

Equities Business Overview

PRESENTATION TO
HYPERLEDGER CAPITAL MARKETS SIG
JUNE 17TH 2020

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Agenda

1. Holistic View of Capital Markets
2. What are equities
3. Equities Trade Lifecycle
4. Current Equities Trading and Settlement Process
5. Challenges in Capital Markets
6. Key problems to solve
7. Blockchain Potential Benefits
8. Sample implementations



Holistic view of Capital Markets

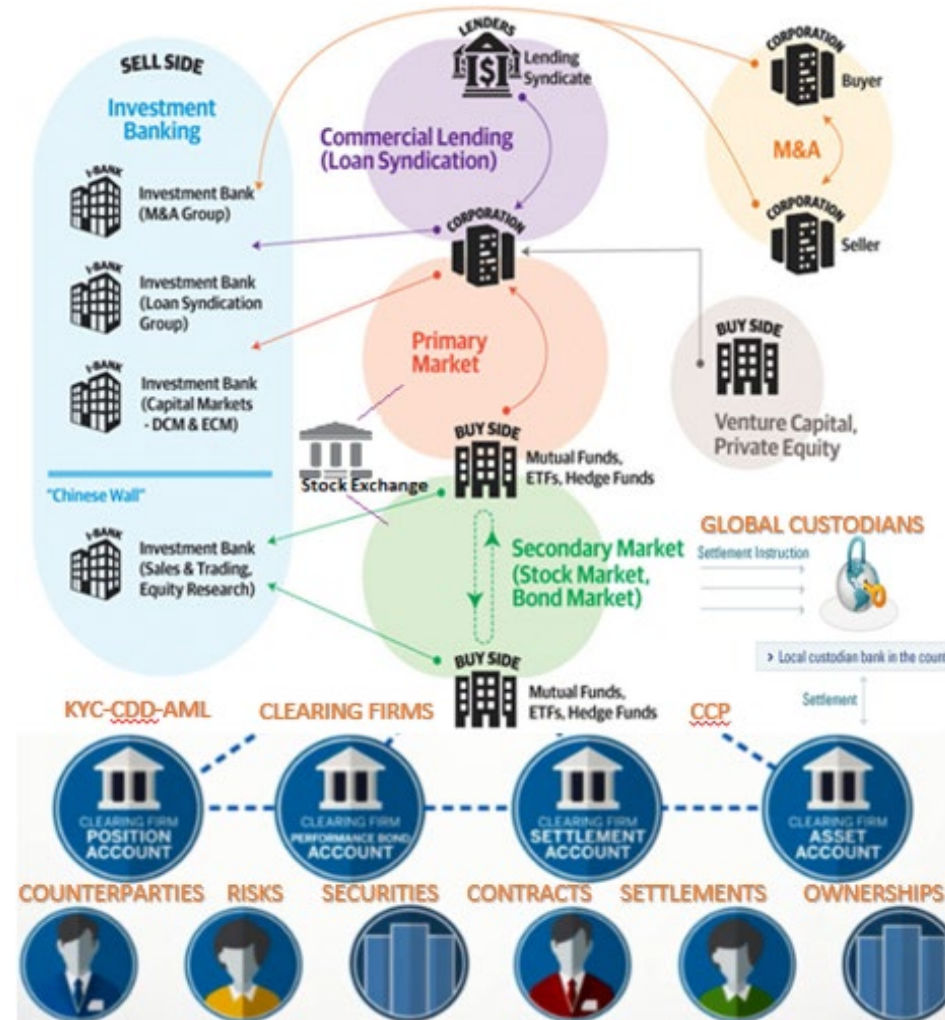
A capital market is a financial market in which long-term debt or equity-backed securities are bought and sold.

Capital market refers to a broad spectrum of tradeable assets that includes the stock market as well as other venues for trading different financial products. The stock market allows investors and banking institutions to trade stocks, either publicly or privately. Stocks are financial instruments that represent partial ownership of a company. These documents are used extensively by companies as a means of raising capital. Within the stock market itself are primary and secondary markets that trade among banks underwriting stock and public investors trading stock, respectively.

Investment Banks are intermediaries between the providers of funding (investors-in the form of both debt and equities investors) and the users of funding (corporates, financial institutions, hedge funds, supranational, municipals and governments). When talking about investment banking, it is important to know the difference between the buy-side and the sell-side. These two sides make up the full picture, the ins and outs of the financial market, and both are indispensable to each other:

- **Sell-Side** – is the side of the financial market, which deals with the creation/issue, promotion, and selling of traded securities to the public.
- **Buy-Side** – is the other side of the financial market that buys and invests large portions of securities for the purpose of money or fund management. The Buy Side refers to those firms that purchase securities and includes investment managers, pension funds, and hedge funds.

Investments banks also tend to be heavily involved in advising corporate clients on their activities, particularly in merger and acquisitions (M&A)



Enhanced from "buy side vs Sell Side - wallstreetprep.com
<https://s3.amazonaws.com/wsp-media-library/finance-careers-overview.png>
<https://www.wallstreetprep.com/knowledge/the-ultimate-guide-to-sales-and-trading/>

The Sales & Trading Division of the Investment Bank connects buyers and sellers of stocks, bonds, commodities and other assets. Salespeople and traders sit on a trading floor. The trading floor is split out by asset class. Any large investment banks has following roles

Front office Sales & Trading :

1. Sales Traders – Client orders and contract management
2. Traders – Pricing, Trade executions and Trade Entry
3. Structuring – Complex Strategies and Product Types
4. Research - analyze market data and trade ideas.
5. Quant/Strat - backtest trade ideas, build pricers, maintain electronic trading or algorithmic trading platforms.

Middle office:

1. Risk management - credit, margin, and market risk
2. Trade Governance - validation, enrichment and novation
3. Product controls-performance, advising, MI,P&L Attribution
4. GRC - legal, compliance and regulatory reporting.
5. Treasury Management - capital, funding and liquidity risk.

Back office:

1. IT and Trade support
2. Trade confirmations/allocations
3. Collateral Management
4. Accounting Settlements –delivery, receipt, payment
5. Reconciliations
6. Custodian – safekeeping of investors’ securities
7. Clearing

Holistic view of Capital Markets (conti.)

Investment Banking and Securities Trading		
Corporate Finance	Capital Markets	
Investment Banking Coverage and Advisory	Coverage	Products
	Institutional Clients Group	Equities
Global Capital Issuance	Research – Fundamental Analysis	Prime Finance, Securities Lending and Custodian Bank (incl. Markets clearing)

Products in Sales & Trading -Markets products are broadly classified as

Equities

Refers to trading stock. More specifically, equities are split up between:

- Cash equities: Trading ordinary shares of stock
- Equity derivatives: Trading derivatives of equities (stock options) and equity indices – ETF

Fixed Income -Refers to bonds, and are often further split up in the following way:

- Bond: Government/Treasury, Municipals: Tax-exempt bonds (State, Municipality, Non-Profit), EM Bonds, Supranational agencies etc.
- Rates: Macro-economic focused Interest Rate Derivatives. Focused on the yield curve, inflation..
- Credit: Corporate Bonds (High Grade, High Yield, Loans), Credit Derivatives – CDS, CDO, iTraxx etc.
- Securitized Products: Mortgage Backed Securities, Asset Backed Securities

Currencies - Also referred to as FX - and **Commodities** rounds out **FICC**.

Money Markets – Warrants, CD, Loans & Deposits etc

Types of trading

Flow Trading - Trader acts as principal, market making directly and not through exchange. The client decides if they want to buy or sell, and the trader sets the price and takes the other side, charging a bid-offer spread on the transaction. Used for Fixed Income and most equity derivatives.

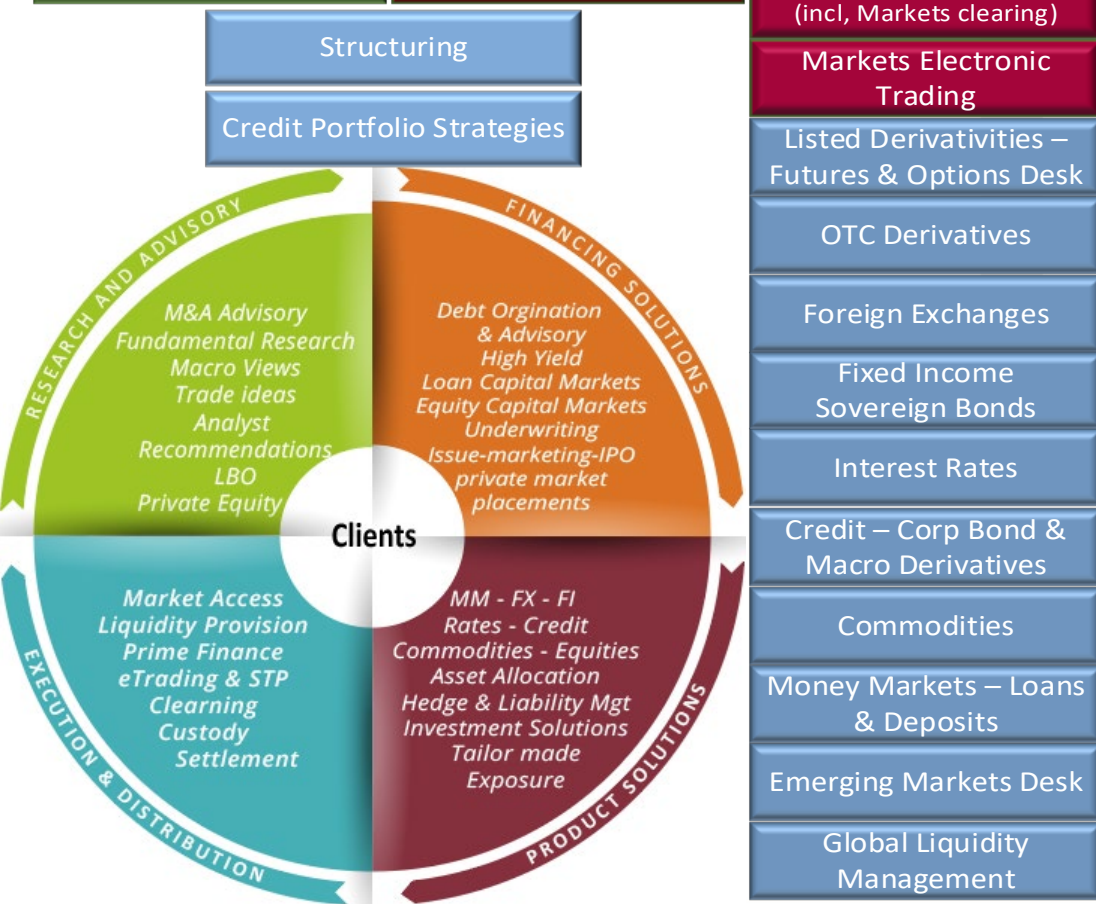
Agency Trading - IB sends client order to exchange on behalf of clients. Action on behalf of clients. Investment bank takes no risk in agency trades, traders earn only a small commission when they act as agent. Mostly Stocks (cash equities), futures and certain derivatives.

Prop Trading -Proprietary trading refers to a banks invests firm money for direct market gain, rather than earning commission dollars by trading on behalf of clients. Banks take direct risk with their own capital.

Electronic Trading – also called platform or algorithmic trading, is all about removing human touch points from the trading process. e.g. ATS, ECN, DMA, Dark Pool, Single Dealer, Exchanges(RM), Broker venues, etc.

Interdealer Brokers (IDB) or Voice Brokers - With no central exchange for some OTC and wholesale secondary markets, financial institutions need to find a way to find information, liquidity and anonymity for their trading activities. IDB has specialist, up to the minute market knowledge, they can offer colour to the dealer at any time. IDB provide anonymity to client traders. IDB broker provides potential buyers and sellers a MTF/OTF venue with the necessary information they need to execute their trades.

Today, most traders are Flow Traders, with Prop Trading being regulated out and many Agency Trading roles being replaced by Electronic Trading. Only Algo and Hedge funds run prop trading desks.



Markets Electronic Trading
Listed Derivatives – Futures & Options Desk
OTC Derivatives
Foreign Exchanges
Fixed Income Sovereign Bonds
Interest Rates
Credit – Corp Bond & Macro Derivatives
Commodities
Money Markets – Loans & Deposits
Emerging Markets Desk
Global Liquidity Management

What are Equities

Equities or commonly known as stocks are instruments that signifies an **ownership** position in a corporation, and represents a claim on its proportional share in the corporation's assets and profits. Ownership in the company is determined by the number of shares a person owns divided by the total number of shares outstanding.

