

An Unreal Primer on Real World Assets



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Since the genesis of smart-contract blockchains, entrepreneurs have sought to bring real world assets (RWAs) on-chain. As of now, real estate, bonds, equities, and other assets are sequestered away in different jurisdictions, exchanges, and databases. Aggregating information within a single open ledger should reduce informational asymmetry and transaction costs, or so the reasoning goes.

The earliest wave of RWAs started with real estate. Buildings are essential, tend to maintain value over time, and are inherently productive (create value). But while tokenization platforms loved real estate, real estate did not love them back. The problem persists: the owner of “tokenized real estate” is not really entitled to the underlying asset. In most [jurisdictions](#), tokens are not recognised as bearer assets. So when trouble arises and a default occurs, how does the token owner foreclose on the bricks to which he or she should be entitled?

When two different consensus environments, one on a blockchain and the other in the real world, collide, uncertainty arises.

In authoring this Primer, we strive to bring honesty and rigor to the emerging space of RWAs. We pull no punches in uncovering the inconsistencies of various DeFi narratives. We propose some radical but humble predictions about our industry. We hope that our readers derive value from our work and that it sparks meaningful discussion.



Teej (馃馃 ≠ 饺)
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...

"RWA" is just a meme to describe how the incumbent system will speak to the new one.

Accounting for the physical in the digital.

I. Ontology: The Dualism of Real World Assets

Assets are an alloy of two elements: representation and ownership. Both must be recorded in a ledger.

“Representation” accounts for the economic essence of an asset: how the instrument works, what it entitles a possessing party to, expiration, interest rate, physical condition and size, any easements or other third party rights, etc.

“Ownership” refers to the legitimacy of title contemplated in a ledger. Not only do stakeholders have to reach consensus on the contents of that ledger, but there must also exist an enforcement mechanism for disputes. Without these two components, rights to and sanctity of ownership are unclear. And without property rights, capital markets cannot form, preventing people and businesses from reaching their productive potential.

“Without an integrated formal property system, a modern market economy is inconceivable. Had the advanced nations of the West not integrated all representations into one standardized property system and made it accessible to all, they could not have specialized and divided labor to create the expanded market network and capital that have produced their present wealth. The inefficiencies of non-Western markets have a lot to do with the fragmentation of their property arrangements and the unavailability of standard representations.”

— Hernando de Soto, [The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else](#)

In the real world, consensus is supported by a web of legal contracts and enforced by courts; in crypto, consensus is recorded in a distributed system of computers and enforced by those machines. All assets, from a commercial real estate loan to Bitcoin, lie on a spectrum between legal enforcement and validator enforcement. In other words, all assets are either legal or digital in nature.

What separates a TradFi (traditional finance) RWA and a crypto RWA? A crypto RWA is an asset with some combination of ownership and/or other rights on a blockchain. In fact, contrary to popular Panglossianism, we will not in the near term *unplug* from

traditional legal systems. As long as creditors require legal recourse in the case of default, capital markets will still be backstopped by physical enforcement, or “the violence layer”.

Over time, capital markets will increasingly be mediated by blockchains. This happens in two ways. First, different jurisdictions acknowledge RWA tokens as [bearer assets](#), enforcing owners legal protections. Second, entrepreneurs embed collateral and various lender protections directly in smart contracts, offering stronger guarantees than those inherent to legal systems.

Over time, as the distinction between crypto assets and RWAs blurs, “Real World Asset” will become as conspicuously anachronistic as “horseless carriage”.

This leads to two categories of RWAs: **Birth**, where new assets are created; **Rebirth**, where existing assets are re-ledgered. Every single RWA can be categorized in a Mutually Exclusive and Collectively Exhaustive (MECE) way: either Birth or Rebirth.

Birth: Create new assets

Asset classes that *do not exist today* will be born natively on blockchains. Consider hashpower-backed loans, DAO Bonds, decentralized [parametric insurance](#) contracts, and agricultural perpetual contracts as the first cohort of newborns in the DeFi nursery. With birth assets, it is the underlying blockchain technology that makes their very existence possible.

Birth assets are digitally native and primed for financialization. As [cryptographic truth](#) minimizes reporting errors and blockchain-based ledgering squashes [administrative overhead](#), a cornucopia of assets awaits conception.

[LandX](#), [DebtDAO](#), and [Etherisc](#) are Birth protocols.¹

¹ Many of these asset types (RBF, insurance, commodities derivatives etc.) already exist and have existed for many decades. We suggest that such asset classes will explode in volume, expand in scope, and become more efficient as blockchains ingest them. LandX for example: while agricultural futures are nothing new, [perpetual](#) commodity bonds certainly are.

Rebirth: Adapt existing assets

Established asset classes like sovereign debt, commercial and residential mortgages, and corporate loans will slowly be [re-ledgered on-chain](#). Via this gradual rebirth, such asset classes will benefit from properties that, while off-chain, they did not.

For both strategic and fiduciary reasons, traditional asset originators will explore on-chain financing. If re-ledgering or issuing assets natively on-chain delivers enhanced liquidity ,reduced administrative overhead, or other material benefits, prime originators will wade slowly into the waters of DeFi.

While the risk is significantly higher than with a conventional loan, DeFi may still offer a [cheaper cost of capital](#) because it broadens access, lowers barriers to entry, and reduces information asymmetry. As rates rise in TradFi, borrowers will look elsewhere for cheaper financing. Truthfully, incentives to port large, established asset classes over are low right now. DeFi has not yet offered a 10x better value proposition for all TradFi capital market participants, but it will. [For DeFi to eat TradFi](#), we have a lot of wood to chop.

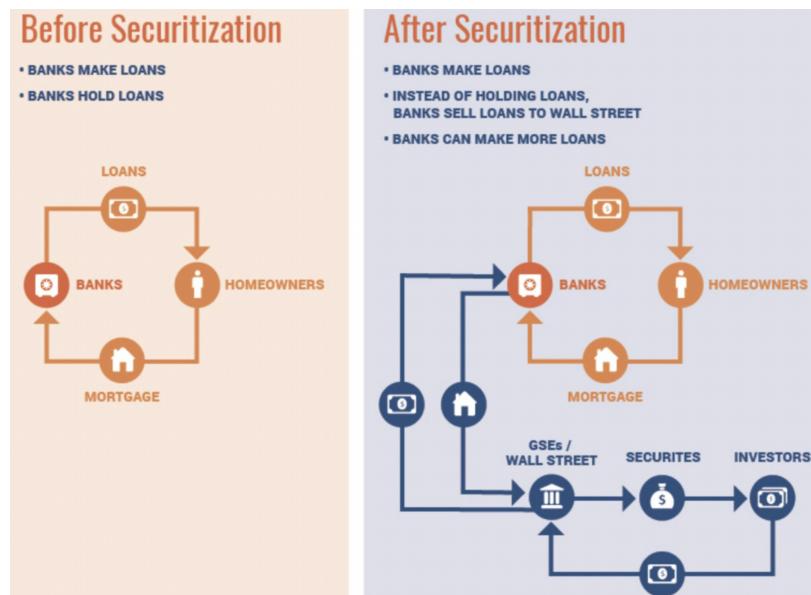
Other more innovative examples in this category include asset classes like climate assets, trade finance (factoring, merchant cash advance, supply-chain finance etc), revenue-based finance (SaaS, Ecommerce), emerging market consumer and business finance, royalty finance, legal settlement finance etc.

II. Problem: In Need of a Standard

Standards align disparate parties on a common set of rules for conduct. The shipping container, a better standard for packaging and shipping physical goods, reduced transportation costs and drove a [surge in global trade](#). The rise of the English language, a literal lingua franca, also coincided with the rise of global trade. The JPEG, PDF, and MP3 formats standardized files across different devices, facilitating the sharing of content on the Internet.

Similarly, by establishing better [standards](#) for how assets are originated, ledgered, packaged, and distributed on-chain, tokenized RWAs can reduce transaction costs between buyers and sellers, driving market efficiency and price discovery.

However, currently there is no common standard for RWAs. What kind of standards do RWAs need? Who will come up with these standards? Much can be learned from the history of how securitization progressed.

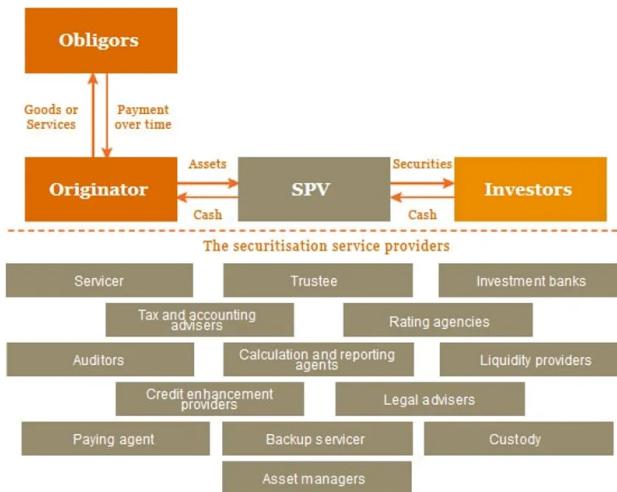


Source: [The Third Way - Housing Finance Part 1](#)

Securitization transformed credit markets in the 1990s. Instead of sourcing proprietary portfolio loans individually from originators (banks), investors approach the securities-dealer market and allocate capital programmatically. Securitization

institutionalized mortgages, corporate loans, and consumer loans. It has trickled down, driving cheaper capital for home buyers, businesses, and consumers.

Securitization took disparate, semi-fungible, illiquid assets and packaged them under a more useful standard, [CUSIPs](#). Derived from the Committee on Uniform Security Identification Procedures and used for financial settlement, the nine-character alphanumeric code is, ultimately, just a token. And though CUSIPs do **represent** the underlying risk, they do not in and of themselves confer ownership.



* Source: [PWC](#)

“Tranches of securitizations, standardized as CUSIPs (with consensus around cashflow waterfalls, legal structures, etc.), allow investors to trade very different forms of debt for each other, increasing the liquidity of their investments and lowering the rate of return they demand.” - Kevin Miao - [Everything is Broken](#)

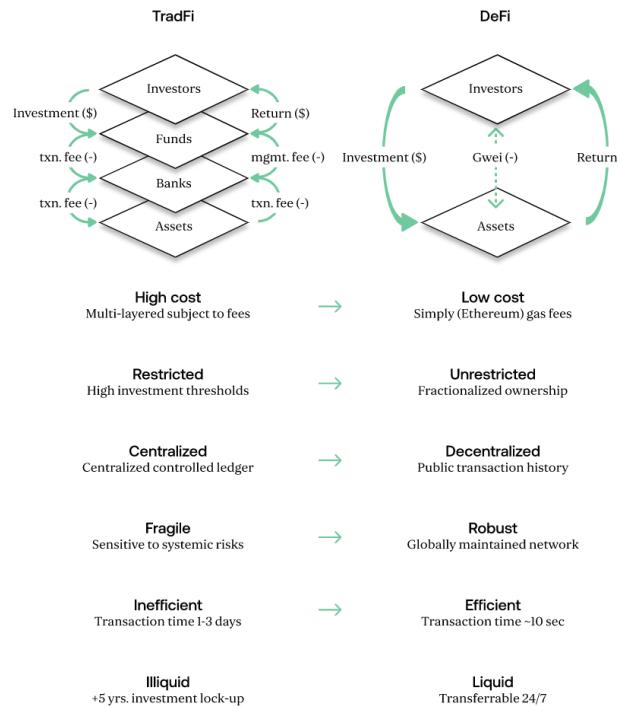
Securitization, and even finance more broadly, is a long and arduous process. The engine requires a long list of service providers to keep it running. The data about asset performance, valuations, recoveries and legal standings sit siloed across different spreadsheets and data rooms. Most worryingly, the actual representation of the underlying asset occurs in a 100-page PDF document.

While the traditional securitization “value-chain” is efficient with respect to certain asset classes (risk), asset transformation (packaging and conversion), and distribution (liquidity), it is messier when the “value-chain” breaks down and parties must resort to

legal remedies. Of more consequence is that securitization is limited to a few core asset classes, available to institutional investors only. Most assets remain paralyzed because they cannot be transparently and efficiently accounted for on incumbent rails. Just as CUSIPs and securitization kicked off the transition to digital finance, tokenization will finish it.

Whereas the internet forged a better standard for the exchange and distribution of text, photos, audio, and video, next we must create a better standard for the exchange and distribution of risk. Simply put, we need internet-native finance. Standards take time to settle, as achieving social and commercial consensus is a gradual process.

Tokenization via DeFi offers a shortcut to establishing consensus: the underlying decentralized ledger provides it.

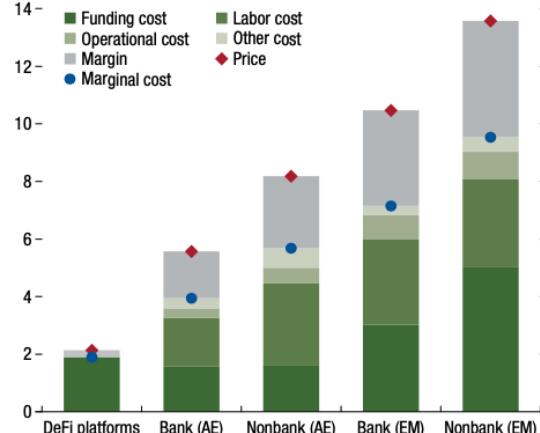


* Source: Frigg.eco's whitepaper

Figure 3.12. Efficiency and Risks of Decentralized Finance

DeFi has the lowest marginal costs due to the absence of labor and operational costs.

1. Estimated Marginal Costs and Margins (Percent)



*Source: IMF's [Global Stability Report](#)

DeFi holds promise to deliver material improvement. Theoretically, it is a superior backend for our financial system. More practically, The IMF has found that DeFi is indeed cost efficient, especially in emerging markets². Savings come from two primary

² Nonetheless, the industry still lacks a rigorous economic case for asset tokenization. For further research, see "[The Monetary Benefit of Tokenizing Renewable Energy](#)" (Philip Berntsen and Markus Leippold).

areas—labor and operational costs. Yet the problem remains: there is no standard for bringing RWAs on-chain. As we contemplate what this standard looks like, all we know is that it must be a marked improvement over existing standards. Otherwise, the network effect native to real world ledgers will prove too sticky to overcome.³

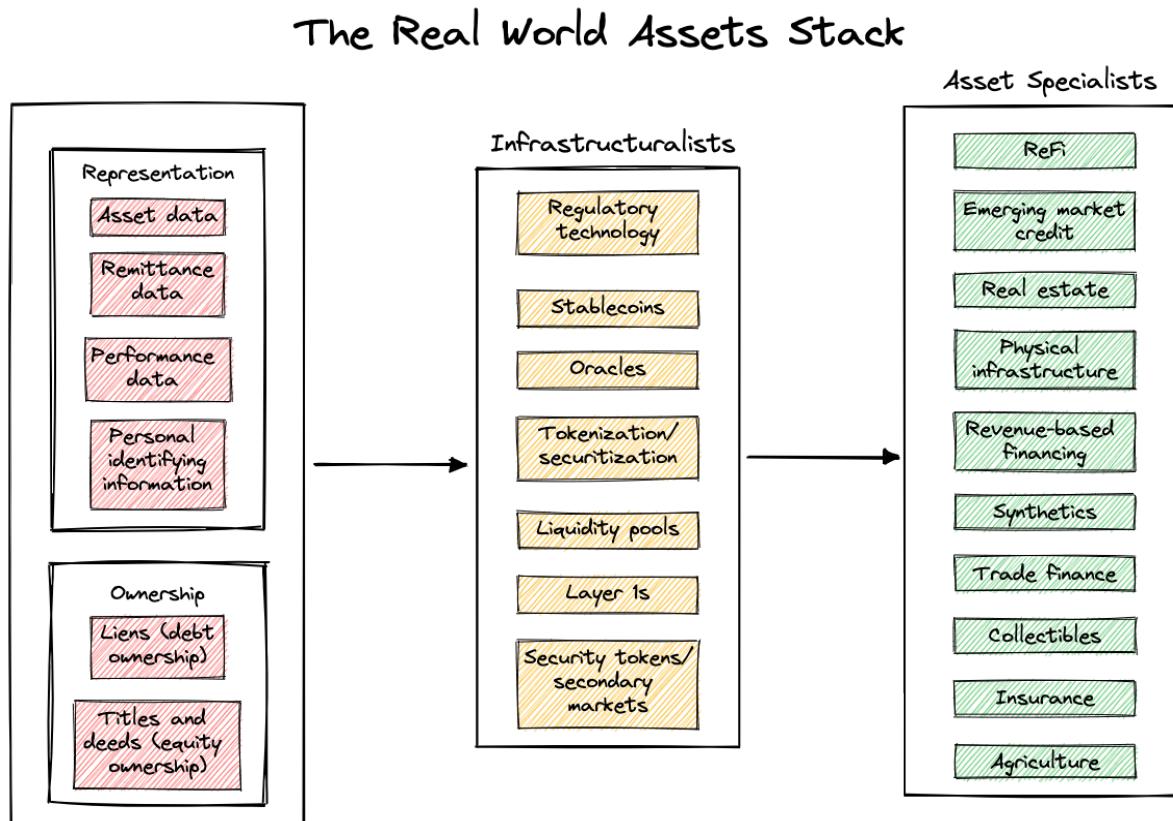
³ The internet also unlocked previously unknown innovation - cloud computing, social media, smart phones, blockchains, the remote-work economy, etc. Crypto will similarly foster the creation of currently unknown, unrecognized or untapped value in the real world.

