ISDA's Common Domain Model (CDM)
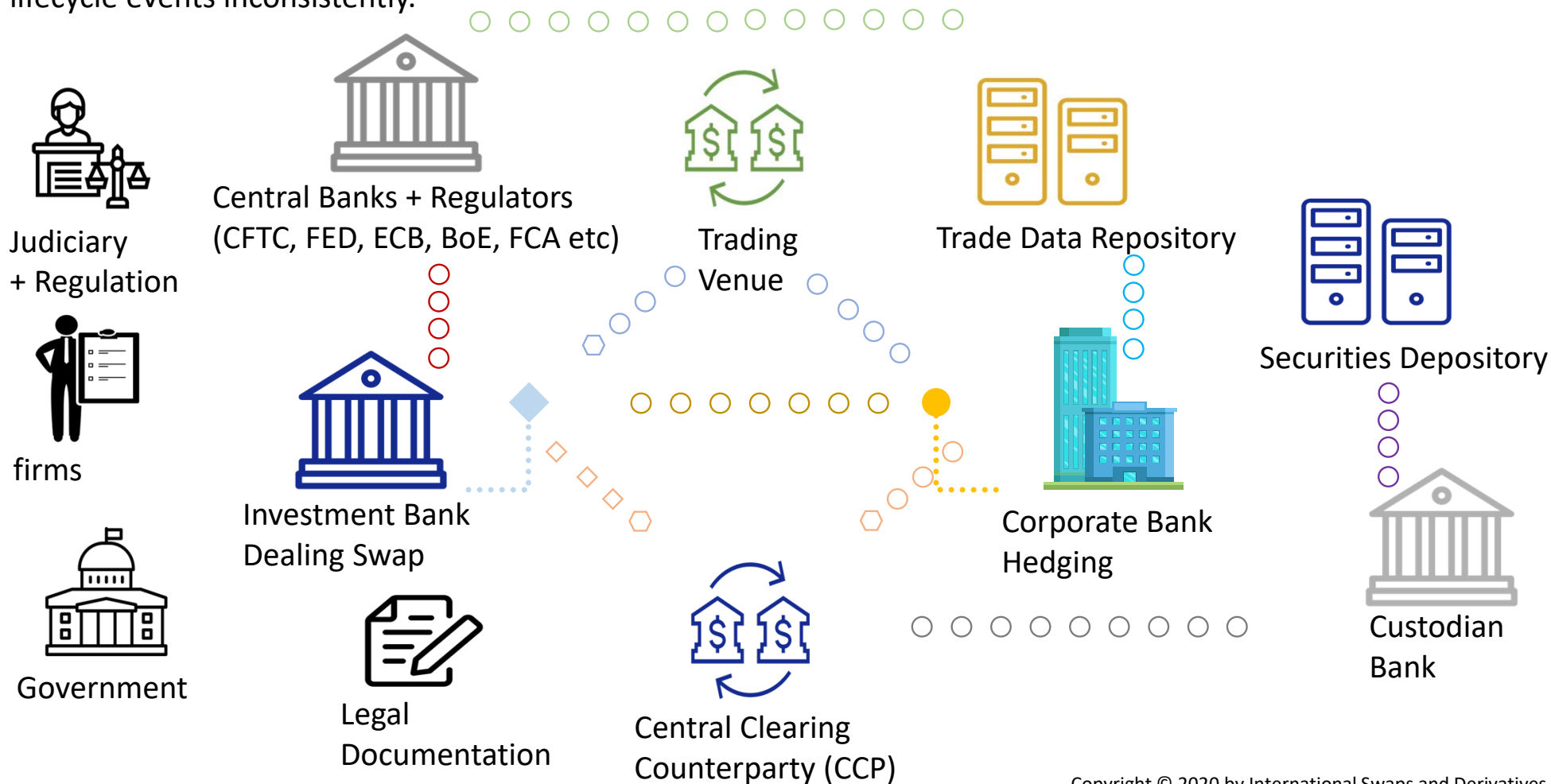
ISDA® | Safe, Efficient Markets