Types of Cash Products

Common stocks

- Also called "Ordinary Shares"
- Still represents ownership in a corporation
- Exercise control by election a board of directors and voting on corporate policy
- Last priority in liquidation

Preferred stocks

- Class of ownership in corporation that has a higher claim on the assets and earning than common stock
- Do not have voting rights
- Higher priority in liquidation than common stocks

American Depositary Receipt

- ADR are negotiable certificate issued by a US bank representing **a specific number of shares of a foreign stock** traded on a US stock exchange.
- ADRs make it easier for Americans to invest in foreign companies, due to dollar denominated price, lower transaction cost and timely dividend distributions

Global Depositary Receipt

- Specific number of share certificate held in the bank of one country of a stock traded on another country exchange
- Also called European Depositary Receipt

Types of Derivative Products

Index

- Indexes are a portfolio of securities representing a particular markets or a portion of it
- Each index has its own calculations methodology and is usually expressed in terms of a change from a base value
- The percentage change is more important than the actual change in value

ETF

- Is a security that **tracks** an index, a commodity or basket of assets like an index fund but trades like a **stock** on an exchange
- *Disclaimer: From the purpose of this presentation, we will simplify and assume that the ETF(s) concerned are booked as stock

Futures & Forwards

- Futures and Forwards obligate the holder to buy the said contract in a future date.
- Futures contract are **standardized** instruments that trade on an **exchange**, have **proper secondary** and are guaranteed against credit default by means of a daily settling of gains and losses.
- Forwards are OTC products

Futures Margin (daily netting)

- In trading futures, margins are required, which acts like a performance bond or down payment. The original deposit is called initial margin and lowest amount the account can reach before it gets pulled is called maintenance margin.

Options

- An Option is a contract that gives one party (the option holder) the right, but not the obligation, to perform a specified transaction with another party (the option writer) according to specified terms.
- Special instrument that covers the right, but not the obligation to engage in a future transaction on some underlying security, or in a future contract.

Parties in Option

1. Option Buyer: Enjoys the right to exercise and the right not to exercise the options; pays the option premium
2. Option Seller (Writer): Has the obligation to deal at the contracted strike price if the buyer will not exercise the option; receive the premium.

Types of Options

1. Call Option
2. Put Option

Types of Option based on Exercise date

1. American - exercisable at any time during the option period.
2. European - exercisable only at expiry date.
3. Bermudan - exercisable at pre-defined dates within the option period.

Warrant

- A derivative security that gives the holders the right to purchase securities, usually equity from issuer at the specific price within a time frame

Others - Synthetic equities, convertibles bonds, Sec lending, Exotics, Strategies etc.

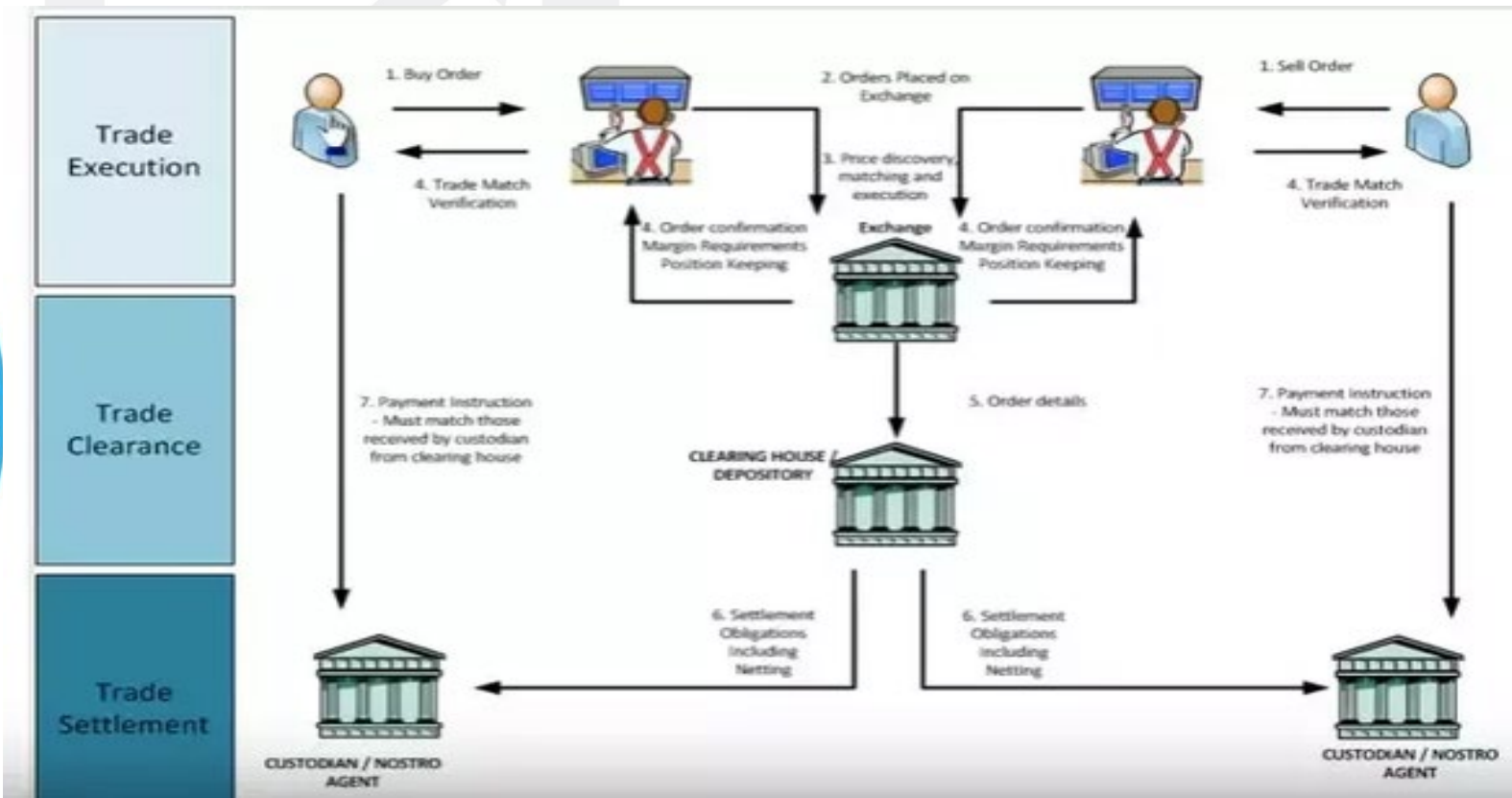
Equities Trade Lifecycle

Issues

- Rising cost pressures from manual processes and legacy technology infrastructure, multiple intermediaries, unnecessary data reconciliations, and complex layer of handoffs within the ecosystem.
- Increased regulatory pressures, including the use of more central counterparties for clearing and settlement, reporting requirements, and higher capital buffer requirements.
- The proliferation of data available across multiple platforms but few programs in place to harness its potential and use its knowledge to better serve clients.

Opportunity

1. Industry standards to facilitate the adoption and migration to sustainable digitization
2. Technology to support new digital business models and processes.
3. Common domain model (CDM) - CDM is meant to be technology agnostic yet at the same time can be leveraged with emerging technologies, such as smart contracts and distributed ledger technologies (DLTs).
4. With the advent of blockchain and smart contracts, the inefficiencies and costs in derivatives trading due to multiple handoffs and complex processes were supposed to decrease.



Equities Trade Lifecycle

Trade Life Cycle – equities secondary market – Pre-trade, Order placement, Order Management (High touch vs Low Touch), Order execution (Exchange x OTC), Confirmation, Reconciliation, Allocation

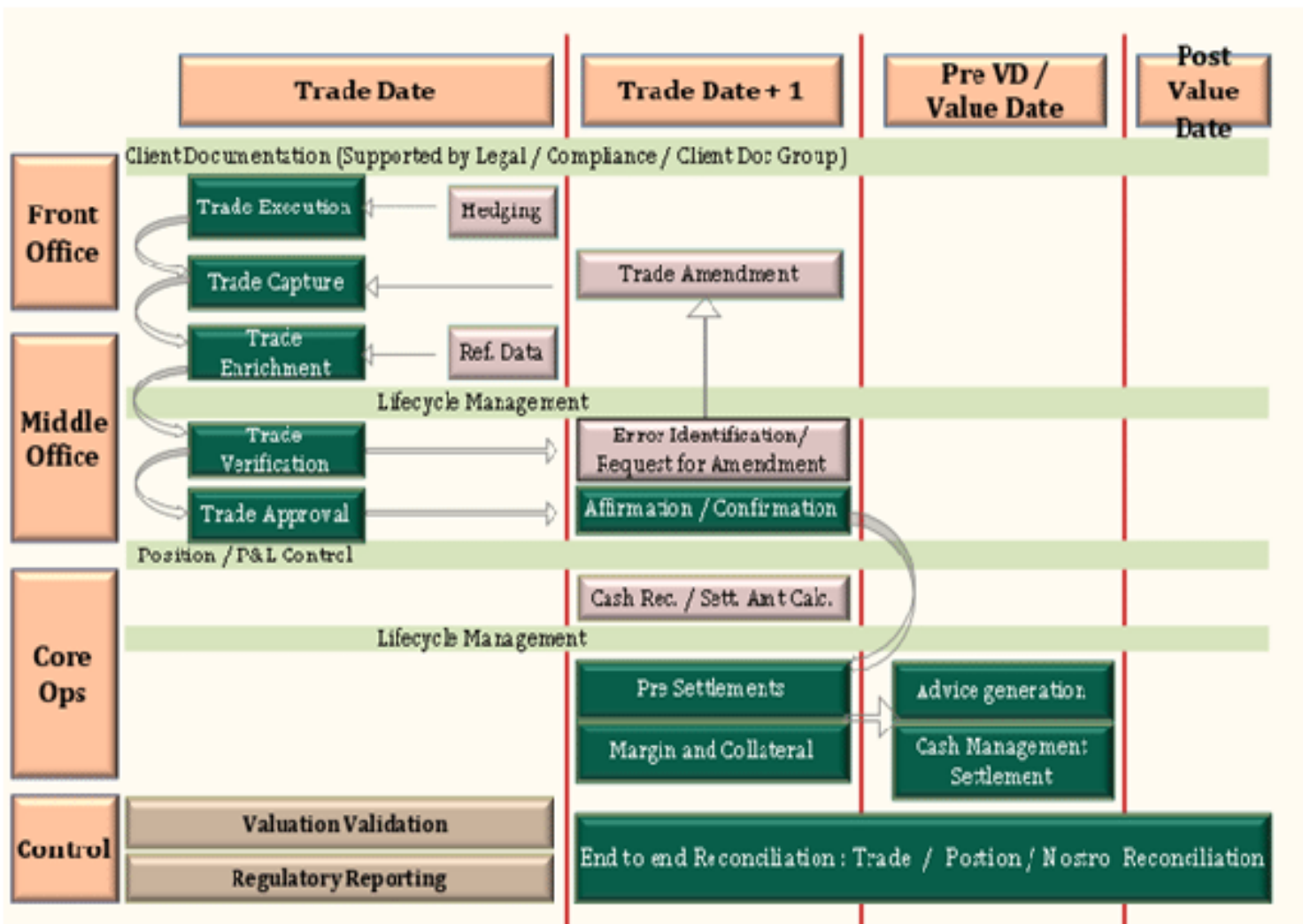
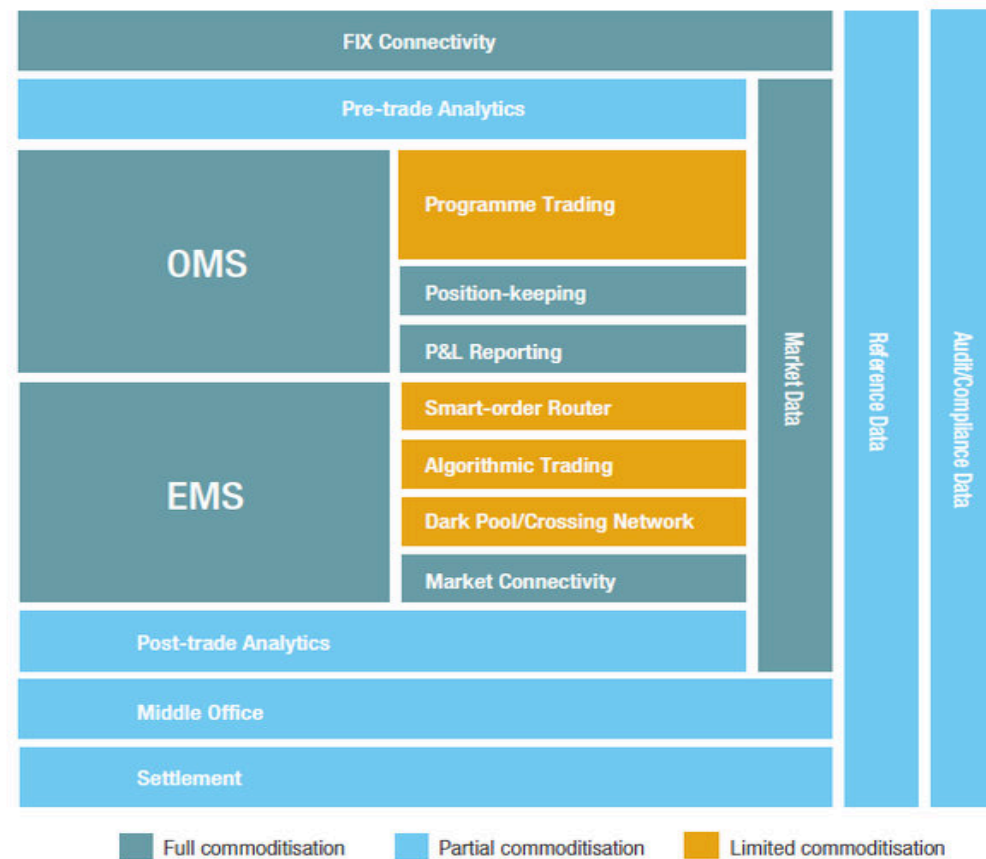


