Beyond Decision Models – Using Technical and Business Standards to Transform Financial Services

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More than mortgages...

FINTECH

Quicken Loans
ROCK VENTURES
ROCK CONNECTIONS
ROCK PROCESSING
AMROCK

VENTURE CAPITAL

Quicken Loans
MARXENT
AutoBooks
uElevate
levellevele
Waymark
Ludlow

PRIVATE EQUITY

ProtectAmerica
ConnectAmerica
ROCKBRIDGE GROWTH EQUITY

FOC INVESTMENTS

ASH & ERIE
AMBER ENGINE
COLLECT

SANDSTROM
DETROIT LABS
DERING HALL

REAL ESTATE

BEDROCK

PARTNERSHIPS

Quicken Loans
OPPORTUNITY DETROIT

SPORTS / MEDIA / ENTERTAINMENT / GAMING / HOTELS

Quicken Loans
100 THIEVES
Fathead
SHINOLA

Quicken Loans
5th Third Field

VENTURE CAPITAL

RockBot

FINTECH

COURTSIDE

FOC INVESTMENTS

dictionary.com

REAL ESTATE

JACK ENTERTAINMENT

SPORTS / MEDIA / ENTERTAINMENT / GAMING / HOTELS

THE RITZ-CARLTON® CLEVELAND
• Background: MISMO & DMN
• Standards Integration
• Loan Life Cycle
• Transforming Fintech

• Financial Services Use Case
• What We Need
• Summary & Closing
• Questions
Background: MISMO & DMN
MISMO

Mortgage Industry Standards and Maintenance Organization

Developer of technology standards for both residential and commercial property transactions in US markets. By promoting improved data consistency, MISMO aims to reduce costs and increase transparency while promoting confidence in mortgages as an asset class for investors.
Drive for Standards

• DMN creates a standardized bridge for the gap between the decision design and implementation
• Ensure that decision models are exchangeable across organizations

• MISMO’s vision is to standardize how the mortgage industry communicates.
• Mission is to drive standardized data AND information and improved business practices between all mortgage stakeholders
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 Integration
Integration at the Data Level
MISMO + DMN

• Import / Create a DMN data structure based on the MISMO XSD

• Reference these attributes (with all enumerations & data typing)

• Create a combined and fully standardized, shareable message
Loan Life Cycle
Mortgage Industry Life Cycle

THE INDUSTRY

- Establishes the market prices and products
- Creates mortgages
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- Collects mortgage payments, manages escrow and delinquencies
- Signs and records loan documentation & disburse funds
- Underwrites
- Closing
- Warehousing
- Shipping
- Processing
- Origination
Where We Are

Barriers to Effectiveness

- Communication
- Regulations
- Legacy
- Redundancy
Transforming Fintech
We Know What DMN Can Do

- Rules have been prevalent in this industry for over 25 years
  - Origination, underwriting, closing, pricing, loan recommendation, compliance, etc.
  - Virtually every step in the life cycle
- Decision models are now being built
  - Data validation
  - Investor guidelines

- Legacy BRMS didn’t quite live up to promise
  - Total business control
  - “Zero time to market”
- Only the richest could do it
- Often part of the traditional SDLC

**DMN does mitigate many of these concerns**
But Where Can We Go?

Rare case where the technology exists to handle new problems

Standardized message allows us to approach old problems in new ways
Financial Services Use Case
Ability-to-Repay and Qualified Mortgage 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.
Evaluated Numerous Times
Distribution of the Rule

43(e) Qualified mortgages.
43(e)(1) Safe harbor and presumption of compliance.

1. General. Section 1026.43(c) requires a creditor to make a reasonable and good faith determination at or before consummation that a consumer will be able to repay the covered transaction. Section 1026.43(e)(1)(i) and (ii) provide a safe harbor and presumption of compliance, respectively, with the repayment ability requirements of § 1026.43(e) for creditors and assignees of covered transactions that satisfy the requirements of a qualified mortgage under § 1026.43(e)(2), (e)(4), or (f). See § 1026.43(e)(1)(i) and (ii) and associated commentary.