III. Solution: Protocol Wars

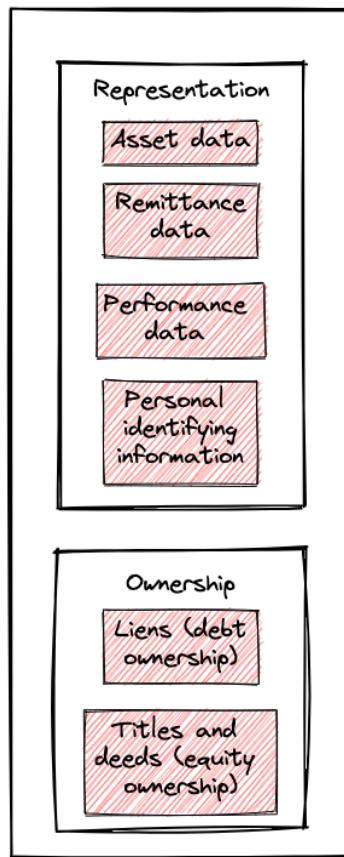
In the nascent stages of the Internet, IBM and Xerox [vied for their proprietary internet protocol suites](#) to be the industry standards. Had IBM's SNA won, all netizens would have been forced to pay rent to IBM's infrastructure. In the end, it was an open, rather than proprietary, standard that prevailed: TCP/IP. This was a monumental victory for posterity—a “thin” protocol was optimal, eventually facilitating far more economic activity than [“fat” alternatives](#) (an assumption—we cannot run the experiment the other way). In a similar fashion, the Protocol Wars are slowly brewing as more and more teams attempt to tokenize RWAs.

The battlefield takes place on three layers, visually represented in the diagram below.

1. Red column: Standards for **Representation and Ownership** of assets
2. Yellow column: **Infrastructuralists**, as middleware, battle for specialists to build on top of their rails.
3. Green column: **Asset Specialists** battle to originate supply of RWAs and facilitate their respective demand.



The Battle for Standards for Representation and Ownership of Assets



With regard to the Internet, [IP](#) defines the source and terminus for information; [TCP](#) dictates how packets travel from one to the other.

In the legal realm, there are bestowed regulations, albeit limited and insufficient, that govern the legal status of digital assets. Similarly, there are a variety of contract standards that define ownership and representation of different financial instruments on-chain.

In the United States, the Uniform Electronic Transactions Act (signed into law in 2000) and the new Article 12 (Digital Assets) of the Uniform Commercial Code provide a basis for development and experimentation. Many companies in the RWA space simply follow the SEC's classification of securities, treating tokenized versions of their TradFi financial

counterparts as legally equivalent. In Switzerland, the new [Distributed Ledger Technology bill](#) recognises digital assets as bearer assets, demonstrating jurisdictional intent to be on the vanguard of blockchain innovation.⁴ In France and beyond, Societe Generale has adopted the [CAST framework](#), a hybrid between using the underlying public blockchain as settlement while keeping an off-chain register. As we can see, progress toward bridging legal enforcement and validator enforcement is being made.

However, translating financial primitive into code primitive is difficult. Nonetheless, the Ethereum DeFi community has proposed and adopted multiple contract standards to represent financial instruments on-chain. The list below enumerates such efforts and details contemporary adoption of the respective standards.

ERC-20 (Tokens)

- The ERC-20, Ethereum's fungible token standard, remains the most popular contract standard due to its Lindy and network effects. The token standard has also seen multiple upgrades and extensions (especially [OpenZeppelin's](#)).
- It has the widest support in the DeFi ecosystem: with exchange (Uniswap), overcollateralized stablecoin (Maker), and borrowing/lending (Aave).
- It is an intuitive choice for tokenizing equity, debt or in general, splitting ownership of a financial instrument.
- Recent adoption: [Frigg.eco](#) tokenizes green bonds into constituent ERC-20s, allowing each to trade permissionlessly on Uniswap and beyond, taking advantage of the Swiss DLT bill.

ERC-721 (NFTs)

- The ERC-721, Ethereum's non-fungible token standard, is commonly used to represent unique digital art, though can be considered an on-chain container for heterogeneous digital goods. Sort of like a standardized shipping crate, embedded with immutable property rights, for the Ethereum economy.
- It has found moderate support in the DeFi ecosystem. We've seen adoption in NFT-based exchanges and a few financial applications—Uniswap v3 replaced ERC-20s with ERC-721 liquidity positions, for example.

⁴ Switzerland is [one of the leading](#) locations in the area of distributed ledger technology (DLT) and blockchain. The [Green Fintech Network](#), a Swiss government body, aims to further promote DeFi alternatives, especially in the field of sustainable finance.

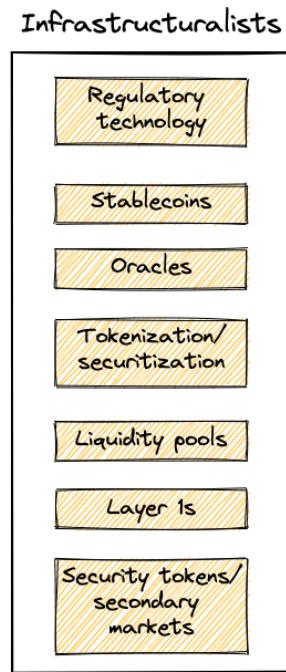
- Recent adoption: Centrifuge represents off-chain risk assets as NFTs on-chain, issuing two tranches (a senior and a junior) of yield-bearing tokens during the process of securitization.

Others

- [ERC3643](#), proposed by Tokeny, is a ERC-20 compatible standard for security tokens.
 - It gives issuers token control, transfer rules and recoverability.
 - It has limited adoption and composability beyond Tokeny's current issuance.
- [ERC-3525](#), proposed by Solv Protocol, is a Semi-Fungible Token standard similar to ERC-1155, backwards compatible with ERC-721.
 - It focuses on tokenizing assets that are fungible within class.
 - Recent adoption: Solv's [Initial Voucher Offering](#), an issuance of convertibles on-chain.
- [EIP-2222](#) is a ERC-20 compatible standard for dividend-paying tokens.
 - It tokenizes assets that are claims on future cash flow, e.g. dividends, loan repayments, fee or revenue shares.
 - Recent adoption: Maple Finance's protocol token, MPL, follows the [ERC-2222 token standard](#) for profit distribution of USDC from the Maple Treasury.
- [ERC-4626](#) unifies the technical parameters of yield-bearing vaults.
 - It provides a standard API for tokenized yield-bearing vaults that represent shares of a single underlying ERC-20 token.
 - ERC-4626 also outlines an optional extension for tokenized vaults utilizing ERC-20, offering basic functionality for depositing and withdrawing tokens and reading balances.
 - Recent adoption: TrueFi [is adopting](#) ERC-4626 to represent each loan book, allowing for aggregators to compose on top of TrueFi's lending vaults.
- [The International Token Standardization Association](#) (ITSA) has a directory of tokens under their [classification framework](#)

- [Here](#) is an example of MakerDAO's protocol token, MKR, under ITSA's classification.
- [The Capital Markets and Technology Association](#) (CMTA) in Switzerland has [a directory](#) of Swiss-compliant token standards.
 - The CMTA is developed by a working group of CMTA's Technical Committee that includes members from Atpar, Bitcoin Suisse, Blockchain Innovation Group, Hypothekarbank Lenzburg, Lenz & Staehelin, Metaco, Mt Pelerin, SEBA, Swissquote, Sygnum, Taurus and Tezos Foundation.

The Battle of Infrastructuralists



The Infrastructuralists build rails that enable the exchange, custody, and settlement of RWAs. From the vantage point of one of your authors who happens to be building an asset specialist (Frigg.eco), one of the fiercest battles⁵ among the Infrastructuralists is being fought in the theater of Regulatory Technology.

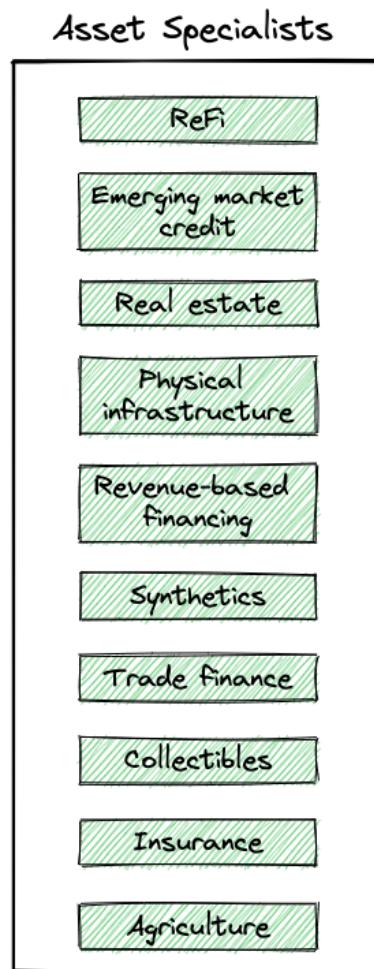
Regulatory technology broadly enables permissioning of participation into any liquidity network. Products include KYC/KYB standards, custody solutions (self-custody/licensed custodian), and exchange (for security tokens with broker-dealer/Alternative Trading System license).

Because Asset Specialists focus on driving liquidity to RWAs, they would benefit enormously from an easy, interoperable, and widely adopted permissioning standard. As it currently stands, institutional and retail users must pass KYC/KYB and AML checks for each protocol that they interact with. This UX is untenable. A DeFi permissioning passport (e.g., a non-transferrable, *soulbound* ERC-721) would promote

⁵ Note that in Section IV, the authors argue that value accrual does **not** happen at the middleware (Infrastructuralist) layer. Without superb reasoning to suggest otherwise, we think DeFi's future will rhyme with the internet's past.

cross-platform interaction and ameliorate the kryptonite of the asset specialists—secondary market liquidity.⁶

The Battle of Asset Specialists



Currently, the larger RWA and RWA-adjacent protocols (excluding MakerDAO) retain total value locked (TVLs) in the \$15-150MM ranges. These protocols rightly recognize the shortcomings of traditional finance/securitization, but are yet to (in our view) convincingly demonstrate how to fix them (including MakerDAO).

⁶ Why does DeFi lack an universal permissioning standard? Two potential explanations: (1) High supply of competing standards, as protocols vie to "own the stack" rather than paying "rent" to other protocols. (2) Low demand for interoperability as regulations typically require token issuers to demonstrate in-house capacity and processes for permissioning (e.g., KYB/AML checks, travel rule, etc.).

Centrifuge, in part due to an early strategic partnership with Maker has managed to secure 87MM DAI in value (of which Maker accounts for roughly 25MM DAI). Centrifuge has maintained an orientation completely towards secured lending against real world yield (mortgages, trade finance, etc.). Further, the protocol, unlike some of its peers, is not expressly focused on emerging markets. It seeks partnerships with [established developed market lenders](#).

On one hand, protocols providing unsecured lending to market makers and market-neutral arbitrage funds have generated significant growth. Examples include TrueFi, Maple and Clearpool. As time goes on, we expect these protocols to parlay the liquidity, mindshare, and brand they've generated within unsecured crypto-native lending into secured real world-centric lending. We can see evidence of this growth strategy in Maple's recent launch of a [Bitcoin mining pool with IceBreaker Finance](#).

On the other hand, GoldFinch and Credix focus on emerging markets credit. GoldFinch has a more diversified approach to sourcing, launching pools for Latam, Southeast Asian, and African assets. Credix, at least in the near term, is focusing on Latin and South America, specifically Brazil. GoldFinch has generated a [TVL of \\$100+MM](#) while Credix appears to have just [broken through \\$20MM](#).

To attract liquidity, protocols often emit native tokens to attract users—effectively a customer acquisition cost or more cynically, a bribe. As such, it is difficult to determine which asset specialists are thriving net of token incentives. Revenues and TVLs across protocols cannot be compared directly—apples to oranges. Rather than compare “horsepower” across protocols, the analyst should understand the “torque” of these protocols, i.e., how much current TVL or revenue does each protocol drive per \$ of native tokens emitted? What portion of the incentivized user base remains when unincentivized?

Due to shoddy data and non-public token deals, your authors will resist the temptation to publish a torque table comparing all relevant asset specialists. Nonetheless, the robust RWA asset specialists are those with sticky liquidity. If the Web2 Fintech playbook applies, then the ratio of Customer Acquisition Cost (CAC) to Lifetime Value (LTV) is king.

Though these protocols are taking differentiated approaches, each is ultimately looking to drive a network effect: on the one side, liquidity (demand); on the other, supply of assets. To the extent that they're able to create this “lock-in”, they'll be in a position to push a proprietary standard for on-chain RWAs. An exemplar of this strategy might be Apple, whose excellence and eventual network effect made iOS the market standard.

This competition, though natural, constrains the one property each of these protocols needs most—secondary market liquidity, particularly from institutions. Because primary liquidity providers (the buy side) are rightly concerned about being able to exit positions, these protocols struggle to generate demand for RWA yields (they have far less of a problem attracting a supply of assets).

IV. Prediction: Adoption Dynamics at the Tails of Two Systems

Because DeFi supports more [coordination with less trust](#), it should serve as a stronger base for economic activity, eventually replacing much of TradFi. But these processes take decades. Though ten years has passed since the proclamation that '[Software is eating the world](#)', it really hasn't [devoured that much, yet.](#)

In many respects, upgrading our financial system from TradFi to DeFi is similar to upgrading server architecture to serverless architecture. It is likely that TradFi and DeFi will coexist for the foreseeable future.

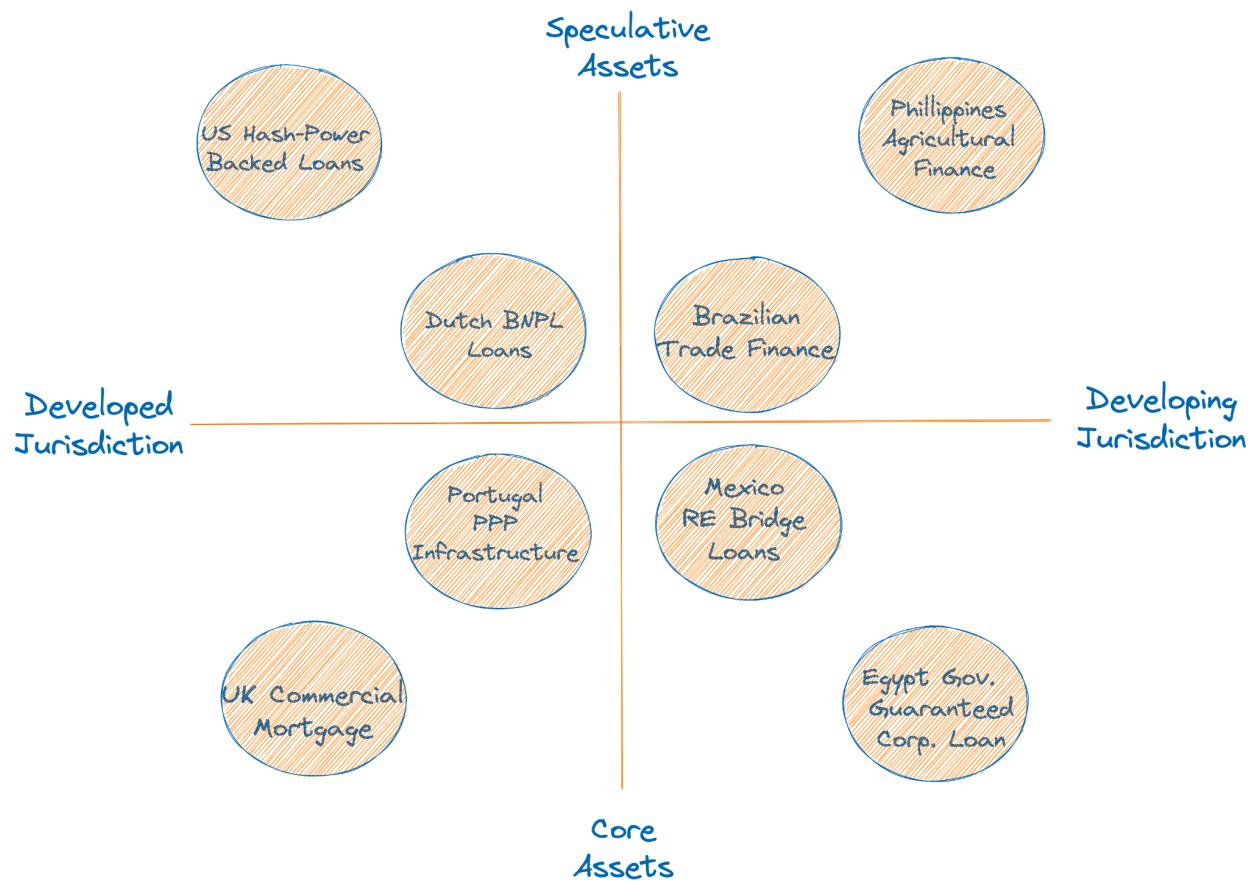
DeFi eats long tail assets first

Think about what Square did:

Square's inception was based on the premise that small businesses paid ~45x more for payment solutions than did larger ones in 2009. By enabling the digitization of SMB payments, Square unlocked the latent potential of and piggy-backed on the successes of its customers. The Square product was fine but it was the fit between that product and the right market (product-market fit) that was excellent. - Teej, [A North Star — DAI as the Destination](#)

DeFi starts by addressing greenfield, niche market opportunities that are under-served by incumbent capital markets. On the other hand, TradFi will maintain a temporary stranglehold on well-understood existing assets with large TAMs like equities, corporate bond markets, and prime real estate, which currently benefit from deep capital markets.

