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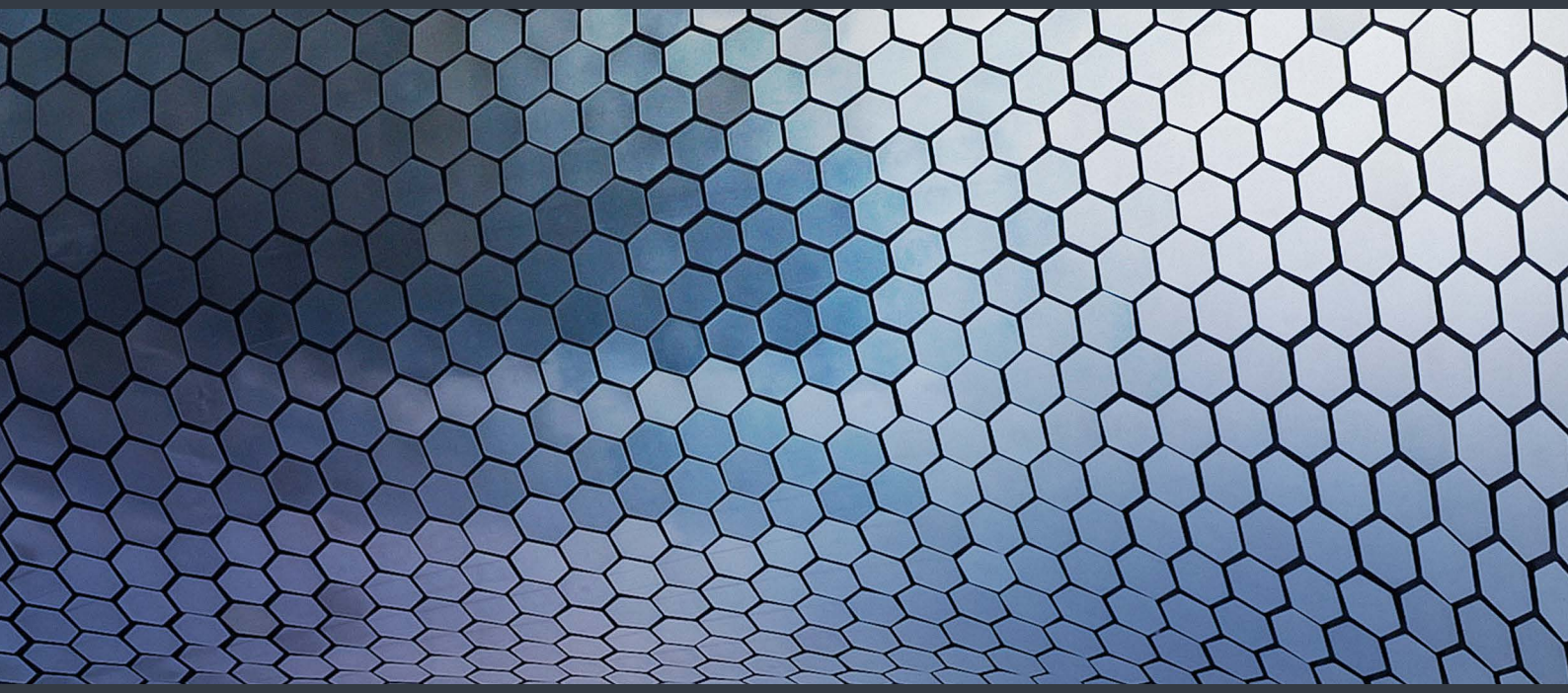
The Clearing & Settlement of Crypto Assets Trading

An Overview of the Current State of the Global Landscape



by greyspark partners

Cryptocurrencies experienced significant depreciation in 2021, with the total market capitalisation of all cryptocurrencies dropping from a peak of around USD 2.5tn in May to around USD 1.3tn by the end of the year, according to data from **CoinMarketCap.** This represented a decrease of approximately 48% in market capitalisation from the peak in May. By December 2022, the **Terra/Luna algorithmic stablecoin, cryptocurrency exchange FTX** and crypto mining company Core Scientific collapsed or were bankrupt, marking the end of an annus horribilis for the burgeoning cryptoassets industry.

