

Canton

Connected capital
markets take flight

Insights from the Canton Network Pilot



THE EXPONENTIAL POWER OF CONNECTION

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Preface

Progress is the product of new and intentional connection. When ideas, technologies, and organizations come together, new solutions and opportunities thrive. This additive process results in something greater than the sum of its parts - collectively moving us forward.

Today, evolving market realities require us to move forward rapidly to improve the safety, soundness, and value of our underlying systems. The risks of maintaining the existing siloed infrastructure and the lost economic opportunities are increasingly evident but the ability to effect change has been limited, at best.

Blockchain technology promises to eliminate inefficiencies and create new opportunities across the capital markets. But we have learned that decentralization doesn't negate the need to be compliant. Complete transparency doesn't protect your customers' data. And interoperability can't be at the expense of forfeiting control.

This pilot brought together 155 market participants from 45 firms, representing a broad spectrum of capital markets - to show how the Canton Network addresses these key industry learnings. For the first time in history industry participants were able to witness transformative opportunities that are possible when blockchains can transactionally interoperate - without re-introducing the counterparty or settlement risks associated with message and API-based integrations.

The Canton Network is a public-permissioned blockchain network that includes a decentralized synchronization service called the Global Synchronizer - designed to respect privacy and institutional sovereignty. In the pilot, independent Canton blockchains used this service to interoperate and execute

atomic transactions, while ensuring participants remained in complete control of their permissions, exposures, and interactions. The goal? To preserve the stability of trusted regulated processes, while offering the transformative power to connect.

As you read through the findings in this report you will discover how this unique approach can deliver on the promise of a 'network of networks' that regulated financial institutions can finally say 'Yes' to.

Canton Network - the exponential power of connection.

45 organizations
Including:
15 Asset Managers
13 Banks
4 Global Custodians
3 Exchanges
1 FMI

350+ transactions
33 independently operated participant nodes
22 application operators running 22 sovereign applications

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Executive Summary

The Canton Network pilot took place over a six week period in November–December 2023

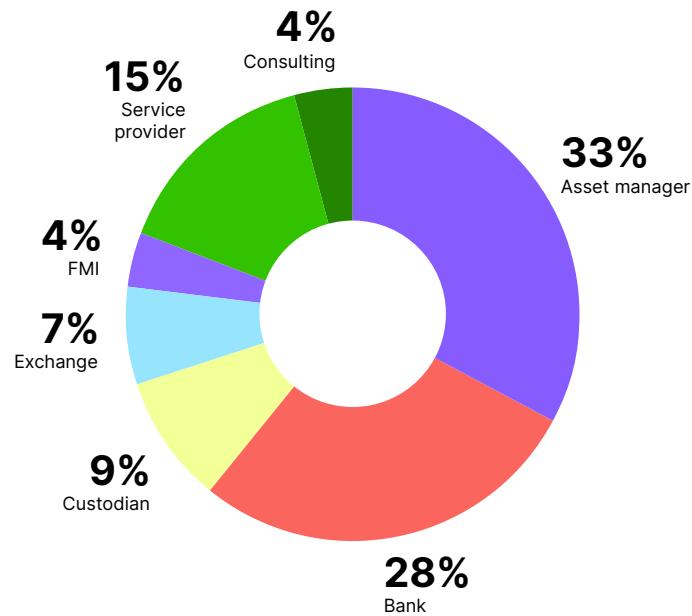
In all, 155 people from 45 financial institutions, exchanges, asset management firms, and capital markets technology providers came together to collaborate with their peers, share insights about network considerations, and participate in a range of simulated transactions demonstrating the connectivity potential of the Canton Network for the capital markets industry.

In the most comprehensive blockchain pilot for tokenized real world assets, firms from every region, across the spectrum of the capital markets value chain came together to explore the opportunities presented by a new digital infrastructure for capital markets. The pilot set out to demonstrate that an ecosystem of permissioned blockchain applications can seamlessly interoperate while maintaining the control required in regulated financial markets – a balancing act that has so far proved elusive with the public and private blockchains available to financial institutions today.

Institutions with blockchain applications in production, including BNY Mellon, Broadridge, DRW, EquiLend, Goldman Sachs, Oliver Wyman, and Paxos, provided market expertise for the working group throughout the program.

Additional pilot participants included: abrdn, Baymarkets, BNP Paribas, BOK Financial, Cboe Global Markets, Commerzbank, DTCC, Fiutur, Generali Investments, Harvest Fund Management, IEX, Nomura, Northern Trust, Pirum, Standard Chartered, State Street, Visa, and Wellington Management, with Deloitte acting as an observer and Microsoft as a supporting partner.*

Fig 1. Pilot participant profile



* Deloitte did not provide any services to the pilot program or the pilot participants, for the Canton Network pilot.



Blockchain promised to eliminate reconciliation and enable risk-free settlement but realizing this potential has been challenging because no network could offer both the control and the connectivity to transact atomically across chains. The Canton Network changes that. Regulated firms can now unlock the capital markets infrastructure that blockchain had promised, without making trade-offs around privacy, connectivity, or trust. No other network can offer the variety of interoperable applications, tokenized asset classes, and institutional capital at scale in regulated markets.”

Yuval Rooz, Co-founder and CEO, Digital Asset

The pilot delivered against three core goals

1**To execute atomic transactions across independently operated blockchains, without sacrificing privacy or control**

Demonstrate how multiple Canton instances can transactionally interoperate via the Global Synchronizer in the public-permissioned Canton Network. Enable atomic and operationally risk-free transactions while preserving the privacy and controls needed by regulated institutions.

2**To prove the viability of the Global Synchronizer for the Canton Network**

Trial the decentralized synchronization service at scale with regulated financial institutions. Demonstrate the ability to execute cross-chain transactions without needing to place trust in a central operator, shared service provider, or competitors to exchange value between systems.

3**To provide a unified experience for the buy side, sell side, and FMIs**

Provide the use cases, reference applications, user interfaces, and network services for participants to demonstrate the individual value and mutual benefits of a shared network.

During the process, over 350 transactions were performed across 22 independently operated Canton instances. These sovereign blockchains interoperated using the network's Global Synchronizer. Each institution taking part in the transactions was set up with its own Canton node to access applications for each permissioned blockchain, and connected to the Global Synchronizer to coordinate atomic transactions across different Canton blockchain networks (see Fig. 8).

The pilot outcomes, feedback, and key takeaways from participants outlined in this report emphasize the potential of unlocking next generation efficiencies, new business models, and mutual benefits for all stakeholders in the capital markets ecosystem, without being forced into one shared ledger or governance regime.

Unlike attempts to connect different blockchain networks in the past, interoperability was not orchestrated using message-based integrations or bridges, avoiding their associated risks. For the first time in history, multiple permissioned blockchains and their users were able to connect seamlessly to perform atomic transactions. The result? An interconnected network of sovereign blockchain networks, suitable for regulated finance.

Key takeaways

1

Blockchain interoperability will be driven by the value of real connections

Businesses are increasingly focused on improving outcomes through valuable connections that can now be made between live capital markets blockchain applications, and networks of users.

2

Tokenization of tradfi demands connectivity and control

Pilot feedback and newly published regulatory standards doubled down on the importance of balancing connectivity and control if banks and financial institutions are to realize the benefits of tokenization without punitive capital charges. This demand came into sharp focus during the pilot in December 2023 when the Basel Committee on Banking Supervision released its final standard on the prudential treatment of banks' exposures to cryptoassets, including tokenized traditional assets, stablecoins, and unbacked cryptoassets.

3

Buy side interest is on the rise with the promise of higher returns

Blockchain and tokenization benefits have been most immediately apparent to the sell side: Operational efficiency, faster issuance to settlement lifecycles, and improved post-trade processes. The buy side is now beginning to see this convert into access to new markets, broader liquidity, new tokenized products and services, and the ability to utilize assets as collateral, or for securities financing.

4

Beyond a single view: data utility will increasingly be a value driver

Participants highlighted that the first order value propositions of efficiency gains through unified data remain a key driver for investing in blockchain. Increasingly though, organizations are exploring the value and opportunities of being able to put that data to work, not only to deliver internal efficiencies but also as a utility in broader networks.

5

Tokenized money market funds are gaining velocity

The broad interest in tokenizing money market funds as an effective way to create new utility for funds, for example to manage margin requirements and optimize cash flows, was evidenced in the pilot. Seven firms, including asset managers, banks and custodians took on the role of fund issuer to experiment with tokenized funds in different use cases.

6

Where institutional liquidity flows, adoption will follow

Many participants highlighted the need to remove liquidity barriers with an approach to interconnectivity that allows digital assets to break out of the constraints and boundaries of 'walled garden' blockchains. By doing so, assets can be mobilized making asset pools more liquid and available for secondary trading or use. Networks that can enable this flow will provide the most compelling venues for institutional assets.

7

Accelerators and incentives will provide on-ramps to the network

Organizations are seeking more off-the-shelf solutions to accelerate connected use cases. In addition, innovative tokenomics arrangements may encourage adoption if these can focus on rewarding network utility, rather than speculation.

“

Canton gives the market a chance to reimagine this infrastructure from zero making it more efficient, predictable, and operationally reliable. The ability to have DvP through the Canton Network will create certainty of settlement allowing us to think about counterparty risk differently.”

Chris Zuehlke, Global Head of Cumberland & Partner at DRW

Why now?

A new interoperability order for synchronized finance

Against the backdrop of ever-compressing timeframes, heightened regulation, and increasing investor appetite for new markets, assets, and investment structures, the current capital markets infrastructure built on legacy technologies, sequential processes, and messaging protocols is unsustainable.

Despite a proliferation of blockchain networks, and hundreds of initiatives in various stages from proof-of-concept (PoC) to production, capital markets participants have yet to be able to fully realize the benefits of blockchain (see Fig. 3). New digital solutions have resulted in digital islands, delivering value that is not as broad or deep as it could be.

That's because neither public-permissionless nor private-permissioned blockchains provide the connectivity and control required by regulated markets, a fact reinforced recently by the [BIS Basel Committee on Banking Supervision's](#) imposition of more punitive risk weightings to cryptoassets (including tokenized assets) on permissionless blockchains.

Public blockchain is designed for interoperability, but does so with significant sacrifices to privacy and control. LEGO®-like 'composability' of financial products comes at the expense of making transactions transparent for all to see and giving up control to unknown validators of transactions.

Private blockchains claim back some controls and limited privacy benefits, but have created new isolated silos. Value can be moved within a private network, but bridges are required to move across networks.

Bridges create the appearance of interoperability, but reintroduce counterparty, settlement, liquidity, and privacy risks. Every connection or workflow between applications needs to be agreed, prioritized, and delivered, making this solution hard to scale. By introducing a new attack surface, weaknesses have also been exploited, leading to significant risk and financial losses.

Recap: Why blockchain for capital markets?

1. Synchronization across counterparties

- Achieve real-time synchronization and workflow automation across organizational boundaries
- Eliminate reconciliation and inefficient, manual, paper- and staff- intensive processes
- Reduce operational, capital, and opportunity costs of multi-day processes and settlement cycles.

2. Frictionless value exchange across systems

- Remove payment, settlement, and counterparty risk
- Open up new market opportunities with greater asset mobility, access to new markets and clients, higher return on investments, and the ability to monetize data in new networks.

[Learn more](#) read the post-trade eBook

The Canton Network takes a fundamentally different approach

With these challenges in mind, the Canton Network is a public-permissioned blockchain network designed to uniquely address the need for interoperability across blockchain instances to enable the atomic transfer and synchronization of institutional assets, liabilities, and data.

One example of the size of the prize is the potential to unlock the ~\$200T¹ of marketable securities that remain tied up for use as collateral in today's markets. With this kind of connectivity now possible, the vision is becoming a reality.

In February 2024, the Hong Kong government issued a HKD 6Bn multi-currency digital green bond on HSBC Orion that saw unprecedented investor demand and secondary trading — with HSBC and the Bank of East Asia completing a repurchase (repo) trade using the digitally-native bond as collateral². A new digital capital markets infrastructure is emerging, delivering ROI with every new connection.

To realize these kinds of benefits, asset tokenization initiatives need to consider the full lifecycle and interactions of a digital asset. The ability of the underlying network to support asset mobility and utility across blockchain applications and secondary markets, and to fully support sound operation within current regulatory frameworks, is vital.

The Canton Network pilot demonstrated this new way forward: unlocking the full potential of blockchain technology for global capital markets by enabling both the interoperability so critical to driving liquidity for new digital assets, and the independent control and privacy that organizations need when composing transactions across the ecosystem.

A new interoperability order



As we deliver on our goal of a single source of truth for the industry, the Canton Network showcased how our platform could play within the wider capital markets ecosystem to unlock settlement efficiencies and greater collateral mobility. Key to this is Canton's ability to deliver both the unified ledger, but also the granular controls we need as an app operator, and the privacy demanded by our customers."

