STA Security Token Advisors

State of Security Tokens 2023

Q1 Extended

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Introduction and Overview

At the end of 2022, Security Token Advisors detailed that investment banks were most active with tokenization on the digital bond issuance side. This carried steam into early 2023 with Goldman Sachs officially launching its Digital Asset Platform (GS DAP™), HSBC launching its Orion platform, UBS following the largest blockchain-based bond to date ($370 million) up with a $50 million bond to its high net worth clients, and ABN AMRO fully-subscribing its inaugural corporate bond with existing equity owners.

Institutional entry into the tokenization space escalated beyond bonds, which dominated the January 20223 headlines, and into the publicly-traded product field through money market and fixed income yield funds and private markets through private equity and private credit developments - both segments of which stole the show from February 2023 through April 2023. In fact, April was such a solidifying month built upon Q1 that STA felt responsible to cover it in tandem, hence the name of this publication: *Q1 Extended*.

This piece will detail the macro trends taking shape within the tokenization space as a function of service providers like transfer agents, broker-dealers, alternative trading systems, custodians, and third-parties, as well as issuers, blockchain foundations, asset managers, investment banks, and activity that Security Token Advisors sees on its advisory side.

The most clear takeaway is that existing capital markets players - from product issuers to commercial banks to index providers to legacy transfer agents to data routers - are almost all exploring the forward-looking digital ecosystem. In some cases, that's simply transforming existing practices into on-chain activity. In others, new lines of business are popping up and expanding the playing field. Crypto native firms who have been around for up to a decade now are also realizing that compliant tokenized products are becoming a huge segment within the digital assets space. The competition for distribution channels and qualified investors now carries more weight than ever in that regard.

We hope you find this *Q1 Extended* publication insightful and useful in the crafting of your own digital strategies. Tokenization spans products, operations, and infrastructure solutions, truly making it the catch-all blockchain technology overlay that incumbent players and new entrants cannot afford to ignore.

Peter Gaffney
Head of Research

Key Takeaways and Executive Summary

Banks and Asset Managers look to solve digital settlement with tokenized deposits

One of the key facets that major players have been evaluating is the very component that underpins the digital assets and tokenization ecosystem: settlement. Many commercial banks, investment banks, asset managers, and other institutional players are hesitant to make use of a generalized public stablecoin to facilitate and support transactions and settlement across tokenized assets and within the associate infrastructure. As a result, discussion around deposit tokens, money market fund tokens, Central Bank Digital Currency (CBDC), and blended alternatives like the Regulated Liability Network (RLN) has been more active than likely ever. This is a key question to answer because it will essentially form the foundation upon which major infrastructure will run and rely. It also begs the question of open versus closed ecosystem solutions; stablecoins offer great open ecosystem capabilities, but tokenized deposits and similar solutions provide superior compatibility with current banking models.

Investment Banks and Broker-Dealers push for security token & tokenized asset distribution

Rolling momentum from Q3 and Q4 2022 right into 2023, household name investment banks made early headlines with launches of bond tokenization platforms, issuances, and syndications. This evolved a bit to include new broker-dealer approvals and entry on the accredited and retail investor private placement distribution channels, including Dalmore Group, Castle Placement, and Bosonic Securities becoming more hands-on with tokenized offerings. Even Jefferies ended its three-year hiatus from the blockchain world by underwriting a $237 million Figure HELOC with Goldman Sachs and JP Morgan. Incumbent investment banks and broker-dealers contributing to product distribution on a retail, accredited, and institutional basis is a necessity for the prospective issuers currently on the sidelines.

Private blockchain solutions maintain institutional interest and traction

The debate between public and private blockchains has always been a strong one in the digital assets industry. When it comes to tokenization, private blockchains have merits on the institutional side. Numerous investment banking tokenization platforms are underpinned by private blockchain solutions like Goldman Sachs with Digital Asset's Daml language, Deutsche Bank with Memento blockchain, and HSBC with Hyperledger Fabric. These banks are seeing savings, even if just in the 10-20 basis points range, on the asset issuance and servicing side; this is nothing to scoff at considering those basis points translate into millions of dollars added to the bottom line.

Notably, Digital Asset launched an interoperable privacy-enabled infrastructure solution for institutions across the board. The Canton Network includes node operators like BNP Paribas, Goldman Sachs, Deloitte, Cboe, S&P Global, and Broadridge, who already works with Daml on its distributed ledger repo network transacting over a trillion dollars a month. It is quite plausible that Canton actually competes with public blockchains in the eyes of institutions because now it offers a certain blend of decentralization and scalability while maintaining that key privacy and security that many desire in this nascence. For the time being, Canton is most comparable to a public-permissioned blockchain except with purely institutional node operators and users.

Private Equity & Private Credit strengthen over Real Estate

On the general investable product side in the private markets, the reality of fractional private equity access to a wider range of investors is solidifying. It's not quite at the retail level yet, although that future trajectory is still on the table from a secondary listing standpoint, but rather is planting its feet on the accredited and qualified purchaser side with up to 99% reduced minimum subscriptions and streamlined investor management solutions. It would be tough to point to any company aside from Hamilton Lane as the frontrunner here. Now on its sixth global tokenized offering, Hamilton Lane has been active in the United States and Singapore in particular with a blend of private equity offerings across numerous service providers and multiple blockchains.

The asset management behemoth also issued its first private credit product in the United States amidst other private credit platform launches including Obligate, DEFYCA, BondbloX, and PV01. The increase in interest on the private equity and private credit side over real estate is also quite notable, as real estate is commonly touted as one of the most feasible use-cases for tokenization from a retail level.

Retail to Institutional Facelift

Asset tokenization and the now commonly used Real-World Asset (RWA) moniker have swept across a much wider range of uses than simply fractional investment products. Everything from individual private assets to equity and debt portfolios to ETF products to money itself is becoming tokenized with the end goal of decentralized finance (DeFi) interaction. The industry landscape has come a long way since the St. Regis Aspen and RealT Section 8 properties were the marquee focuses back when the secondary markets were sub-$1 billion and institutions were still pouring resources into crypto trading desks.

Now, with multiple banks and organizations noting asset tokenization as the "killer use case for blockchain technology" (Citi, JP Morgan, Bank of America) and BlackRock putting tokenization directly on the radar of its shareholders, institutions and associated infrastructure providers are scrambling to determine their tokenization strategies. We've already seen banks involved in primary digital bond issuances on both private and public blockchains, as shown below courtesy of Security Token Market, but that was just the tip of the iceberg.

#	Token	Price	Change	Market Cap
1	UBS Bond UBS	$1.00	0%	$370,000,000.00
2	European Investment Bank Bond EIB	$1.00	0%	$120,000,000.00
3	SG SFH1 SG SFH1	$112.00	0%	$112,000,000.00
4	Siemens Bond Siemens	$1.00	0%	$64,000,000.00
5	SG SFH 2 SG SFH 2	$112.00	0%	$47,999,952.00
6	SGI Index Linked SGI Index Linked	$99.21	0%	$4,999,985.58
7	ABN AMRO ABN AMRO	$100.00	0%	$450,000.00

Stablecoin Alternatives & Settlement Mechanisms

One of the main themes that took shape after the strong Q4 bond issuances is the concept and functionality of digital settlement; specifically, firms address that to have a fully on-chain ecosystem requires an eventual reliable settlement mechanism. As mentioned earlier, transacting millions, billions, and even trillions of dollars of value through repo networks, inter-organization collateral management platforms, and other day-to-day banking activities likely requires something more ironed out than a public stablecoin.

One of the key points STA hears on its advisory side from our asset managers and commercial bank prospects is that they simply cannot park $300 million of client assets into a non yield-generating stablecoin - especially when the risk-free rate is over 5%. This stirs up conversation around plausible digital solutions that bridge the current macroeconomic conditions, banking practices, and the technology itself as alternatives to the basic stablecoin model. So far, there are a handful of alternatives varying in implementation and status.

There is the internal **deposit token** approach that JP Morgan had the foresight of back in 2018 with JPM Coin. JPMC underpins the bank's Onyx division, responsible for settling anything from the $480 billion of blockchain-based repo transactions to the collective $700+ billion of asset swaps in the Tokenized Collateral Network (TCN), inclusive of the repo activities. Any other banks and organizations that join or participate in Onyx will make use of JPMC. It's possible that JP Morgan expands into public blockchain solutions for deposit tokens, which wouldn't be its first foray considering the successful tokenized money swap of Japanese Yen and Singapore Dollars with Aave Arc on Polygon in November 2022, however the prime focus is issuing tokens backed by actual JP Morgan banking deposits. As a proxy of this, any groups making use of JPMC are also trusting JP Morgan's banking operations and practices to properly collateralize each deposit token with the underlying deposit values.

As a more group-oriented yet not quite open ecosystem solution, there is the **USDF Consortium** built upon the Provenance Blockchain. USDF is an FDIC-backed *tokenized deposit* that's designed to provide more utility and trust than existing digital dollars or stablecoins in the market. The USDF Consortium includes First Bank, New York Community Bank, Atlantic Union Bank, Figure, JAM FINTOP, and roughly a dozen others; each bank in the consortium honors and accepts the bank-minted tokenized deposits, thus providing strong network effects to users as new banks and organizations join the consortium.

USDF Consortium's goal is to simply overlay tokenization onto the existing banking ecosystem enabling critical functions like fractional reserve banking - something that a generic stablecoin does not offer and therefore is not feasible for at scale. USDF is ahead of the game here at the very least considering Roll Call detailed "Firms that issue or trade stablecoins are looking to secure banking licenses, largely as a signal to customers that the coins are safe as bank deposits."

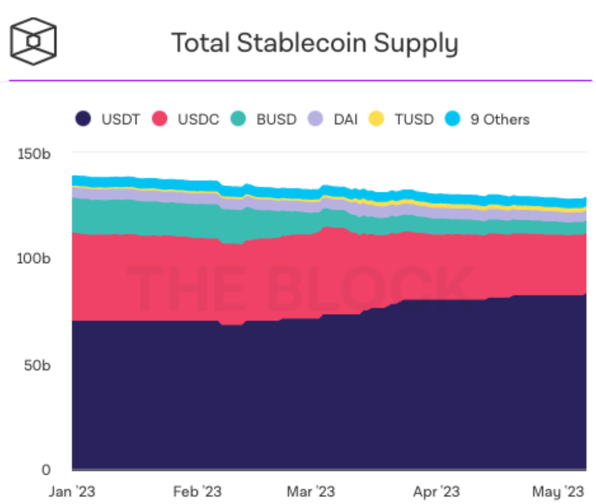
	STABLECOINS	TOKENIZED DEPOSITS	RETAIL CBDC
		USDF CONSORTIUM	
Main use case	Facilitating trading of crypto assets	Real-world payments and traditional financial services	
Consumer Protections	✗	✓	✓
Worth a dollar? (Safety and soundness)	!	✓	✓
Supports Credit Creation (Fractional Reserve Banking)	✗	✓	✗

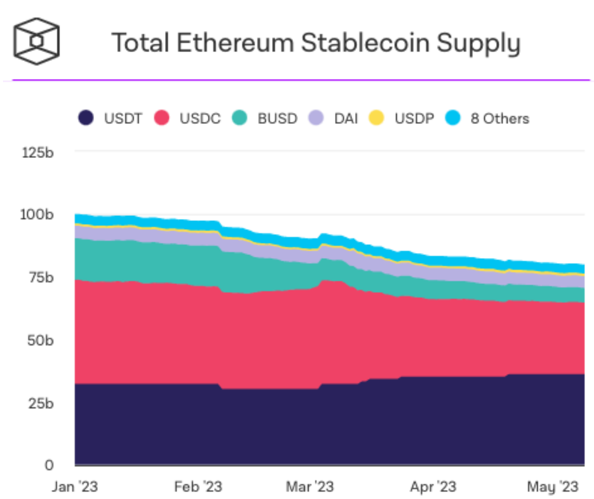
In Europe, Societe Generale and the Bank of England, among others, are preparing their operations for additional digital adoption as well. Societe Generale's Forge division, who is no stranger to tokenization and digital assets (see: SocGen receives $7 million loan from MakerDAO), issued a permissioned Euro stablecoin accessible only to clients, partners, and counterparties who have successfully onboarded through the bank's compliance procedures. The EURCV token follows the path that the European Union's Markets in Crypto Assets (MiCA) framework enables; the act itself is expected to propel the EU's market share of digital asset initiatives and innovation heavily forward. Even the Bank of England proclaims that deposit tokens are "a much simpler proposition than non-bank stablecoins." This is extremely in line with the actions of Soceiete Generale and the previously mentioned cases in which tokenized money must be derived from some sort of banking entity to really fit a feasible and applicable settlement structure.

Central Bank Digital Currencies (CBDCs), a segment that's one of the more controversial ones within the digital assets space, is also now coming into stronger question from prospective alternatives. Constructing a solution specifically as a Central Bank Digital Currency (CBDC) substitute or alternative is the **Regulated Liability Network (RLN)**. RLN is another consortium with the mission of exploring the "technical, legal and business characteristics necessary to provide on-chain, 24*7 programmable, final settlement in sovereign currencies, consisting of the liabilities of both public and private regulated financial institutions." The initiative, which is still in the conceptual phase, is spearheaded by Citi and aims to offer a solution in which bank deposit tokens, stablecoins, and even central bank money could coexist; RLN would essentially be a blend of these aforementioned versions of digital money thus creating a diversified reserve system. On the infrastructure side, RLN seeks to be the settlement layer and already has messaging partners onboarded, including SWIFT. Other consortium members include the New York Federal Reserve, BNY Mellon, HSBC, Wells Fargo, and Mastercard. The usefulness of RLN will likely come down to how successful deposit tokens are through examples like Onyx and USDF. It could be seen as redundant for banks and organizations to join numerous consortiums working towards a similar overarching goal, although it's certainly too early to rule out a multi-faceted solution that could, in theory, span the entire base layer of digital capital markets.

Back to the active markets, there are also more creative solutions to stablecoins that double as actual investable products. Anything in the money market, short-term bond, and treasury fund region is being explored for on-chain transacting and settlement purposes, with a few very prominent cases now totaling around $500 million in collective assets under management. Originally pioneered by **Arca** and its **US Treasury Fund** known as ArCoin, low-risk yield-generating products can act as superior substitutes to non yield-generating stablecoins because 1) they are usually professionally managed funds and 2) may be digitally native products, thus enabling an end-to-end on-chain ecosystem.