Technology Advisory Committee meeting,
CFTC, Washington D.C.,
Wednesday, 26th February 2020
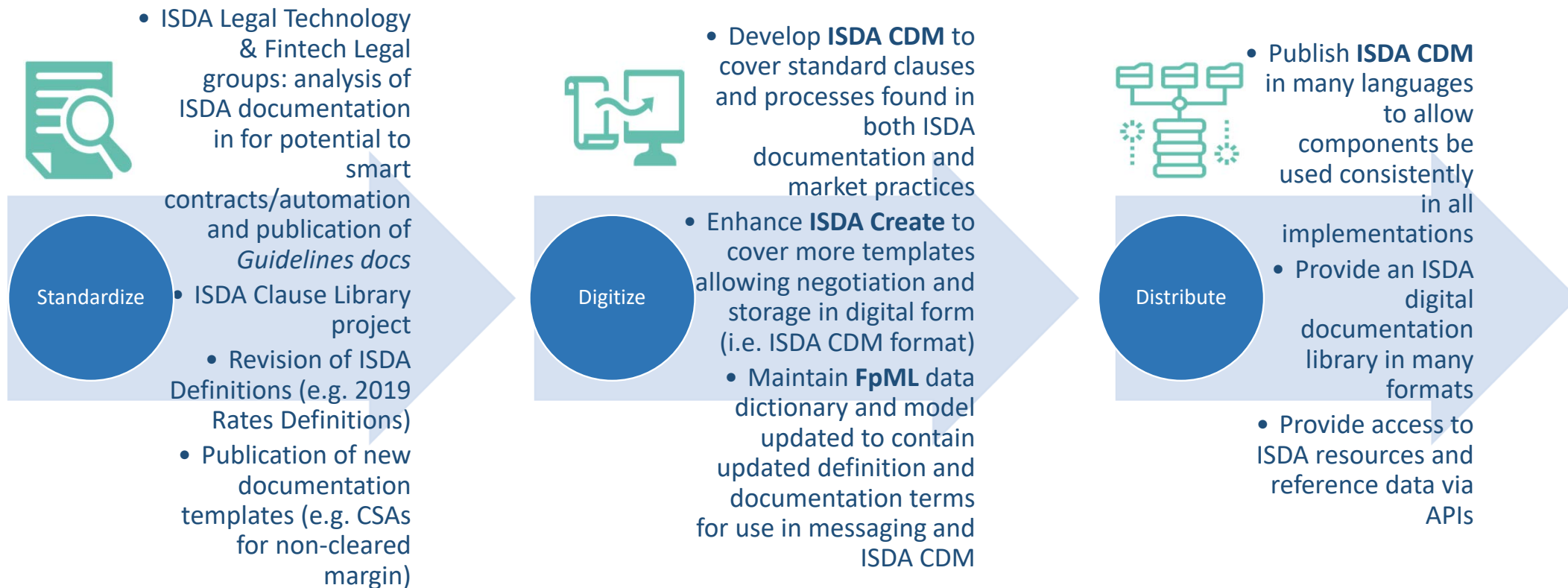
Ian Sloyan
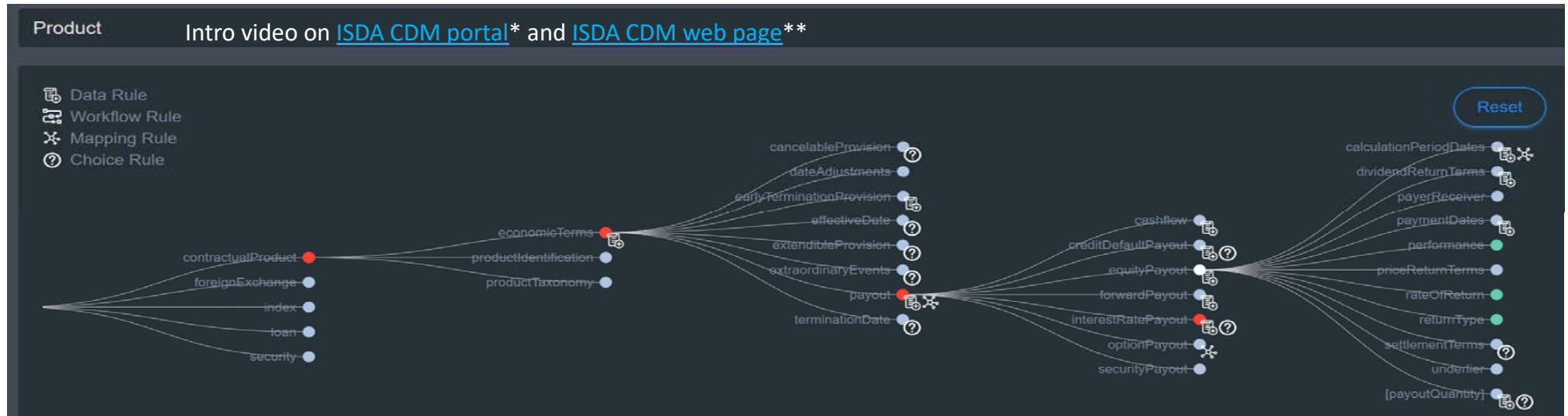Director, Market Infrastructure and Technology
ISDA

What is the market infrastructure?

Thinking of the key entities, institutions, authorities and services we know make the markets function: all parties store trade data in bespoke formats and make changes to these records due to lifecycle events inconsistently.

Judiciary + Regulation

firms

Government

Central Banks + Regulators (CFTC, FED, ECB, BoE, FCA etc)

Trading Venue

Trade Data Repository

Securities Depository

Investment Bank Dealing Swap

Legal Documentation

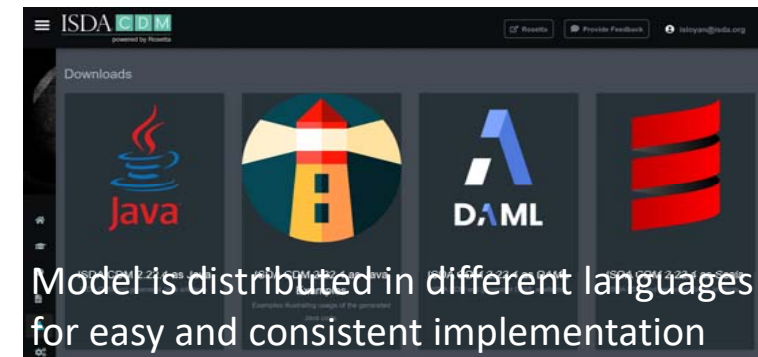Central Clearing Counterparty (CCP)

Corporate Bank Hedging

Custodian Bank

The ISDA CDM is just one part of ISDA's strategy to go from delivering market standards as documentation, to delivering standards as code?

