies
   - Order Dialysis Supplies
   - Send Order

2. "Black Box Pool"

3. Replenish Dialysis Supplies
   - Patient
   - Once a Month
   - Inventory Replenishment
   - Complete
   - Dialysis Supplies
   - Replenish Inventory
BPMN MODEL OF APD – EVENTS

Time Event

Message Event (Throwing)

Message Event (Catching)

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BPMN BACKGROUND

- BPMN 2.0
  - Specification is over 450 pages
  - Over 150 elements
  - How decisions are made are not modeled (addressed with DMN in next example)
- Graphical language for specifying business processes
- Developed by the Business Process Management Initiative (BPMI) which merged with the Object Management Group (OMG) in 2005
- OMG maintains the Unified Modeling Language (UML) which consists of techniques such as Use Case, Class, State, etc.
- BPMN 2.0 is the current version – issued in 2011
BPMN CHALLENGE

- BPMN is a language and like most languages are:
  - Initially overwhelming
    - However most models need less than 10% of the elements (BPMN 2008 Study - see references) – key here is to develop a working set
  - Easy to forget
    - The correct use of the more complex elements due to lack of use
  - Enamored with complex elements
    - Keep it simple – otherwise audience focuses on the modeling technique rather than the business
BPMN WORKING SET OF FLOWS

- **Orchestration** - ordered sequence flow between lanes, events, tasks, processes, gateways within a pool.

- **Collaboration** - a message flow between lanes (actors) in different pools.

- **Choreography** – an interaction flow, a set of message exchanges between two participants. Task participants are displayed in the various bands of the element.
BPMN WORKING SET OF ELEMENTS

× 15 of 150 elements

- Start
- Intermediate
- End
- Task
- Process
- Annotation
- Gateway
- Fork/Join
- Inclusive Decision/Merge
- Sequence Flow
- Message Flow
- Association
- Data
- Pool
- Lane

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BPMN WORKING SET OF ELEMENTS

× 15 of 150 elements
BPMN WORKING SET OF ELEMENTS

- 15 of 150 elements

- Start
- Intermediate
- End

- Task
- Subprocess

- Gateway
- Fork/Join
- Inclusive Decision/Merge

- Data
- Annotation

- Sequence Flow
- Message Flow
- Association

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BPMN WORKING SET OF ELEMENTS

- 15 of 150 elements

Start | Intermediate | End

Gateway | Fork/Join | Inclusive Decision/Merge

Task | Subprocess

Data | Annotation

Sequence Flow

Message Flow

Association
AGENDA – PART 2

I. Background
II. Part 1
III. Part 2
   + Second BPMN Model Example - Gateways
     ❖ Project Decisions on Software Development Methodology
     ❖ Decision Tasks and Gateways
   + DMN Tutorial
     ❖ Model Background
     ❖ DMN Elements and Requirements
     ❖ Decision, Business Knowledge, Knowledge Source, Input Data, Information Requirement, Knowledge Requirement, Authority Requirement

IV. Part 3 (Wrap-up, Questions / Answers)
   + References
   + Optional Example Slides on DMN use of Business Knowledge Element
Software Development – during the vision and scoping of a project, the project manager decides on what software development approach will be used. The project manager bases this decision on project, team, and risk criteria. The result may involve waterfall, agile, or both approaches for the project.

Software development approaches typically are:

+ Waterfall – elicit all requirements upfront culminating in a signed-off Business Requirements Document (BRD)
+ Agile (iterative/incremental) – elicit some of the features in a dynamic backlog
+ Hybrid – use of both waterfall and agile
BPMN SOFTWARE DEVELOPMENT EXAMPLE
BPMN SOFTWARE DEVELOPMENT BUSINESS RULE TASK

- Business Rule Type
- Association and Annotation
- Decisions

[Diagram showing BPMN Task: Evaluate Project and Team Conditions, Approaches (Waterfall, Agile), and Decision (Software Development Approach, Agile Team / Customer Conditions).]
DMN – SOFTWARE DEVELOPMENT APPROACH

Decision Requirement Diagram (DRD)

- Project Characteristics
- Actual Team/Customer Conditions
- Software Development Approach
- Agile Team / Customer Conditions
- Project Management Office (PMO)

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CONNECTING THE MODELS

BPMN

DRD

Decision Tables

Software Development Approach

Agile Team/Customers Conditions

Project Characteristics

Software Development Approach

Project Management Office (PMO)

Agile Team/Customers Conditions

Evaluate Project and Team Conditions

Approach?

