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FIX ↔ FINP2P PROTOCOL INTEROPERABILITY ALLIANCE WHITE PAPER

Connecting FIX to the
world of tokenized assets

February 2025



THE ALLIANCE



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FIX <> FinP2P Interoperability Alliance

Connecting any FIX OMS to Tokenized Assets

The financial industry is on the brink of a significant transformation, driven by the integration of traditional financial systems with blockchain-based and tokenized solutions. This integration promises to enhance transaction speed, security, transparency, and efficiency.

Until now, the industry's focus has primarily been on the "supply" side — exploring ways to tokenize various asset classes and cash. However, the true potential of tokenization lies beyond mere efficiency improvements. Protocols like FinP2P are driving the next stage of this transformation by seamlessly interconnecting supply, demand, and the regulated services essential for operation. The ultimate goal is to provide investors with streamlined access to tokenized assets, either by unlocking previously inaccessible opportunities or by enhancing pricing, functionality, and features such as 24/7 availability, secondary liquidity, and collateral mobility.

A key challenge in this transformation is the interoperability between traditional finance (TradFi) and the digital securities ecosystem. TradFi systems and blockchain platforms operate on different technologies and protocols, creating barriers that lead to inefficiencies, increased costs, and potential security issues. Additionally, financial institutions must navigate a complex regulatory landscape to comply with regulations governing both traditional and digital assets.

To address these challenges, Global Digital Finance (GDF) and FIX Trading Community convened an industry-led working group which brought together financial institutions and technology providers to bridge the gap between TradFi and digital securities. Central to their efforts was the integration of the FIX protocol - a long-standing standard in electronic trading - with the tokenization ecosystem.



FIX/GDF Sandbox Lab Website
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CONTRIBUTORS



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Platonic



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FIX <> FinP2P Interoperability Alliance

Connecting any FIX OMS to Tokenized Assets

Established in H2 2024, the Joint Working Group between GDF and the FIX Trading Community set out to enable the FIX-FinP2P Protocol Interoperability Alliance (the Alliance).

Originating in the GDF Private Markets Digitization Steering Group and governed by GDF under a Creative Commons license, the FinP2P tokenization interoperability protocol is a product of GDF's open innovation environment. As the world's largest open innovation platform supporting the development of best practices for the digital asset industry, GDF continues to convene this ecosystem – notably through the GDF Tokenization Forum - and was able to leverage this platform to enable the Alliance with FIX Trading Community.

By leveraging the open-source FIX Trading Community and the FinP2P Tokenization interoperability protocol, this working group aims to modernize existing financial infrastructure. Its goal is to demonstrate the potential of integrating blockchain technology with traditional financial systems.

The working group set out to achieve several key outcomes:

Interoperable Access

Enhance market liquidity and efficiency by providing interoperable access between traditional platforms and tokenized platforms.

Comprehensive Functionality

Enable a range of functionalities across the end-to-end lifecycle of assets, including issuance, custody, and other functionalities.

Enhanced Security and Compliance

Ensure that integrated systems adhere to the highest standards of security and regulatory compliance.

Commercial, Operational, and Technical Use Cases

Identify and establish use cases for connecting the FIX universe to the tokenization ecosystem, supporting a wide range of processes and flows.

Convening a diverse group of participants, including leading banks and financial institutions, technology providers, and industry facilitators, many of these participants are members/mandated users of the FIX protocol and/or possess the necessary FIX skill sets to effectively test the use cases. Each participant contributed unique expertise and resources, ensuring a collaborative approach to addressing the challenges of integration.

Background

FIX Protocol

The FIX Protocol (Financial Information eXchange) is an open messaging standard designed for real-time electronic communication of financial data. It enables financial institutions to connect and exchange information related to securities transactions in a standardized way, facilitating seamless trading and settlement processes.

The FIX network operates as a global framework for participants in the financial markets, including brokers, asset managers, exchanges, and other intermediaries. These entities use the protocol to communicate trade-related information, such as orders, executions, and confirmations, in a consistent and structured format.

The core functionality of FIX is to serve as a messaging protocol and integration layer that supports various financial instruments and workflows, such as equities, fixed income, derivatives, and foreign exchange. FIX simplifies interoperability by providing a universal communication standard that can be easily integrated with diverse trading platforms and systems. Each participant on the FIX network acts as a node, facilitating direct and efficient data exchange across the global financial ecosystem.

FinP2P Protocol

FinP2P is an open protocol designed for digital asset routing, distribution and transaction orchestration. It enables financial institutions to connect in a standardized way to facilitate the trading and settlement of financial assets. This is achieved by updating records of asset ownership in digital ledgers maintained by these institutions.

The FinP2P Network comprises a series of bi-lateral peer-to-peer connections between FinP2P Routers, operated by regulated institutions (e.g., banks, asset managers). These institutions can perform various regulated activities on the network, such as asset issuance, custody, and brokerage services.

The core functionality of FinP2P is to serve as a routing network and an abstraction layer that connects multiple underlying ledger technologies, and allow both access to them with a unified API, as well as seamless connectivity between them. An intermediary, thin and stateless network layer, interconnecting between any app and any approved distributed ledger technology, to which all financial institutions can easily connect.

Current State & Proof of Concept

Current State

The financial services industry is at a pivotal moment as real-world asset tokenization gains momentum across capital markets. Leading financial institutions have been building out their digital asset capabilities for several years now. However, it is only in this past year, that we have seen a surge in institutional adoption of digital assets with many industry proof-of-concepts moving to production applications.

This is a strong market signal, driven by the likes of BlackRock CEO Larry Fink stating that the next generation for global financial markets will be tokenization of securities and real-world assets [i].

This kind of discussion has only been amplified by the strong success these new digital asset products have shown since their launch, like Blackrock's BUIDL which became the largest tokenized Treasury Fund 6 weeks after launch [ii]. The continued strong performance of cryptoassets continue to drive demand. Charlie Billelo's asset class total returns since 2011 showcases an annualized return of about 149 percent over a 13-year period with three drawdown years corresponding with years the S&P was down [iii].