43(e)(1)(i) Safe harbor for transactions that are not higher-priced covered transactions.

1. Safe harbor. To qualify for the safe harbor in § 1026.43(c)(1)(i), a covered transaction must meet the requirements of a qualified mortgage under § 1026.43(e)(2), (e)(4), or (f) and must not be a higher-priced covered transaction, as defined in § 1026.43(b)(4). For guidance on determining whether a loan is a higher-priced covered transaction, see comment 43(b)(4)-1.

43(e)(1)(ii) Presumption of compliance for higher-priced covered transactions.

1. General. Under § 1026.43(c)(1)(i), a creditor or assignee of a qualified mortgage under § 1026.43(c)(2), (e)(4), or (f) that is a higher-priced covered transaction is presumed to comply with the repayment ability requirements of § 1026.43(e). To rebut the presumption, it

776
4.3 What makes a QM loan higher-priced? (§ 1026.43(b)(4))

A Qualified Mortgage under the General or Temporary definition is higher-priced if:
- It is a first-lien mortgage for which, at the time the interest rate on the loan was set, the APR was 1.5 percentage points or more over the Average Prime Offer Rate (APOR).
- It is a subordinate-lien mortgage with an APR that, when the interest rate was set, exceeded the APOR by 3.5 percentage points or more.

For example, if the APOR is 5 percent at the time when the interest rate on a mortgage is set, then a first-lien mortgage is higher-priced if it has an APR of 6.5 percent or more.

A Small Creditor or Balloon-Payment QM is higher-priced if:
- It has an APR that, when the interest rate was set, exceeded the APOR by 3.5 percentage points or more, for both first-lien and subordinate-lien mortgages. For example, if the APOR is 5 percent at the time when the interest rate on a mortgage is set, a mortgage that is a
- Small Creditor Qualified Mortgage is higher-priced if it has an APR of 8.5 percent or more, regardless of whether it is first- or subordinate-lien loan. To calculate whether a loan’s APR exceeds the APOR for a comparable loan by more than the relevant 1.5 or 3.5 percentage-point spread, you may use the rate-spread calculators and other guidance available online at [http://www.ffiec.gov/ratespread/](http://www.ffiec.gov/ratespread/).
## Benefit of Decision Modeling

<table>
<thead>
<tr>
<th>MISMO element name</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMDARateSpreadPercent</td>
<td>The difference between the annual percentage rate (APR) and the average prime offer rate (APOR) as required for HMDA Reporting Requirements.</td>
</tr>
<tr>
<td>LienPriorityType</td>
<td>A value from a MISMO prescribed list that specifies the priority of the lien against the subject property.</td>
</tr>
<tr>
<td>PresumptionOfComplianceType</td>
<td>Specifies creditor is presumed to have complied with Regulation Z (12 CFR Part 1026.43(e)(1)) with respect to a transaction.</td>
</tr>
<tr>
<td>QualifiedMortgageHigherPricedIndicator</td>
<td>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.</td>
</tr>
<tr>
<td>QualifiedMortgageType</td>
<td>A value from a MISMO prescribed list that specifies the specific standard used to satisfy Regulation Z Qualified Mortgage standards.</td>
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</tbody>
</table>

### Presumption of Compliance Decision

<table>
<thead>
<tr>
<th>U</th>
<th>Qualified Mortgage Type</th>
<th>Lien Priority Type</th>
<th>HMDA Rate Spread Percent</th>
<th>Qualified Mortgage Higher Priced Indicator</th>
<th>Presumption Of Compliance Type</th>
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<td>Standard, Temporary</td>
<td>FirstLien</td>
<td>&gt;= 1.5</td>
<td>false, true</td>
<td>RebuttablePresumption</td>
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<td>Standard, Temporary</td>
<td>SecondLien, ThirdLien, FourthLien</td>
<td>&gt;= 3.5</td>
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<td>Safe Harbor</td>
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<td>SmallCreditor, BalloonPayment</td>
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<td>RebuttablePresumption</td>
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<td>-</td>
<td>false</td>
<td>Safe Harbor</td>
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*Missing data element*
ATR/QM Decision Requirements Diagram (DRD)
Key Points

