

Canton

The Digital Catalyst for Post-Trade Transformation

The power of digitized assets to
radically reshape post-trade services

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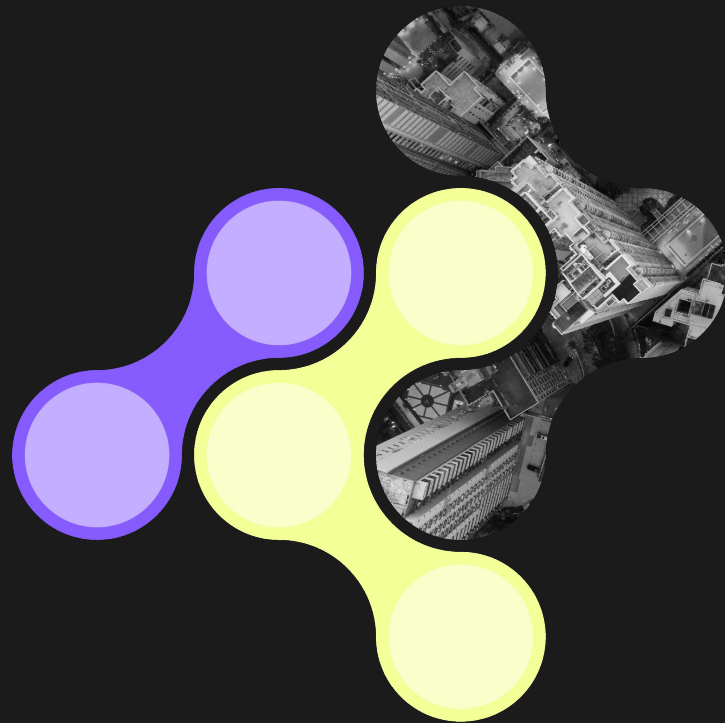
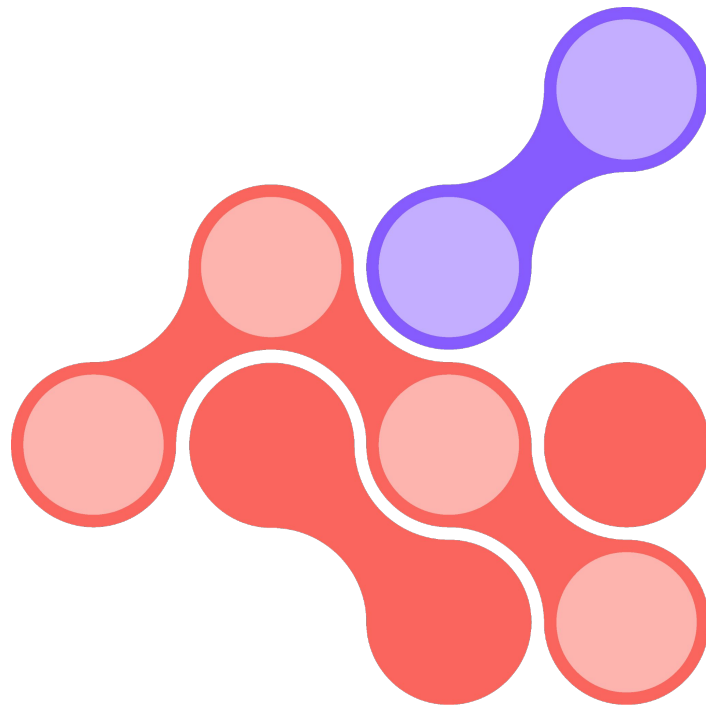


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Introduction: The digital catalyst for post-trade transformation

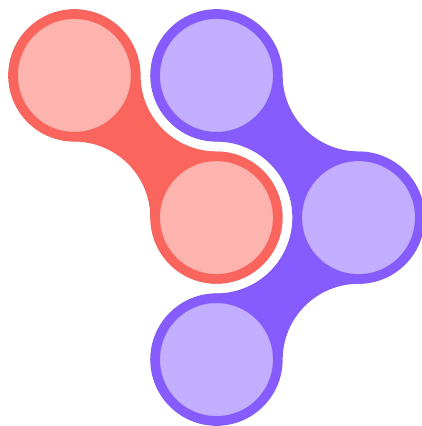
In 2022, we undertook a deep exploration of the benefits of digitization across post-trade, starting with the ability of digital ledger to transform a set of largely, sequential, highly manual set of activities.

After years of talking about what *could* happen, we are now seeing change take place in real time... and momentum is accelerating.

The **launch of individual applications** from Broadridge, Goldman Sachs, HSBC, HKEX, Nasdaq, Tradeweb, Versana and more formed the foundation for improved capital markets. They delivered significant benefits, from better, faster issuance and syndication to accelerated settlement, more efficient repo, and more.

The **introduction of the Canton Network** in May 2023 reflected the growing understanding that no one provider could 'go it alone'. Creating digital islands simply creates new fragmentation and results in different process barriers. Canton Network enables the interoperability that is essential for interconnected capital markets, while also enabling application owners to control access to their application.

2024 brought the **build out and expansion of the [Canton Ecosystem](#)**. New applications and infrastructure providers joined; rising transaction volumes proved the scalability and resilience of the technology; tokenized real world assets (RWAs) and digital native issuances created new digital asset pools; and digital assets were successfully used across complex trading and financing transactions with atomic settlement.



In 2025, we expect to see more complex transactions, the addition of new payment options and new types of assets, and the formation of deeper liquidity pools as tradfi and crypto assets converge.

More than \$16 Bn of assets (including \$8Bn in bonds) have been issued over the last 5 years¹, and more than half of those bonds were issued on Canton-connected applications. Issuance is the essential first step, but creating liquidity requires connecting to the growing crypto wallets of institutional and wealth investors. Crypto markets continue to drive innovation at a rapid pace, but they are also seeking exposure and breadth to enable sustainable growth.

¹ Value Exchange, [DLT in the Real World](#), 2024

Introduction: The digital catalyst for post-trade transformation

Capital markets require competition and innovation, but without sacrificing the stability and safeguards essential to regulated markets. In order to achieve these goals, Canton Network's controls, governance and app development were open-sourced and decentralized in 2024, and are now managed by all participants. In addition to interoperability, transparency and synchronization, Canton is the only L1 blockchain with privacy – and privacy is key to unlocking the full benefits of blockchain technology across post trade and capital markets.

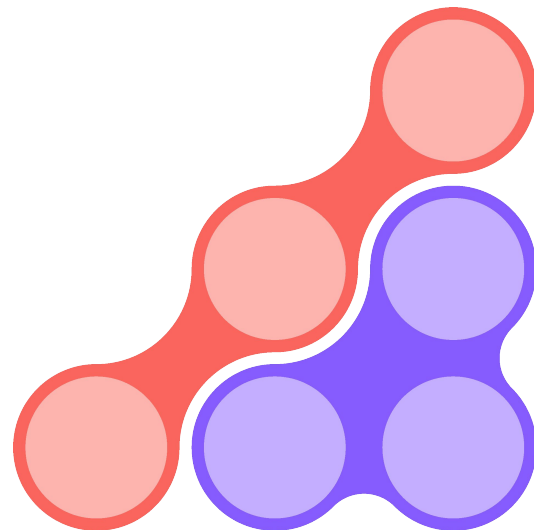
Each chapter of this ebook is a deep dive into a particular post-trade activity. We discuss the challenges inherent in traditional markets and how DLT can create efficiency, reduce risk and increase transparency.

We are already seeing those benefits come to life as individual solutions are in production. Capital efficiency is increasing, fails are decreasing, and transactions take place more quickly and with greater certainty than ever before.

More importantly, as applications connect and interoperate – as they do on Canton Network – those benefits are amplified through the entire post trade workflow.

- Issuing an asset with embedded security and lifecycle details streamlines asset servicing.
- Assuring certainty of settlement reduces the need for collateral as well as capital reserves.
- The ability to 'lock' an asset increases its utility in margining and securities financing transactions.
- And the list goes on.

It's an exciting time to be part of capital markets. We're on the threshold of addressing long-standing, persistent challenges and will undoubtedly uncover benefits we can't even imagine today.

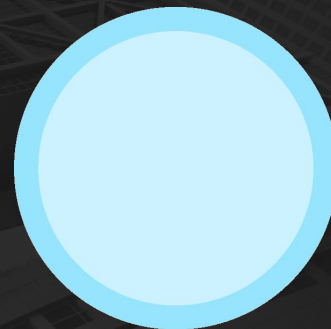


Canton

The Digital Catalyst
for Post-Trade Transformation

Chapter One

Asset creation and issuance - step one in transforming post-trade



Chapter One: Asset creation and issuance - step one in transforming post-trade

The first step in transforming post-trade services

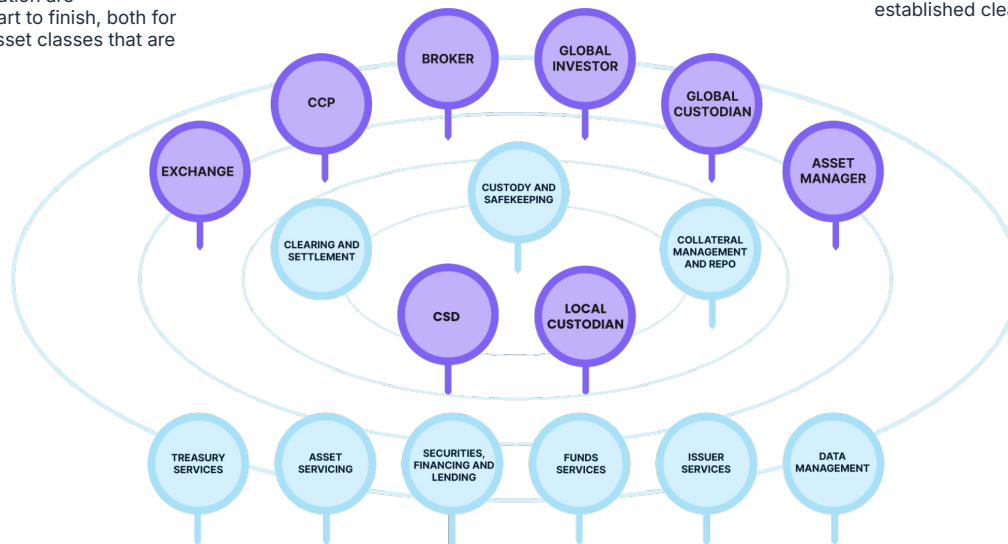
Asset creation and issuance is the first link in the post-trade value chain. Without this, the assets for post-trade services simply don't exist.

As markets have evolved, the shift from physical securities to digital representation has enabled dematerialization and immobilization of assets. However, securities issuance processes have remained firmly in the past, with even the introduction of 'wet' signatures heralded as a big innovation. Tokenization and digitization are revolutionizing this process from start to finish, both for traditional securities and the new asset classes that are constantly emerging.

We will explore the advantages that tokenization and the creation of truly digital assets are bringing to the asset creation and issuance process. We will also dig deeper into untapped opportunities—what might the future hold as the market embraces digitization? Along the way, we will look at how digital pioneers are already reshaping markets and reaping the benefits.

A brief definition

Current issuance processes are based on the creation, distribution, and management of physical documents (stock certificates, bond notes, etc.) administered using a traditional accounting book entry system. Once issued, the purchase/acquisition and subsequent trading of these securities documents is conducted via the securities exchanges (e.g., Nasdaq, NYSE, LSE, HKEX, et al.). Related financial transactions are processed through the established clearing system (e.g., DTCC).¹



¹ Capgemini, [Blockchain Disruption in Security Issuance](#), 2016

Chapter One: Asset creation and issuance - step one in transforming post-trade

A simplified view of issuance includes structuring, issuance, distribution, primary listing, secondary trading, custody, portfolio management, advisory, and market making.

² Each of these steps contains myriad sub-steps. It's a time-consuming, manual process involving multiple players who execute a complex set of steps. The issuer works with investment bankers, lead managers, and syndicate members to structure an asset, which is then issued to asset managers and other investors. The entire process is overseen by regulators, ensuring compliance to required controls and regulations.

As the market continues to adopt structured products, the issuance process becomes even more complex. Increasingly, investors want investments that are tailored to their risk profile, so securities become composed of different sets of outcomes and risks. In response, the market is becoming more dynamic; yet the entire process is running on outdated technology that is sequential, slow, and not sufficiently scaled to handle digital assets. Increasingly, the infrastructure is not fit for purpose.

Challenges

Highly manual and paper intensive, with multi-step, inefficient processes that are sequential and chronological in nature. Delays and costs are driven by inability to complete steps asynchronously or to identify where the process is in its lifecycle.

Long clearing and settlement cycle, from T+3 in public markets to 10 business days for private securities, creating financial costs, including the need to lock up assets in margin and collateral.

"Digital technology would improve the efficiency of security issuance by replacing a paper-intensive, manual process with smart contract-led automation, reduction of intermediaries, and fully automated asset servicing through a distributed ledger."³

Opportunities

- Truly digitized documents, which can even be embedded in the digital asset definition.
 - Multi-party, shared workflows.
 - Concurrent, asynchronous processing.
 - Roles, responsibilities, and terms and conditions clearly defined and incorporated into the asset.
 - Administrative overhead and cost is reduced.
-
- Transaction surety and atomic settlement (reduce settlement risk exposure by over 99% and save \$11-12Bn by applying blockchain to clearing and settlement of cash securities, equity, repo, and leveraged loans. Per Nasdaq, settlement could be reduced to as little as 10 minutes vs. 3 days in the US and 2 days in Europe, freeing up billions of dollars in collateral held against settlement risk.)⁴
 - Use of smart contracts facilitates auto execution of terms and conditions without manual intervention.
 - Transaction processes become faster and cheaper.
 - Lower capital costs and systemic risk.
 - No counterparty risk as settlement happens in real time.

² ASIFMA, [Tokenised Securities](#), 2019

³ Capgemini, [Blockchain Disruption in Security Issuance](#), 2016

⁴ Capgemini, [Blockchain Disruption in Security Issuance](#), 2016

Chapter One: Asset creation and issuance - step one in transforming post-trade

Challenges	Opportunities
Multiple versions of the truth, despite continuous, redundant reconciliations, internally and externally, which contribute to higher issuance costs. ⁵	<ul style="list-style-type: none">• Golden source of truth: one unified view of a master book.• No need for anything beyond the registry to track ownership, which removes the need for today's numerous add-on services and providers.• Immutable records eliminate the need for constant reconciliation.
Risk, including settlement risk, as purchases are paid up front but account credits can be significantly delayed, and counterparty risk on both sides as the transaction remains open until the settlement cycle successfully completes.	<ul style="list-style-type: none">• Ability to support atomic, simultaneous settlement, enabling real time DVP and PVP.• Full lifecycle automation can be baked onto the asset, including specific conditions such as locking.• Eliminate repetitive actions across disparate platforms.
Lack of transparency. Different systems and a highly manual process mean there's no electronic audit trail, which makes tracing and observability extremely challenging.	<ul style="list-style-type: none">• Clear roles and responsibilities, including a role for observers/auditors.• Ability to see where an asset is in the issuance lifecycle.• Immutable records show the full lifecycle, including traceability and provenance.• One master book⁶, making the book building process almost real time and transparent.• Regulatory compliance is programmed directly into the contract to reduce and automate the regulatory compliance burden. The smart contract can execute, regulate, and govern the token.⁷
<p>Multiple intermediaries, particularly as parties to the transaction partner with others to complete their part of the life cycle (nominees, registrars, issuing & paying agents, corporate action processors, etc.).</p> <p>The current separation between the asset's definition and the rules governing workflows and lifecycle events require multiple points of coordination from third parties.</p>	<ul style="list-style-type: none">• A significantly simplified process for all, with the ability to directly issue digital securities on a distributed ledger, streamlining dealings between required parties and reducing the need for intermediaries.• Faster matching of buyers and sellers.• Streamlines syndication and book building, and expedites time to market (create savings by reducing intermediary fees).⁸• Programmable features such as automating dividend payouts, vesting periods, easing voting processes, and distribution of proxy materials to underlying beneficial owners.⁹• Embedding the rules governing a security's lifecycle with the definition of the asset minimizes the need for separate platforms (e.g., corporate actions).