Firms are exploring the business opportunities promised by the tokenization of illiquid assets, estimated to be a \$16 trillion opportunity by 2030 [iv]. They are also exploring how to leverage tokenization and the efficiencies it promises in improving trading processes like reconciliation management – which in turn can lead to significant cost reductions. This is particularly relevant for large-scale markets like U.S. public equities and Treasury securities, which collectively represent over \$75 trillion [v].

However, despite the promising opportunities, the market remains fragmented, and institutions face a host of challenges in scaling tokenized assets into production environments.

Global Digital Finance's (GDF) recently commissioned survey [vi] shed lights onto which challenges firms consider the most significant barriers to entry in their digital asset adoption strategies. Digital financial market infrastructure (dFMI) - or lack thereof - and interoperability were signaled as the key adoption challenges. Interoperability refers to a myriad of different challenges in the context of bridging traditional and dFMI.

The network benefits that DLTs like blockchain promise only to materialize and achieve scale when they are connected to one another. To date, over 1,000 blockchains operate distinctly in a diverse ecosystem. Connecting this ecosystem is vital to facilitate the seamless transfer of data and value across different blockchains, and to build a broader ecosystem and scale their adoption.

By eliminating the need for message-based bridges or external integrations, a focus on interoperability reduces counterparty and settlement risks. This is a crucial consideration for institutions that deal with high-value assets such as bonds or derivatives, where atomic settlement and real-time synchronization across platforms are necessary. Addressing these challenges is crucial for the successful integration of blockchain technology into existing financial infrastructure.

Blockchain interoperability increases the velocity of settlement, reducing counterparty and settlement risk. It also allows tokenized assets to flow across multiple networks and platforms without compromising security or operational control. ensures that assets can be traded and settled on different blockchain platforms, unlocking cross-network liquidity, and enabling access to new markets. Buy-side follows institutional liquidity.

In the traditional financial world, the underlying financial market infrastructure (FMI) and blockchain systems operate on fundamentally different technologies and protocols, making it difficult to ensure smooth and interoperable interactions between them. This lack of interoperability between traditional and new systems can lead to inefficiencies, increased costs, and potential security vulnerabilities.

Furthermore, the regulatory landscape adds another layer of complexity. Financial institutions must navigate a myriad of regulations that govern both traditional and digital assets, with some jurisdictions architecting more stringent regulatory frameworks than others. Ensuring and demonstrating compliance in

these complex regulatory environments whilst integrating new technologies has disincentivized much institutional participation to date.

These challenges underscore the need for robust solutions that can build the bridge between TradFi systems and the world of tokenized assets and herald us into the new era of digital finance.

The FIX-FinP2P Protocol Interoperability Alliance: Proof of Concept and Objectives

To address these challenges and better enable messaging between TradFi and digital securities, several members of the financial and technology communities came together in a working group established under the aegis of GDF's Tokenization Forum and FIX Trading Community. The primary objective of the working group was to link the FIX universe, a widely used protocol for electronic trading, with the tokenization ecosystem, leveraging the strengths of the open-source FIX Trading Community and the FinP2P Tokenization interoperability protocol.

The working group aimed to connect existing financial infrastructure by facilitating interoperability across traditional financial systems and blockchain-based platforms. In so doing, the project aimed to achieve several key outcomes:

Interoperable Access

One of the primary goals of the working group was to provide interoperable access between traditional platforms and tokenized platforms. This interoperability helps enhance market liquidity and efficiency, enabling traditional financial institutions to tap into the growing market for tokenized assets and gain seamless access to traditional securities alongside digital asset securities. By expanding their investment opportunities, these institutions can access new products and retain a competitive advantage in an evolving financial landscape.

End-to-End Asset Lifecycle Management

The solution developed through the working group enabled a range of functionalities across the end-to-end lifecycle of assets, from issuance to custody. This includes the ability to trade tokenized assets, manage corporate

actions, and ensure the secure custody of digital assets. By providing these capabilities, the working group aimed to demonstrate the potential of integrating blockchain technology with traditional financial systems, paving the way for broader adoption in the industry and a fuller realization of associated operational efficiencies.

Enhanced Security and Compliance

The working group also focused on ensuring that the integrated systems adhere to the highest standards of security and regulatory compliance. This includes leveraging existing FIX protocol standards and implementing robust security protocols to protect against cyber threats and ensuring that all transactions are transparent and auditable. By addressing these critical aspects, the working group built trust in the new integrated systems among stakeholders.

Contributors & Participants

The GDF and FIX Trading Community working group brought together a diverse group of participants, including banks and financial institutions, technology providers, industry groups, associations, and advisors, including Ownera, GDF, SEI, U.S. Bank, otcDigital, and Platonic. Deloitte & Touche LLP provided advisory services to GDF.

Working Group Details

Target Objectives

By addressing the challenges of interoperability and leveraging the strengths of both TradFi and digital securities, the working group aimed to demonstrate the potential benefits of the integration of blockchain-based and tokenized solutions. The collaboration of leading banks, financial institutions, technology providers, industry groups, associations, and advisors underscores the importance of this initiative and its potential to transform the financial landscape.

Within the broader goal of modernizing existing financial infrastructure, the project sought to achieve several specific target objectives:

Commercial Objectives

The primary commercial objective was to identify and establish use cases for connecting the FIX community to the tokenization ecosystem. This includes providing access to various types of tokenized assets, such as equities, bonds, and real estate. By enabling traditional financial institutions to interact with tokenized asset markets, the project aimed to unlock new revenue streams and investment opportunities for financial institutions and its clients. The integration may facilitate the entry of traditional investors into the digital asset space, thereby expanding market participation and market liquidity.