DeFi Eats the Long Tail (Speculative/Developing) First



Consider the below categories that are underserved by capital markets:

Jurisdictions: Southeast Asia, South America, Latin America, Africa

Assets: Trade Finance, Agriculture, Public and Private Infrastructure, Insurance, Revenue-Based Finance, Hash-Power Backed Loans, Litigation Finance, Film Finance, Regenerative Finance

From the inception of over-collateralized crypto lending, DeFi has made the [greatest impact on the underserved](#). By providing permissionless access to synthetic dollars, or hard money, individuals trapped in poorly developed monetary regimes benefited the most. Once limited to retail, this axiom will soon engulf businesses. Businesses (Funds,

FinTechs, etc.) with constrained access to capital markets - i.e. those operating from speculative jurisdictions, those in nascency, those who allocate towards opportunistic assets - stand to benefit the most.

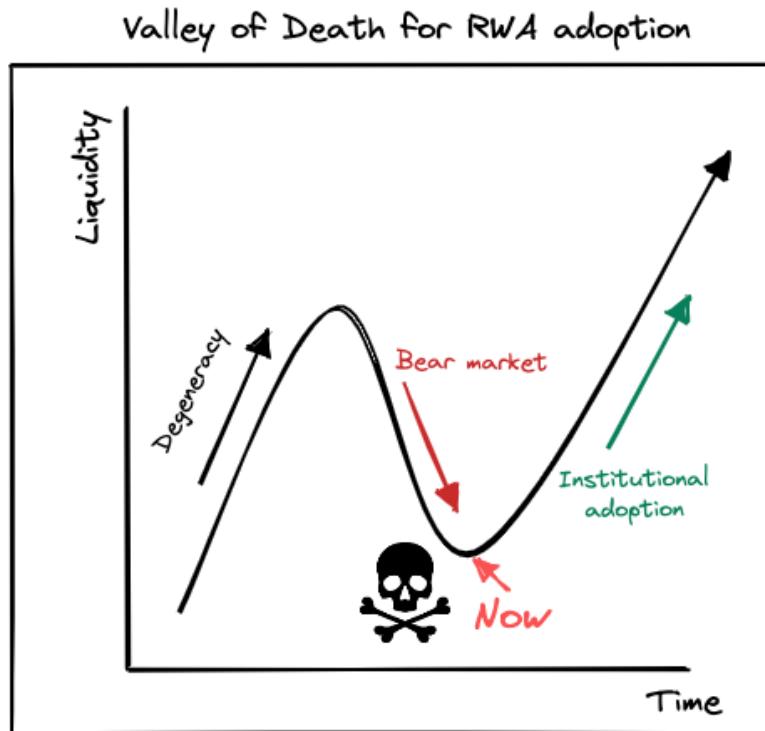
Nonetheless, over-collateralized crypto lending to retail (where crypto was four years ago) and secured lending to businesses against real world assets (where crypto is today) assume very different risk profiles. Crypto lending entails few risks because lenders retain a smart-contract-enforced security interest in highly liquid collateral like ETH and BTC. Validator enforcement has much more deterministic guarantees than does legal enforcement. The only risks that remain are [slippage and smart-contract vulnerabilities](#). On the other hand, RWAs entail a basket of risks: credit risk, liquidity risk, counterparty risk, legal risk, and structural risk, among others.

While we believe that crypto will generate more traction with the long-tail (underserved), it'll simultaneously struggle with adverse selection, or predatory targeting by unqualified borrowers. Due to the setbacks on legitimacy and growth that adverse selection will cause, it will also be important to simultaneously onboard high-quality, established assets and originators (Rebirth). Only by generating traction within both categories of risk (Birth and Rebirth) does DeFi "earn" the platform to make a dent in the world economy.

Capital: Demand from Asset Managers

The European Investment Bank (EIB), the investment arm of the European Union, [issued its first ever digital bond](#), worth €100 million, on the public Ethereum blockchain. Swiss banks, SEBA and Sygnum, each [respectively tokenized](#) their equities after the Swiss DLT bill. [Arca](#) and [Franklin Templeton](#) both offer tokenized treasury bills/money market funds. KKR even [tokenized](#) one of their healthcare funds on Avalanche and lowered the minimum investment threshold for new Limited Partners. It is clear that traditional asset managers are looking to flexibly utilize both DeFi and TradFi.

As RWA adoption trudges through the valley of death in the midst of the current bear market, institutional adoption is essential to the next chapter, both of RWAs and of DeFi more broadly. A key question arises: how will asset managers interact with DeFi and what is the role of RWA in that relationship?

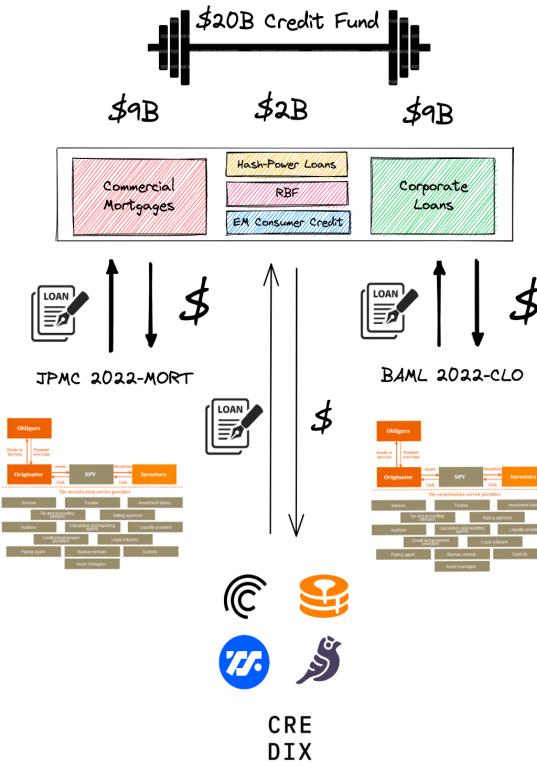


We argue that companies, jurisdictions, and asset classes for which “execution”, or systemized access to capital sources is sub-par, will be most amenable to crypto’s inroads.

Credit funds will continue to tap US/EU securitization markets to buy mortgages, corporate loans, and prime asset-backed securities/loans while turning to DeFi for exposure to less institutionalized assets like private credit, EM consumer and business credit, trade finance assets, revenue-based finance, and hash power-backed loans. They’ll utilize DeFi protocols, especially those that they’ve invested in, as marketplaces to source assets.

In the near term, we anticipate large managers acquiring the majority of their assets (~90%) from traditional avenues while exploring alternative sources for the minority (~10%). We call this dynamic “**Barbell**”, with heavy loads on the ends and a light handle in the middle.

Barbell: Managers Source Established Assets from TradFi, Emergent Ones from DeFi



Capital: Demand from Crypto-Native Organizations

We expect demand from crypto-native organizations for real world assets to be a mid-term catalyst for the RWA industry. For large protocols such as Lido, Synthetix, Gnosis, and Uniswap, whereas RWAs were once unrelated to their core businesses, they will be soon. Driven by attractive risk-reward profiles of RWAs, profitable DAOs with large treasuries denominated in ETH and stablecoins will increase their exposure to RWAs within two years.

Many prominent DAOs do not manage their treasuries efficiently. They hold native tokens and ETH, both of which are subject to high volatility, and stablecoins. As a result of their non-stablecoin holdings, such DAOs find it difficult to match revenues to their projected cost structures (e.g., labor, marketing, software subscriptions, R&D, etc.). In short, they lack a working asset liability management (ALM) policy. And so many resort to conservative and thus excess stablecoin holdings, effectively yieldless RWAs (e.g., USDC). Therein lies an enormous market opportunity for packaged [treasury management](#) solutions for DAOs.

By integrating with protocols that offer tokenized government debt, DAOs benefit from crypto-uncorrelated yield while outsourcing most operational risks. Such yields currently sit at 2-3%. Government paper (especially US Treasuries) benefits from high demand and thus deep liquidity, offering DAOs the option to exit positions quickly with minimal execution/slippage risk.

As protocols like Backed Finance [offer compliant ERC-20 tokens representing US Treasuries](#), we expect more and more DAOs to [replace stablecoins with tokenized treasures](#) and other low-risk credit instruments. A Centrifuge colleague of ours regards tokenized government debt as an RWA gateway drug. US Treasuries are the building blocks of finance. These are ultra-low risk, highly liquid, moderately yielding debt assets.

Though ultra-safe tokenized assets fulfill an unmet need across crypto treasuries, we expect DAOs to slowly venture out on the RWA risk curve. Unlike their TradFin institutional counterparts, DAOs are inherently comfortable putting money to work on-chain. Furthermore, being in crypto, their general risk appetites are higher. They're willing to be first to a yield farm. We are already witnessing this dynamic play out with

UXD's recent [\\$7MM investment into a Maple pool](#) and [\\$1MM investment into a senior tranche at Credix](#).

Supply: Origination from Asset Managers & Web2 Fintech

The lesson from current RWA adoption has revealed that originating assets is easier than capturing liquidity to fund those assets. Originators (sometimes asset managers) gain a lot more by securing cheaper financing, albeit via crypto liquidity and its associated risks, than investors that deposit liquidity into RWAs with limited secondary liquidity available do.

Asset managers are deploying liquidity into DeFi to invest in unique RWAs. Similarly, they will also originate RWAs and secure funding via DeFi. The long-tail dynamic captured before will prevail here as well.

Addem Capital's [integration with GoldFinch](#) and Blocktower's [proposal to MakerDAO](#) express demand for crypto leverage to fund real world loan origination. The former, Addem Capital, which provides small business loans across Mexico and Latam, will launch a \$10MM USDC pool to fund loans to companies in the fintech, healthtech, agrotech, energy, and real estate sectors. The latter, BlockTower's credit fund, hopes to obtain approval for a \$150MM Maker vault to fund the origination of "asset-backed credit, secured by diversified pools of short duration, real-world loans and credit receivables".

As large investment funds explore novel ways to fund assets and generate an edge, they'll establish strategic equity positions in external protocols. BlockTower's partnership with Centrifuge and concomitant [\\$3MM acquisition of CFG tokens](#) is a harbinger of this trend. We expect crypto-savvy institutions like Cross River Bank, Victory Park Capital, Goldman, Coatue, Apollo, Anchorage, GoldenTree, KKR, Franklin Templeton, and the like to gradually place their bets.

FinTechs Incubating Proprietary DeFi Protocols

In a similar but distinct dynamic, Web2 FinTechs (e.g., Trade finance, Revenue Based Finance lenders, and BNPL lenders) will play an important role in originating and supplying RWAs.

They will incubate proprietary protocols to complement their core lending businesses. By leveraging their performance history, pipelines, servicing and underwriting systems, they'll parlay their existing brands into successful RWA protocols with traction right out of the gate. For tech-oriented originators, this is their second test—first they upgraded the customer-facing front ends of finance (Web2 applications) and now they must upgrade the back end (Web3 protocols).

How do Web2 FinTechs differ from TradFi credit funds?

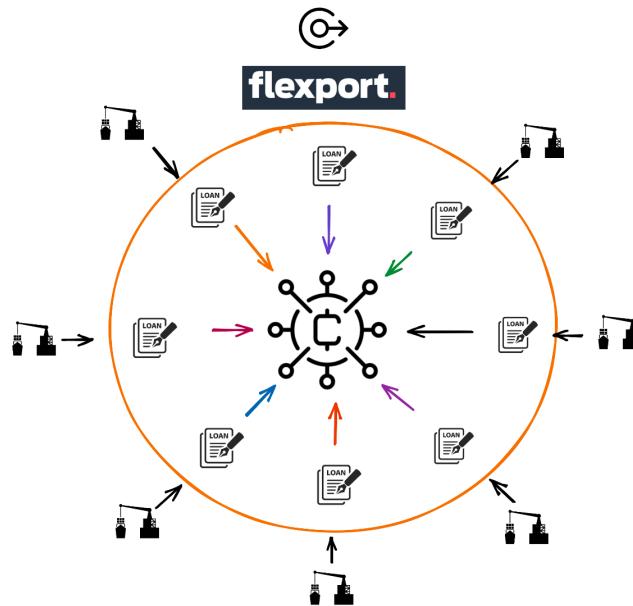
1. **Essence:** FinTech companies are technology-first and with the culture to build. They are also more long-term oriented (not marked to market monthly/quarterly), with the luxury to invest heavily in technology that will enhance the business not today, but in several years.
2. **Specialization:** Sizeable asset and jurisdiction-specific origination, underwriting, and servicing infrastructure.
3. **Data:** Deep trove of borrower data/trends and finely tuned proprietary algorithms.
4. **Product-Oriented:** Focused on core technology but not merely sourcing capital. They are obsessed with delivering a great UX along the value chain from origination to securing secondary market liquidity.
5. **Asset Distribution:** Typically, Fintechs serve as software intermediaries, not balance sheet investors. They distribute and do not retain risk. They are incentivized to develop an edge in distribution in a programmatic and scalable way via a proprietary protocol.

Many such FinTech originators benefit from something that most crypto protocols do not: Product-Market Fit. They know their businesses, flows, and customers well. Those seeking an edge may adopt DeFi but will be wary of losing the certainty they enjoy across other legs of the business, hence the self-launch.⁷

⁷ Due to the obvious risks of sullying the core business by integrating DeFi at all, we imagine only the most intrepid will pursue proprietary protocols. Rather than pure speculation, your authors are advising Fintechs exploring this now.

Having spent years and millions of dollars building a vertical lending operation, such FinTechs will push to maintain control and avoid paying rent to an external platform by building Web3 applications in-house. We'll coin this dynamic: **Inside-Out Execution**.

Inside-Out: Fintechs Incubating Liquidity Protocols to Enhance Core Businesses



Revenue-based Finance (RBF) originators like Pipe or Uncapped, Trade Finance Asset (TFA) originators like LSQ Funding or Taulia, and BNPL lenders like Tinka, Kredivo, or Revolut might fit the bill. Tribal Credit, an EM B2B financing platform, recently [partnered with Bitso \(Latin American Crypto Exchange\) and the Stellar Development Corporation](#), raised funding from [Coinbase Ventures and Third Prime](#), and launched [an ecosystem token](#) (TRIBL). Tesseract, a direct-to-consumer electricity company founded by Revolut's founders, recently launched a [private token sale to fund a Web3-integrated energy protocol](#).

Such technology-enabled lenders do not benefit from easy access to debt capital (yet) and are eager to generate a strategic advantage, of which access to liquidity is one. We are aware of a host of FinTechs (not mentioned above) pursuing such solutions, though are not at liberty to share details yet.