⁵ Capgemini - "Our research shows average fees paid are 3.45% for Regulation D (private security) issuance, 7% for an IPO issuance and 0.9% - 1.5% for a bond issuance. The cost could be reduced by eliminating the intermediaries involved, thereby improving efficiency and reducing cost to the issuer."

⁶ ASIFMA, [Tokenised Securities](#), 2019

⁷ ASIFMA, [Tokenised Securities](#), 2019

⁸ Capgemini, [Blockchain Disruption in Security Issuance](#), 2016

⁹ ASIFMA, [Tokenised Securities](#), 2019

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Beyond a better mousetrap

Most issuance discussions focus on improving the process, in order to reduce costs and create a better, safer, faster path to issuance. For all the reasons shown above, this is critical. But is it sufficient?

Securities are issued to secure funding, hedge risk, meet liabilities, or manage exposure. Issuers and investors alike are looking to capitalize on market trends or conditions, and every delay equates to lost opportunity.

Consider what could be unlocked with a nimbler process, standardized documentation, automated and transparent workflows, more flexibility, and faster time to market. Issuers and investors alike would benefit from faster execution to value. Now imagine what happens when the assets are created digitally—when the asset, the data, and the process are no longer three separate things, and transfers and moves can be executed while keeping the asset, its reference data, and lifecycle events together.



New types of assets and new use cases emerge. We see this already with tokenization of NFTs and artwork. Any type of asset could be tokenized—from physical assets such as gold, to regulated assets and structured products, to intangible assets like intellectual property or loyalty program benefits.



Faster time to market allows organizations to tap investor demand while interest is high. New products or funds are raised with expedited processes, helping companies capitalize on changing market trends and generate new revenues.



Investor interest increases with the flexibility to design unique terms and meet specific risk tolerances. Mobility, liquidity, and asset utility all increase¹⁰, while counterparty and market risk decrease as settlement accelerates to near real time.



Geographic reach expands as geographic boundaries and market time zones become less relevant with asynchronous processing and a true master record. Different regulatory requirements can be encoded directly onto the asset and only triggered when specific conditions are met.



The investor base can broaden as investment thresholds and timeframes decrease. Specific, digital-only tranches can appeal to new investors.



More organizations can tap the markets as the complexity, cost, and time to issue securities decreases. (Bond origination is traditionally >USD300M.¹¹) Fundraising becomes more efficient, and issuers have better information about their shareholders. Investment banks and syndicates can service more clients as onboarding, documentation, and workflows become streamlined.



The number of different entities involved in a trade could be reduced as the need for extra oversight or services is eliminated. And, as the market continues to get more efficient, might it allow a form of peer-to-peer asset creation and issuance, creating the ultimate in customizable assets and making it economically feasible for smaller or mid-size enterprises.

Faster, safer, expanded access to markets could help companies grow faster or investors better manage risk and capitalize on opportunities, opening the doors to a new era of competition and innovation.

¹⁰ BNY Mellon, Digital Assets: From Fringe to Future, 2021

¹¹ ASIFMA, [Tokenised Securities](#), 2019

Chapter One: Asset creation and issuance - step one in transforming post-trade

How do we get there?

The key to transforming asset creation and issuance lies in tokenization and digitization and the ability to operate across disparate legacy systems and infrastructures, as well as digital exchanges. Smart contracts allow parties to define and agree on a process up front, creating transparent, multi-party workflows. With roles and responsibilities defined, terms embedded in the asset itself, and an accurate record, efficiency is injected into the process.

The entire workflow can be modeled within the functionality of the asset on the chain, and any asset can be tokenized as the bundle of rights and obligations with all involved parties and across the full lifecycle of the asset. Digital-native assets and dematerialized securities can benefit from these efficiencies, but the most significant benefit will come with paper-based securities—including securitized assets, equities/ETFs, private equity, and private debt, which were identified as the greatest area of focus and opportunity in a recent The ValueExchange survey.¹² Activities take place asynchronously, dramatically speeding up processing time and reducing cost and risk. Manual processes and constant reconciliation are left in the past, and opportunity takes the place of errors.

Interoperability is crucial to allowing issuance to integrate seamlessly with the emerging digital market infrastructure and the mosaic of local, regional, and global legacy systems within post trade today. Not all organizations will make the same technology choices or move at the same speed, so an underlying technology that can function across different systems, ledger providers, or infrastructures is essential to seamlessly manage issuance, allocation, and settlement.

Milestones on the journey

Across markets and traditional/new asset classes, explore how organizations are forging ahead to redefine issuance with tokenization and digitization.

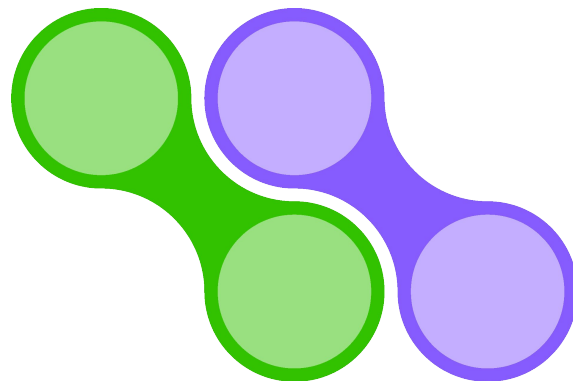
Project Promissa is tokenizing promissory notes for smarter central bank financing. Project Promissa is a project of BIS Innovation Hub, the Swiss National Bank and the World Bank, with eight participating central banks and the International Monetary Fund observing.

- Paper-based promissory notes, which form the backbone of international financing, are manually intensive and require extensive reconciliation and documentation. Tokenized promissory notes create more efficient, operationally secure instruments for central banks and multilateral development banks.
- Smart contracts and DLT simplify promissory note management, creating a single source of truth for all counterparties with embedded lifecycle events. Notes will be faster to issuer, easier to manage, and more transparent.
- Permissioned workflows and embedded privacy uphold data sovereignty and confidentiality. Users can only see information to which they are entitled. Each government and central bank gains enhanced visibility, with a view of all their notes outstanding across different international financial institutions.¹³

Project Promissa is “simplifying the process for making development money available for emerging and developing economies through international institutions.” This is currently “quite an arcane structure” with “piles of paper sitting in vaults across central banks, the World Bank, and receiving institutions across the world.”¹⁴

Cecilia Skingsley

Head of BIS Innovation Hub



¹² [Webinar: Tokenization Done Right](#), July 2022, Digital Asset, CBOE, and The ValueExchange

¹³ [BIS Innovation Hub, Swiss National Bank and World Bank launch Project Promissa](#), January 2024

¹⁴ The Atlantic Council, [BIS Innovation Hub head Cecilia Skingsley unveils new project with the World Bank](#), November 2023

Chapter One: Asset creation and issuance – step one in transforming post-trade

Goldman Sachs developed DAP®, its Digital Asset Platform, as an end-to-end tokenized asset infrastructure that supports the entire digital lifecycle across multiple asset classes on permissioned and public blockchains. Rights and obligations are embedded directly into the asset using Daml. This enables complete modeling of the functionality of the asset on the chain with a structural representation of cash flows, events, and rights and obligations of the entire ecosystem of participants interacting with that asset.

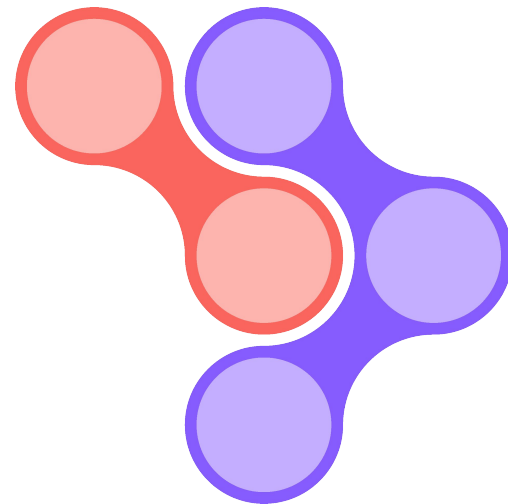
Goldman Sachs cut the time-to-value by using reusable, open-source building blocks. Since the initial delivery, DAP® has been used to issue more than \$205 million in bonds, reducing settlement time from days to seconds driving significant savings on issuance. DAP® has received multiple awards, including Euromoney's financial Innovation of the Year (2023).

Now Goldman Sachs plans to spin out DAP® – to become an industry-owned distributed technology solution. Its first strategic partner, Tradeweb, will include their trading and liquidity capabilities across fixed income to the platform to enable new commercial use cases.

Matthew McDermott, Managing Director & Global Head of Digital Assets, Goldman Sachs

"As we continue to build out our tokenization capabilities, we needed solutions that could rapidly capture the full complexity and diversity of assets at the heart of our business for both digitally native or tokenized traditional assets, and be interoperable across multiple blockchains."

"We view permissioned distributed technology as the next structural change to financial markets. Delivering a distributed technology solution to a wide cross-section of financial market participants has the potential to redefine market connectivity, infrastructure composability, and to deliver a new suite of commercial opportunities for the buy- and sell-side."



Updated February 2025

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Chapter Two Removing risk and inefficiency from **clearing and settlement**



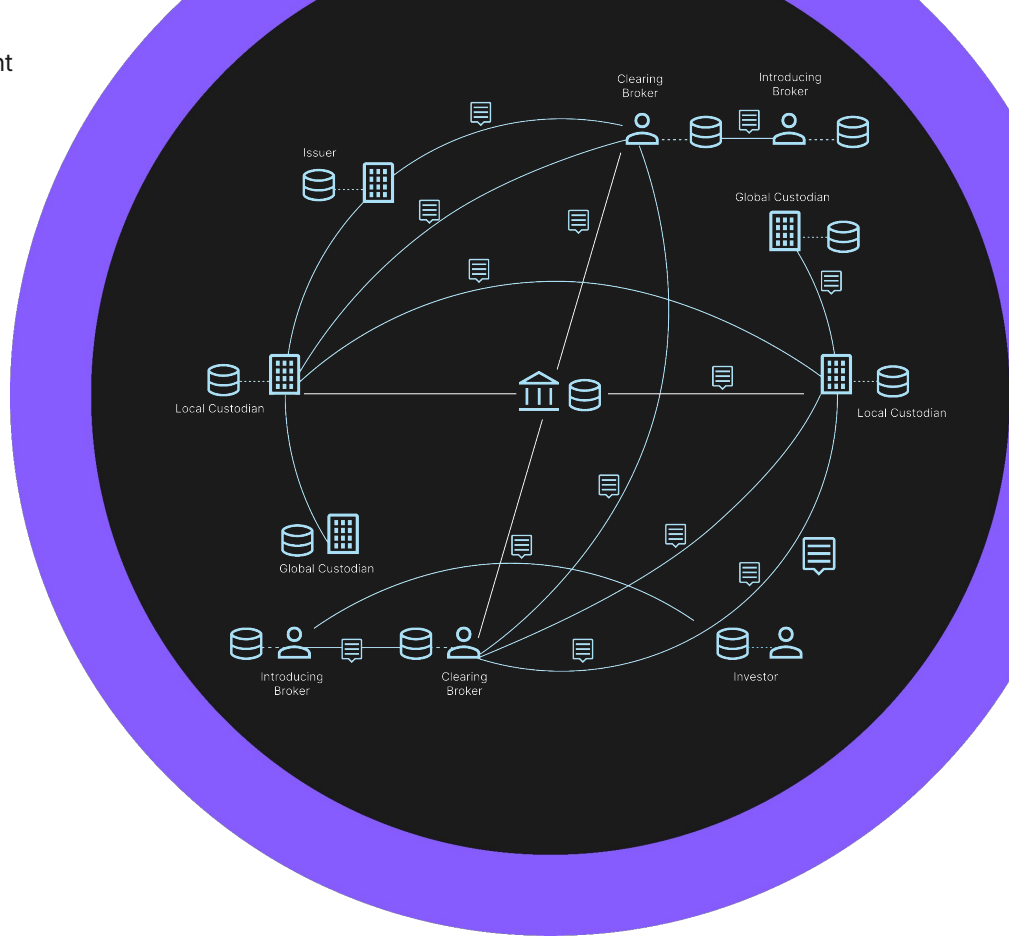
Chapter Two: Removing risk and inefficiency from clearing and settlement

Smart contracts and digital assets have the power to transform the critical steps that move a trade into the post-trade space. Although securities are increasingly digitized, clearing and settlement are only beginning to reap the benefits of digitization.

Despite significant changes over the last decade, clearing and settlement remain rife with inefficiencies driven largely by different regulations, jurisdictions, and the vast size¹ and complexity of the market. These include: A lack of transparent or agreed upon data; numerous agents and intermediaries validating and confirming another party's actions; sequential processes bound by time zones and restrictive cut-offs; and layers of controls that seek to mitigate counterparty, liquidity, and settlement risk in the system.

The unification of data and process within a digital asset can address many of these inefficiencies, since assets can be transferred or moved along with their reference data and lifecycle events. For clearing and settlement, smart contracts and the ability to complete process steps at the exact same moment also create the conditions to go beyond efficiency and remove risk, opening the door to lower expenses and capital costs.

¹ More than ~\$3,360 trillion worth of transactions took place, with quadrillions of securities processed and settled across major market infrastructures. (2020 totals) How is Blockchain going to disrupt Capital Markets? Lucas Schweiger, 27 August 2021



Chapter Two: Removing risk and inefficiency from clearing and settlement

Even the most straightforward clearing and settlement process involves multiple institutions and steps executed within strict timeframes. Additional requirements—from regulations, jurisdictions, or intermediaries—layer on processes and require constant oversight, adding significant complexity to the system.

Distributed ledger technology can streamline reconciliation processes and reduce complexity in securities settlement, ultimately limiting the need for multiple intermediaries, lowering exposure to replacement cost risk, and potentially mitigating the need for central counterparties through simpler, more direct holding systems.²

The combination of digital assets, smart contracts, and DLT could reshape clearing and settlement by reducing or even removing systemic challenges.

² Definitions and process details drawn from BIS: [On the Future of Securities Settlement](#), March 2020

³ BIS, [On the Future of Securities Settlement](#), March 2020

⁴ Capgemini, [Blockchain Disruption in Security Issuance](#), 2016

Challenges	Opportunities
<p>Risk, including settlement or principal risk as purchases are paid up front but account credits can be significantly delayed or the transaction could fail.</p> <p>Fails can take place at the clearing member, investor, or CCP.</p>	<ul style="list-style-type: none">• Smart contracts can reduce the ability to renege on contractual obligations³• Atomic settlement supports true DVP and PVP, reducing fails to deliver and associated high fees from custodians and for interest due or claims handling charges.• Full lifecycle automation can be baked onto the asset, including specific conditions, such as locking.• Repetitive actions can be eliminated across different platforms.
<p>Long clearing and settlement cycles cross time zones/market cut offs, creating financial costs, including the need to lock up assets in margin and collateral.</p>	<ul style="list-style-type: none">• Settlement time could be reduced to as little as 10 minutes vs. three days in the U.S. and two days in Europe—freeing up billions of dollars in collateral held against settlement risk.⁴• Atomic settlement allows auto execution of terms and conditions without manual intervention, providing transaction surety and lowering capital costs and systemic risk.
<p>Inefficiencies with multi-step, sequential, and chronological processes that increase cost, risk, and the potential for fails.</p> <p>Numerous intermediaries are involved: Investment managers, broker dealers/traders, exchanges, clearers/CCPs, custodians, payment banks, CSDs, and issuers (plus agents for securities lending and collateral).</p>	<ul style="list-style-type: none">• Multi-party, shared workflows.• Concurrent, asynchronous processing.• A significantly simplified process for all, streamlining dealings between required parties and reducing the need for intermediaries and time required for settlement.• Embedded reference data, terms and conditions combined with smart contracts that define roles and responsibilities.• Enhanced STP across different internal areas, other asset classes, partners, and clients.
<p>Multiple versions of the truth despite continuous, redundant reconciliations, internally and externally, which contribute to more intermediaries and higher costs.</p>	<ul style="list-style-type: none">• Single, synchronized ledger provides a golden source of truth that eliminates the need for constant reconciliation and confirmation of trade details between multiple back offices.• Accurate records streamline deliveries, support compliance, and could reduce overhead and the number of intermediaries
<p>Lack of transparency. Fragmented systems, manual processes, and redundant records make auditability, tracing, and observability challenging—a particular problem for highly regulated transactions.</p>	<ul style="list-style-type: none">• Observers and auditors have real-time access to data.• Visibility on where an asset is within the clearing and settlement process.• Immutable records show the full lifecycle, including traceability and provenance.• Enhanced regulatory control, with ability to capture and communicate trades in real time or aggregate positions across CCPs to identify systemic risk.