Operational Objectives

From an operational standpoint, the project sought to support a wide range of processes and flows. This encompasses the end-to-end transaction lifecycle, from sharing information about assets to facilitating trading and settlement capabilities. The goal was to ensure that all operational aspects are seamlessly integrated, providing a smooth and efficient experience for all participants. This involved the automation of various processes, reducing manual intervention and the potential for errors, thus enhancing overall operational efficiency.

Technological Objectives

Technologically, the project aimed to demonstrate multiple end-to-end transactions where traders use a FIX-powered platform to access several types of assets on different tokenization solutions. This involved orchestrating the settlement of trades accessed via FIX platforms, thereby showcasing the practical application and benefits of integrating traditional financial systems with blockchain-based platforms. The project highlighted the interoperability between different blockchain networks and traditional financial systems, demonstrating the feasibility and advantages of such integrations.

Architecture Outline

The first phase of the working group comprised the set-up and execution of a Sandbox Lab. This lab prepared the three essential components of the FinP2P ecosystem: the tokenization engine, the FinP2P routers mentioned below, and the custody solution. This includes:

Sell-Side FinP2P Router

This router connects tokenization platforms across select blockchains infrastructures that are both private and public, including Canton, Besu, Corda, Platonic, Kadena, and Ethereum for the working group, with an eventual goal of being blockchain agnostic. This setup enables the simulation of tokenized asset issuance and trading across different blockchain environments.

Payment FinP2P Router

This router initially connects to digital payment solutions. In future updates, it will expand to include multiple payment types, such as central bank digital currencies (CBDCs), tokenized commercial bank money (TCBM), stablecoins, and traditional fiat payments. This will ensure comprehensive coverage of various payment methods used for tokenized trading and settlement.

Digital Custody FinP2P Router

This router links to digital custody services, ensuring secure and efficient management of digital assets. The custody solution handles the signing and sending of transactions, representing ownership changes on the tokenization platform.

Every FIX participating organization gained access to a FinP2P Router, equipped with a FIX Adapter endpoint. Participants then used this endpoint to test various use cases and transaction flows. For example, participants could create a trade for a bond and receive a FIX message upon completion, allowing them to evaluate the integration and functionality of the system.

As the working group progressed, it provided valuable insights into understanding how to integrate blockchain technology into TradFi systems. By achieving seamless communication and interoperability between traditional and blockchain-based systems, the working group unlocked new opportunities for innovation, efficiency, and growth. The successful implementation set a precedent for future projects, encouraging further collaboration and innovation among the working group and market participants. Ultimately, this initiative unlocked the opportunity to create a more efficient, transparent, and secure financial ecosystem for market participants.

Use Cases

As part of the first phase of the working group's efforts, several group members utilized the Sandbox Lab mentioned above to conduct Proof-of-Concept (PoC) trials for several use cases, including Platonic, otcDigital, U.S. Bank, and SEI[®], among others. These PoC trials included the following:

- Private Credit (U.S. Bank and SEI)
- Private Credit (Platonic)
- Private Equity, Corporate Bond, and Multi-Asset Funds (otcDigital)
- Treasury and Repo Clearing (otcDigital)

Below is an overview of each of these PoC trials conducted by working group members, including the objective of the use case, technical details on how the trial was conducted, and the outcomes of these trials.

SEI and U.S. Bank: Private Credit

Overview and Objectives

The primary objective of this use case trial was to demonstrate the feasibility and benefits of integrating traditional financial systems with tokenized assets using the FIX (Financial Information eXchange) protocol. This approach, referred to as "web 2.5," allowed organizations to benefit from blockchain technology's transparency, auditability, speed, and execution advantages while minimizing the initial infrastructure changes required to participate. For this pilot, SEI and U.S. Bank focused on assessing the workflows and processes related to private market assets, more specifically, a subscription into the Private Credit Fund issued on the Platonic Blockchain.

Technical Details

Initial Setup and Approach

The trial focused on leveraging SEI's existing front office solutions, within the SEI Wealth PlatformSM (SWP), SEI's end-to-end wealth technology solution for wealth management firms, facilitating subscription order entry and FIX translation. This ensured that traditional execution and settlement processes were seamlessly updated while the user experience remains the same. Asset data structures for tokenized assets were integrated into the SWP and U.S. Bank's proprietary trading system, Pivot. U.S. Bank is a client of the SWP, and Pivot integrates with the SWP. The SWP infrastructure converted SEI order messages into FIX messages, which were then processed through the Ownera FIX adapter to the FinP2P network for execution and blockchain settlement.

Pilot 1 - MVP - Post Trade Execution Recognition

SEI leveraged its existing connectivity and front-office solutions to handle order entry and FIX translation to the Ownera adapter. The translated messages were executed on the FinP2P network, and the resulting execution report was routed back to the SWP, updating the Accounting Book of Record (ABOR) as it would with traditional off-chain assets. U.S. Bank could access the position updates via their own front-end solutions, with data flowing to their system from the SWP. This approach proved the benefits of integrating TradFi infrastructure with digital assets leveraging each participating company's existing systems and processes with minimal change to the overall user experience.

Pilot 2 - Order Entry with Post Trade Execution Recognition

U.S. Bank entered trades in Pivot, streamlining the user experience and limiting any context switching for tokenized assets. Pivot trade data is communicated to the SEI Wealth Platform, which translates the FIX messages back into the execution flow, updating the ABOR and replicating the cash and position updates to Pivot. This approach aligned with the existing integration process between the SWP and U.S. Bank for any direct order initiation across asset types.

