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Decision Management

A practitioner's perspective

- Formal methodologies and best practices
  - Availability of books, training, best practices
  - Availability of professionals, cost reduction

- Tools to help with knowledge capturing/mining/modelling
  - A common ground where IT and Business can meet and collaborate

- Scalable, cloud based, dynamic runtimes
  - Means to draw results from the join effort

- Integrated BAM KPI monitoring and analysis for decision services
  - Means to optimize and improve

What is DMN?

DMN, which stands for Decision Model and Notation, is a relatively new standard managed by OMG, the organization behind BPMN. … [DMN] is trying to do for Business <u>Decision</u> Management
what BPMN did for Business Process Management a decade ago: empower the business to take charge of the logic that drives its operations, through a <u>vendor-independent</u> diagramming language.

– Bruce Silver, http://methodandstyle.com/what-is-dmn

What is DMN?

- A standard for **Decision Management** from OMG

- A sibling and complementary standard to **BPMN (processes)** and **CMMN (case management)**

- Standardizes decision automation from **modelling to execution**

Why is DMN important?

Some example use-cases

- A standard with the potential to drive radical change in the DM market
  - Similar to the **impact BPMN caused on the BPM market 10 years ago**

- A complement to analytics and AI models in general:
  - DMN integrates with analytic models and provides **explainable white box decisions**
  - Important to meet requirements like **GDPR compliance**

- A complement to **blockchain smart contract** implementations

DMN Introduction: a simple example
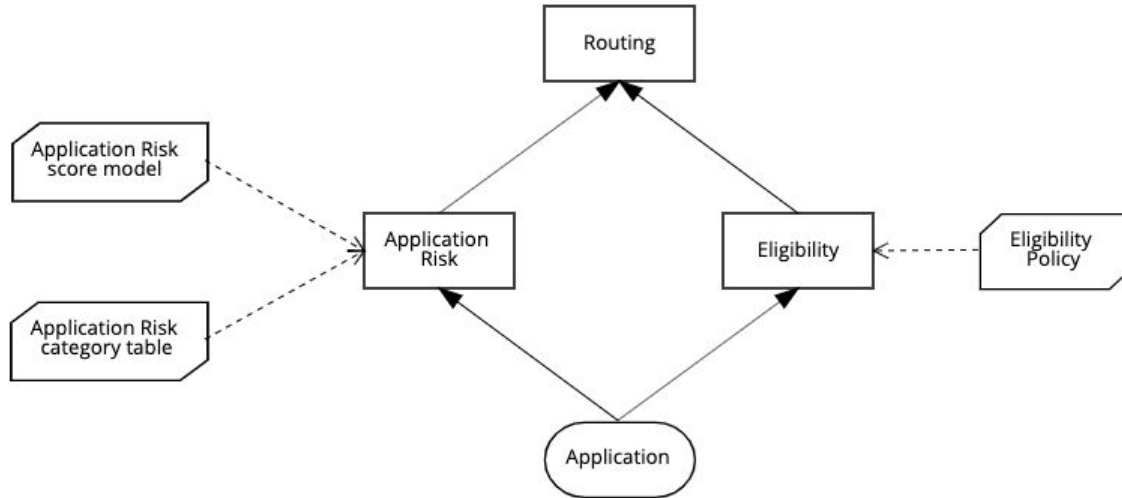
DMN Introduction: a decision logic example
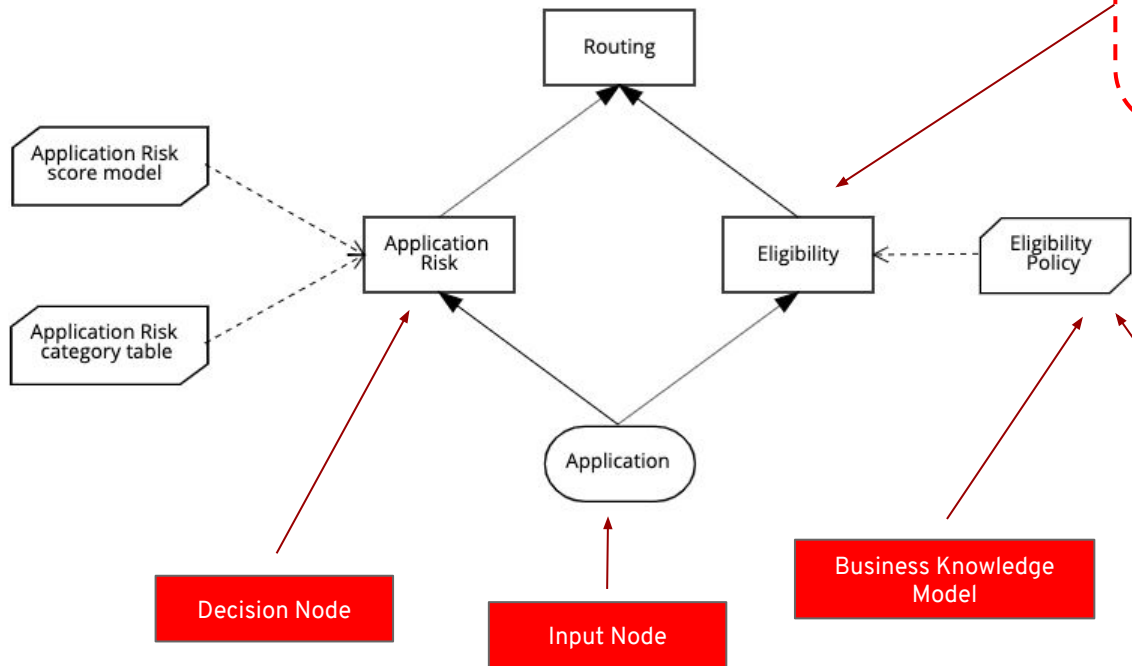
#	Eligibility (string)	
	Eligibility Policy	
1	Employment Status (string)	Application.Applicant.Employment.Status
2	Country (string)	Application.Applicant.Country
3	Age (number)	Application.Applicant.Age