Chapter Two: Removing risk and inefficiency from clearing and settlement

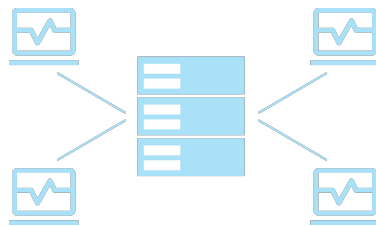
The impact could be profound: Applying blockchain to clearing and settlement of cash securities, equities, repo, and leveraged loans could reduce settlement risk exposure by over 99% and save \$11-12 billion.⁵ But the opportunity extends well beyond driving efficiency and decreasing cost.

Mind the gap: The case for atomic settlement

In traditional delivery vs. payment (DVP) settlement, a clearinghouse or other, independent third party typically facilitates the delivery of the asset in exchange for payment. Though often referred to as simultaneous, that is not accurate. In reality, this is a sequential process that is conditional on the delivery being made before the payment is released.

DVP reduces settlement and counterparty risk overall, but there is still a risk to the clearinghouse and additional time and cost from having other intermediaries involved. For bilateral payments, counterparty risk remains a significant factor.

"Blockchain-based multichain atomic swap technology will become a peer-to-peer alternative to a central clearing counterparty that normally facilitates the DVP settlement of financial assets."⁶



Atomic settlement solves those problems by breaking each complex transaction into its atomic components and settling them all simultaneously—truly simultaneously. All conditions must be satisfied before the transaction can complete, meaning both payment and delivery must take place according to terms set forth in the smart contract for settlement to occur.

Atomic settlement removes the delta between delivery and payment, or, for example, with a CCP, of incoming and outgoing assets that comprise current day netting processes. The knock-on effect is to eliminate the need for margin postings or credit extensions, ultimately lowering capital requirements.

Next-generation settlement: Committed (or locked) settlement

It's important to address inefficiencies to improve operations and sustain sound and healthy markets. Settlement risk is real and costly: Billions of dollars in collateral are held against settlement risk, and the DTCC estimates that a global failure rate of just 2% results in costs and losses of up to \$3 billion.⁷ Settlement can fail, be called into question, or be challenged because of the default or bankruptcy of one party.

"Committed Settlement locks may be used to provide certainty that secured assets will be transferred to a secured party on an enforcement event."

Linklaters, 2019

Is it possible to completely remove settlement and counterparty risk? Security pledges, control account agreements, and custodial account memo pledges were designed to do just that. However, these industry practices are rarely used, due to operational and/or cost challenges and cannot be scaled to accommodate individual movements of securities.

⁵ Capgemini, [Blockchain Disruption in Security Issuance](#), 2016

⁶ Forbes, [Will Blockchain Replace Clearinghouses? A Case of DVP Post-Trade Settlement](#), December 2020

⁷ [DTCC outlines path to reduce trade failures and increase security and efficiency of markets](#), April 2019

Chapter Two: Removing risk and inefficiency from clearing and settlement

Committed—or locked—settlement offers the potential for transformation. This innovative application by Digital Asset allows the secured party to be secured in a more efficient way. Assets can be locked at location, eliminating market movements and securities deliveries. They can also be locked to an intended recipient, making the creation and maintenance of control accounts simple, routine, efficient, and cost-effective.

Combined with the right legal framework, it can:

- Render the system incapable of obeying any instruction other than delivering the asset to the intended recipient.
- Be used to create a first, perfected security interest in that asset with the intended recipient as the secured party.
- Help identify safe-harbored transactions (e.g., securities loans) as exempt from the bankruptcy stay.

“A “digital lock” on an asset through Committed Settlement can provide an elegant technological solution for creating a dependable transaction and incentivizing compliance. A smart contract is utilized to control and automate asset flow, whilst DLT provides a trusted source of truth amongst parties.” (King & Wood Mallesons, 2019)

By locking the asset, its movement happens automatically, removing the potential for human or system intervention. Providing settlement finality completely eliminates settlement and counterparty risk. The seller is guaranteed to receive the agreed-upon funds and the buyer to receive the assets. Importantly, until that transfer happens, the owner remains the legal owner.

The technology exists to achieve this. However, it is only valid if it can stand up in court during bankruptcy proceedings. Digital Asset has worked closely with legal experts in major markets, who have confirmed the ability of committed settlement to evidence certainty of settlement finality and stand up to respective bankruptcy laws. Opinions from Linklaters, King & Wood Mallesons, and Milbank LLP show the feasibility of financial markets to utilize committed settlement within the frameworks, respectively, of English, Hong Kong/Australia, and U.S. Law.

The opportunities of committed settlement

Locking the assets immobilizes them, allowing them to be used for one action and one action only. This removes the risk, which decreases associated margin and capital requirements. It also delivers significant operational benefits, including the elimination of duplicative settlement instructions and significant reduction of reconciliation and verification activity. Transparency is improved with an immutable, real-time record of all transactions across all accounts at the ultimate beneficial owner level, enhancing auditability and regulatory compliance. Looking ahead, the ability to lock assets unlocks other opportunities:

- An asset can be locked for the entire duration of the settlement process or could be locked closer to the settlement date. For example, an asset that is due to settle in three days could be lent out or used as collateral for two days, with a smart contract that guarantees its return in time for settlement in accordance with the original trade. A delay in locking introduces risk, but that risk premia could be priced into the transaction.
- Locking could reduce settlement time by removing layers of validation and reconciliation by intermediaries. With surety of the asset, the parties could agree to an earlier exchange with confidence that both asset and cash will move automatically and simultaneously as the transaction completes.
- Assets could be locked for particular purposes. For example, the asset could be locked to the transfer while the actions required to service it remain accessible, simplifying corporate actions over record date.
- Safeguards can also be put in place. A contract could specify that if the asset is not transferred within a certain period, then the lock will ‘expire’ and the original owner will retain possession.

Chapter Two: Removing risk and inefficiency from clearing and settlement

Asset locking has the potential to transform settlement and downstream activities such as collateral management and securities lending, creating new revenue opportunities and reducing costs with a streamlined process.

Industry pioneers are already tackling clearing and settlement inefficiencies

Several initiatives are underway to improve clearing and settlement, creating opportunity by simplifying a multi-layered process built up over time. While most initiatives are asset class or region specific, they are already creating measurable change.



HKEX created Synapse, a straight-through post trade process with trade level privacy, to improve access to the HKEX Stock Connect program. Investors trade China-listed A-shares via Stock Connect, but out-of-time-zone participants faced a tight settlement cycle that placed exceptional reliance on local custodians and introduced unique settlement risks. Fully integrated into HKEX's CCASS system, the Daml-driven workflow accelerates processing, eliminates errors, and decreases settlement risk.

"Synapse will be of major benefit to global investors when they trade through Northbound Stock Connect."

Charles Li, Chief Executive (2010 - 2020), Hong Kong Exchanges and Clearing

These use cases demonstrate the power of amplification and interconnection. Applications that can interact with one another—forming and expanding networks—go beyond solving specific problems to create vast possibilities for customized service offerings, while still ensuring appropriate controls.

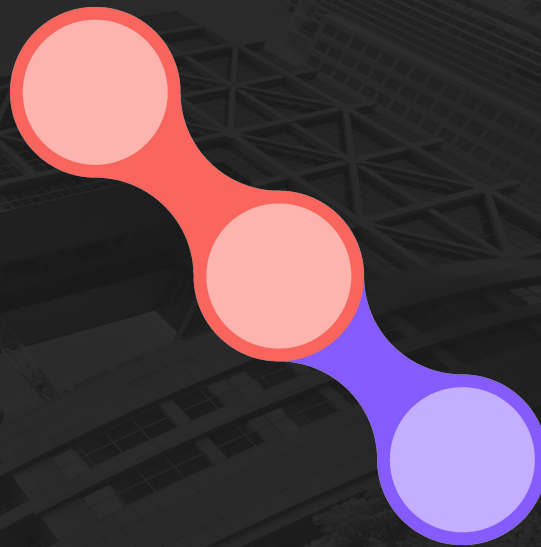
Global markets demand interoperability. Traditional assets and legacy platforms will coexist with digital assets and digital platforms for some time, and not all institutions will make the same technology choices or proceed at the same speed. It's critical that the underlying technology can function across different systems, market infrastructures, and ledger providers or infrastructures. Only then can global markets remain global.

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Canton

The Digital Catalyst
for Post-Trade Transformation

Chapter Three Safekeeping and the shift to composable **custody services**



Chapter Three: Safekeeping and the shift to composable custody services

We've discussed how digital assets improve the issuance and asset creation process and how, in combination with smart contracts, they can enable true, simultaneous settlement with atomicity and remove counterparty and settlement risk completely through committed settlement.

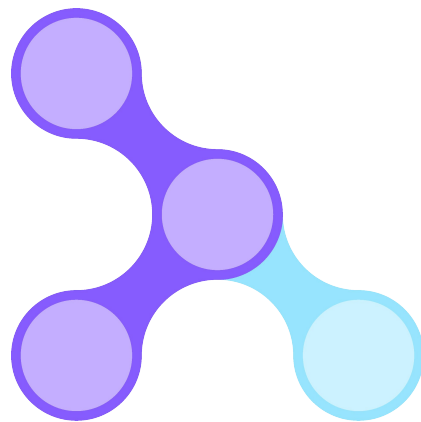
Attention turns now to custody; more specifically, to the service and processes of safekeeping.

Safekeeping global investments requires a complex arrangement of services provided within and across individual markets, with a host of follow-on services that are enabled by holding assets in an account. Safekeeping shares the same difficulties as other post-trade services: data opacity, the lack of a golden record, multiple intermediaries, sequential processes, time zone challenges, and so on. Yet safekeeping also has some unique challenges, which are only exacerbated with the move to T+1, and even T+0, settlement.

Custodians strive to deliver a consistent investor experience over assets held in multiple markets with different rules and regulations, and to manage risk and liability while still supporting clients' trading activities. A global custodian works with local custodians (sub-custodians) who have direct control over the end-user client assets under custody (AUC) and hold accounts at the in-country central securities depository (CSD) or central bank. Although the global custodian has only indirect asset control, they have the burden of direct—often fiduciary—liability over the AUC, including associated capital costs and risk.

"The concept of control is recognized as a crucial common thread helping to determine whether an asset, regardless of technology employed, should be considered held in custody or not by a service provider. A service provider that is exercising control over the asset to the exclusion of others is generally acknowledged as having 'custody' of the asset."¹

Digitization enables a profound shift in how safekeeping services can be delivered: First, through the unification of data and process within a digital asset; second, with the ability of atomic or committed settlement to mitigate or eliminate counterparty and settlement risk; and third, with new flexibility offered by composable services.



¹GDF, ISSA and Deloitte, [Digital Asset Custody Deciphered](#), 2023

Chapter Three: Safekeeping and the shift to composable custody services

Custody and safekeeping defined

The traditional custody market is massive: as of year-end 2024, the five largest global custodians had more than USD \$176 trillion dollars in AUC.² The size of the market, volume of transactions, and breadth of market coverage are key drivers of operational complexity.

- Custodians are responsible for safekeeping their clients' assets in physical or electronic form, processing and settling associated transactions, and servicing the assets across multiple markets. This requires extensive relationships with local or sub-custodians.
- Investors rely on a global custodian for access to global and local markets and their ability to deliver services through economies of scale. These include value-added services such as collateral management and securities lending, which are enabled by virtue of holding the assets.

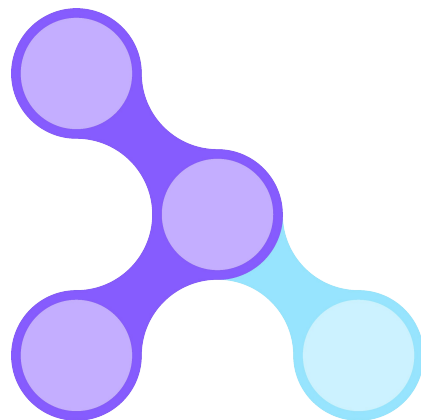
Digital asset custody differs in that the custodian is primarily responsible for safekeeping the key that allows the digital assets to be cryptographically secured. There are multiple options for storing the investors' private keys to safeguard the digital assets, each with distinct benefits and disadvantages. New alternatives will continue to evolve as digital custody solutions keep pace with a rapidly growing market: at USD \$4.3 Bn in 2022, the digital asset management market is expected to reach USD \$15.2 Bn by 2032.³

"A major and further growth driver for this (digital asset custody) market depends on the industry's ability to meet institutional investor's expectations that the digital assets in their portfolio will have certainty that their ownership rights are protected and preferably the same level of protection that exists with their traditional asset classes."

Digital Asset Custody Deciphered, GDF, ISSA and Deloitte, 2023

² [Posttrade360](#), January 2025

³ [Global Newswire](#), March 2023



Chapter Three: Safekeeping and the shift to composable custody services

A bridge to span digital and traditional

The rise of digitally native assets and tokenized securities, coexisting with traditional assets, requires safekeeping that can accommodate both types of securities. No investor, and no service provider, will want to maintain two separate sets of technologies, processes, and workflows in perpetuity, particularly when the infrastructure supporting digital assets delivers such significant efficiencies and benefits.

A recent BNY Mellon|Celent survey found that 91% of institutional investors are interested in investing in tokenized products, and 70% of respondents would increase their digital asset activity if services like custody and execution were available from recognized, trusted institutions.⁴

Challenges	Opportunities
Risk , due to mismatches in market conventions, settlement timeframes, market events, or the chain of control over an asset	<ul style="list-style-type: none">Eliminating manual reconciliation and materially reducing fails becomes an operational imperative with expedited settlement.Committed, atomic settlement enables settlement to be accelerated or delayed from market-agreed timeframes. Settlement also becomes flexible and can occur at any point during the day with finality.With true DVP and PVP and no fails, custodians no longer need to provide intraday liquidity to counterbalance mismatches between securities delivery and receipt of funds.The ability for an asset to be held and controlled by the beneficial owner, with its actions governed by the terms of a smart contract, removes the need for assets to be held in-country and thus subject to unique risks such as closed markets, frozen assets, etc.
Constant regulatory and policy changes ; speed of adoption	<ul style="list-style-type: none">Market and regulatory rules can be embedded in the asset or included in the smart contract.Changes to those rules can be federated across applicable assets and providers to take effect more quickly and with greater certainty.
Difficulty creating or servicing new instruments , and integrating them with existing books of business, entering new markets or offering new services	<ul style="list-style-type: none">Digital assets can be created more quickly and serviced within the DLT framework, and the integration of traditional assets over time will create a more efficient and synchronized process.The DLT framework can rapidly scale and support new asset types since the underlying infrastructure does not need to change.Asset-specific rules can be embedded within the asset's reference data.Market conditions and eligibility can be governed and validated using smart contracts.An improved operating system will enable more services to be offered to more clients, with fewer cost, resources, credit, or risk pressures.Composability enables the creation of networks and partnerships with other providers, creating flexibility to access value added services without full integration with existing legacy technology.
Costs , stemming from redundant and repetitive processes or lack of control during market movements	<ul style="list-style-type: none">Market movements and the duplication of processing between global and local custodians is the single largest driver of cost in safekeeping. Digital assets do not need to be moved, significantly reducing cost.If manual reconciliations decline or cease, staff resources and costs can be dedicated to higher value activities.The capital held as insurance against the inherent risk of market moves significantly diminishes, even as control over the security increases with an unbroken chain of control.