Pilot 3 - Pre-Trade Settlement and Execution Recognition

This scenario involved managing cash for accounts on the SWP, blocking cash in a subscription flow, and creating open orders for the position until settlement. In this trial, SEI will facilitate the creation of an on-chain cash “redemption token” for settlement through the FinP2P network once an order is placed. While still leveraging the FIX adapter, we could further reduce counterparty risk by involving SEI’s custody system in the pre-trade settlement events resulting in the cash and position changes between blockchains. This could be immediately matched with the FIX execution messages returned from the adapter to satisfy contractual settlement reporting and reconciliation. This can also use U.S. Bank as a custodian or payment agent for the cash leg depending on place-of-safekeeping for a given asset and cash agent roles.

Benefits and Impact

For U.S. Bank

- Access to tokenized assets without significant infrastructure changes,
- Cost efficiency by minimizing development and integration efforts, and
- Improved transparency and auditability of transactions.

For SEI

- Enables clients to access the tokenized economy, enhancing service offerings,
- Supports and validates ongoing efforts to create and adopt blockchain technology for the cost efficiency and growth enablement in a regulated environment, and
- Allows gradual blockchain integration without significantly disrupting existing operations.

Future Outlook

The successful execution of the three pilots helps pave the way for further blockchain integration into traditional financial systems. Future opportunities include:

- Full blockchain integration for custody and payment operations,
- Enhanced user experience for seamless tokenized asset transitions,
- Broader asset availability through recognized technologies.
- Developing additional services and products around the integrated system.

This use case trial represents a significant step toward bridging the gap between traditional financial systems and the emerging tokenized economy, in turn providing a scalable solution for organizations looking to leverage blockchain technology as a component of their overall solution strategy.

Platonic: Private Credit

Overview and Objectives

Platonic lead a pilot project aimed at transforming the servicing and ownership of Private Credit Funds through blockchain technology. This initiative involved the deployment of Platonic's private permissioned blockchain (Layer 1)[5] to tokenize shares of a Private Credit Fund. The pilot project was designed to offer pilot customers a novel way to protect data privacy while issuing, managing, and distributing ownership in a Private Credit Fund.

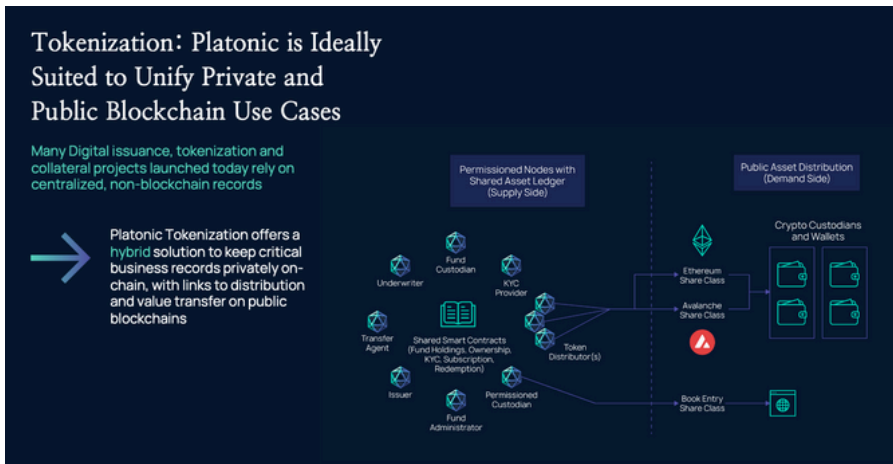
Currently, most digital issuance, tokenization and collateral projects rely on centralized, non-blockchain master records. The primary goal of the pilot project was to enable Pilot Customers to tokenize shares in their Private Credit Funds, thereby enhancing transparency, security, and efficiency in fund management. While most similar tokenization projects involve converting traditional shares in the fund into digital tokens, the Platonic blockchain was used to issue native tokens, which included ownership and entitlements. These tokens were in turn managed through Platonic's blockchain platform.

Use Case Details

The pilot software employed AI linked smart contracts to govern the entire lifecycle of the tokens. These smart contracts were programmed to automate key processes including:

- **Token Issuance:** Smart contracts handled the creation and distribution of tokens, ensuring that they were issued in accordance with the fund's governing documents and adherence to rules and regulations.
- **Token Transfer:** Transfers of ownership between investors were managed seamlessly through smart contracts, which recorded each transaction on the blockchain.
- **Redemption:** Investors redeemed their tokens for a proportionate share of the fund's assets, with the smart contracts automating this process in compliance with the fund's governing documents.
- **Corporate Actions:** Corporate actions such as dividends, interest payments, and other distributions were executed according to predefined rules set by the Pilot Customer, with smart contracts facilitating these transactions automatically.

Figure 3: Platonic tokenization



As part of the token issuance and management process, the sponsor of the Private Credit Fund issues digital tokens to new and existing investors through the pilot. Each token represented a proportional share of ownership in the fund, and investors were entitled to distributions based on their token holdings. The issuance process was designed to be seamless and automated, facilitated by AI linked smart contracts integrated into the blockchain.

These tokens were generated, issued, and managed on the Platonic blockchain. While Platonic handled the master register of token ownership, tokens were represented and distributed to public blockchain wallets. Initially, investors received their tokens on Ethereum, and these tokens were stored in digital wallets maintained by third-party custodians.

The initial phase of the pilot focused on the Ethereum blockchain, but future iterations will expand to support additional blockchain networks. As such, tokens can then be issued from the master Platonic ledger and minted and burned on public chains such as Ethereum, Polygon, Solana, etc as needed. This multi-blockchain capability provided flexibility and enhanced the scalability of the tokenization platform and to add a layer of protection previously unavailable.

Benefits and Impact

The Platonic pilot project was largely successful, with several notable impacts, including:

- **Protection of Data:** Sensitive data was maintained on the Platonic blockchain and is only shared at the direction of the Fund.
- **Transparency and Security:** By utilizing blockchain technology, the pilot project enhanced the transparency and security of Private Credit Fund management. Each token transaction was recorded on the blockchain, providing a clear and immutable audit trail. This reduced the risk of fraud and ensured that all ownership changes were accurately documented.
- **Efficiency:** The automation of key processes through AI linked smart contracts reduced the administrative burden associated with fund management. Token issuance, transfers, and corporate actions were executed automatically, leading to significant improvements in operational efficiency.
- **Investor Experience:** Investors benefitted from a streamlined and user-friendly experience. Tokens were issued to public blockchain wallets, which can be easily accessed and managed. Digital wallets provided by third-party custodians offer additional security and convenience for investors.

