Following publication of the ISDA whitepaper on ‘The Future of Derivatives Processing and Market Infrastructure’ in September 2016, ISDA's Market Infrastructure and Technology Oversight Committee (MITOC) identified **5 key workstreams** to address the challenges identified therein.

- A focus group met regularly for workshops and interviews to **mobilise these workstreams**
- The group quickly identified the interdependent relationship between the **foundational components** of the future derivatives ecosystem
- There is a recognised and pressing concern to avoid looking at these components in isolation and guard against duplication to **avoid replicating the fragmentation** that currently exists today
- Distributed ledgers and associated smart contracts provide a means of enforcement of common domain models across the industry and the group believe that this is the right area to **concentrate our focus** and best chance for success
Executive Summary

Premise
A recognised challenge and opportunity

- Emerging technologies and design principles have highlighted major opportunities for process transformation
- Existing foundations for the exchange of information will prevent market participants from being able to fully capitalise on these opportunities and may require retro-fitting new technologies with old and inefficient components
- A decision needs to be taken in relation to data and process foundations to avoid recreating unsustainable and non-scalable infrastructure

Concept
A standardized model for expressing data and processes

- A common, standardised data and process hierarchy that builds upon the minimal object definitions contained within FpML to express transactions as collections of economic features and trade events
- A proven technique utilised in many internal risk management systems to mitigate the accepted practices of bilateral information exchanges between market participants
- This will act as a non-differentiated unifying standard to facilitate the development of new technologies, including distributed ledgers and smart contracts

Benefits
The essential building block for industry transformation

- The model provides for consistent hierarchical representation across trades, portfolios and events providing enhanced risk management and trade processing capabilities
- Provides the requisite foundations now for genuine long-term process transformation in concert with emerging technologies
- Provides transparency and alignment between market participants and regulators
- Enables market participants to comply with regulatory requirements in a cost-effective manner without fear of redundant effort
- Emerging technologies and design principles have highlighted major opportunities for process transformation
- Existing foundations for the exchange of information will prevent market participants from being able to fully capitalise on these opportunities and may require retro-fitting new technologies with old and inefficient components
- A decision needs to be taken in relation to data and process foundations to avoid recreating unsustainable and non-scalable infrastructure

Proposal
We must commit to developing the design and driving adoption

- Test and further define the hierarchy across a broader set of products, scenarios and actors
- Understand and assess potential to build the hierarchy upon FpML foundations
- Engage with key stakeholders including Fintech providers, regulators etc. and gather their views to refine the model
- Look at ways in which to establish the model as a standard and governance to encourage broad market adoption
- Immediate focus on demonstrating the opportunity to elicit requisite market participation
We believe that the industry is at a critical juncture in its efforts to define and adopt improved data and process hierarchy standards.

We believe that there is no commercial advantage to organisations developing and maintaining standards separately. Current mechanisms for information exchange and storage are not scalable and will potentially (i) inhibit innovation and (ii) increase operational risks and costs.

We believe that there is a need for a standardized data and process definition hierarchy that evolves the FpML structures and provides greater organisation and control around common standards. We believe that the alternative path is not viable long-term.

There are numerous high-profile market initiatives that are already in-flight that will benefit from a common standard.
Path 1 | Continuing as we are

- The current information creation and exchange processes and technologies were developed for the purposes of electronification and automation. As regulation and market standards have become more sophisticated this has resulted in a major technology dependency and unserviceable operating expense debt.

- The model required to enable the industry to capitalise on emerging technologies and disruptive business practices requires data integrity and trade certainty which is not possible with a model that is reliant on information exchange, transformation and reconciliation.

- Continuing on this path will not only magnify the issue (putting further stress on operational processes and risk management) but also lead to retro-fitting innovative solutions with inhibiting constructs and workarounds.
Path 2 | Long-Term Scalable Foundations

- A distributed ledger (or similar authoritative central record) and smart contract construct is able to facilitate complex processes in a simple manner by breaking the siloed input/process/output paradigm
  - Participants store data and perform calculations once
  - Data representation and process/behaviours can be standardised into the smart contract definition
  - Data and code lineage embedded in the distributed ledger – by implication this defines the data model and would be natively BCBS 239 compliant
  - Data stores can be shared across permissioned market participants and regulators
  - No {Extract, Transform, Transmit, Load, Transform, Store, Reconcile} processes.
  - Natively secure (permissioned / encrypted)
  - Interim benefits can be achieved through basic data clean up and introduction of standards

⚠️ Requires commonly adopted data and process definitions to be able to truly capitalise on the opportunity
We are advocating a considered move to a concept that can represent any financial markets product or processes and is applicable at any scale.

By breaking down products into primitive features/objects we would be creating a model where the underlying structure of products, events and portfolios are logically identical and can be simply aggregated where required.

The model utilises proven engineering and computer science techniques and provides the necessary foundation to be able to capitalise on smart contract and distributed ledger principles.