Franklin Templeton's OnChain US Government Money Fund (FOBXX) was formed in April 2021 and has now amassed almost $300 million in assets under management. That $300 million mark is impressive to the tokenization industry but probably underwhelming to the lay person coming from a $1.4 trillion asset manager whose flagship money market master fund is sitting on $12+ billion in assets. The more important takeaway is the fact that the tokenized fund grew in size by 20% ($225 million to $272 million) over April 2023 coinciding with redemptions across the stablecoin ecosystem per The Block, representing a flight to on-chain low-risk yield.





Franklin Templeton is now poised to take advantage of the continued movement from stablecoins, whether algorithmic or fiat-backed, and into on-chain money market funds. To further capitalize on this macroeconomic trend and on blockchain-level momentum, the asset manager elected to expand its tokenized fund from the Stellar blockchain to Stellar and Polygon under the token symbol $BENJI, a nod to its Benji Investments app where this fund is available to retail investors.

Ondo Finance is also seeing traction with its plan to provide traditional professionally managed products on-chain to make use of DeFi applications. Coming to market with the goal of rotating stablecoin holders out of non yield-generating tokens and into yield-generating products completely on-chain, Ondo's first product, the Ondo Short-Term US Government Bond Fund ($OUSG), is nearing $120 million in Total Value Locked (TVL), comparable to assets under management. OUSG primarily invests in the iShares Short Treasury Bond ETF (NASDAQ: SHV) and simply acts as a fully digital wrapper. This enables investors with the performance of iShares Short Treasury Bond ETF and the capabilities of DeFi - namely, Ondo's collateralization platform, Flux Finance, where investors can lend and borrow USD Coin (USDC) against OUSG. Flux currently has $60 million in OUSG supply, indicating roughly 50% of the total OUSG assets staked and available for lending to prospective borrowers.

One of the key uses to look at when it comes to these tokenized money market funds or comparable yield-generating products is how platforms and issuers can improve returns for their investors whenever funds are in escrow or in waiting. For example, RealT began the added yield campaign from its inception when it would hold property maintenance reserves in a Compound pool generating anywhere from 4-6% interest for property token holders. Now that the industry actually has on-chain products ready to take advantage of the high interest rate environment a la professionally managed funds, this same strategy can be applied on a greater level for any dry powder that would typically be held in cash or stablecoin during escrow or waiting periods before deployment across real estate, private equity, private credit, and within benchmark funds.

Investment Bank and Broker-Dealer Involvement in Capital Raises

Looking at investment bank and broker-dealer activity and participation within security token offerings and general blockchain-based products is a key temperature reading. These groups will only get involved if they sense there's money to be made and feel their investors will be receptive to the offerings themselves; this is an indicator of growing comfort and educational understanding of tokenized products, which is critical in breaking down barriers between issuers, of which there is no shortage, and prospective buyers and investors. Investment banks and reliable distribution channels are still very necessary pieces of the capital markets ecosystem,

even when blockchain is involved, which makes the following developments things that issuers and other traditional and digital broker-dealers should be aware of.

Castle Placement, which is a nearly 15 year-old digital investment bank headquartered in New York City, announced the approval and launch of its newly-formed CPGO ATS. CPGO will support traditional equity and debt securities across Reg CF, Reg D, and Reg A+ placements, while also being compatible with security tokens. As we know, security tokens can represent investment instruments of any kind, therefore acting as the potential mass overlay to the general private placement market. Castle has raised over $1 billion of capital for previous clients and currently has 105 open transactions with an aggregate raise target of $6.2 billion. Distribution is the name of the game right now with quality assets and issuers waiting on the sidelines for extra validation, so Castle has the ability to make a noticeable stamp here with its onboarded 600,000 accredited investors and 65,000 institutional investors and/or lenders.

In terms of **retail and accredited** investor **private placements**, Dalmore Group has also accelerated its security token offering trajectory through its Reg A+ performance over Q1 and the Q2 capital raise launch of Freeport, a Security Token Advisors client who is fractionalizing and issuing common shares in physical Andy Warhol paintings to everyday investors via Reg A+. Specifically, Dalmore accounted for $49.8 million of the collective $52.7 million in Reg A+ capital raised in March 2023, translating to more than 1/3rd of the entire quarter's $143 million Reg A+ haul in March alone. Q1 equity crowdfunding saw an 85% jump over Q4 2022 with March marking the largest amount of Reg A+ capital raised since April 2022. This is ammo and brand recognition for future Reg D and Reg A+ offerings, both tokenized and digitized.

Looking at **traditional investment** banks, **Jefferies** has reentered the blockchain world after a *three-year* hiatus. First working with Figure in March 2020 on a large Provenance Blockchain-based HELOC securitization, the investment bank surfaced in late April 2023 with Figure's newest HELOC closing, which just so happens to be the technology provider's first asset-backed security that's rated by a major rating agency.

Looking at this *3,568 loan $237 million* HELOC, FIGRE 2023-HE1 offers Class A and Class B notes; the Class A notes were rated AAA and Class B notes were rated A(low) by Morningstar. The product was underwritten by the JP Morgan, Goldman Sachs, and Jefferies trifecta as the banks continue to explore innovative lending solutions and new lines of business, which will be a key theme for investment banks as a whole. Figure itself reached $5 billion in HELOC originations across 70,000 homes by the end of 2022 while taking a 0.25% servicing fee on all loans in its transactions; that's the reference point to build upon here in 2023.

The three-year hiatus on Jefferies' side is a very positive indicator for the tokenization markets. While security token offerings were originally gaining some steam from an issuer capital raising standpoint in the 2017-2019 era, capped in early 2020 with Jefferies' involvement in one of Figure's most notable deals at the time, things cooled off on the banking side for a couple years. Jefferies went cold turkey, more or less, on the industry. Now, the firm's reentrance symbolizes a point of inflection marked with the necessary confidence in the tokenization landscape for the bank to tangibly get involved as a lead underwriter.

It's also very significant that JP Morgan and Goldman Sachs, both of whom have their own proprietary tokenization services in-house, are **active as underwriters** in this deal. It goes to show that tokenization is simply an overlay to the existing capital markets; investment banks can still perform their usual services and work within their current fee models with a degree of creativity on the product side (blockchain-based securities). Not everything that has to do with tokenization *has* to be done on an individual bank's specialty platform or portal, which should also give institutions some confidence and low-hanging fruit opportunities to get active in the space as capital raising partners.

Of course, there are already existing product tokenization solutions provided by or through blue-chip investment banks. Examples include Goldman Sachs Digital Asset Platform (GS DAP™), HSBC's Orion Platform, and Deutsche Bank's Digital Assets Management Access). While these segments are apt to change and evolve based on demand and trends, each platform's current focuses are as follows:

- Goldman Sachs Digital Asset Platform (GS DAP™): digital bonds, commercial real estate, private credit
- HSBC's Orion: digital bonds
- Deutsche Bank's DAMA: private equity and private credit funds

Still, launching and owning a tokenization platform is not the only nor even the greatest value play that investment banks can contribute to the industry. These tokenized offerings still need a formidable distribution network in which investment banks and broker-dealers hold many of the keys. Until the digitally-native issuance platforms reach a critical mass of active investors, the demand side is the tough piece to crack. Traditional investment banks can make a strong mark this *decade* by simply **acting as investment banks for tokenized offerings**. It sounds so rudimentary but it is absolutely true: issuance platforms and newer broker-dealers need fundraising support for their clients.

The fact that many of these tokenized products get fractionalized and issued at lower buy-ins while also offering newfound benefits (i.e redemptions, liquidity, future collateralization) should be an exciting facet for banks to diversify themselves from each other and expand their typical ranges of qualified investors to smaller clients who are also likely in search of private market offerings that tokenization is becoming more and more associated with.

Digital Product Issuances through Investment Bank Platforms

As touched upon earlier, banks are getting active and placing bets on their own technology horses. After teasing a $104 million European Investment bank (EIB) pilot through its bond issuance platform, Goldman Sachs officially launched Goldman Sachs Digital Asset Platform (GS DAP™) in January 2023, roughly two months after HSBC launched its Orion platform. Since then, GS DAP™ was responsible for the $102 million digital Green Bond with the Hong Kong Monetary Authority (HKMA) and presumably has additional issuances lined up with the current active banks like Societe Generale, EIB, Santander, and Union Bank. It's noted that GS DAP™ saved *15 basis points* (~$156,000) in its inaugural EIB issuance - a number that will likely only increase with the size of these issuances and full end-to-end digital onboarding, servicing, and management.

Other notable banks in play this quarter include HSBC's Orion platform, UBS working heavily with SIX Digital Exchange (SDX), Credit Agricole & SEB's green bond network, and Deutsche Bank with its Digital Assets Management Access (DAMA) platform. Individual issuances include:

- ABN AMRO: ~$600,000 Stellar-based corporate bond on behalf of APOC, its client, subscribed to by existing equity owners
- HSBC Orion: $62 million sterling bond issue & commercial bank money
- SIX Digital Exchange: $102 million municipal bond for the City of Lugano
- LCX: $12 million corporate growth bond

UBS launches world's first native digital bond with intended dual listing and trading on SIX Digital Exchange and SIX Swiss Exchange

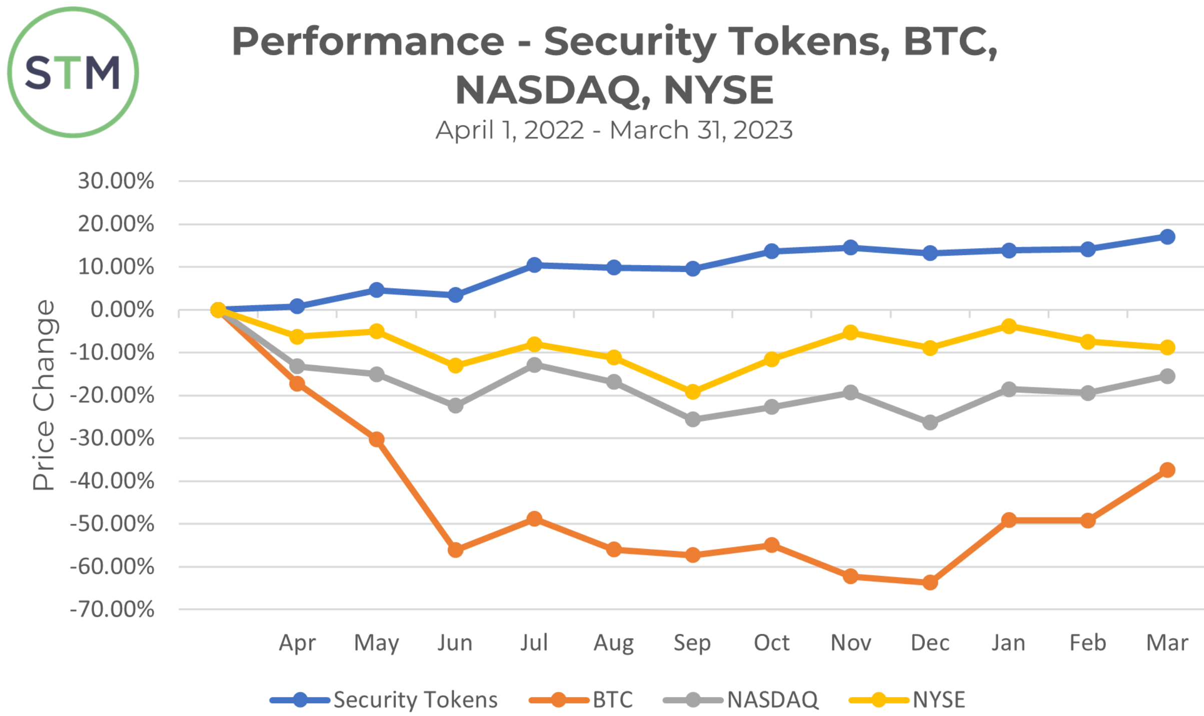
Secondary Market Activity

Of course one of the common questions from prospective issuers, investors, and trading firms surrounds the secondary market activity of security tokens and listed assets. Currently, these tokenized assets trade through broker-dealers (BDs), alternative trading systems (ATSs), multilateral trading facilities (MTFs), digital securities exchanges, and sometimes compliant decentralized solutions internationally. Much of the trading is facilitated on a singular venue basis; there is little to no order routing finding the best executable price for traders because the vast majority of assets are only listed on one venue. This means liquidity numbers are more or less limited to the activity of each individual venue until these marketplaces and players can better support multi-listed offerings with each other.