Gary Klahr, Director of Strategic Initiatives, EquiLend 1Source



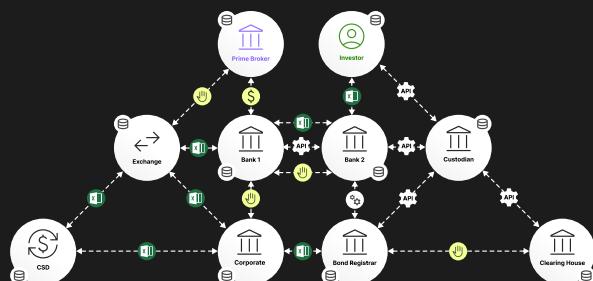
1. Bridging the Collateral Divide, BNY Mellon and Euroclear, 2021

2. HSBC and BEA complete HKD repo trade using digital bond collateral, Securities Finance Times, Feb 2024

Fig. 3: The need for a new interoperability order

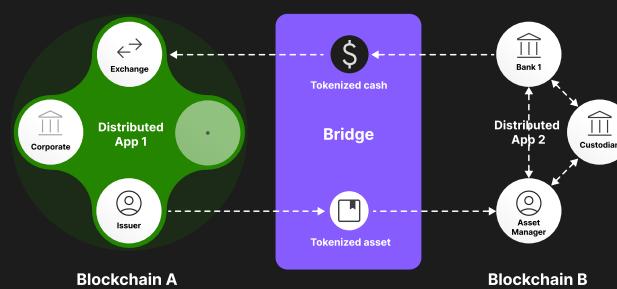
Legacy solutions:

High-cost, low-efficiency message and API-based systems



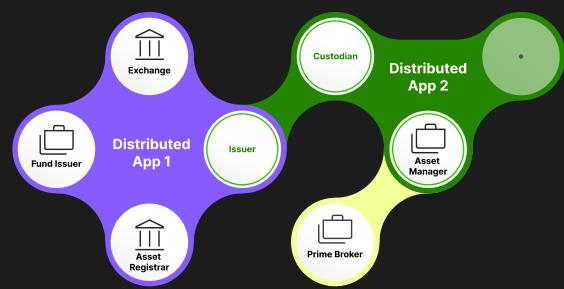
Digital islands:

Blockchain networks integrated with point-to-point bridges



Synchronized finance:

A network of networks with true, transaction-level interoperability



✗ Entrenched siloes - Out-of-sync data between counterparties; no shared source of truth; sequential and intermediated transactions; cumbersome reconciliation.

✗ Trapped assets - Assets locked on balance sheets; restricted product and service innovation; high operating costs, low capital optimization.

✗ High-risk, high latency settlement - High counterparty risk; costly partial/incomplete settlements and rising failure rates.

✗ Digital islands - Public chains sacrifice privacy; private chains sacrifice interoperability; bridges sacrifice atomicity, relying on API/message-based reconciliation.

✗ Settlement risks persist or increase - High-risk cross-chain transfers; assets transformed so owners hold a derivative on the destination chain; or intermediaries re-introduced.

✗ Persistent settlement risks - High counterparty, liquidity and settlement risk; regulatory challenges regarding asset ownership/transaction; increased cyber-risk.

✓ Network of networks - A network of sovereign networks; atomic transactions across permissioned chains; granular privacy; no need to trust a shared service provider.

✓ High asset mobility and utility - Digital asset liquidity; unlock new assets and data; enable greater asset utility and optimize capital flow in a real-time, reconciliation-free network.

✓ Risk-free atomic settlement - Native atomicity to reduce trade-breaks; guaranteed consistency across chains; low attack surface and high-resilience connectivity.

Pilot overview

The most comprehensive blockchain pilot for tokenized real world assets

In December 2023, 155 participants from 45 major financial services organizations came together during a six-week program to demonstrate operationally risk-free settlement across 22 completely sovereign, private-permissioned blockchains.

Connected via the Global Synchronizer, the native interoperability infrastructure now available for Canton Network, over 350 secure, atomic transactions were executed across multiple parts of the capital markets value chain.

The Canton Network pilot was conceived to provide evidence, for the first time, that true atomic smart contract composition is possible between independent blockchains — without sacrificing the controls demanded by regulated financial markets.

Use cases in the pilot connected multiple organizations via applications deployed to dedicated Canton infrastructure. With a focus on the complex, interconnected workflows that take place in daily collateral and margin management, this setup provided the foundation to showcase the possibilities of interoperable digital assets, tokenized cash, and on-chain data — while maintaining the privacy and operational control required by regulated capital markets firms.

45 organizations

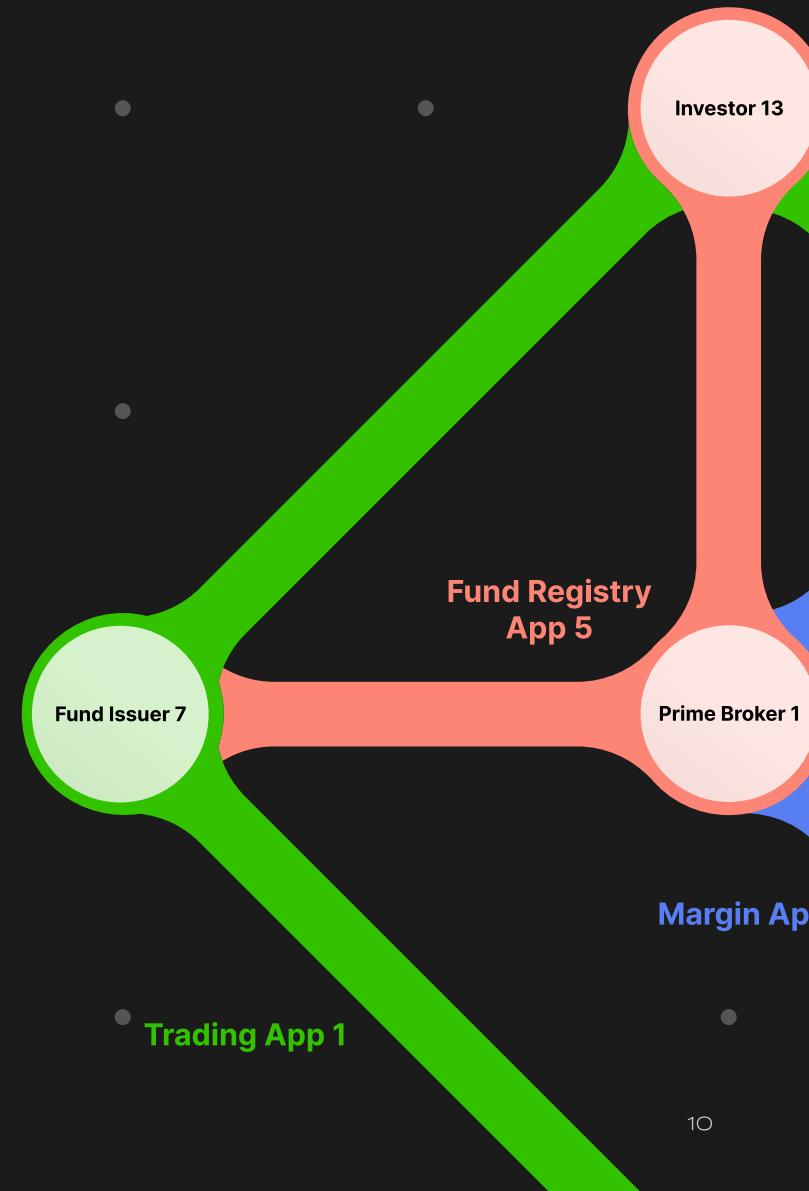
Including:

- 15 Asset Managers**
- 13 Banks**
- 4 Global Custodians**
- 3 Exchanges**
- 1 FMI**

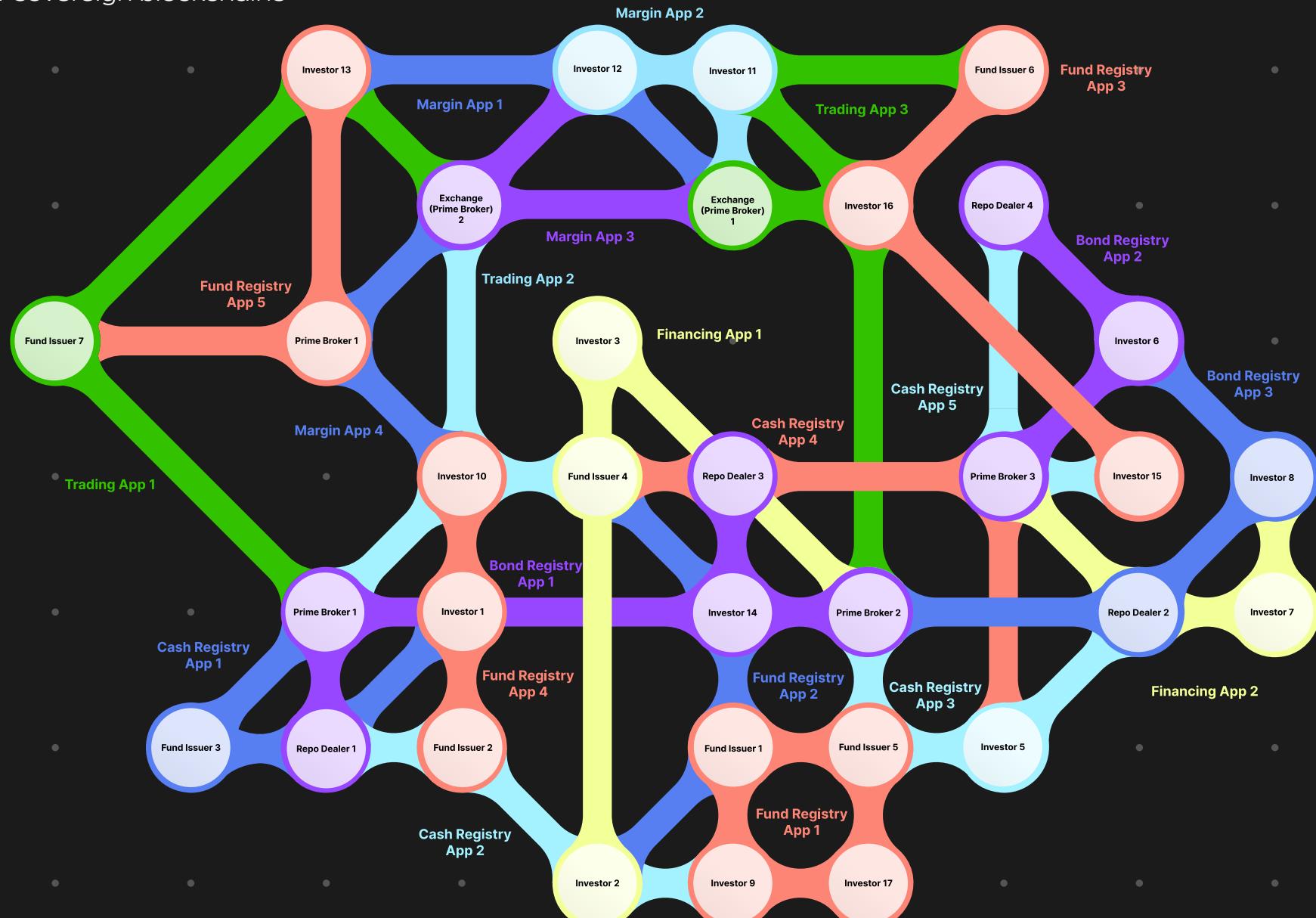
350+ transactions

33 independently operated participant nodes

22 application operators running 22 sovereign applications



Demonstrating an interconnected network of sovereign blockchains



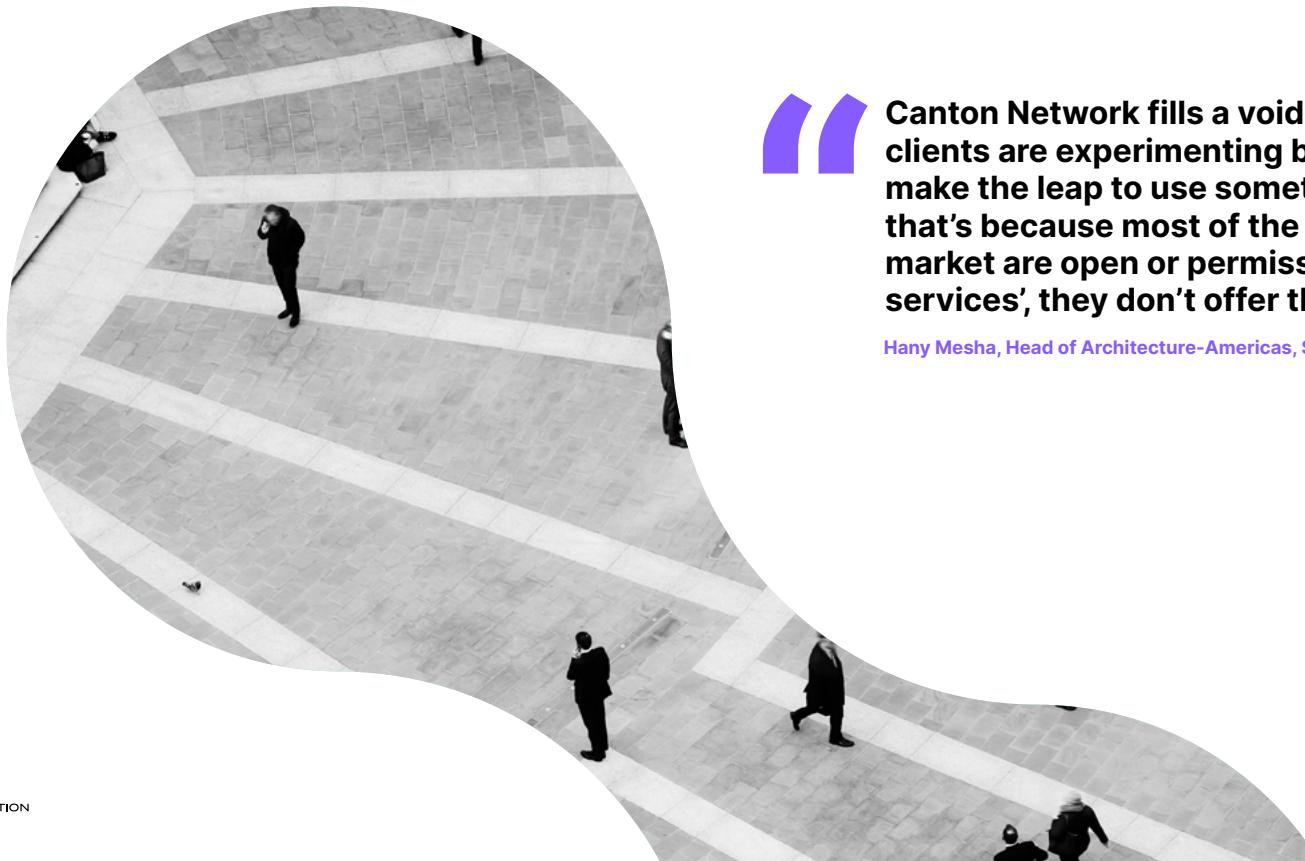
Exponential connectivity with control

Harmonizing data across the silos of financial services remains a cornerstone of the blockchain value proposition. A single source of truth, guarantees of data consistency, and real-time synchronization across disparate internal and counterparty systems are often the basis for an organization's first forays into the technology.

