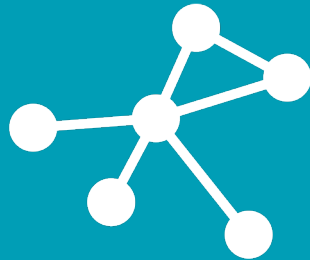


TRISOTECH



Digital Enterprise Suite

WEBINAR

BEYOND DECISION MODELS

USING TECHNICAL AND BUSINESS STANDARDS
TO TRANSFORM FINANCIAL SERVICES

FEATURING

Brian Stucky, CEO, DecisionX

April 25, 2019



SESSION AGENDA

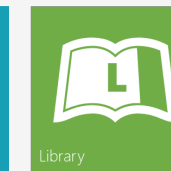
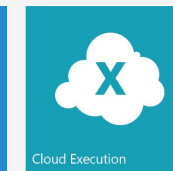
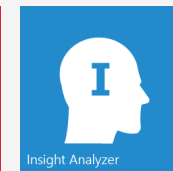
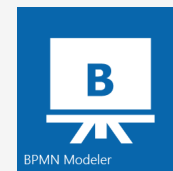
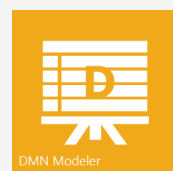
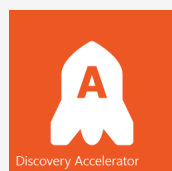
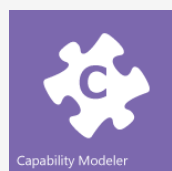
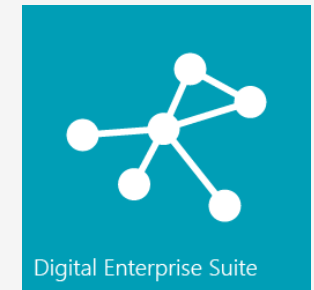


- About Trisotech
- Panelists introduction
- Main session: Beyond Decision Models
- Interactive Q&A (use the Questions section of the panel at any time)
- Recording of session sent later today via email



Trisotech is an award-winning software solution provider.

With the Digital Enterprise Suite' visual **modeling** and **automation** capabilities, organizations are in a unique position to **transform** their business, not only to be more efficient and effective, but also more agile in **innovating** and **improving** customer experience.



THE DIGITAL REVOLUTION

To keep their competitive advantage, companies must adapt and transform their business model

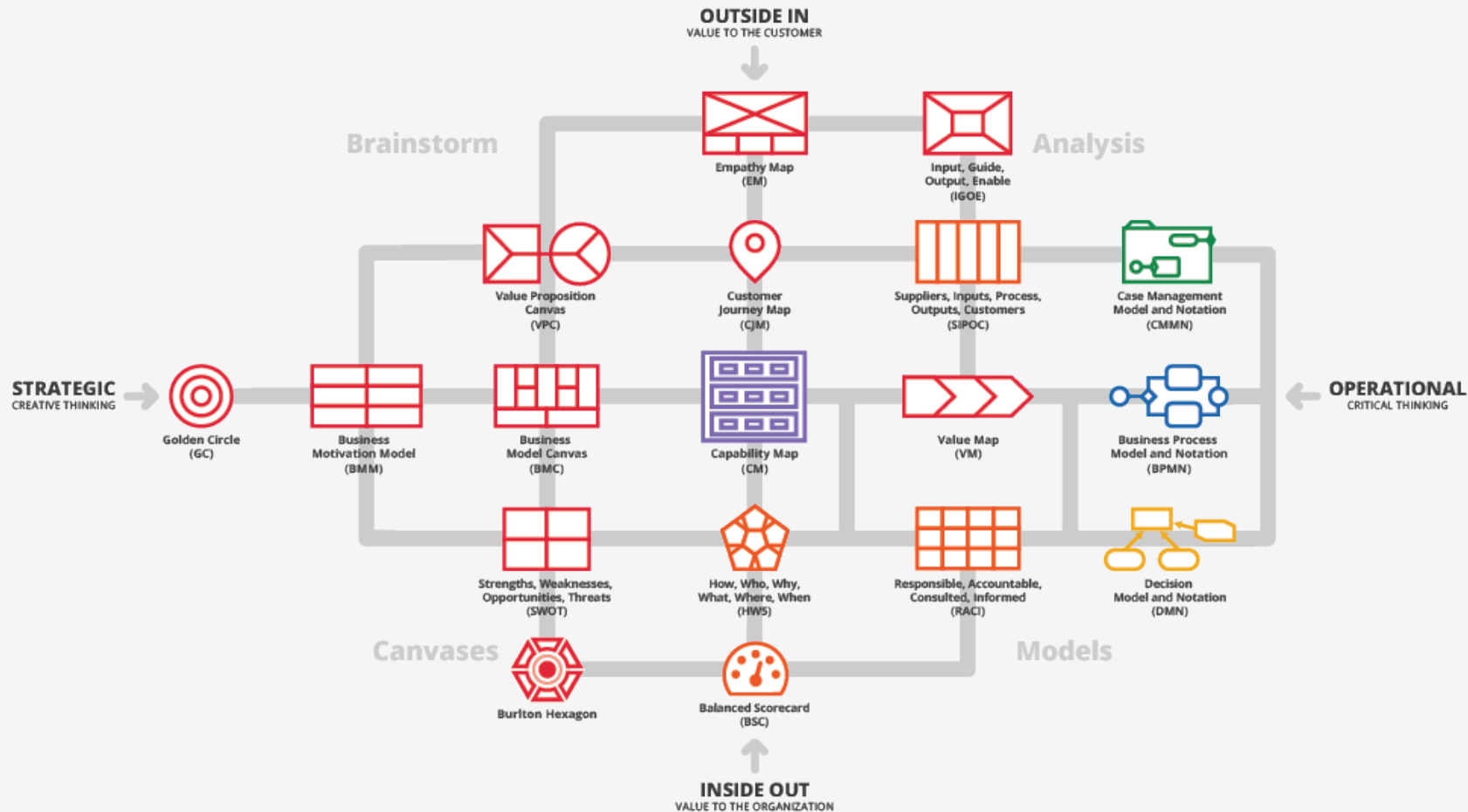
Companies are facing serious challenges in digital transformation:

- U Mastering Digital Transformation
- U Strategic Planning
- U ERP Blueprinting
- U Application Migration
- U M&A (Rationalisation of operations)
- U Discovering and Documenting Operations
- U Collaborative Process Improvement
- U Decision Management
- U Governance, Risk and Compliance (GRC)
- U Bridging the Business and IT Divide
- U Organizational Change Management

DIGITAL TRANSFORMATION

Each enterprise must seek its own path to Digital Transformation.

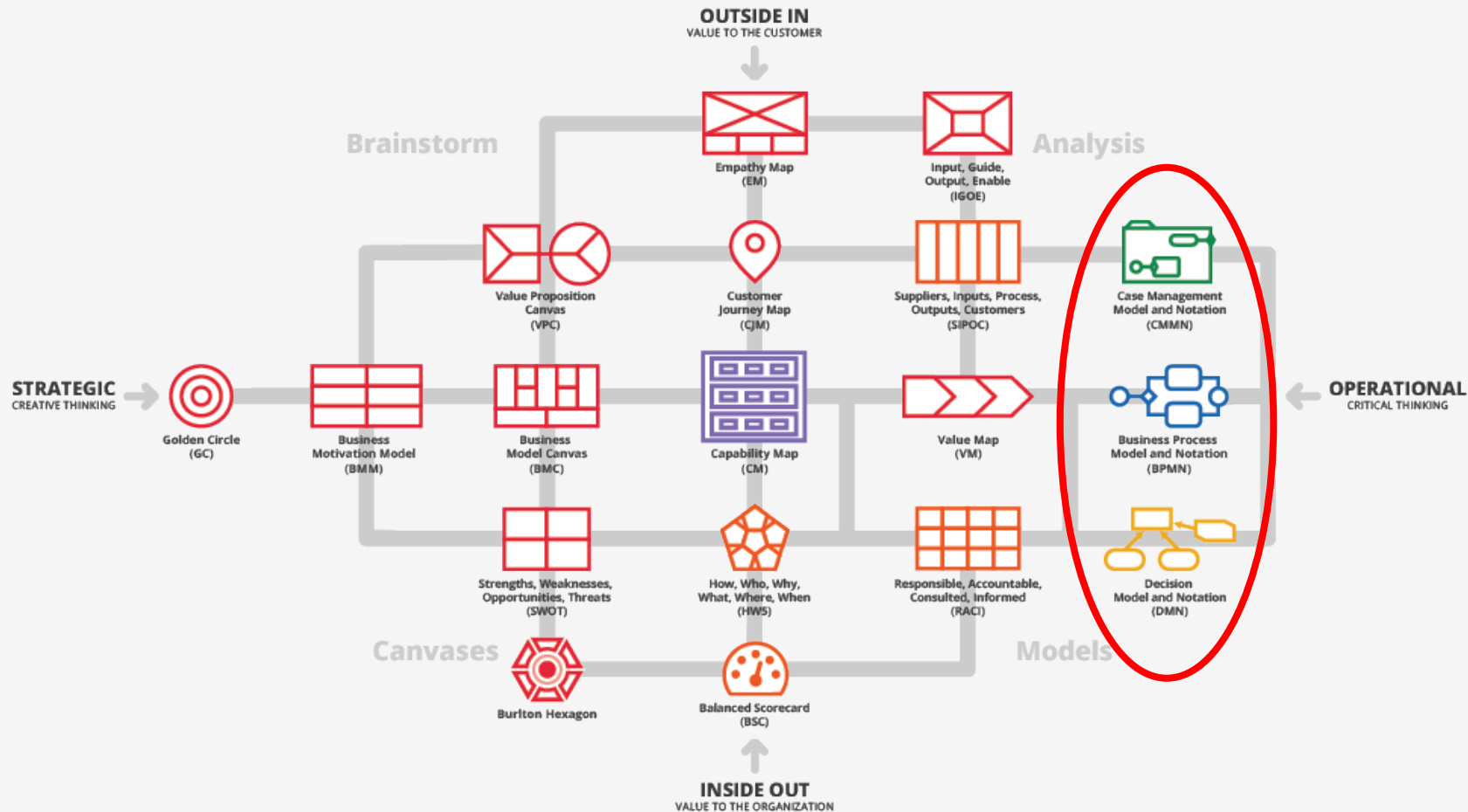
Success may come from reinventing an industry or simply from traditional business models.



DIGITAL TRANSFORMATION

Each enterprise must seek its own path to Digital Transformation.

Success may come from reinventing an industry or simply from traditional business models.



FEATURED PANELISTD



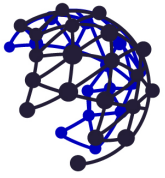
Brian Stucky
CEO, DecisionX

A recognized thought leader in decision management, Brian Stucky brings three decades of experience designing and implementing business rule and process management systems to the financial services industry as well as the Federal government. He started DecisionX to help organizations leverage standards and emerging technology to drive their Fintech and Regtech digital evolution.

Consulting expert, Author, Speaker

Co-chairman of MISMO Decision Management CoP





DECISIONX

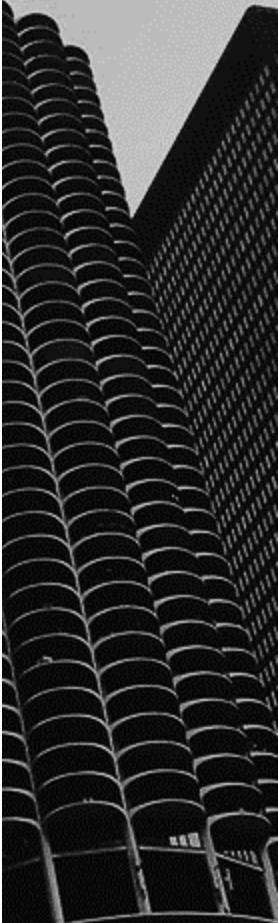
BEYOND DECISION MODELS – USING TECHNICAL & BUSINESS STANDARDS TO TRANSFORM FINANCIAL SERVICES

Brian Stucky

April 25, 2019

BRIAN STUCKY

- ❑ A recognized thought leader in decision management, Brian Stucky brings three decades of experience designing and implementing business rule and process management systems to the financial services industry as well as the Federal government. He started DecisionX to help organizations leverage standards and emerging technology to drive their Fintech and Regtech digital evolution.
- ❑ Mr. Stucky also served as the Enterprise Rule Steward at Freddie Mac where he set the business and technology strategy for business rule development across the corporation. These efforts resulted in Freddie Mac winning a 2005 ADT Magazine Innovator Award in the category of Component-Based Development ("Freddie Mac redesigns its processes to satisfy new customer needs") and being named a finalist for a 2005 Mortgage Technology Magazine "10X" Award
- ❑ Brian is a contributing author to three decision management books, currently serves on the editorial board of the Business Process Management Institute and has well over 60 publications in addition to invited speaking engagements at professional events. He is now in his fifth year as co-chairman of The Mortgage Industry Standards and Maintenance Organization (MISMO) Decision Management Community of Practice and participates in their Future State Initiative.