An interesting development on this front came from OTC Markets Group's May 9th, 2023 earnings call in which the organization, currently supporting over-the-counter (OTC) trading of 10,000+ securities through a network of broker-dealers, revealed FINRA approval for the listing and trading of **digital asset securities** via its OTC Link ATS. The SEC notes that, "Presently there are only two interdealer quotation systems, Global OTC ATS (part of NYSE Group), and **OTC Link ATS** (operated by OTC Markets)." Additionally, OTC Link ATS enables broker-dealers acting as *market makers*, which Security Token Advisors has been detailing as the seemingly overlooked *weak link* in the existing security token secondary markets. President and CEO of OTC Markets stated:

> *"We also recently received FINRA approval to permit digital asset securities to be traded by broker-dealers on OTC Link ATS. This approval furthers our mission of operating regulated markets for broker-dealers and issuers of securities. While it will be some time until the regulatory framework and infrastructure develop, we believe our markets are well-positioned to be part of new trading, data, and disclosure solutions for these securities."*

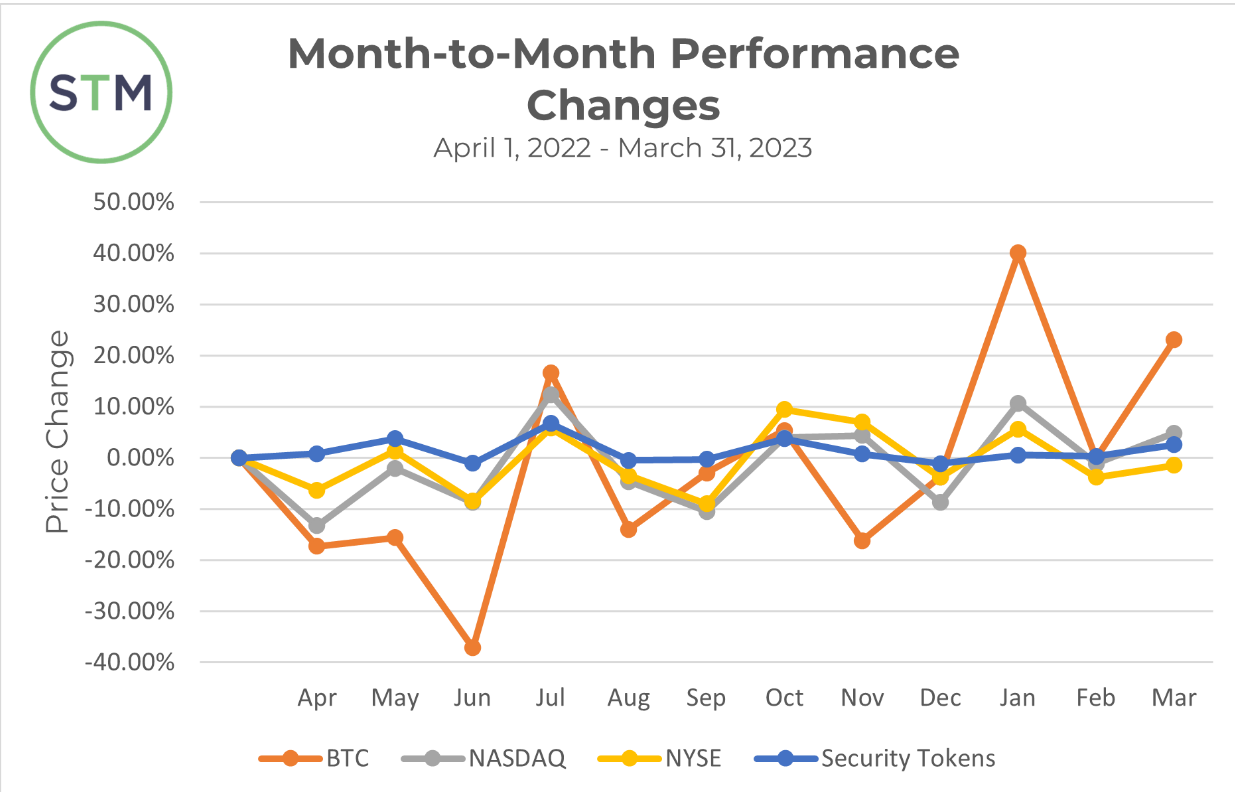
Aside from the recent approvals and drawing on insights from our sister company, Security Token Market (STM.co), the following bits are presented to help provide the rest of the industry with more existing holistic secondary market context across real estate assets, private investment funds, pre-IPO shares, and other asset classes and on-chain instruments.



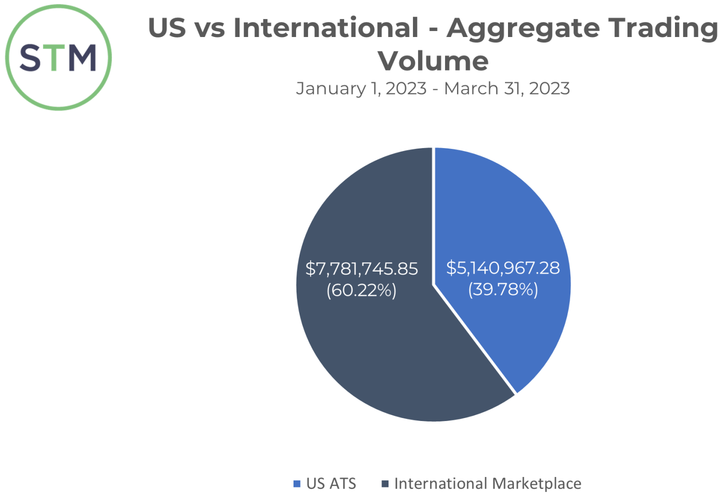
The general bundle of security tokens on global secondary marketplaces, including but not limited to alternative trading systems (ATSs), multilateral trading facilities (MTFs), and digital securities exchanges, outperformed Bitcoin (BTC), Nasdaq, and NYSE over the twelve months ending Q1 2023. The security token bundle showed returns of 17.06%, while BTC, Nasdaq, and NYSE returned -37.45%, -15.51%, and -8.82%, respectively. Looking at month-to-month changes in the visuals displayed below, the security token bundle fluctuated an average of just 1.84%, with its most volatile month changing 6.75% in July 2022. BTC, Nasdaq, and even the NYSE all experienced more volatile movements with average monthly changes of 16.01%, 7.1%, and 5.46%, respectively.

Benchmark	Trailing 12-Month Performance	Average Monthly Change	Highest Monthly Change
Security Tokens	17.06%	1.84%	6.75%
Bitcoin (BTC)	-37.45%	16.01%	40.06%
Nasdaq	-15.51%	7.1%	13.26%
NYSE	-8.82%	5.46%	9.46%

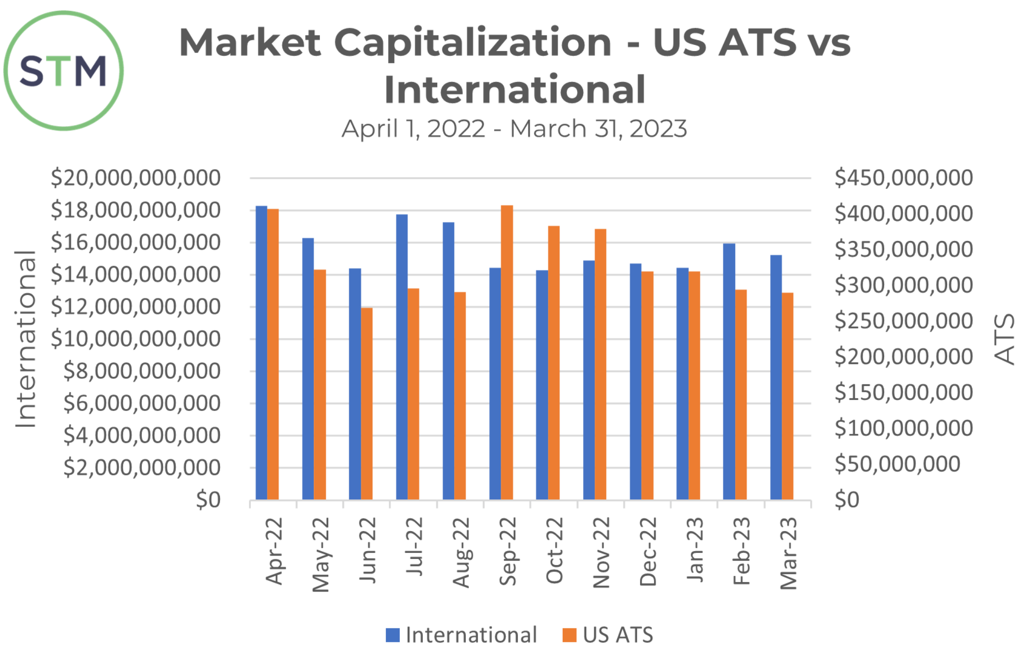
This is possibly a result of the security token bundle's organic diversified backing of assets (real estate, private equity, pre-IPO shares, digital asset mining notes, etc.). As savvy investors seek to diversify personal and client holdings with a greater emphasis on alternatives and less-correlated assets per Morgan Stanley, a strategic security token overlay may offer an added degree of diversification given its natural and existing widespread uses across both private and public assets.



Looking at the secondary trading venues, the United States is limited to just a few truly active alternative trading systems (ATSs) at this point in time: tZERO, Securitize Markets, and INX One. Volume on international marketplaces, where venues could include both centralized solutions and permissioned decentralized solutions across some major digital assets jurisdictions like the European Union and Asia, therefore has historically exceeded that of the active ATSs. There was a collective ~$13 million of global trading volume during the course of Q1 2023, of which international marketplaces accounted for roughly 60% and United States ATSs the remaining 40%.



Perhaps more interestingly and a positive tailwind for ATSs relative to international venues, the market caps of aggregate tokens listed are skewed heavily towards international venues in terms of size while aggregate volume remained a closer race. Over the twelve month period ending Q1 2023, collective market caps on ATSs peaked around $400 million versus $18 billion internationally - putting internationally-listed tokens as 45x larger by market cap than those on ATSs. In Q1 2023 specifically, there was $5.1 million of trading volume on an average market cap of $290 million on ATSs, yielding a 1.77% volume-to-market cap ratio for the quarter. Considering nearly all of these listed tokens are private assets, the fact that there is any trading volume is already a value-add and an upgrade to the existing private markets.

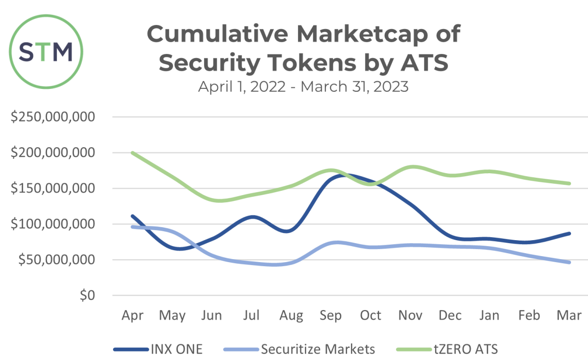


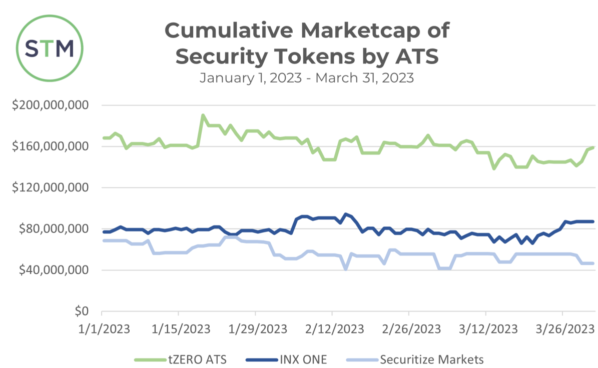
The two most actively-traded security tokens on ATSs during Q1 2023 were tZERO's and INX's own security tokens, $TZROP and $INX, respectively. The tZERO token is a preferred share while INX's token is a profit sharing token by definition; this is more comparable to a standard public equity than an individual real estate asset would be, so it makes sense these two are at the top of the trading activity leaderboard.

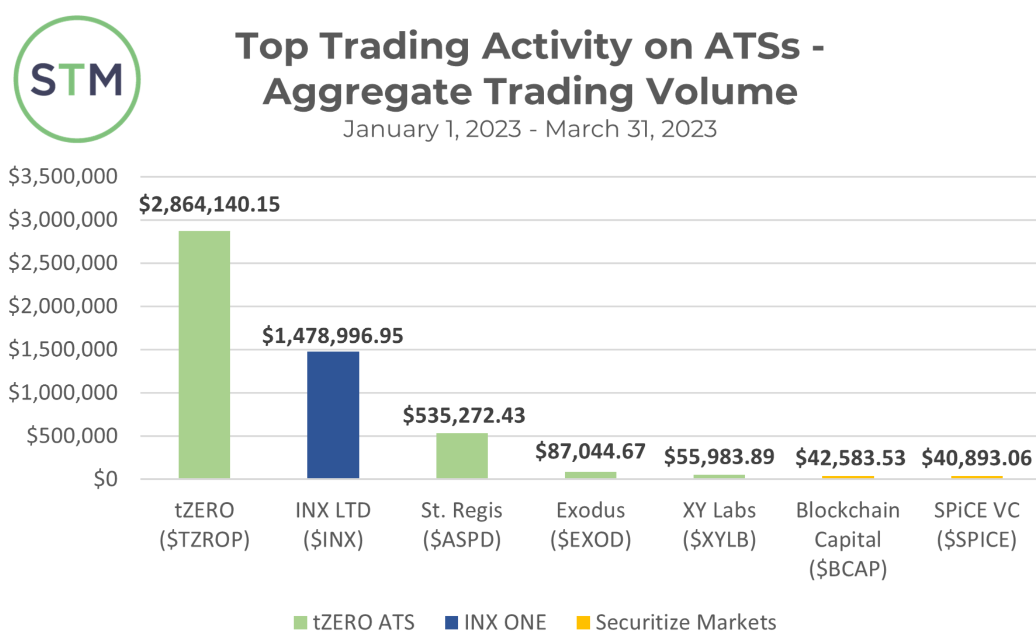
The next five most actively traded tokens on an ATS are:

- St. Regis Aspen ($ASPD) - commercial real estate equity via Reg D
- Exodus ($EXOD) - Class A common shares via Reg A+
- XY Labs ($XYLB) - Class A common shares via Reg A+
- Blockchain Capital ($BCAP) - venture capital fund interests
- SPiCE VC ($SPICE) - venture capital fund interests

Keep in mind that hands-off trading has more or less been nonexistent for these asset types in the traditional capital markets. The closest fit would be periodic redemptions between an investor and a fund manager or over-the-counter (OTC) solutions for large-scale products; the ability to execute trades at secondary market price is novel and therefore even a 4% volume-to-market cap metric is remarkable for a private company, as seen with tZERO ($2.86 million volume on ~$70 million market cap).