The pilot looked beyond what synchronized data can offer for the participants of an individual blockchain application. What if that digital bedrock of high quality, trusted data could be mobilized for use in the wider network context? What if we could extend the potential

of real-time and secure synchronicity across blockchain application networks — creating entirely new financial products and services or new pockets of transparency to support improved price discovery?

This can only be realized by overcoming the challenge of connecting across distributed applications and their underlying blockchains at a transactional level. And by doing this without giving up on threshold regulatory requirements like data privacy, or the need for organizations to have total control over the infrastructure that operates the services they provide.



“Canton Network fills a void in the market today. Our clients are experimenting but haven't been able to make the leap to use something in production. And that's because most of the offered networks in the market are open or permissionless. Even with ‘add-on services’, they don't offer the privacy that banks need.”

Hany Mesha, Head of Architecture-Americas, Solutions Architect at Oliver Wyman Digital

The risk: creating a worse database for the industry

Connectivity across blockchain networks has been attempted through a number of PoCs and pilots. From cross-chain swaps of tokenized bonds for central bank digital currency, and repo swaps for digital cash, these tests have hinted at the possibilities of atomic delivery versus payment (DvP) — often touted as the killer use case for blockchain in financial markets. While these first generation pilots highlighted this potential for capital markets, the ability to complete truly atomic transactions across independently run, permissioned blockchains has not materialized.

Instead, coordinating the exchange of value across underlying ledgers has so far relied on the re-introduction of message-based integrations or bridges. Bridges do have utility, for example where there is a need to connect distinctly separate ecosystems (such as enabling integrations across Bitcoin, Ethereum, or Solana networks). However, this has proven not to be an optimal or scalable solution for building an ecosystem of single-use blockchains — where the atomicity of transactions and real-time synchronization across these subnetworks is a lynchpin of the connected value proposition.

The objective of introducing distributed ledger technology is to create a better synchronized system for the industry. But if the capital markets industry is to unlock its full value, it is important to recognize that bridges have limitations:

Message and asset bridges do not support truly atomic transactions

They reintroduce intermediaries, as well as traditional risks in settlement and reconciliation — the very risks that blockchain was designed to resolve in the first place.

The introduction of new attack vectors

By introducing new API- and message-based integrations between chains, weaknesses have been exploited by malicious actors, leading to significant risks and financial losses. Of the \$5.4 billion hacked from DeFi protocols to date, bridges between EVM-based networks have accounted for 48% of losses.³

Even permissioned blockchains built on the same protocol require bridges to connect

Implementing privacy and permissioning into blockchain networks comes at the price of native interoperability. Until now bridges have been required to connect workflows and asset transfers across independent blockchains, even if they are built on the same underlying protocol.



“Canton Network gives you a lot more clarity on settlement finality, transaction finality, and completion. Plus, it creates a network effect - as more applications are added and more participants join, the benefits will only increase.”

Head of US Market Access, Tier 1 European Corporate and Investment Bank, Global Markets

3. Source: [DefiLlama](#)

The opportunity: a network of networks

In contrast, the Canton Network was designed to allow independent, private-permissioned blockchain instances to interoperate with total atomicity, ensuring security and connectivity at scale. Transactions complete atomically across blockchains, and without relying on message-based integrations or bridges (see Fig. 3).

As the volume of transactions going through production applications delivered on the Canton protocol increase, participating organizations have limitless opportunity to scale, and new opportunities to connect.

With each connection, the network expands, creating new capital markets highways and driving greater demand for secure, scalable interoperability between applications. The value of the network increases with its participants and their activity, creating new connections, transaction flows, and flywheels for growth.

The variety of applications, asset classes, and institutional capital on Canton today paves the way for native digital assets to be mobilized across a network of networks.

Ahead of the public go-live of the Global Synchronizer service in mid-2024 (see Fig. 8), the pilot demonstrated how assets can be swapped instantly for cash, lent out intraday, leveraged as collateral, and more. As new applications join the network, the white space between them presents ever-more opportunities to connect.



The Canton Network pilot program represents an important step in advancing interoperability across blockchain solutions in the financial services industry. Building on the capital efficiencies and cost savings Broadridge's solution already brings participants, connectivity with the broader Canton tokenization ecosystem can play an important role in driving the liquidity that supports the continued adoption of this emerging digital infrastructure for capital markets."

Horacio Barakat, Head of Digital Innovation Capital Markets, GM of DLT Repo Platform

8X

more tokenized securities than public blockchain

\$900B

of syndicated loan commitments

The Top 10

leading global investment banks use Daml applications today

\$1.5T

of repo transactions every month

75%

US syndicated loan market volume

>\$5B

of real-world digital securities issued

Pilot Objectives

The Canton Network pilot set out to demonstrate that a broad ecosystem of sovereign blockchains and their associated applications can now seamlessly interoperate to unlock next generation efficiencies, new business models, and mutual benefits for all stakeholders across capital markets.

The pilot was designed to meet three core goals:

1 To execute atomic transactions across independently operated blockchains, without sacrificing privacy or control

Demonstrate how multiple Canton instances can transactionally interoperate via the Global Synchronizer in the public-permissioned Canton Network. Enable atomic and operationally risk-free transactions while preserving the privacy and controls needed by regulated institutions.

2 To prove the viability of the Global Synchronizer for the Canton Network

Trial the decentralized synchronization service at scale with regulated financial institutions. Demonstrate the ability to execute cross-chain transactions without needing to place trust in a central operator, shared service provider, or competitors to exchange value between systems.

3 To provide a unified experience for the buy side, sell side, and FMIs

Provide the use cases, reference applications, user interfaces, and network services for participants to demonstrate the individual value and mutual benefits of a shared network.



Scope

The pilot built on the learnings of other high profile pilots and PoCs, many of which leveraged Digital Asset's Daml platform and the Canton protocol, and extended those learnings to create a comprehensive program with broader scope and participation.

For example, the US and UK Regulated Liability Network PoCs involved 10 and seven market participants, respectively. They

demonstrated the ability to transfer digital assets between regulated institutions, proved the ability to instantly settle domestic and internal transactions, and tested the ability to move funds between Fed and interbank ledgers in two use cases using Canton, where each bank ran its own Canton node.

The Canton Network pilot expands on these use cases, both in terms of the number and breadth of

participants and the complexity of the scenarios. End-to-end transactions targeted collateral and margin management use cases to demonstrate how, with the stated interoperability infrastructure in place, tokenized assets and cash can be mobilized across the network to be used directly as collateral or to secure securities financing.

In May 2023, Digital Asset and 30 leading market participants launched the Canton Network to provide the first industry designed, public-permissioned blockchain network fit for institutional assets.

Many of the founding participants played an active role in the Canton Network pilot, bringing their expertise of delivering production applications to the working sessions and collaborating with the group to explore the cross-blockchain business use cases enabled by the pilot setup. The pilot reached an even wider industry group. 75% of the firms taking part were new participants, reflecting the growing demand and interest in the Canton Network.

In total, 155 representatives from 45 companies provided a comprehensive sample of the capital markets ecosystem: asset managers, custodians, transfer agents, commercial and central banks, stablecoin issuers, financial market infrastructures and clearers, and technology and consulting providers.

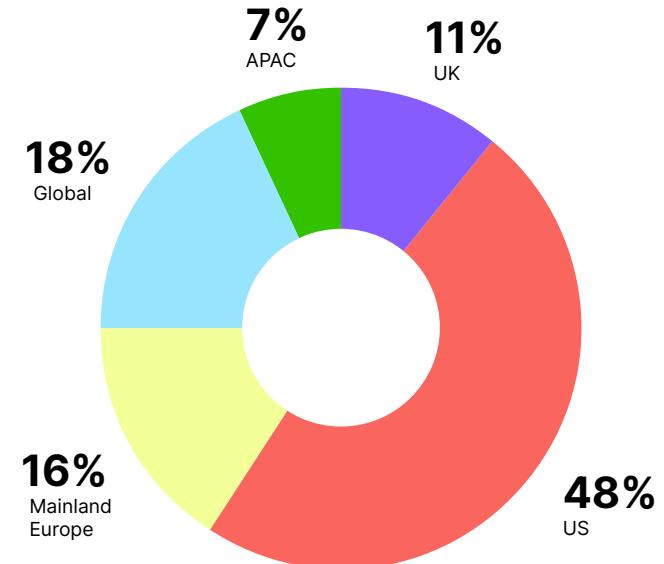


Fig. 4: Participant breakdown by region

Structure and process

During Q4 2023, the six-week pilot concluded with a four-day period in which participants were invited to try a range of dApps, resulting in more than 350 live, simulated transactions.

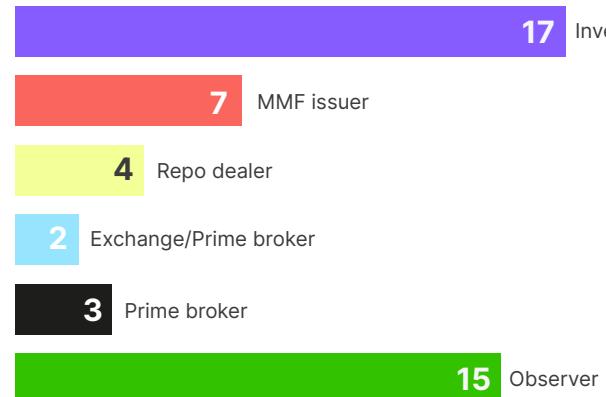
The breadth of participation across the working group sessions provided scope for important input and feedback from organizations that perform the functions represented by the pilot use cases today.

In total, organizations played 70 different roles, acting as participants to the transactions and/or application operators, reflecting real-world capital markets where institutions act in multiple capacities throughout the trading lifecycle.

18 organizations had more than one role; of those, 10 served as both application providers and participants. One organization played four roles, operating two applications, and acting as a prime broker and investor at different points of the transaction.

The variety of roles covered in the pilot underscores the breadth of scope, and complexity in connecting the disparate workflows and systems typically used across each of these types of organization today.

Fig. 5: Roles of participating organizations



Applications and infrastructure provided for the pilot

With the objective of providing a truly unified experience, and to demonstrate multiple independently operated blockchains and their applications working in unison, Digital Asset provided the six Daml application templates used in the pilot. Some of these reflected the same core capabilities as blockchain

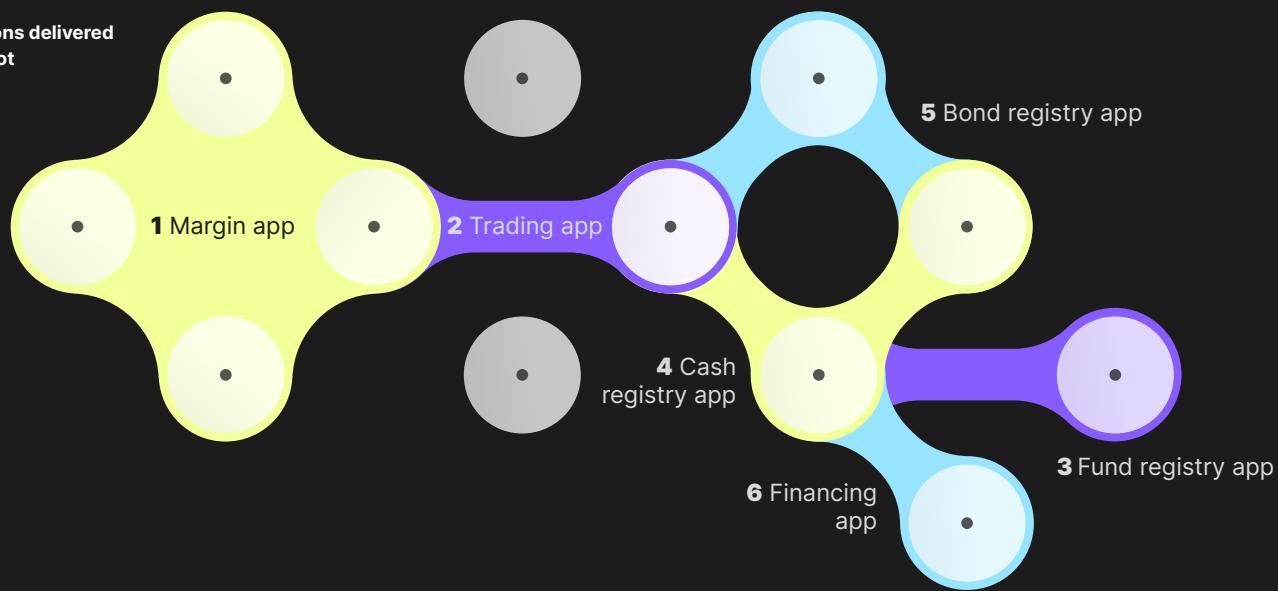
networks already in production on Canton today, while others were created to provide sample applications that can be developed to address whitespace opportunities on the Canton Network. On the next page there is an overview of the applications developed by Digital Asset, and partner Oliver Wyman ([see page 18](#)).