Future Outlook

By tokenizing ownership and leveraging blockchain technology, the project delivered greater transparency, security, and efficiency. As the pilot progresses into future phases, Platonic is committed to refining the platform and expanding its capabilities to meet the evolving needs of fund managers and investors.

This includes:

- **Expansion to Other Blockchains:** The pilot project is designed with scalability in mind. Future updates will include support for additional blockchain networks beyond Ethereum. This expansion will enhance the flexibility of the platform and accommodate a broader range of investors and fund types.

- **Enhanced Features:** Further iterations of the software will incorporate additional features based on user feedback and technological advancements. These enhancements may include improved integration with financial services, advanced reporting capabilities, and greater customization options for fund managers.
- **Regulatory Compliance:** As the project evolves, Platonic will continue to address regulatory considerations to ensure compliance with relevant financial regulations. The team will work closely with regulatory bodies to align the tokenization process with legal requirements and industry standards.

otcDigital: Private Equity and Corporate Bond Assets

Overview and objectives

This use case was designed to demonstrate broad use of multiple digital assets and add value to all market participants – investors, dealers, custodians, regulators, and others. By integrating otcDigital platforms with FinP2P, FIX and the Common Domain Model (CDM)[vii], the specific use case sought to showcase interoperability, connectivity, regulatory compliance and demonstrate end-to-end functions with multiple participants and digital assets.

Currently, a fund manager can access and trade private equity and corporate bond assets (base assets) from several types of ledgers in the primary and secondary markets using FinP2P network and otcDigital platforms. The fund manager can then construct a single-asset or multi-asset fund (composite asset) with those base assets and distribute the fund tokens back into the network for primary and secondary market trading. Other intermediaries and broker-dealers can access and trade these funds and further distribute them to their institutional and retail customers.

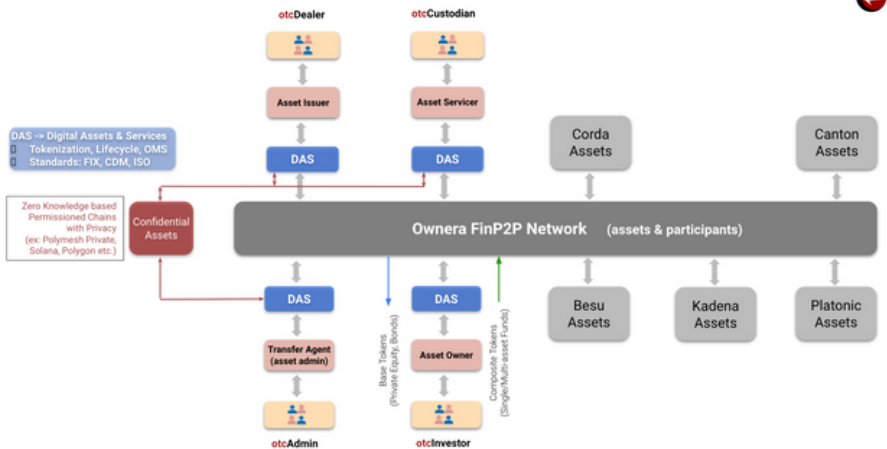
Thus, the use case intended to demonstrate a ping-pong effect of digital assets using the FinP2P-FIX network and otcDigital platforms.

Use Case Details

The platform environment for the use case consisted of several key components and stakeholders, each with distinct roles and functionalities. The FinP2P Adaptors and Ownera FIX Network were integral parts of this

environment, which is visually represented in the diagram below, including comprehensive overview of the system's architecture and interactions.

Figure 4: Overall platform environment



The OTC Platforms are divided into four main interfaces: otcInvestor, otcDealer, otcCustodian, and otcAdmin. The otcInvestor platform serves investors, enabling them to participate in both primary and secondary markets and manage their daily trading operations.

The otcDealer platform is designed for dealers and issuers, allowing them to create new assets, register them on-chain, mint, transfer, and burn tokens. Dealers could also use the book-building module in primary markets to track investor subscriptions and allocate and settle tokens with investor custodians.

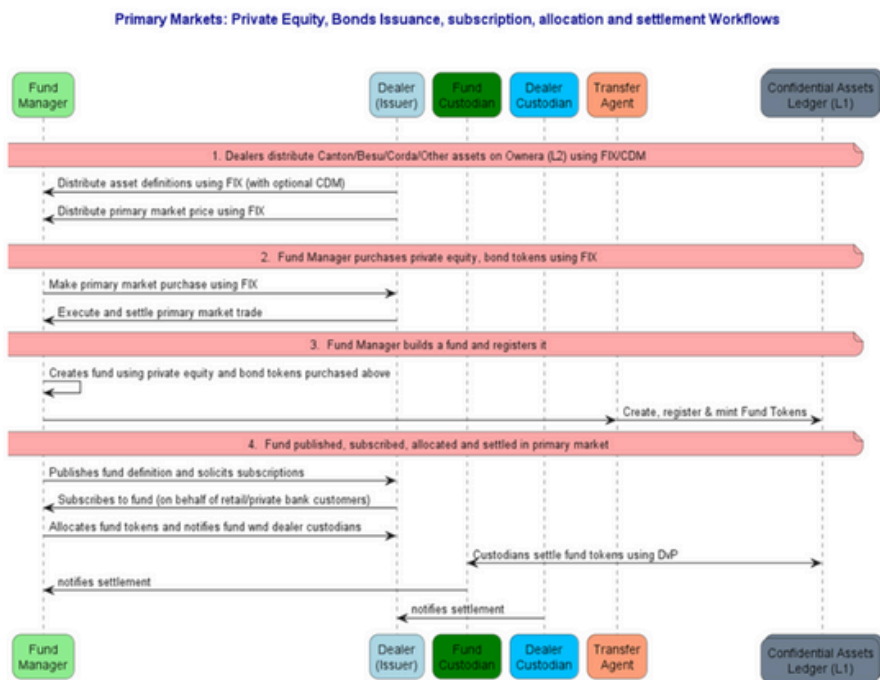
The otcCustodian platform supported custodians by providing a user interface for back-office operations, where they could view all assets, manage their customers' primary and secondary market trades, and settle these trades.