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Standardize

- ISDA Legal Technology & Fintech Legal groups: analysis of ISDA documentation in for potential to smart contracts/automation and publication of *Guidelines docs*
- ISDA Clause Library project
- Revision of ISDA Definitions (e.g. 2019 Rates Definitions)
- Publication of new documentation templates (e.g. CSAs for non-cleared margin)

Digitize

- Develop **ISDA CDM** to cover standard clauses and processes found in both ISDA documentation and market practices
- Enhance **ISDA Create** to cover more templates allowing negotiation and storage in digital form (i.e. ISDA CDM format)
- Maintain **FpML** data dictionary and model updated to contain updated definition and documentation terms for use in messaging and ISDA CDM

Distribute

- Publish **ISDA CDM** in many languages to allow components be used consistently in all implementations
- Provide an ISDA digital documentation library in many formats
- Provide access to ISDA resources and reference data via APIs

Intro video on ISDA CDM portal* and ISDA CDM web page**

COMMON DOMAIN MODEL - A DIGITAL MODEL OF PRODUCTS, CALCULATIONS AND EVENTS

- o Presented as data and functions in the model
- o Composable product model assembled with reusable components
  - o Product classification logic inferred from economic components
- o Composable workflow and lifecycle event model assembled from *primitive* event components
  - o *Primitive* = state transition...with before and after state
  - o Event classification logic inferred from *primitive* components
  - o Functions to define *primitive* state transitions
  - o Function specifications: inputs, outputs, plus constraints
- o Contract mechanics with functions specifying ISDA Definitions
  - o Calculations and operational clauses

Model is distributed in different languages for easy and consistent implementation

*
https://portal.cdm.rosetta-technology.io/#/login
**
https://www.isda.org/2019/10/14/isda-common-domain-model/

ISDA.CDM

```
func FloatingAmount: <"2006 ISDA Definition Article 6 Section 6.1. Calculation of a Floating Amount: Subject
    to the provisions of Section 6.4 (Negative Interest Rates), the Floating Amount payable by a party on a
    Payment Date will be: (a) if Compounding is not specified for the Swap Transaction or that party, an
    amount calculated on a formula basis for that Payment Date or for the related Calculation Period as
    follows: Floating Amount = Calculation Amount × Floating Rate + Spread × Floating Rate Day Count Fraction
    (b) if "Compounding" is specified to be applicable to the Swap Transaction or that party and 'Flat
    Compounding' is not specified, an amount equal to the sum of the Compounding Period Amounts for each of
    the Compounding Periods in the related Calculation Period; or (c) if 'Flat Compounding' is specified to
    be applicable to the Swap Transaction or that party, an amount equal to the sum of the Basic Compounding
    Period Amounts for each of the Compounding Periods in the related Calculation Period plus the sum of the
    Additional Compounding Period Amounts for each such Compounding Period.">

[calculation]
inputs:
    interestRatePayout InterestRatePayout (1..1)
    quantity NonNegativeQuantity (1..1)
    date date (1..1)
output: floatingAmount number (1..1)

alias calculationAmount: quantity -> amount
alias floatingRate: ResolveRateIndex(interestRatePayout -> rateSpecification -> floatingRate ->
    floatingRateIndex)
// TODO: question to group: why can a float rate calculation node in FpML contain multiple rate schedules?
alias spread: GetRateSchedule( interestRatePayout -> rateSpecification -> floatingRate ) -> initialValue
alias dayCountFraction: DayCountFraction(interestRatePayout, interestRatePayout -> dayCountFraction, date)

assign-output floatingAmount: calculationAmount * (floatingRate + spread) * dayCountFraction
```

ISDA Legal definition

CDM aims to bring consistent implementation of the market's standards for data, calculations, best practices, etc

ISDA CDM for **consistent implementation**

Implementation of CDM for Interest Rates clearing processes is currently in flight

CDM for Collateral data and processes*

CDM Equity derivatives model is being enhanced - incl. implementation of equity swap and corporate action processes on a DLT network
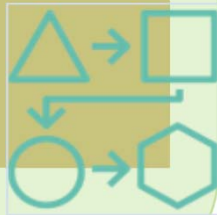
CDM applied to regulatory reporting *

Digitisation of ISDA definitions – including applications of CDM to benchmarks/IBOR transition modelling fall-back mechanisms amongst other crucial elements for this industry transition

Broadening Community and Partners - i.e. working with other trade Associations to extend ISDA CDM to other markets

*(*The focus of this presentation is just on these 2 areas of potential transformation)*

- **ISDA CDM enables interoperability** between systems/services, **removing burden of setting up connections** to different systems/entities, laying groundwork for STP.

  - E.g. **collateral workflow** management: A CSA shared with two collateral management systems, in different parts of the collateral process. If data + processes are defined in ISDA CDM, it allows for portability and easy interchange of information.

- **ISDA CDM promotes transparency and alignment** between **regulators** and market participants.