The sheer number of institutional participants that came together for the pilot was valuable in itself and created a community to further the work. It was positive to see the broad interest across the sector from recognizable names and the degree of overlap in the issues we are all thinking about and trying to solve.”

Head of Platform Settlement Solutions, Global Tier 1 Investment Bank

Application overview

Fig. 6:
Applications delivered
for the pilot



1. Margin application

For: Managing margin calls and collateral in a trading or financing context. Provides workflows for margin calls, collateral posting, and management of margin account balances.

Used by: Buy and sell side trade counterparties to manage their margin flows and collateral assets in real-time.

Operated by: A clearing house, FCM (Financial Clearing Member), or a prime broker.

Connected to: Daml Finance-compatible assets can be used as collateral, and the application can be integrated with any asset or cash registry to facilitate immediate, 24x7 collateral transfer and posting to efficiently satisfy margin calls.

2. Trading application

For: Executing over-the-counter transactions with atomic DvP. Provides workflows for RFQ (Request-for-Quote), negotiation, and trade execution.

Used by: Buy and sell side trade counterparties to enter into bilateral DvP transactions.

Operated by: Market infrastructures or trading venues.

Connected to: Built on Daml Finance in an asset-agnostic way, it integrates with any asset or cash registry to facilitate the atomic and immediate settlement of payment and delivery legs.

3. Fund registry application

For: Providing an ownership record for fund units. Supports the issuance of new funds and facilitates fund transfers and settlement.

Used by: Investors and custodians to see a real-time view of fund holdings and positions.

Operated by: Banks, custodians, and transfer agents.

Connected to: Cash registries or trading applications. A standardized Daml Finance model provides composability with other applications.

4. Cash registry application

For: Providing a register for cash holdings. Facilitates transfers and settlement.

Used by: Investors and custodians to manage cash accounts and execute real-time payments.

Operated by: Banks (central or commercial), service providers (including stablecoin issuers), and FMIs.

Connected to: Trading/DvP application, financing/repo application, or any service that requires cash to be settled within a transaction. The standardized asset model in Daml Finance enables full composability.

5. Bond registry application

For: Providing ownership record for bonds. Facilitates transfers and settlement.

Used by: Investors and custodians for a real-time view of bond holdings and positions.

Operated by: Banks and service providers (e.g. bond registrars)

Connected to: Cash registry or trading application, with innate composability through Daml Finance.

6. Financing application

For: Executing repurchase agreements (repos) and other financing transactions with atomic DvP. Provides workflows for RFQ execution and rolling of repo trades.

Used by: Counterparties to manage liquidity and collateral assets in real time.

Operated by: Market infrastructure or financial services provider.

Connected to: Trading application, margin application, and cash registry. Daml Finance provides asset-agnostic interoperability, enabling any asset or cash registry to be used to facilitate atomic and immediate settlement of near and far legs of a trade.

Request information about the applications

Putting operators and users in control

Each application was delivered with its own private, permissioned instance of Canton and was independently operated by different organizations playing the various operator roles.

Users joined the blockchain networks relevant to their business and ran the associated applications on their

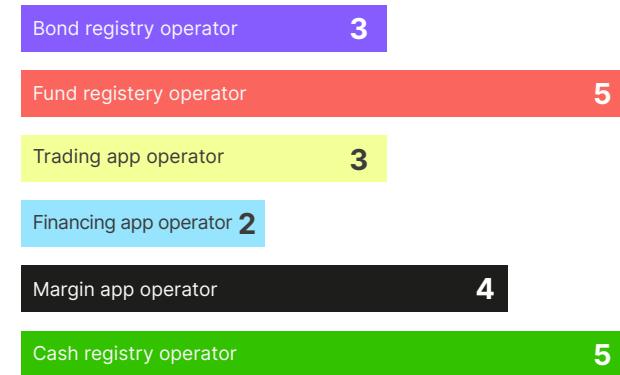


Fig. 7: Each organization acting as an operator simulated control of their own private-permissioned subnetwork and applications

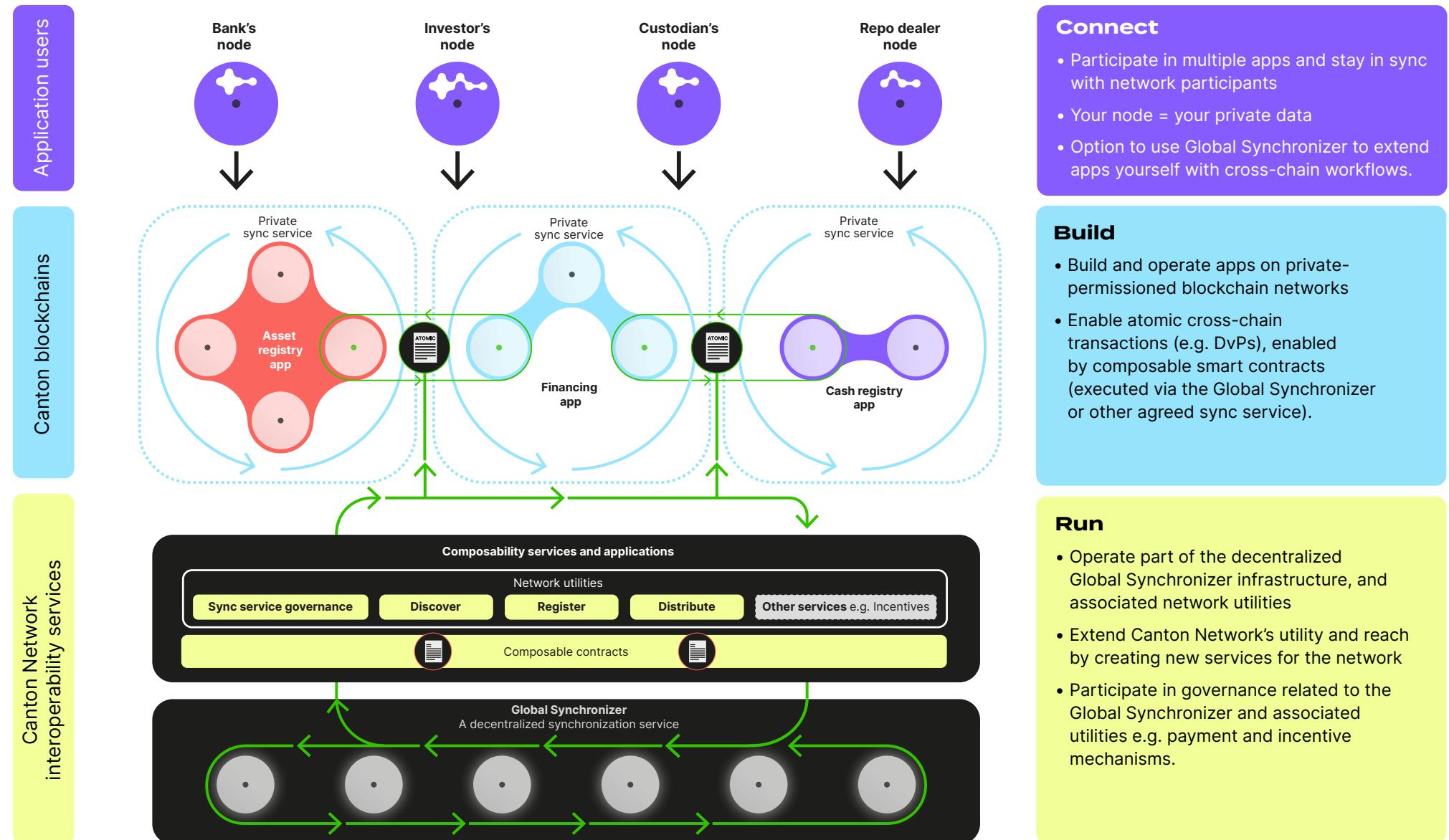
own hosted participant node. Each application manifests as a unique, user-specific interface to initiate and track transactions, ensuring users and operators only see what they are entitled to see, and share what they consent to share.

“Participating in the Canton Network pilot provided the opportunity to view transaction flows from multiple lenses, whether as an issuer of securities or stablecoins or as a prime broker or securities services provider.”

Head of US Market Access, Tier 1 European Corporate and Investment Bank, Global Markets

Organizations were also able to participate in more than one capacity with the confidence that other parts of their organization would not be privy to data they are not entitled to see. This is a critical requirement for large institutions like global banks where compliance measures require internal divisions to block the exchange of information between different functions.

Fig. 8: Transactional interoperability on the Canton Network



Pilot use cases

Asset tokenization beyond issuance

The Canton Network pilot looked beyond asset tokenization to highlight the criticality of connecting the digital asset ecosystem to unlock new opportunities.

Asset tokenization is on the rise, but representing assets in new digital forms is not enough to answer the deep-rooted industry challenges across capital markets. The true value of digitally native assets will lie in their utility and mobility across financial markets. Asset tokenization is the first step; an enabler for more synchronized financial markets. But as we emerge from the first phase of digital issuance, financial institutions and their customers are asking “what now?”

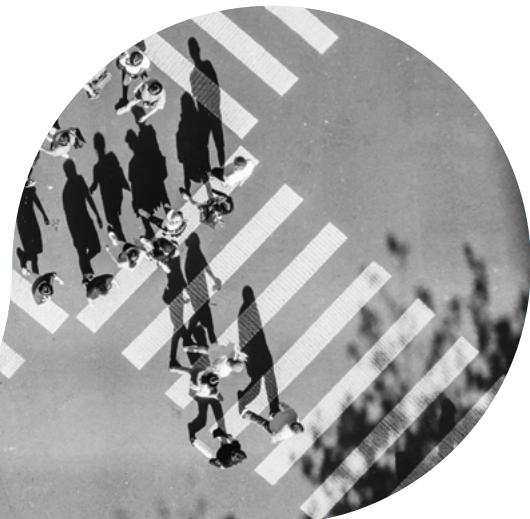
Tokenized assets have limited value when locked on balance sheet, or with restricted opportunities in secondary markets.

The pilot was designed to show how digital assets, cash, and data can be mobilized on a network that emphasizes asset utility to reduce risk, optimize capital efficiency, and unlock new markets for new products and services. The pilot also focused on demonstrating the ability to achieve these goals while operating within the guardrails of today's regulatory environment.

It was critical to represent the varied needs and priorities of market participants across the sell and buy side, service providers, and financial market infrastructure.

- For the sell side, capital and operational efficiency remains front of mind. Products that can improve balance sheet, treasury, and collateral management will result in improved pricing and more competitive offers.
- The buy side wants more cost-effective, easy-to-move products and the ability to increase returns and optimize cash utilization.
- Service providers are searching for ways to deliver additional revenue generating financial products, more sticky software solutions, and new digital asset services.

To deliver this mutual value for all sides of the market, liquidity is key. With this in mind, the Canton Network pilot enabled participants to perform a series of transactions that are only possible on an interoperable, privacy-first network, and after an asset has been tokenized.



This industry pilot stands out in terms of scope and use case complexity encompassing applications across the asset lifecycle and different geographies within the same ecosystem. Northern Trust was pleased to participate in this project as part of our commitment to collaborating with the industry to help drive the evolution of the digital asset infrastructure.”

Justin Chapman, Global Head of Digital Assets and Financial Markets, Northern Trust

Opportunities to reduce risk and optimize capital efficiency

The application templates created for the pilot were made available for participants to take part in the complex, interconnected workflows that take place in daily collateral and margin management.

The problem with daily margin cycles today: a two day risk horizon

With protracted margin cycles, counterparty risk constrains trading activity and capital efficiency. Under a daily margin call regime, the risk horizon driving margin requirements is usually two days. Most of today's capital markets infrastructure is built for T+2 settlement (or T+1 at best), with operational and technical limitations preventing shorter settlement cycles. Day-to-day risk management infrastructure relies on overnight batch processing and manual workflows that require human oversight. With a risk horizon of two days, portfolios are limited by the collateral requirements to cover for market volatility.