- A regulatory agency publishes a mandatory compliance regulation with a textual description of a rule that must be automated
- Updated regularly
- Disseminated from regulatory agency to lenders
- Applied at numerous steps in the mortgage life cycle
- Difficult requirement – particularly for smaller lenders

✓ Relatively easy to implement in DMN
Recent Change – CFPB Update July 2019

- 30 pages of text describing proposed change
- Lenders responsible for digesting, analyzing, and implementing change

➢ No interpretation guidance from CFPB
Change in Established DMN
What We Need
Not Talking About...
New Options for Sharing & Exchange
Sharing Regulations

THE INDUSTRY

- Establishes market prices and products
- Creates mortgages
- Collects supporting documents to verify information
- Evaluates loan documentation to approve/deny loan
- Finances loans from closing until sale to investor
- Collects and monitors mortgage payments, manages escrows and delinquencies
- Signs and records loan documentation & disburse funds
- Packages loan documentation according to investor's guidelines
- Warehouse
- Processing
- Underwriting
- Closing
- Loan Administration
- Secondary Marketing
- Origination
- Shipping/Beverly
- Delivery
Exporting DMN Files
Sharing & Exchange

- Lender guidelines
  - Between lenders
  - Lenders -> affiliates
- Daily pricing rate sheets
- GSE standard guidelines
  - Use as presented
  - Modify with client specific rules
- Compliance
- Reporting
- Data validation

➢ Same ATR applied everywhere

### Conventional Conforming High Balance Products

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<th>Rate</th>
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<td>3.75</td>
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<td>4.50</td>
<td>0.186</td>
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### Conventional Product Pricing Adjustments

<table>
<thead>
<tr>
<th>FICO RANGE</th>
<th>600-640</th>
<th>641-680</th>
<th>681-740</th>
<th>741-800</th>
<th>801-850</th>
<th>851-880</th>
<th>881-900</th>
<th>901+</th>
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### Cash Out Refinance Product Grid (Both Grids Apply All Loan Terms and Programs)

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Enabling Services

THE INDUSTRY

Establishes the market prices and products

Creates mortgages

Collects supporting documents to verify information

Collects and monitors mortgage payments, manages escrows and delinquencies

Packages loan documentation according to investor’s guidelines

Finances loans from closing until sale to investor

Signs and records loan documentation & disburse funds

Evaluation loan documentation to approve/deny loan

Finances loans from closing until sale to investor

Collects and monitors mortgage payments, manages escrows and delinquencies

Underwriting

Shipping & Fulfilling

Closing

Warehousing

Origination

Secondary Marketing

Loan Administration
APIs & Microservices

• Standardizing a *message* (data & structure / MISMO & DMN) facilitate the creation of easily created and accessible APIs
  • MISMO working on standardization
• DMN allows us to create applications, functions and decisions at any level of granularity necessary
  • Microservices as collection of loosely coupled services
  • Common, repeatable mortgage processing functions (e.g., income verification and validation

➢ Access to ONE ATR execution model
Digital Decision Library

APIs enabled that are DMN / MISMO – based

Discrete processing elements – building blocks as needed for integration

Central management – change once
Disseminating Regulations

- Collects and monitors mortgage payments, manages recovery and delinquencies
- Establishes the market prices and products
- Creates mortgages
- Collects supporting documents to verify information
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- Finances loans from closing until sale to investor
- Evaluates loan documentation to approve/deny loan
- Signs and records loan documentation & disburse funds
- Secondary Marketing
- Origination
- Processing
- Underwriting
- Warehousing
- Loan Administration
- Shipping & Delivery
- Closing
Decisions Models as a Regulation Standard