Waterfall

Agile

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## DECISION MODEL AND NOTATION (DMN) – DECISION TABLE

### Solution Development Approach

<table>
<thead>
<tr>
<th>Hit Policy A</th>
<th>Project Characteristics</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Decision Logic Pattern</strong></td>
<td><strong>Requirements Document Mandatory (Yes, No)</strong></td>
<td><strong>Vendor Package (Yes, No)</strong></td>
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Note: a “-” value is irrelevant to conclusion.
<table>
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DMN BACKGROUND

- **DMN 1.0**
  - Published by OMG in 2015 – specification is under 200 pages
  - Graphical language for specifying business decisions
  - Allows for a simpler representation of processes without having gateways for each business rule used in decisions
  - A way of defining business rule combinations via decision boxes (tables)
  - Allows changes in either the business rules or process without impacting the other
Finding complete examples of a BKM is difficult. Perhaps the best approach is to avoid them until more examples are published (i.e., use the decision element instead).
4 Elements and 3 Requirements

- Decision
- Input Data
- Knowledge Source
- Business Knowledge

Information Requirement
Knowledge Requirement
Authority Requirement

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NINE ALLOWABLE RELATIONSHIPS IN DMN

- Decision → Decision
- Decision → Knowledge Source
- Business Knowledge → Decision
- Business Knowledge → Business Knowledge
- Input Data → Decision
- Input Data → Knowledge Source
- Knowledge Source → Decision
- Knowledge Source → Business Knowledge
- Knowledge Source → Knowledge Source
- Knowledge Source → Knowledge Source
AGENDA – PART 3

I. Background

II. Part 1

III. Part 2

IV. Part 3 Wrap-up – Questions / Answers
   × References
   × Optional Example Slides on DMN use of Business Knowledge Element
WRAP-UP

• Business Process Model and Notation (BPMN) and Decision Model and Notation (DMN) are good ways to model today’s business environment.

  ❖ Many more of our business processes today are global and involve several business partners (e.g., value chains cross business boundaries).

  ❖ Many people are retiring and walking away with a lot of business knowhow (e.g., how decisions are made go undocumented).

• DMN together with BPMN provide us complementary models to document not only our joint processes, but the business rules used in process decisions.
For follow-on questions after the webinar contact the author at mark.a.monteleone@sbcglobal.net or access his website http://baquickref.com
REFERENCES

- BPMN and DMN References
  - **BPMN Method and Style**: A levels-based methodology for BPM process modeling and improvement using BPMN 2.0 by Bruce Silver
  - **DMN Method and Style**: The Practitioner’s Guide to Decision Modeling with Business Rules by Bruce Silver (2016)
- BPMN Study and comments
  - [http://www.cebpi.org/2008/03/03/how-much-bpmn-do-you-need/](http://www.cebpi.org/2008/03/03/how-much-bpmn-do-you-need/)
- BPMN 2.0 and DMN 1.0 Specifications
  - [http://www.omg.org/spec/BPMN/2.0/](http://www.omg.org/spec/BPMN/2.0/)
  - [http://www.omg.org/spec/DMN/1.0/](http://www.omg.org/spec/DMN/1.0/)
- BPMN 2.0 and DMN 1.0 Poster
- Comparison of Business Process Modeling Notation tools
- Modern Analyst articles used as a basis for examples
  - [Home Peritoneal Dialysis: a BPMN model and use of 5S principles](#)
  - [Expanding black box pools on an existing BPMN model](#)
  - [An Example of Choosing a Hybrid SDLC using BPMN and the Decision Model](#)
OPTIONAL EXAMPLE SLIDES
ON DMN USE OF BUSINESS KNOWLEDGE ELEMENT
DMN - SOFTWARE DEVELOPMENT APPROACH

Decision Requirements Diagrams (DRD)

- Project Characteristics
- Actual Team/Customer Conditions
- Foreign Project Environment Characteristics
- Software Development Approach
- Agile Team / Customer Conditions
- Foreign Project Risk Rating
- Project Risk Ratings
- Project Management Office (PMO)

The BKM (outlined in red) is not verified.

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DMN - SOFTWARE DEVELOPMENT APPROACH

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CONNECTING THE MODELS

BPMN

DRD

Decision Tables

Software Development Approach

Agile Team/Customers Conditions

Project Risk Rating

Foreign Project Risk Rating

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## DMN MODEL – DECISION TABLE

### Agile Team/Customers Conditions

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# DMN – DECISION TABLE

## Foreign Project Risk Rating

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These rules apply to any foreign project: construction, software, retail, manufacturing, etc.

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