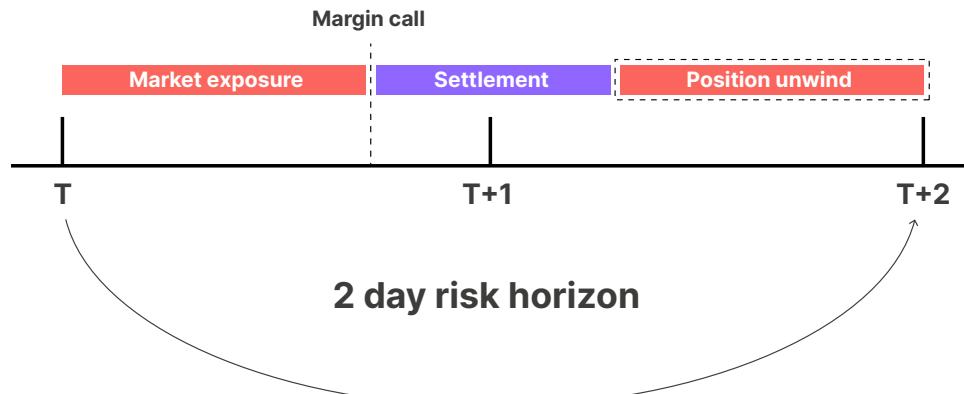


Fig. 9: Today's margin cycle

The benefits of enabling shorter margin cycles:

- Reduced collateral requirements
- Lower credit line consumption
- Less capital requirements and risk-weighted asset (RWA) charges
- Increased trading activity
- Better pricing and improved bid/offer

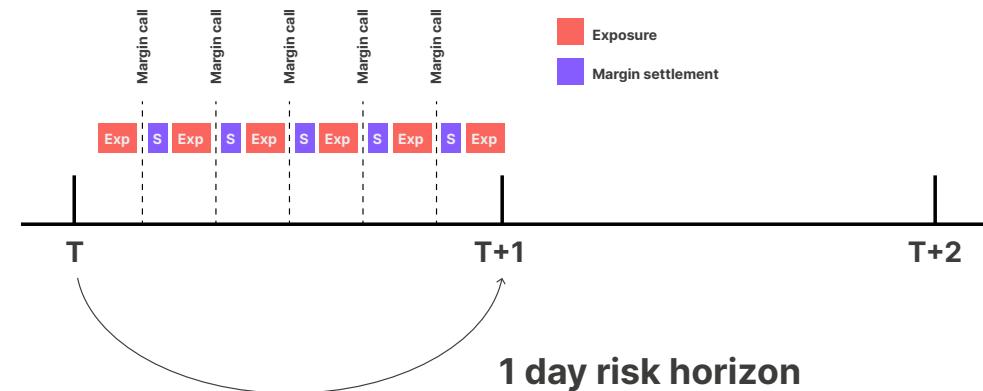


Fig. 10: Benefits of intraday settlement

A new approach

If the applications and underlying blockchains can seamlessly interoperate with automated, cross-chain workflows, the highest levels of automation and straight-through processing are achievable. With the ability to compose applications together in this way, assets become globally available and gain significant velocity. Immediate, atomic settlement and streamlined funding channels make a shorter margin cycle technically and operationally possible.

Underpinned by the Canton Network's interoperability services, participants were able to perform a series of real-time, atomic transactions across blockchains to highlight the potential to significantly reduce settlement and counterparty risk. In addition, these connections demonstrated new ways to mobilize assets for use as collateral, freeing up intraday financing to meet variation margin calls.

The use case transactions were executed, live, on four separate occasions. In the first session, 100 participants joined the simulation. Six application operators and eight individuals from different organizations, joining from around the globe, played the different roles required. Each participating organization was given a login to their unique participant node and applications, all hosted on Digital Asset's Platform-as-a-Service, Daml Hub.

In three subsequent live sessions, the remaining pilot participants performed pre-selected roles — allowing them to take part in transactions themselves or to experience the transactions from different points of view.

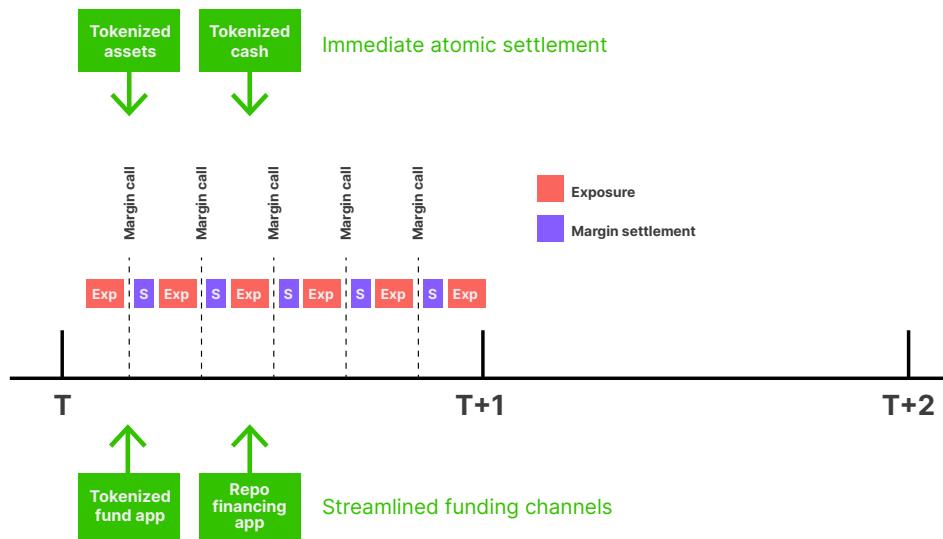


Fig. 11: The potential of tokenized assets for intraday margin management



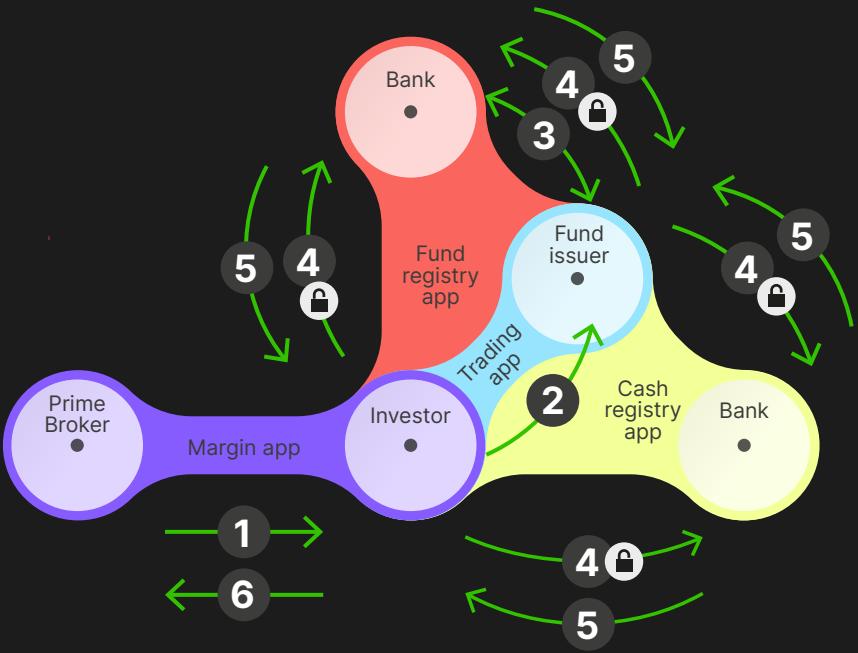
The value of executing on chain is reduced counterparty risk, reduced credit risk, reduced settlement risk, and an increase in the velocity of money and data efficiency.”

Mark Garabedian, Director of Digital Assets and Tokenization Strategy, Wellington Management

Fig. 12: Scenario 1

Using tokenized money market funds to cover margin calls

In the first scenario, a margin call was met by the investor using tokenized money market funds as collateral. To achieve this, the investor triggered a request to purchase tokenized funds from a fund issuer, via the trading application. The following trade resulted in a DvP transaction, swapping tokenized cash for tokenized funds.

**The scenario steps were as follows:**

1. Prime broker issues a margin call to the investor via the margin application.
2. Investor goes to the exchange's trading application and requests a new trade with fund issuer.
 - a. Fund issuer makes an offer to the investor in the trading application;
 - b. Investor accepts offer;
 - c. Exchange, operating the trading application, instructs the trade.
3. Fund issuer requests issuance from the fund registry.
 - a. Fund registry operator approves the tokenized funds to be issued.
4. Locking the cash and fund holdings:
 - a. Investor allocates cash in the cash registry application and approves the incoming funds in the fund registry application. Cash is locked and no longer available to investor;
 - b. Fund issuer allocates funds in the fund registry application and approves cash in the cash registry application. Funds are locked and no longer available to issuer.
5. Trading application operator executes the atomic DvP transaction. The fund issuer takes possession of the cash and the investor receives the tokenized funds at the same time.
6. The investor meets the margin call by pledging their tokenized funds.

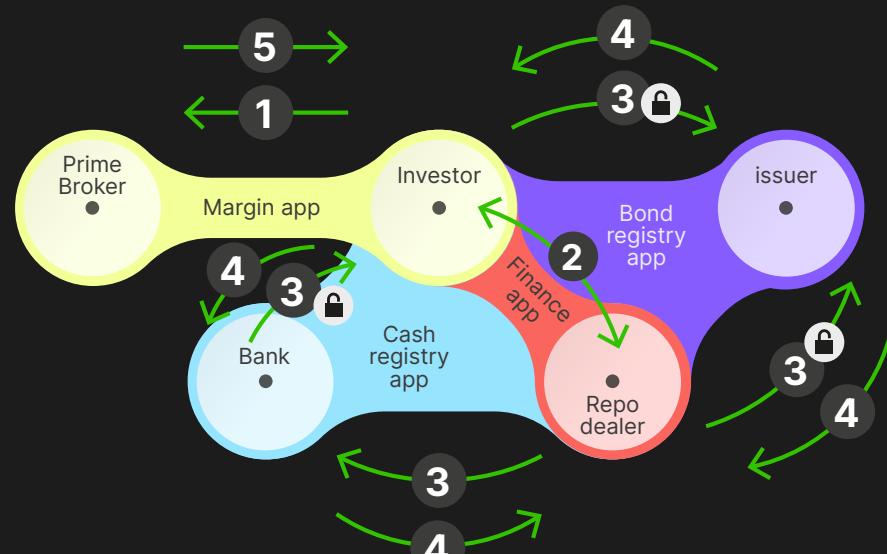
"The simulated transactions were very complex and included participants sitting in different roles. We could clearly see the flow - and, although we participated in the financing leg, we could also see ourselves playing a broker role."

Director of Strategy and Innovation, Tier 1 US Global Investment Bank

Fig. 13: Scenario 2

Intraday repo financing – releasing tokenized cash as collateral for variation margin

In the second scenario, the investor uses tokenized bonds held in a bond registry application as collateral when requesting intraday repo financing via the financing application. The investor then meets a variation margin call using the cash made available by the repo. Again, there are DvP transactions, swapping the digital bonds for tokenized cash.

**The scenario steps were as follows:**

1. Prime broker issues variation margin to investor via the margin application.
2. Investor uses tokenized bonds held in the bond registry application.
 - a. Investor goes to repo financing application to request repo finance, using tokenized bonds;
 - b. Repo dealer makes the offer;
 - c. Investor accepts;
 - d. Trades are instructed by the finance application operator to create settlement instructions.
3. Locking the cash and bond holdings:
 - a. Investor allocates bonds in the bond registry application and approves the incoming cash in the cash registry application. Bonds are locked and no longer available to investor;
 - b. Repo dealer allocates cash in the cash registry application and approves bonds in the bond registry application. Cash is locked and no longer available to repo dealer.
4. Trading application operator executes the atomic DvP transaction. The investor takes possession of the cash and the repo dealer receives the bonds at the same time.
5. The investor meets the margin call by pledging their cash.

Throughout, cross-chain workflows provided the highest levels of automation and straight-through processing. Assets and cash transferred atomically across parties who could see only the parts of the transactions they were permissioned to see via their applications. Each participant's store of data was updated in real-time, maintaining consistency and real-time synchronization with other participants.

This stands in stark contrast to the current environment, where transactions are sequential and every interaction across separate applications and organizations requires a level of manual reconciliation.

“It’s not enough to have individual application islands. They need to connect. That’s what actually yields benefits for all the counterparties involved.”

Hany Mesha, Head of Architecture - Americas, Solutions Architect at Oliver Wyman Digital

Why we need a new way

For these use cases to be successful, it is important to highlight some of the core design features of the Canton Network, and how these differentiate from other blockchain networks.

Public-permissionless blockchains

Designed for interoperability, but sacrifice privacy and control.



Canton Network was designed by the industry, for the industry to provide regulated markets with both the connectivity and control to perform atomic transactions, composed across blockchain networks and applications - without the trade-offs.

Private blockchains

Claim back controls and some privacy, but create walled garden networks.



The Canton Network

Allows private permissioned blockchains to connect via public network infrastructure. Complete atomic transactions across permissioned blockchains, maintaining granular privacy and control over data and applications.



- **Sovereign control:** Each application operator can control the governance, permissions, infrastructure setup, and SLAs of their application and blockchain.
- **Granular privacy:** The Canton blockchain protocol enforces smart contract and authorization rules defining who sees what, ensuring data is shared reliably and with granular control over privacy.
- **Transactional interoperability:** Participants can connect to the decentralized synchronization service to execute transactions that need private, real-time, reliable synchronization across independently managed Canton blockchains. For example in atomic swaps of assets and cash, where counterparties do not want to rely on either the cash or asset holder to ensure that the trade completes, those parties can use this decentralized service to guarantee the all-or-nothing nature of the transaction.

 **For more information:** Get a copy of
'Blockchain Network Evaluation for Regulated Finance'

Fig. 14 The Canton Network difference

Pilot outcomes

The pilot showcased how the Canton Network's Global Synchronizer can facilitate atomic transactions across independently operated permissioned blockchains - and do so with the control that is critical as regulated capital markets businesses look to unlock the full promise of blockchain technology.

During the pilot, the technology was put in the hands of the participants so they could experience the workflows from their own perspective, while also observing how the data flowed to other participants of the transactions.

In doing so, participants experienced transactional efficiencies, synergies that eliminate risks in daily processes, and identified new opportunities to mobilize assets and create new products and services.