Understandably, investor confidence was dented by these events. At the level of markets and trading, investment banks reduced their exposure to cryptocurrencies by 46% in 2022, according to the findings of a December 2022 **Bank for International Settlements** survey of 126 institutions.

Crucially, the BIS survey found that, of the 17 banks providing crypto custody services for institutional investor clients such as asset managers or hedge funds, total prudential cryptoassets exposure in 2022 amounted to EUR 2.9bn with only EUR 1bn held under custody. Given that there are only two ways to trade crypto – hold assets on an exchange or hold a credit line with dealers or market-makers – the fact that banks are currently only willing to hold less than 1% of the market's capitalisation in safe harbour speaks ill of the asset class's future.

To restore banking industry and institutional investor confidence in the viability of the cryptoassets marketplace and its wide variety of products, **GreySpark Partners** believes that wider adoption of the products is predicated on **four conditions:**

01. A clear understanding of the financial instruments belonging to this broad asset class must be achieved by the professional investment community;

02. The standardisation of products and practices, combined with normalised and easily accessible market data;

03. A functioning wholesale market requires clearly established rules and regulations to operate at scale; and

04. The availability of technology to handle and comply with all the above.

In this article produced in partnership with **valantic FSA**, the unique aspects of clearing and settlement applied to cryptoassets is explored along with the reasons why solutions that were originally designed for securities and fiat currencies are challenged to process the instruments traded within this new asset class.

Market Adoption of Available Platforms and Services

The current state of the cryptoassets clearing and settlement landscape cannot be maintained if institutional investors continue to move into the space en masse. This view is derived from observations that – from a structural perspective – the ability of the cryptoassets market to continue to handle large volumes of retail trader inflow is waning.

Institutional investors and their intermediaries must now become increasingly willing to take responsibility for the continued development of the new market that they are seeking to adopt. There are **four blockers** – or requirements – for wide adoption of crypto assets trading within the institutional investor community to achieve critical mass:

1.

Deeper Understanding of the New Asset Class

Spanning the mass of different cryptocurrencies, digital assets, non-fungible tokens, smart contracts and other instruments created thus far, as well as a vision of the future of instrument type creation;

2.

Standardisation and, with it:

- product normalisation;
- **Trading & Settlement Protocols –** Not just APIs, but also – fundamentally – workflows; and
- The Availability of Information, Freely or Otherwise – Specifically, market data;

3.

Predictable Regulations & Rules

Minimising the arbitrage opportunities that are already emerging between different jurisdictions such as the EU, Germany, Switzerland, the US and the rest of the world, with each moving at varying pace in relation to one another in crafting new mandates governing cryptoassets trading broadly, and clearing and settlement specifically; and

4.

The Availability of Front-to-Back Cryptoassets Trading Technology

Exchange-provided or independent technology vendor-provided to supply and deliver on all the above items.

A deeper understanding of the new asset class is arguably already accumulating within the institutional investor community globally, and it may only be a matter of time before everyone is singing from the same hymn sheet. **With regards to the other three market adoption factors:**

Product standards for cryptoassets instrument types other than cryptocurrencies are emerging, and cryptocurrencies trading, specifically, is beginning to coalesce around a limited number of liquid types;

Germany, **Switzerland** and **some APAC countries** currently lead in enshrining jurisdiction-specific mandates, and Seychelles-based **BitMEX's partnership** with vendor Trading Technologies to enable direct market access on the exchange means that emerging markets are rapidly chasing the tail of their developed markets compatriots. Meanwhile, President Biden's March 2022 **Executive Order on Ensuring Responsible Development of Digital Assets** means that cryptoassets trading is headed for the mainstream of US regulation; and

Recently published GreySpark **research reports** examining the current state of FX e-trading technology show that the leading vendors in the space are already addressing institutional investor demand for functional capabilities sophistication in cryptoassets and cryptocurrencies trading. However, in terms of automating cryptoassets and cryptocurrencies settlement in concert with the needs of back-office systems used for traditional assets and securities trading, practically no functional sophistication currently exists.

