ISDA Legal Guidelines for Smart Derivatives Contracts:

Credit Derivatives

Contents

Disclaimer

The purpose of these guidelines is to provide an introduction to credit derivatives for readers who are designing and implementing technological solutions for them. The intention of this paper is not to specify or recommend any particular technological application or project. Rather, these guidelines intend to provide an overview of the legal and documentary framework used for credit derivatives transactions and to highlight certain issues that developers may wish to consider. This paper is intended to help developers tailor appropriate technology solutions for the credit derivatives market.

These guidelines discuss a number of legal issues. These discussions are intended to provide general guidance, not legal advice, and to promote a better understanding of the basic principles that underpin documentation produced by the International Swaps and Derivatives Association ("ISDA"). In practice, the law relating to derivatives transactions and the legal documentation that governs them is complex, it may change over time due to evolving case law and new regulations and it may vary substantially from jurisdiction to jurisdiction.

In presenting this material, an assumption is made that certain terms in ISDA documentation relevant to credit derivatives are capable of being (and may currently be) represented in computer code or performed by or on a technology platform. For example, payment-related provisions that require one party to pay another an amount that is calculated on the occurrence of a certain event may be suited to codification or automated processing. This paper also assumes that some provisions within such ISDA documentation may not be as well suited or efficient to code and will remain as written in the contract.

These guidelines do not represent an explanation of all relevant issues or considerations in a particular transaction, technology application or contractual relationship. These guidelines do not constitute legal advice. Parties should therefore consult with their legal advisors and any other advisor they deem appropriate prior to using any standard ISDA documentation. ISDA assumes no responsibility for any use to which any of its documentation or any definition or provision contained therein may be put.

Unless otherwise defined or the context otherwise requires, capitalized terms used in these guidelines have the meanings given to them in the relevant ISDA document.

Introduction

Since its foundation in 1985, ISDA has consistently sought to promote efficiencies and cost-savings through improvements to processes for the settlement and management of lifecycle events related to a variety of derivatives products. Today, as new technologies are developed and implemented across the financial markets, the derivatives industry is increasingly seeking to achieve even greater efficiencies and cost-savings through the deployment of such technologies.

In response, ISDA has published a series of *Legal Guidelines for Smart Derivatives Contracts*. The purpose of these guidelines is to support technology developers and other key stakeholders in the development of smart derivatives contracts by explaining the core principles of ISDA documentation, and raising awareness of the important legal and regulatory issues that developers and other relevant stakeholders should consider when developing and deploying such solutions within the derivatives market.

This paper focusses on the application of such technology solutions to the credit derivatives market. These guidelines will:

- provide high-level background on the credit derivatives market;
- identify opportunities for the potential application of smart contract technology to credit derivatives; and
- highlight important issues for technology developers to consider when designing technology-enabled solutions for trading and processing credit derivatives and associated processes.

A number of technology-based initiatives working towards greater standardization and automation of the derivatives market have already been developed and implemented. There are opportunities to build on this further by harnessing new technologies, such as smart contracts and distributed ledger technology ("DLT"), in order to provide scalable, cost-efficient and more accurate technology solutions within the credit derivatives market.

While the intention of this paper is not to specify or recommend any particular approach or to address any particular technological application or project, these guidelines do identify areas where existing legal and regulatory standards are likely to influence system design and implementation. These guidelines also highlight areas where further industry collaboration will be required to identify existing areas of legal and regulatory uncertainty and to develop solutions.

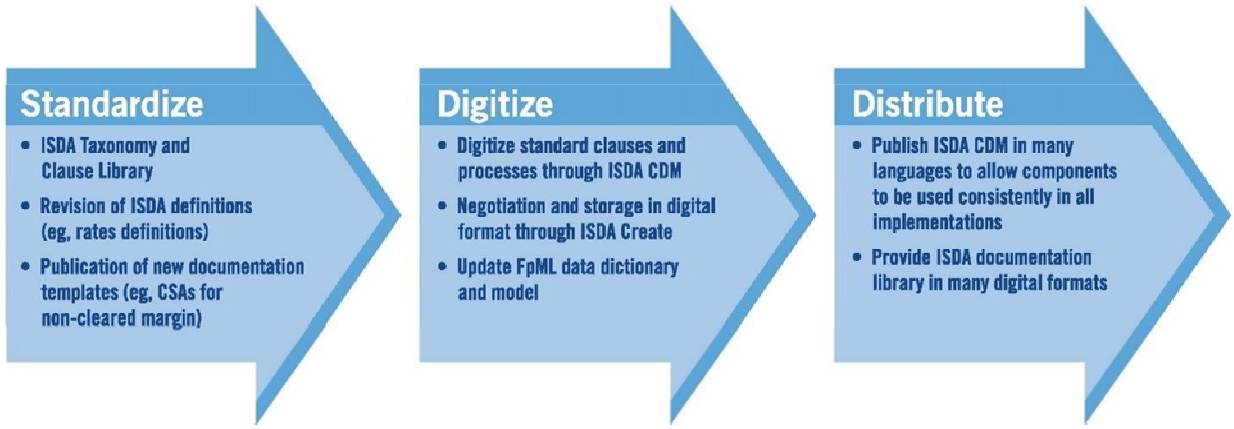
Building the foundation for Smart Derivatives Contracts

On 28th July 2020, ISDA and several other trade associations sent a letter to the Financial Stability Board, IOSCO and the Bank for International Settlements asserting our joint commitment to defining and promoting the development of a digital future for financial markets.[1] The benefits of digitization for market participants are clear. Increased and more widespread implementation of automated, straight-through processing of financial transactions will increase efficiency and reduce costs for market participants. Digitization will promote the consistent creation, processing and aggregation of global financial data, bolstering regulatory oversight and compliance. Through the removal of redundancy and unnecessary complexity, increased digitization and automation will strengthen the operational resilience of market participants and financial markets infrastructure, reducing systemic risk and creating a safer and more robust global financial system.

None of this is possible without industry-led development of essential data standards and the distribution of these standards in digital formats to allow direct deployment within enhanced, automated and intelligent processes, systems and technology.

The letter sets out a series of principles and objectives aimed at promoting the development, distribution and adoption of digital standards within the financial markets, creating the foundation for transformational change in our industry. These principles and objectives address three key areas: **Standardization**, **Digitization**, and **Distribution**.

ISDA's Digitization Initiatives



ISDA is currently working on a number of initiatives to deliver enhanced standardization and digitization of industry-standard derivatives documentation.[2] In the interest rate market, for example, ISDA will develop and publish a new definitional booklet in digital format and make it available through an online platform.

ISDA has also developed the ISDA Common Domain Model (CDM), which establishes a common, digital representation of derivatives life-cycle events described within ISDA documentation. The CDM creates a common set of process and data standards that will

[1] https://www.isda.org/a/MGmTE/Digital-Future-for-Financial-Markets-Letter.pdf
[2] See, for example, the ISDA Clause Library: https://www.isda.org/2020/06/23/isda-launches-clause-library/

increase automation and efficiency in the derivatives market. The CDM currently contains full representations for credit derivatives, in addition to other products and derivatives processes.[3]

Refinement and expansion of these models will facilitate greater connectivity between contractual terms and the processes designed to implement important business and operational functions deriving from contracts, including netting and collateral enforceability, liquidity, and counterparty credit-risk. All of this will help move the industry towards more efficient, cost-effective and scalable payment, settlement, collateral management and regulatory processes, providing a robust foundation for straight through processing of financial transactions.

These enhanced standards will also enable the development and implementation of innovative, automated and intelligent technology solutions. Common, shared representations of data are required in order for distributed ledger technology to operate effectively. It is upon these distributed platforms and data structures that executable and autonomous code within smart contracts can be developed and deployed effectively and efficiently across the financial markets. The aggregation of large, structured data sets will also accelerate the use of AI-based technology solutions, with potential applications across numerous business, risk management and regulatory compliance functions.

Using these enhanced standards as a foundation, technology developers can then deploy automated business logic in a way that draws upon the CDM to facilitate specific functionality. For example, market participants could use the CDM to implement a common underlying digital representation for the calculation of settlement amounts under a credit derivative and to design and run a process that automatically carries out a calculation (possibly taking necessary data from external sources, such as the relevant Determinations Committee) and makes the relevant payment.

[3] https://www.isda.org/2019/03/20/isda-publishes-cdm-2-0-for-deployment-and-opens-access-to-entire-market/

Constructing Smart Derivatives Contracts

In October 2018, ISDA and King & Wood Mallesons jointly published a white paper entitled "*Smart Derivatives Contracts: From Concept to Construction.*"[4]

This paper proposed a practical framework for the construction of smart derivatives contracts.