A grayscale background image of a city skyline with several tall skyscrapers. A thick blue L-shaped graphic element is overlaid on the right side of the slide, framing the text.

AGENDA

- DMN Overview
- MISMO Overview
- Standards – Technology & Business
- Digital Transformation for Financial Services
 - Case Studies



DMN OVERVIEW

OMG STANDARDS

Operational Models & Notations



Business Process
Model & Notation



Case Management
Model & Notation

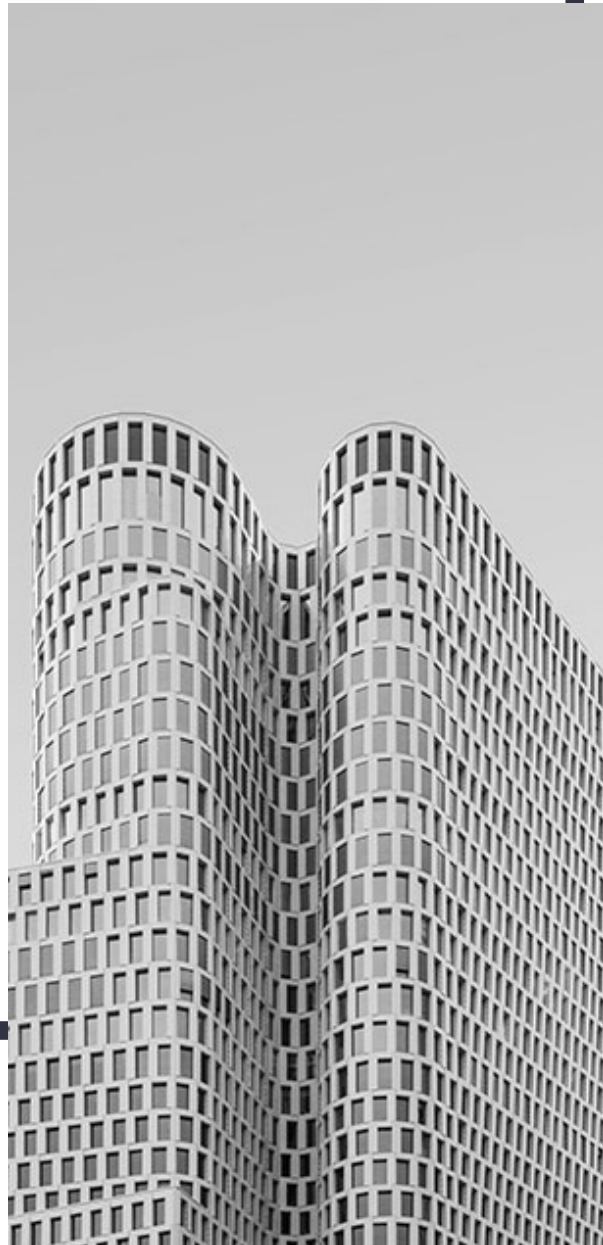


Decision
Model & Notation

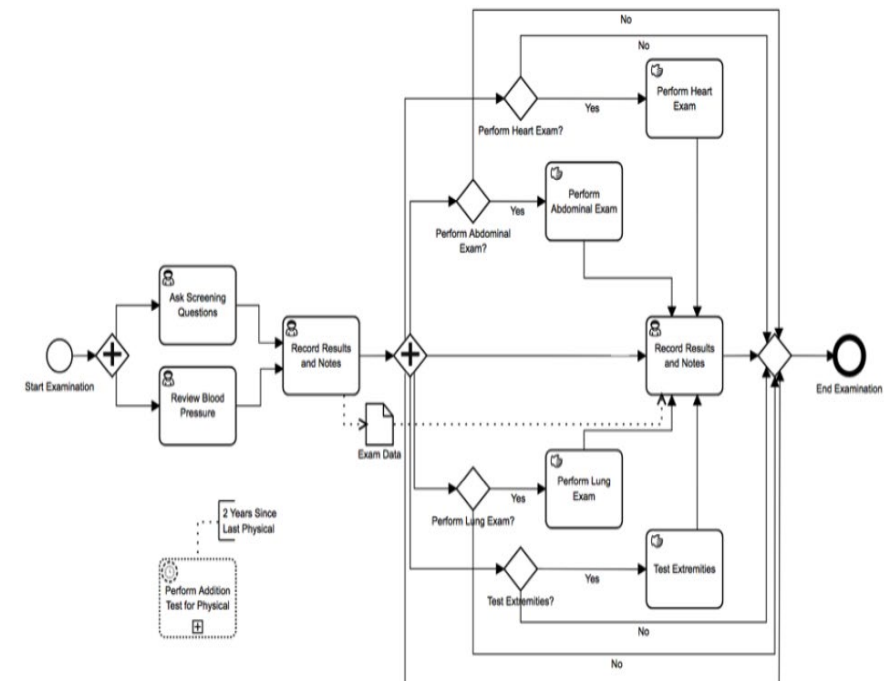
- Means to Ends
- Languages for describing operations
- Tools not Solutions

Business Process Model & Notation

- Business process represents structured work
- BPMN is the global standard for graphical flowcharts of structured and prescribed business process workflows
 - Imperative
 - Activity centric
 - Deterministic sequence
 - Guided work

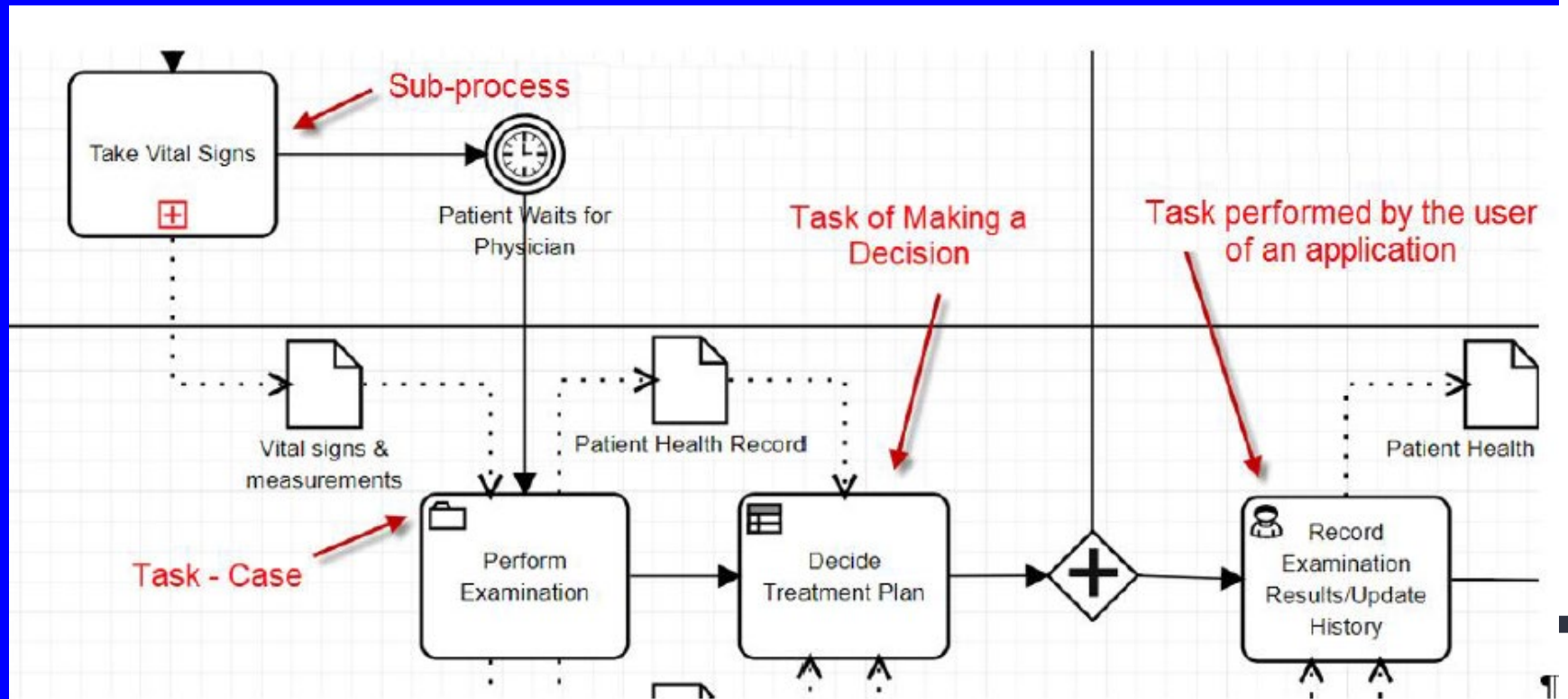


BPMN



BPMN & DMN

- Business process represents structured work
- Decision model identifies and models decisions separately from a process



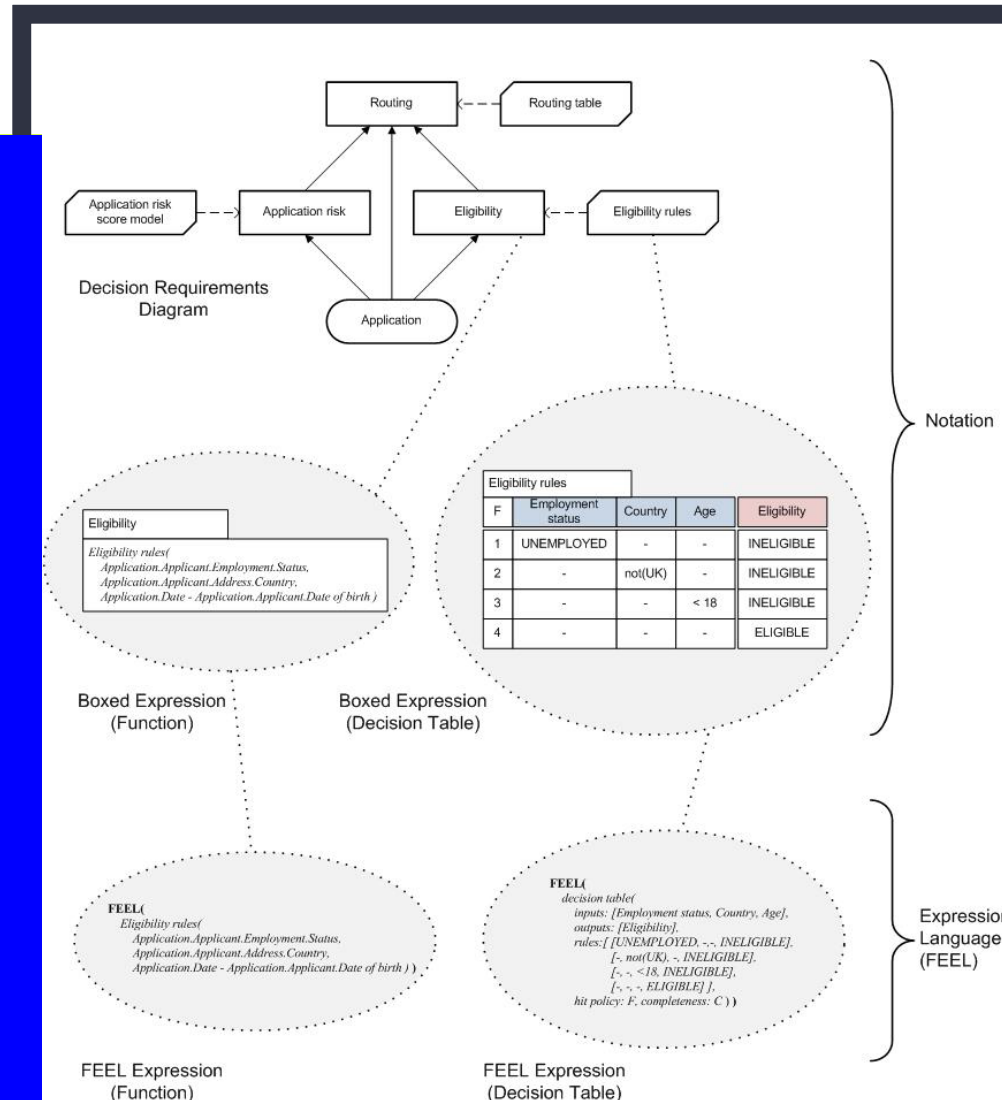
DMN OVERVIEW

Decision Modeling and Notation (DMN)