Throughout, participants were asked for feedback via online polls. A post-pilot survey and a series of qualitative interviews provided insight into key outcomes, lessons learned, and what the market would like to see next. Based on feedback from participants across business, technology, and innovation teams, here is an overview of the key outcomes:

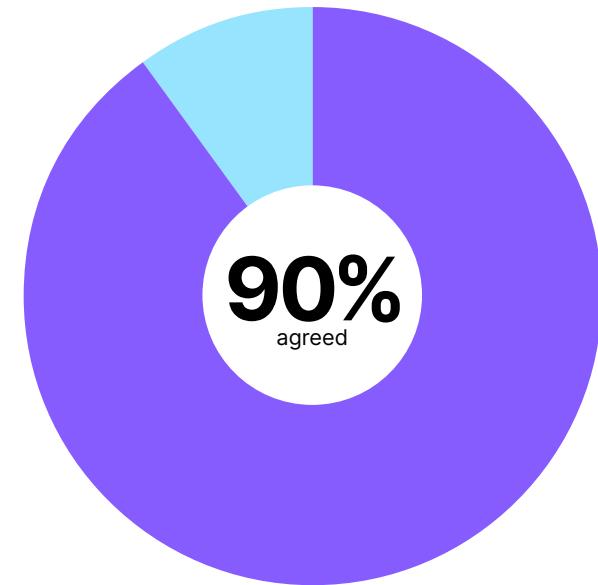
The Canton Network proved its ability to enable atomic transactions across independently operated blockchains to unlock new ways of doing business

When asked whether the pilot had proven the Canton Network's unique ability to deliver on its promise of atomic transactions across sovereign applications in the capital markets space, the feedback was overwhelmingly positive. 90% of participants agreed that it had, with just 10% saying they'd need further exploration to be sure.

Fig. 15: Post-pilot survey.

Do you agree, or disagree with the following statement?

"The Canton Network Pilot gave me confidence that Canton can enable secure, atomic transactions across independently controlled distributed ledger applications...."



We don't want to think in pockets and silos. When you look at repo and equity collateral, for example, you want to think about how those assets can be mobilized. The Canton Network pilot expanded our ability to think about how assets can be used most effectively and opened our minds to new possibilities."

Director Strategy and Innovation, Tier 1 US investment Bank

Pilot outcomes

The Global Synchronizer is operational

- providing connectivity with control

While participants in the room executed transactions with others around the globe, with unified views of data and real-time updates across systems, the Global Synchronizer ensured that no cross-chain transaction required participants to place their trust in a single central operator, competitor or shared service provider to execute value exchange between systems (see Fig. 8)

For example, DvP transactions executed across the cash registry, bond registry,

and their participating investors, banks, and custodians leveraged this decentralized synchronization service to atomically execute the cross-chain legs of these transactions in real-time.

The synchronization services enabled by the Canton protocol are unlike any other blockchain network; all infrastructure operators are blind to any transaction to which they are not a party. The pilot successfully tested the decentralized service over a four-day period with 100% of transactions completed successfully.



The pilot put the Canton Network infrastructure to the test, and we were excited to see it deliver on the promise of connectivity across applications while maintaining the privacy and control that are so critical.

Chris Zuehlke, Global Head of Cumberland & Partner at DRW



Pilot outcomes

The Canton Network pilot surfaced strong enterprise integration capabilities, a scalable architecture, and development accelerators for capital markets

Throughout the program, participants gave feedback on the reference applications provided, along with commentary on their own production applications already live on Canton. While the pilot focused on transactional interoperability, users also highlighted the critical need for Canton Network infrastructure to connect with Web 2 technologies, and be delivered in standard cloud-like or cloud-native architectures. Product leaders and business owners within institutions exploring the commercial value of deploying the technology were quickly able to see the value of the demonstrated use cases, without needing to handle integrations, application development, or hosting.

Applications built for the pilot, and their associated workflows, were designed and implemented by Digital Asset in partnership with key service providers such as Oliver Wyman who provided independent insight into the Canton Network and Daml technology stack during the process.

In summary, the Canton Network pilot successfully demonstrated the ability to compose, synchronize and complete atomic transactions across independently operated Canton blockchains, via the Global Synchronizer. Complex tokenization, trading, intraday financing, and margin workflows were completed atomically and entirely on-chain.

- 1** Showed that privacy could be maintained across the transactions, with each participant only seeing their relevant subset of permissioned data.
- 2** Confirmed the ability of operators to maintain the sovereignty of their applications and blockchains, with control over who could connect and the role they could play.
- 3** Importantly, the breadth of this pilot – both in participation and transaction scope - provides a sharper view into real-world capabilities of the Canton Network to solve the persistent challenges of capital markets.

Across a series of complex, interlinked financing/trading/post-trade workflows, every aspect was completed on-chain, across multiple applications and participants. No bridges or message-based flows were utilized to achieve system and application connectivity. No off-chain workflows were needed to assure privacy.



The pilot was so comprehensive. We proved that you could capture the full lifecycle of an asset from initial issuance all the way through buying, transferring, hypothecation, execution, and settlement. Canton showed the ability to revolutionize the entire ecosystem, not just bits and pieces of the ecosystem - but every part.”

Mark Garabedian, Director of Digital Assets and Tokenization Strategy at Wellington Management

Key takeaways

1. Blockchain interoperability will be driven by the value of real connections

100% of participants responded that the interoperability of blockchains and assets is either very important or extremely important to drive the next phase of adoption and derive value from DLT and smart contract technology in capital markets.

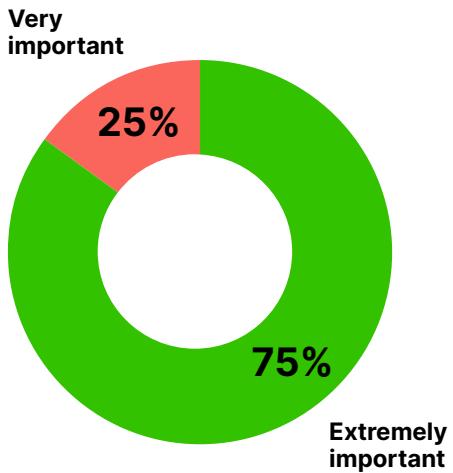
Feedback from participants acknowledged the importance of working towards cross-chain interoperability with an eye on the value of the connections that can be made between applications. As cornerstone blockchains and applications are now reaching significant scale, participation, and transaction volume, the nature of the

interoperability narrative has shifted. Rather than theoretical connections between PoC applications, businesses are focused on improving business outcomes through the valuable connections that can now be made between live capital markets blockchain applications and networks of users.

This real-world connectivity provided the basis for substantive interoperability discussions - for example, how participants could make connections between successful applications in the market today, like Broadridge's Distributed Ledger Repo and Goldman Sachs' Digital Asset Platform.

Fig. 16: Post-pilot survey

"To what extent do you believe the interoperability of blockchain applications and assets is important to drive the next phase of adoption and value from DLT and smart contract technology in capital markets?"



A tipping point for adoption will be when connectivity and standards exist to support secondary markets for digital assets, and the Canton Network pilot showed how an ecosystem of independent applications could interoperate. The pilot brought together asset servicing providers, brokerages, exchanges, CSDs, and asset managers to demonstrate how tokenized assets and different forms of collateral can gain this vital mobility."

**Executive Director, Securities Services,
British Multinational Bank**

2. Tokenization of tradfi demands connectivity and control

By design, Canton Network has sought to solve the connectivity and control issues that have so far held back blockchain network adoption at scale for traditional finance. For regulated finance, both connectivity and control are required for banks to realize the benefits of tokenization without incurring substantial capital charges – and neither public nor private blockchains meet both criteria.

These shortcomings recently came into sharp focus in December 2023 when the Basel Committee on Banking Supervision clarified its final standard on the prudential treatment of banks' exposures to cryptoassets, including tokenized traditional assets, stablecoins, and unbacked cryptoassets. The Basel Committee flagged that permissionless blockchains could give rise to a number

of unique risks. The Basel Committee will not 'allow for the inclusion of cryptoassets [including tokenized assets] that use permissionless blockchains in Group 1', which retain the same capital treatment as the non-tokenized form of the asset. Rather, assets that use permissionless blockchains will be in Group 2, and subject to a punitive 1,250% risk weighting.

The Basel Committee standards are just one example of the heightened regulatory oversight cited by pilot participants. One capital market infrastructure provider pointed to the high degree of activity on emerging standards and interest from central banks, policy makers, and regulators, noting that the deeper perspective gained from the pilot would be valuable in providing market input.



Canton Network prevents or greatly reduces the risk of a bad actor. The way it's structured and designed addresses a big regulatory concern."

Head of US Market Access, Tier 1 European Corporate and Investment Bank, Global Markets



We are looking for a platform with strong interoperability and without the tradeoffs of private-permissioned or public-permissionless blockchains."

Director, Strategy and Innovation, Tier 1 US Global Investment Bank



Find out more and assess your exposure

3. Buy-side interest is on the rise with the promise of higher returns

The benefits of blockchain have been most immediately apparent to the sell side, in terms of data, operational, and settlement efficiency. Digital issuance and tokenization enable faster time to market, allowing them to capitalize on investor interest and opportunities. With improved post-trade processes, they can reduce their operational cost and risk, and improve how cash and collateral could be optimized, translating into capital efficiencies.

To encourage widespread market adoption, the buy side must also begin to see some of the benefits of those efficiencies.

This could include faster access to new markets, broader liquidity, new tokenized products and services, and the ability to mobilize more assets for use as collateral, or for securities financing. With use cases focused on repo financing and margin management, the pilot highlighted that this shift is underway.

With unified data, atomic settlement, and accelerated workflows to manage the lifecycle of day to day activities, the investor can enhance trading, investment, and settlement processes and improve cash management, asset allocation, and investment compliance.



What's changed is that the technology is ready now, and the external environment from regulators and central banks is changing. Buy side participants are starting to move forward to amplify their business, and they demand from their banks that they support these new ecosystems that provide broader business opportunities for asset managers."

Michael Wagner, Partner, Oliver Wyman



The ability to bring tangible benefits to the end investors or managers will be important for widespread adoption and could include, better cash management due to settlement efficiency, enhanced data insights, improved collateral management, and the ability to open up new markets."

Justin Chapman, Global Head of Digital Assets and Financial Markets, Northern Trust

4. Beyond a single view: data utility will increasingly be a value driver

As the formation of a network of networks that allows multiple parties, applications, and providers to work from a single version of the truth while maintaining control and privacy came into view, so did the potential for new distributed, data centric business models.

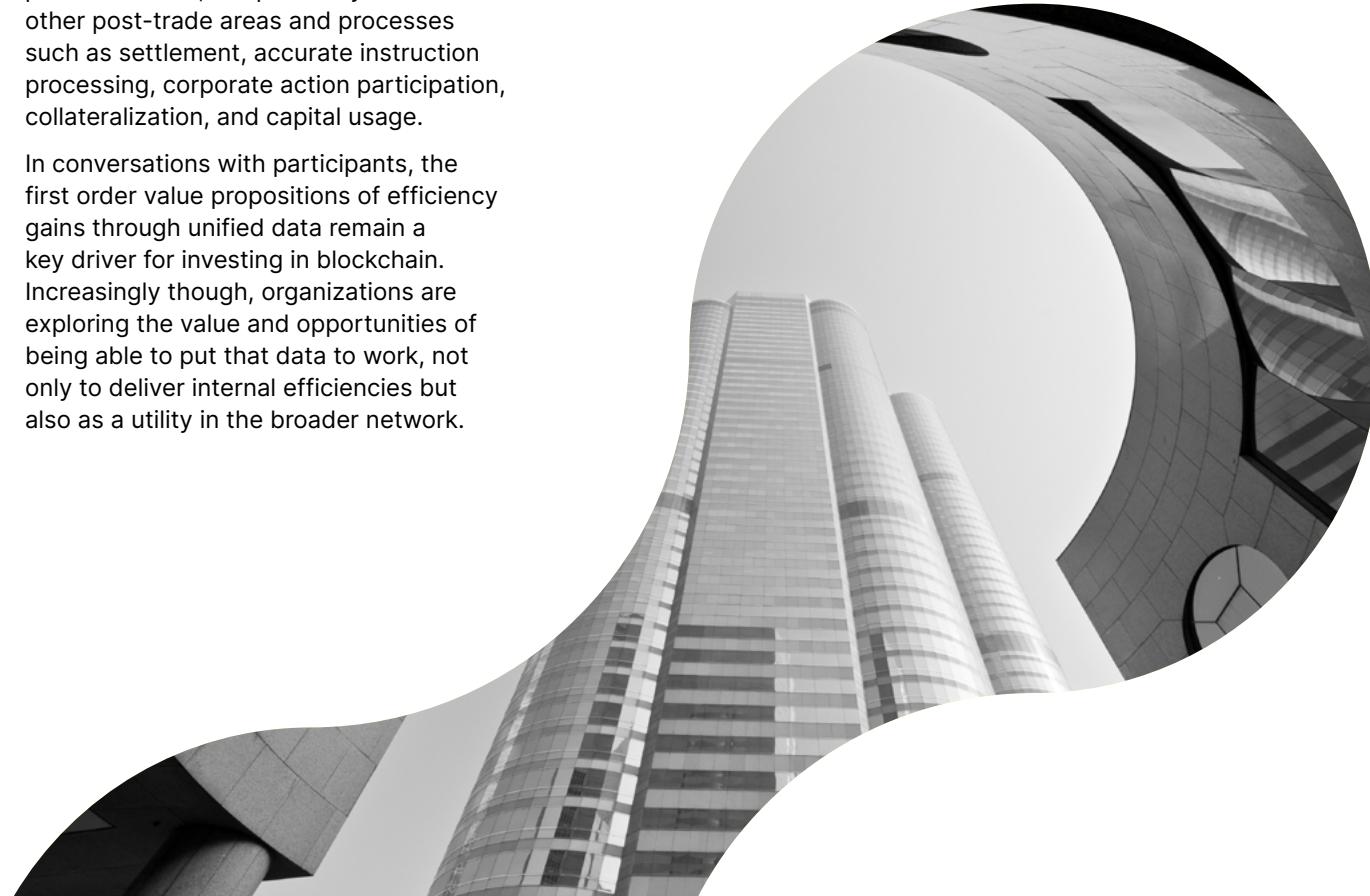
As highlighted during the pilot, within securities lending, the millions of open securities lending contracts each contain multiple terms that can change on a daily basis - whether that's price, benchmark, settlement instructions, or term. As a result, each contract and its data points are being constantly reconciled to remain in sync. Even contracts executed perfectly at the start can come out of alignment during the life of the loan. Every change can result in risk, increased cost, delayed settlement, and a huge expenditure in terms of operating resources.