  - E.g. **regulatory** obligations, such as **reporting** or stress testing, could be met by specifying **via code** that certain CDM components or data should be collected in a certain way. This will drastically improve fidelity and integrity of regulatory outcomes.
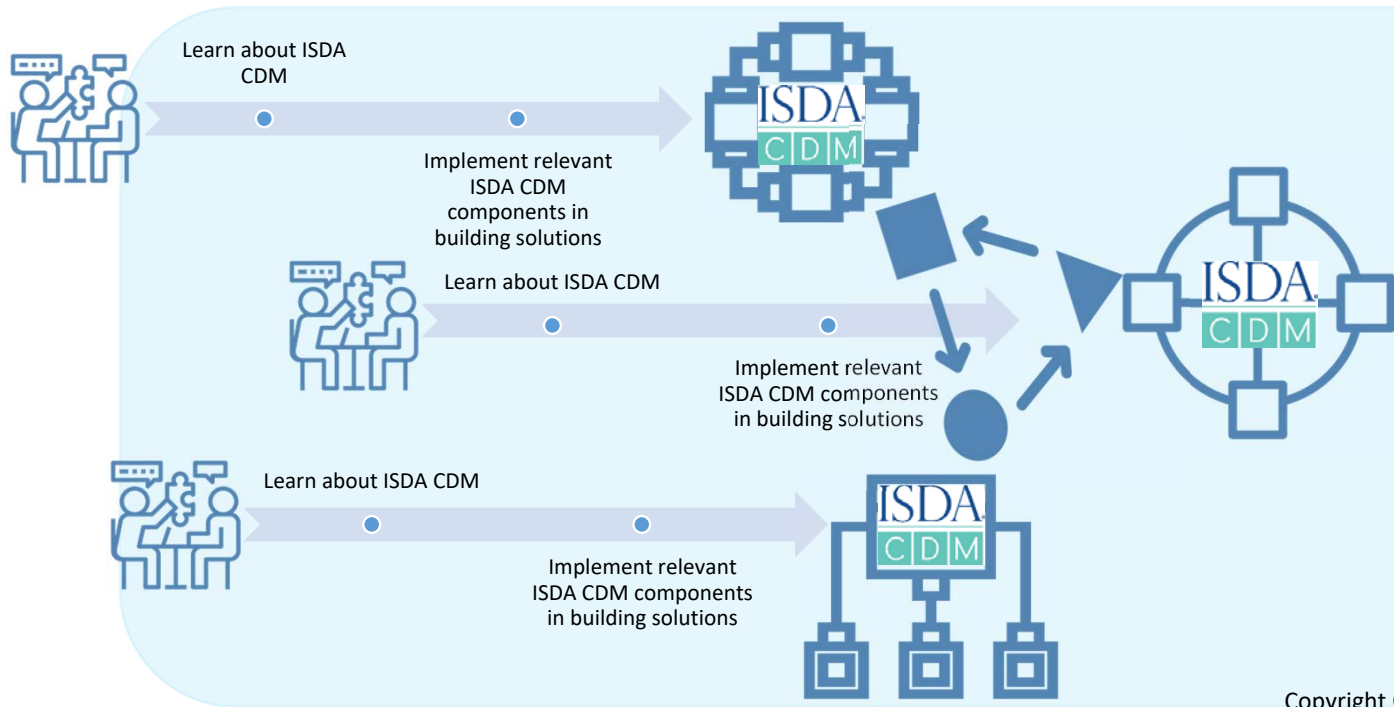
- **ISDA CDM will speed up development of new solutions** for the market by **allowing providers to focus on** what they specialize in – **the technology** – rather than requiring them to interpret and represent market events and processes individually. The **resulting technology solution will also be interoperable** with other offerings which are using ISDA CDM.

Enhance interoperability & straight through processing

Deliver better regulatory oversight

Creates an environment for innovation in financial markets

ISDA.CDM

Creates an environment for innovation in financial markets

Research business domain

Gain subject matter expertise

Design proprietary model

Implement model on technology

Convince market solution is reliable and consistent with market practices

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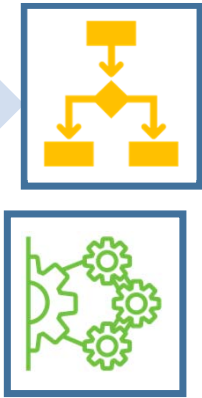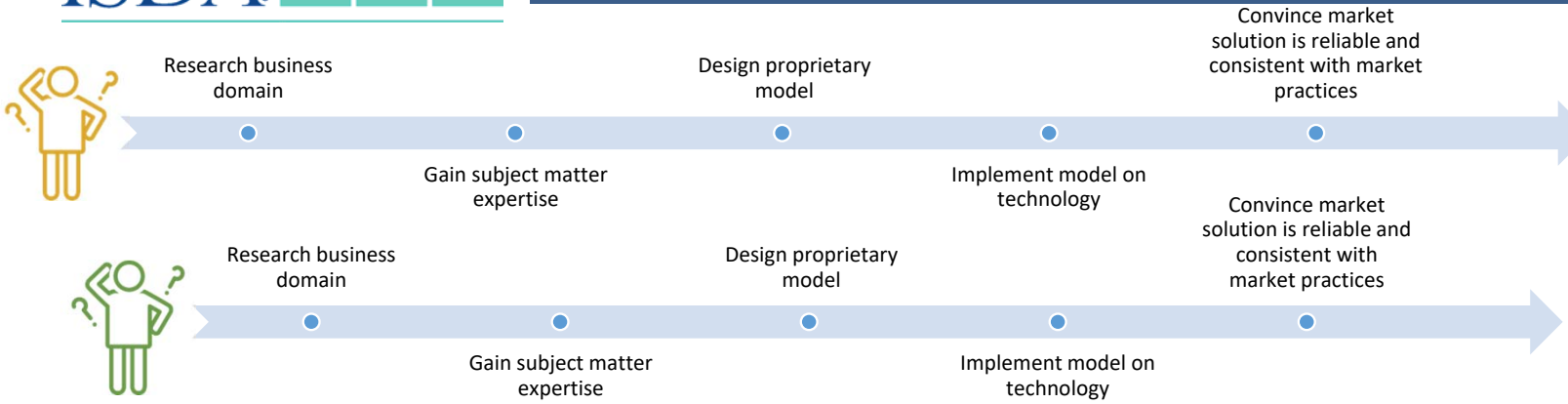
Without the benefit of a common domain model these systems are built on bespoke models and tech, impacting interoperability, taking a long time to market and moreover to gain market's trust

Learn about ISDA CDM

Implement relevant ISDA CDM components in building solutions

Learn about ISDA CDM

Implement relevant ISDA CDM components in building solutions

Learn about ISDA CDM

Implement relevant ISDA CDM components in building solutions

By deploying ISDA CDM; these new systems have:
1. Interoperability
2. Shorter time to market
3. Association with a recognised market standards set from ISDA

ISDA. CDM

Enhancing interoperability, reduces reconciliation & promotes STP

Venue
Bank
Client

Each party captures and processes the trade and **lifecycle** in their own **different** way

New trade
Increase
Margin & Collateral
Maturity

LIFECYCLE

CSA

ISDA CDM

Using ISDA CDM market participants implement the same code to manage trades throughout lifecycle

Venue
Bank
Client

New trade
Increase
Margin & Collateral
Maturity

LIFECYCLE

CSA

Consistent Industry Implementation of **Lifecycle**

CDM is being applied to Collateral workflows to improve efficiency by modelling collateral legal documentation in digital form, so a consistent model for the crucial reference data and calculations used in systems throughout collateral infrastructure can be achieved and implemented.