P	Employment Status (string)	Country (string)	Age (number)	Eligibility Policy (tEligibility)	Description
1	"Unemployed"	–	–	"Ineligible"	
2	–	not("UK")	–	"Ineligible"	
3	–	–	<18	"Ineligible"	
4	–	–	–	"Eligible"	

Decision Node

Input Node

Business Knowledge Model

Decision Model & Notation

Decision Requirements Diagram (DRD)

Decision Table Name

Hit Policy

Rule Number

Conditions

Result Column

U	Existing Customer (boolean)	Application Risk Score (number)	Pre-bureau risk category table (tRiskCategory)	Description
1	false	<100	"HIGH"	
2	false	[100..120)	"MEDIUM"	
3	false	[120..130)	"LOW"	
4	false	>130	"VERY LOW"	
5	true	<80	"DECLINE"	
6	true	[80..90)	"HIGH"	
7	true	[90..110]	"MEDIUM"	
8	true	>110	"LOW"	
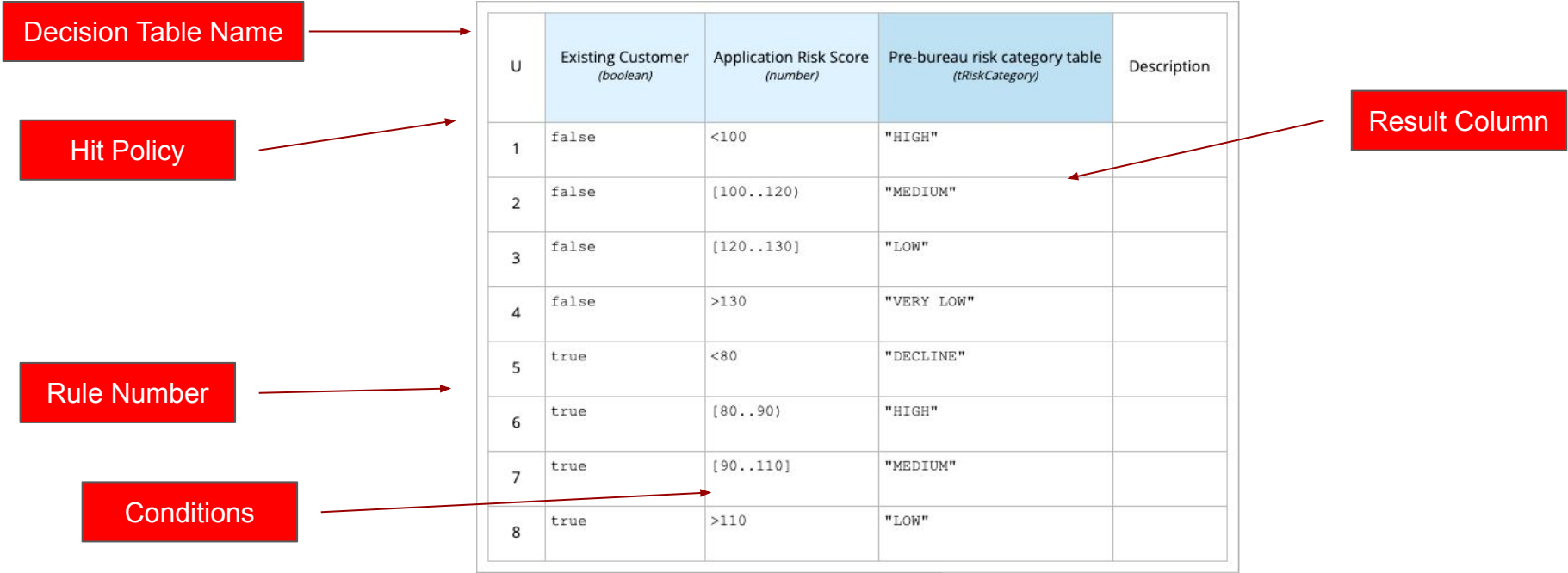
FEEL