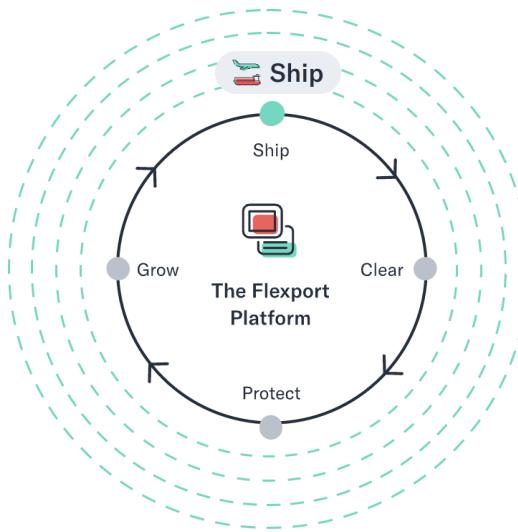
Though many FinTechs will approach incubation of in-house protocols with zeal, many will defect upon underestimating the complexity of the task at hand. In many cases, it

will indeed make more sense for such originators to continue specializing in the off-chain legs (origination, underwriting, servicing) while outsourcing the on-chain legs (liquidity, permissioning, securitization) to external protocols like those asset specialists in our landscape.

Flexport: From RWA to DeFi

We expect “inside-out” adoption by frontier-focused Fintechs to dominate in 2023. If that thematic prediction wasn’t hot enough, consider this much more specific one: **Flexport will launch its own DeFi protocol.**

[Flexport](#) is a global shipping logistics company. Unlike Amazon and other shippers, it does not own ports, ships, trains, or planes directly⁸, at least not yet. Instead, it offers software for customers to book freight on these vessels (freight forwarding). It also offers additional services, e.g., customs brokerage, insurance, and importantly, [financing](#). As a whole, it provides an integrated solution for getting a customer’s shipment from source to terminal.



Source: [Flexport](#)

While Flexport started as an enterprise software provider in the shipping vertical, it parlayed its edge in data into an edge in financing, following the more recent playbook of [enterprise software extending into fintech](#). Flexport enjoys structural privileges that

⁸ Flexport does [own and operate its own warehouses](#).

other trade finance platforms do not. By incubating a [proprietary lending engine](#), the firm can go vertical and own an important leg of the UX: users seeking crucial trade financing to manage their working capital cycles.

But even with a performant in-house lending engine, Flexport does not yet benefit from a performant distribution engine, i.e. the ability to package and distribute assets to external participants. This inefficiency constrains growth. How can we make this assessment?

Despite being a multi-trillion dollar global asset class, TFAs, including factoring, supply chain finance, import finance, export finance, last mile/[drayage](#) finance and inventory finance assets, generally suffer from poor execution, or low systemized access to financial markets. Whereas consumer credit assets originated by FinTechs like Affirm, Klarna, and Sofi are regularly securitized, TFAs are not. Unlike consumer assets, TFAs are more heterogeneous and incur even higher administrative/servicing overhead. As such, despite similar maturities to and often better risk profiles than consumer assets like credit card receivables, TFAs cannot easily be “rolled” to construct a synthetically longer-term securitization. (i.e., roll 45-day assets to create 18-month maturity securitizations).

Because secondary market liquidity options are limited for TFAs, originators like Flexport are forced to either hold assets on the balance sheet or [participate](#) assets out (secondary market) to buyers via a tedious, manual, and expensive process. Given the international nature of Flexport’s businesses, it may very well seek to tap into the international, permissionless liquidity in DeFi capital markets. The “Flexport Protocol” would tokenize, securitize, and create secondary liquidity pools for international investors to programmatically acquire, manage, track the performance of, and divest of Flexport-originated TFAs.

Through deployment of a highly tailored but automated secondary DeFi market for assets, Flexport [achieves a few desirable goals](#):

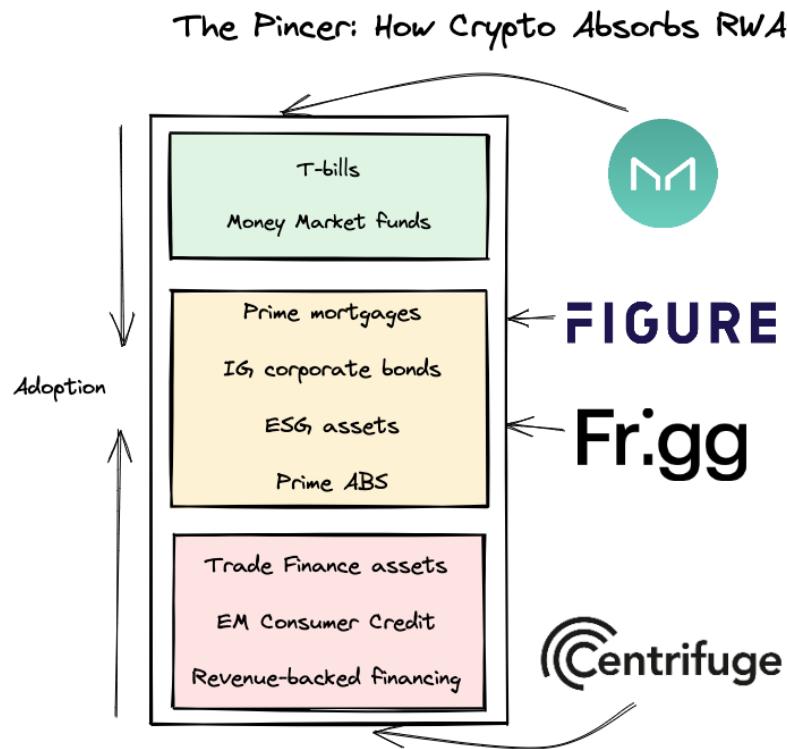
1. **Capital Efficiency/Volume:** By sharing assets, Flexport can grow revenue, support existing clients, and lower capital requirements for doing so. Due to the increased capital efficiency, Flexport can support more of their clients’ financing needs and add new clients.

2. **Borrower and Lender UX:** By standardizing, simplifying, and unifying the manner in which external liquidity providers purchase TFA participations, Flexport will generate greater secondary market demand from institutions. This will diversify funding, adding resilience and enabling Flexport to originate a wider range of asset types, strengthening relationships with existing borrowers.
3. **Vendor Lock-in:** By adding another service to the customer suite, Flexport delivers more value to their customers and makes it more painful for customers to switch to alternative vendors.

A Dialectic: Pincer Adoption, Cost Curves, and Value Accrual

In previous sections, we have discussed the adoption on the demand- and supply-side.

In this section, we reach a dialectic understanding of what types of assets will be originated, the motivation for TradFi to participate in DeFi rails, and the successful business models to ride the RWA wave.



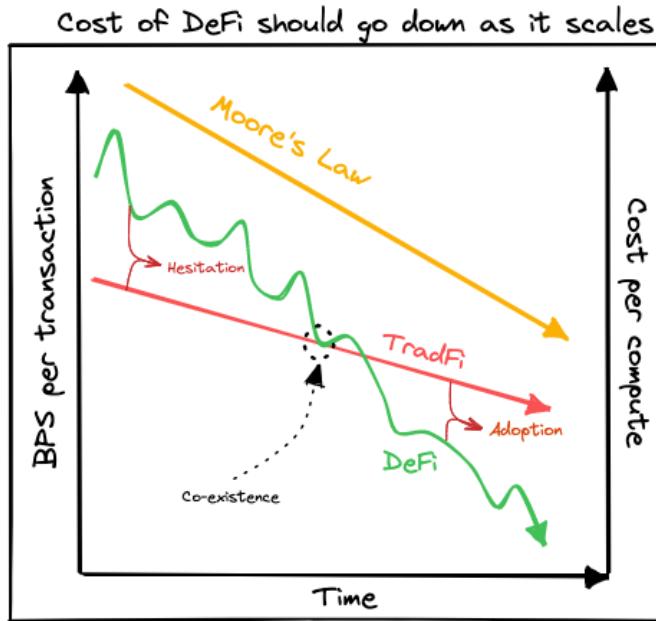
First, we believe that RWA adoption would follow a [pincer Movement](#).

On one hand, RWAs with deep liquidity and deemed as high quality (e.g. Treasury bills) will be absorbed into DeFi, as seen by [Backed's proposal to MakerDAO](#). This adoption is more heavily driven by investors (on the demand side) as they appreciate the deep liquidity (and currently high risk-adjusted yields) available in TradFi.

On the other hand, emergent or long-tail RWAs (e.g. revenue-based financing) will also be originated. This prong of the pincer is more heavily driven by originators (on the

supply side), as such cohorts are underserved by TradFi and appreciate the lower cost of capital.

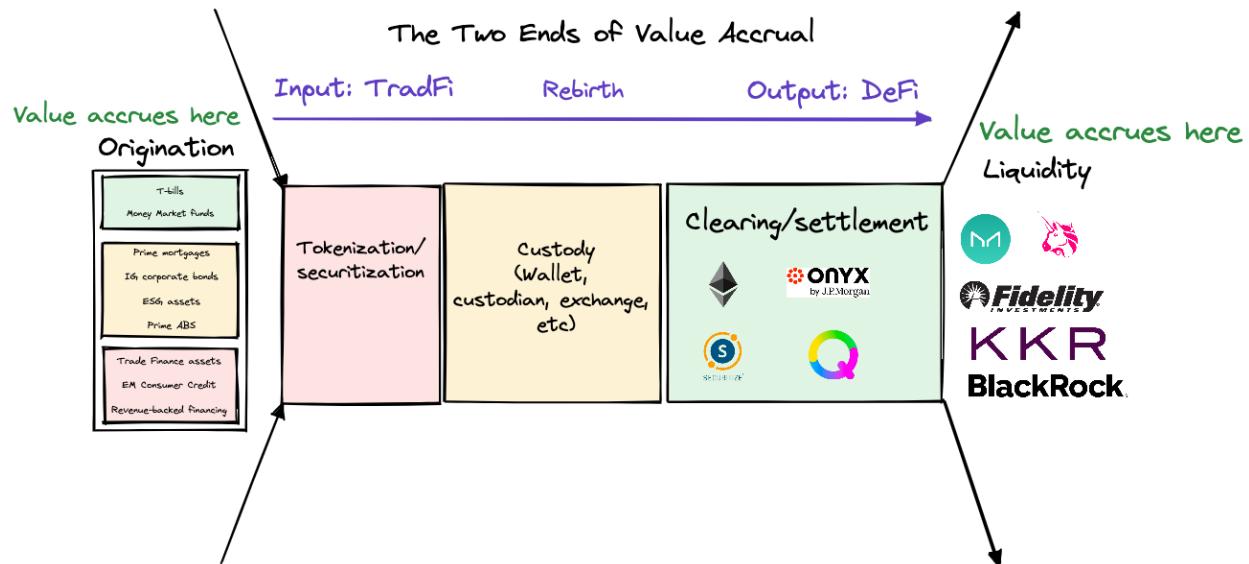
Overall, this mimics a top-down and bottom-up origination along the asset quality stack. An interesting corollary of this observation is that financial innovation (i.e. product space) should follow technological innovation (i.e. design space). This implies that the single most impactful product that can onboard the most marginal users to DeFi is not TradFi-skeuomorphic instruments, but *de novo* 'Birth' assets.



Second, the economic rationale for transitioning from traditional rails to DeFi will play out similarly to the transition from on-premise computing to cloud. In the early phases of cloud adoption, many companies maintained both server and serverless architectures. They paid “fees” for both, using one architecture or the other for different use cases. Eventually companies capitulated to AWS and the like as the *standard* for computing.

Currently, the costs of the institutional DeFi ‘stack’ present a challenge for institutional adoption. The cost of TradFi financial ‘stack’ has improved due to decades of competition. In DeFi, however, new institutional participants must switch to an entirely new suite of infrastructure providers (e.g. wallet, custodian, exchange) and service providers (software, compliance, audits). For certain infrastructure providers, their offerings are simply not competitive at all. To add insult to injury, given that institutions will in the medium term maintain both TradFi and DeFi presences, they’ll pay double the fees. Unless DeFi presents novel profit-making opportunities that are 10x more appealing than TradFi, institutions remain rightly hesitant to truly adopt DeFi.

In the long run, as DeFi grows its base of network participants, costs will drop. When DeFi is indeed 10x better than TradFi, it will have achieved Product-Market Fit.



Lastly, we believe that, in the long run, value accrues at the two ends of the RWA value chain: Origination (sourced off-chain) and Liquidity (placed on-chain). As more and more assets are re-ledgered ('Rebirth') on-chain, the middleware stack (e.g. tokenization, custody, and clearing) will slowly but surely commoditize. As was the case for other industries' infrastructure, hefty profits will still be banked in the interim.

By contrast, companies with edges in origination offer coveted access to previously inaccessible or mispriced assets. As such, specialist originators with strong underwriting and servicing practices will earn the right to command pricing power, though this dynamic is not unique to crypto. Such participants include Web2 Fintechs with significant operational presence (e.g. Flexport, as mentioned in previous sections) and TradFi niche asset originators. Similarly, companies with edges in liquidity and distribution, such as large institutional investors and crypto-native investor communities, will also achieve moats, though they'll look different than their Web2 counterparts.

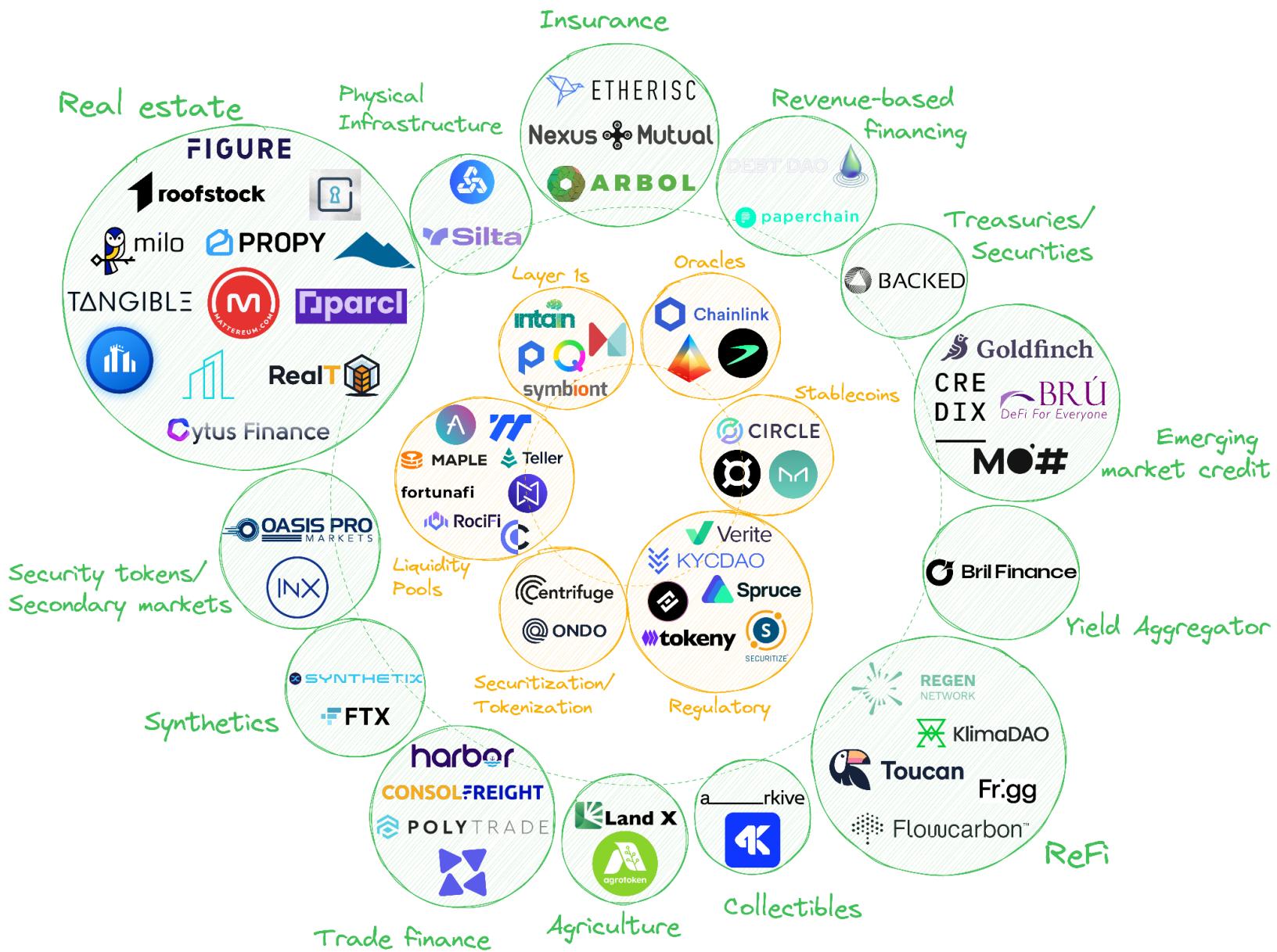
What does this model of value accrual predict? We expect to see more RWA players vertically integrate. First, asset originators will integrate by incubating liquidity protocols (inside-out execution a la Tribal Credit) and then liquidity protocols will integrate by acquiring specialist originators and one another.