Fig 2: Degrees of commoditisation across equities trade management functions



Source: GreySpark analysis

Equities Trade Lifecycle

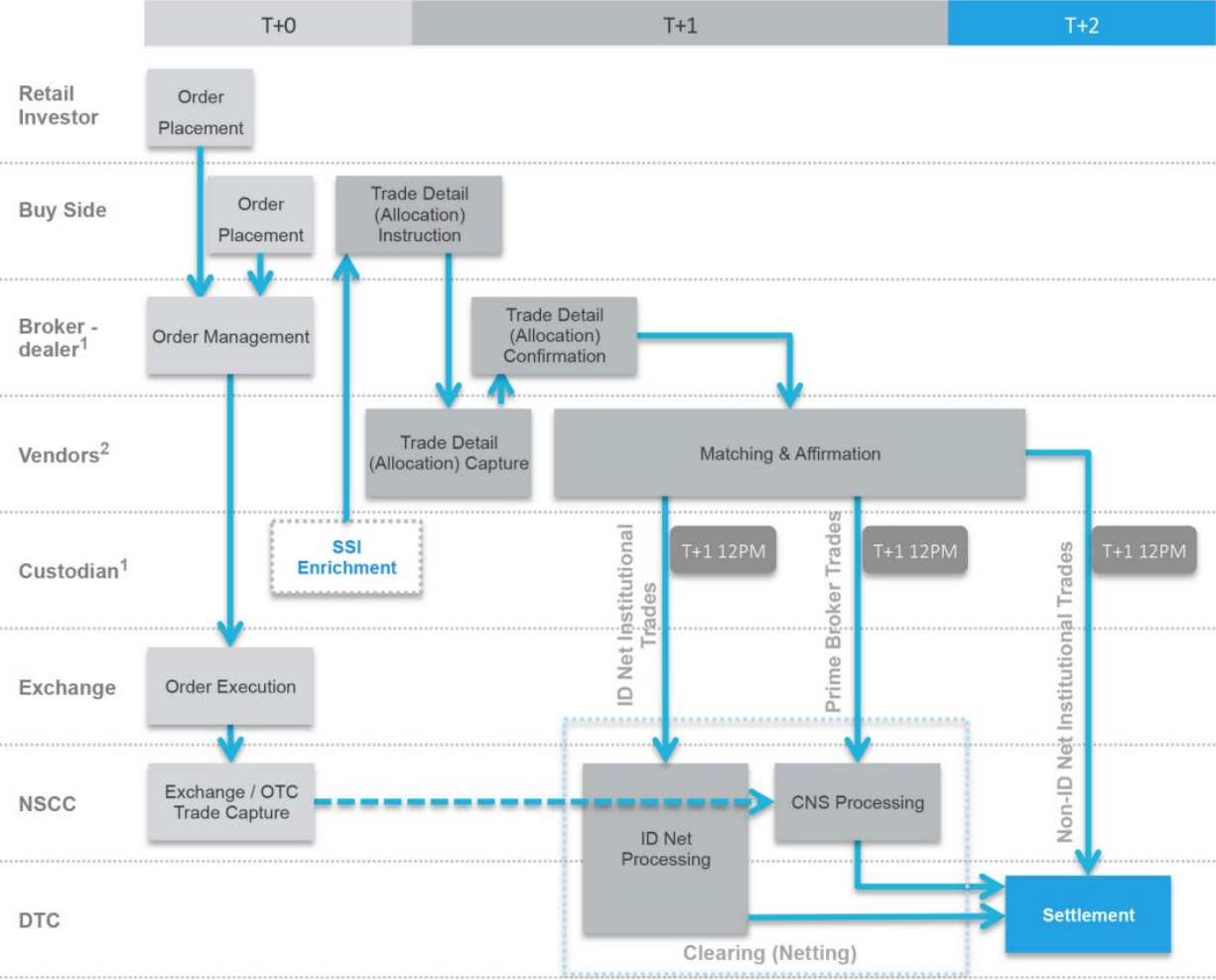
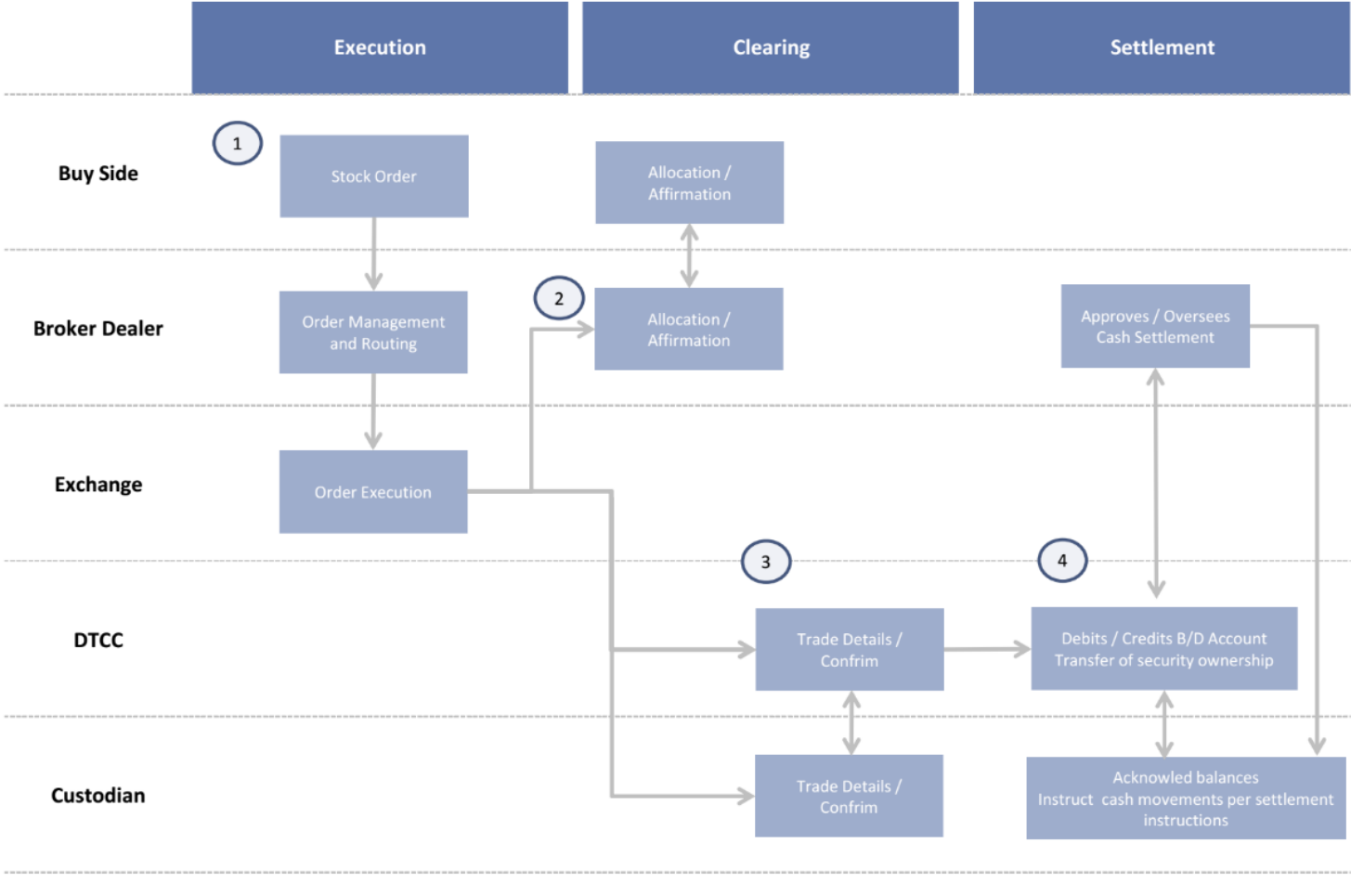


Figure 6: T+2 Trade Processing Workflow

TP1 Reference data and trade processing systems must be configured for T+2 as standard settlement

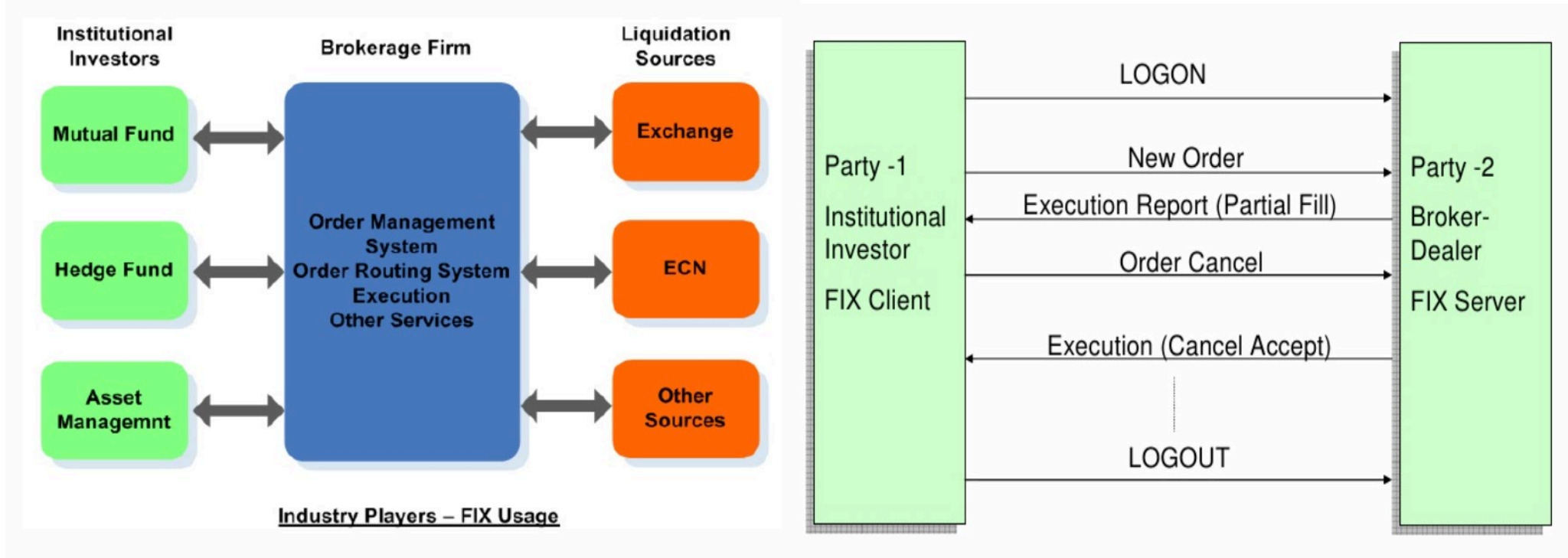
Equities Trade Lifecycle

Exhibit 45: Simplified illustration of how US cash equities trade today



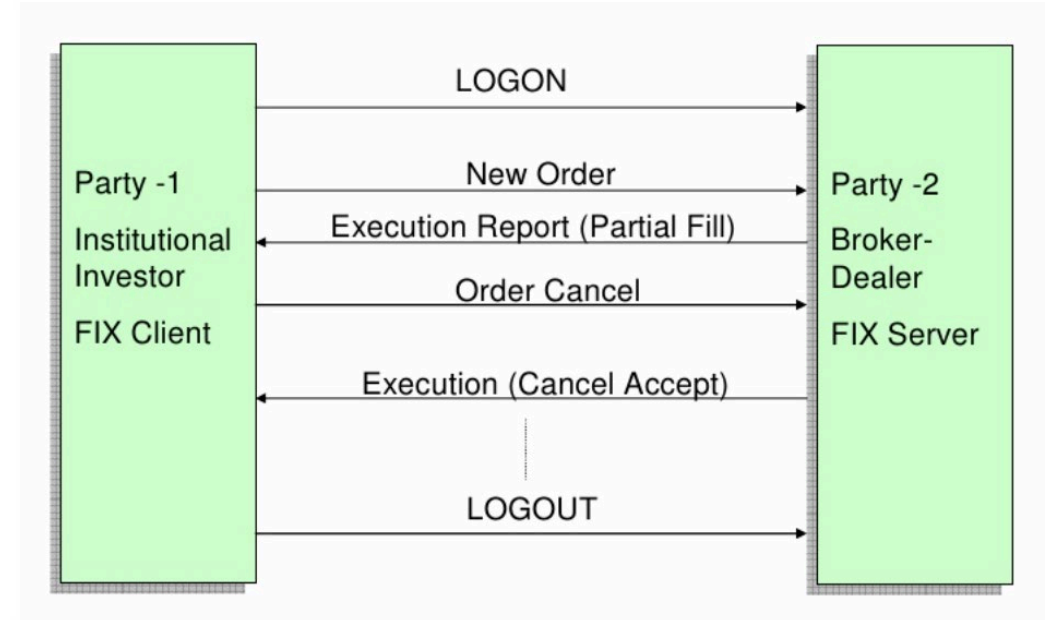
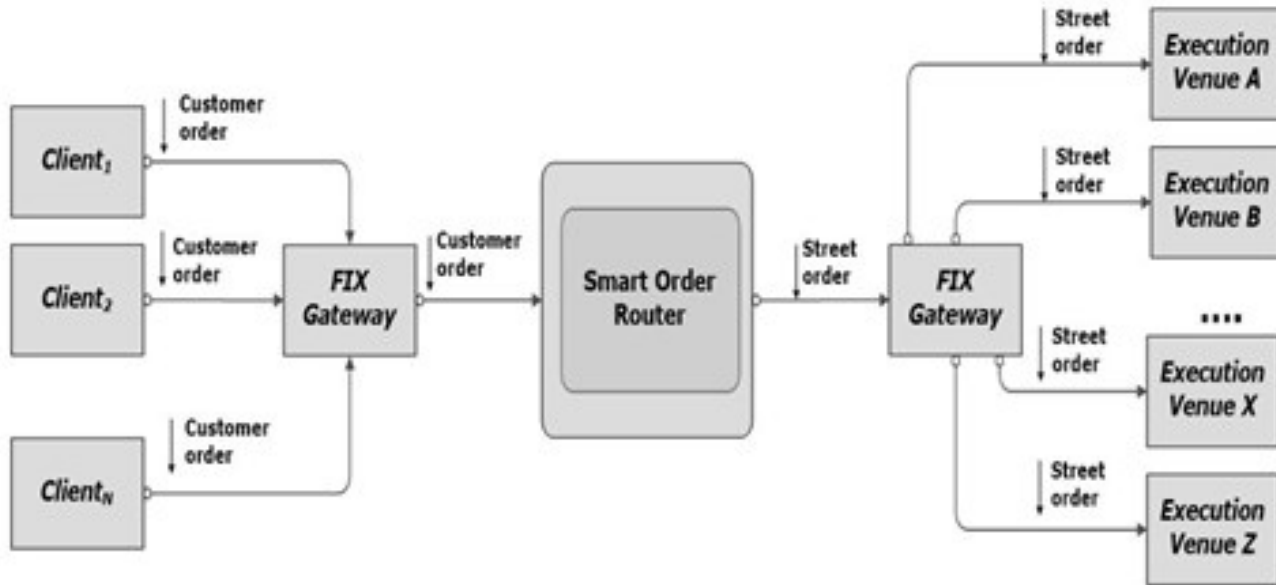
Source: DTCC, Goldman Sachs Global Investment Research.