With blockchain and smart contracts, initial terms are created and validated by both parties. Every status change thereafter is either agreed bilaterally, or one party books the change and the other accepts. This golden source of data means contract terms remain locked and in-step throughout their lifecycle, which not only eliminates reconciliation and position breaks, but positively affects other post-trade areas and processes such as settlement, accurate instruction processing, corporate action participation, collateralization, and capital usage.

In conversations with participants, the first order value propositions of efficiency gains through unified data remain a key driver for investing in blockchain. Increasingly though, organizations are exploring the value and opportunities of being able to put that data to work, not only to deliver internal efficiencies but also as a utility in the broader network.

Data efficiency is probably the least understood. But once you start doing everything on chain all your systems just need an API connection to consume the data that all sits on the same underlying data model. That's a big value add to the entire ecosystem."

Mark Garabedian, Director of Digital Assets and Tokenization Strategy, Wellington Management



5. Tokenized money market funds are gaining velocity

According to a recent report from Moody's, tokenized fund issuance grew to over \$800 million⁴ on public blockchains - tripling from the \$100 million at the start of the year and fueled by large asset managers such as Franklin Templeton whose tokenized fund has surpassed \$270 million in AUM⁵.

As a new form of codified fund asset, these instruments can move in real-time, 24x7, becoming more viable for use as collateral, for example for margin management purposes. Tokenization provides the programmability to enable this additional utility and provide a new tool for collateral mobility.

The broad interest in tokenizing money market funds for this purpose was evidenced in the pilot, where a total of seven different fund issuers participated – one bank, two custodians, and four asset managers.

6. Where institutional liquidity flows, adoption will follow

Liquidity is the key to unlocking the value of tokenized assets. Many participants highlighted the need to remove liquidity barriers with an approach to interconnectivity that allows digital assets to break out of the constraints and boundaries of siloed blockchains and the new digital islands they have created. By doing so, assets can be mobilized, making asset pools more liquid and available for secondary trading or use. More efficient transaction flows and greater certainty of settlement permits asset managers to stay invested in yield-bearing securities for longer and allows asset owners to use a greater percentage of their assets for collateral or lending. Beyond pure operational efficiencies, more effective deployment of assets can drive down margin requirements and capital costs.

 **The pilot was different due to the enormity of the lifecycle, with the platform able to seamlessly complete activities from issuance all the way through to financing, inclusive of custody, brokerage. Seeing transactions take place across applications and geographies on the same ecosystem was exciting."**

Product Manager - Digital Assets, Tier 1 Global Custodian

4. The Block, Moody's says adoption of tokenized funds signals 'untapped market potential', January 2024

5. Ledger Insights, Franklin Templeton's tokenized money market fund passes \$270m AUM, April 2023

7. Desire for value accelerators and ease of adoption

A number of participants cited the breadth and quality of pilot participants and the applications being tested as key factors in their own participation. Organizations are seeking more ready to go solutions to accelerate their exploration of more connected use cases - be it as application users or providers. For example, issuers of tokenized assets, including one bank using the Broadridge DLR solution today, were interested in seeing how digital assets could be financed using repo, and ultimately settled using a digital form of cash - one of the pilot use cases.

Post-pilot, a range of participants have requested access to the application templates provided in the pilot to explore them in greater depth and get a head start in building these utilities for the network.

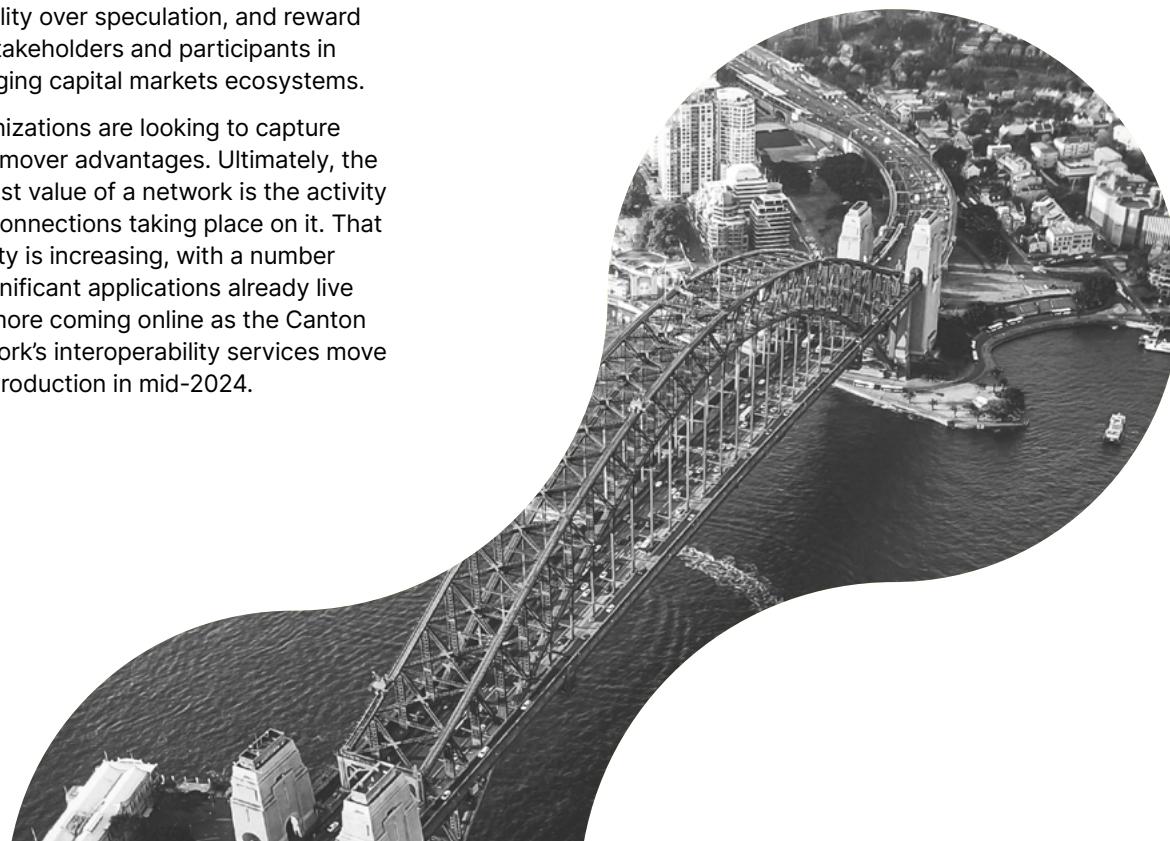
'Off the shelf' components were another request; Daml Finance offers such building blocks and reference frameworks for modeling the assets and workflows to compose Canton Network applications and how they interact with each other and the Global Synchronizer.

In addition, motivating organizations to provide services for the network is equally essential to spurring adoption. Innovative tokenomics arrangements may encourage adoption if they focus on utility over speculation, and reward the stakeholders and participants in emerging capital markets ecosystems.

Organizations are looking to capture early mover advantages. Ultimately, the biggest value of a network is the activity and connections taking place on it. That activity is increasing, with a number of significant applications already live and more coming online as the Canton Network's interoperability services move into production in mid-2024.

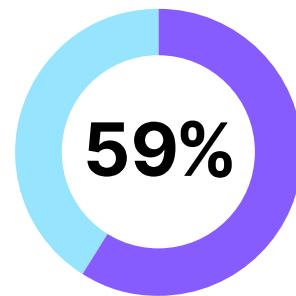
The way Digital Asset has simplified the deployment of nodes, and the way they connect to the synchronization service, is leading edge. It creates efficiencies that I appreciate as an architect and simplifies the engineering effort. And Daml Finance is a great tool that I'd recommend every day of the week. It defines and provides the basic constructs for doing anything within securities, anything with account holdings - to be able to actually flow transactions and liquidity. With these constructs, I can focus on the use case at a higher order, rather than bits and pieces of the code"

Hany Mesha, Head of Architecture - Americas, Solutions Architect at Oliver Wyman Digital

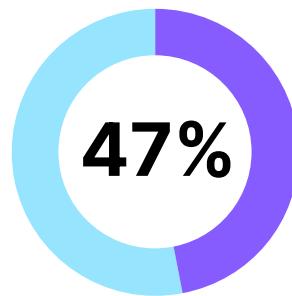


Next steps

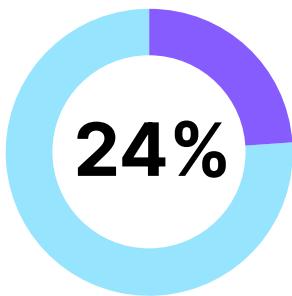
Following the pilot, participants were asked what they would like to see next. The feedback provides a clear directive.



Access to the applications to demonstrate the pilot scenarios internally or to customers



Collaborate to further develop one or more of the pilot applications for the network



Direct support on integrating my existing application with others on the Canton Network

Fig 18: Post-pilot survey results: "Which of the following would you like to see as follow up activities following the Canton Network Pilot?"

1

Open up applications to participants for continued development

A high percentage of participants expressed interest in taking the application templates provided for the pilot to the next stage.

Action: Make the most in-demand application primitives available for industry participants, starting with the asset registry blueprint in Q2 2024

2

Launch the Global Synchronizer into production

Following the success of the public-permissioned [Global Synchronizer](#) during the pilot, Canton Network participants can now go-live.

Action: Make Canton Network's Global Synchronizer permanently available, including governance and new network utilities, in Q2 2024.

3

Educate and collaborate to drive connections

In almost every participant interview, organizations highlighted the importance of delivering change as a collaborative motion and the need to educate on the nuances and important differences between different design choices - whether with customers and partners, or with internal business teams.

Action: Make the pilot content, documentation, demonstrations, and use case walkthroughs available to participants to share across internal teams, and with customers and partners. [Available today on request](#).



The pilot definitely got our business folks excited. The documentation I've shared with my peers has been very well received and the pilot has helped us to build the business case across different internal teams."

Head of Strategy and Innovation, Global Tier 1 Investment Bank

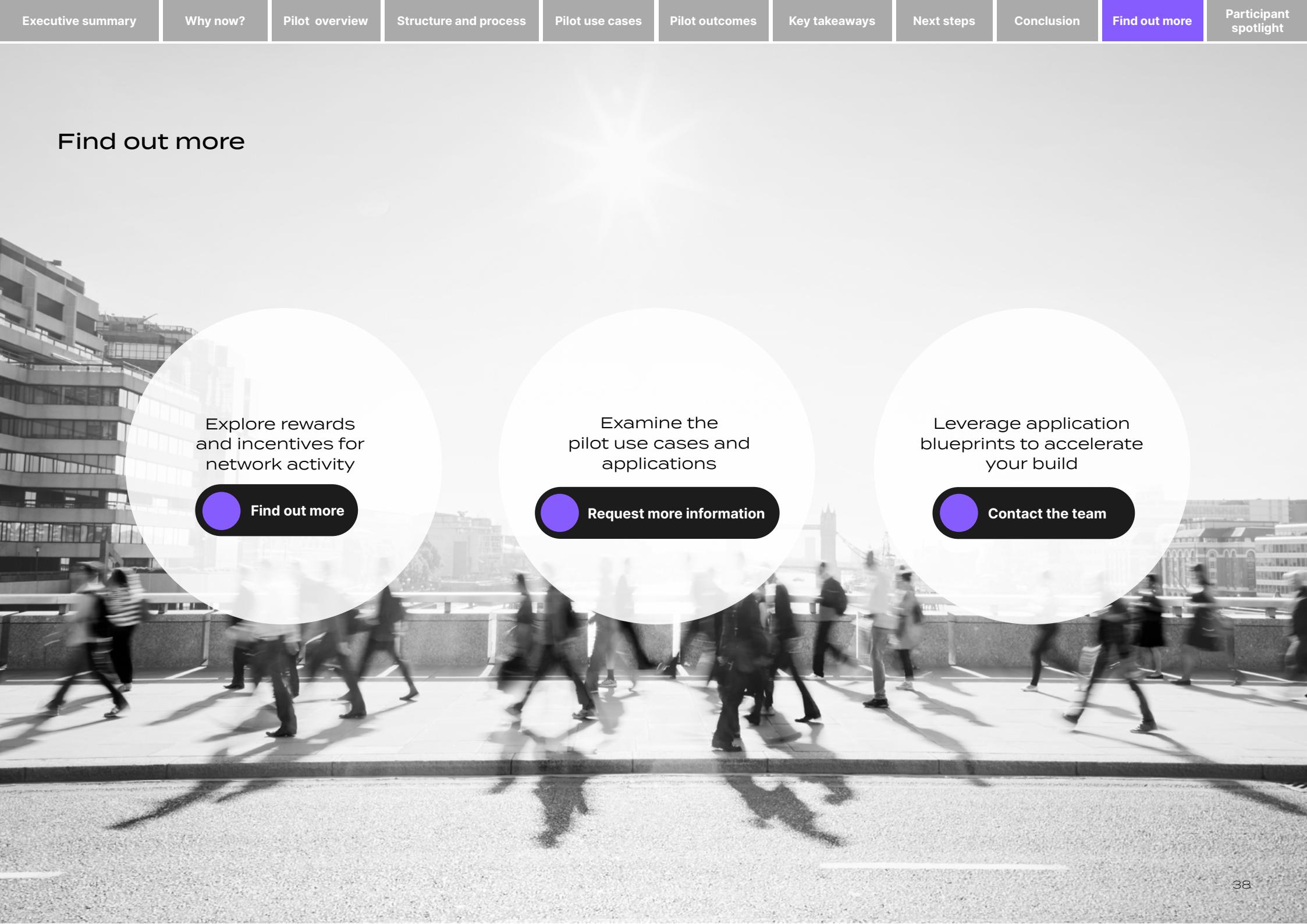
Conclusion

The pilot demonstrated the power of blockchains that can transactionally interoperate on a public-permissioned blockchain network. For the first time in history, market participants saw complex transactions complete atomically – without reintroducing counterparty or settlement risks, while retaining control over their permissions, exposures, and interactions.