Though Silicon Valley has perfected the playbook of software sales, software has not perfected the playbook of Wall Street. Relationships still fundamentally drive the distribution of financial products. If our model of value accrual is valid, the category defining winners will be those that dominate in both origination **and** distribution. Despite its novel shape, (decentralized) finance may reward most handsomely an uncannily similar archetype. If DeFi does indeed become the backbone of the global financial system, then the RWA winners will morph into a new form of investment banks, one bespoke to the 21st century.

V. The Landscape

In crypto, there is an undersupply of useful applications. The RWA product space is no different. Despite RWA is still on its way to PMF, we are confident that we may have found Web3 SoFi's and Revolut's in this ecosystem map. The goal of this section is to give readers a sense of where the space currently is and where it is going.

In this map, we've divided the ecosystem into two broad categories: **Infrastructuralists** (interior - orange) and **Asset Specialists** (exterior - green), consistent with how we view this product space throughout this writing.



Infrastructuralists

- **Stablecoins:** [MakerDAO](#), [USDC](#), [Frax](#)
- **Liquidity Pools:** [Aave](#), [TrueFi](#), [Teller Finance](#), [Maple](#), [ClearPool](#), [FortunaFi](#), [Naos](#), [Rocifi](#)
- **Layer 1:** [Provenance](#), [Mortar](#), [Intain](#), [Symbiont](#), [Comdex](#), [Qredo](#)
- **Oracles:** [Chainlink](#), [SpectralFi](#), [Masa Finance](#)
- **Tokenization/Securitization:** [Centrifuge](#), [Ondo Finance](#)
- **Security Tokens/Secondary Markets:** [Oasis Pro Markets](#), [INX](#)
- **Regulatory:** [Quadrata Network](#), [Tokeny](#), [Securitize](#), [Verite](#), [SpruceID](#), [KYCDAO](#)

Infrastructuralists enable asset specialists/applications in a manner similar to [Web2 FinTech's Banking as a Service](#). These are the rails upon which assets are shuttled through crypto-space.



Stablecoins

Stablecoins are the foundation of crypto markets, bridging TradFi RWA and crypto assets. In fact, centralized stablecoins such as Circle and Tether are the original RWAs—these organizations custody off-chain fiat dollars and government securities and issue “crypto dollars” on-chain. As crypto grows to encapsulate a wider range of stakeholders and users, stablecoin experimentation will grow. We may even begin to see non-dollar pegged RWA-backed stablecoins.

[MakerDAO](#): MakerDAO issues DAI, an Ethereum-based stablecoin backed by crypto (e.g. ETH/WBTC) and RWA collateral. Via a partnership with Centrifuge, MakerDAO made its mark on RWAs in late 2020. It onboarded New Silver, a FinTech originator for residential real estate bridge loans. Since then, Maker has onboarded roughly 150MM of RWAs from trade finance to triple-net lease construction loans to business loan participations. After onboarding Huntingdon Valley Bank (US regulated bank) and Societe Generale in July 2022, RWAs will by Q3 account for roughly 2.5% of total DAI outstanding and 13% of total protocol revenue. As a sovereign currency issuer, Maker is one of the few RWA protocols with a balance sheet of RWAs.

[Circle](#): Circle issues USDC, a multi-chain stablecoin backed by US dollars and dollar equivalents. Dollar-backed stablecoins are the first and simplest tokenized real world assets. Total USDC outstanding sits at [54 Billion](#). Circle has also forayed into lending with its Circle Yield product, a treasury management solution for businesses (accredited only). Overcollateralized 125% against borrowers’ BTC, USDC depositors lend for fixed terms at fixed rates.

[Frax](#): The Frax protocol issues the multi-chain stablecoin, a fractionally-reserved and algorithmic stablecoin. [Proposals](#) for RWA AMOs (Algorithmic Market Operations Controller) do not seem to be generating much traction. Interest might resurface as market conditions improve and Frax rolls out its [Fraxlend](#) module.



Liquidity Pools

Liquidity pools are marketplaces designed to ease the trading of assets. Liquidity is the lifeblood of any physical or digital currency, exchange, or financial network. RWA protocol liquidity pools often, via different means, incentivize liquidity providers for their services in order to bootstrap the demand side of these marketplaces. A sustainable liquidity pool or two sided marketplace is one where buyers and sellers transact often without unsustainable incentives.

[Aave](#): Aave, a money-market protocol on Ethereum, allows users to trustlessly borrow and lend crypto assets. In late 2021, Aave launched its Real World Asset market in partnership with Centrifuge, marking its foray into RWAs. Eight months later (August 2022), Aave's RWA market hosts 5 active pools and TVL of \$8.5MM.

Aave has planned to unveil [GHO](#), its native stablecoin. For borrowers, Aave serves as a savings account. Users deposit collateral e.g. stablecoins, for a variable return and the ability to withdraw at any time. A fixed-rate fixed-term product for RWA borrowers would bring diversity and stickiness to the platform. Given that borrowers prefer a “passive” yield, there could be initial barriers to adopt RWA if they require serious effort in underwriting. An alternative is to diversify exposure to a variety of underlying RWAs, akin to securitization.

[TrueFi](#): Launched in November 2020, TrueFi was DeFi's first credit-based lending protocol. Lenders can earn returns on loaned assets with full transparency on the capital allocation of the loaned capital. Vetted borrowers access undercollateralized fixed-term fixed-rate cryptocurrency loans. Lenders can deposit USDC, USDT, TUSD, or BUSD and earn historical rates in the 8-12% range. Each pool/portfolio on TrueFi has a

responsible party (“portfolio manager”) that onboards borrowers and performs financial underwriting and diligence. Contributors to the DAO include credit professionals and led by veterans with experience in private credit, fintech, and distressed products. These pools have done >\$1.6B in originations and maintained zero defaults. TrueFi recently launched the TrueFi Capital Marketplace which enables third-party managers to launch their own lending pools (“Portfolios”) rather than relying on TrueFi’s internal risk team.

[Teller](#) - The Teller Protocol, live on both Polygon and Ethereum mainnet, enables decentralized unsecured lending and borrowing through an open order-book model. Because unsecured lending is inherently riskier, Teller is experimenting with different ways to model borrower creditworthiness. By integrating zkProofs such as those used by [Chainlink's DECO](#) to verify *but not reveal sensitive* borrower information, borrowers can bridge off-chain data onto on-chain loan requests, bringing lenders increased certainty around creditworthiness.⁹ Lenders who agree to loan terms requested by borrowers, based on the data provided or required, transact directly.

Teller seeks to connect real world FinTechs with DeFi liquidity. Teller's infrastructure currently supports a [breadth of borrowers and use cases](#), including NFT-based lending (Ape Now), residential crypto mortgages ([USDC.Homes](#)), [travel insurance](#) (Koala), commercial real estate lending ([Tower Fund Capital](#)), and [trade finance](#) (PolyTrade). Please note that PolyTrade is a TFA-geared Asset Specialist on our Landscape.

[Maple](#) - Maple is an uncollateralized borrow/lend protocol currently geared around lending market makers and delta neutral trading firms. Rather than underwriting loans in-house, Maple hosts “pool delegates”, who manage liquidity pools by providing junior capital and originating loans to end borrowers At the moment, pool delegates Orthogonal Trading and Maven 11 manage most of the Ethereum-based book while [Credora](#), previously xMargin manages a 43MM book on Solana.

Maple has signaled an intent to open the lending aperture as the protocol seasons. That is to say, though Maple’s focus is currently on unsecured crypto-native institutional lending, it will use this network effect/liquidity to branch out into the unsecured and

⁹ “Teller used the DECO protocol to prove that the sum of a user’s off-chain bank accounts had a balance exceeding a dynamic threshold specified by the requested loan amount.”

secured real world lending space over time. As evidence of this, Maple recently launched a [hash-power backed loan pool](#) with pool delegate IceBreaker Finance.

[ClearPool](#) - Clearpool is a decentralized marketplace for unsecured institutional capital. It allows institutions to borrow funds from a decentralized network of lenders without the need for collateral. Whitelisted institutional borrowers can create single-borrower liquidity pools; lenders earn risk-adjusted interests. Yields are enhanced with additional CPOOL rewards, the Clearpool governance token. Clearpool lays the foundations for a system of on-chain risk management, allowing lenders to monitor, manage and hedge the risks of unsecured lending in real-time.

[FortunaFi](#) - FortunaFi is a lending protocol for tokenized cash-flow generating RWAs. Fortunafi offers an end-to-end solution to securitization by bringing significant efficiencies to Asset Originators and better yields to investors by eliminating the various rent seeking capital market participants. Fortunafi is made possible by the technologies from Centrifuge, Maker, Balancer, and several other DeFi projects. `

FortunaFi operates [a MakerDAO RWA vault](#) with a 15MM DAI debt ceiling with a current utilization of 5.3MM DAI. Underlying assets are tokenized via Centrifuge's tokenization platform, Tinlake. FortunaFi purchases revenue-based finance (RBF) assets from originators like Corl and Pipe.

[Naos](#) - NAOS Finance is a decentralized lending protocol that facilitates the borrowing of crypto native assets by using RWA as collateral. Asset originators initiate RWA financing by tokenizing assets into NFTs which are pledged as collateral. Users can deposit stable coins in a liquidity protocol and mint the synthetic token "nUSD", an interest-bearing and fungible claim on the pool of deposited collateral. NAOS has established a large network of corporate borrowers and is operating with financing licenses in multiple regions. Currently, NAOS has a TVL of \$1.25MM and facilitates borrow/lend pools on both Aave and Compound.

[RociFi](#) - RociFi is a decentralized credit market with non-transferable, native-to-blockchain credit scores created to support under-collateralized lending. The Non-Fungible Credit Scores (NFCS) are non-transferable NFTs which house the user's credit score. The NFCS operates as a Web3 credential for credit, reputation, and trust. The protocol's credit scoring is based upon a user's on-chain data-only, including DeFi

protocol interactions and Web3 credentials. Since launch on Polygon 1.5 months ago, RociFi has issued 729 pseudo-anonymous, under-collateralized loans with a 99.45% repayment (currently), and issued almost 11,000 unique NFCS.



Layer 1s

Layer 1s refer to the underlying blockchain infrastructures. Ethereum, Bitcoin, and Solana are all “layer 1s” while Polygon, Lightning, and Optimism are “layer 2s”. The L1s we included cater specifically to enabling RWA architecture for either institutional or regulatory use cases. Whereas traditionally a blockchain derives its “security” from the validation of transactions, or the punishment of double-spend, the design space for consensus engines is huge. We expect that RWA-specific (i.e. dApp chains) L1s will experiment with regard to what, specifically, constitutes “security” on its network. I.e. What is a desirable state?

[Intain](#): Intain is a layer 1 blockchain and institutional marketplace for digital issuance and investment of asset-backed instruments, with integrated collateral verification, on-chain transaction administration and real time loan analytics in a single platform, built on the Avalanche protocol. Intain raised capital from Blizzard, a venture fund supporting the Avalanche ecosystem in July of 2022. In 2020, Intain partnered with WSFS, the fourth largest trustee in the ABS sector and the party MakerDAO used as Trustee for its [HVB deal](#).

[Provenance](#) - Provenance (HASH), founded by Mike Cagney and the same team building out Figure Mortgage, is an application-specific Cosmos (Cosmos SDK/Tendermint BFT) Layer 1 built for financial services. It caters to large financial institutions and vies to be the software backend that powers large transactions like HELOCs, mortgages, and securitizations. USDF, a Provenance-native stablecoin, will be created by [tokenizing the deposits](#) of the USDF Consortium, a group of FDIC-insured banks.

[Symbiont](#) - Symbiont is an enterprise financial services platform and Layer 1 blockchain. It has created SymPL (proprietary smart contract language), Assembly (an L1), and Smart Securities (standardized digital security standards). It currently has dedicated teams for five business lines: Alternative Assets, Data Management, Fixed Income, Currencies & Commodities, and Mortgages. In 2020, Symbiont and Vanguard first [completed](#) a pilot for Symbiont's Asset-Backed Securities (ABS) solution. In 2021, State Street Corporation, in collaboration with Vanguard and Symbiont, [completed](#) the margin calculation process for a live trade of a 30-day foreign exchange forward contract through the use of Assembly, Symbiont's distributed ledger technology. In Aug 2021, it also [won a lawsuit](#) against IHS Markit, a leading data provider for bond securities recently merged with S&P Global. Symbiont's most recent funding round was led by [Nasdaq's and Citigroup's venture wings](#) - their board includes a former SEC chairman and former CEO of the NYSE.

[Mortar](#): Mortar's aim is to be non-prescriptive infrastructure for CRE to build within DeFi. It is a decentralized blockchain ecosystem seeking to democratize real estate and its underlying structure while improving access and liquidity throughout the market. Our mission is to allow and encourage third parties in Commercial Real Estate (CRE) to utilize blockchain technology to increase liquidity, cut out intermediaries, and automate real estate asset buying and selling. Mortar chain is designed to only facilitate verified real estate transactions. The ecosystem is built on an EVM-compatible, proof of stake, and scalable blockchain. It includes prebuilt frameworks, protocols, and modular plug-ins to streamline the adoption of decentralized real estate applications and financial protocols.

[Comdex](#) - Comdex is a Layer1 infrastructure chain built on the Cosmos SDK. Comdex launched with a vision to open up and supercharge commodities trade industry, one of the oldest and largest industries in the global economy. The L1 hopes to deliver a substrate where builders can seamlessly launch DeFi applications that deliver sustainable yield to on-chain liquidity pools.

The Comdex ecosystem consists currently of seven components, some of which include a B2B application that tokenizes commodities, cAsset which serve as commodity synths backed by IBC assets, and cSwap which is a dex.

[Qredo](#) - The Qredo protocol is a Layer 2 decentralized custodian protocol that sits on top of multiple public Layer 1s with compliance and governance controls built-in to its

consensus mechanism. It is the only provider of a Decentralized MPC (dMPC). It uses multi-party computation to generate segregated deposit addresses and eliminates the risk of private key theft thus removing a centralized point of attack. Qredo targets institutional users with its partnership with Metamask Institutional.



Oracles

Blockchains are fundamentally consensus machines—they are constructed such that many computers agree on the “state”, typically which wallets own how much value at the time of a block’s publishing. Blockchains cannot deal well with information exogenous to the chain (i.e. real world data). The variability this would introduce is incompatible with the determinism of the blockchain’s consensus mechanism.

An oracle is a bridge between a blockchain and the real world (the name being an allusion to the religious oracles that offered a bridge between laymen and deities). It takes data, such as stock prices and weather conditions, and writes it to the blockchain. [This allows smart contracts to reference the state of the world](#), unlocking a variety of applications. So oracles have significant implications for the expansion of applications that seek to source, transform, and bring liquidity to real world assets.

[Chainlink](#): Chainlink is a decentralized oracle network designed to port off-chain/real world data on-chain. Though Chainlink’s core offering is its market & data feeds, which secure the majority of Defi protocols (e.g. DEX, money-markets, etc.), Chainlink has launched a broader suite of off-chain services. This includes Verifiable Randomness (VRF), Keepers, Cross Chain Interoperability Protocol (CCIP), privacy preserving oracles (DECO), and Proof-of-Reserves (PoR).

Chainlink’s track record of reliability has earned it a platform to provide core infrastructure for RWAs on-chain. In this vein, we see market feeds, PoR and DECO as playing roles. PoR verifies that off-chain assets, [such as the dollar reserves in a stablecoin’s accounts or the BTC at BitGo](#), exist and then ships this verification on-chain. This has clear implications for tokenizing RWAs. Akin to zk-proofs, DECO

seeks to verify sensitive off-chain data, such as addresses or borrower names, without publicly revealing that information. Because consumer credit assets are simultaneously an enormous market but also unusually constrained by consumer privacy regulations, DECO could serve as a key bridge between these assets and crypto. Market & Price feeds will play a natural role: if Chainlink can pipe rich data about asset values, real world events (e.g. weather, commodity prices), performance history, and collateral existence on-chain, it may play a key role in embedding RWAs in the world of smart contracts. Consider perhaps an inflation-resistant stablecoin pegged inversely to [Truflation](#).

[SpectralFi](#) - Spectral Finance creates a programmable creditworthiness ecosystem through their oracles for credit risk analysis. It aims to create an open platform of credit-scoring machine learning models. Spectral believes that a user's historical on-chain activity indicates his or her likelihood of defaulting on future loans. In the near term, to quantify a user's creditworthiness, Spectral is oriented around its Multi Asset Credit Risk Oracle (MACRO), effectively an on-chain equivalent of FICO, which uses [Chainlink external adaptors](#). The MACRO score integrates seven dimensions of user behavior—DeFi transaction history, liquidation history, loan safety margin, age or time-based factors, general wallet history, market conditions, and credit mix—to populate an non-fungible credit profile (effectively soul-bound credit). This is an ERC-721 asset that paints a picture of user's creditworthiness, aggregated across numerous wallets. As of August 2022, Spectral launched App V0.3.0 as an open beta.