Friendly Enough Expression Language

a new expression language defined by the DMN specification.

- It aims to bridge the gap between decision modelling and execution, by assigning semantics to the decision model constructs.
- Aims to be usable by any user "capable of using Excel formulas"
- Two levels of compliance:
    - a complete FEEL   ← (Red Hat DM supports the full FEEL)
    - a limited variant, S-FEEL

DMN: examples of Boxed Expressions

and FEEL usages example

P	Employment Status *(string)*	Country *(string)*	Age *(number)*	Eligibility Policy *(tEligibility)*	Description
1	"Unemployed"	–	–	"Ineligible"	
2	–	not("UK")	–	"Ineligible"	
3	–	–	<18	"Ineligible"	
4	–	–	–	"Eligible"	

#	Applicant Data *(tApplicant)*			
1	Full Name *(string)*	"John Doe"		
2	Address *(Any)*	1	Country *(string)*	"IT"
		2	City *(string)*	"Milano"
		<result>		Select expression
3	Age *(number)*	47		

Select expressi...

F	Installment calculation *(number)*		
	(Product Type, Rate, Term, Amount)		
	1	Monthly Fee *(number)*	if Product Type = "Standard Loan" then 20.00 else if Product Type = "Special Loan" then 25.00 else null
	2	Monthly Repayment *(number)*	(Amount * Rate/12) / (1- (1 + Rate/12)**-Term)
		<result>	Monthly Repayment + Monthly Fee

#	a List *(string)*
1	"Apple"
2	"Orange"
3	"Mango"

Conformance Levels

The DMN spec defines 3 incremental conformance levels for implementations

Conformance Level 1

Requires support for authoring of Decision Requirements Diagram, Decision Logic and Decision Tables. This conformance level is basically "documentation only", no execution required.

Conformance Level 2

Everything from conformance level 1, plus support for the S-FEEL (simplified FEEL) expression language. Requires execution, and requires the logic modeled in CL1 to be expressed in S-FEEL.
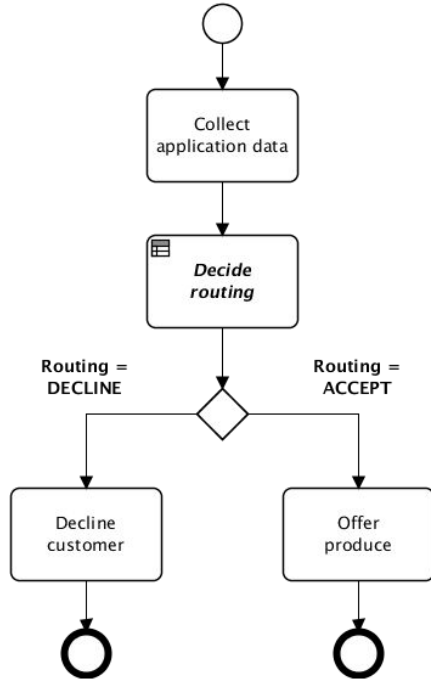
Conformance Level 3