As part of this framework, the paper suggests that the first step toward the construction of a smart derivatives contract is the selection of those parts of a derivatives contract for which automation would be:

- **effective**, which involves determining the parts of a contract for which automation is possible; and
- **efficient**, which involves determining those parts of a contract for which automation delivers sufficient benefit.

Effective Automation

In 2017, ISDA and Linklaters jointly published a white paper entitled "*Smart Contracts and Distributed Ledger – A Legal Perspective.*"[5]

This paper notes that derivatives are fertile territory for the application of smart contracts and DLT because their main payments and deliveries are typically operational in nature, and thus heavily dependent on conditional logic. As a result, they are highly suitable to being machine-automated or analysed in some way. The paper illustrates how one might express these operational provisions in a more formalized form and break them down into components for representation as functions within the ISDA CDM. Developers can then combine these functions with other functions to create templates for use with particular derivatives products, including credit derivatives.

Efficient Automation

There are a number of opportunities for delivering considerable efficiency benefits through greater automation of the credit derivatives market.

First, as mentioned above, the operational processes involved in calculating and settling payment and delivery obligations are likely to lend themselves well to automation and to deliver real efficiencies and cost-savings as compared with existing payment infrastructures.

Additionally, the impact of regulatory change on the credit derivatives market (particularly mandatory clearing and transaction reporting) has caused firms to implement new or amended processes across the front-to-back transaction lifecycle in order to ensure ongoing regulatory compliance. Increased automation can delivery greater efficiency and cost-savings in these areas.

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[4] See ISDA's Whitepaper on "Smart Derivatives Contracts: From Concept to Construction" available at: https://www.isda.org/a/cHvEE/Smart-Derivatives-Contracts-From-Concept-to-Construction-Oct-2018.pdf.

[5] See ISDA, Smart Contracts and Distributed Ledger: A Legal Perspective" available at: https://www.isda.org/a/6EKDE/smart-contracts-and-distributed-ledger-a-legal-perspective.pdf.

These guidelines will explore each of these areas, identifying opportunities for greater automation and highlighting key considerations for technology developers who are creating technology solutions in response.

The Credit Derivatives Market

The key characteristic of credit derivatives is that parties make payments thereunder by reference to the creditworthiness of a particular "Reference Entity," "Reference Obligation" or group thereof. One of the parties to the transaction will be a purchaser of credit protection and the other will be a seller of credit protection. The credit derivative therefore transfers credit risk on the relevant Reference Entity from protection buyer ("Buyer") to protection seller ("Seller). Market participants often use credit derivatives to hedge exposure to a particular piece of debt or economic sector. They may also use credit derivatives to take short or long positions as part of a broader investment strategy.

While the market encompasses a range of products, some of which are highly bespoke, by far the most popular and important product is the credit default swap ("CDS"). Due to a series of industry initiatives, a highly standardised market exists for CDS on commonly traded Reference Entities[6]. As such, the CDS market represents perhaps the most standardized of all derivatives asset classes, and any technological solution addressing market standard contracts is likely to benefit from a high level of scalability.

However, while the CDS market is highly standardized, the determinations required even for market standard contracts can be relatively complex. These determinations are discussed in more detail below. A number of key determinations for market standard contracts are made by the relevant Credit Derivatives Determinations Committee (the "Determinations Committee" or "DC"), a group of market participants tasked with such responsibility. Determinations made by the DC apply to standard CDS on a market-wide basis. The Determinations Committee is subject to a set of published rules (the "DC Rules").[7]. Their input is a key feature of market standard credit derivatives. This means that, uniquely amongst OTC derivatives products, there is no need for a calculation agent, or the parties themselves, to make calculations or determinations under the contract (subject to a very limited number of exceptions, which are discussed below).

Although, in theory, the Determinations Committees can make a determination in relation to any CDS contract which uses the ISDA documentation architecture, in practice determinations are only made in relation to commonly traded Reference Entities and market standard terms. In terms of developing any technological solutions for the CDS market, it is questionable whether it would be worth building functionality for scenarios where the DC does not make a determination (although it would be beneficial for any technology solutions to facilitate manual processing as a fallback in such circumstances). The DC will almost certainly act in cases where a Reference Entity is traded in large volumes. Technology developers may therefore wish to focus on solutions and applications in this area.

6 There are some regional variations, and variations based on the type of Reference Entity, but for any particular Reference Entity the CDS contract is highly standardised.

7 Available at https://www.cdsdeterminationscommittees.org/dc-rules/.

Key market infrastructure

The CDS market already has significant amounts of centralized infrastructure that provides functions such as (i) confirmation matching through MarkitSERV; and (ii) the Trade Information Warehouse maintained by DTCC.

DTCC maintain and operate the Trade Information Warehouse.[8] The Trade Information Warehouse facilitates the processing of lifecycle events including the splitting of CDS transactions due to Successor events, changes to the names of Reference Entities and triggering for "soft" Credit Events, where the parties can elect whether or not to trigger following a Credit Event (e.g. for certain Transaction Types and Restructuring Credit Events).

The Trade Information Warehouse also facilitates the calculation of payments and central settlement of the cash flows through a partnership with CLS Bank International. Further information on the Trade Information Warehouse is available from DTCC.[9]

Despite the existence of this infrastructure, there remain opportunities for greater automation and more efficient straight-through processing in the CDS market. For example, each firm still reconciles their data separately.

Cleared versus uncleared credit derivatives

A high proportion of credit derivatives are centrally cleared through central clearing counterparties ("CCPs") following market reforms in response to the global financial crisis. The share of CDS outstanding with CCPs was approximately 55.9% in the second half of 2019 and totalled $4.2 trillion.[10] The rules of the relevant CCP, which to an extent incorporate the same ISDA definitions as used for non-cleared derivatives, will govern the legal framework and operations related to the cleared credit derivatives. However, CCPs generally retain broad discretion regarding how they manage cleared products, for example in the context of default management. This is likely to result in additional challenges when developing technological solutions for cleared CDS. The impact and relevance of this for implementation of new technology in the cleared credit derivatives market is discussed below.

Exchange-traded versus OTC credit derivatives

Market participants can also trade credit derivatives on specific exchanges ("exchange-traded derivatives" or "ETDs"), rather than bilaterally between counterparties.[11] Discussion of ETDs is beyond the scope of these guidelines.

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[8] The Trade Information Warehouse is described by DTCC as “a centralized, electronic database holding the most current details on the official, or “gold,” record for virtually all cleared and bilateral credit default swap (CDS) contracts outstanding in the global marketplace.”

[9] See DTCC TIW Website: https://www.dtcc.com/repository-and-derivatives-services/derivatives-services/trade-information-warehouse

[10] https://www.isda.org/a/BAQTE/Key-Trends-in-Size-and-Composition-of-OTC-Derivatives-Markets-in-2H-2019.pdf

[11] ETDs should not be confused with OTC derivatives that are traded on specific trading venues, but remain bilateral contracts directly between trading counterparties without the interposition of an exchange or clearing house (and so are commonly referred to as bilateral OTC derivatives).

Market Evolution

Due to the very high level of standardization in the OTC credit derivatives market, the market benefits from continuous innovation. Markets and market practices evolve continuously in response to a range of inputs, from market participants' changing needs to changing regulatory requirements. New products are developed and old products occasionally fall out of mainstream use.

ISDA publishes standard definitional booklets that allow users to add market standard provisions into their trade confirmations. From time to time, ISDA updates these definitional booklets. For example, in 2014 ISDA published the 2014 ISDA Credit Derivatives Definitions (the "2014 Definitions") which have become the market standard for credit derivatives, in place of the 2003 ISDA Credit Derivatives Definitions as supplemented (the "Updated 2003 Definitions"). With respect to the replacement of a set of definitions, there is often a very significant period in which some market participants continue to trade under the old definitional booklet for some of their trading relationships while using the newer booklets for others, and there remains a (dwindling) number of market standard legacy contracts that incorporate the Updated 2003 Definitions. In order to enhance the efficiency of the credit derivatives market and to ensure that the digitization process continues to facilitate innovation, developers will have to accommodate the evolution of this market and avoid building products that may only work for the market as it exists today.