[Masa Finance](#) - Masa is a decentralized credit protocol that allows people to connect their traditional and cryptocurrency accounts. It creates a decentralized credit report as a 'soulbound' NFT. Masa's credit protocol comprises a decentralized credit bureau and embedded lending protocol consisting of a non-fungible credit report, composable credit primitives, smart contracts, and liquidity pools, enabling developers to launch sophisticated credit products in DeFi to match the existing centralized credit paradigm. At launch, Masa supports over 10,000 data sources across 78 countries through traditional financial data integrations with Credit Bureaus, Banks, and Fintechs.



Tokenization/Securitization

Nobody is exactly sure what tokenization/securitization entails yet. If anyone does know, they're not allowed to explain because their general counsel won't let them. At a high level, tokenization is the process of issuing a token that represents (sometimes digitally) a real tradable asset. Because a token is merely a representation of value, anything can be tokenized, from currency to access to buildings. Securitization, a related but separate concept, is a subsector of tokenization that specifically refers to the packaging of financial assets into a more liquid form.

Centrifuge - Centrifuge, one of the earliest RWA protocols, provides a technology platform to securitize assets on-chain via Tinlake, its smart contract financing platform. Asset pools are fully collateralized, liquidity providers [have legal recourse](#), and the protocol is asset-class agnostic with asset pools spanning mortgages, invoices, microlending and consumer finance.

Centrifuge has been able to attract a wide range of borrowers, from the long-tail to the more established ([here](#) and [here](#)). By bringing the entire structured credit market on-chain across securitization, tokenization, privacy, governance, and liquidity integrations, Centrifuge seeks to drive a lower cost of capital to borrowers through increased transparency and access to international liquidity.

Founded in 2017, the protocol sought to address the inefficiencies of trade finance by embedding better guarantees into the flow of funds. A technologically advanced platform, Centrifuge is one of a few protocols to integrate cash flow waterfalls and tranching natively into its smart contracts. Centrifuge tranches debt exposures into senior and junior tokens, DROP and TIN, respectively. Tinlake has brought over \$25M in assets to Maker through existing RWA vaults and boasts an \$87MM TVL.

Ondo Finance - Ondo Finance is building a decentralized investment bank, bridging DeFi with institutional investors. It was launched in July 2021 with natively on-chain structured products that bifurcated DeFi yield into low and high risk tranches. In its v2, set to launch in late 2022, Ondo will support more diverse collateral including RWAs. The new offerings will include on-chain evergreen bonds that create sticky, diverse, credit enhanced term financing in a user-friendly wrapper, backed by a combination of DeFi and RWA collateral. Ondo is partnering with third-party asset managers to originate and manage the RWAs.

Ondo's thesis and strategy are distinguished from its peers who are building two-sided marketplaces in two key ways. First, alignment: Ondo may support the assets in its pools principally. In a manner similar to MakerDAO, it would supercharge its business via a domestic balance sheet. Second, asset focus: Ondo intends to onboard high-quality commoditized assets with blue-chip credit funds. Financing real world assets via Defi rails is still nascent. Hence, the pilot episode of Ondo's financing program *must* go smoothly. Instead of re-inventing the wheel, Ondo orients its growth around strong asset originators who can lend credible underwriting, mature origination and servicing infrastructure, and imprimatur to the platform.



Security Tokens/Secondary Markets

Security tokens represent a stake of ownership or a future benefit in an asset. Similar to ICOs, security tokens provide an ability for digital fundraising but adhere to a higher regulatory standard. As a result of stringent regulations, security tokens are not traded on typical stock exchanges. For an entity to host security token trading, it must retain an [Alternative Trading System, or ATS license](#).

[Oasis Pro Markets](#) - Oasis Pro Markets (OPM) is an investment bank, FINRA registered marketplace, and Alternative Trading System for digital asset securities. One of the few players on our map with an ATS license (the others being Figure/INX), OPM holds potential to serve as a source of secondary market liquidity for on-chain RWAs. (On account of the ATS, OPM is also treated regulatorily as a broker dealer rather than an exchange)

Evidenced by its proposal to facilitate financing for a [heavy fuel furnace project](#) in Egypt and [renewable energy project](#) in India via MakerDAO vaults, OPM will focus initially on bringing liquidity to previously inaccessible foreign debt. In the case of both applications, the borrower is government-affiliated, suggesting a gearing towards sovereign debt issuance.

[INX Group](#) - INX is a blockchain-based platform for trading digital securities and cryptocurrencies. The group has managed to secure an ATS, or Alternative Trading Systems license. In 2017, their INX security token became the first SEC-registered token IPO with an estimated \$85 million in gross proceeds from token sales, received from over 7,200 institutional and retail investors. Since closing the IPO, INX has opened its cryptocurrency trading platform to the public, acquired two brokerages with over \$5 billion in monthly volume, rolled out OTC trading, and is working on developing Bitcoin

and Ethereum Non-Deliverable Forward contracts. INX has also successfully listed traditionally unavailable assets through security tokens such as [in-cask liquor and video games.](#)



Regulatory

Permissioning, in some sense antithetical to censorship-resistant access to financial services, mainly pertains to fulfilling compliance requirements and abiding by the letter of the law. KYC stands for “Know Your Customer”. It refers to the regulatory obligation for capital market participants to carry out certain identity and background checks on their counterparties/clients. It is part of a broader set of Anti-Money Laundering (AML)/Combatting the Financing of Terrorism (CFT) measures.

Real world assets necessarily “inherit” some of the regulatory overhead that traditional asset classes (stocks, bonds, etc.) are subject to. As such, regulatory technology (RegTech) companies serve in a similar capacity to oracles, in that they bridge off-chain data on-chain. In this case, however, the data specifically regards a human or entity’s identity.

Note: It is thus far unclear whether KYC/AML will benefit from a half-life treatment by law. I.e. After an entity, say an SPV, is KYC’d, the activities it partakes in may not need to be KYC’d to the same degree. In the case that the need for strict KYC disintegrates as capital hops from one application to another, RWAs may more easily tap into international pools of permissionless liquidity. We’d love to get schooled on the treatment by our legal engineering colleagues here.

[Quadrata Network](#) - Quadrata Network is an identity and compliance network that consists of Quadrata Passport holders, Passport Issuers, and partners. The Quadrata Passport currently consists of four attributes: Decentralized Identity (DID) for Sybil resistance, Passport linking, AML risk score for compliance, COUNTRY for targeted inclusion/exclusion, and IS_BUSINESS for Know-Your-Business onboarding. Partners

utilize the attributes to do required screening for transactions of RWAs on chain. As Quadrata expands to further attributes/checks, such as accredited investor status, Quadrata aims to onboard a host of other RWAs. The Quadrata Passport contracts were deployed on ETH mainnet in July 2022, they currently have over 500 passports issued.

[Tokeny](#) - Tokeny offers an institutional white-label solution for digital assets that allows asset owners and managers to compliantly issue, transfer, and manage digital assets. All processes, from the client onboarding process including KYC/AML checks to the administration required to manage investor subscriptions, capital tables, distributions, capital calls, etc., are streamlined on the Tokeny platform. It has [secured a partnership](#) with Inveniam Capital Partners. The partnership included a €5m investment by Inveniam, Apex, and K20 Fund. Apex recently [announced](#) a partnership with Inveniam for private asset valuation services. In January 2022, BitMEX partnered with Tokeny to launch its BMEX token. As of August 2022, Fireblocks integrated with Tokeny to offer a turnkey solution for minting and managing security tokens on Ethereum and Polygon.

[Securitize](#) - Securitize provides investors access to security tokens. It also offers a suite of compliance solutions for capital raising, accessing secondary market liquidity, tokenizing assets, and fulfilling KYC/ID requirements. Securitize also hosts a 24/7 primary and secondary market for digital assets.

[Verite](#) - Verite is an open-source data standard for interoperable decentralized identity created by Centre, an open-source initiative of early Circle and Coinbase. It incorporates standards such as the verifiable credentials data models, decentralized identifiers (DIDs), presentation exchange, and credential manifest. It allows opportunities to build sybil resistance, user credentials, permissioned DeFi. It is still under development and adoption. However, it has received [plenty of interest](#) from major exchanges and DeFi protocols.

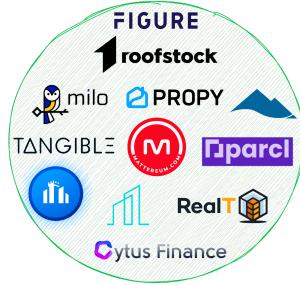
[SpruceID](#) - Spruce enables users to control their data across the web as the world becomes increasingly dependent on cryptography, networks, and digital economies. The SpruceID ecosystem consists of four products: DIDKit, Rebase, Keylink, and Credible. DidKit is a cross-platform framework for decentralized identity. Rebase supports reusable identity verifications across social media, DNS and more. KeyLink links existing system accounts to cryptographic keypairs. Credible is a whitelabel-ready credential wallet.

KYCDAO - KYC DAO offers pseudo-anonymous compliant multi-chain verifications. kycNFTs are the core building blocks of the broader kycDAO trust infrastructure. The soulbound NFTs are minted by verified kycDAO members. kycNFts enable RWA projects to maintain decentralization as compliance is met through NFT gating.

Asset Specialists

- **Real Estate:** [Parcl](#), [PropyInc](#), [labsgroupio](#), [Milo](#), [Figure](#), [Mattereum](#), [Roofstock](#), [CitaDAO](#), [Cytus](#), [Realt](#), [Robinland](#), [Liquid Mortgage](#), [TangibleDAO](#)
- **Emerging Market Credit:** [Goldfinch](#), [Credix](#), [Mohash](#), [Bru Finance](#)
- **Revenue-Based Finance:** [DebtDAO](#), [Paperchain](#), [Yuzu](#)
- **Trade Finance:** [HarborTrade](#), [ConsolFreight](#), [Polytrade](#), [DeFactor](#)
- **Insurance:** [Etherisc](#), [Arbol](#), [Nexus Mutual](#)
- **Synthetics:** [Synthetix](#) [FTX](#), [Blockhouse](#),
- **Treasuries** - [Backed](#)
- **Agriculture:** [LandXfinance](#), [Agrotoken](#)
- **ReFi:** [Regen_Network](#), [KlimaDAO](#), [Flow Carbon](#), [ToucanProtocol](#), [Frigg.Eco](#), [Helios](#), [Stacs](#)
- **(Physical) Infrastructure Finance:** [Delta P3](#), [Sulta Finance](#), [1618](#)
- **Yield Aggregator and Portfolio Management:** [Bril Finance](#)
- **Collectibles:** [CurioDAO](#)
- **Miscellaneous/Mystery Flavor:**
 - **Litigation Finance:** [Ryval](#)
 - **Mystery:** [RWA.xyz](#), [Tokrlabs](#)

Asset specialists are, at least for now, focused on a particular niche of the risk asset universe. Their ability to source, package, and distribute the yield of these RWAs will determine how much capital enters the space. The asset classes we highlight below do not represent an exhaustive survey of the RWA space by any means.



Real Estate

A perennial obsession for tokenizers, Real Estate is simultaneously one of the most appealing and most difficult assets to tokenize. The world's most significant source of wealth, global real estate is valued at \$326T, larger than either the equities or debt markets. To transform or bring additional liquidity to even a portion of this market would drive significant capital formation. In fact, part of the reason why real estate “equity” is so much larger than real estate “debt”, is because a lot of global property is excluded from capital markets. On-chain real estate debt, though difficult to crystallize, can begin bridging the gap between bricks and capital.

[Parcl](#) - The Parcl Protocol is an overcollateralized debt protocol for borrowing synthetic real estate tokens built on Solana. Users can invest and trade specific geographical markets. An individual Parcl is a digital representation of the price per square foot in a given geographic area that has been collateralized by crypto assets. The Parcl Protocol references real world real estate prices, tracked through the Parcl Price Feed (PPF).

[Propy](#) - Propy (PRO) is a marketplace for cross-border real estate transactions. It facilitated the purchase and on-chain title registry of a [Ukrainian apartment](#) in 2017 and [later in the United States](#). The protocol has three core products: Offer Management, a Transaction Platform, and Title & Escrow services. Offer Management allows agents to make and receive bids in one place. The Transaction Platform supports brokers by providing tracking/management of real estate sales and a document portal. Title & Escrow processes and ledgers real estate and NFT transactions. Whether deals are closed via fiat or crypto, the transactions occur on-chain. In partnership with First National Title Insurance company, Propy claims to operate the first blockchain-enabled

title & escrow company. Propy has completed over \$4 billion in real estate transactions on the blockchain. It has raised over \$17 million from its [ICO in 2017](#).

[Milo](#) - Milo is a digital lender financing US home mortgages, investment mortgages, and crypto mortgages for non-US nationals. It supports both acquisition financing and refinancing. Because Milo does not require credit history or a US SSN, it acknowledges alternative assets like crypto as having value worth securing. It targets high-quality foreign borrowers who are yet to establish history on US soil. This profile of loan is often called [Alt. A mortgage](#), meaning it is both riskier than “prime” and unsuitable for Fannie Mae or Freddie Mac funding (agencies).

[Figure](#) - Built by the same team behind the Provenance blockchain, Figure is a lending protocol for residential real estate that settles on the Provenance blockchain. It offers home equity lines of credit (HELOC), mortgages, and crypto mortgages. It holds an unique SEC license called an Alternative Trading System, or ATS. This allows the firm to compliantly market and sell digital securities of all kinds. In 2022, Figure originated digital mortgage loans and [sold ownership to Apollo](#). The firm registered its mortgages through its own lien and eNote registry system, Digital Asset Registration Technologies, or DART, the company’s alternative to Mortgage Electronic Registration System (MERS) databases. For HELOC, it [claimed](#) that it has demonstrated 117 basis points of savings from origination through to deal execution

[Mattereum](#) - Mattereum tokenizes physical assets with one NFT for full ownership. They can be bought and sold as long as they are securely vaulted. Working with both real estate and intellectual property, comprehensive warranties protect buyers from fake assets and theft. Mattereum has been operational since 2017, and selling physical items like gold bars as NFTs since spring of 2021.

[TangibleDAO](#) - TangibleDAO uses income-producing and tokenized real estate as collateral to issue USDR, a stablecoin. It onboards residential properties that serve as the primary source of both collateral and yield. USDR's value accrual is projected to return 5-10% APY. Rental yield from properties held in the USDR treasury is collected, converted to DAI and paid into the treasury on a daily basis. New USDR is minted to account for the increased treasury and distributed proportionally in the form of a daily rebase. Thus, the USDR supply expands by the amount of DAI received from rent. To

collect the daily rebase, users stake their USDR at Tangible. USDR is overcollateralized with a final target collateralization ratio of 130%.

CitaDAO - CitaDAO is building a real estate ecosystem on DeFi, featuring a two-way real estate tokenization bridge, liquidity, and bearer asset tokens that are composable with the broader web3 DeFi space. Unlike past real estate tokenization attempts, CitaDAO takes a 100% DeFi approach that leverages composability with other projects (such as [Uniswap](#) and [Chainlink](#)) in DeFi, which allows scaling of users and use cases.

RealT - RealT is a lending and fractional real estate protocol. Built on top of AAVE, RealT's remote monitoring and management (RMM) platform provides overcollateralized, crypto-backed loans (WETH, WBTC, and stablecoins currently supported). RealT issues Armm tokens at a 1:1 ratio, allowing users to track the value of their deposit and calculate loan repayment. Users can borrow against asset-backed RealTokens as soon as they are deposited on the RMM and Loan-to-Value Ratio (LTV) are set. Users are able to repay loans using stored RealToken value or through income. Lenders begin receiving interest payments instantly. RealT is currently available in multiple non-US jurisdictions and is available to accredited US investors.

Robinland - Robinland tokenizes commercial real estate debt in the U.S into 'RBL' tokens. Robinland has two separate lines of business both pre-launch: B2B and B2C. The B2B side aims to onboard 'RBL' tokens to be used as collateral for DeFi lending protocols to finance loans for real estate developers. The B2C side of Robinland 'crowdfunds' dollars or USDC to finance individual loans of the investors choosing using security tokens as well. Robinland's first project is a multi-family condo in Brooklyn, NY in the coming month using SEC REG. D, Rule 501(c). Robinland also powers Cytus Protocol (see below), which uses commercial real estate interest in the U.S, to provide sustainable DeFi yield.

Cytus - Powered by Robiunland, Cytus is a marketplace for RWA originators and intermediaries to borrow stablecoins. Investors deposit USDC with Cytus, who lends it out to end borrowers. While Cytus mints the same amount of USDY (Cytus' native stablecoin) for investors. Cytus' borrowers are traditional banks and PE firms with histories investing in specific asset classes. Investors get paid interest on their deposit via rebasing while being able to use USDY on other platforms. USDY is both an

algorithmic stablecoin and over-collateralized by RWA-backed loans - RWAs range from land to AAA corporate bonds and treasury bills.