Equities Trade Lifecycle



Source: <https://www.slideshare.net/aiQUANT/fix-protocol-overview-1697394>

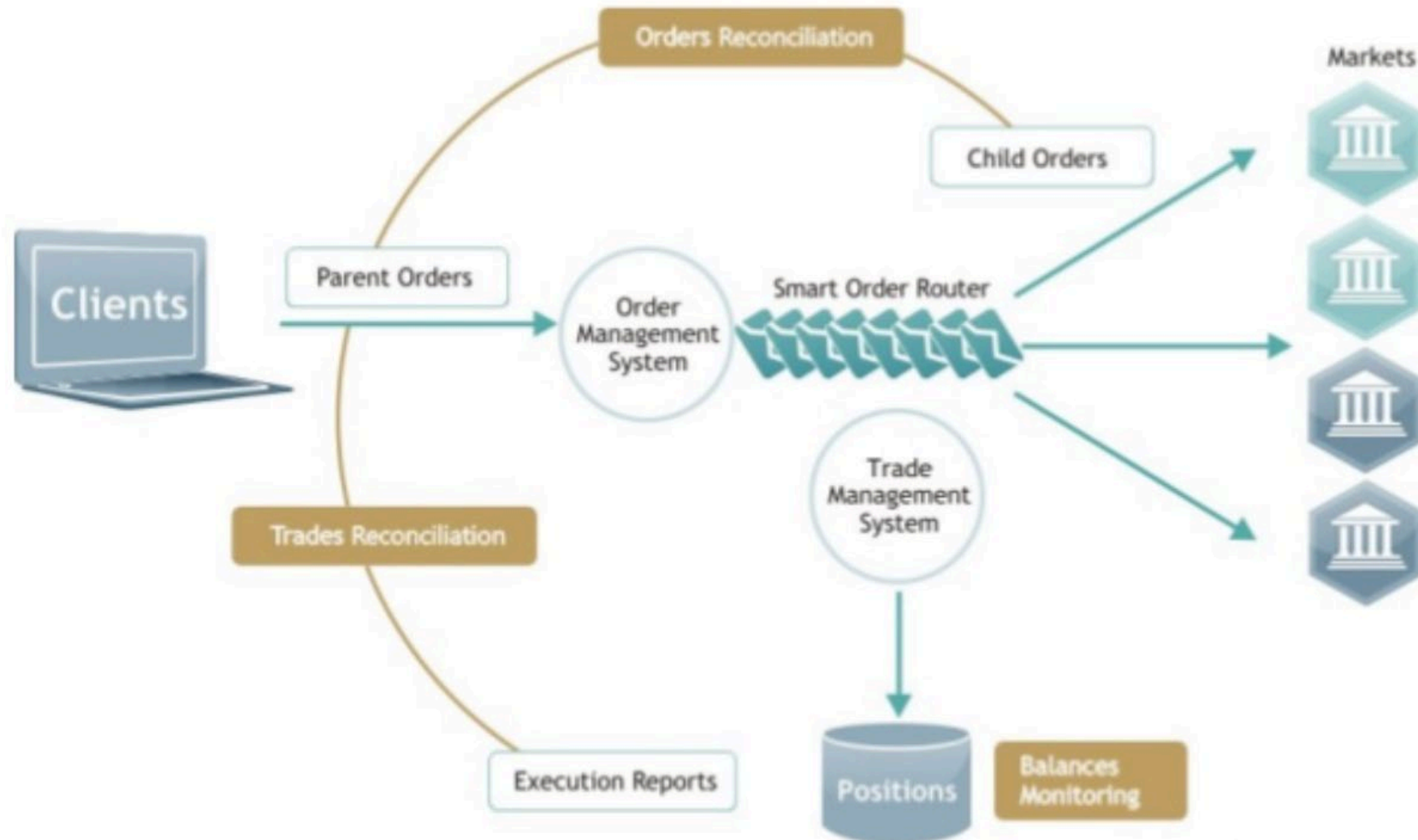
Equities Trade Lifecycle



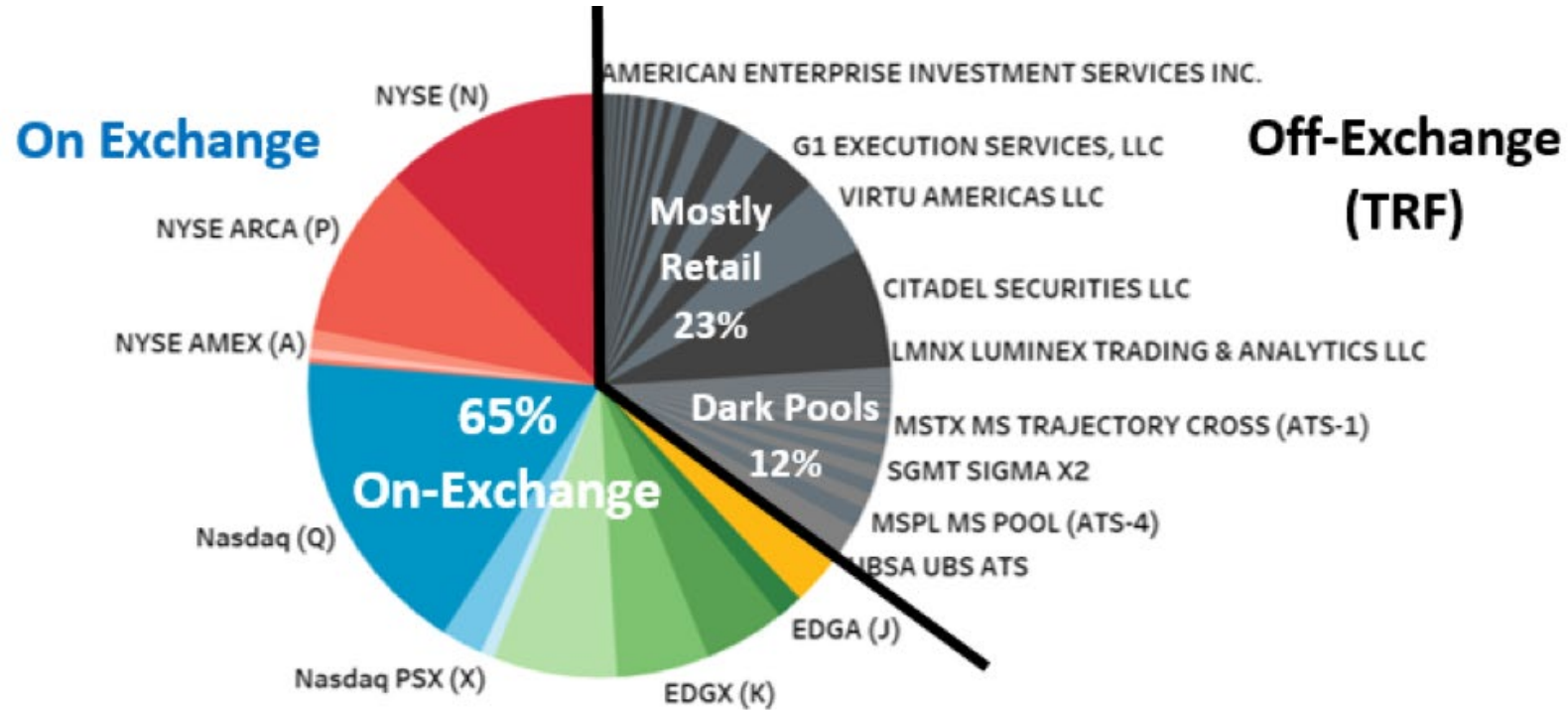
Source: <https://www.b2bits.com/about/success-stories/smart-order-router-system-for-dash-financial>