⁴ BNYM and Celent, [Institutional Investing 2.0 - Migration to Digital Assets](#), 2022

Chapter Three: Safekeeping and the shift to composable custody services

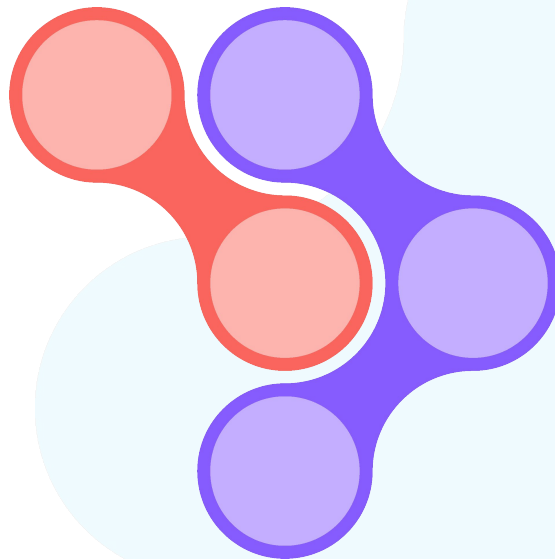
The combination of digital assets, smart contracts, and distributed ledger technology (DLT) can modernize safekeeping to manage assets at scale and allow for a low-to-no-fail settlement process, accommodating major market shifts and addressing long standing challenges.

With the move to T+1 or even T+0, the shrinking window between trade and settlement date will not provide enough time to resolve errors. Simply adding more resources will not suffice; instead, the root causes must be addressed to prevent fails and errors, minimize downstream problems, and avoid penalties.

With DLT, a shared, golden source of data removes the potential for costly mismatches, delays and fails. It eliminates the need for duplicate reconciliation and sequential, manual processes that market participants undertake today – ultimately reducing the high costs and operational risk of managing transactions across different markets and time zones.

“Removing half the time allowed for settlement will mean a more profound need to ensure everything is instructed correctly [the] first time. Automation should be a prerequisite for a T+1 environment to ensure exception management is limited and there is as little risk of trade failures as possible.”⁵

A unified safekeeping model addresses the twin challenges of control and speed. Digital, tokenized and traditional assets are supported by a DLT-driven custody model, creating a more efficient and transparent system. At the same time, smart contracts enable asynchronous processing, removing the challenge of different time zones and multiple intermediaries and enabling faster settlement.



⁵ S&P Global Market Intelligence, [The move to T+1: Who really benefits?](#), May 2022

Chapter Three: Safekeeping and the shift to composable custody services

The dawn of digitized safekeeping

Systemic shifts to safekeeping will largely be driven by upstream changes in issuance, clearing, and settlement. Custodians are already seeing changes as demand to safekeep digital assets rises (bringing new digital custody competitors) and the impracticality of sustaining different operating models becomes clear.

With a view to what's on the horizon, Digital Asset has developed a range of solutions for custodians, providing value to current providers seeking to support the digital assets of their existing institutional relationships, or to emerging competitors staking a claim in a rapidly-changing ecosystem.



The extensibility and interoperability of Daml-based solutions allows custodians to solve specific issues and connect them to other solutions to derive greater benefit. For example, a solution that automates workflows and abstracts key management to eliminate operational risk could be connected to a solution that provides direct asset control with a single book of record for AUC and assets identified on-ledger in segregated accounts. Even if developed independently, a custodian's future-state model could link these and other workflows to create a unified and digitized model of safekeeping that addresses the challenges outlined above, without the need to replace legacy systems. [Learn more about Direct Asset Control on the next page.](#)



To support custodians who use different safekeeping models, we have developed a library of reference applications. These can be used to address specific needs or jump-start a transition to an integrated and streamlined model that spans multiple markets and can support digital, tokenized, and traditional assets. As an example, our direct asset control reference application can kick-start development of a Daml-based custody and safekeeping solution. This enables direct control over client AUC with a single system of record, reducing the cost and risk associated with a bifurcated, global-to-local custodian model, and preserving the provision of local market expertise.



With modules for market setup, instruction receives/delivers, eligibility, settlement instruction, settlement, and reporting, the custodian can accelerate their ability to adapt and respond as safekeeping requirements shift. Further, this component-based approach facilitates the development of new, composable services and enables the creation of networks of providers, creating a new paradigm for safekeeping and post-trade services in the digital era of global investing.

Updated November 2024

CASE STUDY - Direct Asset Control creates a new paradigm for network management

Within post-trade, global custodians rely on a web of sub-custodians to manage investor assets in local markets. Commonly referred to as network management, the obligations and rights of each party are spelled out in legal agreements. To safekeep, manage and service the asset, control passes between the global and local custodian using a set of long-established set of processes that nonetheless results in risk.

Smart contracts and distributed ledger technology (DLT) address these risks while the emergence of public-permissioned blockchains that allow custodians and sub-custodians to connect offers a new paradigm for network management.

In particular, workflows created with Daml and Canton technology offer an alternative to traditional handoffs with the ability to assign rights and permissions for certain actions to different users, and connecting those users in a blockchain network with transactional interoperability. Within safekeeping, using Daml and Cantons to assign direct control over a client's asset offers a way to manage the control issues inherent in the custody/sub-custody model.

The complexities of managing assets in global markets

For context, it's important to briefly look at the relationships, roles and responsibilities of custodians and sub-custodians. Custodians hold investors' assets in the markets where they invest, and each market has its own rules and regulations that apply to those assets whether they are held physically in that country or not. Since not every custodian will have a presence in every country where they are managing investments, custodians utilize a network of sub-custodians for local market expertise and execution.

Local custodians are important - they understand the local tax laws, how issuances are brought to market and corporate events are structured and elected, how the Central Bank and Central Securities Depository (CSD) work, and the ins-and-outs of managing securities and payments. The custodian/sub-custodian model provides an efficient blend of expertise to facilitate global investing.

However, like many post-trade processes, it's not completely efficient. Creating, holding, moving and servicing assets relies on a patchwork of disparate systems, which generally operate in silos. The technologies have evolved over time and were never designed to work with each other - other than via messages being passed between them. As a result, every time a new role or responsibility is inserted into the process, more steps, reconciliations, handoffs, processes, systems and controls are added. This happens nearly constantly, given new business requirements and asset classes or evolving regulatory requirements.

Control is paramount

For a sub-custodian to manage assets in the local market, it has to have direct control over the end-user client assets under custody. The local custodian holds accounts at the in-country CSD or central bank. This means the global custodian only has indirect asset control yet must trust (and often provide risk assurances) that the local custodian will safekeep the asset(s) in a way that meets fiduciary and regulatory standards.

Any transfer/movement of an asset creates risk. When control of an asset shifts from one provider to another, that risk is multi-faceted: the asset passes through separate, disparate legal entities, companies, and workforces, all woven together with procedure and process, often manually. The ability to handle that transfer effectively, if not with complete efficiency, is one of the major selection factors a global custodian uses when selecting a sub-custodian. After a stringent due diligence process, the global custodian monitors and manages their sub-custodians carefully to maximize efficiency and minimize risk.

Regulators have paid increasing attention to where, when and how things might fall between the cracks as control of an asset moves from one party to another, and to the custodian/sub-custodian relationship overall. That's why we've seen fiduciary standards that go beyond the prudent person rule: to paraphrase - 'Do for me what I would do for myself'.

Case study: Direct Asset Control (continued)

Standards include the financial strength, regulatory oversight and risk assessment required of a foreign custodian and sets forth the conditions under which a global custodian is responsible for client assets - for example:

- regarding how a US mutual fund can deposit its securities in a securities depository located outside the US ([SEC Rules 17f-5 and 17f-7](#));
- requirements that customer securities and funds be segregated from a firm's own assets in order to protect them ([FINRA Exchange Act Rule 15c3-3](#)); and
- the need for custodians to prevent the loss or diminution of client assets ([Financial Conduct Authority](#)).

The US SEC [proposed new safeguarding rules](#) in 2023 that expanded the scope of how custody is defined, imposed a wide array of new requirements on qualified custodians, and went beyond funds and securities to include digital, crypto and other assets. And regulation continues to evolve.

Global custodians are now financially responsible for lost or stolen assets (and in some cases, even when the assets are inaccessible due to governmental or market actions), and can also be responsible for the solvency of the sub-custodian as it relates to client assets. The need to hold additional capital is one result of that direct liability.

Even when a custodian excels at choosing sub-custodians and their sub-custodians provide services at a high level of expertise, dynamic global markets make it impossible to adequately prepare for every circumstance. During the 2010 Arab Spring, for example, assets were frozen and markets were closed in Egypt and other countries. Neither investors nor global custodians could get control over their assets.

More recently, investors have been affected by global sanctions imposed following Russia's attack on Ukraine, resulting in frozen assets, suspended trading, and/or the inability to transact in certain securities. In scenarios like these, when access to assets is materially impaired or frozen, the global custodian is at risk under current regulations.

Over time, layers and layers of process-heavy operating models and governance have arisen to remediate these scenarios and mitigate the risk. Unfortunately, technology has not risen to meet the need given the level of fragmentation that exists with the current patchwork of systems.

Even after stringent risk mitigation practices have been deployed, custody risk is not fully avoided. Absence of established and proven legal frameworks, country risk events (such as freezing of assets) and participant insolvency are amongst the risk factors that need to be considered.

ISSA, [Inherent Risks within the Global Custody Chain](#), 2017

Case study: Direct Asset Control (continued)

Smart contracts - a better way to transfer control

While the protocols and safeguards that have been put in place are effective, we now have a technology that matches the current understanding of risk and necessary controls. Smart contracts and DLT offer a fit-for-purpose solution that addresses the issue of control and materially reduces risk.

Using smart contracts, control of the asset can be retained by the global custodian while the sub-custodian is permitted to take certain actions. The sub-custodian can manage a delegated section of the workflow, acting on or making decisions about the asset for a certain set of conditions and responsibilities that align to the expertise and local market knowledge they provide.

“The concept of control is recognized as a crucial common thread helping to determine whether an asset, regardless of technology employed, should be considered held in custody or not by a service provider. A service provider that is exercising control over the asset to the exclusion of others is generally acknowledged as having ‘custody’ of the asset.”

Digital Asset Custody Deciphered, GDF, ISSA and Deloitte, 2023

The benefits are significant:

- Market movements and the duplication of processing between global and local custodians is one of the largest cost drivers in safekeeping. Digital assets do not need to be moved, significantly reducing cost.
- The ability for an asset to be held and controlled by the custodian or beneficial owner, with its actions governed by the terms of a smart contract, removes the need for assets to be held in-country and thus subject to unique risks such as closed markets, frozen assets, etc.
- Aligns the control of the asset with the financial, contractual and regulatory obligation of the global custodian without sacrificing the value added by the sub-custodian, which provides local market expertise and acts on lifecycle events such as tax and corporate action processing.
- The capital held as insurance against the inherent risk of market moves significantly diminishes, even as control over the security increases with an unbroken chain of control.

With this Direct Asset Control, the custodian maintains control of the asset – radically simplifying the process and removing the need for many of the associated operational and capital safeguards.

Importantly, Direct Asset Control can be used on either digitally-native or tokenized traditional assets. The key is in the smart contract, which defines the roles and permissions of various actors within a multi-party workflow.

Case study: Direct Asset Control (continued)

A different kind of network management

Within many custodians, 'network management' typically means the management of the sub-custodian network. With the emergence of Canton Network, network management can take a quantum leap into the future with the ability of custodians and sub-custodians to connect on a public-permissioned blockchain and 'network of networks'.

- The global custodian can have a network of all its sub-custodians
- The sub-custodian can have a network of all its global custodians.

Using the Global Synchronizer, these networks can connect and interoperate to create a new kind of network management. Global Synchronizer is a decentralized and native infrastructure, unlike message-based integrations or bridges (and their associated risks). It coordinates atomic, operationally risk-free transactions across independently-operated permissioned blockchains.

DLT also creates additional efficiencies, allowing custodians and sub-custodians to federate changes out to their networks quickly and easily.

This new 'network management' on Canton can reduce risk for every individual custodian and sub-custodian, while delivering significant efficiencies with multi-party workflows and golden-source data that simplifies operations and removes onerous and repetitive reconciliation across ledgers and entities. Regulatory oversight is also improved, with transparency, immutable records, and full auditability.

Smart contracts, DLT and the Canton Network can transform custody and safekeeping by addressing the challenges of asset control.

Read about the [Canton Network Pilot](#) and the [Global Synchronizer](#).

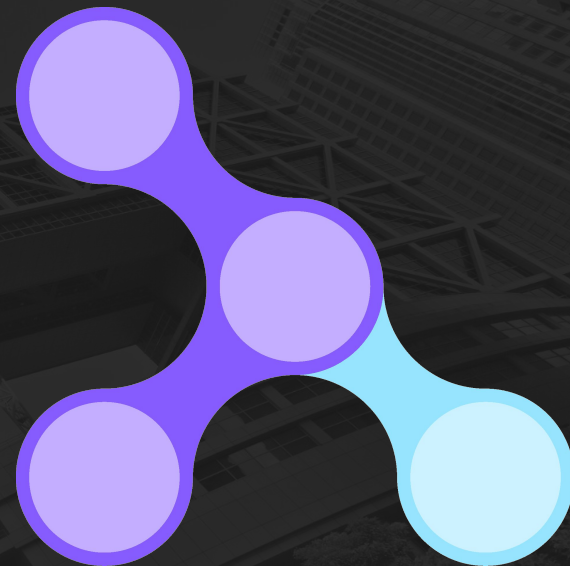
Learn why a public-permissioned blockchain allows for [control and connectivity in regulated markets](#).

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The Digital Catalyst
for Post-Trade Transformation

Chapter Four Reimagining the high-stakes, expensive problem of **asset servicing**



Chapter Four: Reimagining the high-stakes, expensive problem of asset servicing

In addition to [safekeeping](#), custodians are responsible for providing services on the assets they hold for the benefit of their investors. Asset servicing generally includes managing corporate actions, class actions, income processing, proxy voting, and tax reclaim. Although the need for transformation has been discussed for years, asset servicing remains surprisingly manual and/or is reliant on aging systems – in 2022, bank and broker corporate action systems were 9 years old on average.

From issuer notification to capturing investor preferences, legacy systems, data issues and limited standardization result in errors and increase investors' asset servicing costs by 23% per annum. The impact is substantial, particularly when you consider that indirect pass-through costs are likely multiple times that value.



STP rates for mandatory and income events reach only 71%, and are less than 40% for voluntary events.

Inefficiencies and manual processes in back offices are common and costly, with data consistency and lack of clarity on event details cited as leading problems. Despite sourcing and validating data from up to 7 different data feeds – a significant allocation of financing and resourcing – data is the root cause of 56% of corporate actions errors.³ Against this backdrop, consider that data is proliferating; data costs are rising rapidly; talent is getting



Asset servicing errors cost market participants an average of US \$3.42m annually, and make up approximately 10% of annual operating costs for brokers.

harder to find and retain; and voluntary events are growing exponentially as issuers create new options for investors. Rising volumes only exacerbate asset servicing issues, and the largest investment markets in the world are growing most quickly. As just one example, North American portfolios have grown by 48% YOY⁴ so the 3.7 million event announcements processed in 2023 by holders of American securities⁵ are likely to increase by ~50% in 2024.



Error rates of 3-10% are routine – a level that would be unacceptable anywhere else in capital markets.²

With recent regulations (such as SRDII) requiring shareholders to more actively participate in governance, investors are paying more attention to corporate actions, particularly stewardship and ESG issues.

EY notes that “98% of investors said their stewardship in 2024 would focus as much on material environmental and social matters as in 2023.” A majority of investors say they want companies to prioritize climate change and environmental stewardship, and 67% of investors will make those topics the focus of their engagements with companies.”

What directors need to know about the 2024 proxy season, EY, February 2024

¹ The ValueExchange, [LegacyTech: A case for post-trade transformation](#), 2022

² All data in this section from The ValueExchange, [Asset Servicing Automation 2024](#), October 2024

³ The ValueExchange, [Corporate Actions 2021: From issuer-ready to investor-ready](#), 2021 and [Asset Servicing Innovation](#), 2020

⁴ The ValueExchange, [Asset Servicing Automation 2024](#), 2024

⁵ DTCC, [The Hidden, Rising Cost of Corporate Actions](#), May 2024

Chapter Four: Reimagining the high-stakes, expensive problem of asset servicing

The particular challenges of corporate actions

Within the themes explored in our earlier post-trade chapters, COACs have some unique attributes.