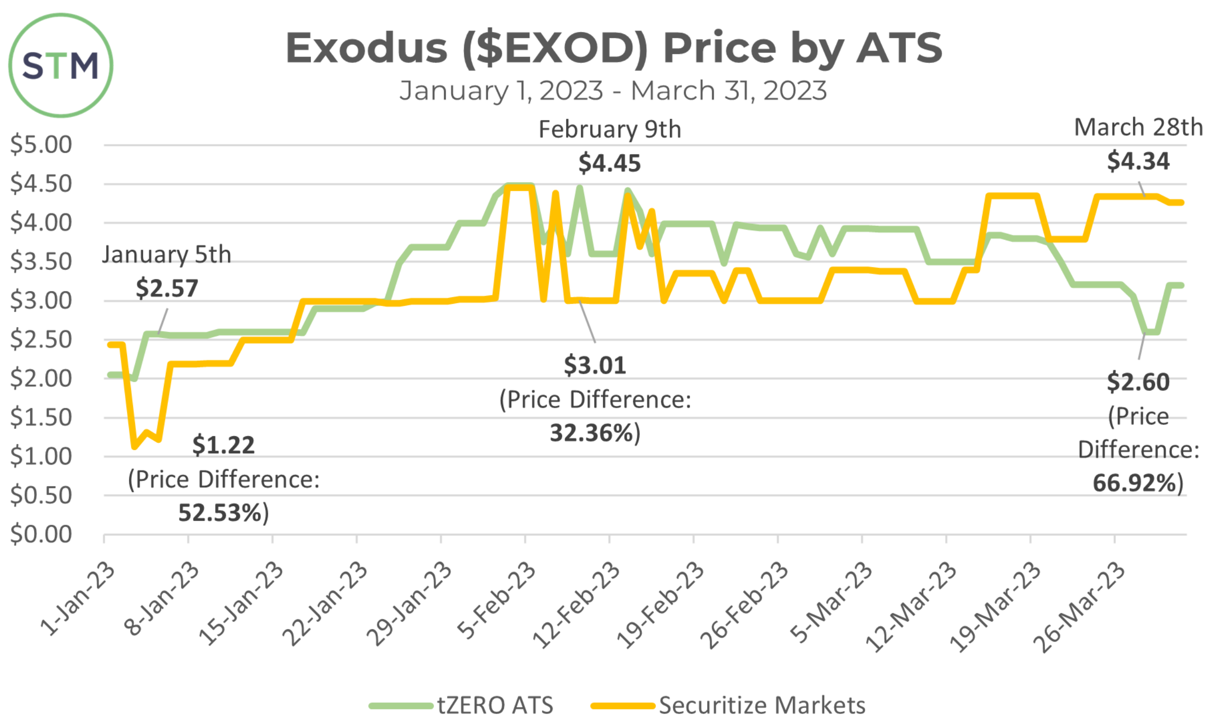






One of the exciting opportunities within this more nascent vertical of digital assets lies within the growing pains of the secondary markets: arbitrage. The marketplaces are certainly not as built out as public equities, as fixed income desks, or even as crypto exchanges. However, Bitcoin (BTC) was only seeing anywhere from a few thousand to a few hundred thousand dollars of daily trade volume from 2011-2013 per CoinMarketCap; that remaining decade was an era in which arbitrage opportunities were rampant, and skilled market makers were able to take advantage of the mispricing across the various crypto marketplaces.

While this isn't apples-to-apples since BTC is not a security and here we are indeed dealing with blockchain-based securities, a trading firm cannot ignore the opportunity that lies across the ATSs and global digital securities venues. Look at the price action of Exodus ($EXOD), which is listed on both Securitize Markets and tZERO.



Over Q1 there were 3 extreme $EXOD price differentials of 52%, 32%, and 67% across Securitize Markets and tZERO, with almost nonstop smaller mispricings otherwise. Granted collective $EXOD volume for the same time period was $87,044, it is unexpected that these pricing gaps fill themselves in the short-term even if organic volume increases to more notable levels. This would be where actionable opportunities present themselves to smaller-sized prop traders or prospective market makers.

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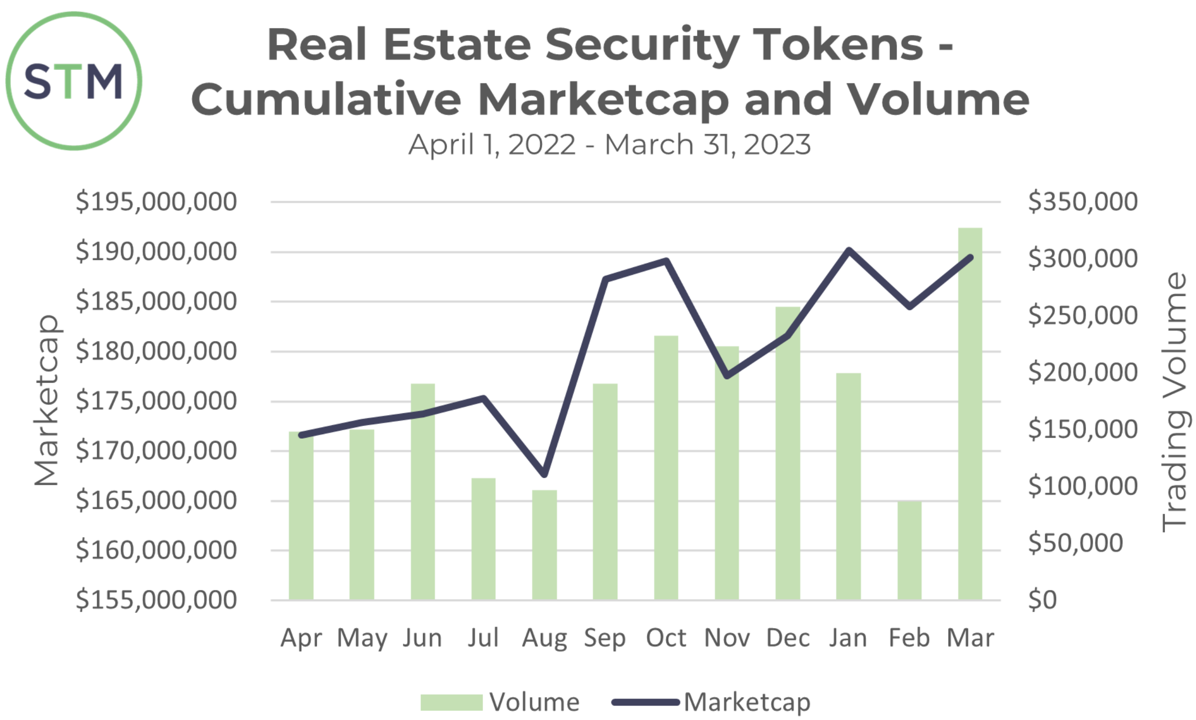
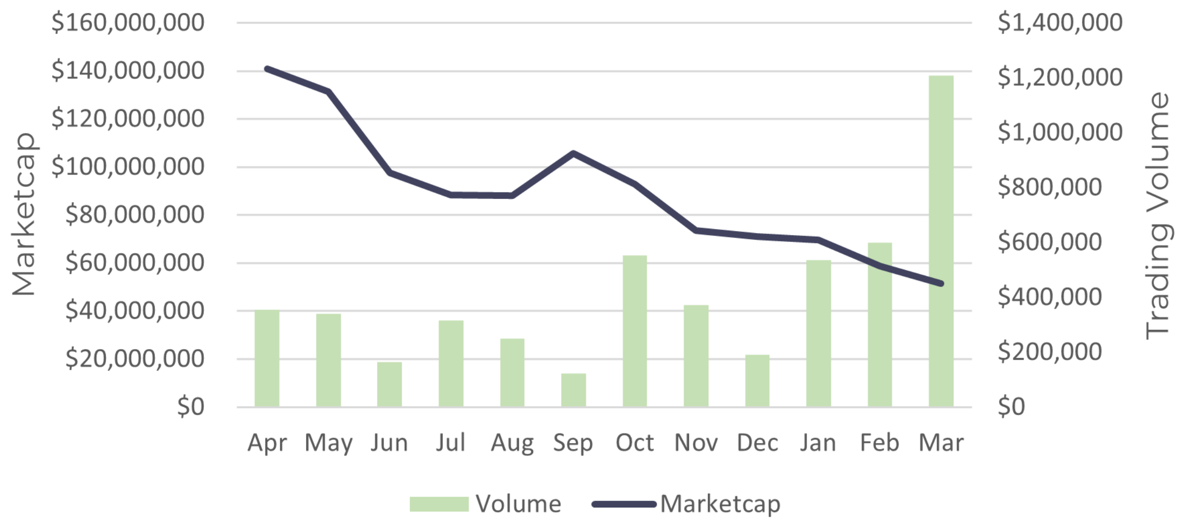
Looking at the global markets inclusive of ATSs and international venues the past twelve months ending March 31, 2023:

- Real estate grew 10% in market cap and achieved mostly steady increases in trading volume, both signaling an "upwards and to the right" trend
- Private investment fund tokens slowly picked up volume before spiking in March 2023 while market cap value decreased 60%, signaling selling pressure
- Pre-IPO Equity tokens significantly dipped in volume, decreasing by 80% from April 2022 - August 2022 with insignificant activity for the remainder of the period in which the market cap ended null



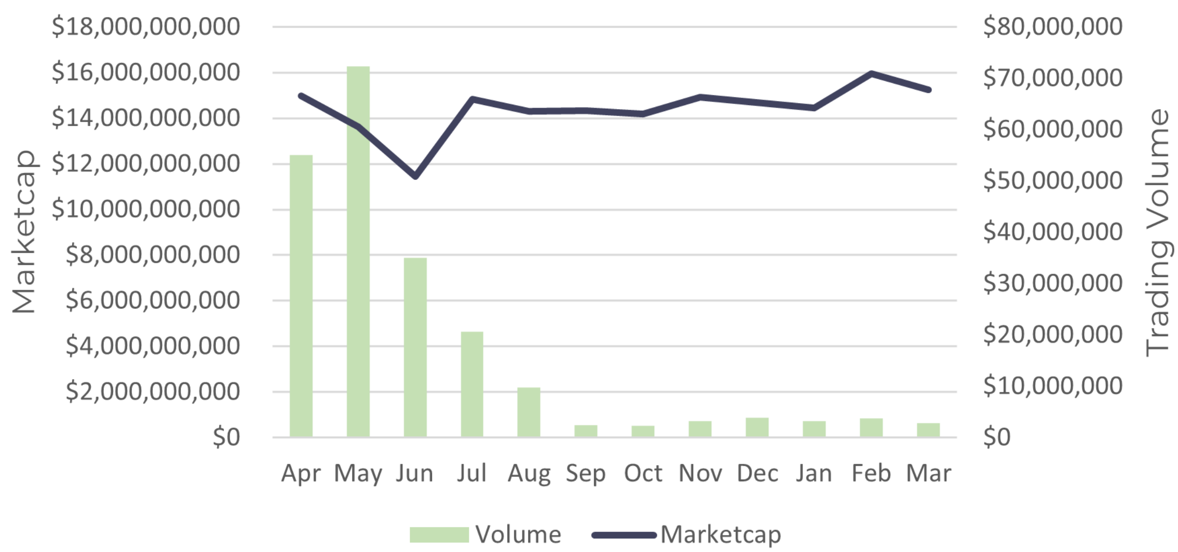
Investment Fund Security Tokens - Cumulative Marketcap and Volume

April 1, 2022 - March 31, 2023

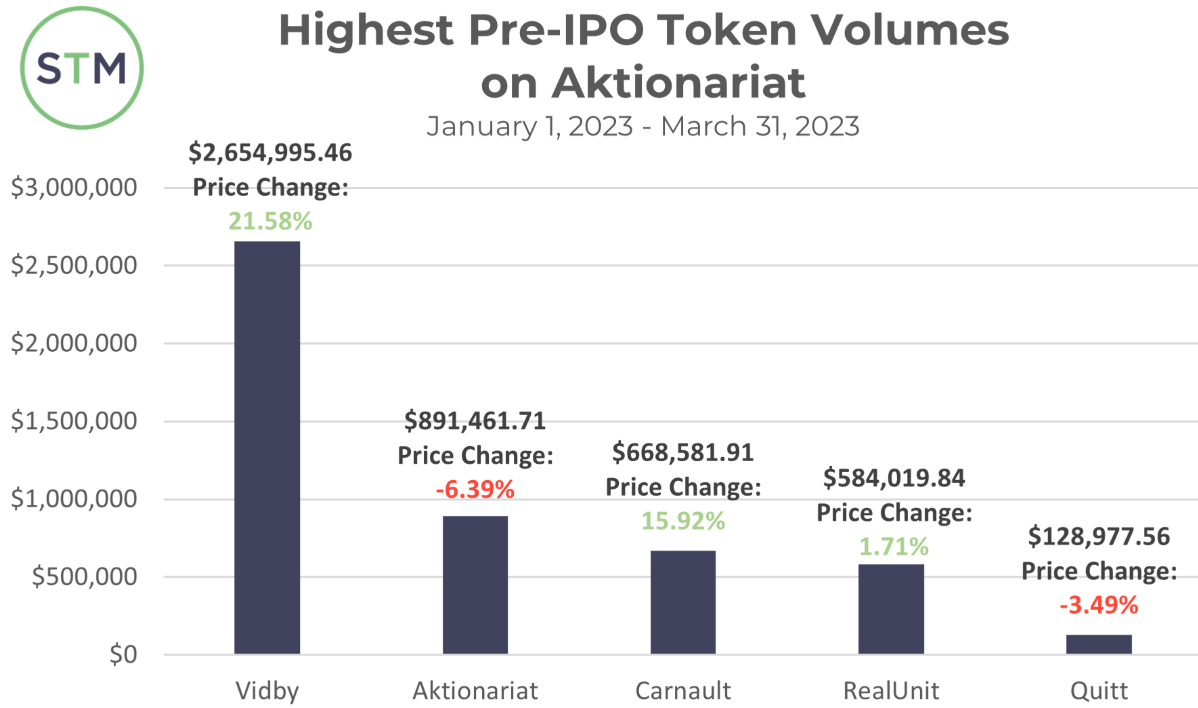


Pre-IPO Share Tokens - Cumulative Marketcap and Volume

April 1, 2022 - March 31, 2023



The chart directly above details general equity tokens of private companies ranging from startups to commodities firms to service providers. The chart below focuses on the Swiss tokenization marketplace Aktionariat, who lists pre-IPO shares of startups. While most of the listings saw mid six-figures in volume across Q1 2023, one pre-IPO equity eclipsed the seven-figure mark rising 21% on $2.65 million in volume.



Private Equity and Private Credit

The private equity and private credit themes shaped up on a global scale at a time where asset managers are exploring alternative opportunities on both fronts.
Hamilton Lane has been the most widespread active issuer within these focuses considering the firm now has 6 products openly raising capital or under contract with varying service providers, blockchains, and geographies.

Led by Victor Jung in the Digital Assets division, **Hamilton Lane** issued an investment product on the Ethereum blockchain with ADDX in Singapore in early 2022, citing reduced subscription amounts of 92% from $125,000 to just $10,000 as a function of the blockchain-enabled platform's investor management and fund servicing scalability. The issuance was done by taking a portion of the $2.2 billion Global Private Assets Fund and issuing it on a secondary basis via security token to accredited international investors. This came six months after $120 billion Partners Group, at the time, issued the first tokenized private equity fund with ADDX making use of a unique open-ended monthly subscription and redemption model in its $6 billion Global Value SICAV Fund.