Source: <https://www.slideshare.net/aiQUANT/fix-protocol-overview-1697394>

Equities Trade Lifecycle

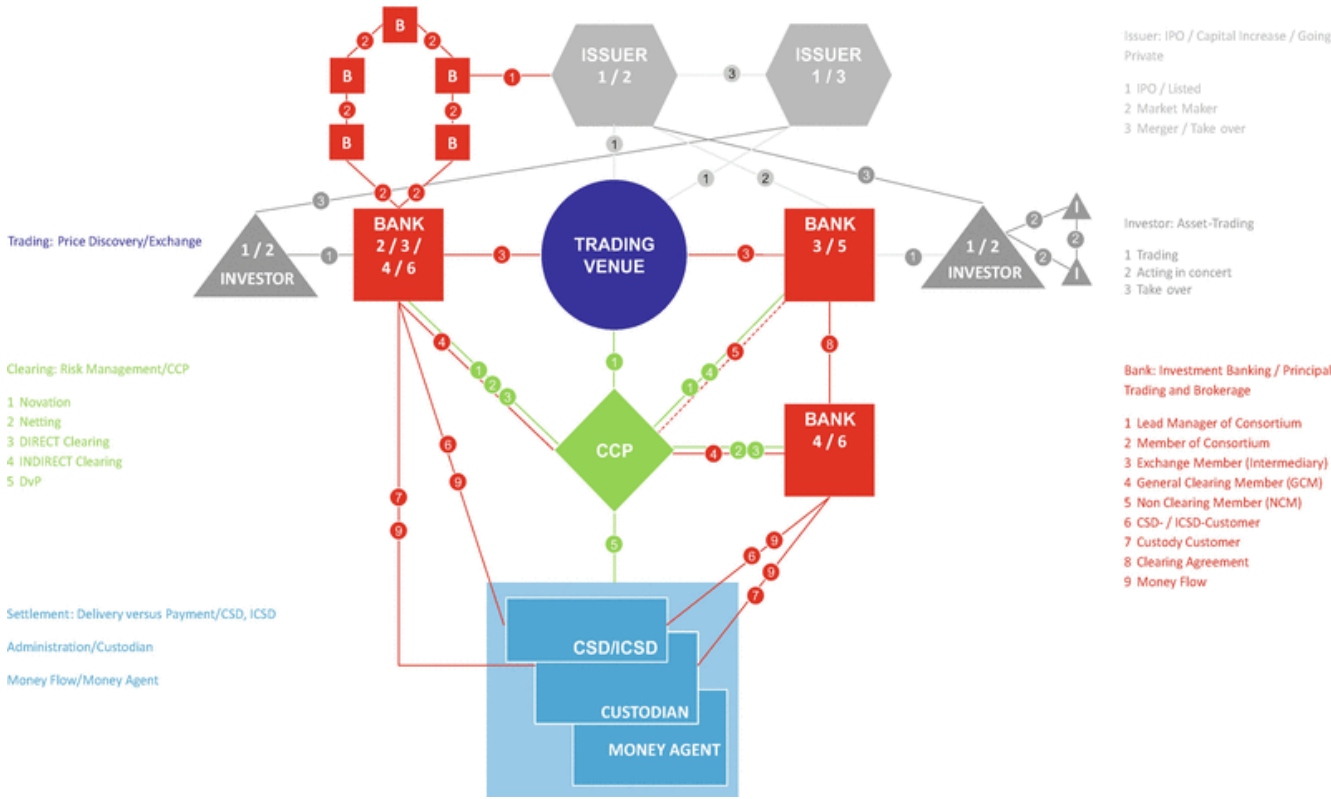


The distribution of liquidity in the US market

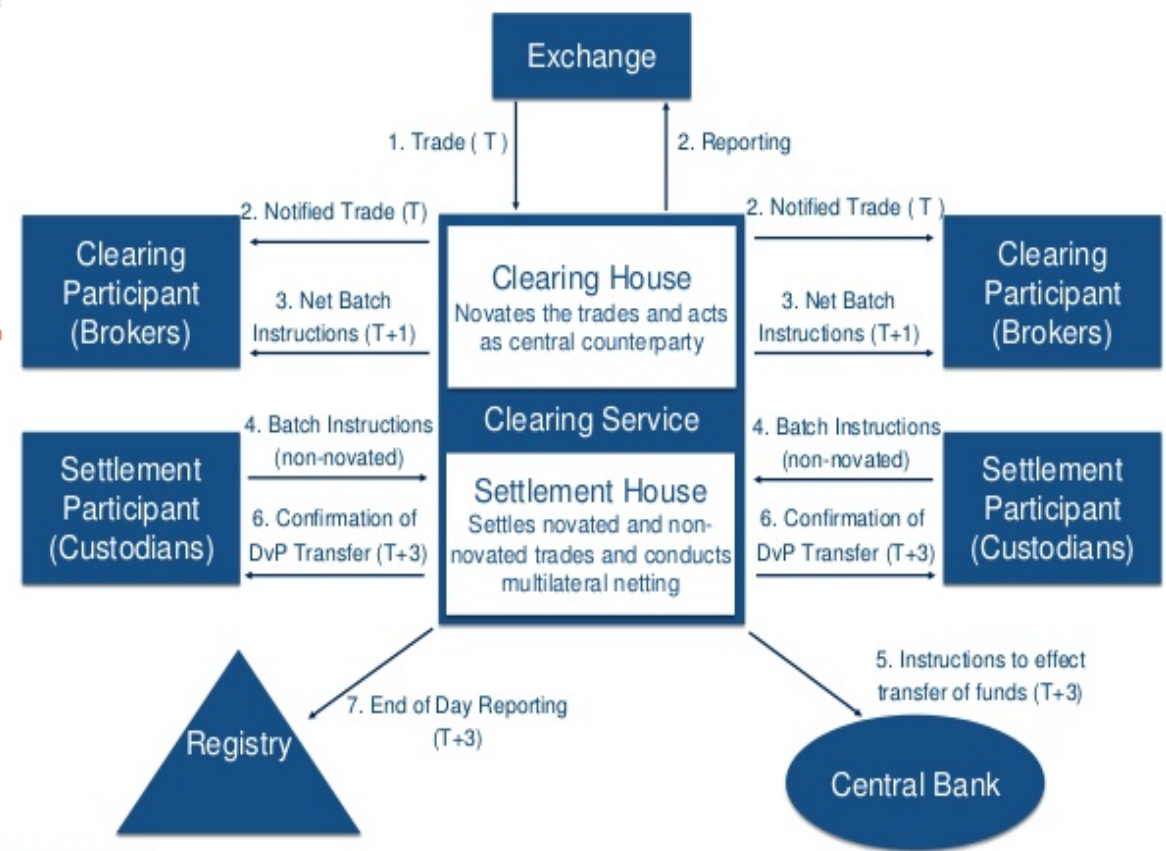


Source: Nasdaq Economic Research, SIP data, FINRA ATS data (for Oct-Nov 2018) - <https://www.nasdaq.com/articles/slicing-the-liquidity-pie-2019-02-11>

Current Equities Clearing and Settlement



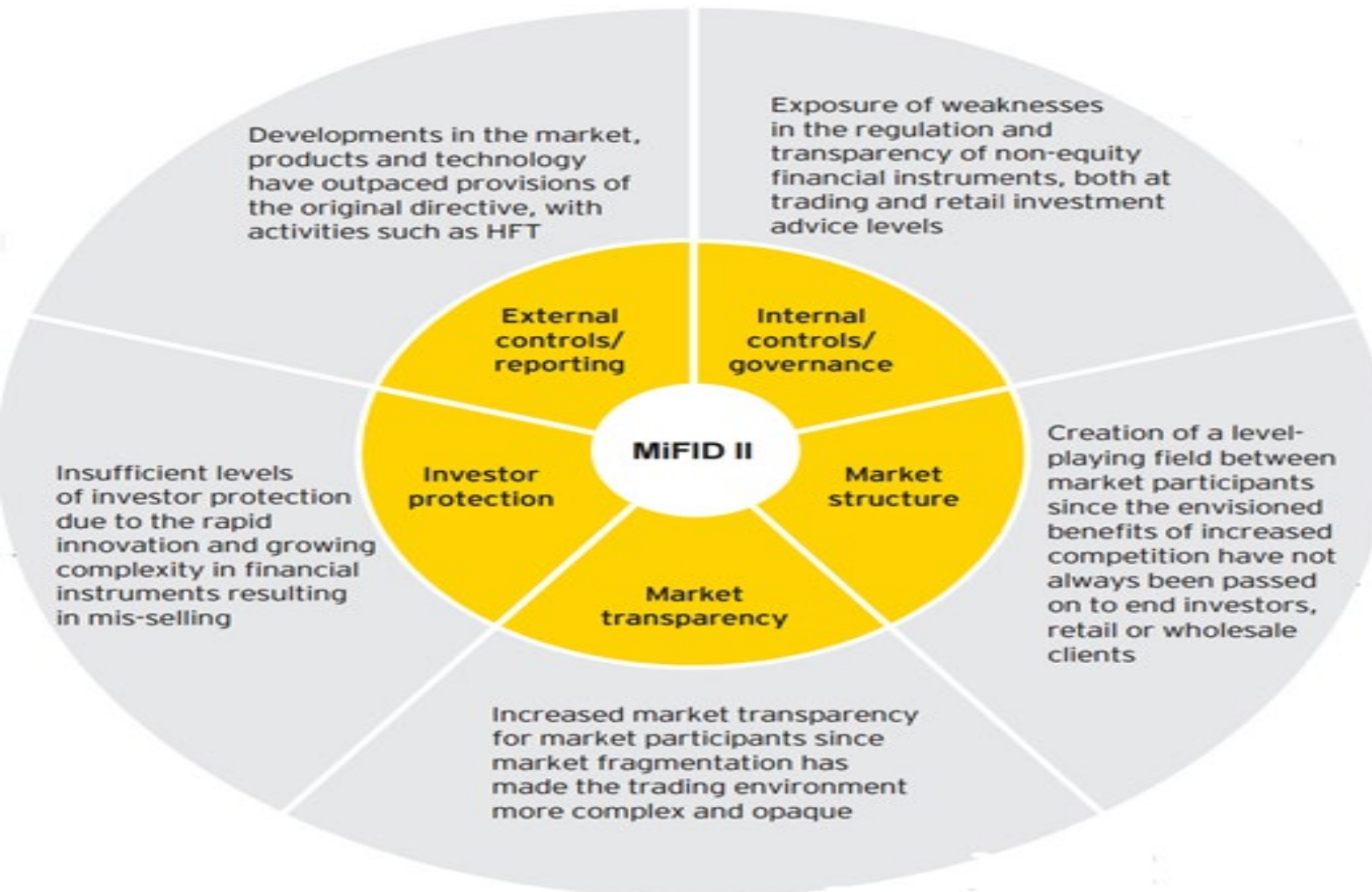
Securities Clearing and Settlement



Source: ASX

Challenges in Capital Markets

- ❖ Challenges in Capital Markets – Transparency (e.g. reporting, execution indicators), operations efficiency (e.g. reconciliation), risk management (...), liquidity, AML, surveillance (record keeping, trade reconstruction)
- ❖ Common domain model (CDM) - Common standards for data formats, reference data, transactional data, and business processes. CDM is meant to be technology agnostic yet at the same time can be leveraged with emerging technologies, such as smart contracts and distributed ledger technologies (DLTs).



1. A consistent model that defines all lifecycle events and processes for traded products can position firms to achieve simplification and scale in post-trade while preserving freedom of technology choices and interoperability between technology solutions.
2. With the advent of blockchain and smart contracts, the inefficiencies and costs in derivatives trading due to multiple handoffs and complex processes were supposed to decrease. However, before banks and industry participants can rely on any distributed ledger as the new holy grail or “single source of truth,” better standardization is required. Most participants today use a complex set of processes, data structures, and reporting formats to track trade lifecycles in order to satisfy internal and external regulatory and compliance norms. Thus, without a common language or format, it may not make sense to adopt a common ledger.
3. The market ecosystem faces challenges from a sub-scale post-trade infrastructure marred by inadequate risk controls. Traditional cost-saving opportunities have already been fully explored, and new solutions don’t effectively address the end-to-end process. Current pain points will likely magnify over time, increasing stress on operational processes and risk management, as well as leading to the need to retrofit innovative financial technology solutions with inherent workarounds. A standard blueprint for the entire post-trade can significantly reduce inefficiencies. However, real digital transformation is only possible through common underlying standards.

Key problems to solve

Operational simplification:

Reduces manual efforts to create transparency and reconcile and resolve customer struggle.

Regulatory efficiency improvement:

Enables real-time monitoring. Our central data store solution will help clients with regulator reporting and assisted reporting

Fraud minimisation:

With the help of blockchain, machine learning and artificial intelligence, banks and financial institutions can monitor fraud and financial crime.



Counterparty risk reduction:

Agreements can be codified and executed in a shared, immutable environment

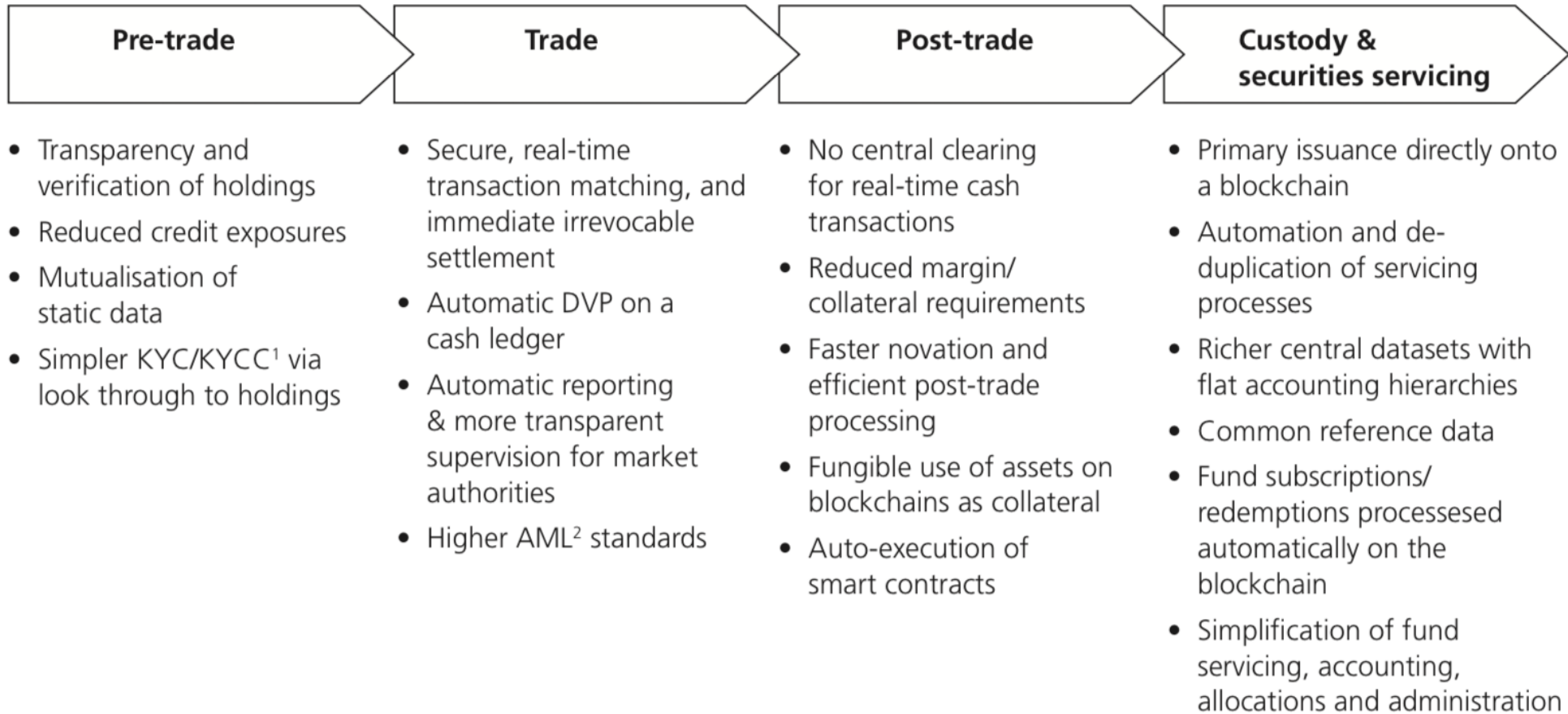
Clearing and settlement time:

Our Smart Contract technology reduces some 3rd party transaction verification/ validation and accelerates settlement

Liquidity and capital improvement:

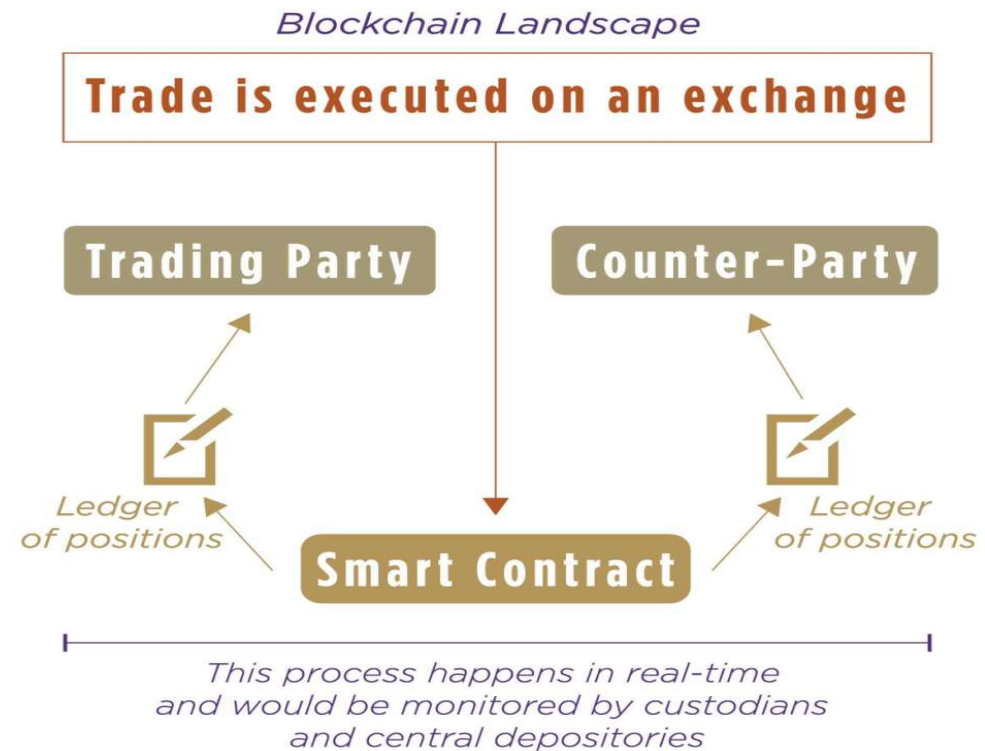
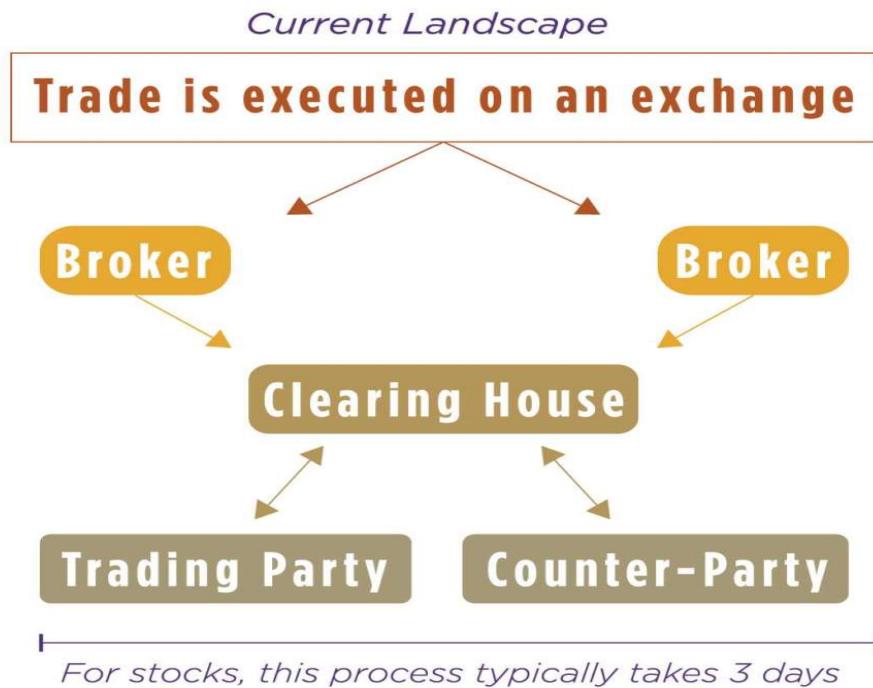
Can reduce locked-in capital and provides increased transparency

Blockchain Potential Benefits



Blockchain Potential Benefits

CURRENT CLEARING & SETTLEMENT PROCESS VS. CLEARING & SETTLEMENT PROCESS WITH BLOCKCHAIN

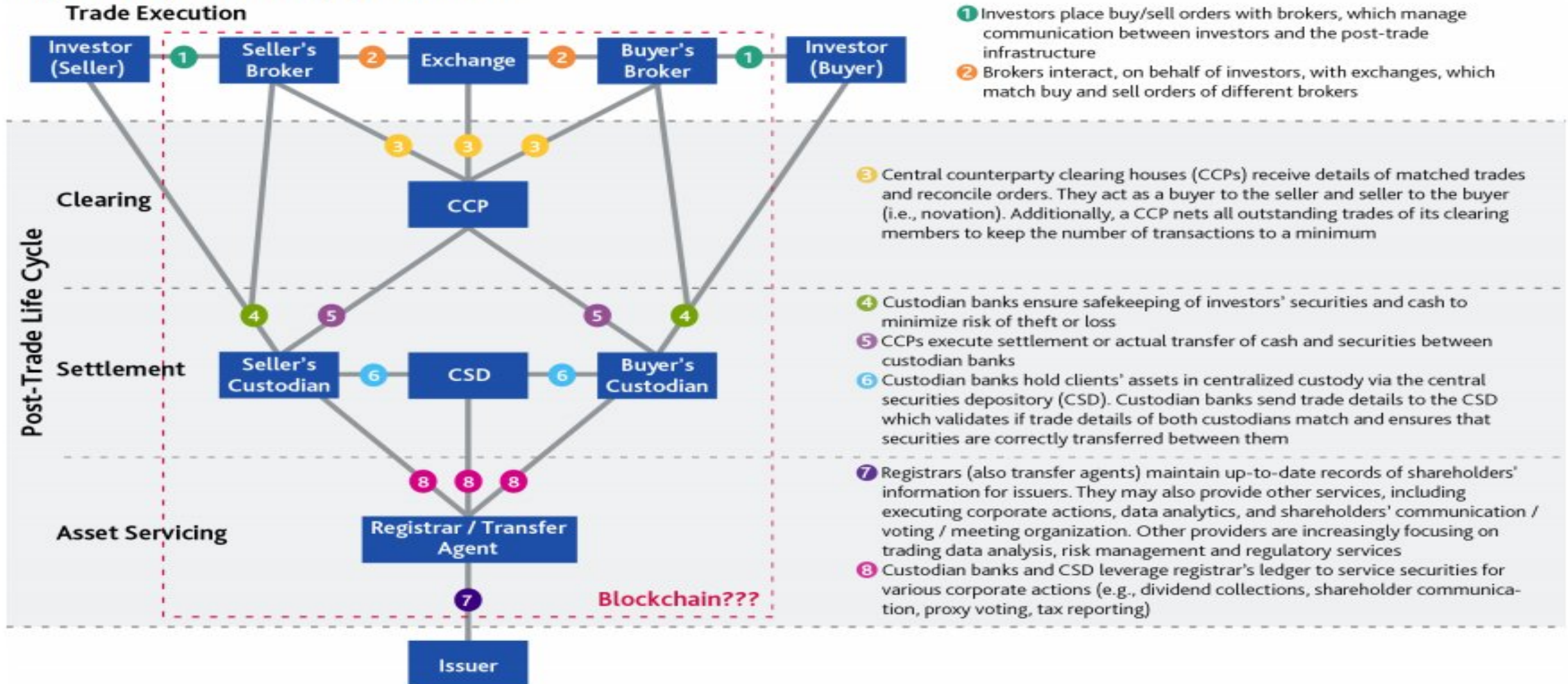


Blockchain benefits for Equities Clearing and Settlement

Exhibit 1

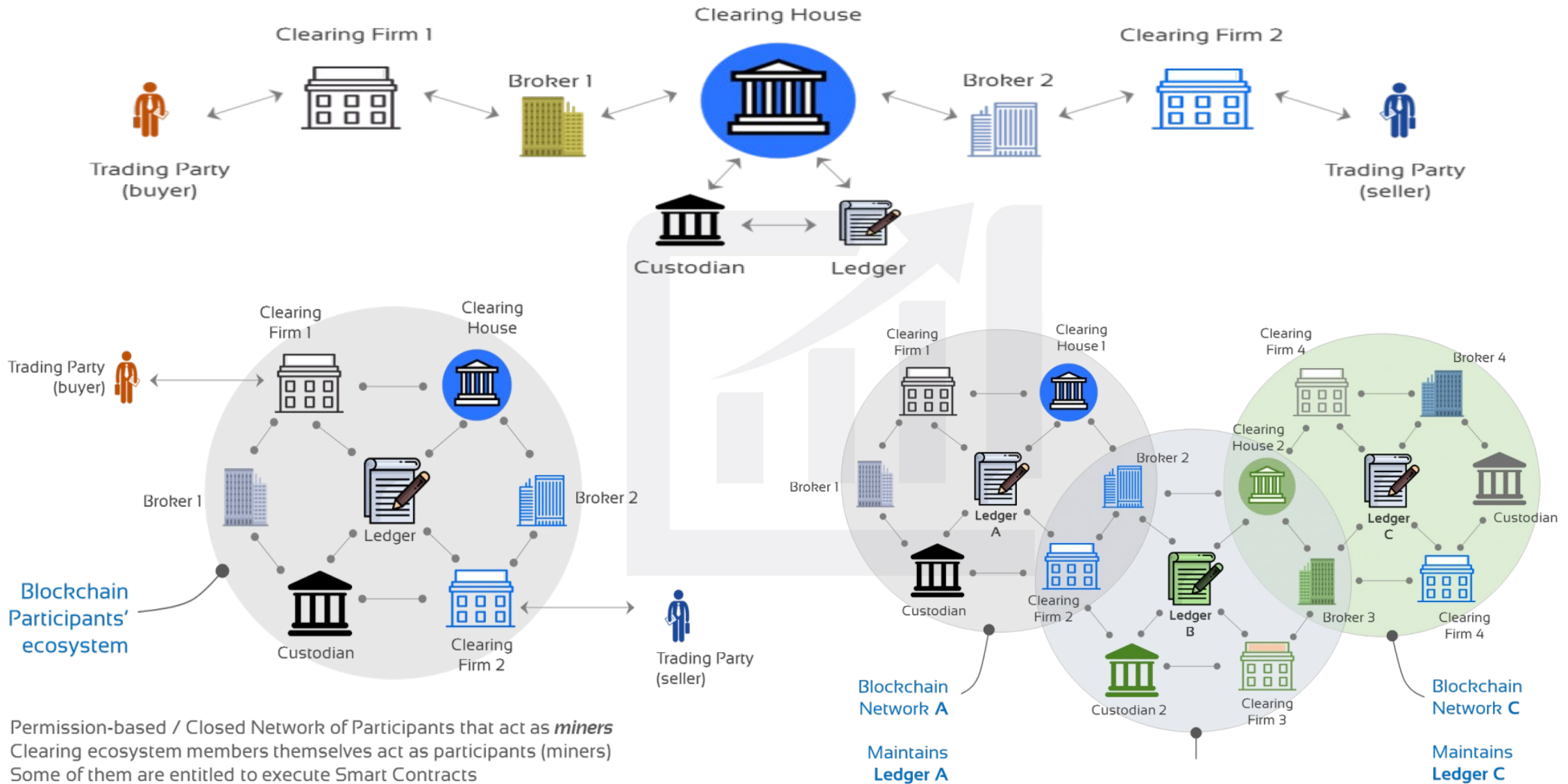
Blockchain Applications and Clearing, Settlement and Asset Servicing Layers

Simplified Example of a Cash Equity Securities Trade



Sources: European Central Bank, World Economic Forum, Richard Gendal Brown (R3), Moody's Investors Service

Equities Clearing and Settlement



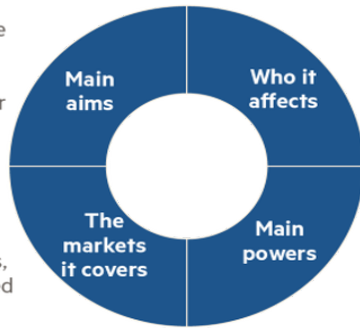
- Permission-based / Closed Network of Participants that act as *miners*
- Clearing ecosystem members themselves act as participants (miners)
- Some of them are entitled to execute Smart Contracts
- Some of them are entitled to carry out transactions and maintain Ledgers (blockchain)

AML, FinCrime, Surveillance & Regulatory Compliance

Next generation compliance solutions can be designed to protect financial institutions from financial and reputational harm. We can provide tailored our solution to fit to your specific needs. We offer fully integrated, customisable AML and trade surveillance solution based on next generation AI machine learning algorithms.