Unclean, untrusted data	Manual, risky & error prone	Complex, conditional processes
Data from many sources, at significant cost. Even when the pieces are put together, there may be no clear picture.	The various data sources must be manually validated and rekeyed. Peak event periods only increase the pressure.	More complex products and rising voluntary events. More active governance by investors.
Inadequate record keeping	Multiple intermediaries	Tight timeframes
Hard to identify ultimate beneficial owners (UBOs). Impacts notification, vote tabulation, and reporting.	COACS involve issuers, brokers, CSDs/exchanges, custodians, managers, asset owners, and more. Risk rises at every step.	Deadlines back up through the chain of participants, giving investors little time to have their voices heard.

Given failing trades and settlement penalties, combined with audit, regulatory, and reputational risk, it's no wonder that COACs have come into sharp focus.

Many firms are looking to change their systems to reduce manual processes and associated operational costs. Messaging automation can help: following SRDII implementation in Europe, 71% of AGM and EGM announcements are distributed in ISO 20022 or ISO 15022 formats. However, while outbound messages may be more standardized, inbound communications from investors have been less affected and remain fragmented.⁶

To date, efforts have focused on better managing processes without addressing the core issues. With rising volumes and more complex events, that won't be enough.

"47% of the market now plans on running transformation projects in this space. Not only is corporate action change the largest area of industry transformation today—it is also the most urgent."⁷

Barnaby Nelson, The ValueExchange

⁶ The ValueExchange, [Asset Servicing Automation 2024](#), 2024

⁷ The ValueExchange, [LegacyTech: What is the change?](#), 2022

Chapter Four: Reimagining the high-stakes, expensive problem of asset servicing

Eliminate, not manage: The promise of digital assets

Market forces are already driving the tokenization and digitization of assets to develop new types of securities, reach more investors, and improve trading and settlement. This inevitably creates benefits in the asset servicing space that, ironically, may prove bigger than the benefits on the front end.

When you set up the digital expression of an asset or create a digitally native asset, its data and lifecycle events are intrinsic components. They remain together even during transfers and moves. As such, asset servicing information no longer needs to be gathered from external sources or validated.

This creates a true paradigm shift. All the costs and risks associated with multiple data sources, cross-checking, rekeying, interpreting, and reconciling simply evaporate. When assets include built-in information and events, there's no scope for the data to be unknown or distorted.

The benefits begin to flow throughout the entire process:



The time needed to process COACs could shrink to minutes (from days or even weeks for complex structured products) with a complete and transparent audit trail. Every step of the downstream and upstream flow of information is transformed: Fewer intermediaries are needed, repetitive data validation at every step is removed, and the only cut-off time that matters is the one set by the corporation. Investors have immediate access to the COAC as soon as the issuer publishes it to the blockchain, and they can take action on it right up until the deadline.



Tokenization solves the pernicious problem of identifying owners (including underlying beneficial owners), along with the processes and systems built up over time to communicate with those owners, secure their votes, or manage payments. Issuers are legally obligated to inform all legal owners and, where required, to collect votes through a chain of stakeholders. With atomic transactions, the owner of record is clear at any moment. Even if ownership changes shortly before a deadline, a digital COAC or proxy process can render the action of a prior owner obsolete and allow the new owner to participate.



Safekeepers no longer need to manage the data or operational risk associated with COACs or hold capital against errors. Risk remains, of course, but is solely with the issuer, technology, or investor.



A simplified process encourages more investors to take part in proxy voting, becoming more actively engaged in governance and achieving ESG goals. Although retail investors own 31.5% of all shares, they voted only 29.6% in 2023 while institutional investors' voting participation was 80%.⁸



The traditional pain points associated with class actions and tax reclaims, long recognized as massive and manual data exercises, also disappear. It becomes worthwhile for investors to participate and recapture all potential benefits or payments from class actions, while embedded tax rules can be compared with investors' residency status to create opportunity for relief at source.

⁸ Broadridge, [Dear Board: Individual shareholders are vital](#), 2023

Chapter Four: Reimagining the high-stakes, expensive problem of asset servicing

Beyond embedded data and lifecycle events, the impact of digitization on clearing, settlement, and safekeeping also can drive further efficiencies and reduce exposure. Atomic or committed settlement mitigates or eliminates counterparty and settlement risk, and an unbroken chain of control removes operating and liquidity risk (and their associated costs) from the process. Services become digitized and composable, removing the necessity for safekeepers to offer a full value chain of services simply because they hold the assets.

The seminal change is the ability to delegate responsibility over specific workflows within a digital process. The safekeeper could continue to manage corporate actions as an agent with permissioned responsibility over that portion of the workflow, or they could form or join new service partnerships and networks.

Steps on the journey and a glimpse of the destination

Digital Asset has created several asset servicing reference applications to demonstrate the impact of smart contracts and distributed ledger technology and accelerate implementation and adoption.

For corporate actions, the lifecycle data is stored with the asset, visible to participants and updated in real time as a golden-source record. All participants are notified as new events occur. Only the registrar has complete visibility to both owners (including UBOs) and their elections. A number of use cases have been explored, including dividend payments, renounceable rights (which can be traded), and bond servicing (calls/coupon payments/redemptions).

"With digital securities, smart contracts, and a distributed, synchronous ledger from front to back, you rip out 30 to 40 years of inefficiencies.

You are genuinely talking about removing hundreds of billions of dollars in risk and associated countermeasures designed to remediate that risk."

Barnaby Nelson, The ValueExchange

For proxy voting, the entire process is managed on a blockchain via smart contracts with clearly defined roles and permissions. Steps include meeting initialization, ownership record loading, voting rights allocation, proxy assignment, voting, meeting management, and post-meeting actions.

With the systemic issues inherent in asset servicing resolved, we could see a totally different, more sophisticated relationship between companies and investors. Communication becomes more immediate, and each side gains visibility into the actions and intent of the other—a sharp contrast from today when both parties are totally blind to one another.

Investors become more confident that they are realizing all the benefits of their investments and that their priorities are heard, while corporations get greater insight into the priorities and behaviors of their investors, which could lead to new investment products and enhanced opportunities for all parties.

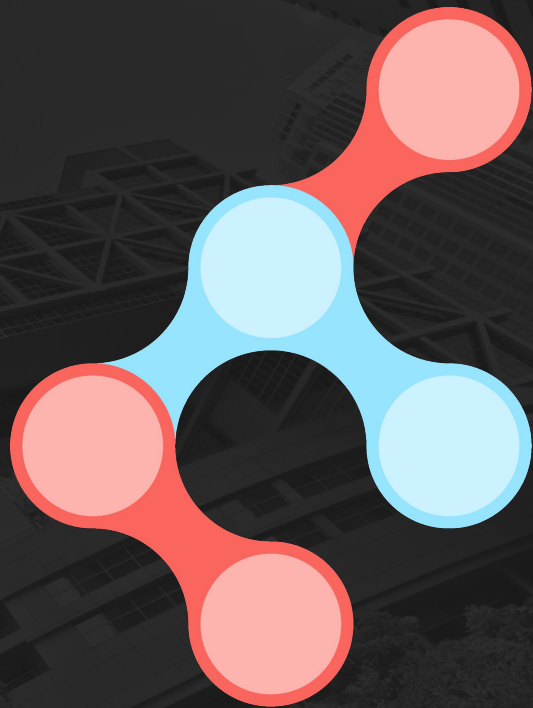
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The Digital Catalyst
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Chapter Five

Achieving **global collateral mobility**
with tokenization of real-world assets



Chapter Five: Achieving global collateral mobility with tokenization of real-world assets

One of the earliest use cases for blockchain, collateral is once again at the fore, and for good reason. Designed to reduce counterparty and settlement risk in the system, this interconnected set of activities has its own set of operational risks and capital impacts. Collateral is used broadly – it is posted for securities financing and trading, secures asset-backed instruments and loans, and is held against inventory transfers. Rising demand has been fueled by regulatory changes, many of which focus on capital and liquidity, resulting in an ever-increasing appetite for high-quality liquid assets.

While the types of transactions requiring collateral, as well as the required amounts and quality of collateral, have increased dramatically in the past two decades, only a small portion of assets are being mobilized today. SIFMA data shows a \$255.7 trillion universe of marketable securities¹, yet the global collateral market is just \$28.4 trillion.²

Tokenization could change this significantly, by improving asset visibility and mobility. Digital assets are already affecting the post-trade value chain, causing fundamental changes that have the power to reshape collateral management. First, more assets can be used to meet obligations and more transactions can be collateralized. Second, collateral can be deployed more efficiently, with the optimal collateral allocation as and where it's needed around the globe, allowing collateral obligations to be met 24/7 and boosting securities financing. Finally, collateral use can extend beyond post-trade and financial services to a broader set of use cases.

Managing collateral: a multi-faceted challenge

Today's collateral management is a critical daily activity with risk and capital implications. The complex process involves numerous partners and handoffs—from client, to custodian, to exchange or CSD, to collateral agent, and the ultimate collateral providers and receivers—and faces restrictions in terms of time, liquidity and acceptable assets.

Purely from an operational point of view, collateral management is challenged by:



Limited real-time asset and inventory data, making it difficult to optimize collateral to satisfy regulatory requirements and address capital and balance sheet scarcity



The need for meticulous eligibility testing and monitoring, to ensure collateral meets parameters set by counterparties or specific regions. That complexity only increases as ESG screening becomes more prevalent. Ultimately, collateral valuations can also be affected by ESG, as assets with a favorable ESG rating could be more desirable and liquid.³



Different settlement times and market cutoffs, making it hard to seamlessly move collateral between time zones and geographies.



An ever-expanding roster of collateralized trades, creating increased demand for the volume and range of high quality liquid assets (HQLAs).



Regulatory changes, including the new SEC requirement to centrally clear treasury and repo trades in the US \$26 trillion Treasury market by mid-2026, continue to reshape market requirements, workflows and meet demand for greater transparency



Inventory restrictions, with assets held at multiple custodians or at a location where they cannot be readily accessed or used as collateral.

¹ SIFMA, [2024 Capital Markets Fact Book](#), July 2024

² [Finadium](#), August 22, 2024 (Euro to USD conversion based on that date)

³ [Eurex, The role of ESG ratings for collateral](#), March 2023

Chapter Five: Achieving global collateral mobility with tokenization of real-world assets

Collateral agents can mitigate the operational burden of constant monitoring, oversight, collateral movements, and dispute management. If part of a custodian, they create efficiency by minimizing the need to move assets. However, with multiple cash and collateral accounts residing on different ledgers, it is challenging to deploy cash or collateral nimbly to meet obligations. Transfers and other processes remain largely manual, introducing risk and delays that are hardly optimal for a process that should deliver in-the-moment risk management.

Assets are often held in custody at a location other than where they can be utilized as collateral most optimally, introducing drag on performance and increasing funding costs and other expenses for market participants throughout the value chain.⁴

How Canton Network will help

Given the challenges, it's not surprising that Digital Asset identified collateral as a prime use case for distributed ledger technology (DLT) nearly a decade ago, seeing the potential to use blockchain and smart contract technology to transform the operating model - improving the process with atomic, real-time settlement, locking collateral at the custodian to eliminate the need for market delivery, and mobilizing collateral via tokenization. This approach has been ratified across industry, including in a 2020 paper⁵ from Deutsche Bundesbank that proposed overcoming inefficiencies by eliminating securities movement between custodians using a collateral token managed in a DLT environment. By allowing securities to be defined and recorded digitally,

the underlying traditional asset would remain locked in an account at the custodian, and the asset would not need to be moved across settlement systems. The existence of a golden record would remove the necessity of complex reconciliations between the various parties. Finally, once a token is created, it can be directly exchanged between the collateral giver and taker according to applicable rules.

This future state is already upon us: Citi estimates that by 2030, \$1 trillion of an expected \$42 trillion securities financing and collateral market will be tokenized.⁶

⁴ BNY Mellon and Euroclear, [Bridging the Collateral Divide](#), November 2021

⁵ Deutsche Börse AG | Deutsche Bundesbank, [How Can Collateral Management Benefit from DLT?](#) January 2020

⁶ Citi, [Money, Tokens and Games](#), March 2023

Chapter Five: Achieving global collateral mobility with tokenization of real-world assets

Some in-market solutions are using private permissioned ledgers to tackle collateral challenges. J.P. Morgan Onyx tokenizes and transfers ownership interests in money market funds to improve collateral mobility and velocity, and facilitates intraday repurchase (repo) transactions.^{7,8} HQLA^x requires assets to be held at Clearstream, then uses DLT to facilitate the ownership transfer of securities while avoiding cross-custodian movements.⁹ These solutions address specific inefficiencies, but run the risk of creating a new type of market fragmentation with 'digital islands' created by private permissioned blockchains. Although a certain level of coordination can be achieved with bridges and APIs, it cannot achieve the lower risk / higher efficiency model enabled with atomic settlement and interoperability. Rather, it introduces new risks.

Broadridge is taking a different path, running its [Distributed Ledger Repo \(DLR\)](#) platform on the public, permissioned [Canton Network](#) and using smart contracts and distributed ledger technology (DLT) to reimagine the \$10 trillion repo market. DLR handles \$1.5 trillion in monthly volumes with a single platform for market participants to agree, execute, and settle repo transactions. The underlying securities are immobilized while ownership is transferred via smart contracts. DLR has made repo markets more operationally effective and robust by minimizing errors, removing the need for data reconciliation, improving auditability, and reducing risk. Broadridge is also extending their DLR solution to support sponsored repo in advance of the new requirement to centrally clear US treasury and repo trades. They can achieve this and run at unprecedented scale given the technology they've deployed: with one application and on one platform, their volumes are over 400x larger than the sum of all crypto activity.¹⁰

On the Canton Network, Broadridge is part of an evolving ecosystem where solutions developed independently can interconnect using technology that enables native interoperability and extensibility. This creates opportunities for market participants to join together without trade-offs, on the first privacy-enabled open blockchain network for institutional assets. Assets and data can seamlessly move across interoperable applications, and previously siloed financial institutions can connect without sacrificing privacy or control. For example, a tokenized collateral network can connect to exchanges for cleared collateral. Then a lending and repo platform could also connect—creating convergence for different platforms that can all communicate with one another and share the same data sources to create a truly frictionless movement of collateral.

The unique capabilities of public, permissioned networks are increasingly appealing to securities services providers who are focused on ensuring safe, resilient and universal access to their varied clients. In fact, 30% of custodians see public, permissioned networks as their preferred network option today.¹¹

⁷ J.P. Morgan, [Blockchain brings collateral mobility to traditional assets](#)

⁸ Financial Times, [Banks turn to blockchain in search for high-quality trading assets](#), 23 May 2022

⁹ [HQLA^x](#)

¹⁰ The Tie - The Canton Network Series, Part 1 - [Transforming Real World Assets through Compliant Tokenization and Mobility-Focused Network Infrastructure](#), 2024

¹¹ Citi [Securities Services Evolution](#), 2024

Chapter Five: Achieving global collateral mobility with tokenization of real-world assets

Tokenization is the path to collateral mobility

The last several years have seen a boom in digital issuance, particularly in bonds. 2024 has seen the volume of digital asset issuance exceed \$15 billion, with multiples of that now being used as tokenized liquidity in the world's collateral markets. Trillions of dollars in tokenized collateral are now being exchanged every day and millions of dollars are accumulating in tokenized money market funds.¹²

Yet DeFi is finding itself challenged by some of the same issues as TradFi. Fragmentation from new digital islands results in a lack of liquidity, particularly for digital bonds. Investors are holding assets in digital wallets but are unable to fully utilize them given a lack of interoperability. As a result, while there are more digital assets than ever, the ability to use them as collateral is limited.

That's why attention is again on tokenizing traditional, real world assets (RWAs). As Citi's recent paper states, "From a practical perspective, tokenization is the key enabler in bridging the worlds of digital and traditional assets, offering traditional market liquidity and digital market mobility and programmability."¹³

Tokenizing RWAs unleashes substantial advantages, including:

- The ability to mobilize a broader pool of assets as collateral, including assets such as US Treasuries, Eurobonds and Gilts that are underutilized today.
- Access to traditionally immobile assets, such as gold and other desirable commodities that would create a new pool of high quality liquid assets.
- Global real time use, regardless of market windows or settlement cutoffs, by combining tokenized RWAs with DLT-powered multi-party workflows.
- Intraday collateralization with smart contracts that execute daily lifecycle activities such as collateral valuation and margin top-up, allowing organizations to more precisely meet financial obligations with greater capital efficiency.
- Greater control over the asset, including the ability to lock the collateral to a transaction and to have a perfected securities interest in the collateral. In the event of a default, the ledger provides immutable evidence of the secured party's clear and undisputed right to the asset. This enhances the secured party's ability to take control of the asset and immediately give direction for its custody and use.