Canton Network preserves the stability of trusted regulated processes while creating the transformative power to connect. It offers a viable solution to the persistent problems of capital markets by improving asset utility while reducing risk, operational inefficiencies, and cost– not just for one organization and its counterparties, but across a whole connected ecosystem.

That opportunity space was clearly recognized by the 45 institutions that participated. Cornerstone application networks are already creating momentum, proving the value of the technology in different pockets of the market. With global synchronization infrastructure now available for the network, participants are actively building the new connections of capital markets. And as activity in the ecosystem continues to reward its participants, momentum will continue to build.

Find out more



Explore rewards and incentives for network activity

[Find out more](#)

Examine the pilot use cases and applications

[Request more information](#)

Leverage application blueprints to accelerate your build

[Contact the team](#)

Participant spotlight

Investors and custodians:

New services, new liquidity, new opportunities

Northern Trust

Northern Trust joined the pilot because, in working on different use cases centered on tokenization and digital issuance, they realized that current uses of blockchain for traditional financial assets highlight the need to address how to drive greater liquidity for digital assets at an industry-wide level. With the Canton Network pilot, they could explore the ability to interoperate between industry-wide digital asset applications, which they see as key to success as the industry matures.

Whilst continuing to work with other ledgers, they were interested to see how the Canton Network approached interoperability across participants in the asset lifecycle. While there are many benefits for those earlier in the value chain, the ability to bring tangible benefits to the end investors or managers will be important for widespread adoption. Those benefits could include “better cash management due to settlement efficiency, enhanced data insights, improved collateral management, and the ability to open up new markets,” according to Justin Chapman, Northern Trust’s Global Head of Digital Assets and Financial Markets.

He added: “This industry pilot stands out in terms of scope and use case complexity encompassing applications across the asset lifecycle and different geographies within the same ecosystem. Northern Trust was pleased to participate in this project as part of our commitment to collaborating with the industry to help drive the evolution of the digital asset infrastructure.”

Wellington Management

While confident that blockchain technology can deliver, Wellington believes getting everyone to work together is critical to creating network effects. “What attracted us to the pilot was the critical mass of peers and partners that joined in. Custodians that we use, investment banks, issuers, peers, and service providers — there was a large consortium of participants, including buy- and sell- side firms, and getting everyone on board is the key,” said Mark Garabedian, Director of Digital Assets and Tokenization Strategy at Wellington Management. “Canton showed the ability to revolutionize the entire ecosystem, not just bits and pieces of the ecosystem – but every part.”

Wellington sees legal and regulatory challenges as another hurdle, but believes the success of the Canton Network pilot could help with that. “The pilot was so comprehensive. We proved that you could capture the full lifecycle of an asset from initial issuance all the way through buying, transferring, hypothecation, execution, and settlement.” Noting that other pilots have been more limited, focusing on just issuance or just settlement, Garabedian thinks the end-to-end nature of the Canton Network pilot will prove compelling in conversations with regulators. He hopes participants will come together to collectively “tell the world that the technology works and that we can do this in a regulatory compliant and sophisticated manner” to move the needle forward.

As an asset manager, Wellington sees the value proposition of executing on-chain as “reduced counterparty risk, reduced credit risk, reduced settlement risk, an increase in the velocity of money, and in data efficiency.” Garabedian commented that the gains from data efficiency are not well understood and may be underestimated. “Once you start doing everything on-chain, your systems just need an API connection to consume the data that all sits on the same underlying data model. That’s a big value add to the entire ecosystem.” It stands in sharp contrast to today, where data is pulled from different systems that have different underlying data models, and needs to be cleansed and aggregated in house or through third parties — a resource-intensive and costly process.

Garabedian believes that highlighting the power of the data transformation will also be important. “If all the assets are on-chain or represented on-chain, and workflows are on-chain, then you can build virtual portfolio management systems that will be more performative and cheaper than what your current PMS and OMS systems look like. Add streaming prices to that, and you can create comprehensive virtual multi-asset, multi-workflow Accounting and Portfolio, Order, and Risk Management Systems.”

Participant spotlight

Banks and exchanges:

Connectivity and control

Global Markets Division of Tier 1 European Corporate and Investment Bank

Moving towards tokenization and digitization means moving beyond one-off transactions with limited liquidity and utilization. The Canton Network pilot provided a look at an interconnected set of applications and activities within an ecosystem, and the ability to view the transaction flow from multiple lenses.

The permissioned nature of Canton removes the limitations that exist with public-permissionless networks. “We can’t do things the way they’ve been done in the past. The future is interconnected, and the pilot demonstrated that the movement of trading and collateral management could be done seamlessly — the whole puzzle, not just one piece.”

This bank is both an issuer of tokenized assets, and a user of Broadridge’s DLR system (built on Digital Asset technology and deployed on Canton). With Canton Network, “a security we issue can be natively financed through the Broadridge DLR application and potentially be settled using a digital form of cash. Integrated, orchestrated Canton applications make that possible.” The potential benefits are enormous, from better liquidity to lower operational and capital charges.

“Overall the pilot was extremely successful in bringing the industry together to demonstrate how a full-blown ecosystem could operate. Some pilots have accomplished some things — but not at this scale in terms of users. This shows what’s really possible in the near future.”

Tier 1 US Global Investment Bank

This top five US-based global bank noted that it is focused on identifying platforms with strong interoperability and without the trade-offs of private-permissioned or public-permissionless blockchains. Based on the depth and breadth of organizations and applications participating in the Canton Network pilot, the bank joined to explore the connectivity between applications that aligned with their business strategy — and be part of the go-forward conversation. “The simulated transactions were very complex and included participants sitting in different roles. We could clearly see the flow and, although we participated in the financing leg, we could also see ourselves playing a broker role,” said the bank’s Director of Strategy and Innovation.

Rather than joining any number of the emerging platforms that don’t connect, the bank was looking for opportunities to easily interface with in-market and nascent applications from various providers and partners. “When you look at repo and equity collateral, you want to think about how those assets can be mobilized. The Canton Network pilot expanded our ability to think about how assets can be used most effectively, opening our minds to new possibilities.”

Tier 1 US Global Investment Bank and digital asset platform provider

This global bank is already actively involved in blockchain powered solutions providing its own digital asset solutions to institutional and corporate customers. They joined the pilot as a cash registry operator, looking to gain a better understanding of the Canton Network ecosystem and as part of their exploration of different networks for potential future connections. The value of the pilot was “the sheer number of true institutional participants that the platform brought together — seeing that broad interest across the sector from recognizable names and the degree of overlap in the issues we are all thinking about and trying to solve.” The pilot provided a community to further that work.

The pilot “emphasized how the architecture of the Canton Network not only supports application sovereignty, but through its structure can also still support atomic settlement.” The inclusion of DvP in the use cases was important given its value to customers.

Participant spotlight

Major service providers:

Transforming the status quo

Broadridge

Broadridge DLR uses smart contracts and distributed ledger to create workflow efficiencies. After starting with post-trade rep improvements, Broadridge tackled sponsored repo and HQLA and is looking to roll out intraday repo bilaterally and to intra- / inter-entity processes or those requiring matching. DLR has gone beyond pure operational efficiency. By consolidating activity across Broadridge's depository facilities, collateral providers can optimize collateral and settlement, reducing their agent fees and daylight overdraft charges.

DLR participants are realizing significant savings across the board, from agent fees to lower staffing costs and higher automation, to fewer breaks and resulting fees/penalties, plus a reduction in capital pledge for buffer sizing through smarter use of capital.

"The Canton Network pilot program represents an important step in advancing interoperability across blockchain solutions in the financial services industry. Building on the capital efficiencies and cost savings our solution is already bringing participants, connectivity with the broader Canton tokenization ecosystem can play an important role in driving the liquidity that supports the continued adoption of this emerging digital infrastructure for capital markets," said Horacio Barakat, Head of Digital Innovation Capital Markets, GM of DLT Repo Platform, Broadridge.

DRW

DRW was part of the founding group of organizations that launched the Canton Network in 2023. During the pilot program, DRW executives provided their insights and first-hand experience of participating in the Canton Network. DRW discussed the intraday repo use case demonstrated during the pilot. As a participant in Broadridge's DLR solution running on Canton the organization is already seeing the benefits of better capital efficiency and utilization. DRW is also one of a group of organizations participating in the decentralized infrastructure and synchronization layer of the open Canton Network.

"The pilot put the Canton Network infrastructure to the test, and we were excited to see it deliver on the promise of connectivity across applications, while maintaining the privacy and control that are so critical," Chris Zuehlke, Global Co-Head of Cumberland & Partner at DRW said. "Canton gives the market a chance to reimagine this infrastructure from zero making it more efficient, predictable, and operationally reliable. The ability to have DvP through the Canton Network will create certainty of settlement allowing us to think about counterparty risk differently."

Participant spotlight

EquiLend

EquiLend 1Source seeks to eliminate reconciliations across securities lending. With millions of open contracts containing multiple terms that can change on a daily basis, every contract and its data points must be constantly kept in sync. Changes can make contracts come out of alignment, resulting in risk, increased cost, delayed settlement, and a huge expenditure in terms of operating resources.

Using DLT and smart contracts, initial terms are created and validated by both parties and every status change thereafter is agreed. This golden source of data keeps contract terms locked and in step throughout the lifecycle, to eliminate reconciliation and position breaks and improve settlement, accurate instruction processing, corporate action participation, collateralization, and capital usage. Traders will also gain a better view of inventory and positions.

"The Canton Network pilot gave us unique insight into the potential of seamlessly connected solutions for the securities lending market. As we deliver on our goal of a single source of truth for the industry, the Canton Network showcased how our platform could play within the wider capital markets ecosystem to unlock settlement efficiencies and greater collateral mobility. Key to this is Canton's ability to deliver both the unified ledger, but also the granular controls we need as an app operator and the privacy demanded by our customers. Our participation reinforces our commitment to innovation and dedication to implementing solutions that drive the industry forward," said Gary Klahr Director of Strategic Initiatives, EquiLend 1Source.

Oliver Wyman

As a long-time partner of Digital Asset, Oliver Wyman was extensively involved in working on the applications used in the Canton Network pilot, bringing to life the open economic network proposed at Davos two years ago. "What was theory then is becoming applicable now," notes Michael Wagner, Partner. The security and interoperability that sits at the core of the Canton Network addresses banks' need for privacy, which previously created a major stumbling block with public-permissionless blockchains. Scalability was also an issue, but is addressed with the way that nodes are deployed and connected in the Canton Network.

According to Hany Mesha, Head of Architecture - Americas, Solutions Architect, Canton Network fills a void. It creates the opportunity space for all the different applications that are being built to come together to create end-to-end transactions that deliver greater value. "Currently, we are seeing many different islands being created, but there's no way to connect them. Transactions and liquidity stop at the border of each island. Canton Network enables interconnectivity between the islands, creating broader benefits for every market participant involved."

With a more efficient transaction flow and certainty of settlement, "asset managers can stay invested in yield-bearing securities for longer periods of time" or "use a greater percentage of their assets for collateral or lending," says Wagner.

To move forward, banks will have to look beyond the things that keep them busy today to the solutions that will help them be more modern and resilient. It's much more than simply being more efficient, although that's an important outcome. Digital assets delivered in a way that prioritizes interconnectivity and control present a huge new opportunity for banks to create new revenue streams and deepen customer relationships.

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Connect on Canton

The first open blockchain network designed with the control, privacy, and interoperability needed to power synchronized financial markets.

Canton

The Canton Network is the financial industry's first privacy-enabled, interoperable blockchain network designed for institutional assets, launched by a group of leading financial institutions, infrastructure providers, technology firms, and consultants on 9 May 2023. The Canton Network's design overcomes the shortfalls of existing smart-contract blockchain networks and enables previously siloed systems in finance to become interoperable and synchronized in ways that had been impossible before. Offering the privacy and controls required for highly regulated organizations, the Canton Network creates a safe and sound environment in which assets, data, and cash can move freely across applications in real time, unlocking new efficiencies and powering innovation.

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