Lastly, the otcAdmin platform catered to asset administrators, who provide standard Transfer Agent services and act as auditors to track asset holdings. These administrators offer additional services such as account auditing, assisting in mergers and acquisitions, bankruptcies, and legal and regulatory enforcements.

The applicable standards for asset classes in primary, secondary, and lifecycle stages included the Financial Information Exchange (FIX) and the Common Domain Model (CDM). For private equity, FIX was used across all stages. Bonds utilized both FIX and CDM for primary and secondary markets, with CDM used for lifecycle management. Funds relied on FIX for all stages.

In the primary markets, the workflow involved several steps, as illustrated in the diagram below.

Figure 5: Primary markets workflow



Ownra published Corda, Daml, Besu, and other DLT-based assets with descriptions on the FinP2P network using the FIX protocol. These assets were described in FIX for equities or CDM for bonds, with Ownra and OTC collaborating with ICMA for bond taxonomy.

The applicable standards for asset classes in primary, secondary, and lifecycle stages included the Financial Information Exchange (FIX) and the Common Domain Model (Most regulated securities would require a unique identifier at the time of issuance. This identifier is usually represented in ISIN or CUSIP code. However, not all issued digital assets require a CUSIP or ISIN identifier. In order to uniformly address these assets and to identify the blockchain where these assets are deployed, a Digital Token Identifier (DTI) issued by the DTI Foundation (DTIF) would be very useful. OTC and Ownera worked with DTIF to obtain these identifiers as part of this use case.

Dealers then created and distributed private equity and bond assets using the Polymesh confidential assets private permissioned ledger, leveraging Zero Knowledge Proofs (ZKP) for privacy[i]. The otcAdmin acted as the Transfer Agent, responsible for OTC token registration, minting, and maintaining the off-chain cap-table coordinated with the on-chain cap-table. OTC platforms distributed all ledger assets to investors and their custodians.

Investors directly purchased primary market OWN tokens using the FIX adapter and subscribed to OTC assets. The otcAdmin then minted OTC tokens and transferred them to the dealer, who then allocated primary market OTC assets and notified investor custodians. The dealer custodian and investor custodian then engaged in atomic Delivery versus Payment (DvP) settlement, and upon settlement, investors were notified of their positions in real-time. Audit trails were available for all market participants, and the otcAdmin maintained the off-chain cap-table based on ledger settlement records.

In secondary markets, investors used the Order Management System (OMS) to execute orders using FIX, with the secondary market simulated by Ownera. They also used the OTC Request for Quote (RFQ) platform to execute bilateral trades with dealers. Custodians settled all secondary market trades in real-time, similar to primary markets, and the otcAdmin was notified of all trades, updating the off-chain cap-table accordingly.

For fund managers, the process of multi-asset fund creation and distribution involved the otInvestor platform. Investors or fund managers created a multi-asset fund and identified the otcAdmin as the Transfer Agent during the fund creation process. The fund manager, fund custodian, and otcAdmin coordinated to register and mint tokens into the fund manager's custodial account. Similar to

dealer functions, the fund manager was able to distribute, allocate, trade, and settle in both primary and secondary markets.

The platform operated under the assumption that regulated digital cash, such as deposit tokens and stablecoins, would be available in confidential networks or through FinP2P by participating banks.

A very specific use case for cash leg would be to integrate with Finality. For all Ownera published assets, Ownera FIX adapter can settle the payment leg directly with Finality. For OTC assets, OTC would work with Ownera's payment API to settle the cash with Finality. Since banks and other dealers can also use the FIX gateway for trading digital assets, cash settlement with Finality would be a more practical use case.

Benefits and Impact

All market participants, including investors, dealers, custodians, and transfer agents, have experienced several key benefits as a result of this integration.

They can now access assets from multiple issuers and blockchains through Ownera's FinP2P-FIX network. This network allows them to engage in the entire lifecycle of digital assets from start to finish. Additionally, they have gained access to a single platform that supports a wide range of assets such as private equity, corporate bonds, commercial paper, commodities, carbon credits, single asset or multi-asset funds, and structured products, with more options expected in the coming months.

The platform also ensured that they meet regulatory compliance requirements by using FIX and CDM standards. Furthermore, it paved the way for full automation, leading to significant efficiencies in operations and overall cost reductions.

Future Outlook

To further explore the use case, it is essential to delve into the various life-cycle events workflows that play a critical role in the financial ecosystem. This includes events such as:

- Coupon payments
- Bond maturity
- Redemption
- Bulletin Boards
- Exchange Information

otcDigital: Treasury and Repo Clearing

Overview and objectives

The Securities Exchange Commission (SEC) issued a clearing mandate for Treasury and Repurchase Agreements (Repo) in Dec 2023. This mandate requires all market participants to meet the treasury clearing by December 2025 and repos by June 2026. As the new clearing market develops, execution venues, dealers, CCPs and other FMI's would develop trade processes (trade execution, allocations, reporting, reconciliations, life-cycle events, etc.) mainly using FIX.

otcDigital (OTC) is building a decentralized marketplace (DeFi) for treasuries and repos that will meet all the requirements of the SEC clearing mandate and support digital assets. OTC has already demonstrated the use of FIX in digital assets using the Ownera FinP2P FIX adapter. OTC intends to extend the use of FIX adapter to the treasury and repo markets. OTC is also introducing Instant Treasury and Instant Repo trading where settlement happens immediately and automatically between the trading parties using digital assets for treasury and cash legs. The custodians for the parties or a tri-party agent can facilitate the settlement in real-time. These instant products should minimize or completely eliminate any hit to a dealer's balance sheet. Hence these products maybe exempted from SEC clearing mandate thus eliminating margin and collateral costs.