A - Reference data from CSAs and other collateral documentation needs to be in a consistent standard - CDM models for collateral docs which can be executed on electronic platforms such as ISDA Create* solves for this

B - Collateral eligibility and the identification of eligible assets and instruments is a special case of above and important area where ISDA is seeking a standard and modelling this in CDM

C - Connecting different systems in collateral lifecycle with consistent data model is a prerequisite for automation- CDM solves for this (ISDA has been working with vendors on the same)

D - Inconsistent calculations cause breaks and disputes – ISDA is working to model in CDM functions/calculations for clauses such as delivery amount found in documentation and processes such as margin calls

*ISDA Create is an electronic document negotiation and management system for amongst other docs ISDA margin CSAs

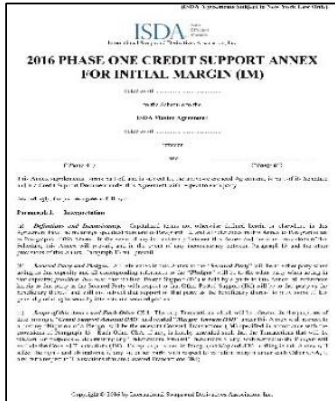**C - Connecting different systems in collateral lifecycle**

ISDA.CDM

Enhancing interoperability, reduces reconciliation & promotes STP

Focussing on CDM's potential on collateral processes in the lifecycle
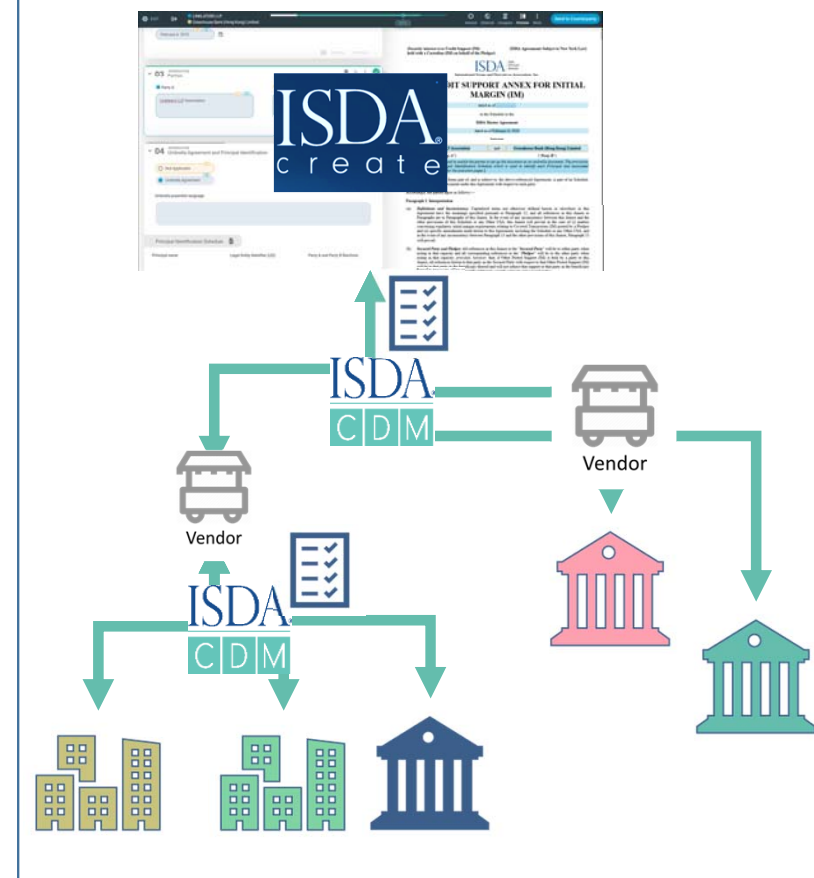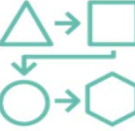
A - CDM models for collateral docs