All the pieces of the trade lifecycle puzzle must fall into place for institutional investor confidence in the new asset class to become bolstered – particularly regarding collateral management, counterparty and settlement risk, and balance sheet limitations. Once the community's concerns in those areas are effectively addressed by new infrastructure, then the conditions would be ripe for the emergence of a watershed moment in which rapid institutional investor adoption and expansion of crypto assets trading, clearing and settlement to occur.

The Specificities of Cryptoassets vs. Fiat Currency & Securities

Unlike fiat currency and securities, cryptoassets and currency is only as valuable as the belief that subscribers to a particular blockchain are willing to assign to it. Governments, via central banks, dictate the amount of fiat currency available within a national or federal system at any one time and – via regulators – apply strictures to the ways in which assets, including securities, are bought and sold that deploy legally binding requirements on all the actors within a trade lifecycle chain. In contrast, the volume, value and governance of cryptoassets are controlled solely by the blockchain that they are derived from and its miners.

The clearing and settlement of cryptoassets differs from traditional assets and securities process and workflow in that – on a blockchain – several key steps of the front-to-back fiat lifecycle are controlled solely by public or permissionless or by private or permissioned systems (see **Figure 1** on next page).

Permissioned and permissionless blockchains are two different types of blockchain networks, each with their own distinct characteristics and use cases. **The main differences between them are:**

Access Control – Permissioned blockchains restrict user access and require permission from a central authority to participate in the network, while permissionless blockchains are open to anyone who wants to participate in the network;

Validators – Permissioned blockchains typically have a set group of validators who are responsible for verifying transactions and maintaining the network, while permissionless blockchains rely on a decentralised network of participants who compete to validate transactions through a process called mining;

Transaction Speed – Permissioned blockchains tend to have faster transaction speeds and higher throughput than permissionless blockchains due to their centralised governance and smaller network size;

Security – Permissioned blockchains have higher security than permissionless blockchains because the network is controlled by a central authority, which can enforce rules and protocols to prevent fraudulent activity. Permissionless blockchains rely on the integrity of the decentralised network to prevent fraudulent activity; and

Privacy – Permissioned blockchains can provide greater privacy and confidentiality because access to the network is restricted and participants can be identified and verified. Permissionless blockchains are transparent and open, allowing anyone to view transactions and participate in the network anonymously.

Figure 1: The Traditional (Fiat) vs. Public / Private Blockchain (Crypto) Trade Lifecycle

High Level Trade Lifecyle Steps	Fiat Assets & Securities	Permissionless Blockchain	Permissioned Blockchain
Step 01: Order Placement	A Custodian Holds an Electronic Share	A Purchased / Sold Share of Cryptoassets Ownership is Recorded on the Permissionless Blockchain	A Purchased / Sold Share of Cryptoassets Ownership is Recorded on the Permissioned Blockchain
Step 02: Order Matching	The Trade is Matched via an Electronic Venue	The Trade is Matched via an Electronic Venue	A Clearing Firm Simultaneously Matches the Trade via a Broker, a Clearinghouse & a Custodian
Step 03: Trade Execution	The Trade is Executed via an Electronic Venue	The Trade is Executed by Digital Signature on the Permissionless Blockchain	The Trade is Executed by Digital Signature on the Permissioned Blockchain w. the Consent of all the Mining Parties
Step 04: Trade Processing	Trade Match/ Confirmation	The Trade is Validated via the Permissionless Blockchain's Consensus Method	The Trade is Validated via the Method and Simultaneously Written to the Clearinghouse and the Custodian the Shared Ledger by the Clearing Firm, the Clearinghouse and the Custodian
	Instruction to Custodian to Settle Trade		
	Delivery vs. Payment (DvP) on the Trade		
Step 05: Asset Lifecycle Events	Events are Actioned by the Custodian/ Market Data	The Trade is auto processed by the Permissionless Blockchain	The Trade is auto processed by the Permissioned Blockchain
Step 06: Portfolio Reconciliation	The Transaction is Reconciled to the Custodian	The Transaction is Reconciled to the Permissionless Blockchain	The Transaction is Reconciled to the Permissioned Blockchain

Source: GreySpark analysis

The overarching functional capabilities requirements, then, of a clearing and settlement system for handling the post-trade management elements of cryptoassets must be fundamentally different from the functional capabilities requirements of a system that handles only traditional, fiat assets or securities. **For example:**