77% of capital markets participants believe traditional securities will be digitized in 5 to 10 years,¹⁴ and digital assets are expected to grow to approximately \$16 trillion in value over the next 15 years.¹⁵

¹² Citi [Securities Services Evolution](#), 2024, citing ValueExchange research

¹³ Citi [Securities Services Evolution](#), 2024

¹⁴ [The Future of Securities: A Digital Asset Securities Study](#), ArcaLabs, January 2022

¹⁵ [Advancing the Digital Asset Era, Together](#), An Industry Paper from DTCC/Clearstream/Euroclear, September 2023

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The ability to evidence perfected securities interest in the collateral – both the RWA and its ‘digital twin’¹⁶ – was a key outcome of two recent Canton Network pilots, both of which focused on underutilized or previously immobile collateral pools. Market participants successfully created and used ‘digital twins’ of [US Treasuries](#) and [Gilts/Eurobonds/Gold](#) as collateral in a complex series of repo and margin activities, demonstrating the potential of connected, synchronized finance.

Legal observers Latham & Watkins and Clifford Chance, respectively, provided legal opinions confirming the ability of the secured party to perfect title on and take legal possession of both the tokenized and underlying RWA.

"In this pilot, the lifecycle was extended to include default. This is crucial because collateral isn't just about mitigating risk—it ensures that in the event of a default, secured parties can take legal possession of the collateral. This demonstrates blockchain's potential to support the full lifecycle of financial transactions, beyond just execution. Article 12 and the revisions to Article 8 of the Uniform Commercial Code start to establish a framework for using distributed ledgers to represent securities interests in the indirect holding system, which is where the vast majority of securities transactions take place today. Blockchain represents the next step in the evolution of securities books and records maintained by broker-dealers, much the way record-keeping previously evolved to cloud-based platforms."

Jenny Cieplak, Partner, Latham & Watkins

"With certain approaches and platforms, a digital twin is not a separate asset and so the impact for master agreements, trading relationships, close-out processes, and valuation approaches are minimized, but it is always important to ensure the digital twin is catered for and reflected into existing product and platform documentation. As an operational and record-keeping tool rather than an asset, some of the legal and regulatory issues can be reduced while avoiding extensive surgery or a wholesale reset of established product and asset documentation."

Paul Landless, Co-Head of Fintech and a Tech Group Leader at Clifford Chance

¹⁶ A digital twin is defined as ‘an electronic controllable record representing an asset that has been immobilized on another system of record, and reconciled with that original system of record to ensure ownership is reflected precisely’. A tokenized security is a digital twin token that represents an underlying security or financial instrument issued on a different platform (e.g., a traditional CSD or registrar), where such representation itself satisfies the definition of a security/financial instrument under local law. CFTC’s [GMAC Digital Asset Classification Approach and Taxonomy](#), March 6, 2024

Chapter Five: Achieving global collateral mobility with tokenization of real-world assets

What benefits will tokenized collateral deliver?

Beyond the ability for tokenization to facilitate a broader, more utile collateral pool, collateral is likely to transform even further as a more interconnected future state takes shape. With tokenized or digital-native assets, smart contracts, and DLT:

A digital asset combines the asset, data, and process into a unified whole, allowing asset transfers and moves that keep the security, its reference data, and lifecycle events together. Beyond the substantial impact on issuance and corporate actions, this also creates the ability for asset tagging.

1. Collateral eligibility and allocation terms can be directly embedded on the digital or tokenized asset, enabling market participants to be notified of an asset's eligibility (or ineligibility) in real time, and allocation of eligible assets to be made automatically. When these essential services are no longer provided as an overlay on the account, sequentially or after the fact, the result is a significantly streamlined collateral workflow and less risk. Ineligible collateral can no longer be allocated, removing the need for manual oversight, removals, or substitutions.

Dynamic collateral availability and optimization ensures compliance with or availability for obligations in real time, a radical reduction in over or under collateralization, and better management of financial resources against capital requirements.

2. Atomic and committed settlement not only provides certainty of settlement, but also enables assets to be locked against a particular transaction or for a transaction to be atomically collateralized in real time. Committed settlement functionality allows collateral to be locked for a secured party in one location or time zone for an obligation in another location or time zone, without having to initiate a market transfer. *See specific legal opinions for [English Law](#), [U.S. Law](#), and [Hong Kong and Australia](#) for more details about committed settlement. See also the legal opinions provided in the Canton Network pilot reports from tokenizing [US Treasuries](#) (Latham & Watkins) and [Gilts/Eurobonds/Gold](#) (Clifford Chance)*

A. This could impact margin requirements, such as the amount of (or whether) intraday capital is required for positions that broker dealers can allocate and secure in real time. Any easing of margin and collateral requirements frees liquidity and capital to be used for other purposes.

B. Collateral reuse could increase with the ability to automatically recall a locked security. Automated asset inventories and embedded eligibility would substitute an acceptable security.

C. When assets no longer move in and out of custody control but actions are governed by a series of delegated permissions over sections of a workflow, many of the gating factors that trap assets in a particular location or prevent them from being used as collateral disappear. If assets don't have to move, they can be used as collateral. This could deepen the collateral pool, broadening access to the nearly 90% of available securities that are currently not used as collateral and enabling physical commodities (such as gold) to be tokenized to create higher quality assets. This would inject more liquidity into the entire financial ecosystem.

As networks of networks emerge and applications and participants can interoperate across public permissioned blockchain ecosystems such as the [Canton Network](#), collateral can be mobilized across client and provider nodes with interoperability. The ability to lock collateral at the custodian location means that custodian retains the assets under custody, while the assets can be tokenized and used 24x7 across time zones and markets. Additionally, the collateral provider benefits as excess collateral can be returned in real time, even after market hours. Furthermore, the transparency and auditability of the blockchain record could give regulators the necessary confidence to revisit the requirements for margin or capital held due to delivery and settlement risk.

Chapter Five: Achieving global collateral mobility with tokenization of real-world assets

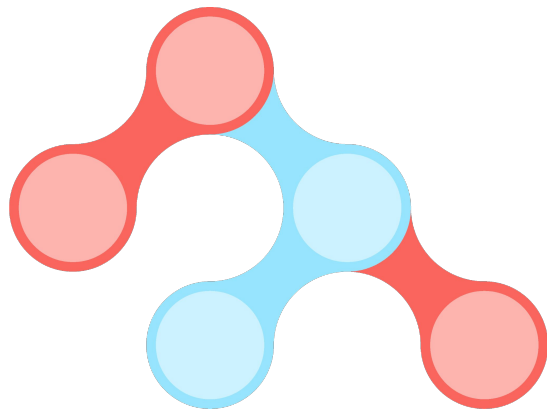
And beyond that?

Removing settlement risk from collateral and creating a broader available inventory establishes the framework for true optimization across transaction types, borders, and counterparties. Flexible, multi-factor optimization models can be deployed, with allocation instructions sent directly to maintain appropriate collateralization. Automated monitoring and reporting provide continuous status updates to all permissioned parties.

Additionally, the individual and discrete steps used to exchange and manage collateral can be broken down to their component functions. This creates a library of building blocks and tested workflows pertinent for use cases extending far beyond repo and derivatives transactions.

Asset identification, eligibility assessment and testing, allocation, and optimization are foundational components of risk management that are widely applicable to other types of transactions. They can be used to create efficiency and innovation in areas as varied as supply-chain management (with digital, real-time escrow services) or in how assets are used as collateral in real estate transactions.

Given the relevance of these components to any transaction where one party needs to be secured against the performance of another party, the potential applications are virtually limitless.



Related reading

Canton Network, [Unlocking Collateral Mobility through Tokenization: US Treasuries Use Case](#), September 2024 - Press release and pilot report
Canton Network, [Unlocking Collateral Mobility through Tokenization: Gilts/Eurobonds/Gold Use Case](#), October 2024 - Press release and pilot report
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Legal opinions on Perfected Securities Interest and Committed Settlement

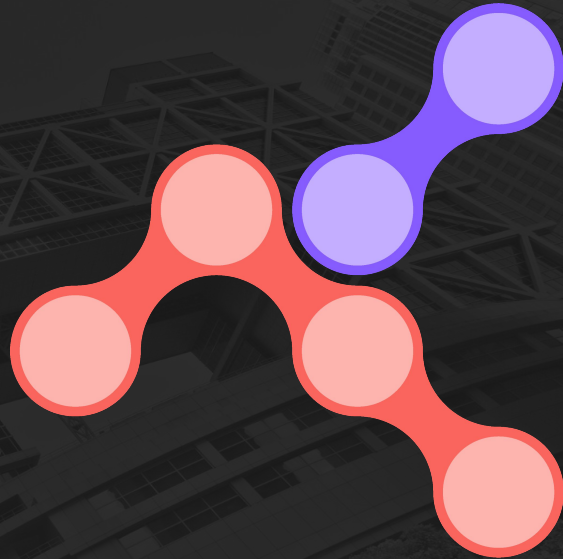
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Clifford Chance opinion in [Unlocking Collateral Mobility through Tokenization: Gilts/Eurobonds/Gold Use Case](#), October 2024, Press release and pilot report
Linklaters and Digital Asset, [Digital Asset's Committed Settlement: Adoption under English Law](#), 2019
King & Wood Mallesons, [Committed Settlement in Hong Kong and Australia](#), July 2019
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Updated October 2024

Canton

The Digital Catalyst
for Post-Trade Transformation

Chapter Six Increasing the efficiency and volume of **securities financing**



Chapter Six: Increasing loans and returns in securities lending

The upstream changes brought by tokenization and digitization to clearing, settlement and asset servicing will also affect value-added services provided on held assets later in the post-trade lifecycle. Like collateral management, securities lending will see significant shifts in legacy processes and business practices.

A brief definition

The \$2.6 trillion dollar securities lending industry¹ plays an important role in the smooth functioning of capital markets, enabling securities held in portfolios to be used for more transactions. Lenders are large portfolio managers and buy-side institutions who use this strategy to earn incremental portfolio returns and improve performance for the underlying investors (beneficial owners). Banks and broker dealers borrow securities to settle a specific transaction or in order to hedge, establish short positions or facilitate market making activities on their own behalf or for their clients.

Loans are short-term and collateralized based on the value of the securities, with daily adjustments based on market value fluctuations. The lender can reinvest the collateral, receiving income as well the borrowing fee for the loan. Lending can be direct, where counterparties arrange the transaction between themselves or through an agent acting as intermediary. Agency securities lending is generally provided by the custodian bank or large broker-dealer.

Legacy barriers to efficient lending

While securities lending enhances liquidity and efficiency across markets globally, like other post-trade services it involves a complicated network of inconsistent and siloed infrastructure across counterparties and intermediaries. Different legal agreements, market policies/protocols, and risk management strategies affect each loan and its associated collateral.

Many of lending's legacy challenges can be addressed through distributed ledger technology and smart contracts.

¹BNY Mellon and Euroclear, [Bridging the Collateral Divide](#), November 2021

Challenges	Opportunities
Risk, given the potential for delivery fails or default throughout the chain. Settlement risk, due to different time zones and market cut-offs, creates a need for additional margin or collateral and for indemnification.	<ul style="list-style-type: none">• A shared end-to-end workflow eliminates settlement risk.• Full lifecycle automation can be embedded in the asset, including specific conditions for its return.• Atomic settlement allows auto execution of terms and conditions without manual intervention, providing transaction surety and reducing systemic risk.• Committed settlement locks an asset for a secured party in one location/time zone against an obligation in another location/time zone, without having to initiate a market transfer, lowering capital costs.• Margin requirements stemming from delivery risk decrease, and the need for agent lender indemnification could be eliminated, positively impacting capital requirements.
Inefficiencies, with multi-step, sequential, and chronological processes that cause delays and friction.	<ul style="list-style-type: none">• Multi-party, shared workflows and concurrent, asynchronous processing simplify and accelerate the process for all participants and can reduce the need for intermediaries.• Assets include their reference data, terms and conditions, including criteria on lending eligibility and corporate action lifecycle events.
Multiple data sources, used across different systems and platforms, require constant validation and reconciliation.	<ul style="list-style-type: none">• Single, synchronized ledger provides accurate, real time data to entitled parties.• A golden source of truth limits or removes manual checks and redundant reconciliations, lowering operational cost and risk.
Lack of transparency, making it hard to audit or observe lending transactions, particularly for direct lending. Limited visibility to ultimate beneficial owners (UBOs), creating challenges for corporate action servicing.	<ul style="list-style-type: none">• Discrete roles enable auditors and other observers to see data and transactions in real time.• Ownership can be traced and known at any time, simplifying the identification of the UBO for the purposes of corporate action processing.• Automated loan and counterparty terms, to the individual beneficial owner and borrower level, decrease costs and accelerate loan structuring.• A secured network enables lenders and borrowers to easily identify opportunities and manage or scale direct lending programs.

Chapter Six: Increasing loans and returns in securities lending

Challenges	Opportunities
Inventory management is difficult, as borrowers can't see what's available and lenders can't identify what's in demand.	<ul style="list-style-type: none">• A shared view of inventory and auto-swap facilities to maximize lending optimization• Automated locates over a wider inventory of assets, increasing identification and allocation of available lendable assets• Integrated reference data and a standard view of terms, loans and collateral to streamline the entire process
Low profit margins and high capital costs. Narrow loan fees make it uneconomical to provide certain services. High capital charges for agent lenders arise from the need to indemnify the UBO against borrower default. Inflated margin on clearing and collateral stems from delivery and settlement risk.	<ul style="list-style-type: none">• Margin requirements, the need to indemnify the borrower, and capital costs are reduced by using Committed Settlement² functionality to eliminate delivery and settlement risk.• With Committed Settlement, in the event of a borrower default, securities on loan are immediately and automatically returned to the UBO as the secured party. With no default risk to the UBO, the need for agent indemnification is eradicated.• Automated rules, combined with real time trade, asset and counterparty data, enable margin netting.

Upstream developments drive downstream opportunities

As with collateral management, securities lending will be significantly altered by three fundamental changes earlier in the post-trade chain. With tokenized or digital-native assets, smart contracts and DLT.

1. The unification of asset, data and process in a digital asset enables an asset to be moved or transferred while keeping the security, its reference data and lifecycle events together. This allows for asset tagging, which embeds terms directly onto the asset and triggers its availability or eligibility status versus a particular counterpart or agreement.

As one of the banking activities that is “high-risk in corporate action terms,”³ a digital lifecycle presents enormous opportunities for securities lending. Securities can be lent with or without rights. Based on the underlying loan agreement, the smart contract and embedded lifecycle data ensure a corporate action event accrues to the correct entitled party. For example, automated recalls and substitutions over record date remove both corporate action and processing risk.

² See specific legal opinions for [English Law](#), [U.S. Law](#) and [Hong Kong and Australia](#) for more details about committed settlement.

³ The ValueExchange, [Corporate Actions 2021: From issuer-ready to investor-ready](#), 2021

Chapter Six: Increasing loans and returns in securities lending

2. Atomic and committed settlement not only provides certainty of settlement but enables assets to be locked against a particular transaction or for a secured party. The implications for securities lending are profound:



Atomic settlement eliminates the need for clearing credit and its related capital charges, along with delays in settlement and associated bankruptcy risk. It removes the potential for bankruptcy stays to disrupt the process and reduces the need for margin.



Committed settlement uses a smart contract to lock assets to a particular recipient or transaction, rendering the system only able to deliver that asset to that recipient. Combined with the right legal framework⁴, committed settlement can be used to create a first, perfected security interest in that asset with the intended recipient as the secured party. It helps identify safe-harbored transactions such as securities loans as exempt from bankruptcy stay, and could encourage regulators to revisit the capital requirements for these transactions.

See specific legal opinions for [English Law](#), [U.S. Law](#) and [Hong Kong and Australia](#) for more details about committed settlement.