Everything from conformance level 2, plus support for the full FEEL language. This includes additional modeling elements like "boxed expressions".
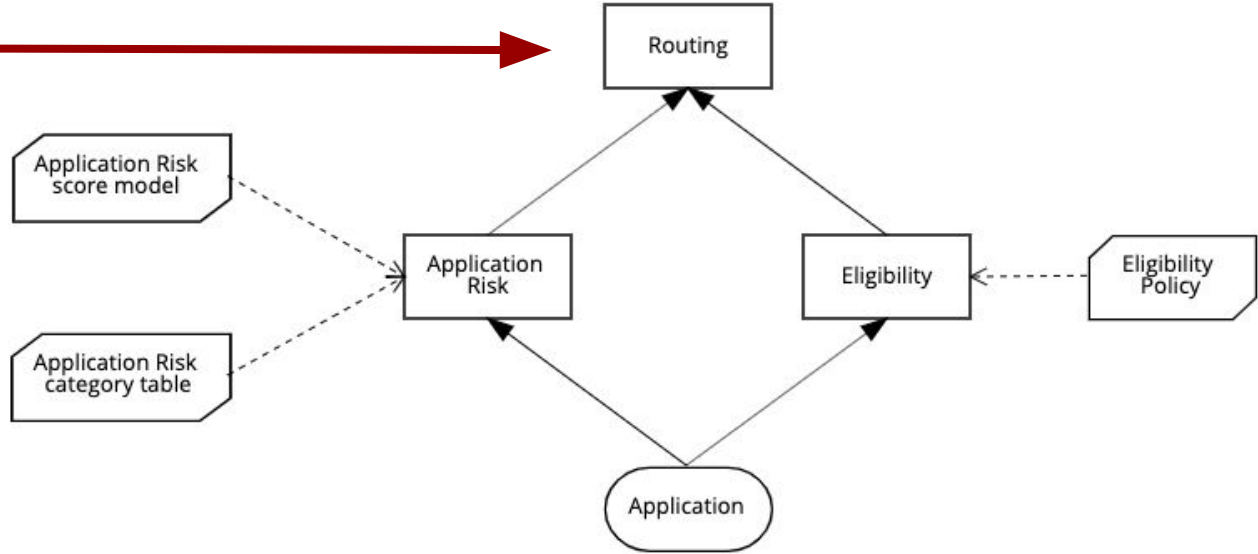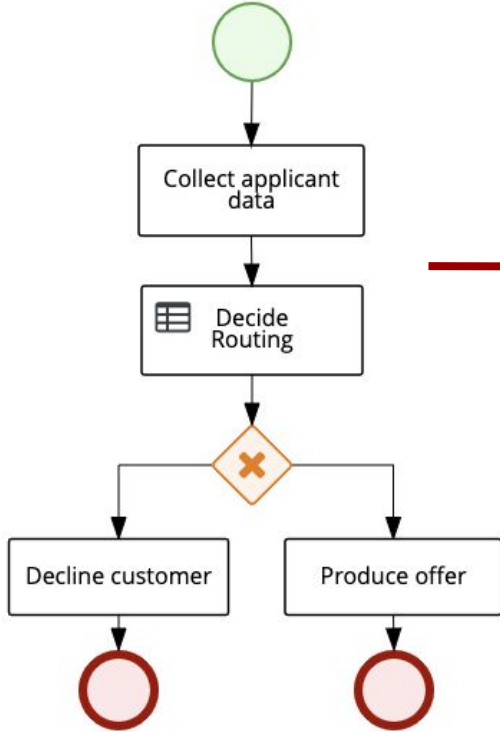
DMN Big Picture