Mifid II: what you need to know

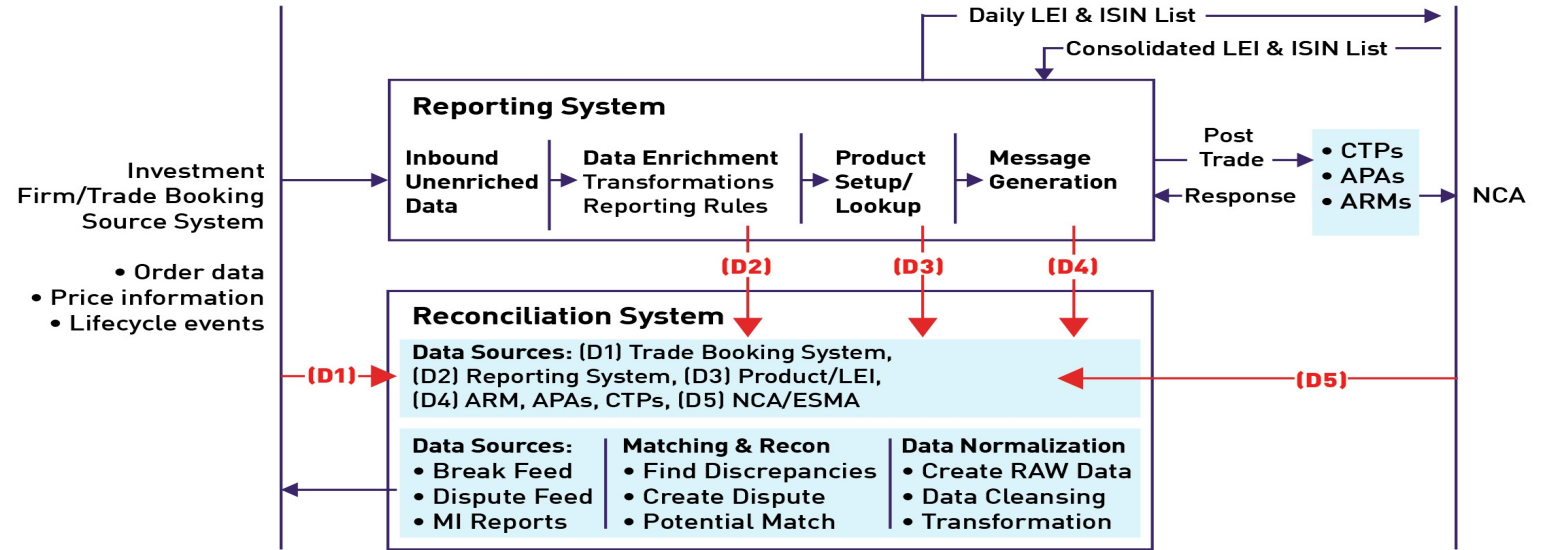
- To make European markets safer, more transparent and more efficient
- To restore investor confidence following the financial crisis
- To move a significant part of over-the-counter trading on to regulated trading venues



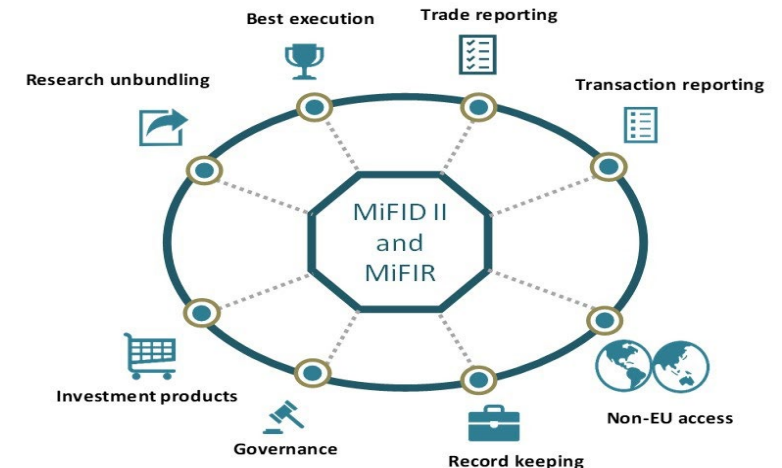
- Equities markets, fixed income, commodities, currencies, futures, exchange-traded products and retail derivatives such as contracts-for-difference

- Everyone - banks, fund managers, exchanges, trading venues, high-frequency traders, brokers, pension funds and retail investors

- More pricing transparency for off-exchange markets
- Volume caps for equity 'dark pools'
- Splitting payments for analyst research and trading commission
- Tougher standards for investment products



The MiFID II Circle of Truth
Source: Aite Group



Source: FT research © FT

AML SOLUTIONS:

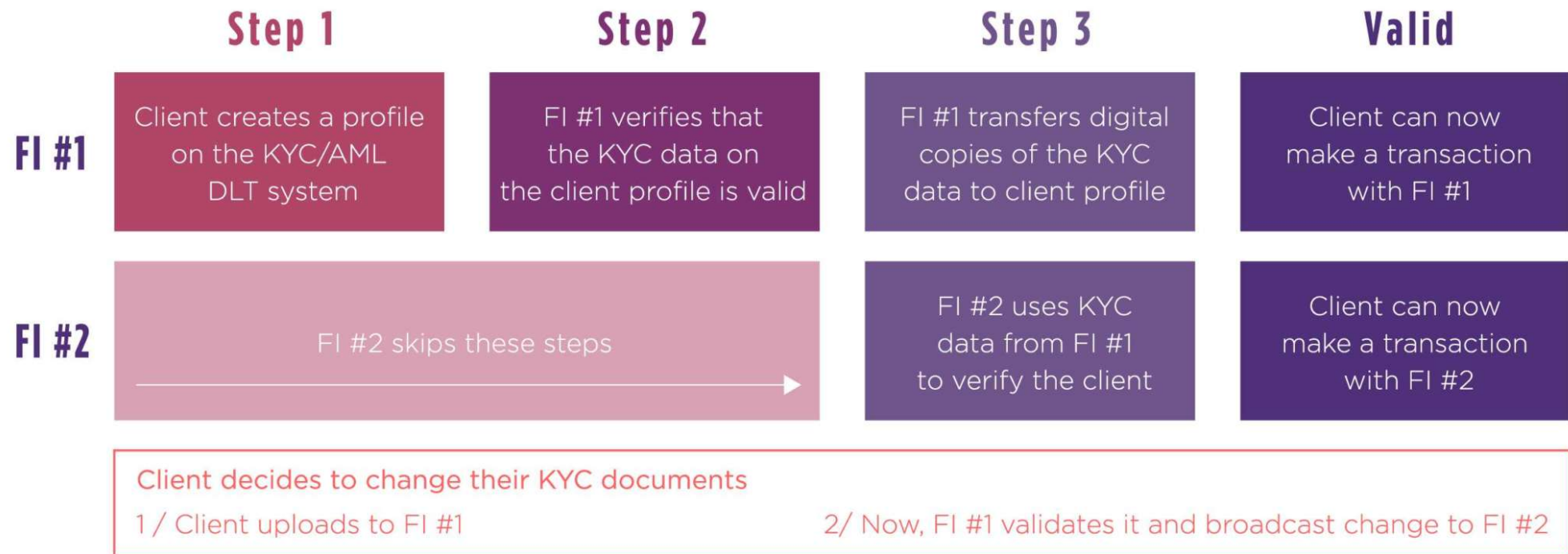
- ❖ CLIENT ONBOARDING
- ❖ CUSTOMER DUE DILIGENCE (CDD)
- ❖ KNOW YOUR CUSTOMER (KYC)
- ❖ SANCTIONS AND PEP SCREENING
- ❖ TRANSACTION FILTERING
- ❖ REGULATORY REPORTING
- ❖ ALERT CASE MANAGEMENT
- ❖ AI/ML BASED FRAUD DETECTION AND PREVENTIONS

TRADE SURVEILLANCE:

- ❖ ENSURE THE FIRM IDENTIFY POTENTIAL MARKETS VIOLATIONS SUCH AS INSIDER TRADING OR ROUGE TRADING
- ❖ MONITORS USING RELATIONSHIP GRAPH
- ❖ AI/ML CLUSTERING AND SCORING ALGORITHM TO VERIFY ABNORMAL ACTIVITIES
- ❖ FULLY TRANSPARENT CASE MANAGEMENT
- ❖ AI/ML BASED ALERT SCENARIOS

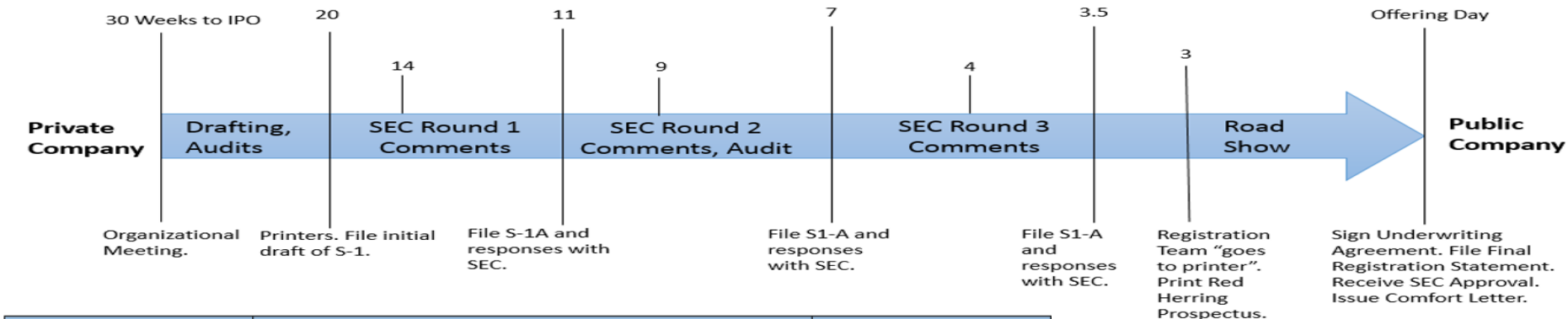
Blockchain Potential Benefits

HOW BLOCKCHAIN WORKS IN KYC/AML COMPLIANCE



FI (Financial Institution)

DLT - Primary Market – IPO / Roadshow



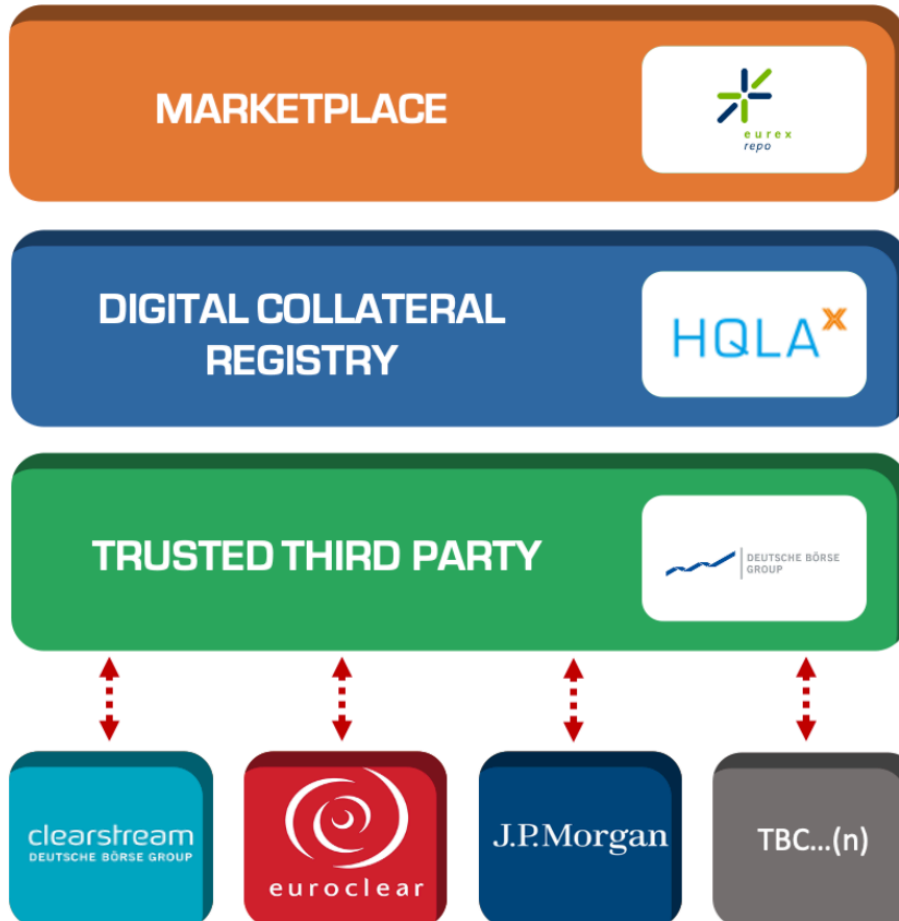
Participant	Basic Role	Expected Cost
Company Personnel	Provides company information necessary for drafting the S-1 form and actively assists throughout the registration process. Company personnel includes the CEO, CFO, controller, VP's, in-house legal counsel, and other employees assisting with the IPO.	Estimates vary widely depending on internal expertise and complexity of IPO
SEC	Reviews the registration statement (or S-1 form) and has the authority to allow or deny the issuance of shares. This decision is based on whether correct procedures were followed.	Between \$0.02 and \$0.15 million (fees vary depending on the number of securities filed and amount of debt)
External Legal Counsel	Drafts key documents for analysts and shareholders, anticipates structural changes, and handles compliance issues.	Between \$0.7 and \$1.5 million (fees can vary dramatically, based on hourly rates with little to no discount)
Underwriter (Investment Bank)	Helps develop the registration statement, promotes the company's shares to investors through a road show ⁶ and directs the financial strategy.	Usually 7% of the IPO proceeds, paid upon a successful transaction
Underwriter's Legal Counsel	Drafts the underwriting agreement ⁷ and ensures the completeness of the registration statement on behalf of the underwriter.	
Independent Audit Firm	Issues an audit opinion, provides technical expertise, writes a comfort letter ⁸ , and reviews all aspects of the S-1. The primary purpose of the comfort letter is to document the performance of procedures requested by the underwriter.	Between \$0.5 and \$1.2 million (fees can vary dramatically, based on hourly rates with little to no discount)
Advisory Accounting Firm	Offers independent counsel on IPO project management, strategic approaches, complex financial reporting issues, internal control matters, and post-deal concerns.	Between \$0.3 and \$0.8 million (fees can significantly increase for a complex IPO)
Financial Printer	Prints the registration statement and prospectuses and prepares the electronic filing for the SEC.	Between \$0.3 and \$0.5 million

An initial public offering (IPO) seems to be the de facto goal of many startup companies. Founders, investors, and public observers often wonder, "When will this company IPO?", "What will this company's stock price be when they eventually IPO?", and "Why hasn't this company completed an IPO yet?" You may have been asked some of these questions about your own company. While an IPO is a worthy objective with many potential benefits, there are also many risks and disadvantages associated with going public, and thus, an IPO may not be suitable for every company.