ISDA CSA IM 2016 Japanese

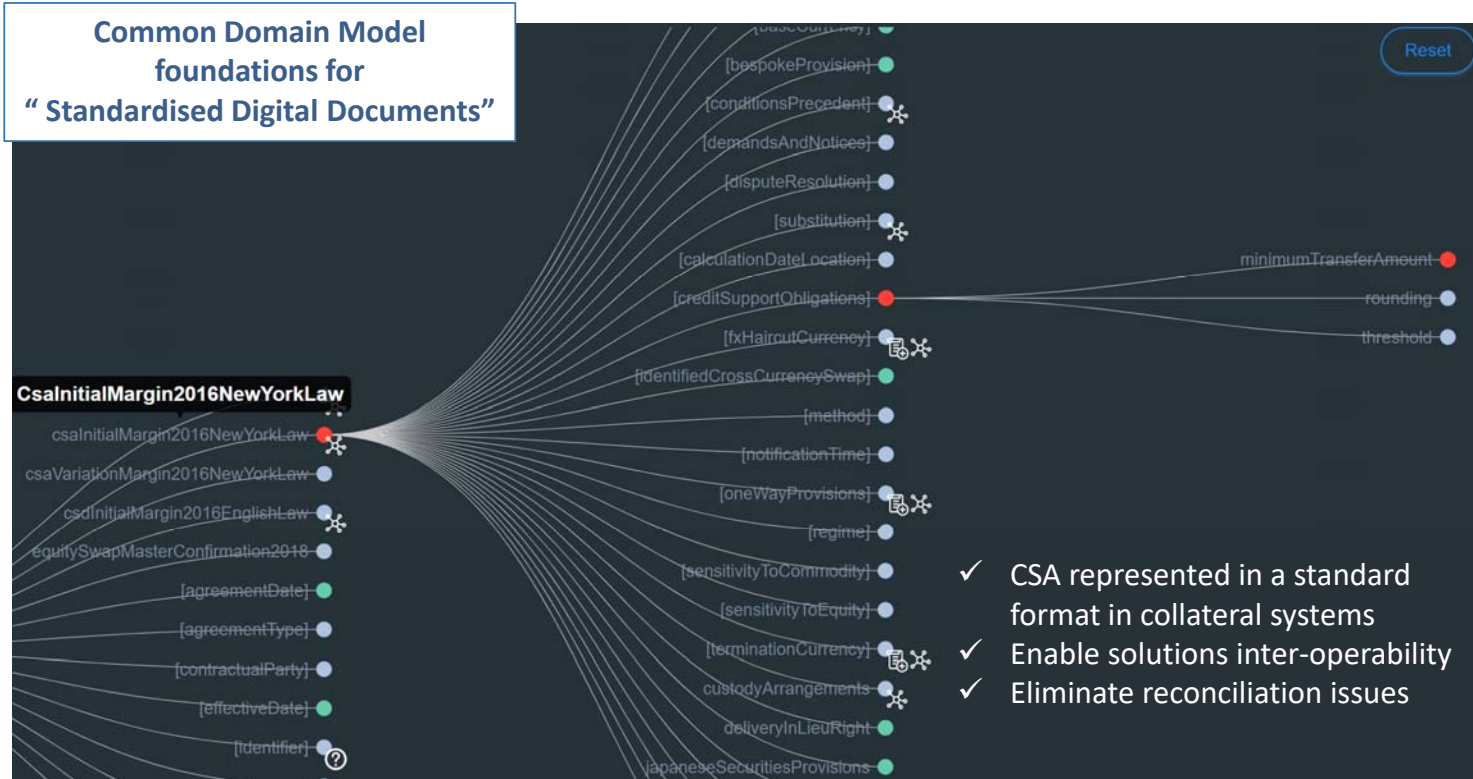ISDA CSA IM 2016 New York

ISDA CSA VM 2016 New York

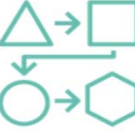ISDA CSA IM 2016 English

**Common Domain Model foundations for " Standardised Digital Documents"**

CsaInitialMargin2016NewYorkLaw

- ✓ CSA represented in a standard format in collateral systems
- ✓ Enable solutions inter-operability
- ✓ Eliminate reconciliation issues

Enhancing interoperability, reduces reconciliation & promotes STP

Focussing on CDM's potential on collateral processes in the lifecycle

B - Collateral eligibility and the identification of eligible assets

CSA Free Format Eligible Collateral Schedule No set standard open to misinterpretation

	Items of Eligible Collateral (IM) and Eligible Currencies	[In respect of Party A's posting obligation]	[In respect of Party B's posting obligation]	[Valuation Percentage]
(A)	[ ]	[ ]	[ ]	[ ]%
(B)	[ ]	[ ]	[ ]	[ ]%
(C)	[ ]	[ ]	[ ]	[ ]%
(D)	[ ]	[ ]	[ ]	[ ]%
[FX Haircut Percentage]		[In respect of Party A's posting obligation: [8]% [, unless the Eligible Collateral (IM) is denominated in the Termination Currency specified with respect to Party B under the Agreement (including, without limitation, pursuant to this Annex), in which case, 0%.]		
		[In respect of Party B's posting obligation: [8]% [, unless the Eligible Collateral (IM) is denominated in the Termination Currency specified with respect to Party A under the Agreement (including, without limitation, pursuant to this Annex), in which case, 0%.]		
[Termination Currency][10]		With respect to Party A: [ ].		
		With respect to Party B: [ ].		
		In relation to a calculation pursuant to Section 6(e)(ii)(2) in respect of an Early Termination Date resulting from a Termination Event where there are two Affected Parties: [ ].		
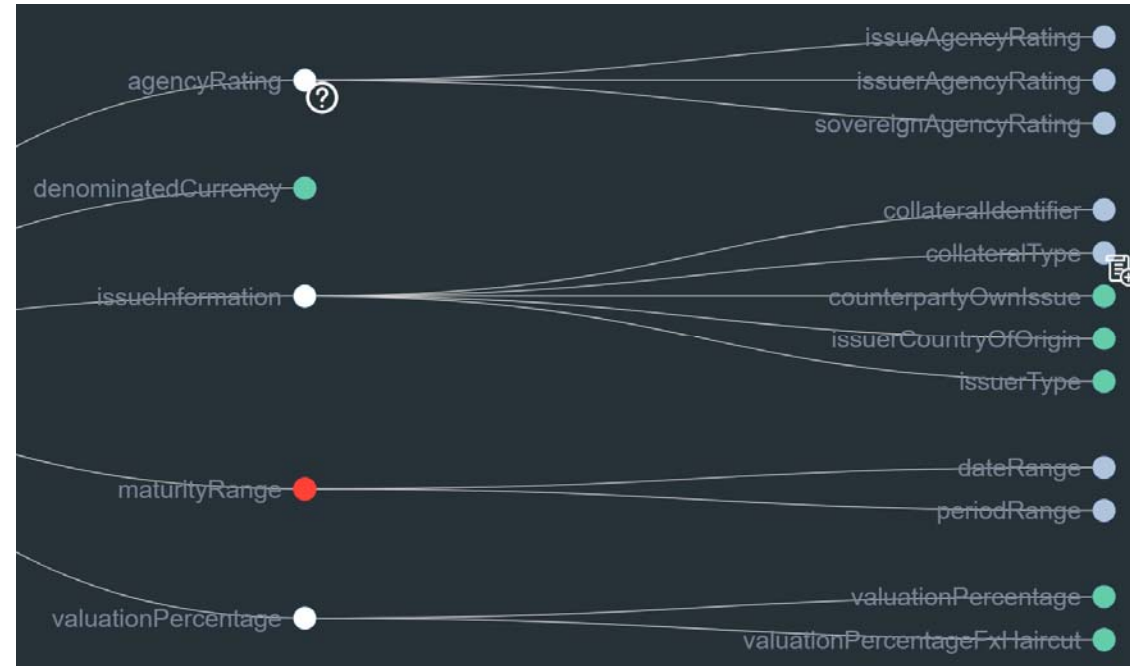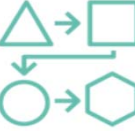
D. Digitizing Collateral Documentation Calculations