- ▶ “... provide a common notation that is readily understandable by all business users... DMN creates a standardized bridge for the gap between the business decision design and decision implementation.”
- ▶ Use Cases
 - ▶ Modeling Human Decision-making
 - ▶ Modeling Requirements for automated Decision-making
 - ▶ Implementing automated Decision-making
- ▶ Decision Management Solutions, Escape Velocity, FICO, KUL, KPI, IBM, Model Systems, Oracle, TIBCO, Visumpoint



DMN CONFORMANCE LEVELS

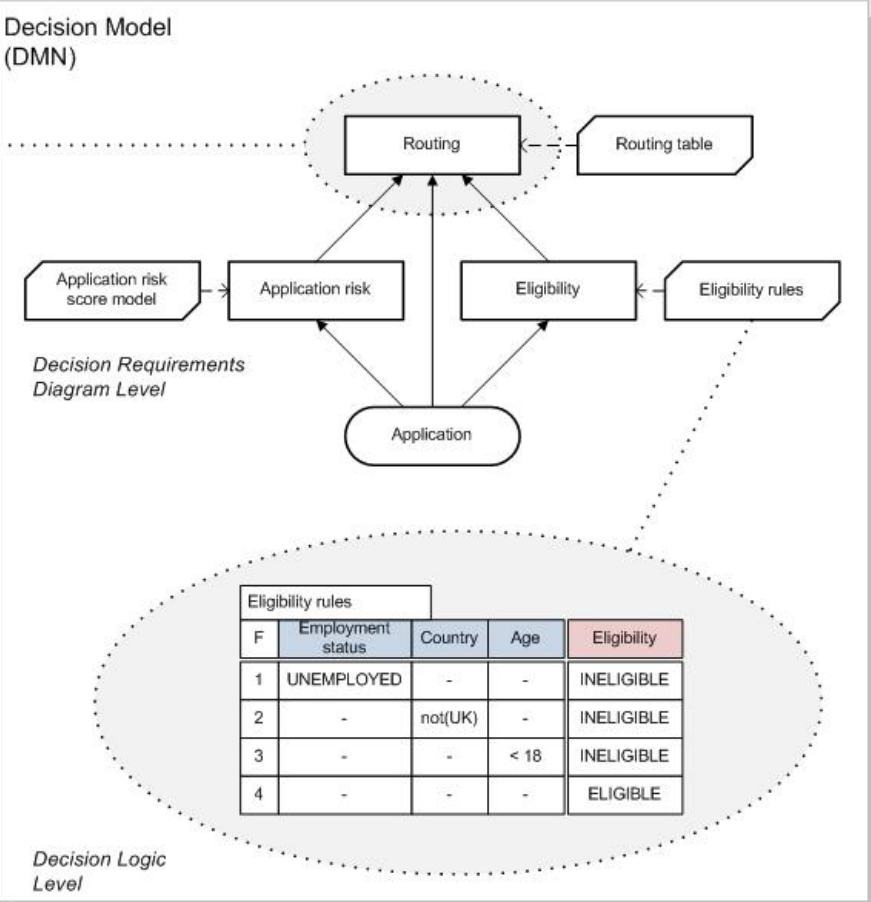
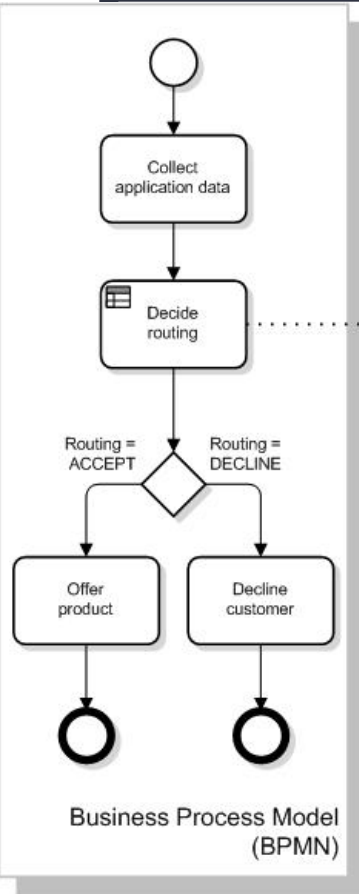