Hamilton Lane's ADDX fund was followed up with the filing for the creation of three digital share classes in the firm's existing Private Assets Fund (PAF) in October 2022. These new digital share classes will be issued on the Provenance Blockchain with Figure's Digital Fund Services (DFS) solution, and mark the first 1940 Act fund investing in private assets with digitally-native shares. In January 2023, the first of

Hamilton Lane's three-fund agreement with Securitize rolled out on the Polygon blockchain, beginning with its $2.1 billion Direct Equity Fund V.

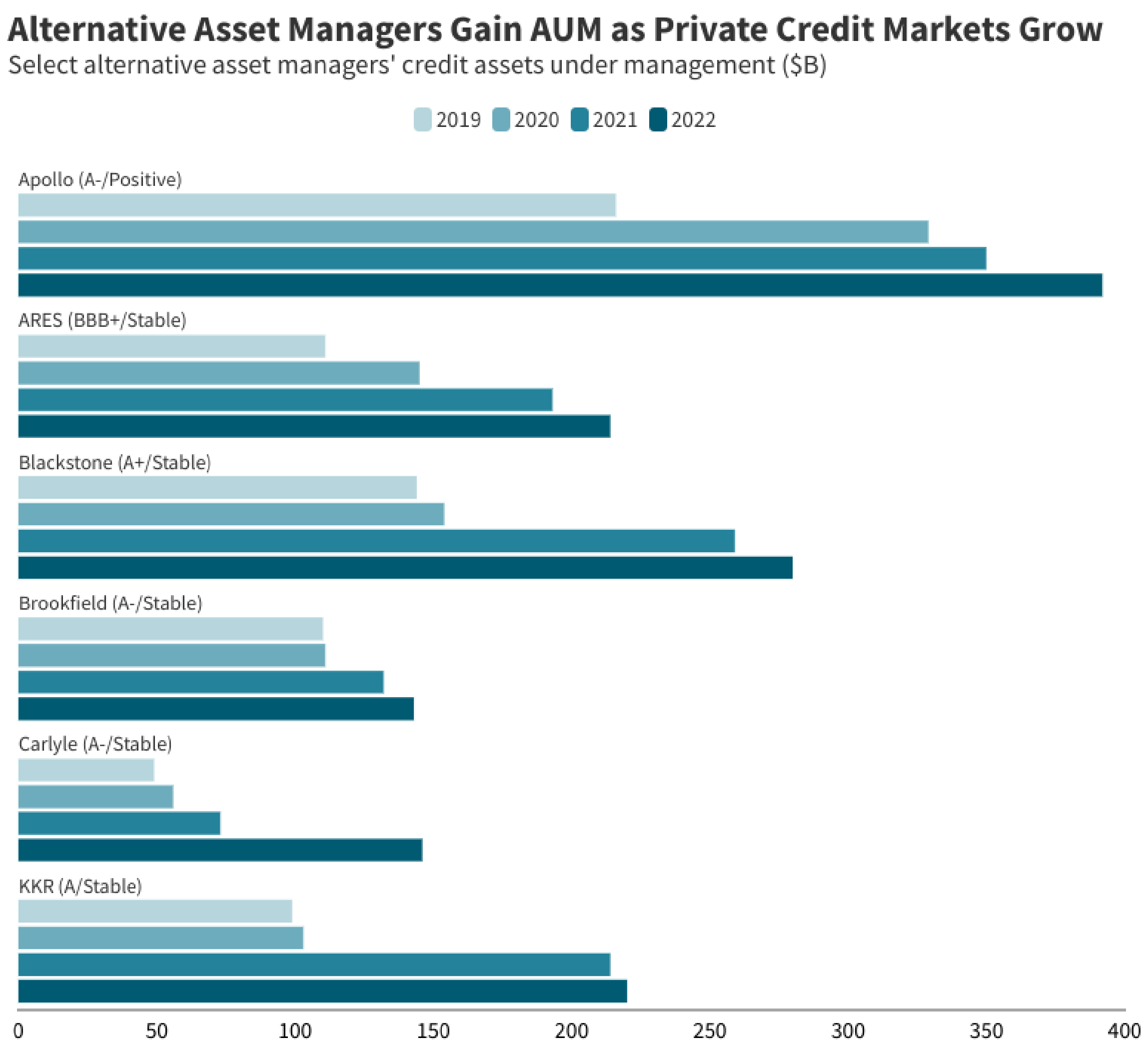
Headed back to Singapore in early April 2023, Hamilton Lane partnered with Southeast Asia's largest digital alternative investment marketplace Alta to offer a tokenized evergreen fund. Notably, Alta acquired the digital securities exchange Hg Exchange in order to seamlessly enter the tokenization markets, a move STA detailed in The State of Security Tokens 2022 when Binance Singapore took an 18% stake in the platform. Lastly and most recently, in May 2023, Hamilton Lane issued its first tokenized credit fund to date and the second of the three agreed upon products with Securitize. Hamilton Lane once again selected to work with Polygon for the Senior Credit Opportunities Fund (SCOPE) feeder fund issuance. The feeder fund buy-in is 99.5% less than that of the traditional evergreen fund - just $10,000 versus $2,000,000. As an improved version of the original Partners Group model, the SCOPE feeder will offer monthly subscriptions and *on-demand* redemptions, making it the first private credit fund in the United States to offer real-time liquidity to investors.

Beyond the single issuer that is Hamilton Lane, a **number of platforms** popped up and/or solidified in 2023 YTD. International platforms like Obligate, BondbloX, PV01, and DEFYCA made headlines under the common mission of connecting private credit issuers with smaller investor syndicates to better meet supply outside of the traditional avenues. This follows suit with the decade-long positive trend of private credit in Europe growing over *5x* from $36 billion to $187 billion over 2012-2022 per Macquarie Group and the Deloitte Private Debt Deal Tracker.

Based in the United States but primarily working with LATAM and APAC companies, Hamsa has already tokenized over $3 billion of private credit and receivables, another interesting use-case as corporations across the board (SMEs to Fortune 500 companies) seek to put their future cash flows to work. These blockchain-wrapped loans may eventually be used in DeFi applications following a similar playbook to BlockTower Capital, who is working to fund $220 million worth of real-world assets with Centrifuge and MakerDAO through its institutional credit fund.
**Deeper dives on these platforms can be found under the "Public Blockchain Updates & Notable Issuers" and "Private Blockchain Updates" sections.*

There is an **extreme opportunity** at the intersection of **private credit and tokenization** for some of the major alternative asset managers. With firms like Hamilton Lane and Apollo already active in tokenization and firms like BlackRock and Carlyle tangentially involved (i.e. through partners, subsidiaries, or portfolio companies such as Carlyle's Calastone), this is one of the more promising near-term verticals to make use of blockchain-based securities. Fixed income funds may also present more attractive or suitable products to investors who are still weary about private equity's ability to navigate the macroeconomic picture, thus finding investor demand.

S&P Global provides useful insights into how these alternative asset management behemoths are working with private credit in its April 2023 Private Lending report stating, "Six of the largest alternative asset managers we rate (Apollo Asset Management Inc., Ares Management Corp., Blackstone Inc., Brookfield Asset Management Inc., The Carlyle Group and KKR & Co.) have roughly doubled assets under management devoted to credit since the end of 2019, reaching approximately $1.4 trillion" and detailing this in the graphic below.



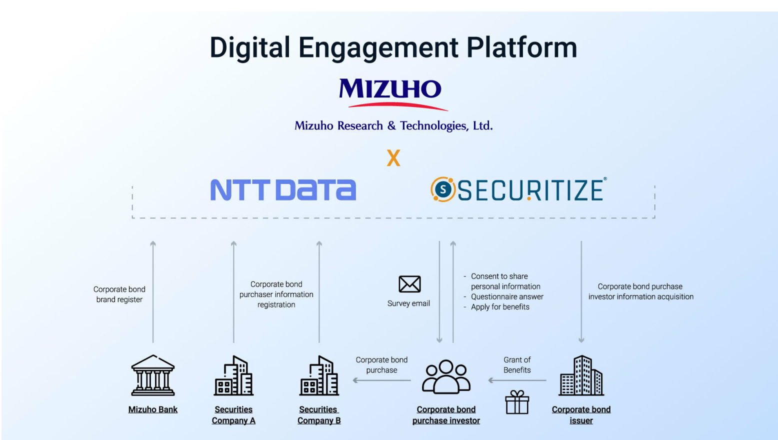
Data as of Dec. 31, 2022.
Credit assets under management reference : Apollo defines as "yield" for Q3 2022 and as "credit" for 2021 and 2020, Blackstone as "credit and insurance," Carlyle as "global credit" and KKR as "credit and liquid strategies" for 2022 and "public markets" for 2021 and 2020. For Brookfield, credit AUM represents fee-paying AUM (FPAUM) related to Credit Strategies division, excluding DoubleLine.
Sources: Company filings and presentations; S&P Global Ratings.

Platform and Service Provider Updates

The following section is meant to detail relevant platform and service provider updates including but not limited to digital transfer agents, broker-dealers, alternative trading systems, issuance platforms, data providers, and other third-party groups associated with asset tokenization. This will be helpful to issuers and investors in evaluating how platforms have progressed, as well as getting a general reading for the public-facing side of the tokenization industry.

Securitize

Securitize closed 2022 with institutional momentum coming off of the KKR feeder fund launch and Hamilton Lane multi-product signing. It kicked 2023 off with the first Hamilton Lane product to go live - a Polygon-based feeder fund to the $2.1 billion Equity Opportunities Fund V. Securitize continued to build the bridge between traditional private market investors and blockchain securities a month and a half later in March through its integration with Onramp, which will provide Onramp's collective $35 billion across its onboarded RIAs and wealth management groups access to Securitize-listed products, including Hamilton Lane's. This integration is designed so that "RIAs can holistically manage portfolios across private equity, digital assets, and traditional investments to uniquely optimize wealth strategies for their clients." In early May, Hamilton Lane also listed its first private credit product, a tokenized Senior Credit Opportunities Fund (SCOPE) feeder with Securitize and Polygon in efforts to raise capital at lower check sizes from the 2 million qualified purchasers in the United States.



Throughout the quarter, Securitize was active on its transfer agent side with the March launch of BridgeTower Capital's compliant staking services, which will ultimately connect investors with staking opportunities within the BridgeTower ecosystem and Securitize product listings alike. At the end of March, Security Token Market closed its Regulation Crowdfund (Reg CF) round as the first Web 3.0 crowdfund offered through Securitize. Internationally, Securitize Japan teamed up with Mizuho Research and NTT Data to develop a blockchain-based communications system for Mizuho Bank and its clients.

Equity Shift

Equity Shift is one of the more unique platforms of its kind. It's an SEC-registered Broker-Dealer & Alternative Trading System that actually makes use of private blockchain solutions for product issuance and management, rather than public blockchains like most service providers in this section. Equity Shift received its 10th U.S. Patent for the BITE® platform in February, enabling it to strengthen the technology and execution around the *Blockchain Instrument for Transferable Equity* (BITE). This proprietary solution offers pre-IPO equity owners with a range of corporate functions through the ATS including primary issuance, secondary transfer, entity buyback, note conversion, dividend payment, and more. The patents and platform itself are designed to offer onboarded users with extreme customization on the pricing and execution sides, and makes use of the underlying blockchain for data recording and transaction functionality.

DigiShares

DigiShares had an active Q1 on the across the board regarding integrations and issuer contracts. DigiShares opened its own $5 million security token offering Reg D and Reg S Series A round in March and closed it in early May. The future secondary listing is to be determined, although DIgiShares indicated that the *DIGI* tokens will list on Oasis Pro Markets alongside its March integration announcement with the ATS. On the note of integrations, DigiShares expanded its custodial network with Fortress Trust in March to better accept and manage cryptocurrency subscriptions within its platform and Dwolla in April to improve its fiat USD processes. On the product issuance side, DigiShares confirmed a number of real estate letters of intent including powering The FuturEstate Alliance's tokenization platform as a white-label service provider.

Securrency

Securrency rang in the New Year with a new CEO - Nadine Chakar from State Street Digital. Nadine's appointment comes shortly after WisdomTree announced 9 new SEC-approved blockchain funds with Securrency Transfers, the transfer agent arm of Securrency. It will be interesting to see how Securrency makes use of its BD/ATS, whether with WisdomTree or other prospective clients. So far, the transfer agent supporting the Ethereum and Stellar blockchains and the firm's patented Compliance Aware Token (CAT) has been the headline focus.

Rialto Markets

Rialto Markets, which offers a wide range of individual and enterprise solutions through its BD/ATS, had a strong quarter for its foundation. The firm unveiled its broker-dealer with 14 companies seeking a collective primary capital raise of $350+ million, and another 30+ issuers signed totalling $1+ billion in targeted capital raised.

These issuances are a blend of Reg CF, Reg A+, and Reg D offerings across real estate, energy, and even the music industry.

Rialto's big announcement came through its enterprise solution in which it was selected by Rubicon Carbon to issue, manage, and trade carbon securities. Rubicon Carbon is backed by TPG's $7.3 billion Rise Climate fund and seeks to provide enterprise customers with nature-based and non-nature-based carbon credits designated as Rubicon Carbon Tonne (RCT). Rialto Markets will be building out this marketplace to enable institutions to purchase a variety of carbon products in its efforts to drive decarbonization with Rubicon.

Tokeny

Luxembourg-based issuance platform **Tokeny** had a productive quarter across new blockchain integrations and live product issuances alike. On the integration side, Tokeny expanded its blockchain support from Ethereum and Polygon to now include Avalanche (AVAX) in its efforts to build a more institutional and robust system. Product issuances include the Emprendeduros venture capital fund, a $10 million Bali hotel, fine art and collectibles through Artory, and Blocktrade's private company equity with 5,000 Class B shareholders in the European Union.

Operationally and from a features perspective, Tokeny's ERC-3634 protocol for complaint permissioned security tokens received a 10/10 security audit score from Hacken, a leading Web 3.0 auditor who evaluates and rates protocols and infrastructure. Around this same time, Tokeny announced its Open-Ended Subscription solution for issuers of open-ended funds, a testament to its growing client base and interest from UCITs, ETFs, mutual funds, REITs, hedge funds, and other investment vehicles and wrappers.

Republic

Prominent crowdfunding and capital raising platform **Republic** launched the Republic Note, known as $R/Note, as a profit sharing Simple Agreement for Future Equity (SAFE) token in July 2020. It originally raised $16 million via Reg D 506(c), and raised another $3+ million in 2023 from almost 2,500 retail investors via Reg CF. The token is not yet trading since most are locked up until mid-2023, but will likely trade on an Alternative Trading System (ATS) in the near future as an Algorand-based token with the issuance platform Upside. Additional structure details are available in the updated April 2023 whitepaper.