A distributed ledger system has the capability to record positions at an end-beneficiary level. This increased transparency and resulting operational efficiencies open up opportunities for service providers alongside the custody chain.⁴

As a result, the need for margin and indemnification is drastically reduced, if not eliminated. Since the system prevents any use of the asset other than delivery to the intended recipient, the risk of non-performance for non-bankrupt entities is eradicated. In the event of a bankruptcy, participants in the system are assured that the intended participant has a perfected security interest in the asset and the transaction is safe-harbored. When the security can no longer be lost, there's no need to indemnify the beneficial owner, rendering obsolete the capital charges associated with that indemnification.

Finally, if less margin is required, there's a broader pool of assets available for lending or as collateral – or to be deployed in other financial transactions. Dispensing with indemnification would reduce costs, complexity and capital utilization for agency securities lending transactions, making that service more profitable while reducing a potential drag on performance.

3. When assets no longer move in and out of custody control but actions are governed by a series of delegated permissions over sections of a workflow, many of the conditions that trap assets in a particular location disappear. This allows more assets to be lent or used as collateral. Physical commodities can also be tokenized, creating more high quality assets and injecting more liquidity into the entire financial ecosystem.

The ability to lend securities by delegating permissions over specific workflows, regardless of where (or by whom) those assets are held, is likely to spur greater interest in direct lending. Direct lending allows the lender to realize more of the returns although not every organization has the size, scale or desire to manage their own lending activities. Agent lenders continue to play an important role, providing oversight and fiduciary responsibilities. However, the services provided by agent lenders are likely to change when they don't need to tap their institutional balance sheet for indemnification or hold the asset in custody before it can be lent.

Substantial inefficiencies arise from the problem of inventory being located in places where the securities cannot be optimally deployed against relevant exposures in other locations. Market participants often hold the same type of assets across several custodians. The most optimal collateral cannot be accessed expeditiously or easily mobilized to their counterparty.⁵

⁴ Deutsche Börse AG | Deutsche Bundesbank, [How Can Collateral Management Benefit from DLT?](#), January 2020

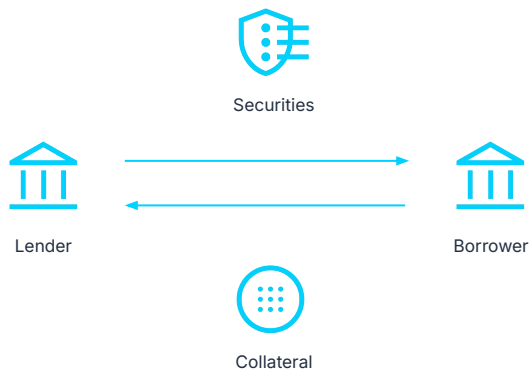
⁵ BNY Mellon and Euroclear, [Bridging the Collateral Divide](#), November 2021

Chapter Six: Increasing loans and returns in securities lending

Unexpected benefits from post-trade innovation

As discussed in our collateral management chapter, Broadridge has used smart contracts and DLT to create a better and more efficient repo process. Their Distributed Ledger Repo (DLR) platform provides a single platform for market participants to agree, execute and settle repo transactions. It is designed to be extensible to other types of transactions, including securities lending and financing transactions.

Broadridge expected the biggest gains from DLR to be operational efficiencies, and those have certainly materialized. However, they have also seen unexpected borrowing and capital efficiency benefits. With underlying securities immobilized and ownership transferred using smart contracts, banks and broker dealers are able to borrow securities for shorter time periods to address specific business requirements. Securities can be borrowed intraday and for only a few hours, removing the need to hold the same level of capital that would be needed for an overnight transaction.



A look ahead

Committed settlement opens the door to customizable settlement timeframes, which could present even more demand and opportunities for shorter short-term loans. In combination with smart contracts, it also enables greater flexibility in how rights are assigned: for example, it could become possible for the dividend payment to be assigned to the borrower while the UBO retains proxy voting rights, and the rates for that transaction could reflect that particular set of conditions.

Peer-to-peer (P2P) networks for direct lending are expanding, including the non-profit Global Peer Financial Association (GFPA) established by CALPERS, the State of Wisconsin Investment Board and other beneficial owners. The potential removal of indemnification as a necessary service could provide a significant boost to P2P, since credit intermediation performed by the agent lender is seen as a key factor holding the P2P lending construct back.⁶ How much more flexibility could be created if GFPA could connect to a repo network (such as DLR) or to tokenization or payments networks? And what if different P2P networks could connect to one another, with locate functionality based on standardized, embedded data?

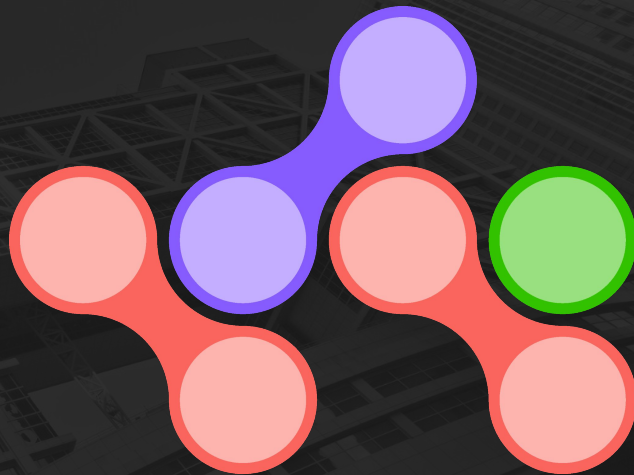
That is the vision of an ever-expanding global economic network. Using underlying technology that enables interoperability and extensibility, solutions developed independently can interconnect. This creates opportunity for market participants to join together and for new, composable solutions to be built, driving additional efficiencies for frictionless collateral movements and expanding the asset pools and counterparties available for securities lending programs.

⁶ Global Investor/ISF, Summer 2021, p 24

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The Digital Catalyst
for Post-Trade Transformation

Chapter Seven Transforming **fund services** to fuel growth



Chapter Seven: Transforming fund services to fuel growth

At the fulcrum of investment and investor, fund services is a highly manual process reliant on data from multiple participants across a complex, upstream chain of events. Fragmented, linear information-flows require constant cross-referencing to maintain an accurate register of holdings and provide correct, timely servicing for mutual funds, ETFs, and other emerging investments.

Across fund administration, transfer agency, and fund accounting, this manual environment leads to high operating costs in a low-margin business. Beyond cost, the risk is significant both operationally and financially. From onboarding to an incorrect or late NAV, providing fund services demands a level of transparency and access to accurate, real-time data that is not currently available or accessible in a digestible form. Errors and delays lead to liabilities and losses, from direct costs to the service provider to regulatory fines for the asset owner or reputational or financial harm to the fund manager.

“The issue comes down to transparency into operations and distribution.”

Bank of New York Mellon¹

A patchwork of systems and processes

Built over time, the infrastructure supporting fund services relies on legacy technology that is hard to modernize, with multiple parties recording and reconciling the same transaction on a daily basis.

According to research conducted by Global Custodian and Calastone in 2021, only 30% of fund administrators said that transfer agency was fully automated.²

As funds have grown in scope and popularity and asset managers have expanded to more jurisdictions, the challenge has only become more complex. Even more problematic, many of the tactical solutions initially devised to address short-term needs have become entrenched, locking inefficiencies in place.

Very real consequences for growth

The lack of automation and transparency has profound consequences for everyone in the fund universe, starting with the providers who face relentless pressure to reduce cost, manage risk, and meet tight deadlines, even as funds proliferate and become more complicated. NAVs must be struck and published within a narrow window following market close so that the day's orders and redemptions can be processed using that data.

For managers, a costly and manually intensive operational model limits the ability to develop innovative structures or customizable strategies for different investors, restricting their ability to grow and create deeper client relationships. More complex fund structures such as alternatives can't be readily supported with current systems, and the inability to solve some basics (such as buying fractions of mutual funds) narrows the potential investor universe by preventing smaller purchases.

For investors, basic information about their mutual fund purchases or redemptions (including price and number of shares) is not available until the next trading day, since it's dependent on the prior day's NAV. Orders need to be provided by specific cut-off times to be processed at that day's NAV; otherwise, a transaction instructed today won't take place until the following day—at which time market conditions could be quite different. And high processing costs drive up unit costs, which can disincentivize investment.

¹ Bank of New York Mellon, [How Blockchain is Transforming Funds Servicing](#), 2020

² Calastone, The Future of Fund Administration, 2021. [Request the report](#)

Chapter Seven: Transforming fund services to fuel growth

"67% of large asset owners see investment governance as a key operational priority."

Barnaby Nelson, The ValueExchange

Now add environmental, social, and corporate governance (ESG) to the mix. According to a recent survey of asset owners by The ValueExchange, rising ESG demands and cost pressures are a growing concern. Beyond simply tracking and managing their investments and asset allocations—for which a stunning 45% rely on excel spreadsheets—asset owners are under increasing pressure to evidence sufficient oversight of key functions, whether that is pre-trade compliance, NAV, tax, or regulatory reporting. Unable to provide evidence that the in-house checks and verifications required as part of their fiduciary responsibilities have taken place, asset owners are seeing an increase in regulatory sanctions.³

Given these mounting demands, the case for innovation in fund services is clear—and distributed ledger technology (DLT) holds the key.

"In a survey undertaken by Calastone, a third of respondents identified DLT as the technology that could have the biggest impact on the future landscape of funds, citing its benefits to create greater efficiency in fund trading and cooperation between participants." Gartner, 2021⁴

From operational complexity to operational agility

With smart contracts running on DLT, fund services can be significantly streamlined and de-risked from start to finish.



Investor and fund onboarding is simplified and expedited with permissioned access to core documents and digital identification (including KYC and AML documentation).



Fund details and investment parameters can be baked into the asset, and smart contracts can trigger automated checks against ownership thresholds and eligibility requirements to facilitate governance.



A golden source of truth eliminates the need for constant data reconciliation, significantly streamlining operations and accelerating accurate NAV production. An improved NAV process could allow new orders to be accepted closer to market close, minimizing the gap between instruction and investment.



A single registry gives all entitled parties an accurate, real-time view of ownership, transactions, and positions at a fund, at the asset and owner level, providing better intelligence to fund managers about demand and liquidity and improving investor communication and distribution.



Risk decreases with fewer manual touchpoints and repetitive actions across multiple systems.



The entire process becomes more transparent, providing better regulatory control. Immutable records show the full lifecycle, including traceability and provenance. Observers and auditors have real-time access to data.

Importantly, the transition can be incremental as long as the technology is interoperable and extensible. This is essential given decentralized markets and the number of participants involved with fund services; in addition to not using the same systems, not everyone would be ready to make a change at the same time.

³ The ValueExchange, [Asset Owner Transformation](#), 2021

⁴ Calastone, The Future of Fund Administration, 2021. [Request the report](#)

Chapter Seven: Transforming fund services to fuel growth

Investors will have more economically attractive options, while fund managers will have a more dynamic view into fund activity and be able to create new structures to meet investor demand. Asset owners will be able to manage their holdings and exposure more actively and with greater confidence in the underlying performance data. They may also be able to redirect some investment spending: According to The ValueExchange, 66% of asset owners plan to run system automation projects in the next three years—with spreadsheets and outdated macros in sight.⁵ Improvements made more holistically across fund services may reduce the need for asset owners to address certain issues at an individual level.

The shift is already underway

Given the scope for transformation, we are seeing the emergence of a better fund-services infrastructure. To name just a few initiatives:

- In the alternatives space, CAIS has partnered with Digital Asset to explore faster investor authentication methods, reduce transaction costs and friction by creating workflow efficiencies, and enhancing product liquidity using DLT, smart contracts, and blockchain. The use cases apply across alternative strategies, including private equity, venture capital, real estate, real assets, and private debt.
- Multiple providers are working to digitally transform components of the fund ecosystem, including Allfunds, DMI Fund Services from Calastone, Fundnode, Iress, and SETL. Respectively, initiatives focus on data, analytics, reporting, research, and regulatory services; digitized fund distribution, administration, and issuance; automated end-to-end fund settlement; improved fund data distribution and a single registry for listed and unlisted funds; and mutualized fund distribution and instant information exchange.
- Buy-side focused innovation can be found in initiatives like HUB—a new asset management platform seeking to transform asset managers' operations technology with a digital operating model focused on improving distribution and analytics and driving investment solutions.
- OSTTRA is an exchange-led joint venture between S&P Global and CME group, providing post-trade, cross-asset services (derivatives, FX, repos, cash equity, commodities, and bonds) including the ability to optimize a variety of exposure and capital requirements.

Chapter Seven: Transforming fund services to fuel growth

As a technology provider, Digital Asset has created reference applications that jumpstart exploration. The ETF reference application allows required parties to immediately see NAV data when the sponsor updates it and provides a scalable back end to simplify ETF creation and redemption. The Compliance and Regulatory Reporting reference application streamlines governance with transaction data analysis, customizable reporting, and data aggregation within or across markets. This could include daily short-sell reporting, foreign ownership limits, liquidity use and availability, repo/financing volumes, and a single view of FX flows—all information that is not readily available today.

Are there broader opportunities?

The fundamental shifts taking place earlier in the post-trade cycle will affect fund services in the longer term.

- Asset tagging at issuance embeds conditions, reference data, and lifecycle events. This information could be used in automated compliance checks for asset owners, ensuring investments adhere to guidelines before they are made. Furthermore, investors could create the equivalent of 'eligibility schedules', signaling their interest in different types of investments and structures—and be automatically contacted when those opportunities arise.
- Atomic settlement of cash and fund shares, without the need for acknowledgement, confirmation, or additional reconciliations, creates greater transparency into ownership and facilitates faster distributions and other asset services.
- Expanded distribution could be achieved with technology that connects across public and private ledgers to reach more investors.

- Better management across the board, from using ESG criteria to manage funds (e.g., auto-redemption if funds go overweight on resources) to rapid onboarding of investors as they subscribe to new funds.
 - Automation of the entire NAV process, as more components of at- and post-trade services are digitized. Mutual fund NAV calculations could potentially move to intraday (similar to ETFs), creating greater liquidity in the market.
- Deeper relationships between distributors and investors with a data-led view of investment flows and client behavior, both within different fund types and ultimately across a network of services that spans different asset classes.

Ultimately, the biggest win comes with the expansion of investment options for investors through the creation of new, more tailored and dynamic funds with fewer ingrained costs, inefficiencies, and risks.

Digital Asset's Daml Finance accelerates the creation of new products and fund structures and expedite time-to-market. This library of tools simplifies creation, modeling, and servicing of the entire lifecycle of complex financial instruments. Asset-agnostic workflows can be easily extensible to other instruments and structures, while using a shared library increases asset mobility throughout the lifecycle. This initiative should turbocharge the creation and connection of digital asset solutions, simplifying innovation for a broader array of participants across financial services.

⁵ The ValueExchange, [Asset Owner Transformation](#), 2021

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Chapter Eight Ushering in a new era for **treasury and payment services**



Chapter Eight: Ushering in a new era for treasury

Treasury is the ultimate driving force behind trading and the post-trade lifecycle. IPOs, payments, financing, lending, and capital management are all means to an end: Helping organizations effectively manage their financial resources to meet obligations, fund priorities, and grow.

Many distributed ledger technology (DLT) use cases are rightly focused on streamlining payments processes to remove inefficiencies and increase certainty of payment. From SWIFT to PayPal and Zelle, the payments space is rife with innovation. While the opportunities and benefits are significant, we are focusing on the impact of digitization throughout post-trade and how that affects treasury services.