Furthermore, the credit derivatives market has been in the past an enthusiastic user of the "Protocol" approach to documentation updates. This means that when ISDA publishes a new set of definitions, or an amendment to an existing set of definitions it also typically publishes a Protocol. A Protocol is a multilateral mechanism under which adherents agree to amend their existing credit derivative trades to adopt the new definitions or an amendment. Adherents to the Protocol then conduct their trades on contractual terms consistent with the market standard going forward. Developers will need to build products that are capable of updating existing terms from time to time through Protocol adherence.

The credit derivatives market is expansive and cross-jurisdictional in nature. There are a number of participants involved in the process, including counterparties, external data providers, benchmark administrators, CCPs and other financial market infrastructure and payment service providers. Developers should consider the challenges in ensuring interoperability among systems and data formats used by these different participants and across different jurisdictions.

Understanding Credit Derivatives

This section sets out how a typical credit derivative transaction works, with a focus on typical calculation/valuation processes and payments/deliveries.

Cash flows and key events under a typical credit derivative

The simplest form of market standard credit derivative is a single name CDS. Its cash flows and key events are summarized below.

Credit derivatives can become significantly more complex. For example:

- they can reference a group (or "index") of Reference Entities,
- they can trigger only once a certain number of Reference Entities have experienced a Credit Event ("nth to default products"), and/or
- losses can be allocated on a tranched basis i.e. risk is shared overall between the contracting parties, but allocated between them on a sequential basis as losses occur.

For certain types of Reference Entity (e.g. financial institutions), market standard CDS can reference debt at different levels of seniority, which means a Credit Event can occur and be settled by reference to debt obligations of the Reference Entity that have different levels of contractual/legal subordination. However, the below is broadly indicative of the main features of credit derivatives in general, and highlights the key issues that a developer will need to consider.

The lifecycle of a single name CDS can be broken down into three stages, each of which is described in more detail below:

Premium

The premium is a payment by Buyer to Seller of a fixed periodic amount, typically in addition to an upfront amount paid by Buyer to Seller or by Seller to Buyer. These periodic amounts represent the fee for the credit protection provided by the Seller. These payments stop if settlement of the contract occurs. The upfront payment is determined at the time of trade. Buyer makes this payment shortly after the trade date, regardless of whether settlement of the contract occurs.

Triggering

If the Reference Entity experiences a Credit Event, the contract may be “triggered.” At this point, payment of premium ceases and the contract moves to the settlement phase. The relevant Determinations Committee determines the occurrence of a Credit Event.[12]

[12] For contracts incorporating the 2014 Definitions or the Updated 2003 Definitions.

Settlement

CDS can settle in multiple ways:

- *Physical settlement*: Historically, CDS settled by physical settlement. In this scenario, Buyer delivers to Seller a debt obligation of the Reference Entity in exchange for payment by Seller to Buyer of its par value.

- *Cash settlement*: CDS typically includes the option (generally as a fallback) of cash settlement – Seller pays Buyer the difference between the market value of a "Reference Obligation" and its par value.

- *Auction settlement*: The standard and most common form of settlement for market standard CDS on liquid names. This is essentially a form of cash settlement. However, the cash settlement amount is calculated by reference to an auction of participating dealers.[13]

Other Intervening Events

A number of other intervening events could also occur. Successor events are particularly noteworthy. If certain corporate events occur in relation to a Reference Entity (for example it merges with another entity or it demerges) the DC may determine that the CDS trade should be adjusted to reflect the relevant event. So for example, if Reference Entity X merges with Company Y to produce a new entity Z, the DC may make a determination that the CDS trade should now refer to Z as its Reference Entity. If Reference Entity X demerged into Y and Z and each took on half of X's debt obligations, then the CDS trade may split into two CDS trades half the size – one with Y as the Reference Entity and one with Z as the Reference Entity. Therefore, a smart contract would need to have the functionality to accommodate these types of input from the DC and to update the transaction(s) accordingly.

Understanding key market documentation

Before considering these three stages further, it is important to understand the key market documentation employed by market standard credit derivatives contracts. This documentation has been designed to achieve greater standardization across contracts, with the aim of enhancing trade fungibility and liquidity.

The 2014 Definitions and the Updated 2003 Definitions

Credit derivatives typically incorporate the 2014 Definitions. It is less common for new trades to incorporate the Updated 2003 Definitions. Market standard contracts incorporate these definitions virtually wholesale, so that the only terms that parties need to agree for a specific transaction are the key economic terms such as Reference Entity, Reference Obligation, price, size and tenor of the trade. The 2014 Definitions have largely superseded the Updated 2003 Definitions, though some longer-dated trades written on the Updated 2003 Definitions remain outstanding, and there remains market interest in determinations thereunder. Any technology solution that is deployed within the CDS market will therefore need to have regard for the fact

[13] The auction also provides an opportunity for parties to CDS trades to buy or sell debt obligations of the Reference Entity at the same price as is used to cash settle their CDS trade, thereby eliminating basis risk.

that there is a not a single or uniform set of definitions that apply to all CDS transactions, and that some trades still operate under the Updated 2003 Definitions.

Contracts that incorporate the 2014 Definitions or the Updated 2003 Definitions include the concept of a "Transaction Type." This contractual term effectively imports a pre-identified set of elections from the Credit Derivatives Physical Settlement Matrix.[14] For example, by specifying that a trade references the "Standard North American Corporate" Transaction Type, the parties thereby specify the particular Business Days, Credit Events and other key terms that apply. The Credit Derivatives Physical Settlement Matrix can evolve over time as the relevant definitional booklets are amended and supplemented. Once entered into, trades will not typically incorporate subsequent amendments to the Credit Derivatives Physical Settlement Matrix.

The definitional booklets can also change over time. As noted above, when this happens, parties may amend existing trades by adhering to a Protocol.

The Determinations Committees

The Determinations Committees make binding determinations in relation to contracts that incorporate the 2014 Definitions or the Updated 2003 Definitions, including whether or not a Credit Event has occurred with respect to a particular Reference Entity. These common determinations promote standardization, as they ensure that two otherwise identical contracts do not result in, for example, different determinations as to whether a Credit Event has occurred. As such, each DC effectively represents an external source whose determinations have a direct bearing on the payouts and cash flows under market standard credit derivatives.

Each DC consists of up to ten sell-side and five buy-side voting firms, alongside observers representing central counterparties. Each DC may also include up to two consultative non-voting sell-side firms. A DC currently exists for the Americas, Asia (excluding Japan), Australia-New Zealand, EMEA (Europe), and Japan, each with responsibility for their local transaction types. The DC rules govern determinations made by the DCs, which include provisions designed to ensure the independence of the authorized representatives of each participating institution. DC Administration Services, Inc. currently acts as a secretary to each DC, and does not have a vote.

[14] Available at https://www.isda.org/2011/01/20/credit-derivatives-physical-settlement-matrix-3/.

Credit Derivatives lifecycle events

Premium

A key trade process in the context of credit derivatives is the calculation of the premium payable by Buyer to Seller. As a starting point, this will be calculated as a fixed periodic amount for market standard contracts, payable quarterly on the standard dates (referred to below), which ceases following the occurrence of a Credit Event (see further below). This may be (and in the CDS market typically is) augmented by an upfront payment payable by either Buyer or Seller (the "Initial Payment").

Market participants trade and price CDS based on changes in the credit risk of the underlying Reference Entity. But to aid standardization and fungibility among contracts, the established convention for market standard CDS trades is for the premium to be agreed at one of a small number of conventional fixed percentage rates for a given Reference Entity (e.g. 1% or 5% per annum), which are then paid on standard quarterly dates across all contracts, regardless of when traded.

The parties agree the Initial Payment at the time of trade, based on two components. The first component reflects the correction necessary to arrive at the overall premium rate agreed between Buyer and Seller at the time of trading. For example, where the chosen conventional fixed rate is 1% per annum but the parties agree a price of 0.90% per annum, Seller will pay to Buyer an Initial Payment equal to the present value of 0.10% percent per annum. The second component is for premium that accrued from the previous quarterly payment date to the trade date, which the Seller pays to Buyer. The Initial Payment is the net of these two amounts. ISDA publishes a market standard calculation for the conversion of market rates to Initial Payments, including the code necessary to automate the calculations.

Note that credit derivatives do not typically reference floating rates of interest, as the premium element of the trade comprises a fixed amount. However, some more bespoke products may reference floating interest rates, for instance where one of the cash flows represents the provision of funding. To the extent a developer wishes to build a solution capable of handling such payments, we refer to the discussion on floating reference rates and the ongoing global reform thereof in ISDA's "*Legal Guidelines for Smart Derivatives Contracts – Interest Rate Derivatives*" paper.[15]

Triggering

Broadly speaking, the occurrence of a Credit Event reflects a decline in the creditworthiness of the relevant Reference Entity. The occurrence of a Credit Event is what triggers the payment of a credit protection amount from Seller to Buyer.