- Conformance Level 1
 - Notation
 - Interchange

- Conformance Level 2
 - Notation
 - Interchange
 - S-Feel

- Conformance Level 3
 - Notation
 - Interchange
 - FEEL

THE DECISION MODEL & NOTATION



Methodology

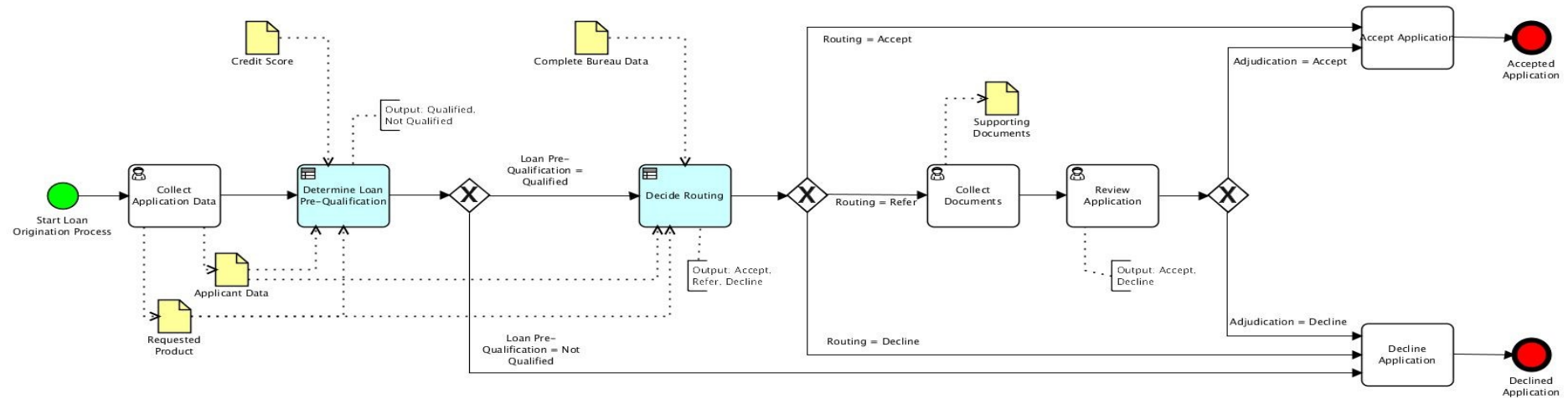
Technology

Exchange

LOAN ORIGINATION PROCESS

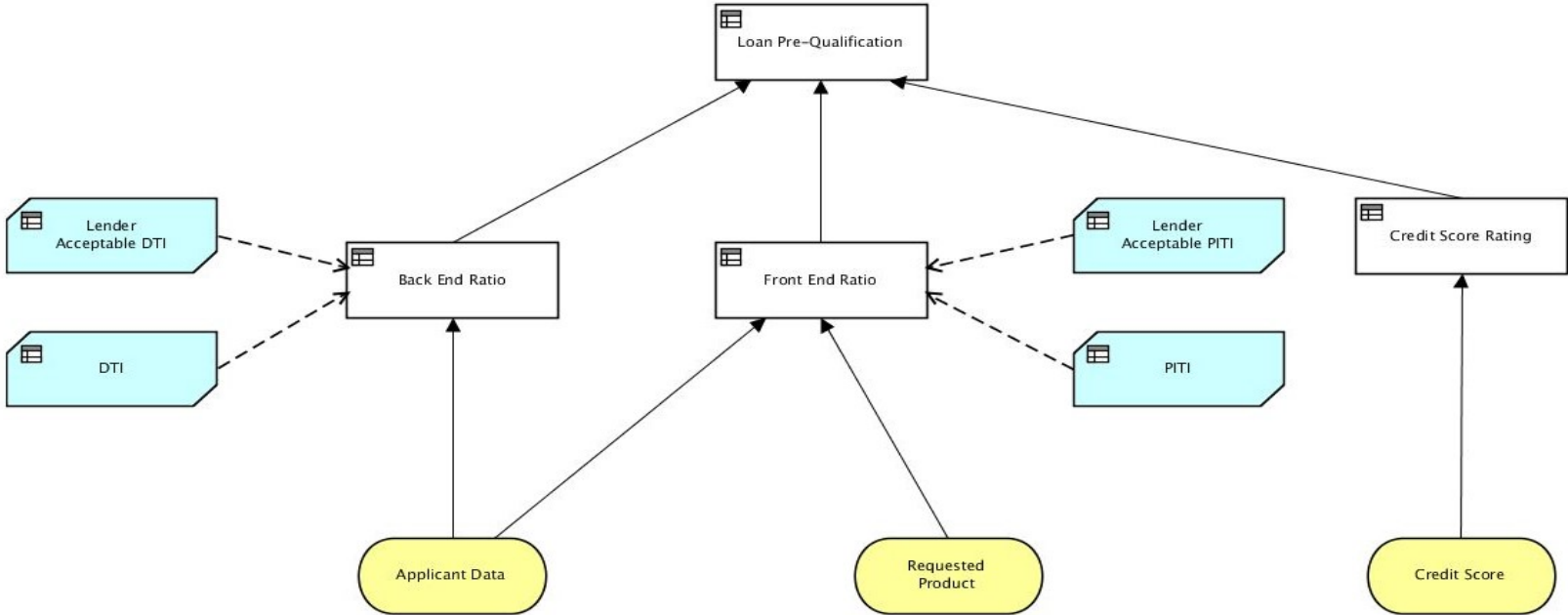


Loan Origination Example Process



PRE-QUALIFICATION DECISION

DM Challenge Loan Pre-Qualification Decision Service



PRE-QUALIFICATION RULE

Loan Pre-Qualification Loan Qualification

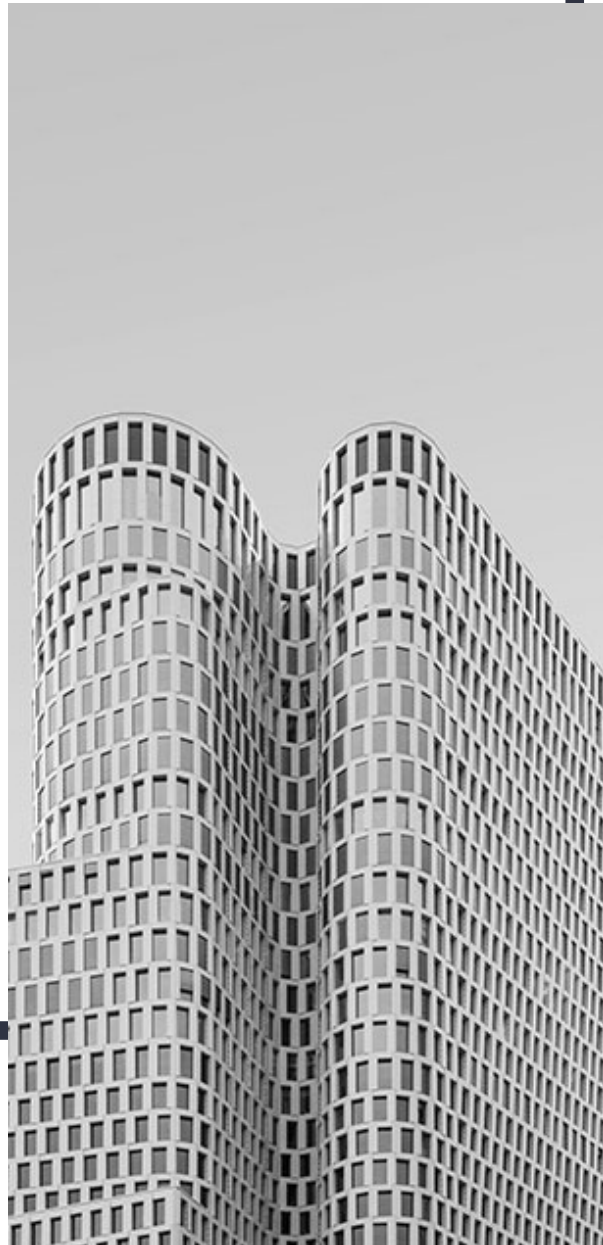
	inputs			outputs		annotations
F	Credit Score Rating	Back End Ratio	Front End Ratio	Loan Pre-Qualification		Description
				Qualification	Reason	
	<i>Credit Score Rating</i> "Poor", "Bad", "Fair", "Good", "Excellent"	<i>Back End Ratio</i> "Insufficient", "Sufficient"	<i>Front End Ratio</i> "Sufficient", "Insufficient"	<i>Text</i> "Qualified", "Not Qualified"	<i>Text</i>	
1	"Poor", "Bad"	-	-	"Not Qualified"	"Credit Score too low."	
2	-	"Insufficient"	"Sufficient"	"Not Qualified"	"Debt to income ratio is too high."	
3	-	"Sufficient"	"Insufficient"	"Not Qualified"	"Mortgage payment to income ratio is too high."	
4	-	"Insufficient"	"Insufficient"	"Not Qualified"	"Debt to income ratio is too high AND mortgage payment to income ratio is too high."	
5	"Fair", "Good", "Excellent"	"Sufficient"	"Sufficient"	"Qualified"	"The borrower has been successfully prequalified for the requested loan."	



MISMO OVERVIEW



- DMN creates a standardized bridge for the gap between the decision design and implementation
- Designed to be useable alongside the standard BPMN business process notation
- ***Ensure that decision models are exchangeable across organizations***



- MISMO's vision is to ***standardize how the mortgage industry communicates.***
- Our mission is to drive standardized data **AND** information and improved business practices between all mortgage stakeholders through collaborative and innovative initiatives that improve efficiency, reduce costs and facilitate stakeholder success.

MISMO & DMN

MISMO Recommends DMN Standard

Mar 25, 2019

MISMO, the mortgage industry's standards organization, recommended the use of the Decision Model and Notation (DMN) standard for documentation, implementation, execution and exchange of business rules and decisions across the mortgage industry.



The DMN standard was developed by the Object Management Group® (OMG®), an international, open membership, not-for-profit technology standards consortium. DMN, when used in combination with existing MISMO standards, will enable mortgage industry participants to automate the exchange of business rules and decisions between partners; thereby reducing time and cost in the mortgage process. [Read More Here.](#)

Categories: [MISMO in the News](#) [Press Release](#)



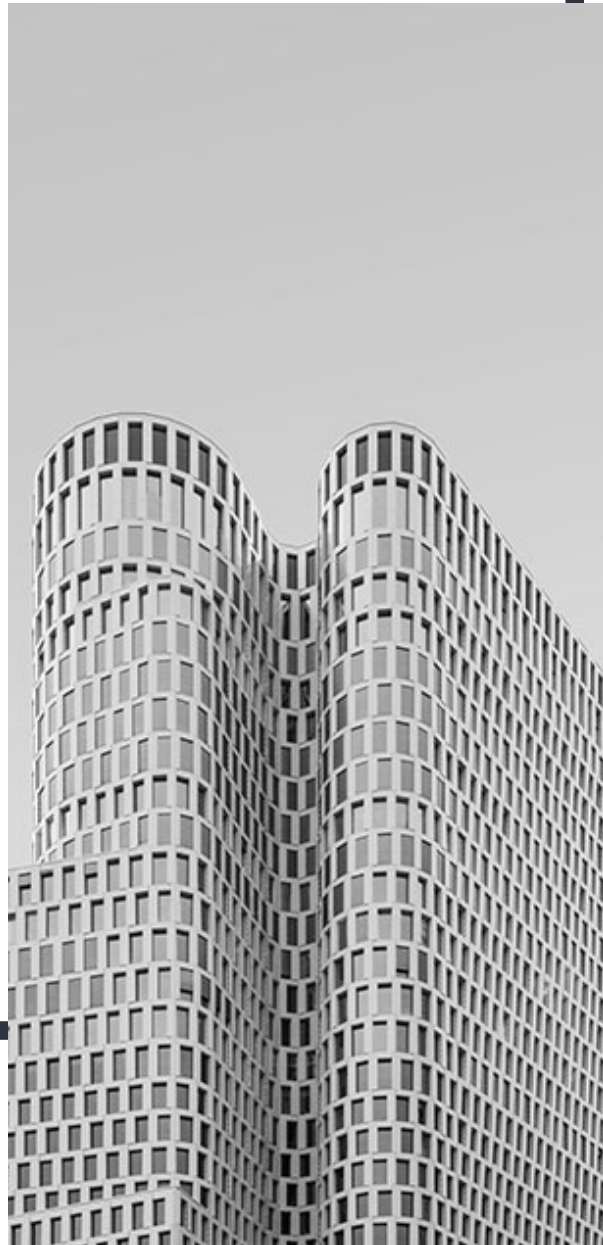
**STANDARDS –
TECHNOLOGY & BUSINESS**

MISMO

```

1 <?xml version="1.0" encoding="UTF-8"?>
2 <xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xlink="http://www.w3.org/1999/xlink" elementFormDefault="qualified" at
3   <xsd:annotation>
4     <xsd:documentation>Version: 3.4.0 Build: 8324 Date: 2015-12-17 Iteration: </xsd:documentation>
5     <xsd:documentation>Copyright 2015 Mortgage Industry Standards Maintenance Organization (MISMO) All rights reserved.&#xD;THIS
6   </xsd:annotation>
7   <xsd:include schemaLocation="MISMOEnumeratedTypesB324.xsd"/>
8   <xsd:include schemaLocation="MISMODataTypesB324.xsd"/>
9   <xsd:include schemaLocation="MISMOComplexTypeExtensionsB324.xsd"/>
10  <xsd:include schemaLocation="MISMOExtensionDetailsB324.xsd"/>
11  <xsd:import namespace="http://www.w3.org/1999/xlink" schemaLocation="xlinkMISMOB324.xsd"/>
12  <xsd:import namespace="http://www.w3.org/XML/1998/namespace" schemaLocation="xml.xsd"/>
13  <xsd:complexType name="ABOUT_VERSION">
14    <xsd:annotation/>
15    <xsd:sequence>
16      <xsd:element name="AboutVersionIdentifier" type="MISMOIdentifier" nillable="true" minOccurs="0">
17        <xsd:annotation>
18          <xsd:documentation>A unique value that represents a user defined version identifier.</xsd:documentation>
19        </xsd:annotation>
20      </xsd:element>
21      <xsd:element name="CreatedDatetime" type="MISMODatetime" nillable="true" minOccurs="0">
22        <xsd:annotation>
23          <xsd:documentation>The date and time at which the message, deal or document was created.</xsd:documentation>
24        </xsd:annotation>
25      </xsd:element>
26      <xsd:element name="DataVersionIdentifier" type="MISMOIdentifier" nillable="true" minOccurs="0">
27        <xsd:annotation>
28          <xsd:documentation>Specifies the data file version.</xsd:documentation>
29        </xsd:annotation>
30      </xsd:element>
31      <xsd:element name="DataVersionName" type="MISMOString" nillable="true" minOccurs="0">
32        <xsd:annotation>
33          <xsd:documentation>Identifies the type of data file.</xsd:documentation>
34        </xsd:annotation>
35      </xsd:element>
36      <xsd:element name="EXTENSION" type="ABOUT_VERSION_EXTENSION" minOccurs="0"/>
37    </xsd:sequence>
38    <xsd:attribute name="SequenceNumber" type="MISMOSequenceNumber_Base">
39      <xsd:annotation>
40        <xsd:documentation>An integer value used to provide an order to multi-instance sibling elements. The value must be u
41      </xsd:annotation>
42    </xsd:attribute>
43    <xsd:attributeGroup ref="xlink:MISMOResourceLink">
44      <xsd:annotation>
45        <xsd:documentation>An xlink attribute group for defining the end point of a relationship.</xsd:documentation>
46      </xsd:annotation>
47    </xsd:attributeGroup>
48    <xsd:attributeGroup ref="AttributeExtension">
49      <xsd:annotation>
50        <xsd:documentation>An implementation of the ability to extend an instance document by using any attribute. To change
51      </xsd:annotation>
52    </xsd:attributeGroup>

```



DMN

LIABILITIES	LIABILITIES »
LITIGATIONS	LITIGATIONS »
	1 COMBINED_LTVS tCOMBINED_LTVS »
	1 ACH tACH »
	2 ADJUSTMENT tADJUSTMENT »
	3 AFFORDABLE_LENDING tAFFORDABLE_LENDING »
	4 AMORTIZATION tAMORTIZATION »
	1 AMORTIZATION_RULE tAMORTIZATION_RULE »
	2 AMORTIZATION_SCHEDULE_ITEMS tAMORTIZATION_SCHEDULE_ITEMS »
	3 EXTENSION tAMORTIZATION_EXTENSION »
	5 ASSUMABILITY tASSUMABILITY »
	6 BILLING_ADDRESS tBILLING_ADDRESS »
	7 BUYDOWN tBUYDOWN »
	8 CAPITALIZATIONS tCAPITALIZATIONS »
	9 CHARGE_OFF tCHARGE_OFF »
	10 CLOSING_INFORMATION tCLOSING_INFORMATION »
	11 COLLECTIONS tCOLLECTIONS »
	12 CONSTRUCTION tCONSTRUCTION »
	13 CONTRACT_VARIANCES tCONTRACT_VARIANCES »
	14 CREDIT_ENHANCEMENTS tCREDIT_ENHANCEMENTS »
	15 DISCLOSURES tDISCLOSURES »
	16 DOCUMENT_SPECIFIC_DATA_SETS tDOCUMENT_SPECIFIC_DATA_SETS »
	17 DOCUMENTATIONS tDOCUMENTATIONS »
	18 DOWN_PAYMENTS tDOWN_PAYMENTS »
	19 DRAW tDRAW »
	20 ESCROW tESCROW »

MISMO + DMN

Language + Syntax

- Import / Create a DMN data structure based on the MISMO XSD
- Reference these attributes (with all enumerations and data typing) directly in decisions
- Export a combined and fully standardized message

Field 49 Applicant Race Collection Basis Decision
Text

1	Borrower Classification Type Text	MISMO HMDA Data.DEAL_SETS.PARTIES.PARTY.ROLES.ROLE.BORROWER.BORROWER_DETAIL.BorrowerClassificationType
2	HMDA Race Collected Based On Visual Observation Or Surname Indicator Boolean	MISMO HMDA Data.DEAL_SETS.PARTIES.PARTY.ROLES.ROLE.BORROWER.GOVERNMENT_MONITORING.GOVERNMENT_MONITORING_DETAIL.HMDARaceCollectedBasedOnVisualObservationOrSurnameIndicator
3	Borrower Is An Individual Person Indicator Boolean	MISMO HMDA Data.DEAL_SETS.PARTIES.PARTY.ROLES.ROLE.BORROWER.BORROWER_DETAIL.BorrowerIsAnIndividualPersonIndicator
4	Applicant Race Collection Basis Text	

inputs			outputs		
	Borrower Classification Type	HMDA Race Collected Based On Visual Observation Or Surname Indicator	Borrower Is An Individual Person Indicator	Applicant Race Collection Basis	Description
U	Text "Primary", "Secondary"	Boolean	Boolean	Text	
1	"Primary"	true	-	"1"	
2		false	true	"2"	
3		-	false	"3"	