DMN in context of BPMN

DMN Big Picture

DMN in context of BPMN
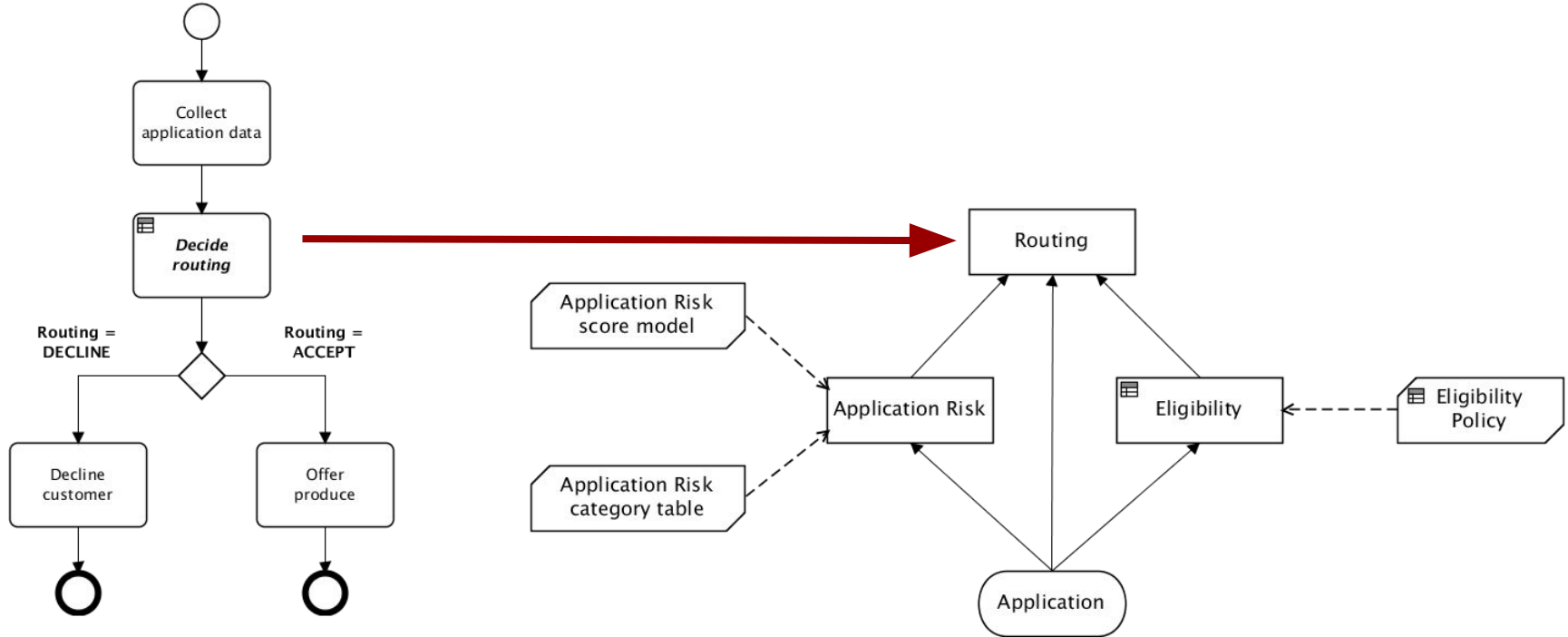
DMN Big Picture

DMN in context of BPMN

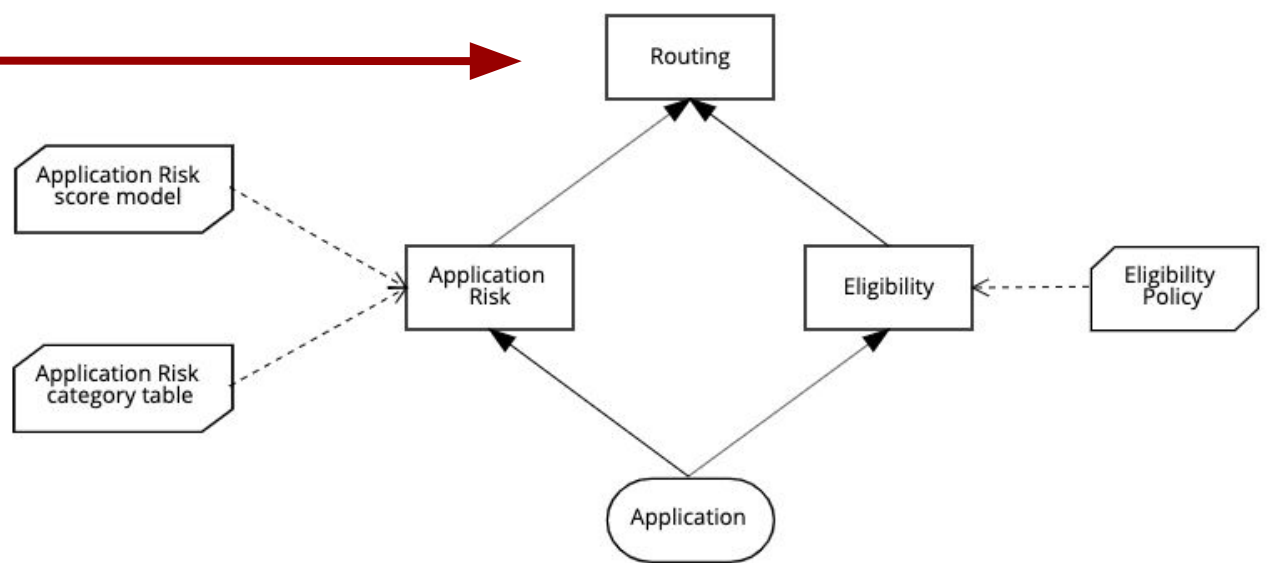| F	Installment calculation *(number)*		
	(Product Type, Rate, Term, Amount)		
1	Monthly Fee *(number)*	if Product Typ... then 20.00 else if Produc... then 25.00 else null	
2	Monthly Repayment *(number)*	(Amount * Rate...	
	<result>	Monthly Repaym...	

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DMN and other Drools assets

Comparison of DMN and DRL: a complementary strategy

- DMN models are ONE of the supported Drools assets
  - New engine behind the same API
  - DMN only supports a subset of Drools features
  - **The strength of DMN lies on its standard language, business appeal, and ease of documentation**
- DMN focus on **Decisions, not Rules**
- DMN models are **stateless only**
  - Statefulness can be emulated by retaining state on the client
- DMN delegates decision table evaluation to Drools **high performance core algorithm**

DMN and other OMG's Standards

DMN with BPMN, PMML, CMMN

- **CMMN: deals with "Cases"**
  - Declarative, knowledge-intensive, weakly structured set of actions
  - Actions may start process fragments, and may invokes decisions
- **BPMN: deals with "Business Processes"**
  - Imperative, well structured, highly predictable workflows
  - May invokes decisions, and may invoke predictive models