[15] See ISDA Legal Guidelines for Smart Derivatives Contracts – Interest Rate Derivatives available at https://www.isda.org/2020/02/11/legal-guidelines-for-smart-derivatives-contracts-ird/.

The 2014 Definitions contain the following seven different Credit Events:

Credit Event	**Description**
Bankruptcy	The commencement of liquidation proceedings in relation to the Reference Entity or other insolvency related events.
Failure to Pay	The failure of the Reference Entity to make a payment under any of its relevant obligations once the relevant grace period has expired.
Obligation Acceleration	A situation, excluding a failure to pay, where a relevant obligation of the Reference Entity becomes immediately due and payable prior to its termination date.
Obligation Default	A situation, excluding a failure to pay, where a relevant obligation of the Reference Entity becomes capable of being declared due and payable prior to its termination date.
Repudiation/Moratorium	An authorised officer of the Reference Entity or a governmental authority repudiates, or declares a moratorium in respect of any of, the Reference Entity's obligations and the repudiation or moratorium is followed by a non-payment or a restructuring within a specified time frame. Unlike a Failure to Pay or Restructuring, the non-payment does not need to exceed a certain amount and the amount of the restructured obligation does not need to exceed a specified threshold.
Restructuring	A change in terms of a debt obligation of the Reference Entity, causing it to become less favourable to the holders of that obligation.
Governmental Intervention	Actions or announcements by a governmental authority resulting in, amongst other events, the reduction in the rate or amount of interest or amount of principal payable by a Reference Entity, an expropriation or other event which mandatorily changes the beneficial holder of the obligation or a mandatory cancellation, conversion or exchange of the Reference Entity's obligations.

Different Credit Events apply to different Transaction Types, some Credit Events are only relevant to certain types of Reference Entity, and bespoke transactions may apply non-standard combinations or even entirely new events.[16] These events may occur at an entity

[16] It is worth noting that thresholds or other more detailed criteria may also apply.

level (e.g. Bankruptcy) or an obligation level (e.g. Failure to Pay). For the obligation level events, market standard contracts will define the universe of debt obligations on which a Credit Event may be observed, which may include direct obligations of the Reference Entity or obligations under certain guarantees. The DC will determine which obligations are eligible for these purposes. The parties will typically specify a Reference Obligation, which (amongst other functions) is always capable of being an obligation in respect of which an obligation level Credit Event may occur.

The occurrence of some Credit Events and potential Credit Events will cause other terms of the contract to behave differently. For instance, where applicable, the occurrence of a potential Failure to Pay Credit Event or Repudiation/Moratorium Credit Event close to maturity of the contract can cause its expiry date effectively to extend. The purpose of this extension is to see whether the potential Credit Event crystallizes into an actual Credit Event.

There is also a difference between "hard" credit events, where the contract triggers automatically upon determination thereof (e.g. Bankruptcy and Failure to Pay), and "soft" credit events, where the parties can elect whether to trigger (e.g. for certain Transaction Types where “Mod (Mod) R” Restructuring is applicable).

Some Credit Events can also settle on a more complex basis e.g. "Mod (Mod) R" Restructuring Credit Events settle differently depending on the tenor of the contract and any relevant debt obligations of the Reference Entity.

An important difference between CDS and Interest Rate Swaps is that the underlying Reference Entity or Reference Obligation of a CDS contract can change during its life. This may be because the Reference Entity changes due to one or more Successors being identified or the Reference Obligation is replaced following the occurrence of one of a defined set of events in respect of the agreed Reference Obligation.

As the occurrence of a Credit Event will depend on an event occurring in respect of the Reference Entity or the Reference Obligation during the life of the contract, it is important that these changes are capable of being monitored and recorded. This will ensure that users can properly map an event in respect of an entity or obligation to any contract currently referencing that entity as the Reference Entity or that obligation as the Reference Obligation.

DC determinations

As mentioned above, the default position for a market-standard CDS is that the Determinations Committee responsible for the relevant Transaction Type determines the occurrence of a Credit Event. Eligible Market Participants[17] are able to submit a question to the relevant DC, along with supporting publicly available information from particular source(s). The DC will then deliberate the issue and determine whether the event described constitutes a Credit Event. This will sometimes be clear-cut, such as when a court filing demonstrates that a Reference Entity is in insolvent liquidation. Other times it will require potentially extensive legal

[17] Eligible Market Participants are parties to actual credit derivatives contracts, as opposed to interested bystanders.

interpretation, and may even go to "External Review" – an arbitration process that can be utilised where the DC is not able to reach the necessary majority.[18]

This determination effectively represents an external input. A smart contract will need to be capable of accommodating the impact of this input.

Bilateral triggering

A determination by a DC that a Credit Event has occurred will typically result in the automatic triggering and settlement of the CDS trade.

However, there is one situation in which this is not the case, namely where the CDS is triggered following a Mod (Mod) R Restructuring. In this case, separate triggering is required as the parties' settlement obligations differ depending on whether the CDS was triggered at the election of the Buyer or Seller.

In addition, there is always a possibility that the DC declines to make a determination, most likely because the relevant Reference Entity is not widely traded.

In either of these circumstances, it is open to the parties to trigger their contract bilaterally. To do so, there is a formal timeline and notification requirements that the "Notifying Party" must observe. In particular, the Notifying Party must deliver a Credit Event Notice, setting out the Credit Event in reasonable detail. Unless the bilateral triggering is for the purpose of triggering CDS following the DC determining that a Mod (Mod) R Restructuring has occurred, the Notifying Party must also deliver accompanying publicly available information from a particular source(s).

Generally, accounting for the consequences of DC determinations would likely lend itself well to automation within a smart derivatives contract. However, it will be more challenging to reflect the limited circumstances in which bilateral triggering may become available and the related timelines and notices. In particular, if the DC does not act and the two parties have differing views on the outcome under the contract of external events, there is no rules-based fallback for determining which party's view is correct. One potential solution could be to develop an affirmation system for bilateral triggers that are not subject to DC action, which allows parties to proceed to settlement or the next phase of the smart contract once the bilateral process has reached consensus.

Having regard for these complexities will be important when evaluating opportunities for automating aspects of this process and in determining where human intervention may continue to be required.

[18] For Credit Events, an 80% majority is required.

Settlement

Once it has been determined that the contract will settle, the settlement amount must be determined. Credit Derivatives can physically settle, cash settle, or settle by reference to an auction convened by the DC. Market standard contracts typically auction settle, with a fallback to physical settlement.

There is a lot of detail and complexity that goes into determining the settlement value of a CDS trade. For a commonly traded Reference Entity on market standard terms, the DC undertakes this process. This results in a simple numerical input to determine a settlement payment that can serve as a straightforward input to an automated calculation process.[19]

However, it may be that the DC decides not to hold an auction or the auction does not apply to a particular trade. While this is only likely for trades on non-commonly traded Reference Entities or bespoke trades, developers may need to consider this possibility. Developers will also need to consider how any automated technology solution should operate upon the occurrence of a fallback to physical or cash settlement.

These issues are considered in more detail below.

Physical Settlement

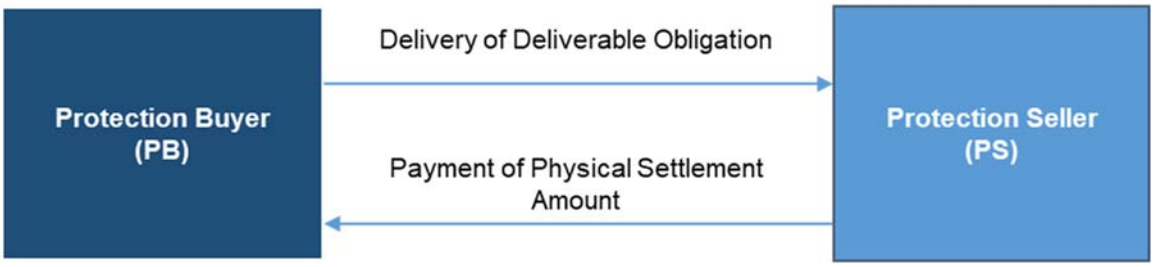
Historically, most market standard credit derivatives physically settled. Understanding physical settlement remains important for auction settlement. When auction settlement was introduced, the DC Rules provided that Buyer and Seller should not be prejudiced by the holding of an auction when compared to the position they would have experienced had physical settlement applied.