24/7 Availability – Cryptoassets markets, unlike other organised markets, do no stop;

The Ability to Handle Fractional Settlement – Traders use cryptocurrency and fiat currency to buy / sell fractional amounts of a crypto coins, contracts or tokens, sometimes at minimum order sizes totalling just 0.00001;

Different Wallets for Different Coins / Instruments – Each cryptoasset is settled in a corresponding wallet, and they cannot be mixed into other wallets – effectively one portfolio per cryptoasset;

A Virtual Ledger System – The creation of a batch mechanism to reduce the costs associated with settling multiple transactions;

Payment of Miner's Fees in Cryptocurrency – In order to process a transaction on a blockchain, the network charges a fee to users that can only be paid in cryptocurrency;

The Ability to Process Fixed Quantity, Not Price, Fiat Currency Orders – In cryptoassets trading, investors settle on a quantity of which the notional amount is unknown; and

Specialised Crypto Interfaces – Traditional, fiat interfaces for clearing and settlement work by facilitating the transfer of funds between different financial institutions. **They do so by following several steps:**

Initiation – A transaction is initiated by a sender who provides the necessary information, such as the recipient's account details, the amount to be transferred, and any other relevant information;

Verification – The sender's bank verifies the transaction by confirming that the account has sufficient funds to cover the transfer and that the details provided are correct;

Transmission – Once the transaction is verified, the sender's bank transmits the funds to the recipient's bank via the clearing and settlement interface. The funds are transferred electronically, typically through a secure network such as SWIFT;

Settlement – The recipient's bank receives the funds and credits the recipient's account. The settlement of the transaction typically takes place within a few hours or days, depending on the currency and the location of the banks involved; and

Reconciliation – Once the transaction is settled, the banks involved in the transaction reconcile their accounts to ensure that the funds were transferred correctly and that there are no discrepancies.

In cryptoassets clearing and settlement, interfaces for managing the process and workflow must be different because the process and workflow required is specific to the decentralised network of nodes that govern the blockchain on which the cryptoasset operates. **Generally, the main difference is that the steps are truncated:**

Initiation & Verification – The sender uses a software wallet or a hardware wallet to initiate the transaction. The wallet generates a transaction request that includes the recipient's public address, the amount of the cryptoasset to be transferred, and a unique digital signature;

Transmission & Settlement (Broadcast to the Network) – The transaction request is broadcast to the decentralised network of nodes that maintain the blockchain ledger. The nodes validate the transaction request, and if it meets the necessary criteria, then the transaction is added to a new block on the blockchain; and

Reconciliation – Which occurs over **three stages:**

1.

Validation & Verification – Once the transaction is added to the blockchain, the nodes on the network validate and verify the transaction through a process called mining. Miners use their computing power to solve complex mathematical equations, which help to confirm the transaction and add it to the blockchain;

2.

Confirmation & Finalisation – The transaction is confirmed and finalised when it is added to multiple blocks on the blockchain. This process can take several minutes or longer depending on the specific blockchain and the level of activity on the network; and

3.

Recording on the Ledger – The transaction is recorded on the blockchain ledger and is visible to anyone who has access to the blockchain. The sender and recipient can view the transaction on the blockchain and track its progress from initiation to finalisation.

There are already many fintech companies and financial services firms attempting to address the technical challenges associated with cryptoassets clearing and settlement through a range of different offerings that are either experimental in nature or that are being utilised in some form of live deployment (see **Figure 2** on the next page).

Crucially, though, most of these companies are attempting to address long-standing inefficiencies in the post-trade processing of fiat assets and securities using distributed ledger technology to supplant existing processes and systems, or they are attempting to replace only one small element of the overall process chain with a blockchain capable of replicating the required outcomes in a faster, automated manner.

Figure 2: Fintech providers & financial services firms working to resolve crypto-assets clearing & settlement challenges

Source: Blockdata.com

As such, there is currently no third-party system available in the cryptoassets trading marketplace capable of effectively functionally linking existing custody, depository or investment bank back-office systems with crypto brokerage venues and exchange platforms such that the post-trade data received from the marketplace can be translated into messaging language that can then be ingested and appropriately parsed by fiat assets and securities-centric protocols.