- **DMN: deals with "Decisions"**
  - Declarative, well structured, side-effect free, decision evaluation
  - May invoke predictive analytic models
- **PMML: deals with "Predictions"**
  - Data driven, predictive analytic models
  - Given inputs, predicts outputs

Guidelines for DMN implementations

when opting for DMN

- Think **decisions**, not rules
- Focus on **communication**, documentation, common language
- **Cost reduction**: availability of professionals, books, training
- **No vendor lock-in**: DMN standardizes syntax **and** semantics
  - **DMN TCK**:
    https://dmn-tck.github.io/tck/overview_Drools_7.17.0.Final.html
- Native **cloud** based deployment on OpenShift

Want to know more?

- Drools Website: https://drools.org/learn/dmn.html
  Specific Chapter for Drools DMN support in the documentation

- http://learn-dmn-in-15-minutes.com

- Videos: https://www.youtube.com/playlist?list=PLdbdefeRIj9RW_bWDmx17oXzKshu-4T9H

- Trisotech: https://www.trisotech.com/dmnquickstart

- Bruce Silver's book: DMN Method & Style : http://methodandstyle.com/books

More info, links, books, etc

Red Hat Business Automation: https://www.redhat.com/en/technologies/jboss-middleware/process-automation-manager

DMN Specification: https://www.omg.org/spec/DMN/About-DMN/

DMN Technology Compatibility Kit (TCK): https://dmn-tck.github.io/tck/index.html

DMN Method and Style (2nd edition): https://amzn.to/2Rk9vbQ

DMN Cookbook: https://amzn.to/2MBEwaO