Physical Settlement is fundamentally simple. Buyer delivers to Seller any eligible obligation in exchange for a cash payment in the currency of the notional amount of the contract equal to the obligation's par amount. Buyer can deliver eligible obligations with an aggregate par amount up to the notional amount of the CDS contract. If the eligible obligation is denominated in a different currency from the notional amount of the contract, the contract sets out rules for calculating the FX rate to be applied to make these calculations.

The debt obligations of the Reference Entity that are eligible for physical settlement are called "Deliverable Obligations", these being the obligations that Buyer may deliver to Seller. This always includes the Reference Obligation. The parties will use a set of Deliverable Obligations Characteristics to determine which other debt obligations may be eligible for delivery. These characteristics broadly reflect the parameters that market participants expect to see in relatively standard types of debt obligation for the relevant Reference Entity type. The DC will typically determine what constitutes a Deliverable Obligation, and will invite submissions from market participants as to what should be admitted.

[19] The results of each auction are published on www.creditfixings.com.

Physical Settlement



The provisions of the relevant Credit Derivatives Definitions and the DC rules may adjust an obligation's "par" amount for these purposes. This is to reflect, for example, the fact that a bond that was originally issued at a significant discount to its face value will not necessarily entitle the holder to a claim for its full face value upon the insolvency of its issuer. Under the 2014 Definitions, the amount a Seller pays is also reduced to reflect any contingency on the obligation delivered to it. This could include, for example, a credit-linked note whose redemption amount may be eliminated by the occurrence of an uncertain event that will make that obligation entirely contingent, and so reduce its deliverable amount to zero (i.e. it is not eligible to settle the contract). Similarly, a guaranteed bond whose guarantee is capped at a given amount will only be deliverable up to such cap amount.

Once the list of Deliverable Obligations is established, Buyer may deliver anything on that list to Seller. Rationally, any Buyer will deliver the obligation with the lowest market value in order to maximize its CDS pay-out (such obligation is referred to as the "cheapest to deliver" obligation). This principle informs how auction settlement works.

Auction Settlement

Auction settlement is typically used to settle CDS transactions on commonly traded Reference Entities.

The auction is designed to replicate the outcomes of physical settlement, but results in cash settlement of market standard contracts. Auction participants[20] effectively bid on the "cheapest to deliver" Deliverable Obligation on the "Final List" provided by the DC, expressed as a percentage of its due and payable amount. This process ultimately sets the Auction Final Price, which is a single value expressed as a percentage. Auction-settled CDS contracts will then pay out such that the Buyer receives an amount equal to the greater of 100% minus the Auction Final Price and zero, multiplied by the notional amount of its trade.

[20] Generally the dealer firms represented on the relevant DC and certain other dealers that are active in CDS markets.

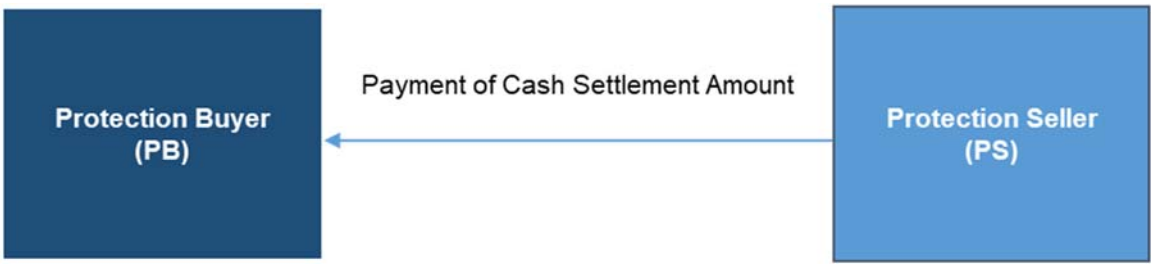
Auction Settlement

Markit Group Limited and either Creditex Securities Corporation or Creditex Brokerage LLP administer the auction. The rules for each auction are set out in the particular "Auction Settlement Terms" for that auction. The mechanics of the auction are well established, but are generally beyond the scope of this paper.[21][22]

Cash Settlement

In common with auction settlement, cash settlement results in a one-way payment from Seller to Buyer. The Cash Settlement Amount is typically determined by reference to the Reference Obligation, as opposed to the cheapest to deliver amongst all Deliverable Obligations. The Buyer receives 100% minus the Reference Obligation's "Final Price," multiplied by the notional amount of the trade. The valuation process for determining the Final Price is set out in detail in the applicable definitions booklet and the Credit Derivatives Physical Settlement Matrix.

Cash Settlement



While cash settlement will generally not apply, it remains a contractual possibility under most market standard contracts. Cash settlement will generally only occur in circumstances where (i) the DC decided not to hold an auction and (ii) physical settlement cannot be completed due to an impossibility or illegality, or where the contracting parties cannot trade in the relevant obligations being delivered due to constitutional restrictions. Forms of cash settlement also apply where one party fails to deliver an obligation when required to do so. These fallbacks apply quite rarely and their terms can be reasonably complex.

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[21] It is worth noting that the auction permits CDS users to place orders to buy or sell Deliverable Obligations at the Auction Final Price, subject to certain conditions. These orders will then be physically settled, by delivery and payment between the relevant dealer and its customer. The auction also generates actual trades between participating dealers, which will result in similar transfers.

[22] For more detailed information on this, Markit and Creditex published a "Credit Event Auction Primer" available at http://www.creditfixings.com/CreditEventAuctions/fixings.jsp (last updated February 2010).

Index CDS

So far this paper has focussed primarily on single name CDS. As mentioned above, a number of more complex CDS product types are widely traded. In fact, the largest part of the CDS market by volume is Index CDS.

The term “Index” in this context is something of a misnomer - CDS indices are essentially defined baskets of Reference Entities. The Reference Entities included in CDS indices are typically updated on a semi-annual basis in March and September. Whether or not single name CDS trading on a Reference Entity is liquid is often an important factor in determining whether or not a Reference Entity is included in one of the CDS indices. There are different indices for different geographical regions and market segments (e.g. investment grade versus non-investment grade).

Organizations such as IHS Markit support Index CDS products through the publication of both the indices themselves and standard documentation for Index CDS. IHS Markit is responsible for the iTraxx and CDX indices. The standard documentation typically consists of standard terms supplements and standardised forms of confirmations. These documents are designed to supplement the 2014 Definitions or the Updated 2003 Definitions (as applicable) to enable the trading of Index CDS.

In keeping with other market initiatives, Index CDS documentation is designed to ensure maximum standardization. The parties will only need to agree limited trade parameters such as size and tenor when entering into a trade. Accordingly, though the cash flows and structural features of Index CDS products are more complex than single name CDS, these products often benefit from a similar degree of standardization.

As noted above, CDS indices are rebalanced on a semi-annual basis. In addition to the scheduled semi-annual updates, CDS indices are also “re-versioned” following the occurrence of a Credit Event in respect of a Reference Entity in the index which results in the weighting of that Reference Entity being reduced to zero. The most recent version of any particular index is known as the “on-the-run index”.

Market participants often use Index CDS (both untranched and tranched) as part of an investment strategy or for other purposes, such as hedging credit risk on a portfolio of derivatives counterparties.

Untranched Index CDS

Index CDS trades are essentially basket trades. A simple Untranched Index CDS is analogous to a defined basket of single name CDS trades. For example, if the relevant CDS index included 100 Reference Entities, then by entering into an Untranched Index CDS, the parties have in effect entered into 100 separate single name CDS trades. Credit Events or Successors in respect of any of the Reference Entities will be handled in broadly the same manner as described elsewhere in this paper.

In respect of Untranched Index CDS using certain Transaction Types, Mod Mod R Restructuring will apply which is a “soft” Credit Event. This means parties can elect whether or not to trigger. In order to maintain fungibility between Index CDS transactions on the same

index version, the affected Reference Entity is “spun-off” from the Untranched Index CDS transaction and turned into a separate single name CDS on that Reference Entity. The separate single name CDS can be then either bilaterally triggered and settled or not triggered and remain between the parties as a single name CDS until expiry or a subsequent Credit Event. This process can be operationally burdensome and could be further streamlined using technology.

Tranched Index CDS

Tranched Index CDS is more complex than Untranched Index CDS. Whilst Untranched Index CDS provides exposure to each of the Reference Entities in the relevant index, Tranched Index CDS allows market participants to take exposure to a particular tranche of risk associated with the defined basket of Referenced Entities.