**Economics**

Each transfer or exchange of assets such as:
- IRS as an exchange of Coupons
- CDS as a security, Coupon and a Cash Fee

Where “Coupon” could be represented by quantity, rate and days and “Cash” could be represented by the CCY code.

**Events**

Defined as “before” and “after” states

Described by (i) Parties (ii) Quantity and (iii) Economics

New | Amend | Full Term
---|---|---
Part Term | Full Assign | Partial Assign
Cash | Phys. Exercise | Knock-out Exercise
Exercise | Observation | Compress | Split

**Identifier**

Conceivably the collective transaction can generate a unique identifier based on its constituent parts.

**Transaction**

A collection of primitive economic exchanges/transfers and external or internally driven events

- Econ 1
- Econ 2
- Econ 3
- Econ 4
- Int. Event 1
- Ext. Event 1
- Econ 4

- IRS as an exchange of Coupons
- CDS as a security, Coupon and a Cash Fee

Where “Coupon” could be represented by quantity, rate and days and “Cash” could be represented by the CCY code.
Path 2 | Smart Contracts

A smart contract is an automatable and enforceable agreement. **Automatable** by computer, although some parts may require human input and control. **Enforceable** either by legal enforcement of rights and obligations or via tamper-proof execution of computer code.

- Technology behind smart contracts allows for data to be married with the logic that acts on it, in a **unified representation**.
- This allows ‘smart code’ embedded in the contract definition to respond to **events and process** them in a pre-defined manner, which can potentially result in other events that trigger additional processing and so on.
- Definition of such smart contracts can incorporate **both economic and contractual/legal terms** and can significantly eliminate duplication in processing and need for reconciliations across industry participants.
- Further, digitizing legal terms with the commercial elements of the trade enables seamless processing and resolution through a **shared data fabric**.

**Smart contract code**

Focuses exclusively on automation and therefore concerns itself only with those operational aspects expressed in code.

**Smart legal contracts**

Consider both the operational and non-operational aspects of a legal contract, some of whose operational aspects must be automated by code.

**Smart Contract Templates**

Provide a framework to support complex legal agreements for financial instruments based on standardised templates.

**Smart Contract Agreements**

Fully-Instantiated template including any customised legal prose and parameters.

Concept | High Level Overview

- Ultimately the primary goals and underlying value will only be maximised with broad industry adoption
- ISDA has proven experience and a trusted market position in developing and maintaining industry-wide standards
- We believe delivery of this target future-state has two key areas of focus for ISDA which can be categorised as follows:

1. **Develop & Maintain**
   - Facilitate Design and publication
   - Manage Updates
   - Subscriptions

2. **Advise & Influence**
   - Advise on Standards
   - Drive Adoption
   - Collaborate with Vendors
   - Market Awareness & Education

- We expect that ISDA will develop and maintain a Financial Data and Process Object Definition (as it currently does with FpML)
- We expect that ISDA will be involved in the creation and maintenance of smart contracts
- We expect that ISDA will work closely with utilities and service providers to ensure distributed ledger technologies are able to adopt the proposed standards
Potential Benefits | Summary by Stakeholder Group

A common, standardised data and process hierarchy provides important benefits to all key market actors and participants

### Market Participants
- Relieves strain on existing infrastructures
- Enables significant downward shift in operating expense cost curve
- Single trade record for trade processing
- Enhances ability to optimize collateral and net cash flows
- Enables compliance with regulatory requirements in a cost-effective manner without fear of redundant effort

### Regulators
- Improved quality, accuracy and timeliness of regulatory reports
- Collaborative process for regulatory definition
- Systemic production of common product identifiers
- Capability to more accurately understand market risk
- Granular data available for threshold determinations

### Market Infrastructure Providers
- Relieves strain on existing infrastructures
- Enhanced risk management and trade processing capabilities
- Opportunity to provide more high-value centralised services
- Reduces regulatory risk related to data transformation
- Promotes interoperability and avoids fragmentation

### FinTech and Solution Providers
- Lowers barriers to entry for new service providers
- Avoids creating redundant backwards compatible adaptors to legacy standards
- Promotes innovation
- Promotes collaboration and avoids fragmentation
Next Steps

- Publish ISDA CDM version 1 ‘model definition’ discussion document that provides a definition for the standard representation of derivatives trade events that are asset class and product agnostic,

- Complete an initial use case study to test the model and demonstrate its application and the opportunity,

- Engage broad industry stakeholder groups to further validate the version 1 model definition and identify additional use-cases to test the robustness of the model against a range of applications,

- Leverage the feedback from industry engagement to refine the model and develop a version 2 ISDA CDM in digital form,

- Work with a broad set of industry stakeholders to develop an appropriate and robust governance model for the ISDA CDM,

- Participate, and facilitate where appropriate, in the debate regarding the development and deployment of smart contracts in the derivatives industry. Ensure the technology, legal and operational processing communities are aligned.

If you would like to know more or to get involved in this work please contact MarketInfrastructureandTechnology@isda.org