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# Institutional DeFi: What's Actually Gaining Traction

## Executive Summary

- **Real-World Assets (RWA) on Chain:** Over $30 billion of real-world assets have been tokenized on blockchains as of Q3 2025, a ~900% increase since 2022 [1]. This growth is driven by *yield-bearing instruments* – especially private credit (~$17B) and tokenized U.S. Treasuries (~$7.3B) now circulating on-chain [2]. Major asset managers like BlackRock and Franklin Templeton have launched tokenized funds, while banks (JPMorgan, SocGen, etc.) are piloting on-chain bonds and deposits. Figure's Provenance blockchain leads with ~$12.5B RWAs, followed by Ethereum (~$9.2B) [2]. Even permissioned bank networks are enormous – e.g. the Canton network (by major banks) processes over **$4 trillion** in tokenized assets (mainly repo trades) and ~$2T *per month* in tokenized U.S. Treasury repo volume [2].

- **Institutional Adoption and Participants:** Dozens of *blue-chip institutions* are active. BlackRock's tokenized money market fund **BUIDL** has become the largest on-chain fund at ~$2.9B AUM [3] [4], surpassing Franklin Templeton's on-chain U.S. Government Money Fund (~$368M as of Apr 2024) [5] [6]. Traditional banks are engaging via private networks: J.P. Morgan's Onyx blockchain has settled $300B+ in intraday repo loans since 2020 [7]. Societe Generale's digital arm (Forge) issued tokenized bonds and even borrowed $7 million DAI from MakerDAO with on-chain collateral [8]. In Asia and the Middle East, regulators have greenlit pilots like the **Qatar National Bank's** tokenized money market fund (approved in Dubai's DIFC) [9]. A growing cohort of **20+ institutions** (e.g. Siam Commercial Bank's venture arm) have used Compound Treasury's on-chain yield, which amassed ~$180M from clients by 2023 [10].

- **Key Infrastructure – Custody and Compliance:** Institutional gateway platforms have matured. **Fireblocks** alone serves over *2,200 institutional clients* (banks, funds, exchanges, etc.) with MPC-custody and DeFi access, securing $10+ trillion in transfer volume [11] [12]. **Coinbase Prime** offers custody, trading, and staking to ~13,000 institutional customers [13] and is now the single largest Ethereum node operator with ~3.84 million ETH staked (11.4% of all staked ETH) [14]. Regulated custodians like **Anchorage Digital** (a U.S. federally chartered crypto bank) report $50B+ in assets under custody [15] and support tokenized assets (e.g. custody of BlackRock's BUIDL tokens and **Liquid Collective**'s institutional staked ETH). These custodians provide compliance layers – e.g. whitelisted wallet addresses, strict KYC/AML, insurance and audited security – that give institutions comfort to interact with DeFi protocols.

- **"Permissioned DeFi" and Pilots:** Regulatory sandbox initiatives are enabling *DeFi with KYC*. Under Singapore's **Project Guardian**, over 40 financial institutions across 7 jurisdictions ran 15 pilots trading tokenized bonds, deposits and FX on public chains using permissioned liquidity pools [16] [17]. A DBS Bank/J.P. Morgan trial in 2022 successfully executed foreign exchange and government bond trades on a public blockchain *with verified institutional wallets* ("trust anchors" performed KYC)

[18] [19]. That pilot proved regulated entities can use DeFi AMMs for real trades while meeting compliance [20]. Subsequently, Standard Chartered tokenized $500M of trade finance assets on Ethereum in 2023 – and saw "about ten" institutional investors oversubscribe the offering [21] [22]. Now an industry consortium (Citi, HSBC, StanChart, etc.) is forming a **Guardian Wholesale Network** to commercialize these tokenization use-cases at scale [23]. Likewise, central banks have dabbled: the BIS **Project Mariana** with France, Singapore and Switzerland showed it's feasible to use an automated market maker to exchange wholesale CBDCs for FX – essentially a regulated DeFi FX swap market [24].

- **Growth in Institutional Staking and Yield Products:** Institutions are seeking on-chain yield in compliant wrappers. **Liquid Collective's** LsETH (a "Know-Your-Client" ETH liquid staking token led by Coinbase, Kraken, etc.) has grown ~215% in 2024, reaching over **$1 billion** TVL and becoming the 6th-largest liquid staking token [25]. This indicates significant institutional uptake of liquid staking via a regulated consortium model. Coinbase itself has staked a massive 3.84 million ETH on behalf of clients as of 2025 [14]. Traditional yields are also being delivered through DeFi: **Compound Treasury** (offering a fixed 4% on USDC) earned an *S&P investment-grade rating (B-)* and attracted corporate treasuries and even a Thai bank (SCB) as clients [10] [26]. Though its AUM (~$180M) is modest, it proved the concept of wrapping DeFi lending into a compliant, rated product for institutions.