For example, the relevant CDS index could consist of 100 Reference Entities and be divided into four tranches:

- Most senior tranche: 35-100%
- Second most senior tranche: 25-35%
- Third most senior tranche: 15-25%
- Most junior tranche: 0-15%

Each tranche consists of a starting point and an end point. Market participants specify a tranche in their trade by specifying an “Attachment Point” and a “Detachment Point”.

By way of example, if a market participant desired protection on the most junior tranche, the relevant market participant would buy a Tranched Index CDS referencing the 0% - 15% tranche – i.e. the Attachment Point would be 0% and the Detachment Point would be 15%.

Upon the occurrence of the first Credit Event in respect of a Reference Entity in the Index, the DC would be responsible for the DC process as normal, including organising the Auction. Following the occurrence of the Auction, since the Attachment Point is 0%, the Seller would be required to make a payment to the Buyer.

As with single name CDS, the recovery is typically based on a percentage equal to 100% minus the Auction Final Price. The amount payable by the Seller depends on the notional amount of the trade, the size of the tranche and the weighting of the relevant Reference Entity in the overall portfolio.

The remaining portion of the tranche is reduced in size to reflect that a Credit Event has occurred. This process is repeated in respect of any subsequent Credit Events until the Detachment Point is reached.

Once the Detachment Point is reached, no further payments are made by the Seller to the Buyer (regardless of how many additional Credit Events occur). This is because the tranche in respect of which protection was bought is exhausted.

Whilst Index CDS, and particularly Tranched Index CDS, is a more complex product than single name CDS, it may be an area particularly suited to technological innovation that assists with the processing of Credit Events and Successor Events in respect of Reference Entities in the relevant index and the operational processes involved in the rebalancing and reversioning of the indices. Developers and technology providers should also consider whether licences or permissions are needed for any proposed solutions and contact the organization that produces the relevant CDS index.

Considerations for technology developers

CDS transactions would likely benefit from the implementation of new technology solutions to further facilitate efficient post-trade processing. As described above, many of these functions are already automated and performed by existing market infrastructure (e.g. TIW). It seems likely therefore that any new technology solution would need to be integrated within existing market infrastructure and perhaps provide for existing services to be delivered in a more efficient manner e.g. by aiding reconciliation or the more complex processing required in index CDS.

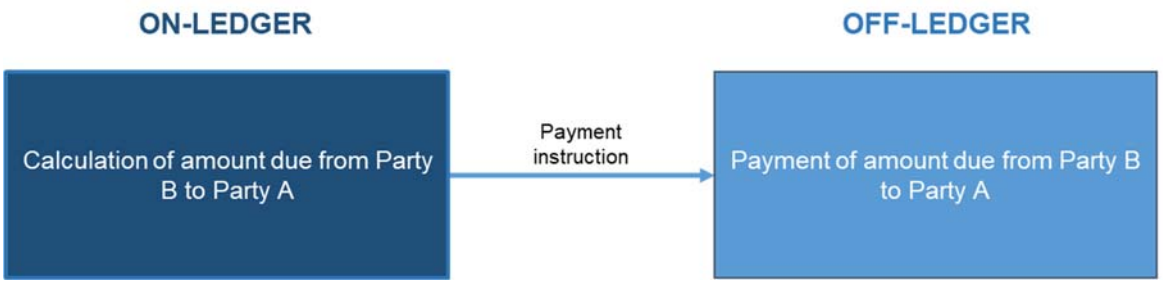
There may also be opportunities for derivatives market participants to use new automated and intelligent technology solutions to automate settlement of amounts or deliveries that are determined to be due and payable under derivatives transactions.

For example, it may be possible to use DLT or similar technology to allow for quicker and more efficient settlement. In considering the use of DLT in this context, it is useful to recall the distinction made in the *ISDA Guidelines for Smart Derivative Contracts: Introduction*[23] between different types of potential DLT implementation that are capable of supporting smart derivatives contracts.

In the context of credit derivatives, a 'light chain' system would allow market participants to exchange information in relation to credit derivatives in an automated, digitized way, and then carry out certain trade processes (for example, calculation of fixed amounts) through technological means. This could involve, for example, an automated feed or API that transmits a relevant determination made by the DC.[24]

In a light chain scenario, the ledger recorded by way of DLT would in effect serve as a messaging system among participants. The parties would continue to use the existing banking system to make payments and deliveries. The ledger would record the parties' payment obligations, but actual payments would take place off-chain. The parties would need to, for example, use an existing payment system to initiate the relevant transfers of cash or non-cash assets. This scenario also assumes that the parties are using the same DLT platform or ledger, or that there is a sufficient degree of interoperability between their platforms.

Light chain settlement



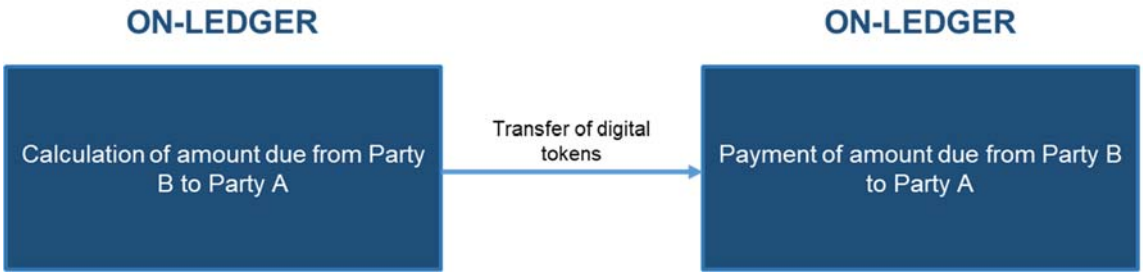
[23] See ISDA, Legal Guidelines for Smart Derivatives Contracts: Introduction available at: https://www.isda.org/a/MhgME/Legal-Guidelines-for-Smart-Derivatives-Contracts-Introduction.pdf.

[24] Note that there is currently no standardized data feed provided by the DC website.

A 'heavy chain' system would be a settlement system in itself. Payments and deliveries would take place directly on the ledger or platform. In this scenario, certain forms of digital asset (e.g. tokenised securities) would be constituted on the ledger itself, either in native form or as representations of real-world assets. The ledger would also facilitate and record the transfer of these digital assets among the parties to meet their payment or delivery obligations. Both the obligations of the parties and the transfers of value (including of collateral, where applicable) would be recorded or occur (as applicable) on the ledger, without the need for external payment or settlement systems.[25]

However, there are inherent limitations to a heavy-chain system in the context of CDS. For example, if there is a physical settlement of a deliverable obligation, that asset will need to be tokenised such that it is capable of being hosted and transferred on the platform. The deliverable obligation is an asset of the Reference Entity and it is likely that it will be outside the control of the parties to a CDS to arrange for tokenisation of any of the Reference Entity's assets. Although more detailed discussion around tokenisation is beyond the scope of this paper, these issues should be taken into account when developing automated settlement platforms for use in the CDS market.[26] It should however be noted that because of the prevalence of auction settlement it would be rare to have physical settlement for a commonly traded CDS Reference Entity.

Heavy chain settlement



As described in earlier ISDA Guidelines, the approach taken will have an impact on the issues that technology developers should keep in mind. Where parties use external systems to make payments, the need to accurately identify payment flows and address the interoperability of systems will be significant. Parties will need to address any divergences that arise between outcomes on- and off-ledger. For example, where a payment is recorded as having been made on the ledger but settlement off-ledger has not been executed, the parties will need to ensure that there is a robust reconciliation mechanism capable of addressing such scenarios. Ultimately, a robust, clear and enforceable legal solution will be key to achieving legal certainty in such situations.

[25] For further discussion of these issues, see the Bank for International Settlements' Committee on Payments and Market Infrastructures paper on wholesale digital tokens (December 2019) available at: mailto:https://www.bis.org/cpmi/publ/d190.pdf.

[26] These issues include settlement finality, netting and legal certainty around the characterization of certain types of collateral arrangement. The appropriate response to these issues will likely depend on the specific legal or regulatory framework in the relevant jurisdiction.