- No more documents! No more interpretation!
- Express regulations as decision models
  - Facilitates adoption
  - Eases burden on industry players
  - Mitigates inconsistencies
  - Write and interpret the rule
  - Changes and versioning made easy
  - Rapid deployment of changes
- ATR rule – change and deployment is easy

*Discussions underway with regulatory agencies and MISMO!*
Digital Mortgage

THE INDUSTRY

- Establishes the market prices and products
- Collects and monitors mortgage payments, manages escrows and delinquencies
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- Finances loans from closing until sale to investor
- Signs and records loan documentation & dispute funds
- Underwrites
- Loan Administration
- Secondary Marketing
- Origination
- Processing
- Shipping
- Warehousing
- Closing
- Wholesaling

Quicken Loans
“Checking the Checker”

Mortgage origination is still a very form based process

- **Redundant Checks:** Information that has been checked by an originator will be re-checked by correspondent banks and aggregators. Q/C procedures involve a duplication of checking.

- **Data quality and Standards:** Common errors owing to versioning of data, lack of electronic data exchange standards, even with MISMO, ULDD.

- **Manually Intensive:** Data validation through stare and compare and manual input of data from multiple sources is time consuming and often inaccurate.
Passing the Data is Good...

THE LIFE OF LOAN SMART CONTRACT IS ABOUT UNIFYING DATA AND AUTOMATED BUSINESS PROCESS

LIFE OF LOAN SMART CONTRACT

AUTOMATED BUSINESS LOGIC

The business process runs as an automated computer program, based on data that is provided by trusted participants on the blockchain.

CHECK DTI

CHECK APPRAISAL VALUE

LOCK RATE

SUBMIT NOTICE OF LOAN

UNIFIED DATA "ON CHAIN"

PARAMETER DATA

Parameters that the smart contract uses that provide the specifics of the loan (e.g., is it a FHA loan etc.).

ORIGINATION RELATED DATA

This may include digitized form data, verification keys from third parties for certain data elements.

SECURITIZATION RELATED DATA

A tie to the common security that enables a line of sight from the loan through the MBS pools and common security.

TRANSACTION RELATED DATA

Every payment made on the loan is available.

SERVICING RELATED DATA

Special servicing, refinancing, re-performer history

PARTICIPANTS ON THE LEDGER CONTRIBUTING AND READING DATA AND PARTICIPATING IN THE SMART CONTRACT’S AUTOMATED BUSINESS PROCESS

BUYERS

APPRAISERS

GUARANTORS

ORIGINATORS

AGGREGATORS

CORRESPONDENT BANKS

ATTORNEYS

INSURERS

OTHER THIRD PARTIES
Passing the Data & Rule is Better...

**THE LIFE OF LOAN SMART CONTRACT IS ABOUT UNIFYING DATA AND AUTOMATED BUSINESS PROCESS**

**LIFE OF LOAN SMART CONTRACT**

- **AUTOMATED BUSINESS LOGIC**
  - The business process runs as an automated computer program, based on data that is provided by trusted participants on the blockchain.

- **CHECK DTI**
- **CHECK APPRAISAL VALUE**
- **LOOK RATE**
- **SUBMIT NOTICE OF LOAN**

**UNIFIED DATA "ON CHAIN"**

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- **ORIGINATORS**
- **AGGREGATORS**
- **CORRESPONDENT BANKS**
- **ATTORNEYS**
- **INSURERS**
- **OTHER THIRD PARTIES**

*Quicken Loans*
Closing
My Wish List...

DMN vendors compliant with the standard!

Look for the easy wins!

Promote other business industry standards!
  Health care
  Insurance (ACORD)

Facilitate migration from legacy systems!
Thank you!

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