- ❖ Industry 5.0 has revolutionised how digital transformation can be delivered. IPO process are still very cumbersome and paper based.
- ❖ Companies incur huge transaction cost during the IPO issuance process
- ❖ Additional Regulatory Requirements And Disclosures
- ❖ Market Pressures

Blockchain Potential Benefits

- Vanguard - a synchronized **database for mutual fund indexes** that is constantly updated every time CRSP makes a change to the index
- <https://www.forbes.com/sites/jeffkaufman/2019/05/30/vanguard-is-now-using-blockchain-technology-to-help-manage-13-trillion-in-index-funds/#1244abc28dfe>
- **Riskless Trading** - effectively guarantees that every matched order (execution) is settled. Riskless trading is made possible through atomic settlement on the SDX system <https://www.sdx.com/en/home/sdx/business-model.html>
- A 'Smart' Approach to Blockchain for **Collateral Management**: Bringing Banks and Blockchain Together
- <https://www.synechron.com/insights/a-smart-approach-blockchain-collateral-management-bringing-banks-and-blockchain-together>
- Vanguard Advances Blockchain Technology Pilot To **Streamline Asset-Backed Securities Markets**
- <https://www.prnewswire.com/news-releases/vanguard-advances-blockchain-technology-pilot-to-streamline-asset-backed-securities-markets-301074465.html>
- HQLA^x - seamlessly execute capital-efficient securities lending transactions for enhanced balance sheet optimization and **mobilize collateral** across a fragmented custody ecosystem; this is done without moving the collateral from one location to another.
- <https://www.hqla-x.com/>
- **Shortening settlement times** - Project Ion aims to shorten the settlement cycle for the DTCC's core settlement systems
- <https://www.ledgerinsights.com/dtcc-blockchain-tokenize-private-securities-public-ethereum/>
- **Tokenizing private securities** - Project Whitney is the edgier of the two proposals and aims to tokenize private securities and enable secondary trading. This would initially target Regulation D (SEC Exemption) equities.
- <https://www.ledgerinsights.com/dtcc-blockchain-tokenize-private-securities-public-ethereum/>
- Paxos, Credit Suisse Claim First Blockchain-Based **Settlement of US Equities** - <https://www.coindesk.com/paxos-credit-suisse-claim-first-blockchain-based-settlement-of-us-equities>



MARKETPLACE

- Eurex Repo electronic trading market (new segment for HQLA^x collateral swaps)
- Ability to enter specific opening/closing date & time (to the nearest minute)

DIGITAL COLLATERAL REGISTRY

- Enables atomic change of ownership of baskets of securities
- Delivery vs Delivery "DvD"

TRUSTED THIRD PARTY (TTP)

- Holds baskets of securities at multiple custodians on behalf of participants
- Management of exposure requests to triparty agent services

CUSTODY LAYER (Triparty Agents and Custodians)

- Safekeeping of securities in accounts opened by the TTP
- Collateral management of securities in and out of segregated TTP accounts



Blockchain Implementations

Market Infrastructure

Markets

A real-time trading and settlement platform.

CSD

A depository system for securities, funds or other assets

Asset Management

Fund Distribution

A platform to manage the creation and distribution of funds with primary and secondary market capability.

Onboarding & KYC

A suite of tools to manage client onboarding process

Payments

CBDC

A framework to enable cash-like transactions over the internet.

Wholesale Payments

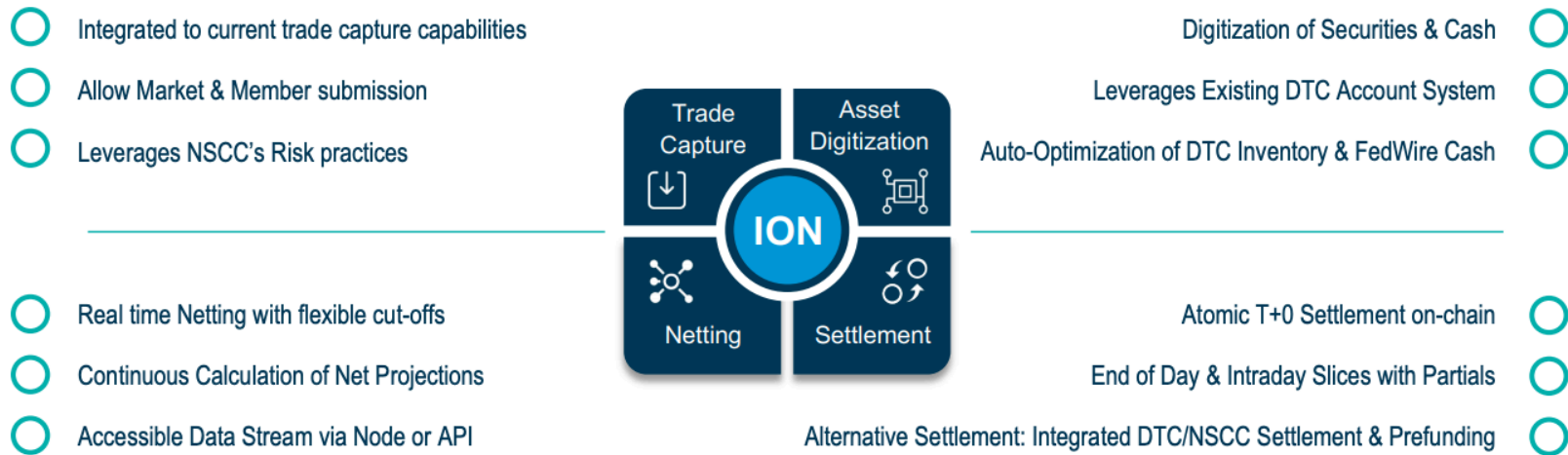
Payments infrastructure backed by a Central Bank Digital Currency.



POTENTIAL DIGITAL ACCELERATED SETTLEMENT SERVICE

The proposed design of a Digital Accelerated Settlement Service at DTC was inspired by key concepts from the Settlement Optimization and Accelerated Settlement initiatives but modelled around a T+0 settlement cycle.

Underpinned by DTCC's years of settlement experience, a potential Digital Accelerated Settlement Service has the promise of offering the industry an accelerated settlement option that does not compromise on the core benefits of DTCC's centralized netting and risk management.



Common Interface via Front End, Node & API abstracting **between existing and new** infrastructure

Backward compatibility to Settlement Web for **ease of adoption**

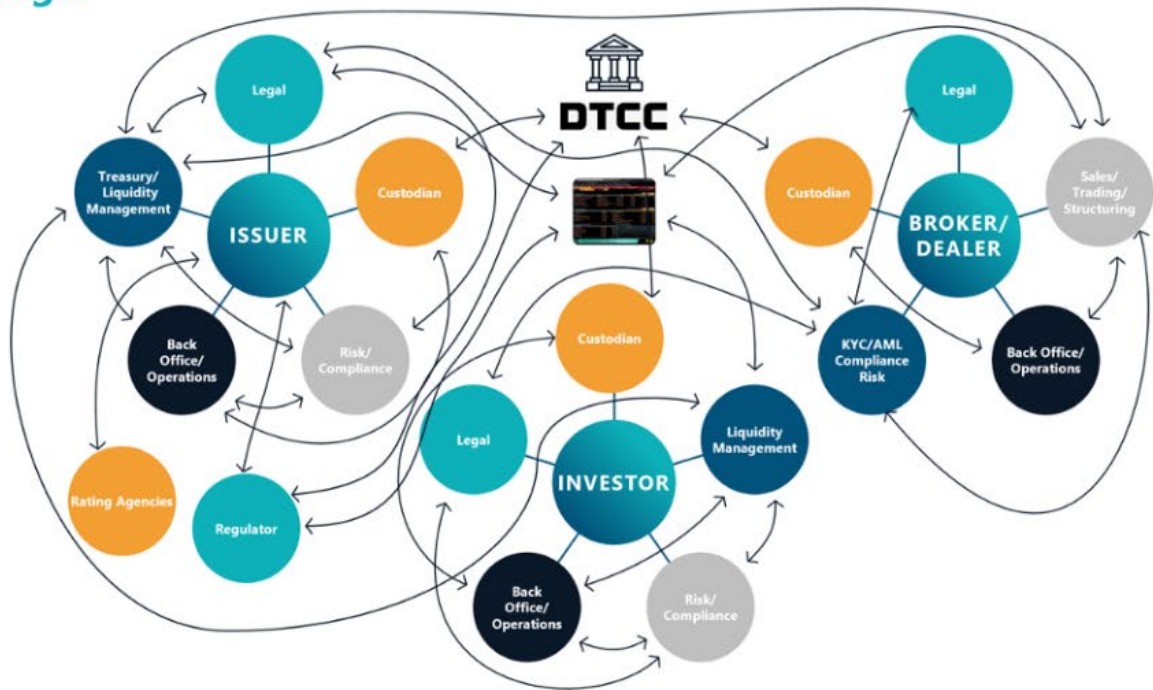
Full Synchronization between the ledgers **for redundancy and resiliency**

Q&A

Thanks you for your time.

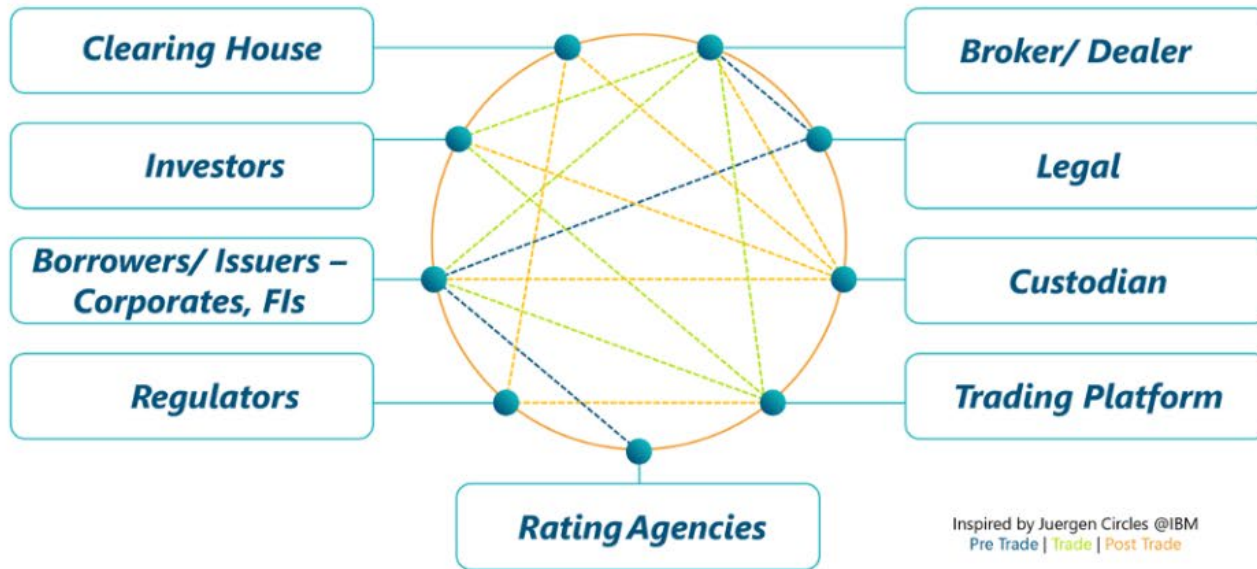
TODAY

Centralized Ledger



TOMORROW

Distributed Ledger



Inspired by Juergen Circles @IBM
Pre Trade | Trade | Post Trade