According to SIFMA, the combined market size for treasuries and repos is about USD 36 Trillion. According to DTCC, there are currently about 2,500 sponsored buy-side institutions, and another 7,500 new indirect clearing relationships would be formed to meet the clearing requirements. Most of the buy-side institutions will have to deploy margin and collateral management platforms to meet the clearing regulations. Thus, the clearing mandate offers a perfect tailwind to build a solution that supports TradFi assets and digital assets in cash, treasuries, mortgage backed securities (MBS), asset backed securities (ABS), etc. Essentially, the new mandate provides the perfect Killer Application for digital assets in a production environment for 2025.

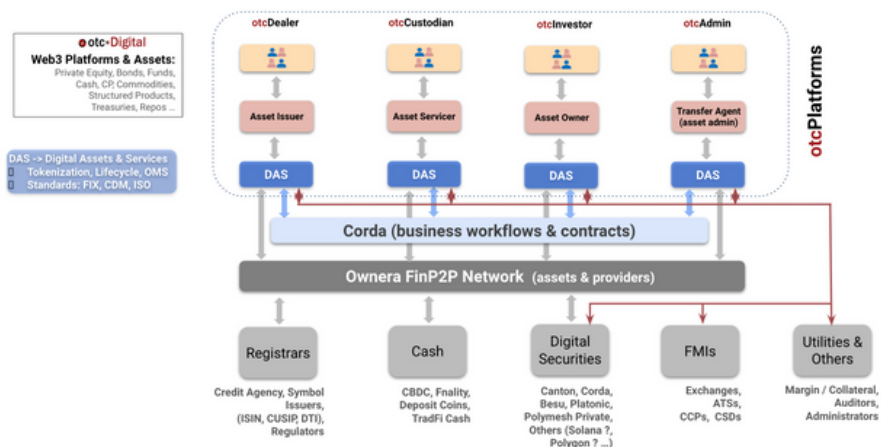
Use Case Details

The platform environment for this use case consists of several key components and stakeholders, each with distinct roles and functionalities. OTC has already built and deployed a clearing, margin and collateral management solution for interest rate swaps. It will leverage these modules to support treasury and repo

clearing, namely Credit Service Annex (CSA), margin calls, collateral management, collateral optimization, etc.

The Fin2P Adaptors and Ownera FIX Network are integral parts of this environment, which is visually represented in the diagram below, along with a comprehensive overview of the system's architecture and interactions.

Figure 6: OTC treasury and repo platform environment



The OTC platforms are divided into four main interfaces: otcInvestor, otcDealer, otcCustodian and otcAdmin. The otcInvestor platform serves investors, enabling them to participate in cleared and uncleared treasury and repo markets and manage their daily trading operations.

The otcDealer platform is designed for dealers and market makers, allowing them to execute trades with investors directly or using exchanges (ATS/ECN/MTF). Dealers can offer integrated execution and clearing facilities (Done-with model) or just offer clearing facilities (Done-away model) to investors.

The otcCustodian platform supports custodians by providing a user interface for back-office operations, where they can view all assets, manage their customers' trades and settle these trades. The custodians would interact with the clearing members of a CCP and offer margin and collateral management facilities to the

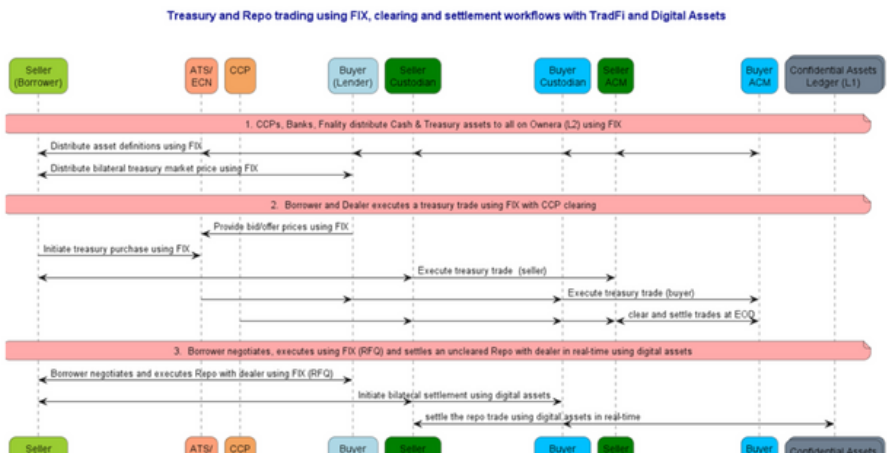
investors. The custodians would use the FinP2P protocol to transfer cash and collateral to the clearing environment on behalf of the investors.

Lastly, the otcAdmin platform caters to asset administrators, who provide traditional and digital transfer agent services and act as auditors to track asset holdings. These administrators offer additional services such as account auditing, assisting in mergers and acquisitions, bankruptcies, legal and regulatory enforcements.

The applicable standards for asset classes in primary, secondary and lifecycle stages include the Financial Information Exchange (FIX) and the Common Domain Model (CDM). While treasury and repo trades can be executed using FIX, the margin call and collateral management life-cycles are better handled using CDM.

In the new cleared markets, the trade execution and clearing workflows involve several steps, as illustrated in the diagram below.