Where a DLT platform is designed to house a settlement system as described above, using digital or dematerialized assets to meet payment or collateral obligations, the system or platform design may have an impact on the laws governing operations involving the asset itself.[27]

[27] See Private International Law Aspects of Smart Derivatives Contracts Utilizing Distributed Ledger Technology (https://www.isda.org/a/4RJTE/Private-International-Law-Aspects-of-Smart-Derivatives-Contracts-Utilizing-DLT.pdf)

Clearing

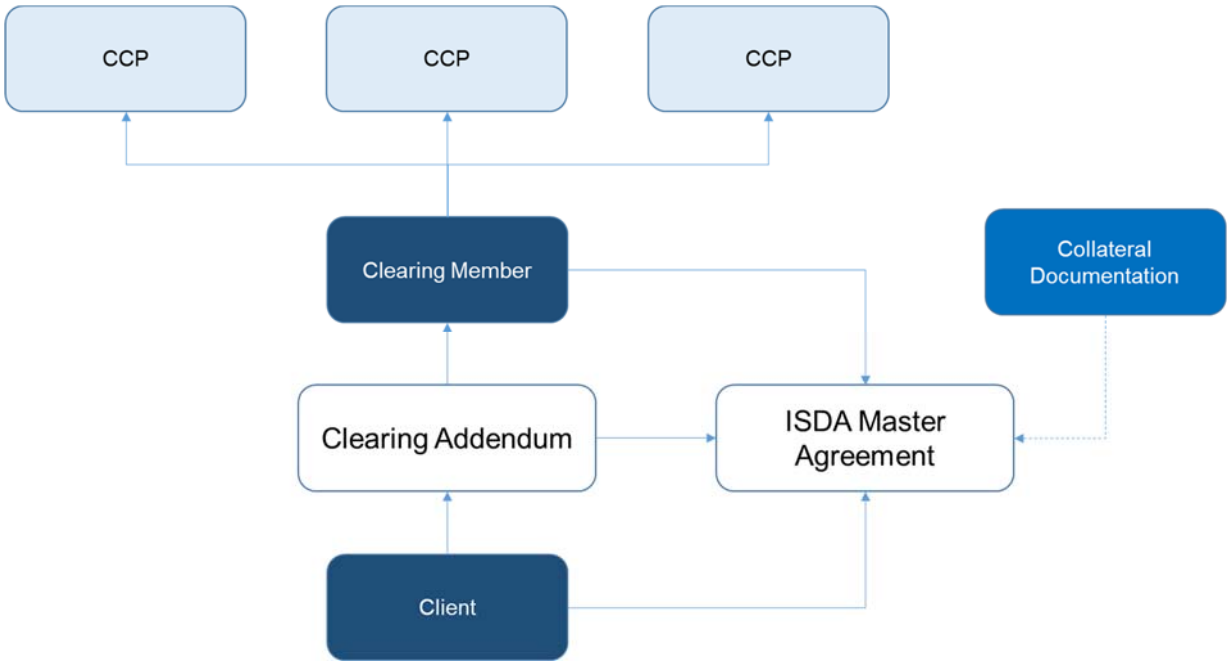
A large proportion of the credit derivatives market is centrally cleared. Technology developers should be aware of the broader considerations that apply to the cleared derivatives market.

Cleared credit derivatives will include the following legal relationships:

(i) *Relationship between the CCP and the clearing member*: The CCP rules govern this relationship.

(ii) *Relationship between the clearing member and underlying client*: This will not be relevant to all cleared credit derivatives but will be relevant to arrangements where a clearing member of a CCP clears a credit derivative on behalf of an underlying client (whether directly or indirectly). Parties generally enter into cleared transactions using some form of clearing agreement. The clearing agreement typically takes the form of an addendum or module to the ISDA Master Agreement between the clearing member and its client.[28] The illustration below represents a stylized example of a typical clearing model.[29]

Typical clearing model



CCP Rules

The rules of the relevant CCP primarily govern the mechanics of cleared credit derivatives, and the legal principles that apply to them. These rules typically give CCPs significant discretion (as discussed further below) and broad powers to make amendments to the rules. For example, CCPs have developed internal systems and models to calculate (i) margin required from clearing members; (ii) contributions from clearing members to the default fund

[28] ISDA has published the ISDA-FIA Client Cleared OTC Derivatives Addendum for these purposes.
[29] It is important to note that different clearing models exist in different jurisdictions, and the above example may not accurately represent the documentation structure or content that might be used in all scenarios.

based on possible losses the CCP may suffer; and (iii) transaction valuations leading to settlement of payments flows under credit derivatives. The CCP generally makes calculations and amounts are paid to or by the clearing members on prescribed deadlines or as requested by the CCP. The economic terms of the cleared credit derivative will incorporate the 2014 Definitions or the Updated 2003 Definitions and cleared contracts will be in a market standard form.

New automated technology solutions have the potential to create more streamlined and integrated processes for clearing and settlement of derivatives. Presently, these processes are somewhat fragmented, with manual input and intervention required at various stages of the trading and post-trading clearing and settlement cycle for cleared derivatives. There is scope for further automating the flow of information between participants involved in this process, particularly given the high level of standardization that is already present in cleared credit derivatives transactions.

Developers of technology solutions will need to consider interoperability among different technology applications and infrastructure. CCPs, as with other market participants in this space, have specific systems, platforms and processes that they use.

CCPs and other market infrastructure providers (such as Central Securities Depositories or "CSDs") are also considering opportunities to migrate, upgrade and automate their existing systems, using DLT and other automated and intelligent technology solutions. These system enhancements will simplify processes and achieve efficiencies by reducing the amount of manual intervention required. New requirements under the Central Securities Depository Regulation (CSDR[30]) that aim to improve the efficiency of securities settlement within the EU are likely to accelerate these plans. However, it is likely that the wholesale implementation of such technologies by regulated financial market infrastructures will be an incremental process.

Client clearing arrangements

Parties use a number of industry standard contracts to document the legal relationship between a clearing member and its client. The mechanics of the documents and the legal architecture will depend in part on the client clearing model being used:

(i) Principal model (typical for Europe): Under this model, there will be a separate back-to-back credit derivative between the clearing member and the client. The legal documentation will typically ensure that this credit derivative mirrors the trade between the clearing member and the CCP, particularly in terms of close-out triggers and payment flows. The intention is for the clearing member to act as a riskless principal.

(ii) "Agency" model (typical for the US): Under this model, the clearing member typically acts as an "agent-trust" of the client but is liable as principal for the client's obligations under the credit derivative vis-a-vis the CCP.

There are certain elements of this relationship where further automation and digitization would be beneficial. For example, where the principal model is used automated technology could

[30] Regulation (EU) No 909/2014 of the European Parliament and of the Council of 23 July 2014 on improving securities settlement in the European Union and on central securities depositories and amending Directives 98/26/EC and 2014/65/EU and Regulation (EU) No 236/2012

ensure alignment between the entry into and modification of client transactions and the associated transaction between the clearing member and CCP.

Pass-through of margin from the client to the CCP could also be automated and streamlined. However, it should be noted that there might not necessarily be a direct correlation between (i) payments (including of margin) between a clearing member and a CCP and (ii) payments (including of margin) between a clearing member and its clients. This is because payment flows between a CCP and the clearing member may be netted across the transactions of many different clients of the clearing member. In addition, clearing members may call clients for a broader range of margin and may retain margin where margining at the CCP is on a net omnibus basis.

Technology developers should also bear in mind the wider legal framework. For example, the application of smart contract technology to the termination of the cleared credit derivative will need to take account of the process that exists at the CCP level for terminating the transaction between the CCP and Clearing Member. It will also need to consider the means by which this process is then reflected in the corresponding transaction entered into between the Clearing Member and client (if applicable). This level of contingency may present some challenges for automation when a transaction is modified or terminated. Similarly, many of the standard ISDA Master Agreement provisions (to the extent still relevant to the particular trading relationship) are often adjusted. For example, clearing documentation might disapply provisions allowing the client to suspend payment and deliveries upon the occurrence of an event of default or potential event of default. This creates a complicated legal structure through the interaction of the CCP rules, underlying trading documentation (such as the ISDA Master Agreement), client clearing documentation and specific trade details.

Porting is another area where there is considerable potential for further digitization and the adoption of smart contracts. There are, however, practical obstacles that will need to be considered and overcome, particularly in relation to partial porting, whether or not collateral is to be ported and where there is net omnibus margining.