Inveniam

Inveniam, the data oracle and operating system for private assets with $55 billion onboarded, hosted its annual *Data 3.0 for Web 3.0 Summit* in Miami, FL in March

2023. Gathering some serious names including Blackstone, Bain, US Bank, MUFG, and Coinbase, the industry began connecting the dots among classic banks and crypto-native firms, with tokenization being that optimal midpoint.

Inveniam also had its share of client and partner announcements, with perhaps the most notable being Cushman & Wakefield in April 2023. Cushman & Wakefield, the dominant commercial real estate brokerage and services firm, will be using the Inveniam data operating system to create a digital middle-office solution focused on the improvement in appraisals and transaction valuations through real-time data surveillance; this is largely in preparation of the tokenization and trading of commercial real estate assets.

This is the second major publicly announced white-labeling of Inveniam's operating system, with the first being Apex Group and its robust fund administration services in Q3 2022. In March 2023, Apex Group was selected to be the fund administrator of the NewVest Private Equity 50 Index Fund (PE 50), which allows institutional investors with one-click exposure to the general private equity market. Apex Group was likely largely selected by NewVest because of Inveniam's services behind-the-scenes as NewVest's thesis here relies on greater data trust, transparency, and price discovery to all involved investors and participants.

Figure

Figure's two largest developments of the quarter came on the public securities and asset-backed securities sides. In February, NovaWulf submitted its bid to take over the Celsius creditor claims and transform creditors into common equity holders via registered tokens that will trade on the Figure ATS. This would be Figure's first publicly-registered company listing in tokenized form, as NovaWulf would file 10-Ks and 10-Qs much like a Nasdaq-listed company. While NovaWulf's bid was accepted in April, the deal is not yet final and therefore the listing is not yet live or active.

Also in April, Figure issued one of its many HELOC securitizations on the Provenance Blockchain, this one achieving the new feat of a public rating through Morningstar. Figure was able to garner the Jefferies, JP Morgan, and Goldman Sachs underwriting trifecta and Morningstar ratings of AAA and A(low) for the HELOC's Class A and Class B shares, respectively. See the "Investment Bank and Broker-Dealer Involvement in Capital Raises" section earlier in this publication for additional details and context.

INX One

INX One had a busy quarter across the board. It enjoyed several new product listings while also upgrading certain components of its infrastructure capabilities. Playing into Polygon's formidable momentum within the tokenization and real-world assets

space, INX One announced its integration and support of Polygon-based assets in March; INX previously supported Ethereum and Avalanche, thus making Polygon its third active blockchain solution. In early May, BitGo, who has had a long-standing partnership with INX, announced its new institutional-grade custody solution for digital securities, which enables wallet segmentation and checks-and-balances among users including viewers, spenders, approvers, and administrators. This could go a long way in INX's pursuit of family offices, asset managers, and wealth management groups.

On the product side, INX listed primary security token offerings for metaverse firm XMANNA and the Bitcoin mining firm Hashrate Asset Group, and the direct listing of real estate and energy firm Greenbriar, whose shares are now dual-listed on the Toronto Venture Exchange (TSXV) and INX Securities ATS. The latter offering marks the first publicly-listed company to also list its securities in tokenized form within the United States. HGC, the issuer of Trucpal tokens, an existing listing and client of INX, also issued its first blockchain-powered dividend to investors using solely USDC for the transaction.

tZERO

Quarter 1 for **tZERO** could be summed up as this: doubling-down on digital securities. In early February, tZERO announced its election to scrap and sunset the cryptocurrency trading platform; this is in efforts of shifting resources solely towards the regulated securities entities that tZERO operates, including its BD/ATS and newly formed primary capital raise portal, tZERO Markets, for Reg CF, Reg D, and Reg A+ offerings.

In tandem with the primary markets announcement, tZERO opened its first crowdfund (Reg CF) offering for Aurox, a digital assets software platform and ecosystem for an onboarded 70,000 traders. On the secondary ATS side, tZERO listed Energy Funders Yield Fund I, which raised $15 million across 200 investors via Reg D in 2022. Energy Funders marks tZERO's 7th active ATS listing to date.

Oasis Pro Markets

Oasis Pro Markets (OPM) solidified an integration with primary issuance platform DigiShares with the intention of listing the DIGI token on the Oasis Pro Markets ATS upon the clearing of the one-year lockup period associated with DigiShares' Reg D raise. Oasis Pro Markets is also expressing interest in building on the Provenance Blockchain, which could be the next integration in efforts to open Provenance Blockchain's $9+ billion assets up to secondary listings with OPM.

InvestaX and IX Swap

Singapore-based **IX Swap**, owned by Coinbase Ventures-backed InvestaX, received the Bahamas Digital Asset and Registered Exchange (DARE) license, enabling retail investors in qualified jurisdictions to participate in IX Swap primary and secondary listings. The DARE Bill is meant to cover digital assets and digital securities alike, ranging from staking and DeFi activities to securities swaps. IX Swap is a decentralized security token marketplace built on the Polygon blockchain, with its first listing being Millennium Sapphire (MSTO) in March 2022.

Vertalo

Austin, TX-based transfer agent **Vertalo** boasts Freeport, the first tokenized Reg A+ offering(s) approved and qualified by the SEC since Exodus in 2021. Working to tokenize common shares in multiple Andy Warhol paintings on the Ethereum blockchain, Vertalo is the acting transfer agent and issuance platform for Freeport, with Dalmore Group acting as the broker of record. Two months prior in January 2023, Vertalo rolled out its Onboard-as-a-Service platform known as Vertalo I/O to streamline investor setup and compliance functions for other online crowdfunding platforms, broker-dealers, and investment fund managers looking to bring greater order to the antiquated onboarding processes.

SIX Digital Exchange (SDX)

SIX Digital Exchange, Swiss-based exchange who is globally well-known for its work on the digital bond side through issuances like the $400+ million UBS bond late 2022, added to its fixed income repertoire with the City of Lugano's $108 million municipal bond in January. Roughly a month after completion, Swiss National Bank (SNB) included the digital bond in its General Collateral Basket. Assets listed in the General Collateral Basket can be used in SNB repo activities, making the SDX-issued bond the first digital product to be included. This is a strong step for the blockchain-based repo narrative covered in the Private Blockchain Updates section in this publication.

SDX also received Swiss Financial Market Supervisory Authority (FINMA) approval to issue, trade, and settle euro (EUR) denominated bonds in its digital interface. As SDX has certain dual-listing compatibility with its parent company, SIX Swiss Exchange, the euro denominations could bring another range of wealth and products to the firm's immediate ecosystem. SDX also found its latest Central Securities Depositary (CSD) member in Liechtenstein-based Kaiser Partner Privatbank in March.

ADDX

ADDX, who expanded its brand throughout the capital markets with the joint research paper with Boston Consulting Group in late 2022 calling for $16 trillion of tokenized assets by 2030, added to its roster of respected clients that already includes KKR, Partners Group, Investcorp, and Hamilton Lane throughout Q1. ADDX tokenized a portion of the Asia General Macro Fund, one of the first hedge fund products in the tokenization landscape, in January; this was followed up in March with a $600 million Yangzijiang Financial private equity fund. To date, Singapore-based ADDX has sold over $500 million worth of tokens to international accredited investors across 60 listings per an interview with its CEO.

Alta

Alta, who acquired the digital securities exchange HGX in 2022, is the largest alternative investment platform in Southeast Asia. Based in Singapore, Alta secured Hamilton Lane as a client in March 2023; Hamilton Lane issued a portion of an evergreen fund with Alta, marking the firm's 5th tokenization worldwide at the time.

SDAX

Singapore Digital Asset Exchange (**SDAX**) issued its first real estate-linked token with Straits Trading Company, a conglomerate from 1887 with interests in resources, property, and hospitality. In January, the conglomerate issued a roughly $5 million corporate bond for the final leg of townhome development, marking its first digital note as well.

Archax

UK-based **Archax** had some updates to its infrastructure and services provided throughout Q1. In January, it rolled out its digital asset custody service that cleared the Financial Conduct Authority's (FCA) criteria in partnership with Metaco (acquired by Ripple in May 2023). In March, Archax announced the launch of its primary issuance marketplace for real-world assets as its lead investor, almost half-trillion dollar asset manager abrdn, looks to push its client base towards digital assets and issue tokenized fund products.

Fireblocks

As one of the leading custody solutions in the digital assets space, **Fireblocks** began offering its one tokenization-as-a-service solution for issuers. In January, Dutch investment bank ABN AMRO used BitBond to create smart contracts on the Stellar blockchain before using Fireblocks to mint and custody the tokenized bond. Fireblocks acts as the tokenization issuance provider; clients simply need to supply their own smart contracts or framework, which BitBond did here on behalf of ABN AMRO. Shortly after in February, Capital Trust Group selected Fireblocks for its Polygon-based digital bond issuance in New Zealand. One of Fireblocks' strengths here is that it supports 1,800+ organizations and hundreds of blockchain tokens, making it extremely versatile with client demand.

Fireblocks also completed May integrations with Avalanche's Spruce subnet for institutional sandbox solutions and Deal Box security token offering packaging platform.

BitGo

BitGo has also been scaling its tokenization capabilities, although not necessarily to the same extent yet. Its most notable development this quarter was shown through the institutional wallet upgrade with INX, in which it enables user segmentation and permissioning across viewers, spenders, approvers, and administrators.

Public Blockchain Updates & Notable Issuers

This section is meant to highlight some of the more active and trailblazing public blockchains within the tokenization space. The overview and hand-picked use-cases are meant to show readers the full breadth of the tokenization technology and the scale at which each blockchain is operating. Over time, it is expected that certain chains begin specializing in financial segments (i.e. public mutual funds, private debt, real estate, tokenized deposits) based on issuer satisfaction and traction, although it is much too early to determine that. Drawing insights from market trends and from advisory clients, STA has elected to highlight:

- Provenance Blockchain (HASH)
- Polygon (MATIC)
- Stellar (XLM)
- Avalanche (AVAX)
- Ethereum (ETH)

Provenance Blockchain (HASH)

Provenance Blockchain is a public-permissioned blockchain developed specifically with financial services in mind. The layer 1 blockchain touts over $12 billion in transactions across lending, investment funds, banking & payments, and other services per Provenance Blockchain Foundation. The direct ecosystem includes over 50 major financial institutions and almost 10,000 open wallets, with 700+ of those being institutional and qualified investors. These components played a strong role in the selection of Provenance Blockchain by prominent and notable issuers across the public markets, private markets, and banking landscape alike.

NovaWulf is an SEC-registered investment firm with a distressed asset management strategy and background. NovaWulf submitted a proposal to Celsius, the crypto lending firm that filed for Chapter 11 bankruptcy, to buy and manage the creditor claims following the operating fallout (mining, staking, collateralized lending, and capital solutions).

These creditor claims and associated assets will be *equitized* (converted into equity) and managed on-chain with Provenance blockchain, essentially turning creditors into equity owners in the operation moving forward. Novawulf considered simply listing this on a Nasdaq or traditional exchange given they have the means to, but decided to keep the digital-native narrative in place with Provenance and with Figure Technologies' management services. After all, Celsius investors *were* working in the crypto space and not with traditional financial services. Since these investors are already *existing investors* in the original company (Celsius), NovaWulf was granted an exemption from the SEC that allows them to issue stock (equity) to these current investors out of bankruptcy - something that is unlikely to pass through the SEC right now for brand new offerings.

The most interesting piece about this deal is the fact that NovaWulf will be filing Form 10-Ks and Form 10-Qs as a public company. To our knowledge, this is the first digital asset security that files 10-K and 10-Qs; pending success, this could be a model playbook for companies in similar situations and, more broadly, simply for issuers focusing on the future of public offerings. Additionally, there will be anywhere from ***100,000 to 500,000 equity holders*** right off the bat given the sheer amount of expected converted creditors. This is huge considering trading activity and market depth is one of the facets that digital securities infrastructure providers have been struggling with. Lastly, this security will trade peer-to-peer on Figure ATS or through Figure's existing plumbing which will inherently bolster Figure's traction in the industry as far as user base activity and trading volume goes.

Hamsa is another key user of the Provenance Blockchain who has already tokenized over $3 billion worth of commercial loans and trade finance products. Hamsa itself is a tokenization service provider who also enables the credentialing of real-world asset level data: the end goal is to ***natively originate*** assets on-chain rather than allowing digital twins (digital representations of an underlying analog asset) like we've primarily seen in the United States. This is enriched by allowing clients and issuers to append asset data like loan performance, asset history, tax assessments, and more directly with Hamsa.

Some of Hamsa's current use-cases include ESG loans, credit card receivables (which was a *Tokenize This theme in March 2021*), asset-backed loans, eCommerce receivables, and real estate equity. Many of Hamsa's institutional clients and partners wish to bring these products to wealth management groups and even to international exchanges for distribution down the road.

Hamilton Lane, $832 billion asset manager who currently has 6 total tokenized fund projects in motion, is issuing three new blockchain-native share classes in the $500+

million Hamilton Lane Private Assets Fund (*PAF*) organized under the Investment Company Act of 1940 on the Provenance Blockchain. This is the first '40 Act fund with blockchain-native share classes geared towards the private markets.

Hamilton Lane is managing these share classes through Figure Technologies' Digital Fund Services (DFS) to handle cap table management, investor distributions and reporting, and capital calls. Per the SEC prospectus, each of the existing share classes will have digital classes (i.e. Class R and Class R-DIG) with their own respective terms and rights. It also details that, "In the future, the Digital Fund Shares may be available for trading on a public decentralized or centralized electronic exchange platform that is a national securities exchange or an Alternative Trading System ("ATS") operated by a registered broker-dealer and that is subject to Regulation ATS," while also naming decentralized trading and swaps as a future possibility, with proper compliance in place of course.

Provenance Blockchain is also responsible for **USDF**, an FDIC-backed *tokenized deposit* minted and supported by the USDF Consortium, that's designed to provide more utility and trust than existing digital dollars or stablecoins in the market. In order to facilitate digital settlement on-chain and create an end-to-end digital lifecycle such as the one anticipated by Hamilton Lane and NovaWulf, there needs to be a proper medium of digital settlement. The USDF Consortium includes First Bank, New York Community Bank, Atlantic Union Bank, and roughly a dozen others; each bank in the ever-growing consortium honors and accepts the bank-minted tokenized deposits.