[Roofstock \(RoofStock OnChain\)](#) - Home onChain is an ERC-721 based protocol for tokenizing sole ownership of an SPE with title to an individual SFR property. Roofstock is a prime example of the “*Inside-Out Execution*”, where long-standing specialist originators with a thick book of assets incubate a proprietary protocol. Its primary business is as a real estate fintech. It has done \$5 billion of GMV across 70+ Single Family Rental (SFR) markets and manages around 16K units for clients. Roofstock is vertically integrated: sourcing, acquisition, reno, leasing, property management and asset management. The last two through acquisitions of Streetlane, Great Jones, and Stessa.

[Liquid Mortgage](#) - Liquid Mortgage is a digital asset and data platform designed to validate documentation, payments, and related loan-level information in the post-origination process. Liquid Mortgage is currently partnered with Canopy to provide on-chain due diligence services and reporting. Redwood Trust [utilized Liquid Mortgage](#) to facilitate a non-agency residential mortgage backed security (RMBS) pricing on a blockchain. The securitization, SEMT 2021-6, had an initial principal balance of \$449MM and was composed of 497 jumbo residential loans. In a similar tie-up, Liquid Mortgage [recently partnered with Redwood Trust](#) to provide loan repayment data on a \$313 million real estate securitization offering.

In the case of both securitizations, Liquid Mortgages acts as a Distributed Ledger Agent (“DLA”). Blockchain is used to- enhance the quality and timeliness of loan level reporting. Whereas the traditional reporting cycle for remittance data on CMBS/RMBS transactions is monthly, Liquid Mortgage is expected to report on a daily basis.



Emerging Market Credit

As explained in “Prediction: Adoption Dynamics at the Tails of Two Systems”, markets which are underserved by current financial markets will be among the first to meaningfully adopt crypto. Businesses in emerging markets such as India, Nigeria, etc. can not easily access credit or western securities even though demand is overwhelming. While the protocols below focus exclusively on emerging markets, others like FTX also have a large impact by democratizing access to previously unavailable assets/financial instruments. The opportunity is massive.

Goldfinch- Goldfinch is a decentralized uncollateralized lending protocol. Borrowers (off-chain lending businesses) propose deal terms for credit lines (Borrower Pools) to the protocol. Goldfinch's community of Investors can then supply capital to these credit lines (Pools), either directly to individual Pools (as Backers) or indirectly by automatically allocating capital across the protocol (Liquidity Providers via the Senior Pool). These Borrower businesses use their credit lines to draw down stablecoins, specifically USDC, from their Pool.

Borrowers then exchange the USDC for fiat currency and deploy it on the ground to end-borrowers in their local markets. Nearly 80% of loans on Goldfinch represent borrowers from growth economies in EMEA, APAC, and LATAM.

In order to determine how to allocate capital from the Senior Pool, the protocol uses a principle of "trust through consensus." This means that while the protocol doesn't trust any individual Backer or Auditor, it does trust the collective actions of many of them. In this way, Goldfinch provides the utility of crypto while leaving the actual end-borrower

loan origination and servicing to the businesses best equipped to handle that in their own communities.

Credix - Credix is a two-sided marketplace for asset originators to supply loans and for liquidity providers to fund those loans. It focuses on emerging market credit in LATAM. It is currently financing car loans, revenue-based financing (RBF), and SMEs. Though Credix's expansion is driven primarily by asset managers, the protocol expects to move into other geographies (not just EM) as well as include new asset classes like agriculture and supply-chain finance. Credix has secured a number of high-profile partnerships with asset originators/junior capital providers, though *many remain non-public*.

Below are some of Credix's partnerships we've been given permission to divulge:

- [A55](#) (largest provider of revenue-based financing in Brazil)
- [MeuTudo](#) (\$1 billion FinTech working with Goldman Sachs and Itau bank)
- [MGG Investment Group](#) (\$5 billion traditional credit fund)
- [Almavest](#) (specialized EM FinTech fund)
- [Addem Capital](#) (specialized EM FinTech fund)

Mohash - MoHash makes illiquid private debt assets more liquid and tradable. The protocol issues MoH tokens, a set of ERC-20 tokens each backed by RWA collateral across multiple geographies/continents. They recently [raised](#) \$6 million in seed funding.

Brú Finance - Brú Finance is a decentralized lending protocol currently focused on agricultural commodities with plans to expand to real estate, gold, and others. It is currently live across a decentralized network of 1400+ custodian warehouses in India with plans to expand to South-East Asia, African, and European Market. Brú enables receivables-based financing for small businesses - using the borrower's accounts receivable (credit) sales to secure short-term loans. They have tokenized \$600M in agricultural commodities to date and are live on the Polygon test net.



Revenue-Based Finance (RBF)

Revenue-Based Finance has filled a lacuna in capital markets. Many businesses and DAOs are mature enough to generate significant revenue but not so significant to be able to access either bank term loans/lines or, of course, corporate bond markets. Revenue-based finance capitalizes on the middle ground between venture capital and these mature corporate loan markets. It's an emerging, non-dilutive capital solution primarily for SaaS/ecommerce/tech enabled businesses.

For analogs, readers may be familiar with the Silicon Valley Bank (SVB) model. Right now, RBF entails lending against a stream of contracted revenues. Lenders typically receive a senior % of monthly revenues and are sometimes additionally secured equity warrants, i.e. convertible into equity in certain cases. The obligations laid forth in an RBF arrangement are thus enforced by courts in the real world.

With that said, RBF is really unsecured lending, similar to trade finance (collateral is an IOU). As such, it is inherently more digitally-native (or at least digitally representable) than is lending against hard assets like equipment and real estate. Furthermore, RBF, like trade finance, suffers from lumpy and binary fraud risks. These two underlying characteristics place RBF well for digital transformation via the securitization and transparency potential of blockchains.

Interestingly, we are witnessing the genesis of on-chain RBF, with contractual obligations strengthened via smart contract enforcement. Porter Finance and DebtDAO, both detailed below, enable a lender to take a smart-contract guaranteed collateral interest, with the former taking a perfected lien on tokens and the latter doing so in revenue.

We might call this burgeoning sector ‘Deterministic Debt’ and expect this primitive to grow in prominence over the next five years. Deterministic Debt is an evolution of capital markets, where software mediates completely who gets paid and when, according to certain conditions fed to it by an oracle. Though current iterations have myriad flaws, by codifying how assets are distributed up in a default, we can remove uncertainty from and thus lower funding costs in capital markets.

DebtDAO - Debt DAO is a permissionless marketplace for crypto-native credit, made possible by its novel [Spigot](#) smart contract. Spigot allows crypto-native borrowers to take out loans based on future cash flows and for lenders to receive a guarantee of payment. Risk on DebtDAO is assessed by third parties (Llama DAO, Gauntlet Network, etc.) who can verify Debt DAO’s own [generalized cashflow model built on Credmark](#).

DebtDAO is similar to [Porter Finance](#), entitling lenders to a smart-contract guaranteed security interest in collateral. However, whereas Porter enables security interests in a borrower’s native protocol tokens, DebtDAO utilizes Spigot to escrow 100% of borrower cash flows as soon as the borrower defaults (with no upfront collateral). If a borrower defaults on contractual interest or principal payments, lenders can foreclose on a revenue-generating smart contract. Theoretically, seized assets could also be traded at some future date (the origins of on-chain distressed debt investing...?). DebtDAO’s pilot issuance was a [5MM FRAX credit line](#) with a 9% APR on draws to Redacted Cartel.

PaperChain - PaperChain allows for creators to receive advances against future expected revenue. Unlike canonical Revenue-based finance, which secures *contracted* future revenue, PaperChain is slightly more speculative for the lenders. While piloting via financing of music royalty streams, PaperChain serves creators of all kinds including musicians, Youtubers, Twitch streamers, and podcasters. The lending product is only available to US creators at the moment. In September of 2019, PaperChain [partnered with Centrifuge and the Maker](#) foundation to advance 60,000 USD of Spotify revenue. Stripe currently handles payments.

Yuzu - Yuzu Protocol provides infrastructure to do asset-backed securitization of FinTech asset books on-chain. They primarily focus on developed market revenue based financing and other asset-backed loans. Specifically, Yuzu develops data-driven

underwriting technology for such loan books that have significant datasets. The protocol intends on launching on Ethereum mainnet in Q4 2022.

Honorable Mentions: [Porter Finance](#)



Trade Finance

Trade Finance is a foundational but overlooked asset class. It is a \$15T market for short-term corporate credit. Subsectors of trade finance include factoring, supply chain finance, import/export finance, and inventory finance. Because all companies party to global trade are on a 30 to 90 day payment delay, companies require capital solutions to manage working capital cycles efficiently. I.e. pay SG&A, labor costs, etc. However, it suffers from undercapitalization due to the fractured shallowness/fractured nature of the funding bench as well as the lack of mature securitization markets. This “funding” gap might be tapered via integration with on-chain credit markets. In a capacity similar to RBF, Trade Finance assets are primed for digitalization, financialization, and on-chain securitization. But also in a similar capacity to RBF, due to the messiness of fraud and managing/servicing these assets, we will invariably underestimate the importance of getting the off-chain components right.

[HarborTrade](#) - Founded in May 2018, Harbor is a FinTech firm focusing on Supply Chain Finance (SCF) and working capital solutions to improve the cash conversion cycle. Harbor’s programs allow for early payments to suppliers so that buyers can optimize their own liquidity through trade credit. These programs are administered on Harbor’s proprietary platform which not only injects liquidity into the supply chain, but it allows for better vendor and procurement management.

Harbor Trade successfully applied for and [secured a 7MM DAI Maker](#) vault to fund originations in the Summer of 2021. It partnered with Centrifuge as a token issuance platform and Throttle Capital as an equity (TIN) co-investor and provider of debt structuring services. As of today, 2.5MM DAI of the capacity is being utilized.

[ConsolFreight](#) - ConsolFreight is a SaaS freight technology provider focusing on international trade. The company connects a network of small/medium sized freight forwarders under its logistics platform (*ForwardTogether*). Its goal is to grow a trusted ecosystem of freight forwarding partners where entities can have access to digitalisation, business, and financing solutions, including the use of blockchain and smart contracts.

In January of 2021, ConsolFreight applied successfully to open a [2MM DAI Maker vault](#) as a credit line to originate new loans against both its tokenized freight invoices (*CFactoring*) and trade financing (*Trade Forward*) solutions. Centrifuge Tinlake acts as the backend tokenization platform for CF's collateralized loans.

[Polytrade](#) - Polytrade is a decentralized trade finance platform focused on receivables financing. It connects buyers, sellers, insurers, and investors to provide real-world borrowers access to low interest to free working capital by tapping crypto lenders. By tokenizing real-world invoices, Polytrade digitizes receivables and allows for SMEs and new sources of funding. As opposed to peer-to-peer lending, where investors funds are matched with individual invoices, the Polytrade platform aggregates the supply of funds from various investors. As investors supply their assets to the platform, funds get added to the combined liquidity pool. Once the validators approve an invoice, the invoice gets funded automatically. Investors get returns based on the time their assets are deployed towards funding invoices. They can withdraw their funds anytime irrespective of the maturity of the invoices funded. Polytrade is live on Polygon.

[DeFactor](#) - DeFactor provides the connectors and risk models for asset originators to be able to digitize their data in a way that they can easily plug into the finance which is available through the existing and emerging lending protocols.

Defactor is building the decentralised tools and components needed to enable a shift in how financing is conducted. Defactor allows small business and asset originators to access the liquidity pools available on the blockchain. Deals originated and processed through their system are automatically insured - a fixed margin of the transaction fees generated are allocated to the insurance pool which will cover the loss of any late or non-payment of deals through the platform. Asset originators are able to reduce their cost of capital, improve payment terms, and increase working capital by staking collateral on the network.



Insurance

Insurance, yet another form of risk transfer, may be well-suited to blockchains for a few reasons.

First, deterministic nature: parametric insurance contracts, or agreements that execute automatically under certain conditions, can and should live on immutable Layer 1s. The auditability of such contracts lends credence to the credence of an insurance contract. Furthermore, such on-chain applications can ingest off-chain data, allowing for risk methodologists to compete on creating the best risk models. These market forces will drive down premiums and create new kinds of coverage.

Second, organizational design: insurance companies are one of the few for-profit organizational types that have successfully been [structured as mutuals](#). A mutual company is one where its customers, or in this case its policyholders, are also its owners. Similar to a DAO in many ways, decentralized governance might be useful beyond its current application in swaps and lending protocols.

[Nexus Mutual](#) - Nexus Mutual is a decentralized alternative to insurance built using a risk sharing pool in the form of a mutual. Members are financially incentivized to participate in Risk Assessment, Claims Assessment and Governance while also sharing in returns. Nexus offers various types of cover including yield token, protocol, and custody cover. Members are KYC-ed and receive NXM tokens to participate in protocol activities. Like traditional insurance companies, Nexus Mutual invests a portion of their float (cover) and are currently establishing a [liquidity pool](#) with Maple.

[Etherisc](#) - Etherisc is an open-source platform for decentralized parametric insurance. This includes a technical protocol and application layers where any service provider can operate. The platform enables a wide range of insurance applications: from commercial insurance to non-profit solutions such as mutuals, peer-to-peer insurance, cooperative models and many new structures. Their first pilot was the Flight Delay dApp where attendees of Ethereum's Devcon2 conference held in Shanghai, China were offered flight-delay insurance policies. Service providers on Ethersic are currently offering or going to offer crop, hurricane, wallet, and social insurance.

[Arbol](#) - Arbol offers end-to-end climate risk solutions in the forms of insurance, reinsurance, and derivatives for businesses of any size or location in the agriculture, energy, maritime, and leisure industries. Its automated pricing platform launched in early 2020, with premium growth rapidly expanding from \$2 million transacted in the first eight months to \$100 million+ in the 1H of 2022. Arbol's key differentiator includes a massive climate data infrastructure. It allows automated instant pricing using an artificial intelligence underwriter, and non-traditional risk capacity bringing capital from non-insurance sources. By combining all these factors, Arbol brings scale, transparency, and efficiency to parametric coverage in stark contrast to the oligopoly of reinsurers that currently dominate the climate risk insurance space.

[OTONOMI](#) - OTONOMI is a decentralized B2B SaaS platform for insurance carriers. Specifically, it provides insurance for air freight delays. They partner with Chainlink to source flight data and arrival/landing times from multiple data sources for their air cargo insurance smart contracts. They also launched first-ever [smart-contract-powered air freight insurance index](#) which is now available on the NASDAQ. The OTO-USA-1 index replicates a blended basket of air cargo delay insurance policies with data provided using Chainlink oracles and OAG aviation data. The deployed smart contracts represent unique air cargo insurance policies (e.g. JFK — LAX air shipment). The index gives investors access to the real-time performance of the supply chain sector and opens up future investment and hedging opportunities to buy-side investors, hedge funds, assets managers, bankers, and insurers while simultaneously creating a bridge between crypto traders and the insurance market.



Synthetics

Synthetics are essentially tokenized derivatives - they allow for exposure to an asset without buying/selling the asset itself. Synthetics often rely heavily on oracles to provide live data and can be used for exposure to anything from equities to commodities. These derivatives allow for populations who could not previously access certain assets to participate in global markets.

[Synthetix](#) - Synthetix is a decentralized synthetic asset issuance protocol built on Ethereum and Optimism (a layer two scaling solution built on Ethereum). These synthetic assets are collateralized by the Synthetix Network Token (SNX) which, when locked in the contract, enables the issuance of synthetic assets (Synths). By pooling collateral, the protocol supports direct conversions between Synths via the smart contract, obviating the need for a counterparty.

This mechanism solves the liquidity and slippage issues experienced by DEX's. Synthetix currently supports synthetic fiat currencies, cryptocurrencies (long and short) and commodities. SNX holders are incentivized to stake their tokens as they are paid a pro-rata portion of the fees generated through activity on Synthetix from integrators (Kwenta, Lyra, Curve, dHEDGE, and many others). It is the right to participate in the network and capture fees generated from Synth exchanges, from which the value of the SNX token is derived. Trading on the Synthetix infrastructure does not require the trader to hold SNX.

[FTX](#) - FTX is one of the crypto exchanges. Like many other exchanges, FTX allows users to trade a variety of financial instruments in crypto markets such as crypto futures, spots, and derivatives. However, FTX also allows users to trade synthetic/tokenized

assets such as US equities (stocks). These spot tokens are backed by real shares of the stock custodied by FTX Switzerland. Currently, they can be redeemed with FTX Switzerland for the underlying share; FTX is currently working on new ways to withdraw these tokens.