Porting is the process by which a client is entitled to transfer transactions they are clearing through one clearing member to another member (who has agreed to accept the transactions) with the same CCP. Such transfers may take place in the context of a clearing member's default, where positions held by its clients would have to be transferred to a different clearing member, but client clearing agreements generally also permit porting in a business-as-usual scenario (provided certain conditions are satisfied). When porting of transactions takes place, a CCP will transfer affected transactions with the existing clearing member to the transferee clearing member[31], accompanied by a transfer of the associated collateral balances (although the exact way in which this will occur varies slightly at different CCPs). At the same time, the client's clearing agreement with the transferor clearing member may be terminated and a separate arrangement with the transferee clearing member will be established. Once triggered by a client, the execution of the porting process itself can be largely mechanical in nature (although the complexity of the client's cleared portfolio and the collateral holding arrangements at the CCP may present certain challenges, particularly where only some of the transactions rather than the entire portfolio is being transferred). The process would therefore

[31] The precise legal mechanism involved in the transfer may vary.

lend itself to automation, although it would require CCP involvement in the digitization process as porting effectively occurs at the level of the CCP.

CCP discretion in respect of cleared products

As noted, a key consideration in the cleared credit derivatives market will be the level of discretion afforded to CCPs. CCPs will have significant discretion to make determinations, make unilateral demands and/or take unilateral action both in a business-as-usual scenario and in the context of a clearing member default. This could include, amongst other actions, demands for additional margin or contributions to the CCP default fund (calculated by the CCP on the basis of certain parameters but with room for discretion or adjustment as to how the CCP makes those calculations) and managing the default process.

Technological solutions are most easily applied to processes that involve limited discretion, for example a calculation based on objective inputs, or to make a payment if a certain objective criterion is met at a specified time on a specified date. Discretion fits less easily within these applications and technology developers should therefore consider how their technological solution should account for the exercise of CCP discretion. Likewise, clearing members reserve similarly broad discretions and powers when passing clearing risk onto their client. One cannot assume that an outcome at the CCP/clearing member level will necessarily be replicated at the clearing member/client level.

This may not prove to be a major obstacle. Developers will need to ensure that their technology is capable of identifying situations where CCPs exercise their discretion to make changes to their processes or requirements. This will require effective interoperability and the establishment of automated communication channels between the CCP and any external platforms used for this purpose. Such platforms will also need to be flexible enough to accommodate any consequent changes to trade terms, including with respect to collateral arrangements.

A key example of CCP discretion arises upon the default of a clearing member. A CCP will typically have discretion to exercise a broad range of powers with respect to the contracts and margin of the defaulted clearing member.[32]

Such powers may include:

(i) *Hedging* – To reduce the market risk associated with a defaulted portfolio, the CCP may consider hedging its exposure by entering into offsetting transactions with other clearing members. The CCP will have discretion to determine whether to take this action and the exact terms on which it does so.

(ii) *Auction* – The CCP may go through a detailed process to auction the defaulted portfolio to other clearing members. The CCP may have discretion in terms of splitting up the defaulted portfolio into separate portfolios for auction purposes. CCPs will have

[32] This is in contrast to the comparatively straightforward contractual mechanism that parties follow in the event of a counterparty default under an uncleared transaction. For further information, see ISDA Legal Guidelines for Smart Derivatives Contracts – The ISDA Master Agreement (https://www.isda.org/a/23iME/Legal-Guidelines-for-Smart-Derivatives-Contracts-ISDA-Master-Agreement.pdf)

different processes for running these auctions and different requirements imposed on non-defaulted clearing members around bidding for these portfolios.

(iii) *Loss attribution* – The CCP may also attribute any remaining losses it has suffered due to the default through a pre-defined order of priority (‘or waterfall’), using default fund contributions made by clearing members and other sums. The exact waterfall will differ between different CCPs.

These processes and powers of CCPs are broad and may vary among different CCPs. They are designed to give the CCP room to manoeuvre in what may be a significant period of stress in the financial markets. This discretion is therefore an important feature of the cleared credit derivatives market, and one that technology developers will need to contemplate when considering the possible application of smart contract technology.

Reporting

A number of jurisdictions require the reporting of credit derivatives transactions to certain authorized bodies, as part of initiatives to allow regulators to better understand and regulate the derivatives market as a whole.

Requirements regarding regulatory reporting of credit derivatives are detailed and precise. To take the requirements under EMIR[33] in the EU as an example, the details of each credit derivative entered into, modified or terminated and which has (in most circumstances) at least one EU counterparty will need to be reported to an EMIR-registered or recognized trade repository. The content and format of these reports are prescribed by regulation, with the aim of harmonizing standards and reducing the need for reconciliation of data between trade repositories in a specific jurisdiction. This includes the use of specific identifiers (e.g. LEIs with respect to relevant parties such as the counterparty or CCP, or unique product identifiers to identify the derivative type), as well as detailed information around the terms of the relevant contract.

Depending on the counterparties to the transaction, multiple regulatory reporting regimes may be relevant, each of which will have different detailed requirements. However, while significant differences still exist between different regulatory regimes (e.g. in the collection of data under EMIR and Dodd-Frank), regulators are working towards a goal of harmonizing the data and audit trail to reduce redundancies and inefficiencies.[34]

Given the short timeframes for compliance with regulatory reporting requirements,[35] the ability to automate and streamline this process would be highly beneficial. Technology developers and providers in this space will need to ensure that they are familiar with the detailed requirements around format and content of these reports. Specifically, developers should consider carefully how to attribute liability for the failure to make a report (or errors in the report) among the parties, as the market participant will typically retain regulatory responsibility for compliance.

Developers should also consider any requirements to protect data and information collected and may need to build separate silos to protect parties' confidential information from unauthorized disclosures. Only information that is permitted to be disclosed to each participant in the system (e.g. CCPs, regulators, brokers, counterparties) should be made available to them, even where data is collected centrally. Technology developers should consider designing and integrating appropriate information barriers or other data security measures into the relevant platform to address this concern.

Regulators are already considering how to apply technology to regulatory reporting requirements. For example, ISDA is working with the UK Financial Conduct Authority, the

[33] Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories Text with EEA relevance.

[34] See OICU-IOSCO Report, "Market Fragmentation & Cross-border Regulation" available at: https://www.iosco.org/library/pubdocs/pdf/IOSCOPD629.pdf.

[35] For example, under EMIR parties must submit reports no later than the next working day.

Bank of England and participating financial institutions to explore how the ISDA CDM can support the digital regulatory reporting pilot for derivatives.[36]

Any technology solution in this area would benefit from being interoperable across multiple regulatory reporting regimes. This would remove the need to build multiple systems to comply with these requirements. This includes the multiple jurisdictional reporting regimes which may apply to derivatives, but also reporting regimes which apply to other similar products (such as securities financing transactions under SFTR).[37]

[36] A report on the deployment of ISDA CDM to deliver a UK digital regulatory reporting pilot is available at: https://www.isda.org/2019/05/21/isda-cdm-deployed-to-help-deliver-uk-digital-regulatory-reporting-pilot/.

[37] Regulation (EU) 2015/2365 of the European Parliament and of the Council of 25 November 2015 on transparency of securities financing transactions and of reuse and amending Regulation (EU) No 648/2012.

Conclusion

These guidelines provide an overview of the existing legal framework and processes for OTC and cleared credit derivatives. They highlight areas in which there is significant scope for further digitization and adoption of new technologies that can lead to increased efficiencies.

Credit derivatives, in particular, present fertile ground for such initiatives as they are highly standardized derivative products, although even market standard contracts can contain complex features. It is therefore important to give careful consideration to the development of smart derivatives contracts in the context of credit derivatives, given the size of the market and their widespread use by many different types of market participants.

This paper discusses aspects of credit derivatives to which technology developers should have regard, particularly in the context of the settlement/lifecycle event process, where the greatest potential for increased automation and application of new technologies may exist.

ISDA encourages members to contribute to this work to ensure industry views are taken into account and that each of these various projects and initiatives benefit from broad-based market feedback and expert insight.

Members can participate in ISDA's work by joining the following working groups:

- **ISDA Legal Technology Working Group**: Established to promote greater standardization and digitization of ISDA documentation through the ISDA Clause Library Project.

- **ISDA Fintech Legal Working Group**: Established to raise and discuss areas of legal and regulatory uncertainty in the application of new technology (such as smart contracts, DLT, digital assets and AI) to derivatives trading.

- **ISDA CDM Architecture and Review Committee**: Established to define a standard representation of derivatives trade events that are asset class and product agnostic, and to develop a common domain model across transaction and legal agreement data required for processing of such events.

Members can join these Working Groups through the My Committee Dashboard on the ISDA website: http://www.isda.org/committees.

If you have any questions on any of the issues raised in this paper, please contact ISDALegal@ISDA.org

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Since both the individual participants and their employers contributed towards the preparation of these guidelines, participants are identified by reference to the organization with which they were associated during the preparation process.