From 2018 IM CSA Calculation Legal Text

Paragraph 3.   Credit Support Obligations

(a)   *Delivery Amount (IM).* Subject to Paragraphs 4 and 5, upon a demand made by the Secured Party on or promptly following a Calculation Date (IM), if the Delivery Amount (IM) applicable to the Pledgor for that Calculation Date (IM) equals or exceeds the Pledgor's Minimum Transfer Amount (IM), then the Pledgor will Transfer to the Secured Party Eligible Credit Support (IM) having a Value as of the date of Transfer at least equal to the applicable Delivery Amount (IM) (rounded pursuant to Paragraph 13).   Unless otherwise specified in Paragraph 13, the "*Delivery Amount (IM)*" applicable to the Pledgor for any Calculation Date (IM) will equal the amount by which:

(i) the Credit Support Amount (IM) applicable to the Pledgor

exceeds

(ii) the Value as of that Calculation Date (IM) of all Posted Credit Support (IM) held by the Secured Party (as adjusted to include any prior Delivery Amount (IM) and to exclude any prior Return Amount (IM), the transfer of which, in either case, has not yet been completed and for which the relevant Regular Settlement Day falls on or prior to such Calculation Date (IM)).

(b)   *Return Amount (IM).* Subject to Paragraphs 4 and 5, upon a demand made by the Pledgor on or promptly following a Calculation Date (IM), if the Return Amount (IM) applicable to the Secured Party for that Calculation Date (IM) equals or exceeds the Secured Party's Minimum Transfer Amount (IM), then the Secured Party will Transfer to the Pledgor Posted Credit Support (IM) specified by the Pledgor in that demand having a Value as of the date of Transfer as close as practicable to (but not more than) the applicable Return Amount (IM) (rounded pursuant to Paragraph 13). Unless otherwise specified in Paragraph 13, the "*Return Amount (IM)*" applicable to the Secured Party for any Calculation Date (IM) will equal the amount by which:

To Equivalent ISDA CDM digital calculation code

```
func DeliveryAmount_IM:
    [calculation]

    inputs:
        creditSupportAmount Money (1..1)
        postedCreditSupportAmount Money (1..1)
        minimumTransferAmount Money (1..1)
        rounding CollateralRounding (1..1)
        baseCurrency string (1..1)

    output:
        result Money (1..1)

    alias deliveryAmount:
        Max( creditSupportAmount -> amount - postedCreditSupportAmount -> amount, 0.0 )

    condition:
        baseCurrency =
            ( creditSupportAmount -> currency
                and postedCreditSupportAmount -> currency
                and minimumTransferAmount -> currency )

    condition:
        creditSupportAmount -> amount exists
        and postedCreditSupportAmount -> amount exists
        and minimumTransferAmount -> amount exists

    assign-output result -> amount:
        if deliveryAmount >= minimumTransferAmount -> amount
        then RoundToNearest( deliveryAmount, rounding -> deliveryAmount, RoundingModeEnum -> Up )
        else 0.0

    assign-output result -> currency:
        baseCurrency
```
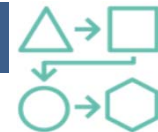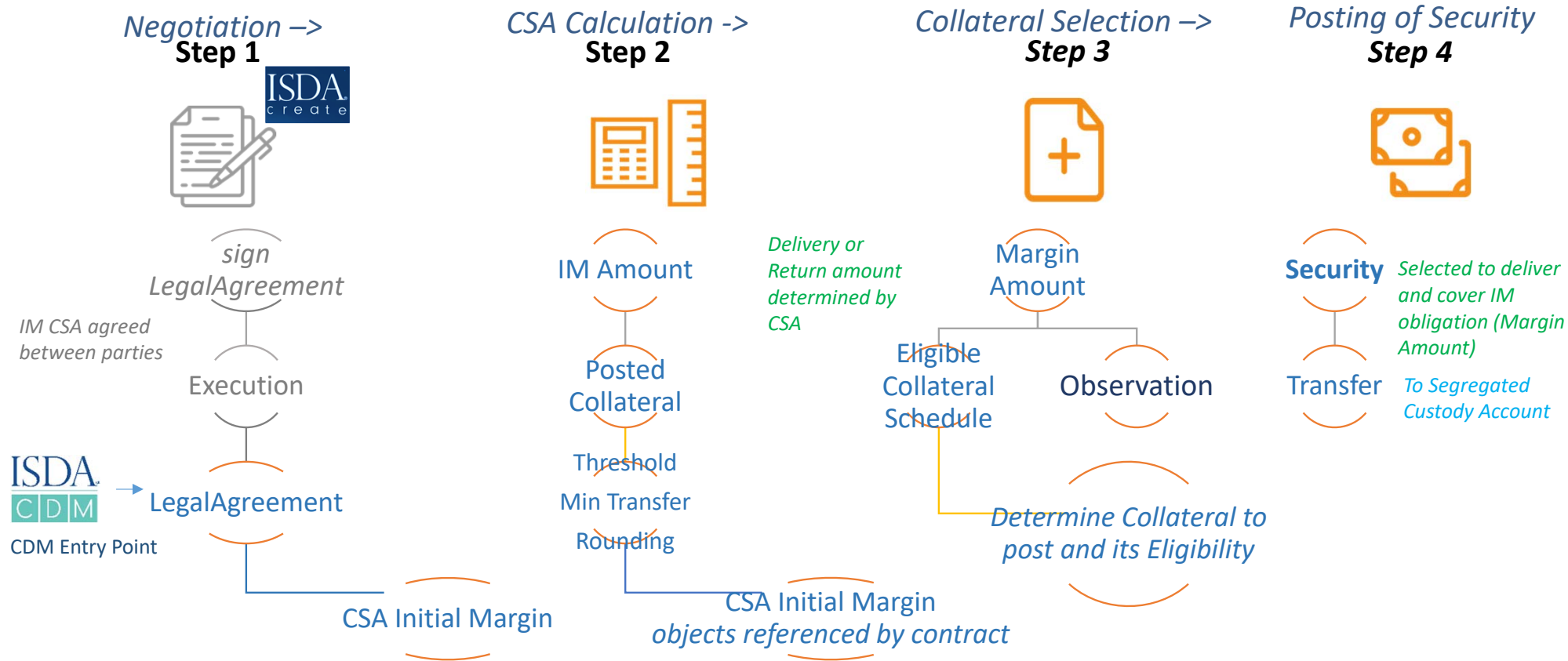
SUMMARY - Putting the model components together: CDM Collateral Initial Margin workflow