Applicant Race Collection Basis



DIGITAL TRANSFORMATION: FINANCIAL SERVICES



CHASE BANK HIT WITH DOWNGRADE OVER JUMBO MORTGAGE UNDERWRITING, FINTECH GAPS

Moody's Investors Service downgraded JPMorgan

Chase's prime jumbo mortgage originator assessment

to its second-highest rating, citing the bank's growing

reliance on correspondents with delegated

underwriting authority and *shortcomings in its*

technology infrastructure. (August 24, 2018)



BARRIERS TO FINTECH & REGTECH

- Bridging the gap between business and technology – the latter must be flexible enough to handle complexities and nuances of compliance
- AI techniques alone won't satisfy regulators – must *explain why* decisions were made
 - Article 22 of the GDPR requires that companies be able to explain to their customers how machine decisions are made
- Uncertain regulatory landscape
- Dealing with legacy systems
- Regulators unwillingness to articulate specific positions and interpretations
- Companies forced into thinking locally when they should be looking globally



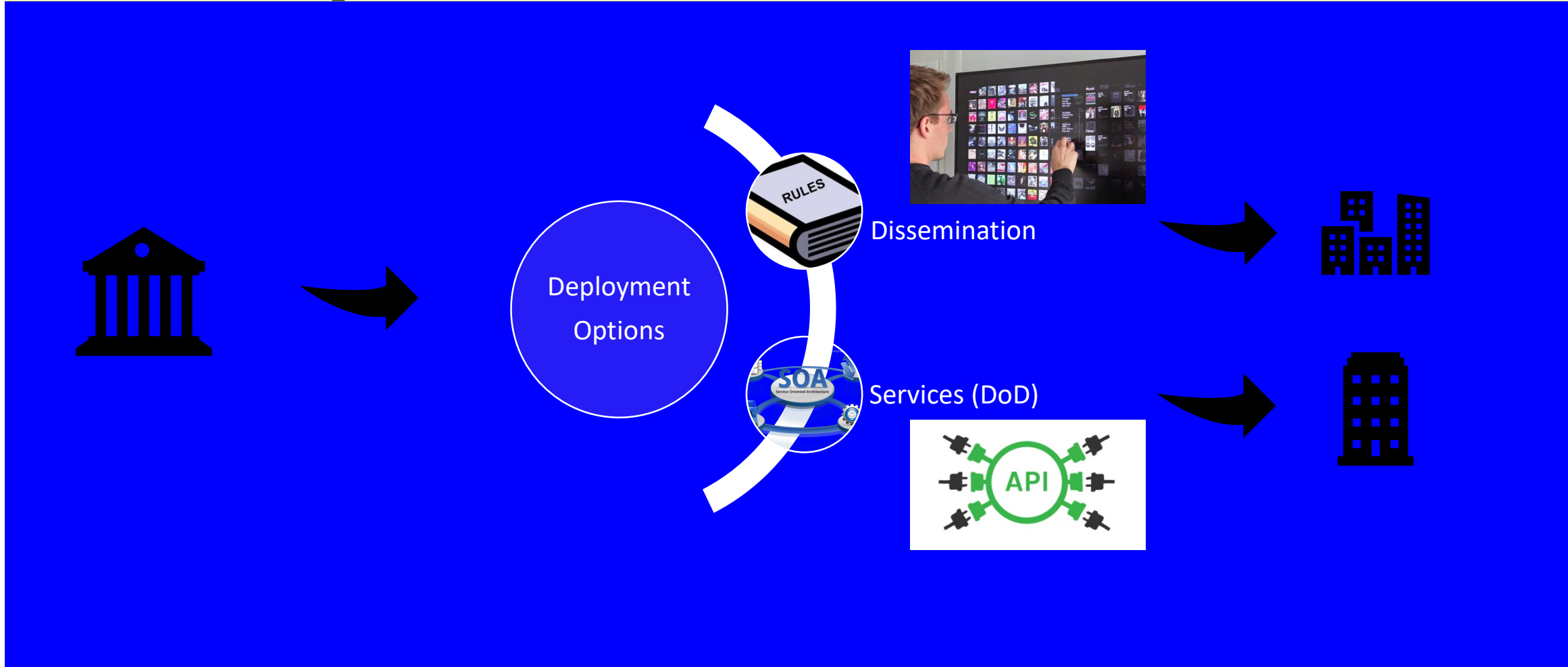
- **Open, API-based architectures able to rapidly evolve and share are critical**
- **Need coordinated industry-wide design and collaboration effort to set clear standards**
- ***Create, modify, and exchange decisions in a transparent, common format!***



APPLICATION AREAS

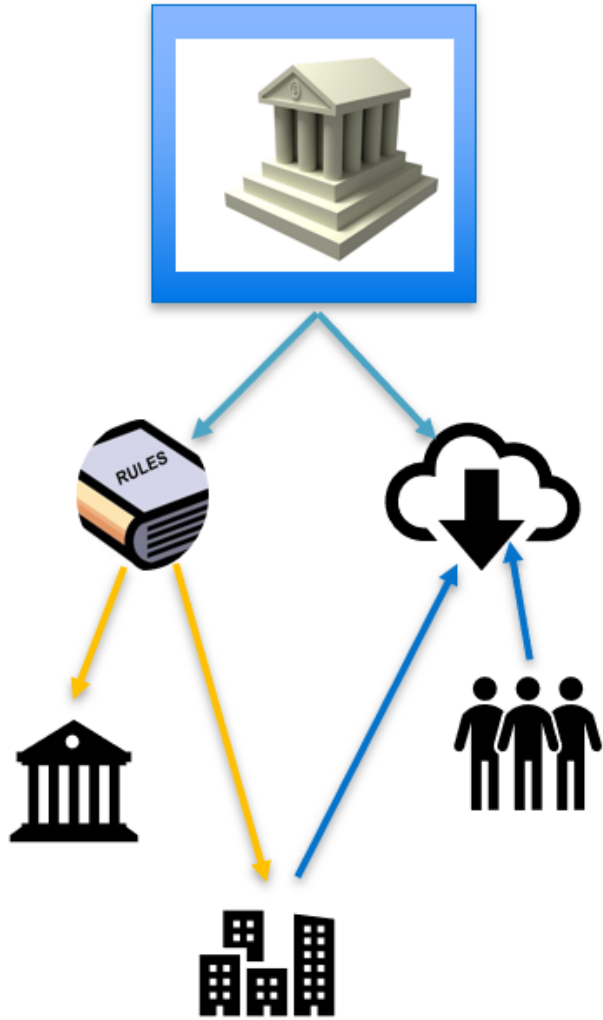
- *Exchange*
- APIs and Microservices
- Regulations
- Explanation & Transparency

OPPORTUNITY: MOVING TOWARDS TRUE EXCHANGE

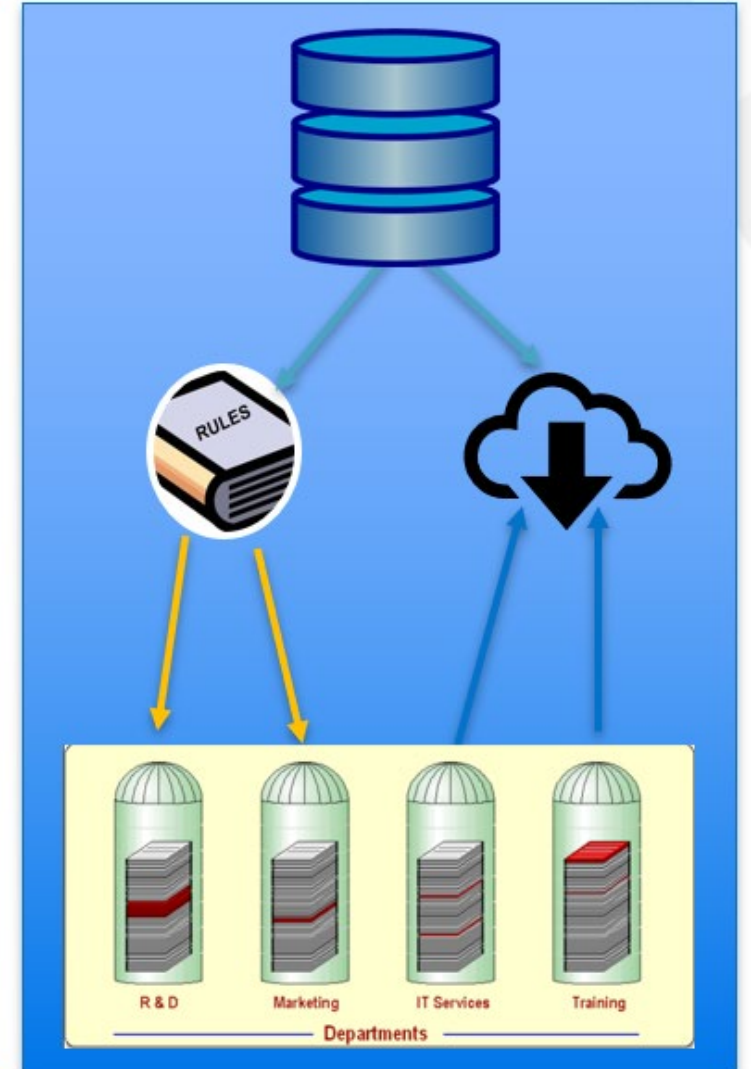


DECISIONS

BETWEEN




WITHIN





APPLICATION AREAS

- Exchange
- *APIs and Microservices*
- Regulations
- Explanation & Transparency



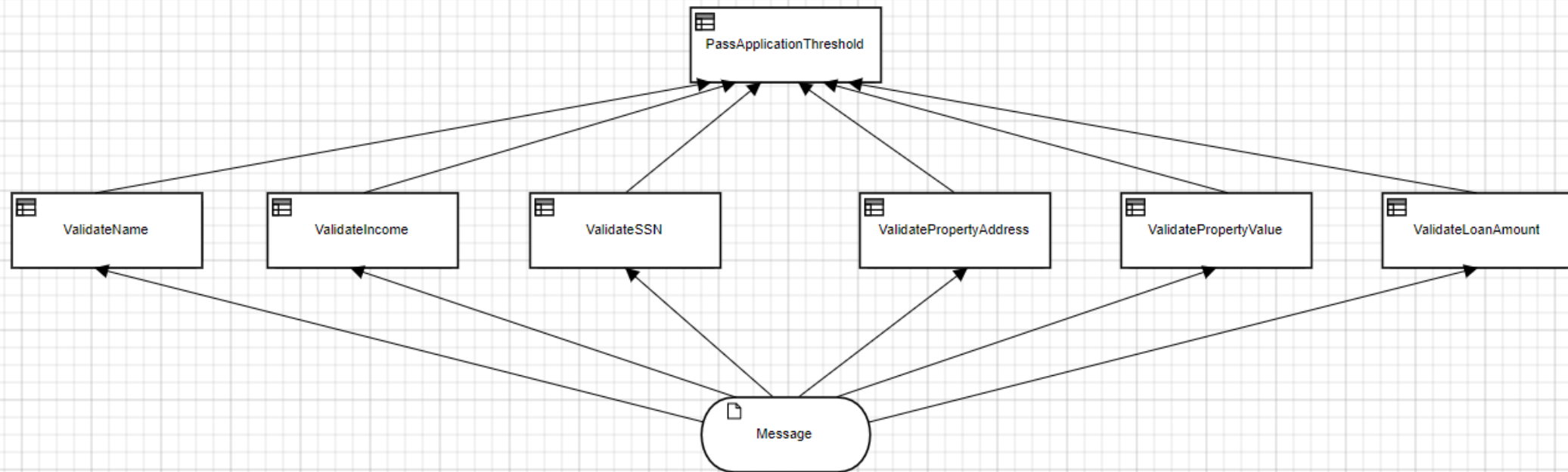
Decision as a service for both commercial and government services will become a primary delivery model, allowing decisions (and the automation enabled by them) to be easily plugged into applications; this will require more of a business-first, model-driven approach rather than having decisions built in code by developers.