Polygon (MATIC)

As an Ethereum layer 2 blockchain, Polygon already has an actionable path ahead of it with regards to asset tokenization. Issuers evaluating Ethereum will likely find themselves preferring Polygon since it provides the best of both worlds: the security of Ethereum and the high-volume transactability of a layer 2 solution. Polygon has also made efforts to integrate wider across the tokenization ecosystem, now working with groups including Securitize, Tokeny, and INX, among others. Polygon certainly has momentum with some of its marquee issuances YTD, including multiple Hamilton Lane products.

Swiss commodities firm Muff Trading AG issued corporate bonds through **Obligate**, a debt securities protocol built on Polygon. While the size of this issue was undisclosed, platforms like Obligate have the potential to be very powerful and scale as private credit is one of this publication's key themes.

In true blockchain nature, Obligate enables corporations to issue bonds and debt to a wide range of potential buyers without relying on banks or traditional lenders. Based in Switzerland, Obligate has a Know-Your-Customer (KYC) firewall early in the process to ensure proper regulatory compliance. After completion and subscription via USDC stablecoin, investors receive ERC-20 tokens representing the bond allocation and the right to payment at maturity or collateral in the case of a default. Of course, if these bond tokens choose to list on marketplaces or on decentralized exchanges (pending compliance oversight), investors have the option to trade or swap at their discretion.

Also on the debt side, engineering and manufacturing giant **Siemens** is Germany's third-largest publicly traded company by market cap. It also issued a one-year digital bond worth $64 million on the Polygon blockchain in February 2023 in accordance with Germany's Electronic Securities Act.

Since there was not an accepted digital euro at the time of issuance, Siemens accepted traditional forms of fiat payment while still being able to sell the bonds directly to investors without engaging a central securities depository. All in all, the transaction was completed and settled within 2 days, and investors may hold the bonds to the one-year maturity date, at which point they will be paid out (potentially in digital year if accepted and feasible at that point in time) and retired.

Staying in Germany but moving towards another exciting form of investment product wrappers, **Swarm** is making use of Polygon to improve the accessibility of United States-issued stocks and ETFs. Shares of Apple, Tesla, and BlackRock US Treasury Bond ETFs are being wrapped and issued as compliant tokenized securities to retail and institutional investors. Trading of these fully asset-backed tokens will be 24/7 real-time on Swarm's permissioned DeFi platform, which is regulated by Germany's Federal Financial Supervisory Authority (BaFin).

Swarm developed this solution through recognizing that international investors desire direct access to traditional US investment products (i.e. publicly-listed stocks, bonds, ETFs) while also having the comfort of trading and operating in real-time so as not to be limited to US trading hours. More importantly, compliance practices regarding tokenized stocks become ever more significant and crucial after 2022's crypto exchange fall-outs, thus positioning Swarm well. Users who are already in the DeFi ecosystem with stablecoins and tokenized products will be able to swap directly in or out of Swarm's products without ever leaving the ecosystem; this is a powerful step towards building a robust real-world asset distribution strategy.

Stellar (XLM)

The $1.5 trillion asset manager **Franklin Templeton** unveiled the first US-based mutual fund to record and process share ownership and transactions on blockchain in late 2021. Working with Stellar (XLM), Franklin Templeton created the OnChain US Government Money Fund (FOBXX), which is available to US retail investors through the firm's digital asset application Benji Investments.

The digital product has garnered ***$270 million*** since its inception date 2 years ago (April 6th, 2021), and its allocation makeup is nearly identical to the firm's US Government Money Fund (FMFXX) with $4.8 billion in assets. The key differences are simply the fact that shares will be managed on a decentralized cloud-based ledger rather than on a single Excel sheet, and that shares will open up to 24/7/365 trading without the need for daily human settlement (i.e. during the redemption process). Instead, orders can settle either in real-time or at a predetermined time on a daily basis that's automated through ledger directions.

Lastly, the blockchain-based fund charges a Gross Expense Ratio of 8.76%, although investors can take advantage of a large fee waiver that expires at the end of Q2 2023 and brings the Net Expense Ratio down to just 0.20% to incentivize capital versus the flagship US Government Money Fund (FMFXX) 0.53% Net Expense Ratio.

In the discussion of stablecoins vs. deposit tokens vs. yield-generating substitutes, FOBXX was one of the first of its kind: a professionally managed money market product on the digital asset rails. It's probable that investors begin to rotate from stables into yield-generating products on-chain, as covered throughout this publication, especially as US interest rates maintain these current levels.

Similarly, WisdomTree Inc, who has pioneered the Exchange-Traded Fund (ETF) industry for the past two decades and manages $90 billion in assets, entered the blockchain-based fund space with a whopping 10-product announcement. Working with Securrency for transfer agent services and Stellar (and Ethereum) for record keeping, **WisdomTree Prime** will issue the following blockchain-native products:

- WisdomTree Short-Term Treasury Digital Fund (WTSYX)
- WisdomTree 3-7 Year Treasury Digital Fund (WTTSX)
- WisdomTree 7-10 Year Treasury Digital Fund (WTSTX)
- WisdomTree Long Term Treasury Digital Fund (WTLGX)
- WisdomTree Floating Rate Treasury Digital Fund (FLTTX)
- WisdomTree TIPS Digital Fund (TIPSX)
- WisdomTree 500 Digital Fund (SPXUX)
- WisdomTree Technology and Innovation 100 Digital Fund (TECHX)
- WisdomTree Short-Duration Income Digital Fund (WTSIX)
- WisdomTree S&P 500 Twitter Sentiment Digital Fund (TWTRX)

The firm's initial product is the WisdomTree Short-Term Treasury Digital Fund (WTSYX) tracking the Solactive US 1-3 Year Treasury Bond Index. It will be made available to US retail investors through the WisdomTree Prime app and interface expected to launch in 2023. The wave of products will all be registered 1940 Act open-ended funds. In the WTSYX press release, WisdomTree referenced how ETFs drew market share from mutual funds since investors simply needed an individual brokerage account to buy ETFs. "Today, all an investor needs is a smart phone to access digital assets," shows how powerful WisdomTree Prime could be in getting these traditional funds in front of a wide audience.

While heavily associated with traditional publicly-traded and accessed products via the mutual fund and ETF examples, Stellar is also being used on the debt side. In January 2023, **ABN AMRO** became the first Dutch bank to successfully issue a digital bond for a client on a public blockchain - Stellar. Working with Bitbond and Fireblocks, ABN AMRO raised 450,000 euros for APOC, an aviation client of the bank. Subscribers to the bond were existing equity holders, which acted as a distribution channel for the bond issue, and proved the concept that digital bonds could be issued to existing *individual investors* and not just to other private banking groups.

Avalanche (AVAX)

Avalanche and Ava Labs have been running and leading a number of initiatives across asset tokenization as a whole, but the major Q1 development is the Spruce subnet. The Evergreen Subnet, **Spruce**, is an institutional-grade sandbox for prospective issuers and firms to get familiar and comfortable with the Avalanche blockchain prior to committing to a full launch, whether on the product side or infrastructure side.

The major names who joined Spruce upon launch include:

- WisdomTree ($90 billion ETF specialist)
- T. Rowe Price ($1.31 trillion assets under management)
- Wellington Management ($1.4 trillion wealth group)
- Cumberland (digital assets trading and market making with DRW)

In this cohort, WisdomTree is expanding its existing footprint from Stellar (XLM) and Ethereum (ETH) to now include Avalanche (AVAX) in what could be future traditional product roll-outs like their *ten already approved* digital 1940 Act funds, or it could even be something more unique like infrastructure on the asset collateralization side.

Seeing Cumberland in the mix is extremely exciting, as well. One of the critical needs in the security token industry lies within the secondary markets as painted in the

Secondary Trading Activity section: liquidity and market making services. Although not apples-to-apples given we are comparing digital assets with registered or exempt securities (even in digital form), Cumberland already makes institutional-grade markets in BTC, ETH, and other cryptos, as well as their associated derivatives.

The latter is nonexistent in security tokens as of now, and spot volumes are pretty weak relative to built-out markets like equities and crypto. Nonetheless, Cumberland likely sees value in the security token secondary markets and sees parallels to previous nascent marketplaces; them stepping in to hold basic bid-ask spreads and contribute to volume numbers would go a long way for the overarching industry.

Those are just two examples (WisdomTree, Cumberland) among a sea of potential hundreds. The Spruce subnet basically walls off external ecosystem factors from the internal players (i.e. the asset managers and institutions who join the subnet) to enable a permissioned playground. Issuing parties will receive mock tokens and enjoy *gasless transactions* so that those who join are free to build and iterate products and infrastructure prior to issuing on Avalanche's mainnet, or even on a live subnet - not just the Spruce subnet.

On the product and third-party platform side, **Intain** launched its structured finance marketplace on Avalanche in January 2023. With already $5.5 billion in assets on its administrative platform, IntainADMIN, the structured finance service provider brought its end-to-end marketplace to a permissioned Avalanche subnet for its clients including WSFS Bank, UMB Bank, and Wilmington Trust. Through IntainMARKETS and its automation features, the firm will be able to onboard and manage much smaller tranches and issues of asset-backed securities, essentially treating $10 million issues equivalent to $100 million issues from a management perspective, thus bringing greater precision to this industry segment.

DEFYCA, Luxembourg-based private debt platform, launched on the Avalanche testnet in March 2023 with plans to launch on mainnet in July 2023. The platform will be issuing digital securities to professional and qualified investors under the European Union's comprehensive Markets in Crypto-Assets (MiCA) regulatory framework. Upon mainnet launch, DEFYCA will offer two inaugural funds to investors: a €100 million ($105 million) direct lending fund targeting European small & medium enterprises (SMEs) and a $200 million private infrastructure feeder fund, a model in which Avalanche is quite familiar with.

Debt servicing will be managed by smart contracts, including liability matching, settlement, payment flows, and price discovery, and investors are able to subscribe via USDC, EUROC (euro stablecoin by Circle), or fiat currency, with Citi acting as the cash custodian. Investors will likely have access to applicable secondary markets in the future.

Ethereum (ETH)

Ethereum is still the most widely integrated and used blockchain for the majority of digital assets activities, including asset tokenization. The layer 1 blockchain is being used for a wide variety of projects from art to carbon credits to private debt to real estate to wrapped ETFs; it isn't pigeonholed into one sector or use-case. Ethereum is also perhaps the most compatible with DeFi protocols and services, thus making it the easy catch-all option for issuers who have the long-term goal of using tokenized assets within the DeFi ecosystem for lending, collateralization, swapping, and more.

Security Token Advisors' very own client **Freeport** works to overlay tokenization onto the museum-quality and fine art world, an alternative asset class that averages 8.9% annual returns and outperformed the S&P 500 by 40% since the start of the century. Freeport publicly launched May 10th with common equity shares in individual Andy Warhol pieces *Marilyn*, *Double Mickey*, *Mick Jagger*, and *Rebel Without a Cause* offered to retail investors under the Regulation A+ exemption. Freeport is working with Vertalo (Transfer Agent), Dalmore Group (Broker-Dealer), and North Capital (Custodian) for the execution of these six-figure offerings. Interestingly, the "Member Liquidity Access Benefit" section in the offering circular may allow for the future collateralization of these tokens, which is one of the DeFi segments mentioned in the previous paragraph.

On a global level, **OpenEden** plays into the key theme of on-chain yield via treasury products. OpenEden holds US Treasury Bills, currently generating over 5%, in a bankruptcy-remote vehicle regulated by the Monetary Authority of Singapore (MAS), and issues ERC-20 tokens to whitelisted wallets for investment representation. The firm works with Chainlink and Elliptic to audit its on-chain activity to provide investors with the desired transparency, and subscriptions and redemptions take place in real-time.

Underlying Assets Managed by a
Singapore-Regulated Entity

Private Blockchain Updates

Private blockchain solutions are currently being used primarily for both internal and external institutional transactions that 1) yield savings to the parties involved and 2) reduce execution time and labor. Those two factors are applicable to digital bonds, fund administration, and publicly-traded product transactions and settlements alike, among other use-cases developing day-by-day.

Private blockchains serve a very strong purpose on the institutional side of capital markets - one that doesn't necessarily need to access the general public or even need to be facilitated in a decentralized manner. This side of industry is more focused on capturing efficiencies to improve operations, reduce risks, and ultimately increase the bottom line: which is what technological revolutions and progressions have almost always provided to the capital markets infrastructure.

Banks, asset managers, and service providers who connect the dots among the sell-side and buy-side have already begun to see benefits from running activities on private blockchains. This section will detail some of the prominent use cases and progress built upon the following prominent private blockchain solutions:

- Digital Asset (Daml, Canton)
- JP Morgan (Onyx)
- R3 (Corda)
- Hyperledger
- Enterprise Ethereum

Digital Asset - Daml & Canton Network

Digital Asset is a capital markets blockchain infrastructure provider with an array of institutional and enterprise solutions. Digital Asset's flagship product is Daml, a private blockchain language upon which a number of institutional tokenization platforms are built, as detailed below. Digital Asset also announced its interoperable Canton Network designed to rival a public-permissioned blockchain on an institutional level.

Canton Network includes organizations like Deloitte, Goldman Sachs, Broadridge, S&P Global, BNP Paribas, Cboe, DRW, Moody's, and roughly 30 more acting as node operators. What this presents to institutions looking to enable tokenization from either a product, operational, or infrastructure level is security and confidence in knowing who the other members of the network are and their involvement levels, while also better achieving a degree of decentralization. It won't be as decentralized or distributed as a true layer 1 public blockchain, but this is a fantastic opportunity for institutions to get familiar and comfortable with the technology in a more controlled environment.

Goldman Sachs Digital Asset Platform (GS DAP™)

Goldman Sachs officially launched its Digital Asset Platform (GS DAP™) in January 2023 underpinned by the Daml language. The main mission of GS DAP™ is to streamline the complexities of asset lifecycles from start-to-end in a singular environment; this is very in line with the credence of private blockchain technology. RIght around the time of launch, Goldman completed a digital bond issuance for European Investment Bank (EIB), in which GS reported it reduced "bond issuance settlement time for the European Investment Bank from T+5 to T+0 at a speed of sub-60 seconds with cross-chain atomic Delivery versus Payment (DvP) settlement in this inaugural issuance." GS DAP™ is focused on digital bonds first and foremost, as that is where investment banks are already seeing traction, but likely has the goal to spread across other institutionally-demanded products including commercial real estate opportunities, private equity funds, and structured finance.