Negotiation –>
Step 1

ISDA create

sign LegalAgreement

IM CSA agreed between parties

Execution

ISDA CDM
CDM Entry Point → LegalAgreement

CSA Initial Margin

CSA Calculation ->
Step 2

IM Amount

Posted Collateral

Threshold
Min Transfer
Rounding

CSA Initial Margin
objects referenced by contract

Delivery or Return amount determined by CSA

Collateral Selection –>
Step 3

Margin Amount

Eligible Collateral Schedule

Observation

Determine Collateral to post and its Eligibility

Posting of Security
Step 4

Security

Selected to deliver and cover IM obligation (Margin Amount)

Transfer

To Segregated Custody Account

ISDA CDM

Delivers better regulatory oversight

How can the market implement regulation with ISDA CDM?

REGULATORS & TRADE ASSOCIATIONS

Example Artefacts:

Map of Trading Scenarios

Reporting Sample per Scenario

INDUSTRY PARTICIPANTS
Implement the same code in their solutions

Implement rules and best practices in ISDA CDM
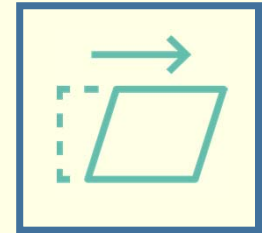
ISDA CDM

Dealer X

Dealer Y

Vendor Z

✓ Directly operational output (software)

✓ Eliminates reconciliation issues by promoting a single interpretation of regulation as code
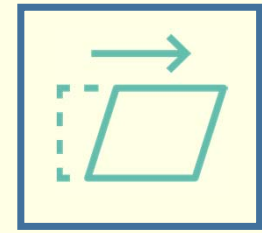
✓ Enables inter-operability of solutions
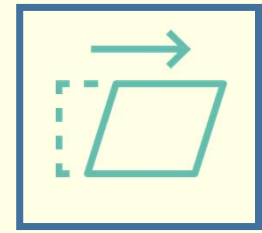
Consistent Industry Implementations

ISDA.CDM

TEXTUAL VIEW

```
102    LegalEntityIdentifierOfTheReportingParty
103
104  report CFTC CFTC_Part_43 in ASATP
105      when Reportingparty and PubliclyReportableSwap
106      using standard FpML_SDR_MessageSpecs with fields
107          DayCountConvention
108          AssetClass
109          CFTCPriceNotationType
110          CFTCPriceNotation
111          UnderlyingAsset1
112          UnderlyingAsset2
113          PriceFormingContinuationData
114          CFTCNotionalCurrency1
115          RoundedNotionalOrPrincipalAmount1
116          CFTCNotionalCurrency2
117          RoundedNotionalOrPrincipalAmount2
118          Cancellation
119          Correction
120          Executiontimestamp
```

REGULATIONS	TYPE	REFERENCE	PROVISION	RATIONALE	LOGIC
ESMA MiFIR RTS_22 ●	Eligibility **Reportingparty**	rule_number 43.2	Reporting party means the party to a swap with the duty to report a publicly reportable swap transaction in accordance with this part and section 2(a)(13)(F) of the Act.		Reportingparty filter when rule HasContract
ESMA EMIR ITS_9 ●					HasContract ContractForEvent then extract Contract
CFTC CFTC_Part_45 ●					
CFTC CFTC_Part_43 ●					ContractForEvent extract if WorkflowStep -> businessEver
	Eligibility **Publicly Reportable Swap**	rule_number 43.2	Publicly reportable swap transaction means: Unless otherwise provided in this part - (i) Any executed swap that is an arm's-length transaction between two parties that results in a corresponding change in the market risk position between the two parties; or (ii) Any termination, assignment, novation, exchange, transfer,		PubliclyReportableSwap (NewTrade, QuantityChange) NewTrade filter when WorkflowStep -> businessEv

QUESTIONS?