[BlockHouse](#) - Blockhouse Capital is a data-driven DeFi platform for fixed income issuance and trading. It aims to drive hyper-liquidity to issued debt securities through its DLT-based exchange. Blockhouse will offer embedded structured products informed by custom oracles. These vaults will enable investors to express directional views about real world yields in a neat package. Blockhouse has partnered with a real estate asset manager in the US with over \$1B in AUM to bring an initial \$30M pipeline of real-estate loans on-chain.

Disclaimer: Teej is an advisor to the project.



Treasuries

Backed - Backed Finance departs from a synthetic asset model for accessing equities. Backed issues tokens that represent the value of a financial asset. For each minted token, Backed buys the underlying asset (1-to-1) and holds it via a licensed custodian. Eligible token holders can redeem their tokens for the market value of the underlying asset. Backed tokens are fully backed 1-1 with their underlying asset, compliant under the Swiss DLT Act (see detail in the [glossary](#)), and compatible with the DeFi ecosystem as they are ERC20 tokens.

As of August 2022, MakerDAO token holders have greenlit a [collateral application](#) from Backed Finance to mint DAI against 500MM of a tokenized US Treasury ETF. In the case the collateral is onboarded, this will mark the first instance where tokenized government debt will have been added to a crypto organization's balance sheet.



Agriculture

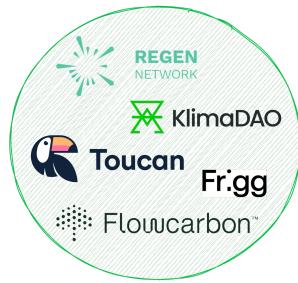
Agriculture is an enormous industry largely untouched by tech and finance has not touched - this is especially true in emerging markets where capital is not readily accessible for small scale farmers. There is significant innovation occurring in RWAs with respect to agriculture, many projects categorized as ReFi, Emerging Markets, and Insurance could easily be construed as agricultural protocols.

[LandXfinance](#) - LandX supports perpetual agricultural commodity bonds. These instruments provide capital to real world farmers, who might reinvest in equipment or upgrading production capabilities, in exchange for a legal share of their crop. Secured by liens on the underlying farmland, the protocol currently provides investors access to wheat, soy, corn, and rice perps. xTokens (e.g. xSoy), yield-bearing tokens, provide a perpetual yield paid in stable coins at the value of 1 kilogram of the underlying commodity, distributed daily. xBasket is an equally weighted index of the 4 pilot commodity perps. With a mere 5% of global derivatives volume absorbed by agricultural trading, LandX seeks to bring crypto liquidity to an enormous but under-traded asset class. LandX recently announced a [partnership with KlimaDAO](#), purchasing carbon credits as part of the announcement.

[Agrotoken](#) - Agrotoken is a global agricultural commodities tokenization platform. Producers deposit grains in an oracle and Agrotoken mints a representative token. Each token represents one ton of grain that the producer delivered for storage, every ton is validated through a "Proof of Grain Reserves" (PoGR). Agrotoken issues (minting) the cryptograins and deposits them in the wallet corresponding to the PoGR depositor. The depositor of the PoGR, who may be a Producer, Oracle or Global Network Partner

(GNP), transfers cryptograin to the crypto ecosystem to be used in applications where cryptograins are accepted.

Agrotoken recently announced a partnership with Visa and Pomelo to cocreate a payment method that enables agricultural producers to use their grains as a form of payment through a card. Agrotoken incorporates Pomelo as the infrastructure to issue, distribute and process the payments made with the card, which will soon be supported in any store that accepts Visa.



ReFi

ReFi, or Regenerative Finance, leverages market based-solutions to address systemic sustainability problems and to regenerate communities and natural environments. By constructing higher-fidelity oracle networks and by capitalizing on transparent, immutable ledgers, ReFi protocols strive to create a more competitive market for climate assets. As new types of ecological assets are minted and as transaction volumes tick up, the increased financial incentives drive real ecological improvements.

[Regen Network](#)- Regen aims to monitor, verify, and base contracts on ecological health outcomes. It currently provides three core ecological protocol frameworks: Ecological State Protocols (ESPs) define the algorithms and conditions necessary to verify a certain state or change of state on a piece of land. Ecological Contracts (ECs) fund and reward desired changes in ecological state. Supply Protocols (SPs) tie ecological state into supply chains in trusted ways.

Through its ecological ledgering system, RegenLedger, built on the Cosmos SDK, aligns land regeneration with economic outcomes. RegenLedger is a proof-of-stake blockchain that aims to serve as the Earth's registry for ecological claims and assets. The RegenLedger consists of two core capabilities

1. **Ecological Proofs:** Verification and analysis of ecological outcomes
2. **Market:** An open, liquid, and auditable market for the issuance and exchange of ecological credits

With a different approach than Klima, Toucan, or Flow, Regen seeks to provide a registry and standard for the creation and trading of myriad new ecological assets, not just carbon credits. The distributed, immutable public RegenLedger acts as a source of

ecological truth for all participants in the Regen ecosystem. An open database makes it possible to audit which authorities said what about which requirements when. With the proliferation of ecological data from satellites, drones, IoT sensors, the capacity to verify and reward granular ecological outcomes is huge. That the ledger proves outcomes such as top-soil improvement or reforestation might unleash a layer of economic activity on top.

*For a full-breakdown of the protocol, see Teej's [Vulpine](#)

[KlimaDAO](#) - Klima, an Olympus (OHM) fork built on Polygon, allows users to retire tokenized carbon credits, including Base Carbon Tons or BCTs, for KLIMA. (BCTs are part of Toucan's infrastructure). KlimaDAO holds 15,224,133 carbon assets (of a total 25.4MM carbon credits on-chain), making it the largest single holder of tokenized carbon assets.

[Flow Carbon](#) - It seeks to address climate change by tokenizing and creating liquid, on-chain markets for carbon assets (Voluntary Carbon Market - VCM). Projects that create Verified Carbon Units (VCUs) vary widely, ranging from reforestation, erecting renewable energy infrastructure, carbon-sequestering agricultural practices, and waste/landfill management. Based on our discussion with the team, this heterogeneity drives a concomitant non-fungibility in the financing market for these projects. I.e. because the projects are different, there is no efficient, uniform capital market for climate entrepreneurs to tap, hamstringing the creation of VCUs. Flow seeks to add "fungibility" across the different VCU-creating projects via its Goddess Nature Token, or GNT.

Flow Carbon was co-founded by Dana Gibber, Caroline Klatt, Rebekah Neumann, Adam Neumann.

[Toucan Protocol](#) - Toucan launched in October 2021 to tokenize voluntary carbon credits. It is the infrastructure provider behind Base Carbon Tonne (BCT), the protocol's first carbon reference token. BCT was released with launch partner, KlimaDAO, the first platform to build on Toucan's Web3 carbon market technology. "In the first month of launch, BCT achieved \$2B in trading volume — about double the voluntary carbon market's volume for the entire year of 2021." Further, over 150,000 tokenized [credits were retired](#) (via on-chain token burning) in the two months following launch.

[Frigg.Eco](#) - The current financial system is significantly failing short of our funding goals in sustainable finance, putting up a lackluster fight against climate change. Frigg.eco works with a selected group of project developers with operational blue-chip ESG renewable assets. Frigg.eco helps them access (re-)financing via crypto by issuing green bonds on-chain. The Frigg Standard consists of Swiss-based legal, financial and software workflows that can onboard institutional asset managers with ESG mandate to DeFi while ensuring the highest standard of ESG asset-level transparency. The current ESG asset management industry is opaque, inefficient and insufficient. It's time to upgrade our financial system and fight against greenwashing.

[Helios](#) - Helios allows crypto institutions and users to fund profitable solar projects in emerging markets, earning stable, uncorrelated, and inflation-adjusted yields. Users deposit stablecoins into lending pools corresponding to groups of solar projects in specific geographies. These pools are drawn down to fund installations which generate and sell clean energy, earning double digit yields, returned directly to Helios users as APY. Our installations are backed by 20 year Power Purchase Agreements (PPAs), the underlying land, and the solar panels.

[STACS](#) - Vying to be the nexus of ESG finance, STACS has launched three products. The group's primary product, ESGpedia, is a one-stop registry of ESG certifications and data from a variety of vetted sources. A second product is Vetta, a smart contract platform that queries ESGpedia for data on key lifecycle events and executes a release of value accordingly. As per the website, corporate partners include UBS, Citi, PWC, Deutsche Bank, and Mastercard.



Physical Infrastructure Finance

[Delta P3](#) - In July 2021 the Avalanche foundation kicked off DeltaP3 with an investment to build a crowdfunding platform for public-private partnerships, including but not limited to infrastructure projects. DP3 has incubated partnerships with government and government-affiliated organizations who would act as project suppliers/syndicate partners.

The application uses subnet infrastructure to serve as a decentralized rendezvous point for P3 procurement, coordination, investment, and design. Its token, DP3 maintains the DeltaP3 chain while serving as the core consensus mechanism for administering the services provided by the platform.

[1618](#) - 1618 brings DeFi liquidity for public infrastructure project financing and provides real yield backed by cash flow generated from the infra projects. 1618 engages with companies for project financing (contractors, PSUs, infra companies) with competitive borrowing rates in constructing public infra: national highways, state highways, roads, bridges, and others. Projects pass risk engine checks and are evaluated holistically: contractor business experience, balance sheet strength, project kind, geography, the govt department, and range of other parameters. They are currently focused on Indian, UK, and US markets.

[Silta Finance](#) - Launching on Avalanche, Silta connects DeFi liquidity with physical infrastructure projects. Physical infrastructure projects such as renewable energy farms, highways, or airports, that are generally available only to institutional investors.

Sponsors seeking funding can submit loan applications through the Silta DApp. Applications are assigned an initial “Silta score”, a rating based on the risk and other

factors of the requested collateral. The Silta DAO then decides whether the loan application should be approved.



Yield Aggregators and Portfolio Management

[Bril Finance](#) - Bril enables investors to make a return on their crypto portfolios in uncorrelated, responsible and sustainable ways. Bril's products allow users to compose a customized portfolio of yield opportunities in DeFi and real world assets based on their risk appetite. Bril combines intuitive, flexible UX with institutional-grade security and risk management tools to create a platform that appeals to retail users as well as funds, family offices, and protocol treasuries.

Bril is building its platform which is expected to launch on Ethereum and Aptos in Q4 2022.



Collectibles

Fractionalized collectible platforms have existed before crypto - Rally Road and others allow for users to invest in otherwise esoteric assets via LLCs and other structures. Bringing these assets on chain allows for innovations in ownership models while adding crypto liquidity.

Given the traction of fractionalized collectible platforms in web2, we expect to see plenty of new companies and innovation in this space via an RWA approach.

[ArkiveDAO](#) - Arkive is a decentralized museum - one curated and owned by its members. They aim to solve something museums have traditionally had a monopoly on: deciding what art is significant enough to preserve, and worthy enough to display. The company is planning to be a counter-weight to the fact that only a tiny fraction of collections are being displayed to the public, with more than 90% of items being locked away in private collections. Arkive chose to build on-chain as it enables higher levels of temporary lending of museum pieces, and potential collateralizing against a piece becomes possible. Their first acquisition, which was voted on by the community, were the original patents for the world's first electronic computer — the ENIAC. Although much discussed, Arkive isn't currently planning to create a physical space.

[4K protocol](#) - 4K's mission is to become the decentralized coordination layer for the physical world. They are designing a system to ensure that digital tokens representing a physical item are accurate, actionable, and enforceable. 4K acts as a physical-digital Bridge, allowing anyone to create a set of digital property rights for physical goods - they allow users to store physical assets on-chain by transforming real-world collectibles

into physically-backed NFTs. They currently have over \$10M in secure assets, and recently facilitated the RWA-backed NFT loan of a Rolex Daytona with [Arcade](#).



Miscellaneous/Mystery Flavor

[RWA.xyz](#) - RWA.xyz will serve as a data dashboard, the Bloomberg for on-chain assets. It enables the buy side to parse relevant data and drive towards investable insights. It aims to serve as a credit rating agency for DeFi yield-strategies (i.e. BBB+ yield aggregation tranche?).

[Ryval](#) - “The stock market of litigation financing”, Ryval strives to democratize access to legal outcomes. Ryval allows investors to buy and sell tokens that represent shares in a litigation. A multi-billion dollar asset class with high double-digit annual returns, litigation finance is still cloistered—currently accessible only to sophisticated, large investors. Ryval, with a thesis similar to many participants in our ecosystem map, seeks to leverage open markets to A) drive better legal outcomes to the underserved B) finance more legal projects more cheaply and C) allow for price discovery in project finance.

The company takes advantage of a rule created through former President Barack Obama’s JOBS Act, which allowed a private company to crowdfund up to [\\$5 million from Americans](#), regardless of their wealth. Ryval will allow “[all investors regardless of accreditation status](#)” to purchase tokens associated with a specific case on Avalanche. They can then hold or trade them on the open market. Whoever owns the token at the time of a settlement or verdict then cashes in.”¹⁰

Ryval is headed by Kyle Roche, managing partner of Roche Freedman.

¹⁰ [VICE - Tech Startup Wants to Gamify Suing People Using Crypto Tokens](#)

Glossary

- **RWA** - Real world assets - An asset represented on a blockchain but that refers to off-chain data. Most RWAs to date are fixed income assets with credit risk.
- **Stablecoin** - A token linked (pegged) 1:1 to something external of value, such as a currency. Oracles are often used to maintain price information for such assets on-chain.
- **Revenue-Based Finance**: RBF, a form of venture debt, refers to the process by which a lender extends credit against the future contracted revenues of a borrower. The lender will be entitled to a percentage of the borrower's monthly revenues rather than a fixed dollar amount. Thus far, RBF as a product has mainly been useful in SaaS/tech-enabled/e-commerce settings, though it actually originated in the oil, gas, and mineral sectors.
- **Permissionless** - refers to public blockchains/protocols that allow anyone to participate in validating and mining transactions, as well as using the system to buy, sell, trade and utilize assets.
- **Composable** - Composability refers to the interoperable nature of crypto building blocks (ex. ERC-20s). Just like LEGO-like blocks can be combined in any number of ways to build something new, composability enables the various components of a system to be mixed and matched to create novel systems and applications. Blockchains are exponentially composable, since they are both permissionless and permanent. Each additional smart contract or application added to the network is open and accessible to developers looking to build upon and extend its functionality. By enabling and incentivizing a true open-source ecosystem, dapps can scale in functionality and reach.
- **Tokenization**: Conveying the economic representation of or ownership of an asset via a Layer 1 distributed ledger. Securitization, often likened to tokenization, is a subset of tokenization. It's similar in that both technologies have the potential to re-package assets in a more efficient and accessible way. But it falls short in that a token is much more versatile—we can tokenize yield into a "securitized" form and do many other things, financial and otherwise.
- **Swiss Distributed Ledger Technology (DLT) Act**: The Swiss DLT Act, ratified in 2021, consists of two pieces, ledger-based securities and DLT trading systems.
 - **Ledger-Based Securities**: A “Ledger-based security as a right that is entered in a securities ledger under a registration agreement. Such

securities can only be exercised and transferred via a particular securities ledger. If a user complies as per the four conditions of a compliant securities ledger, he or she may convey legally enforceable ownership of an asset to the owner of the wallet that holds the token. These new ledger-based securities are expected to facilitate the ability of companies to raise capital and issue instruments representing equity or debt by reducing the cost and effort. They are also expected to improve liquidity by making the transfer and secondary trading of securities easier and more accessible.”¹¹

- **DLT Trading System:** The other half of the act regards a license required to enable the compliant exchange of ledger-based securities. These institutions are regulated as per existing regulation applied to stock exchanges and multilateral trading facilities. Interestingly, a DLT TS license enables recipients to face non-financial institutions, offer central custody, and settle transactions on a blockchain.
- **Hash Power-Backed Loans:** Loans underwritten to Bitcoin Miners secured against ASIC miners, land, data centers, power purchase agreements (PPAS) or other collateral types.
- **ReFi (regenerative finance)** - leveraging pooled capital from DeFi as a tool to solve systemic problems (racism, environmental degradation, climate change) at scale.
- **Synthetics** - Synthetic assets allow users to have exposure to an asset without needing to hold the underlying asset. Synthetics are similar to derivatives and exist for many assets that have derivatives (fiat currencies, commodities, equities, etc.) and a range of novel digital assets. By allowing users to have exposure to an asset without owning, synthetics drastically increase the accessibility of assets that were previously unavailable for jurisdictional/regulatory reasons.
- **Oracle** - Oracles are tools that collect and send off-chain data to smart contracts. Off-chain can refer to a different blockchain or completely off-chain data. In both cases, oracles serve as a trusted source of data (ex. asset prices, climate data, etc.) and are important to RWA protocols.

¹¹ [FintechNews - A Look into Switzerland's Distributed Ledger Technology Act](#)