Broadridge - Distributed Ledger Repo (DLR)

Broadridge, whose technology platforms power $9 trillion worth of transactions per day, makes use of Daml for its Distributed Ledger Repo (DLR). The DLR saves $1 million for every 100,000 transactions relative to the pre-existing repo technology solutions per an interview with Forbes, and the blockchain-based network is already transacting over $1 trillion a month (~31 billion per day) itself through Broadridge's existing capital markets partners, as well as presumably the other firms who joined the Canton Network.

JP Morgan - Onyx

JP Morgan's **Onyx** division, which is dedicated to digital assets infrastructure and networks, first came to public light through JPM Coin (JPMC) in the 2018 digital assets period. JP Morgan's vision, which has begun unfolding more and more accurately as competing private networks come to market, was to underpin all or most of their digital ecosystems with JPMC. It acts as an internal settlement token backed by the bank's assets; JPMC won't be moved into DeFi applications, but rather will serve to enable that end-to-end digital lifecycle that tokenization affords. The most applicable overlay to capital markets that Onyx has developed thus far is its tokenized collateral network (TCN), which could include its digital financing repo network and general collateral management solutions.

Tokenized Collateral Network (TCN)

The **Tokenized Collateral Network** (TCN) is Onyx's catch-all solution for the digitizing and mobilizing of assets. Having launched in May 2022, TCN is already responsible for roughly $700 billion in collateral transactions, with the lion's share of that stemming from the repo network and clients including Goldman Sachs, BNP Paribas, and DBS Bank.

While the majority of these transactions have been in the form of tokenized money market funds, treasury products, and cash equivalents, that's simply the base layer. TCN can and likely will be useful for the collateral mobility of alternative products including real estate assets, investment funds, commodities, and structured products. All of these segments already have industry-wide examples to point towards; as banks and banking partners require greater financing precision on alternatives, expect TCN to offer a unique and newfound solution that the traditional banking landscape falls short on.

R3 - Corda

R3 was originally founded as a 9-bank consortium for distributed ledger technology (DLT) in 2014, and evolved to a software infrastructure provider across the digital assets space with the launch of its open-source Corda blockchain in 2016. Corda became quite prevalently used across the tokenization ecosystem, primarily with regards to banking and financial services given the privacy functions afforded by the network. A few key Corda power users and platforms are shown below.

HQLAx

HQLAx is an enterprise tokenization network or solution that focuses on the digitization of high-quality liquid assets (HQLA) for seamless interparty transactions and swaps. This can be for repurchase financing and agreement (repos), general collateral management, or transactions with Delivery v. Delivery (DvD) to reduce credit risk and settlement risk at scale Having partners and users like Goldman Sachs, BNP Paribas, JP Morgan, BNY Mellon, Deutsche Borse, and Citibank, there is some serious volume in play, which makes even small basis points savings very significant and attractive.

HQLAx, while built on Corda, is able to work cross-chain as proven in its December 2022 repo swap across Corda and Enterprise Ethereum with Santander, Goldman Sachs, and UBS. Throughout Q1 2023, HQLAx has been focusing on the securities lending and repo side of the business as it sees collateral mobility to be much of the institutional value associated with distributed ledger technology.

Vanguard

Corda also found a new adopter late 2022 and into early 2023 in the world's second largest asset manager with $7.6 trillion in assets under management: **Vanguard**. Specifically, Vanguard Australia began using a Corda-based back-office distributed ledger technology solution for asset managers developed by the Australian firm Grow Inc. Grow's fund administration services will enable Vanguard to "claim 100%

straight-through-processing rates for fund reconciliation," which is projected to save back and middle office staff up to 100 hours a week in labor.

For reference, straight-through-processing is a measure of automation within a firm's operating procedures. A claim of 100% straight-through-processing insinuates a fully-automated process. This allure of full automation is one of the gems that asset managers look towards blockchain for. It also reiterates the need for digital settlement tokens and mechanisms to create an end-to-end digital lifecycle in order to achieve that 100% straight-through-processing mark. In Vanguard's case, it's working with fund administration. Should there be a component of the process that isn't programmable or automated, the rating would then decrease and move away from full-automation. Being done at scale and saving 100 hours a week in labor time and fees translates to tangible dollars and a stronger bottom line for a firm of Vanguard's size.

Contour Network

The **Contour Network** is a global trade finance platform that made headlines in April when Citi India completed its first blockchain-based Letter of Credit (LC) for its client, Cummins. According to Contour, Letters of Credit, which are the primary records that underpin the trade finance industry among importers, exporters, and banks alike, done digitally like the solution it presents can "reduce costs by 15 to 20 percent and reduce processing time by up to 80 percent." The shared ledger experience also reduces error and haggling among vendors, similarly to the JP Morgan Onyx vision with its repo network.

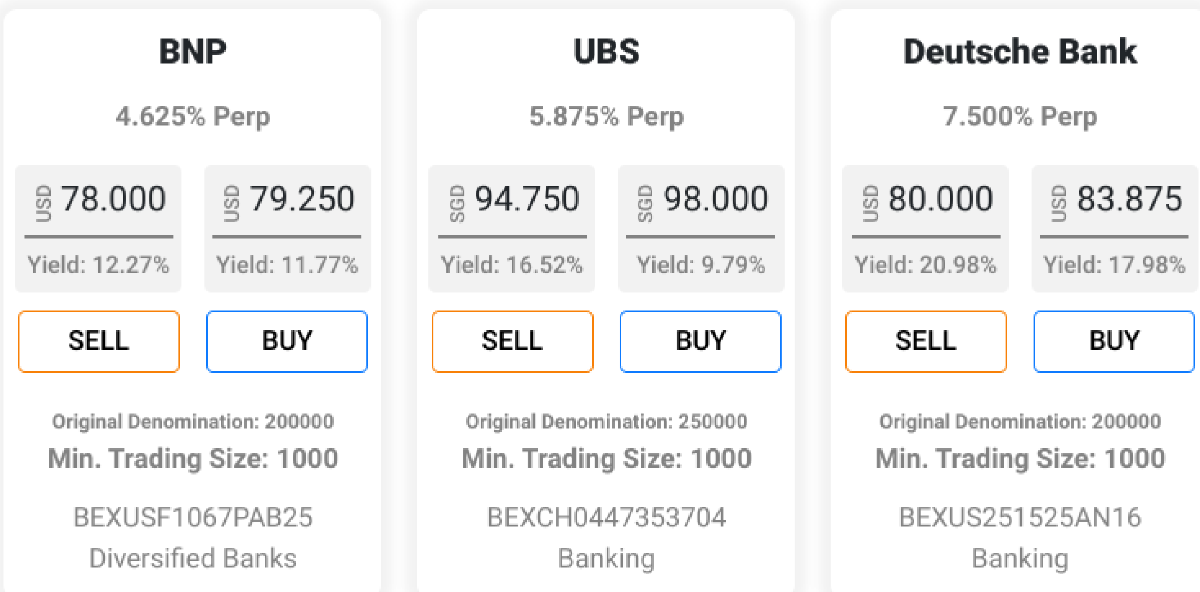
The Citi India LC presentation on Contour was completed start-to-finish in just 3 *hours* versus the average 5 to 10 *days* sans blockchain. Citi is citing multi-party transparency as a digital enabler for the industry, thus resulting in more efficient and properly-priced credit creation and extension to this $5+ trillion industry with an almost $2 trillion gap in supply availability per McKinsey. The gap is the addressable fix here as it is largely a factor of paper documentation delay amid times of high demand, such as the COVID-19 period.

Hyperledger

Hyperledger is a global open source enterprise-grade blockchain foundation that currently has thirteen sub-groups within it, such as Hyperledger Fabric, Hyperledger Sawtooth, and Hyperledger Besu. This framework enables flexibility for projects looking at more tailored and built-out solutions on the private side while providing a head start and supportive ecosystem based on project needs. Hyperledger is commonly associated with IBM from its inception in 2015, and has since developed across numerous verticals of enterprise blockchain, including tokenization.

BondbloX

BondbloX is a Hyperledger Sawtooth-based private credit platform regulated by the Monetary Authority of Singapore (MAS) as a Recognized Market Operator (RMO) and integrated with Citi and Northern Trust on the banking and custodian sides. BondbloX enables institutional and corporate debt issuers to fractionalize and list existing or new issues, some of which are shown below. The fractionalization aspect fuels Bondblox's mission to target the 500 million investors designated as HENRYs (High Earner Not Rich Yet), which may consist of lower-level accredited investors for the most part. The blockchain issuance and life-cycle management, including investor and asset servicing, provides the efficiencies needed to take on minimum investments as low as $1,000, which is not feasible in analog markets.



Enterprise Ethereum

Enterprise Ethereum seeks to make use of the most globally widespread and decentralized blockchain network in a more permissioned and closed-end fashion. Ethereum (ETH) is still the leader across the general decentralized finance space in terms of issued assets and application compatibility, as well as in regards to total value locked (TVL), number of active developers, and existing user base per chaindebrief. Blockchain-native firms like Consensys have contributed to the development of Enterprise Ethereum as institutional-grade solutions on ETH in accordance with the Enterprise Ethereum Alliance (EEA).

Allfunds Blockchain

Allfunds, the European fund administrator with $1.4 trillion in assets under administration and a distribution channel consisting of over 3,000 fund groups and almost 900 distributor contracts, makes use of Enterprise Ethereum to power its subsidiary, Allfunds Blockchain. **Allfunds Blockchain** works with notable clients including $676 billion global asset manager AllianceBernstein and the Italian asset manager Azimut Group. Allfunds Blockchain's primary initiative is its FAST transfer solution which enables immediate transfer and settlement of assets and data among supported parties (clients, partners, service providers, etc.). The momentum is strong here and Allfunds has already seen firms like BNP Paribas, BBVA, and Santander work to integrate Allfunds Blockchain and its FAST solution for improved servicing.

Calastone

Similarly on the fund administration side, Carlyle-owned **Calastone** has been exploring the creation of a global blockchain-based funds marketplace since 2018. When Carlyle acquired a majority stake in October 2020, Calastone was already building out its Distributed Market Infrastructure (DMI) on Enterprise Ethereum, with an ultimate goal of becoming chain-agnostic. In May 2023, it got a bit more granular in its whitepaper details two routes:

- The tokenization of fund units (which is what is typically seen in the market thus far)
- The tokenization of assets *within* a fund

The first model is the tokenization of either Limited Partner (LP) or General Partner (GP) interests. This can be done via feeder fund models or comparable carve outs, and provides fractional exposure to a fund's performance itself. The second model is building towards a more transparent investment ecosystem. If the underlying fund assets themselves are tokenized, they may be able to achieve greater price discovery either through disclosures, secondary trading, redemptions, or simply asset-level data on-chain; this is a need in the private markets that many in the tokenization are calling for. The second approach has the potential to build more of a fund-of-funds or even exchange-traded fund (ETF) model, whereby the underlying assets themselves are subject to investor actions on the primary and secondary markets, thus pushing the general fund wrapper to be even more dynamic than it would be holding analog assets.

Security Token Advisors Updates

Security Token Advisors (STA) has witnessed the growth of this industry first-hand from its inception when Herwig Konings, CEO & Founder of STA, advised one of the first compliant security token offerings in the United States beginning in 2017. This year, 2023, marks a paradigm shift in the industry. Wall Street has fully embraced the technology and benefits of tokenization and is already managing and issuing investments across public and private blockchains. STA's reporting will continue to focus on being your most reliable and holistic source of information for this industry.

As a leading research and consulting firm, STA will soon be announcing new clients of household names in finance to help them learn and participate in this burgeoning ecosystem and transform capital markets using a new operating system built on distributed ledger technology and blockchain protocols. This will further mark a shift in our focus to closely cater to asset managers, investment banks, fund managers, and the service providers that are creating the technology itself from data providers to custodians and the blockchain foundations & core development teams .

STA Success Network

To further help create best practices, disseminate information and thought leadership, and increase adoption from capital markets, STA launched a new platform on April 20th in order to connect the industry and scale its capabilities. The STA Success Network is a research portal that packs STA's research, weekly intelligence, and advisory tools all into one. Since launching, over 150+ members have joined and participated in the weekly programming that includes office hours, a legal webinar series called *Powers Hour with Marc Powers*, and special panels and workshops with brokerage platforms, blockchain protocols, and tokenization providers. On top of networking opportunities, members are featured in a directory where others can follow activity and send direct messages.

Members also become contributors with STM.co, enabling them to submit for publication. New announcements, guest opinions, and breaking news will be distributed to thousands of readers on STM.co and the What's Drippin newsletters, in addition to possibly being picked up by media partners in the STA Success Network. Members can also manage a vendor page on behalf of their firm to share information, news, and contact information about engaging with them. The STA Success Network will continue to grow and may already be the largest research consortium around tokenization in the world. Membership to the platform is $999 per month.

About Peter Gaffney, Partner, Head of Research & Institutional

Peter Gaffney is the Head of Research at Security Token Advisors, where he helps facilitate the tokenization of assets for clients ranging from Real Estate investment groups to Private Equity & Venture Capital firms to Pre-IPO shares. He leverages experiences at Global X ETFs and boutique private equity firms to bring the public and private sectors under one roof via security tokens. Among numerous thought pieces, he publishes *The State of Security Tokens* series as a baseline of knowledge for the industry, and works to create a more fluid ecosystem among industry participants, platforms, and services on both the retail and institutional levels. Since joining STA, Peter has advised and worked hand-in-hand with the Digital Asset heads of some of the largest financial institutions in the world.

About Herwig Konings, Partner, Founder & CEO

Herwig Konings is a veteran and pioneer in the industry due to his background in equity crowdfunding. In 2013, he founded compliance software firm InvestReady which provides accreditation software and other tools to issuers, investment banks, Fortune 500's, tokenization platforms, and brokerages/ marketplaces. He also served as the Managing Director of the Miami Venture Capital Association from 2016 to 2018 and has been awarded the MIami Technology Leader of the Year award by the Greater Miami Chamber of Commerce in 2015. He frequently speaks at various Universities, for corporate clients, and has taught the Florida BAR CLE blockchain course.