Nathaniel Palmer, bpmNEXT 2018

API & MICROSERVICES

- **APIs** define the correct way for a developer to write a program that requests services from an operating system (OS) or other application.
 - **Micro services** are a software development technique—a variant of the service-oriented architecture(SOA) architectural style that structures an application as a collection of loosely coupled services.
- ❑ Standardizing a *message* (data & structure / MISMO & DMN) facilitate the creation of easily created and accessible APIs
 - ❑ DMN allows us to create applications, functions and decisions at any level of granularity necessary – Microservices!
 - The mortgage industry identified two technology initiatives it claims have the greatest potential to improve processes and be the most broadly adopted over the next two years, according to Fannie Mae. About 63% of senior mortgage executives named [application programming interfaces](#) as being most likely to streamline processes.

APPLICATION THRESHOLD DECISION MODEL



DEPLOYMENT OPTIONS – SERVICE

RV3.4 Application Threshold BKS T1

Published by
Brian Stucky
12/13/2018

Group Artifact Version
dmn:rv3.4-application-threshold-bks-t1:LATEST

Version: Latest ▾ Service: Whole model ▾

Model view

RV3.4 Application Threshold BKS T1

Form
<https://decision-x.trisotech.com/execution/dmn/form/prod/dmn/rv3.4-application-threshold-bks-t1>

Rest API
<https://decision-x.trisotech.com/execution/dmn/api/run/prod/dmn/rv3.4-application-threshold-bks-t1>

Open API
<https://decision-x.trisotech.com/execution/dmn/api/openapi/prod/dmn/rv3.4-application-threshold-bks-t1>

Test
<https://decision-x.trisotech.com/execution/dmn/api/test/prod/dmn/rv3.4-application-threshold-bks-t1>

Endpoints Documentation

Try it Rest API Open API Run Test Promote Basic Options Delete

FORM EXECUTION

RV3.4 Application Threshold BKS T1

[Download XML template](#)

Choose File Purchase_ULAD_XML.xml

Run

Results

PassApplicationThreshold

ValidateIncome

ValidateLoanAmount

ValidateName

ValidatePropertyA

true

DIGITAL MORTGAGE LIBRARY

Mortgage Service Library

Brian Stucky ▶ URLA Proto ▶ Mortgage Service Library

✓ Name	Last Updated	Updated by	Version	State
✻ Closing	-	-	-	-
✻ Origination				
✻ Processing				
✻ Underwriting				
✻ Funding				
✻ Warehouse				
✻ Shipping and Delivery				
✻ Secondary Marketing				
✻ Loan Administration				

Origination Brian Stucky ▶ URLA Proto ▶ Mortgage Service Library ▶ Origination

✓ Name	Last Updated	Updated by	Version	State
✻ Rate Sheet	-	-	-	-
✻ Loan Processing - Documentation	-	-	-	-
✻ Product Eligibility	-	-	-	-
✻ Regulatory	-	-	-	-
✻ Pricing Adjustment	-	-	-	-
✻ Loan Selection and Ranking	-	-	-	-

Pre-Qualification Brian Stucky ▶ URLA Proto ▶ Mortgage Service Library ▶ Origination ▶ Pre-Qualification

✓ Name	Last Updated	Updated by	Version	State
✻ LTV Rules	-	-	-	-
✻ Debt to Income Rules	-	-	-	-
✻ Housing to Income Rules	-	-	-	-
✻ Compensating Factor Rules	-	-	-	-
✻ QRM Rules	-	-	-	-



APPLICATION AREAS

- Exchange
- APIs and Microservices
- *Regulations*
- Explanation & Transparency

CFPB

HOME MORTGAGE DISCLOSURE ACT (HMDA) REPORTING

HMDA is implemented by Regulation C, 12 CFR part 1003, and requires certain institutions to collect, report, and disclose specified information about their mortgage lending activity.

The Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act) expanded the scope of information relating to mortgage applications and loans that must be collected, reported, and disclosed under HMDA.



CFPB HMDA Reg C

**Table 2
Total Annual Burden, All Information Collections- All Regulated Entities**

	Lower Bound Estimate			Upper Bound Estimate		
	Number of Respondents	Total Burden per respondent ¹	Total Burden (Rounded to Nearest Thousand)	Number of Respondents	Total Burden per respondent ¹	Total Burden (Rounded to Nearest Thousand)
Tier One Annual Reporter	259	10,448 hours	2,706,000 hours	187	10,588 hours	1,980,000 hours
Tier One Quarterly Reporter	29	11,034 hours	320,000 hours	29	11,034 hours	320,000 hours
Tier Two	2,015	1,619 hours	3,262,000 hours	5,111	1,434 hours	7,330,000 hours
Tier Three	3,943	143 hours	563,000 hours	921	173 hours	159,000 hours
Total	6,250	NA	6,851,000	6,250	NA	9,789,000

Total Estimated Burden for all Respondents (Rounded to 100 Thousands): 8,300,000 hours²

¹ The Bureau estimates that approximately 6,250 financial institutions will be required to report HMDA data for closed-end mortgage loans to the CFPB after implementation of the final rule. This is reflected in the column conveying the number of respondents, where the total is rounded to the nearest 10. The Bureau estimates that 725 of these financial institutions will also be required to report data for open-end lines of credit, and that 24 additional financial institutions that are currently HMDA reporters will now report data only for open-end lines of credit. These 749 financial institutions consist of 273 tier 3 financial institutions, 463 tier 2 financial institutions, and 13 tier 1 financial institutions. The estimates of total burden in the table include reporting of closed-end mortgage loans for all respondents indicated in the number of respondents column, plus reporting of open-end lines of credit for the subset of respondents that will also be required to report open-end lines of credit. The total burden per respondent in the table is total burden divided by number of respondents, and therefore does not reflect the specific burden hours for either respondents that report only closed-end mortgage loans or that report both closed-end mortgage loans and open-end lines of credit.

² The Bureau estimates that, for all HMDA reporters, the burden hours will be approximately 6,851,000 to 9,789,000 hours per year. 8,300,000 is approximately the mid-point of this estimated range.

List of Subjects in 12 CFR Part 1003

Banks, Banking, Credit unions, Mortgages, National banks, Savings associations,

Reporting and recordkeeping requirements.

Authority and Issuance

For the reasons set forth above, the Bureau amends Regulation C, 12 CFR part 1003, as set forth below:

PART 1003—HOME MORTGAGE DISCLOSURE (REGULATION C)

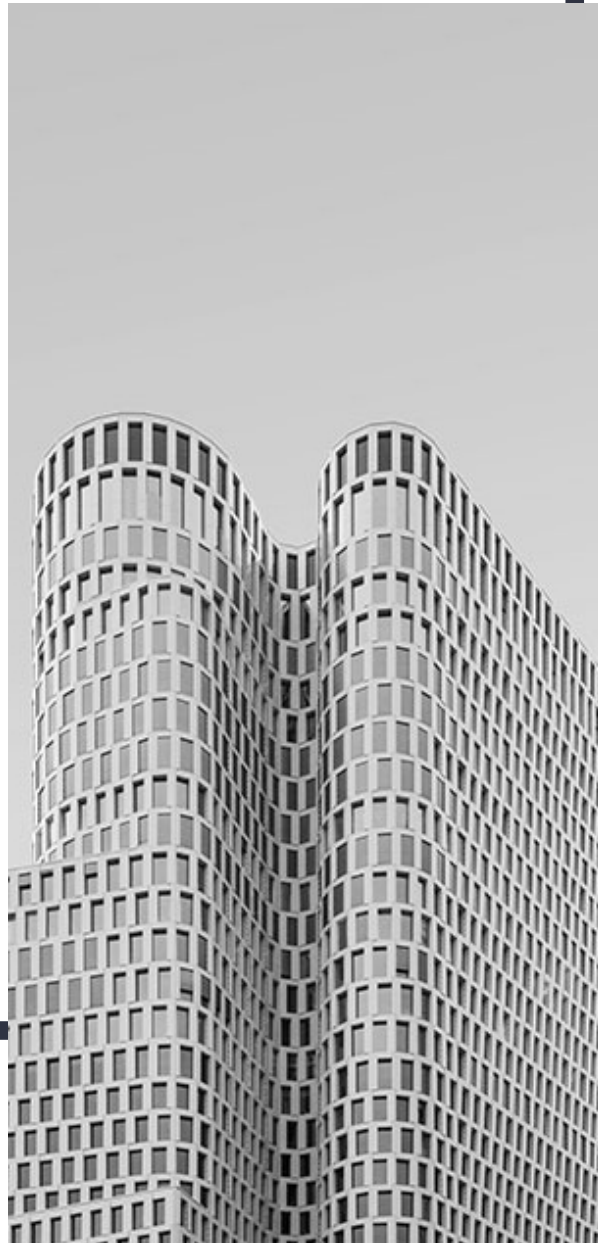
1. The authority citation for part 1003 continues to read as follows:

AUTHORITY: 12 U.S.C. 2803, 2804, 2805, 5512, 5581

652

CFPB HMDA Reg C

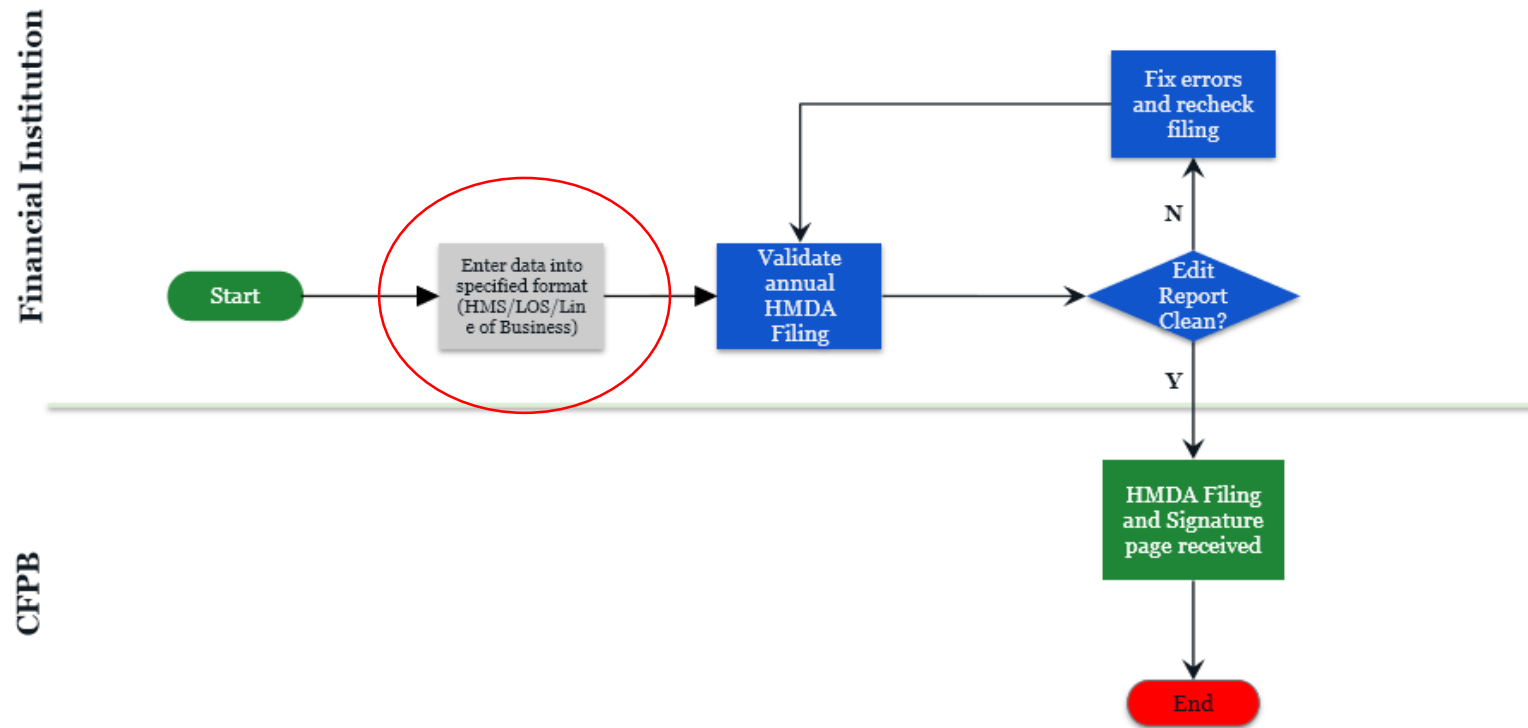
- Nearly 800 pages
- Regular modifications, updates and changes
- Must be consumed, interpreted, processed and implemented in a timely fashion
- Time and resource intensive operation



CFPB HMDA PROCESS

HMDA Data Collection – New Process

In new process, the HMDA filer will run the edits in the HMDA Platform and only a clean HMDA file will be accepted.