The impact of post-trade transformation

Each of the prior chapters has focused on different aspects of the post-trade lifecycle. Viewed through a treasury lens, we begin to see how a digital transformation can reshape how financial resources are acquired and deployed:

1. **Asset creation and issuance:** The ability to more quickly issue securities or expand the types of assets available can accelerate capital raising and reach new investors. The time required for book building could be cut 35-50%, and savings of up to \$35,000 for a \$1 billion issuance could be realized by reducing intermediary fees.¹
2. **Clearing and settlement:** Atomic or committed settlement provide transaction and payment surety, while reducing settlement times can free billions of dollars in collateral being held against settlement risk.²
3. **Custody and safekeeping:** By mitigating or even eliminating counterparty or settlement risk, liabilities and costs decrease. Interim financing requirements are minimized, as is the need to hold capital as insurance against market movements or gaps in the custody chain of control.
4. **Asset servicing:** Approximately 70% of business units around the world paid out over USD \$2 million in corporate action errors in 2020, not to mention the billions being spent to acquire data, fund projects to improve processing, or risk remediation countermeasures.³
5. **Collateral management:** The ability to mobilize more of the \$201 trillion universe of marketable securities as collateral (vs. the 10% currently used)⁴ injects liquidity into the entire financial ecosystem and facilitates the collateralization of more transactions, even as the need to hold collateral diminishes due to innovations in clearing and settlement.
6. **Securities lending and financing:** Atomic settlement provides certainty of settlement while committed settlement locks an asset to a particular recipient or transaction. As a result, the need for clearing credit, margin, and indemnification is greatly reduced or even eliminated—along with associated capital charges—expanding the pool of assets available for use in lending, collateral, or other financial transactions.
7. **Funds services:** A manual, fragmented process creates risk and high operating costs in a low-margin business. Errors and delays lead to liabilities and losses, from direct costs to the service provider to regulatory fines for the asset owner to financial liabilities for the fund manager.

Independently and in aggregate, the ability to remove or remediate these direct and associated costs would significantly boost the financial resources that could be funneled back into the business or deployed elsewhere to jumpstart innovation.

¹ Capgemini, [Blockchain Disruption in Security Issuance](#), 2016

² Capgemini, [Blockchain Disruption in Security Issuance](#), 2016

³ The ValueExchange, , [Corporate Actions 2021: From issuer-ready to investor-ready](#), 2021, and [Asset Servicing Innovation](#), 2020

⁴ BNY Mellon and Euroclear, [Bridging the Collateral Divide](#), November 2021

Chapter Eight: Ushering in a new era for treasury

Improving cross-border transaction flows

The scope for improvement is enormous, with global corporates moving nearly \$23.5 trillion across countries annually (equivalent to about 25% of global GDP). Current mechanisms are costly, slow, and sub-optimally transparent:

- Cross-border fees per transaction average \$27, or approximately \$120 billion in 2020, excluding foreign exchange (FX) fees
- Payments can take two to three days to reach the end beneficiary
- Visibility into payment status is limited⁵

The tangible costs rise when FX fees are tacked on, but trapped liquidity and delayed settlement create an additional, hidden drag.

Given the cost and inefficiency, a number of initiatives aim to revolutionize these transactions. They include Project Cedar,⁶ which focuses on FX spot transactions for Phase I, to Project mBridge,⁷ which experiments with cross-border payments using a DLT-driven common platform for multiple central banks and commercial participants. Nearly every large financial institution is also seeking to transform cross-border money movement, whether for their own inter-company transfers, trade financing, or to reduce FX transactions and fees. Others are joining forces to advocate for more systemic change.

A cross-industry group of commercial banks and payment service providers has proposed the creation of a Regulated Liabilities Network (RLN) to capture some of the promises of digital currency today using current rules, regulations, and arrangements. RLN takes aim at the inefficiencies of domestic and cross-border electronic payment systems used for retail and wholesale use cases (including cross-border trading). It would modernize these systems using tokenization and distributed ledger technology to create a new financial market infrastructure (FMI), using tokenized, regulated liabilities that keep intact the promise to pay customers on demand at par value in national currency units. Benefits would include settlement finality and a global, real-time gross settlement (RTGS) capability that allows for 24x7 settlement in central bank money in multiple national currencies.⁸

A mature RLN might present a multi-currency, multi-asset settlement platform⁹ that operates within the regulated financial infrastructure and coexists with the existing two-tiered banking structure. The New York Innovation Center just announced a 12-week proof-of-concept project to explore the feasibility of an interoperable network of digital central bank liabilities and commercial bank digital money using distributed ledger technology provided by SETL and Digital Asset.

Chapter Eight: Ushering in a new era for treasury

Redefining currency

However, RLN and other innovations in the payments space can coexist with the creation of central bank digital currencies (CBDC), which are direct liabilities of a central bank.

An initial group of pilot projects has already demonstrated the viability of CBDC technology between central banks' payment systems, and a current wave is focused on use cases that create efficiencies and address the shortcomings of current financial arrangements. Based on our involvement in various initiatives aimed at taking CBDC from the philosophical to the practical, Digital Asset has identified five key technology building blocks as foundational to any CBDC exploration. These include:

1. An interoperable, composable, and extensible platform to facilitate wide adoption and support continued innovation.
2. Finality of settlement, using smart contracts and distributed ledger technology to guarantee transaction atomicity.
3. Robust safeguards and controls that use embedded rights and permissions to provide oversight, auditability, and privacy within and across ledgers.
4. Trusted digital identities, so that participants can identify their counterparties and respective roles.
5. Resilience and the ability to securely scale to handle high volume and throughput levels.

Setting a place for all

CBDC is not suited for every treasury or payments application. The wealth of potential use cases demands a broad array of solutions: While CBDC would be a central bank money/national currency, other digital assets such as stablecoins and digital tokens can play a critical role in payments and capital markets.

In a way, the abundance of DLT-driven exploration we are seeing in the treasury space is proof of the potential for digital innovation. While some initiatives will fall by the wayside, others will succeed or consolidate for greater impact. Either way, it's the start of a new era for treasury services.

With these criteria met, a CBDC can be compatible with other CBDCs—essential for any transaction that crosses borders. Beyond capital markets and payment transactions, CBDC is also uniquely suited to address current shortcomings of banking and traditional financial markets, such as financial inclusion, sustainable development, and funding to remote communities. CBDC can preserve the attributes of the existing two-tier banking system while also enabling new consumer protections, such as the reduction or elimination of depository risk.

⁵ Oliver Wyman & J.P. Morgan - [Unlocking \\$120 billion value in cross-border payments](#), November 2021

⁶ [Project Cedar: Improving Cross-border Payments with Blockchain Technology](#), Fall 2022

⁷ Project mBridge: [Connecting economies through CBDC](#), October 2022

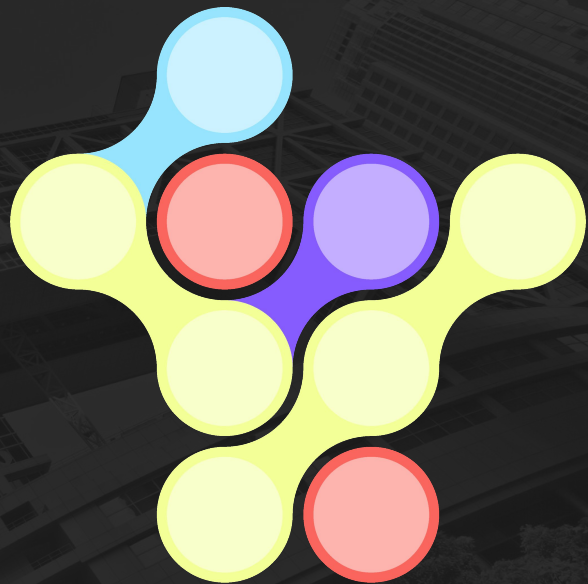
⁸ Citi, [The Regulated Internet of Value](#), 2021

⁹ [The Regulated Liability Network - Digital Sovereign Currency](#), November 2022

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Chapter Nine Lightening the **data management** load



Chapter Nine: Lightening the data management load

Data is the common denominator of business, especially so given digitization and expansion of assets, financial services, and solutions.

Yet sourcing, managing, maintaining, and appropriately sharing data creates enormous inefficiencies and challenges that drive up cost and risk for everyone involved. Nowhere is this more evident than in post-trade, where customer, counterparty, and transaction data needs to cross institutional, market, and geographic boundaries quickly and with high levels of accuracy. Adding to the complexity, data must be managed in a way that preserves all required privacy and must also adhere to any specific regulatory requirements about where it is physically held or stored.

Although data is critical to managing the relationships of trust that underpin all financial transactions, the current state of play is far from ideal.

- Onboarding can take from six weeks to many months, with senior salespeople spending an average of 1.5 days per week onboarding new client organizations.¹ This costs providers in terms of staffing and productivity, and prohibits investors from acting on their investment strategies.
- Inconsistent, untimely, or incomplete data increases risk, from fraud or market risk to counterparty or settlement risk. Multiple documents are required and may differ from provider to provider, country to country, or by transaction type. The lack of 'golden source' records accessible to each party in the trade necessitates constant reconciliation of security, pricing, and market data at every step of the transaction lifecycle.
- Compliance and regulatory reporting remains a slow, manual, and error-prone process that generally takes place after the fact. This limits timely oversight that could stop small problems from becoming big issues, particularly during emerging market crises.

Reimagining data management has the potential to create a healthier, more efficient financial ecosystem.

Transcending traditional data boundaries

Markets, financial institutions, and their clients have been trying to tackle the data management challenge for decades. The initiatives have been extensive and often resulted in important progress. For example, banks have created internal reference data engines to streamline transaction processing and improve accuracy; markets have worked to standardize requirements and documentation; and institutions have created repositories of core documents to accelerate onboarding. For the most part, however, any improvements were only realized within the walls of that particular organization or market.

Distributed ledger technology, particularly the use of smart contracts and multi-party workflows, can deliver broader, transformative change by removing traditional barriers and enabling more flexible access to data. The opportunities lie in a more centralized approach to information with permission-controlled access. The right data is provided at the right time to the right parties while ensuring appropriate safeguards remain firmly in place. Importantly, access is not restricted to parties only using a particular technology: different ledger solutions or legacy technologies can connect using interoperability protocols, which break down traditional information silos to create efficiencies throughout the transaction lifecycle.

¹ Bank of England, [Charting the Future of Post-Trade: Findings from the Post-Trade Task Force](#), April 2022

Chapter Nine: Lightening the data management load

Exploring a future state

For a glimpse into the future of post-trade, consider these three use cases:

1. Broader access to better data. Today, every player in the post-trade process separately ingests data and moves it through their own systems to populate different processes. Then, the transaction moves to the next step in the chain and the process begins all over again—but this time, the data received must be reconciled and/or re-populated, creating multiple layers of time-consuming double-checks.

Distributed ledger technology allows for a single system of record for market, pricing, NAV, and other data. Entitled parties have real-time access to the ledger and transaction data, improving accuracy, increasing reliability and confidence, and substantially reducing operational costs and risks. Aggregating and standardizing data across markets, entities, and jurisdictions can create even greater efficiencies.

Since smart contracts can preserve country-specific rules, requirements, and market practices and enforce them when conditions are met, the governance process also improves. Oversight can take place in real time: regulators and supervisors can look at or across markets or asset classes to conduct appropriate surveillance and analysis, without visibility into individual transactions in order to preserve privacy.

Harkening back to earlier chapters, the introduction of digital-native assets or tokens can significantly streamline the reference data process. With asset and lifecycle data embedded in the asset, there's no need to secure that information from external providers. With institutions using up to seven different feeds just to source and validate corporate action data, this can create substantial operational and financial efficiencies.²

2. Shared, efficient workflows. It's difficult to mutualize workflows without sharing sensitive or confidential data across entities. But stopping the flow of data at each institutional boundary means significant duplication of effort and results in inconsistent or inaccurate information, missed deadlines, and other risks. With a multi-party workflow managed by smart contracts, the data can retain integrity throughout the entire lifecycle. The difference lies in the ability to permission a party to view or use specific data at different points of a transaction, with access on a strict 'need to know' basis. So while there may be an entire universe of data available, some parties may have access to a galaxy of data while others only see data from a particular solar system or planet—and that access will vary by role or at different points of the transaction.

Across post-trade, it would be difficult to overstate the metamorphosis created by multi-party workflows. Syndication is expedited when underwriters, borrowers, and investors can access and act on the same information in real time. When every party in a transaction chain is using the same timely, reliable, and accurate data, post-trade processes can accelerate, reducing timeframes for clearing and settlement and remediating the need to hold collateral against settlement risk.

² The ValueExchange, [Corporate Actions 2021: From issuer-ready to investor-ready](#), 2021, and [Asset Servicing Innovation](#), 2020

Chapter Nine: Lightening the data management load

Exploring a future state (continued)

3. Faster onboarding through better KYC. Onboarding is a necessary but highly inefficient process, frustrating to both providers and clients. After reviewing the large number of documents required and the degree of overlap between documents needed by different firms to complete onboarding, the Bank of England-sponsored Post-Trade Task Force recommended creating a core set of documents and suggested that “an optimal solution would be a centralised KYC passporting platform that could store the core documents most commonly required by firms”. These could “be accessed by all market participants when granted permission by their clients”. Although this could be one platform, it could also operate “like one platform even if there were multiple platforms involved and that there was wide market participation in it”.³ This could be a better option for a solution that might ultimately extend across multiple jurisdictions.

Interoperability and smart contracts offer logical ways to address this challenge. Interoperable technology would allow participants to ‘plug in’ and access information whether they are using traditional mainframe or ledger-based systems, without significant

investment or the need to touch their underlying code. Smart contracts can be written with explicit role-based permissions, which can be readily updated as needs change (for example, if an institution wants a new provider to have access to their documents). Alerts and predefined conditions can also ensure documentation remains up-to-date: a transaction could be flagged due to an authorized signatory issue, with an alert automatically sent to all parties, or an institution could be reminded to update documentation on certain timeframes to preserve their ability to conduct business.

Ideally, the ability to prove identity digitally rather than with physical documents would truly unlock the onboarding process. Digital Asset is currently working with CAIS to store digital identities on chain, using explicit permissions to reveal information to the right parties only when it is needed. While the current project focuses on alternative investments, the potential for expansion to other asset classes could be a game changer to investors looking for a nimbler way to implement their investment strategy.

Regardless of jurisdiction, all transactions rely on reference data, all counterparties must be known, and all activity must be reported to the relevant authorities. And so, like other parts of the post-trade lifecycle, various components of these solutions are being developed or are in use today using demos and detailed use cases from Digital Asset on Daml-driven KYC, Reference Data, and Compliance and Regulatory Reporting.

Similar to earlier initiatives, some of these will deliver benefits to a particular institution or market. Other programs are looking at new ways to better share and use data across parties, creating the first iterations of interconnected networks. To achieve the full potential and lighten the data load, these connections will need to broaden and expand. When multiple parties and providers can access trusted and reliable data, the financial ecosystem becomes more robust and sustainable for the benefit of all.

³ Bank of England, [Charting the Future of Post-Trade: Findings from the Post-Trade Task Force](#), April 2022



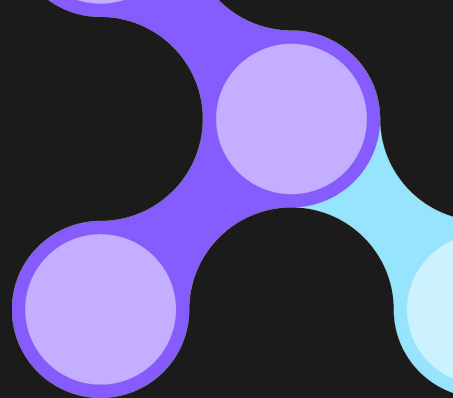
ABOUT THE GLOBAL SYNCHRONIZER FOUNDATION

The GSF provides transparency and member engagement in decisions made by the operators (Super Validators) of the Global Synchronizer, to ensure a reliable, fair and trusted service for the Canton Network.

Managed by the Linux Foundation

By embracing open governance principles, the Global Synchronizer Foundation promotes transparency, fairness and collaboration. It creates the meeting place to nurture and responsibly evolve the regulatory-grade blockchain infrastructure unlocking the potential of interoperable, tokenized real-world assets.

To learn more about the GSF, please visit sync.global or follow on [X](#) or [LinkedIn](#).



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ABOUT CANTON NETWORK

Canton is the first privacy-enabled open blockchain network, ensuring limitless connections that preserve privacy. Enabled by unique smart contract technology, network participants can confidently exchange data and value to unlock the potential of synchronized financial markets.

The public-permissioned blockchain network includes a decentralized synchronization service – the [Global Synchronizer](#) – designed to respect privacy and institutional sovereignty.

In this 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. This preserves the stability of trusted regulated processes while offering the transformative power to connect.

To learn more about the Canton Network, please visit our [site](#) or follow us on [X](#) or [LinkedIn](#).