The Challenges & Limitations of Existing Service Offerings

In November 2021, in an effort to support innovation and fair competition, the EU finalised new regulations for the provision of crypto assets trading and custody services by financial services firms through the **Proposal for a Regulation of the European Parliament and of the Council on Markets in Crypto-Assets (MiCA).** The EU regulation, which enshrines federally the actions that some member states previously took to manage growth in the space at the country-specific level, is now also being examined by other countries and jurisdictions.

GreySpark believes that other nations and supra-national jurisdictions are likely to implement their own mandates as demand at both the institutional level and retail level to trade and hold cryptoassets continues to grow. At issue, then, is that the global financial system does not currently offer these cryptoassets trading and custody services at a scale comparable to the growing demand for them **in the sense that:**

Fragmentation – Cryptoassets markets and trading venues are spread over a range of legal and quasi-legal constructs run by regulated and unregulated infrastructure providers alike;

Illiquidity – The liquidity available in most crypto-assets types is often insufficient in its supply to satisfy levels of traded demand for it, especially in critical market situations;

A Lack of Depo Banks – Depository banks such as the US Depository Trust & Clearing Corp. (DTCC) are currently unable to order and process crypto assets trades; and, crucially

Technology Gaps – Custody and investment banking industry back-office systems are unable to translate cryptoassets clearing and settlement protocols into messaging language that can be understood by fiat-centric systems.

Overcoming the technology gaps is the most pressing challenge for the financial services industry in the sense that third-party vendor solutions could be developed to functionally link fiat assets and securities clearing and settlement systems with the cryptoassets marketplace constituted on brokerage platforms and exchanges. However, several challenges linked to the idiosyncrasies of the cryptoassets marketplace must first be mitigated by the new technology (see **Figure 3** on the next page).

Figure 3: The challenges of cryptoassets clearing & settlement for Fiat-centric back-office systems

Challenges	Description
Challenge 01: End-of-Day Batch Processing	Fiat markets operate on the principle of a ‚closing bell' and the need for end-of-day batch processing and system downtime.
Challenge 02: The Inability to Handle Fractional Settlement	All fiat asset classes cannot be traded fractionally, and they must settle in full amounts.
Challenge 03: One Clearing Account per Investor Portfolio	Fiat clearing systems hold only one clearing account per investor portfolio, and they can only clear transactions denominated in fiat currency.
Challenge 04: Omnibus Account Netting & Settlement	Fiat brokerage systems use omnibus accounts to net transactions so they can be settled one-by-one.
Challenge 05: Responsible Intermediaries	Responsible intermediaries rely on fiat-centric, traditional processes for clearing and settlement, and they charge fees for delivering this service in fiat currency only; their back-office systems are not able to accept payment for the services in cryptocurrency.
Challenge 06: Notional Amounts, not Quantities	In FX, for example, investors settle on a notional amount and not a notional quantity.
Challenge 07: Industry Messaging Standards	Fiat systems use SWIFT messaging and other industry standards to process clearing and settlement data, and they cannot write directly onto a virtual ledger.

Source: GreySpark analysis

The early days of Bitcoin saw a decentralised, trustless network that relied on miners to process transactions and maintain the integrity of the blockchain. However, this approach was not scalable and suffered from slow transaction times and high fees. Since then, various advancements such as the **Lightning Network**, side-chains, and second-layer solutions were developed to address latency concerns. Those technologies enabled faster, cheaper and more efficient transactions, making cryptoassets more accessible to a wider range of users.

Additionally, the development of centralised exchanges and trading platforms made it easier for investors to buy, sell and trade cryptoassets. However, the emergence of the cryptoassets marketplace infrastructure also raised concerns around security and the custody of cryptoassets, with several high-profile hacks and breaches occurring in recent years.

Decentralised exchanges and non-custodial wallets were developed to address these concerns, enabling users to retain full control of their cryptoassets and trade them in a trustless manner. However, these technologies are still in their early stages and suffer from issues such as liquidity and usability.

With regulation now slowly creeping into the cryptoassets trading arena, GreySpark believes that codification of product characteristics and trading standards will naturally lend technology vendors opportunities to – piece-by-piece – unify clearing and settlement protocols that are purposefully designed with institutional investor interests in mind.

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