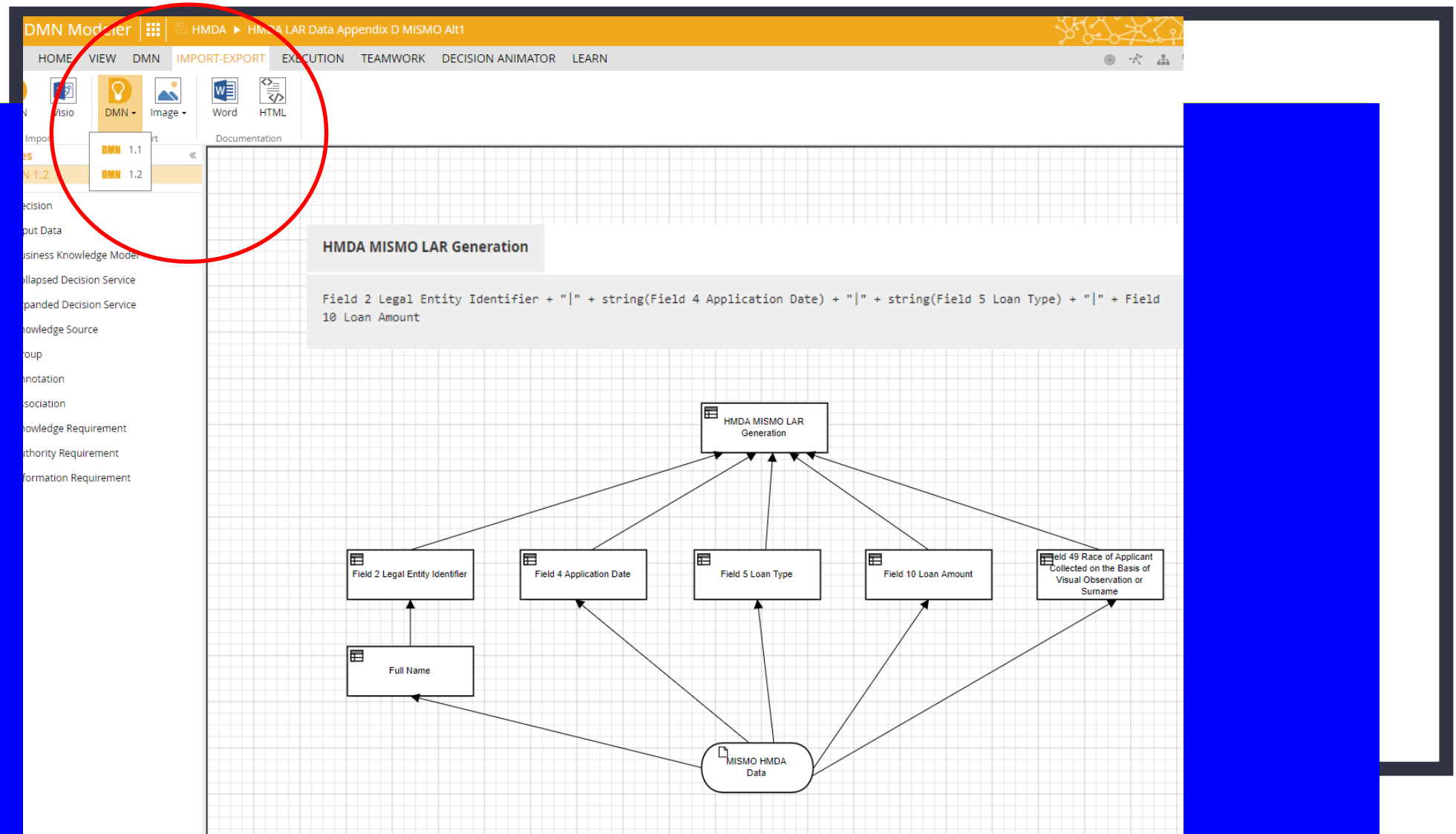
INTERPRETING THE RULE

- **Field 10 (Data Record 2) Loan Amount decision table**
- This field is derived from several fields in the XML.
- Where **HMDADispositionType** is one of ("ApplicationApprovedButNotAccepted", "ApplicationDenied", "ApplicationWithdrawn", "FileClosedForIncompleteness", "PreapprovalRequestDenied", "PreapprovalRequestApprovedButNotAccepted"), use **BorrowerRequestedLoanAmount**
- Where **HMDADispositionType** = "LoanOriginated" AND (**OpenEndCreditIndicator** = "false" AND **ReverseMortgageIndicator** = "false"), use **NoteAmount**.
- Where **HMDADispositionType** is one of ("LoanOriginated", "LoanPurchasedByYourInstitution") AND **OpenEndCreditIndicator** = "true", use **HELOCMaximumBalanceAmount**.
- Where **HMDADispositionType** is one of ("LoanOriginated", "LoanPurchasedByYourInstitution") AND **ReverseMortgageIndicator** = "true", use **ReverseInitialPrincipalLimitAmount**.
- Where **HMDADispositionType** = "LoanOriginated" AND (**AssumedIndicator** = "true" AND **OpenEndCreditIndicator**="false"), use **AssumedLoanAmount**.
- Where **HMDADispositionType** is one of ("LoanPurchasedByYourInstitution") AND **OpenEndCreditIndicator**="false", use **LoanAcquisitionActualUPBAmount**.

MOVING TO DMN

HMDA Loan Amount Decision											
U	HMDADispositionType	Reverse Mortgage Indicator	Open End Credit Indicator	Assumed Indicator	Assumed Loan Amount	Borrower Requested Loan Amount	HELOC Maximum Balance Amount	Loan Acquisition Actual UPB Amount	Note Amount	Reverse Initial Principal Limit Amount	HMDA Loan Amount
1	"LoanOriginated"	FALSE	FALSE	FALSE	-	-	-	-	-	-	<i>Note Amount</i>
2	"LoanOriginated", "LoanPurchasedByYourInstitution"	TRUE	-	-	-	-	-	-	-	-	<i>Reverse Initial Principal Limit Amount</i>
3	"LoanOriginated", "LoanPurchasedByYourInstitution"	FALSE	TRUE	-	-	-	-	-	-	-	<i>HELOC Maximum Balance Amount</i>
4	"LoanOriginated"	-	FALSE	TRUE	-	-	-	-	-	-	<i>Assumed Loan Amount</i>
5	"LoanPurchasedByYourInstitution"	-	FALSE	-	-	-	-	-	-	-	<i>Loan Acquisition Actual UPB Amount</i>
6	"ApplicationApprovedButNotAccepted", "ApplicationDenied", "ApplicationWithdrawn", "FileClosedForIncompleteness", "PreapprovalRequestDenied", "PreapprovalRequestApprovedButNotAccepted"	-	-	-	-	-	-	-	-	-	<i>Borrower Requested Loan Amount</i>

HMDA REPORTING - PARTIAL DRD & EXPORT



The screenshot displays the DMN Modeller interface with the 'IMPORT-EXPORT' menu highlighted. The main workspace shows a diagram titled 'HMDA MISMO LAR Generation' with the following text:

```
Field 2 Legal Entity Identifier + "|" + string(Field 4 Application Date) + "|" + string(Field 5 Loan Type) + "|" + Field 10 Loan Amount
```

The diagram is a Partial Decision Requirement Diagram (DRD) illustrating the data flow for HMDA MISMO LAR Generation. It features the following elements:

- Root Node:** HMDA MISMO LAR Generation (Decision)
- Intermediate Nodes:** Field 2 Legal Entity Identifier, Field 4 Application Date, Field 5 Loan Type, Field 10 Loan Amount, and Field 49 Race of Applicant Collected on the Basis of Visual Observation or Surname (Data).
- Source Node:** Full Name (Data).
- Input Node:** MISMO HMDA Data (Data).

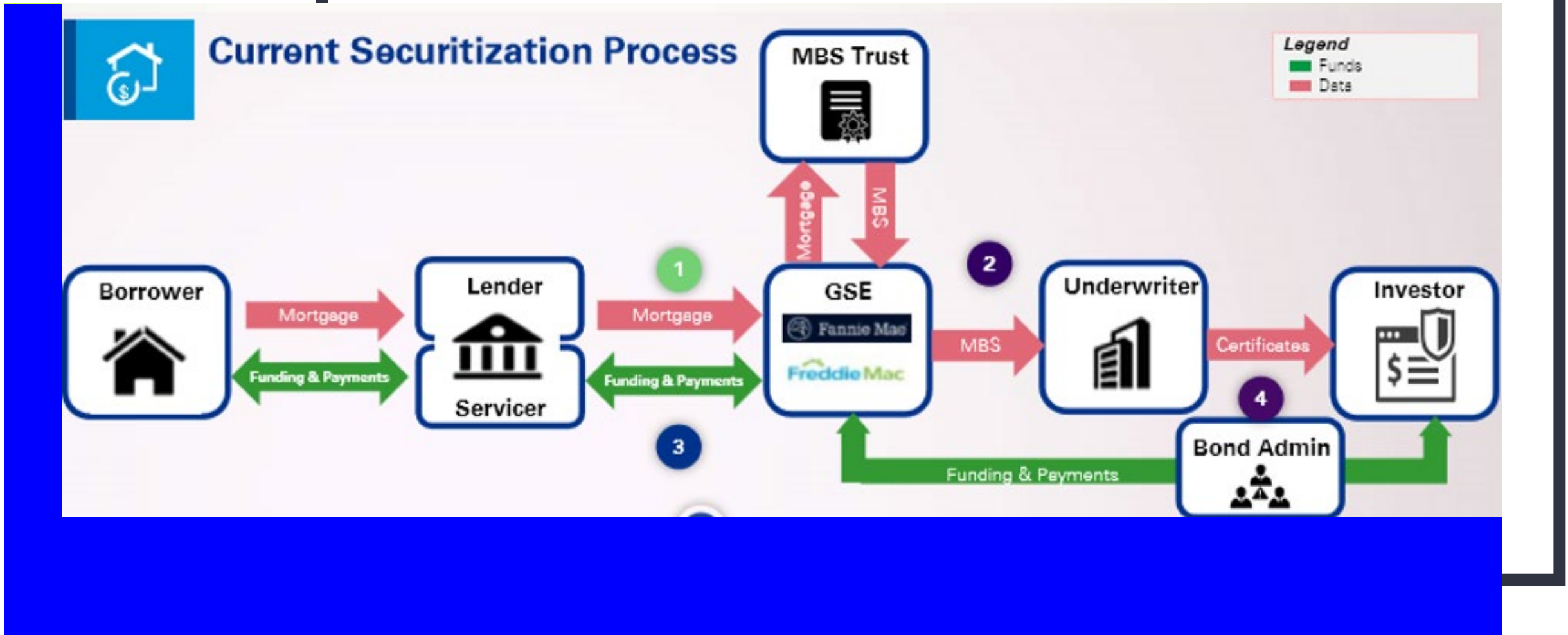
Arrows indicate the flow of data from the source and input nodes through the intermediate nodes to the root node. Specifically, MISMO HMDA Data feeds into Full Name, Field 4 Application Date, Field 5 Loan Type, Field 10 Loan Amount, and Field 49 Race of Applicant. Full Name feeds into Field 2 Legal Entity Identifier. Field 2 Legal Entity Identifier, Field 4 Application Date, Field 5 Loan Type, Field 10 Loan Amount, and Field 49 Race of Applicant all feed into the HMDA MISMO LAR Generation node.