Figure 7: Treasury and Repo trading workflow



Treasury security definitions can be published by the CCP to all market participants. Similarly, treasury prices can be distributed by exchanges or by the dealers directly to their customers. An investor can execute a treasury trade in exchanges using FIX. Alternatively, the FIX RFQ protocol can be used by the

investor to execute a bilateral trade with a dealer or on the Ownera bulletin board.

Once a trade is executed, it must be submitted to the CCP for clearing by a clearing member. The clearing member can submit the trade to the CCP as a sponsored transaction where the investor has a direct clearing relationship with the CCP. Alternatively, the clearing member can submit for clearing as an agent (ACM) for the investor acting as an indirect participant.

In the case of instant digital treasury and repo trading, the custodians for the parties can directly settle using digital assets representing treasury and cash. This process may eliminate clearing through a CCP subject to approval from the SEC. Alternatively, OTC can assist a CCP to implement instant clearing using digital assets.

Benefits and Impact

The use of FinP2P-FIX solution provides the following benefits:

- Direct secondary market execution for treasuries with dealers using FinP2P-FIX,
- Secondary market infrastructure integration with ATS (Alternative Trading System) or ECNs (Electronic Communication Network) like Tradeweb, Tradition, BrokerTec,
- Ownera bulletin board functions using FIX,
- Settle various forms of digital cash (CBDC, Finality, stablecoins, deposit tokens, etc.) using FIX,
- The emergence of intraday repos will enable new FIX based execution models including RFQs, central limit order books (CLOBs), auctions, etc.,
- As the new clearing market develops, execution venues, dealers, CCPs and other FMIs would further develop trade life-cycle processes using FIX,
- Ownera FinP2P network can be Integrated with CSDs (ex: DTCC) for digitizing treasuries, which then can be used for real-time trading and settlement using FIX, and
- Intraday repos provide a whole new way of financing for corporations and hedge funds to trade, reducing intraday market and credit risk.

Future Outlook

To further explore the use case, it is recommended to delve into the margin call and collateral management of the platform. This includes:

- Credit Service Agreement (CSA)
- Margin Call workflows
- Collateral workflows
- Collateral substitutions
- Collateral optimizations

Key Findings & Recommendations

The analysis conducted by the working group has yielded several critical insights into the integration of traditional financial systems with blockchain-based platforms. These findings highlight the transformative potential of leveraging advanced technologies to enhance financial operations and market dynamics. The key findings are summarized as follows:

Interoperability and Integration

The working group successfully demonstrated the interoperability between traditional financial systems and blockchain-based platforms. This integration was facilitated through the use of the FIX protocol and the FinP2P Tokenization interoperability protocol.

Enhanced Efficiency and Automation

The use of AI-linked smart contracts and blockchain technology significantly improved the efficiency of fund management processes, including token issuance, transfers, and corporate actions.

Security and Transparency

Blockchain technology provided enhanced security and transparency, with each transaction recorded on an immutable ledger. This reduced the risk of fraud and ensured accurate documentation of ownership changes.

Market Liquidity and Access

The integration enabled traditional financial institutions to tap into the growing market for tokenized assets, enhancing market liquidity and providing seamless access to both traditional and digital asset securities.

Regulatory Compliance

The use of FIX and CDM standards ensured that the integrated systems adhered to regulatory compliance requirements, building trust among stakeholders. Based on these key findings, the following actionable recommendations are proposed for future actions:

Expand Blockchain Support: Future iterations of the platform should include support for additional blockchain networks beyond Ethereum. This expansion will enhance the flexibility of the platform and accommodate a broader range of investors and fund types.

Enhance Features and User Experience: Incorporate additional features based on user feedback and technological advancements. This may include improved integration with financial services, advanced reporting capabilities, and greater customization options for fund managers.

Strengthen Regulatory Compliance: Continue to address regulatory considerations to ensure compliance with relevant financial regulations. Work closely with regulatory bodies to align the tokenization process with legal requirements and industry standards.

Promote Interoperability: Focus on further enhancing interoperability between traditional financial systems and blockchain-based platforms. This will facilitate seamless communication and data transfer across different systems, reducing inefficiencies and costs.

Leverage AI and Automation: Continue to leverage AI-linked smart contracts and automation to streamline processes and reduce administrative burdens. This will lead to significant improvements in operational efficiency and cost reductions.

Engage with Market Participants: Foster collaboration with a diverse group of market participants, including banks, financial institutions, technology providers, and industry groups. This collaborative approach will drive innovation and ensure the successful integration of blockchain technology into traditional financial systems.

Conclusion

The integration of traditional financial systems with blockchain-based and tokenized solutions represents a significant leap forward in the financial industry's evolution. The working group's efforts to bridge the gap between TradFi and digital securities through the FIX protocol and the FinP2P Tokenization interoperability protocol have demonstrated the immense potential of this integration. By enhancing interoperability, efficiency, security, and regulatory compliance, the initiative has paved the way for a more efficient, transparent, and secure financial ecosystem.

The successful proof-of-concept trials conducted by various participants, including Platonic, otcDigital, U.S. Bank, and SEI, underscore the practical benefits and feasibility of integrating blockchain technology with traditional financial systems. These trials have shown that tokenized assets can be seamlessly managed, traded, and settled across different platforms, unlocking new opportunities for market participants and enhancing market liquidity.

As the financial landscape continues to evolve, it is crucial to build on these successes and address the remaining challenges. Expanding blockchain support, enhancing features and user experience, strengthening regulatory compliance, promoting interoperability, leveraging AI and automation, and engaging with a diverse group of market participants will be key to driving further innovation and adoption.

The findings and recommendations outlined in this whitepaper provide a roadmap for future actions, ensuring that the financial industry can fully realize the benefits of integrating blockchain technology with traditional systems. By fostering collaboration and embracing advanced technologies, the industry can create a more resilient, efficient, and inclusive financial ecosystem that meets the needs of all stakeholders.

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