APPLICATION AREAS

- Exchange
- APIs and Microservices
- Regulations
- *Explanation & Transparency*

DATA FLOW IN LOAN LIFE CYCLE



ATR/QM RULE

- The CFPB governs the [Ability-to-Repay and Qualified Mortgage Rule](#). The ATR/QM rule generally took effect on January 10, 2014.
- **Ability to Repay** is the Truth In Lending Act rule which prohibits creditors from making a mortgage loan without a reasonable and good faith determination of the consumer's ability to repay the loan. The ATR decisions examine at a minimum eight factors, including verifications of income and assets, employment, and a review of credit history.
- **Qualified Mortgage** is the Truth In Lending Act rule which, when loan products meet QM-defined restrictions, provides creditors with a conclusive presumption of ATR compliance ("safe harbor") for loans that are not higher-priced, or for higher-priced loans, provides creditors with a rebuttable presumption of ATR compliance when the ATR process is followed.
- The Qualified Mortgage decision has three primary outcomes:
 - The Regulation Z Ability-to-Repay exemption reason, if any.
 - The Regulation Z Qualified Mortgage standard that is used for the transaction
 - Whether the transaction meets the QM safe harbor standard, the rebuttable presumption standard, or neither standard.

ATR/QM DECISION TABLE

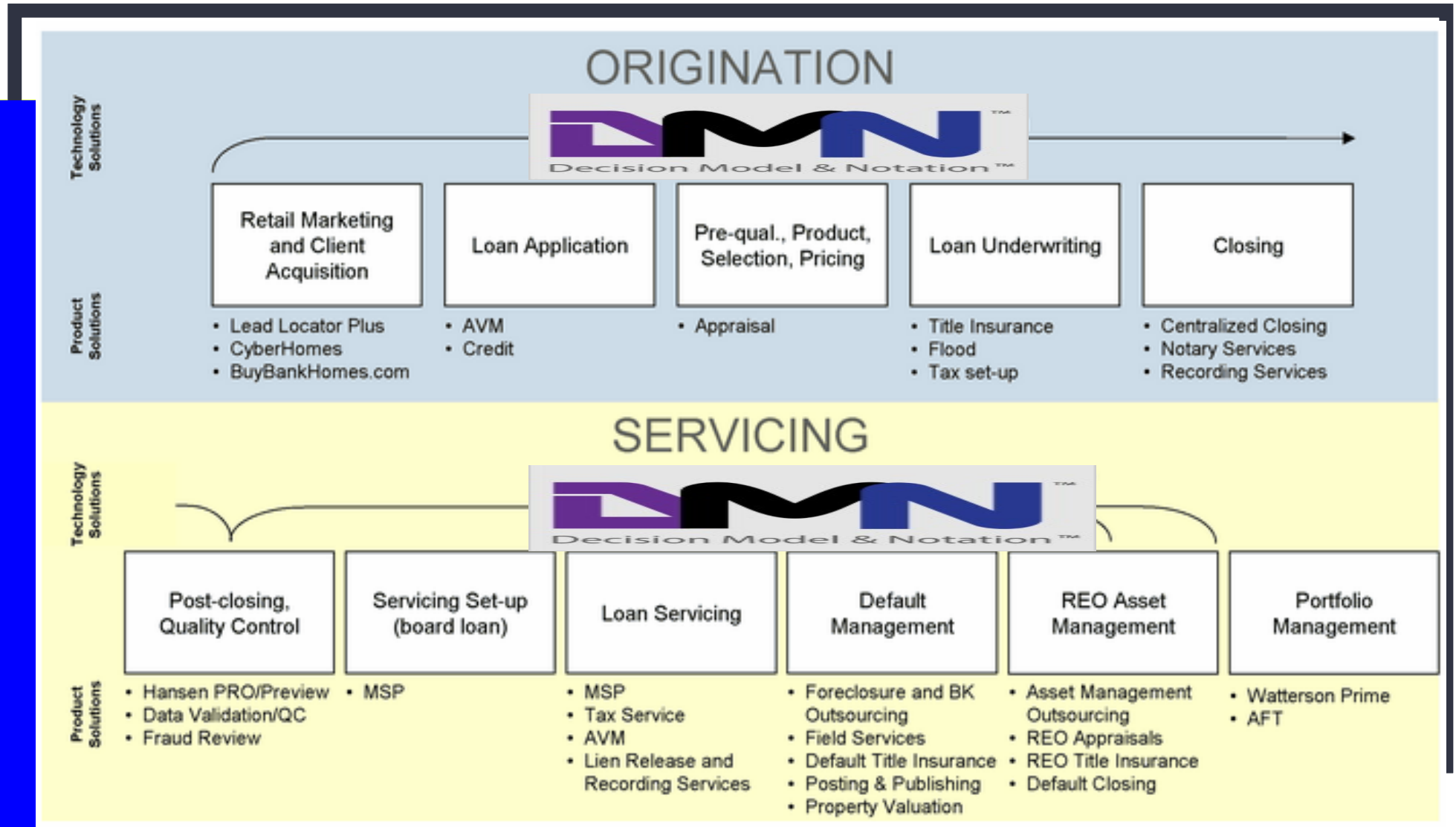
MISMO element name	Definition
HMDARateSpreadPercent	The difference between the annual percentage rate (APR) and the average prime offer rate (APOR) as required for HMDA Reporting Requirements.
LienPriorityType	A value from a MISMO prescribed list that specifies the priority of the lien against the subject property.
PresumptionOfComplianceType	Specifies creditor is presumed to have complied with Regulation Z (12 CFR Part 1026.43(e)(1)) with respect to a transaction.
QualifiedMortgageHigherPricedIndicator	When true, indicates the transaction is considered to be a higher priced mortgage loan under Qualified Mortgage requirements, and determines whether a loan has a safe harbor or rebuttable presumption of compliance with the ATR requirements.
QualifiedMortgageType	A value from a MISMO prescribed list that specifies the specific standard used to satisfy Regulation Z Qualified Mortgage standards.

Presumption of Compliance Decision					
	Qualified Mortgage Type	Lien Priority Type	HMDA Rate Spread Percent	Qualified Mortgage Higher Priced Indicator	Presumption Of Compliance Type
U		FirstLien, FourthLien, Other, SecondLien, ThirdLien		false, true	RebuttablePresumption SafeHarbor
1	Standard, Temporary	FirstLien	>= 1.5	true	RebuttablePresumption
2	Standard, Temporary	SecondLien, ThirdLien, FourthLien	>= 3.5	true	RebuttablePresumption
3	SmallCreditor, BalloonPayment	-	>= 3.5	true	RebuttablePresumption
4	-	-	-	false	SafeHarbor

ATR/QM DRD



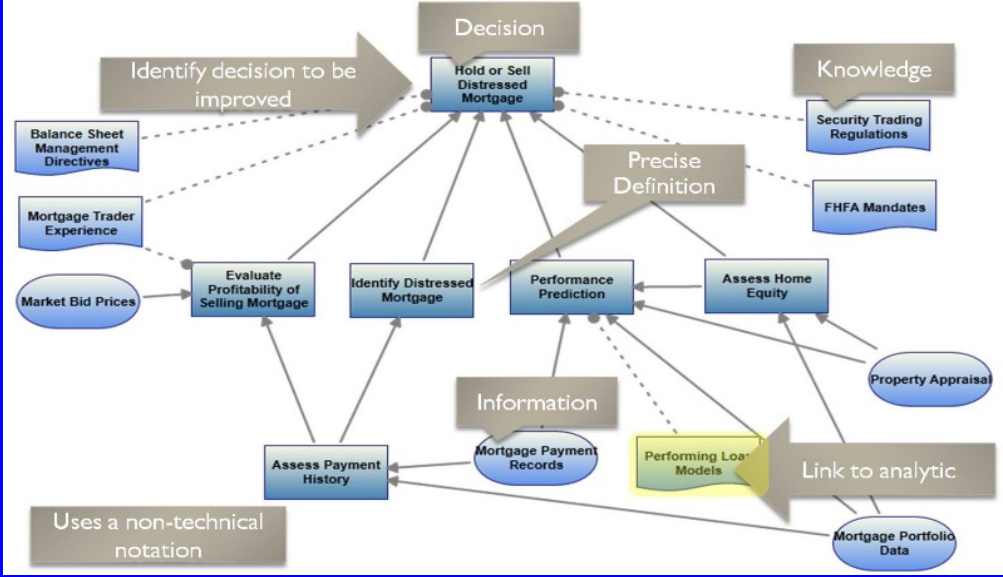
WHAT IF ... DIGITAL MORTGAGE + DECISIONS





CLOSING THOUGHTS

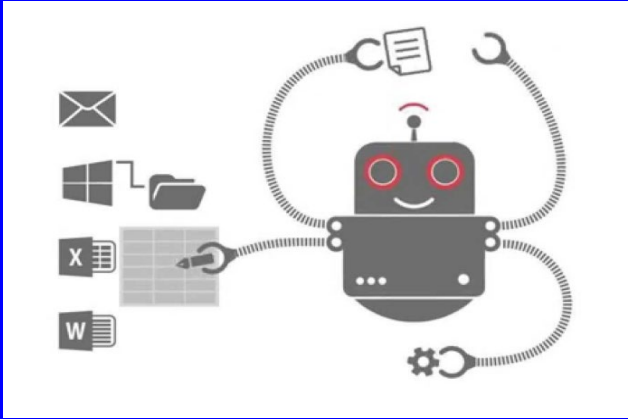
DECISION MANAGEMENT, DIGITAL TRANSFORMATION & NEW TECH



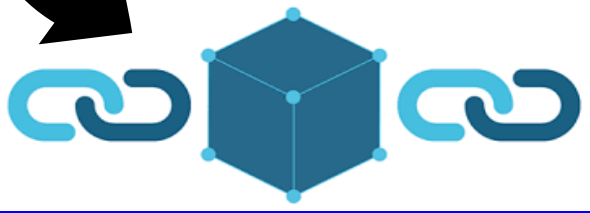
Decision Management



AI



RPA



Blockchain

FUTURE: VALUE VS COLLABORATION

High Industry Value	<p>Info Security / Privacy</p> <p>Info Security / Risk</p> <p>“MISMO LAB” – bring in millennials</p> <p>Regulatory “Pre-check”</p>	<p>Reference Model Implementations (for a fee)</p> <p>MISMO B2C</p> <p>Info Security Standards</p> <p>Electronic Loan File</p>	<p>Industry Forms – Standards for Completion</p> <p>Data standards for the mortgage industry</p>	<p>Interoperability (like Bluetooth): Define / Certify</p> <p>LDM – Tech agnostic view of the standards</p> <p>Data standards – Data aggregators (VOI/ VOA, etc.)</p> <p>Enable JSON</p> <p>“Gold” / approved copy of data file</p>	<p>Trusted Repository of Data/Docs – Nat'l Mtg Record</p> <p>Transition from a data exchange focus to an API integration in both B2B and B2C</p> <p>Reference model implementations (for a fee)</p> <p>Business Reference Model / Business Rules for Data Validation (data definitions / implementations)</p>
	Low Industry Value	<p>MISMO PR problem</p> <p>Commercial oriented business model for MISMO</p>	<p>3rd Party Risk Mgmt</p> <p>Info Security Collaboration Portal</p>		
	Low Collaboration	High Collaboration			

FUTURE: FEASIBILITY VS ADOPTION

<p>High Feasibility</p>		<p>Industry Forms – Standards for Completion</p> <p>Data standards – Data aggregators (VOI/ VOA, etc.)</p>	<p>Enable JSON</p> <p>Interoperability (like Bluetooth): Define / Certify</p> <p>LDM – Tech agnostic view of the standards</p> <p>Transition from a data exchange focus to an API integration in both B2B and B2C</p> <p>Reference model implementations (for a fee)</p> <p>Business Reference Model / Business Rules for Data Validation (data definitions / implementations)</p>
<p>Low Feasibility</p>	<p>Electronic Loan File “Gold” / approved copy of data file</p> <p>Trusted Repository of Data/Docs</p>	<p>Data standards for the mortgage industry</p>	
	<p>Low Likelihood of Adoption</p>	<p>High Likelihood of Adoption</p>	

Forrester Research's Tech Radar ranked **decision management** as the top AI technology in terms of **business "value-add"** over the next 5-10 years.



THANK YOU

Brian Stucky

DECISIONX

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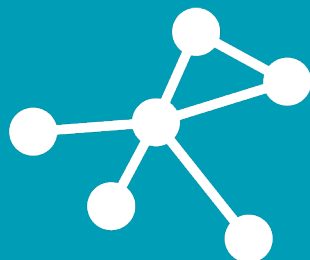
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