- **Regional Leadership and Regulatory Tailwinds:** Singapore, Switzerland, the UAE, and Europe are leading in enabling institutional DeFi. Singapore's MAS expanded Project Guardian and published frameworks for tokenized bonds and funds (Guardian Fixed Income & Funds Frameworks) to guide industry adoption [27] [28]. Switzerland's FINMA has licensed SIX Digital Exchange (SDX) to trade tokenized securities under full regulation. The UAE (Abu Dhabi, Dubai) rolled out comprehensive virtual asset regimes – Dubai's VARA issued a rulebook in 2023, and Abu Dhabi's ADGM updated its regulations for digital asset custody, disclosures and abuse controls [29] [30]. This helped attract real projects: in July 2025 Dubai's DFSA approved the region's *first tokenized money market fund* (Qatar's QCD fund, backed by QNB) aimed at bringing U.S. Treasuries on-chain for regional institutions [9] [31]. Europe's new **MiCA** law (2023) provides a uniform licensing regime for tokenized securities and stablecoins across the EU [32] – giving traditional players clarity to launch on-chain products. Hong Kong's government issued **HK$800M tokenized green bonds** in 2023-24 under HKMA oversight, and is even subsidizing tokenized bond issuances [33] [34]. These moves signal that key jurisdictions see tokenization as strategic and are actively facilitating trials, often directly involving public-sector institutions.

## Capital Deployment & Traction in Tokenized Assets

**Tokenized Funds and Securities – AUM and Inflows:** The tokenization of traditional assets into digital tokens is no longer theoretical – it's here and growing fast. As noted, about **$30B** of real-world assets are on-chain now, up from just $2.9B in 2022 [1]. Much of this value sits in *tokenized fixed-income products* that offer yield, which institutions crave. Notably, **BlackRock's USD Digital Liquidity Fund (BUIDL)** – a tokenized money-market fund holding short-term U.S. Treasuries – exploded to **$2+ billion** within its first year [35] and now accounts for ~42% of the on-chain Treasury market [36]. (By mid-2025, BUIDL had grown to ~$2.9B, overtaking Franklin Templeton's earlier fund [3].) Franklin Templeton's **OnChain U.S. Government Money Fund (BENJI/FOBXX)**, launched in 2021 on Stellar, was the pioneer regulated fund on-chain and sits around the few-hundred-million AUM mark (it had $368M in Apr 2024, before BlackRock eclipsed it) [6] [5]. These

tokenized funds are not just sitting idle – crypto trading platforms **now accept BUIDL tokens as collateral** for derivatives, effectively merging traditional fund liquidity with DeFi markets [37].

Meanwhile, **tokenized private credit** has quietly become the largest RWA segment on-chain, surpassing even Treasuries [38]. Platforms like **Maple Finance**, **Figure/Provenance**, and **Tradable** collectively host on the order of **$14–17B** in tokenized loans to businesses [38] [2]. Maple Finance, in particular, has staged a big comeback: after surviving 2022's credit defaults, Maple's lending pools now have **$2.95B** in assets and over $732M actively loaned out (mostly in USDC) as of July 2025 [39] [40]. Maple has originated more than **$4B** in loans since 2021 to ~100 institutional borrowers (hedge funds, trading firms, etc.), yielding over $50M in interest to lenders [41]. The protocol pivoted to over-collateralized lending post-FTX and now sees *stablecoin lending dominate (92% in USDC)* [42]. In short, Maple is proving that on-chain credit markets can serve institutional borrowers at scale, with recent growth driven by demand for predictable yield [43]. Other DeFi credit platforms like **Centrifuge** and **Goldfinch** also contribute – Centrifuge focuses on financing real-world receivables (it leads with ~50% share of DeFi private credit by end-2023 [44] [45]) and funnels collateral to MakerDAO, while Goldfinch provides under-collateralized loans to fintech lenders in emerging markets (~$100M+ loan volume). **Figure's Provenance** blockchain – used for loan originations and funds – hosts **$12.5B** of these private credit and loan tokens, making it the single-largest chain by RWA value [2].

**Banks and Asset Managers Going On-Chain:** Traditional financial giants are directly participating or launching their own platforms:

- **JPMorgan Onyx (Kinexys):** J.P. Morgan's private blockchain for wholesale lending has been a trailblazer. Since 2020, Onyx's intraday repo application has processed over **$300 billion** in tokenized repo transactions among JPM and partners [7]. On Onyx, banks can tokenize U.S. Treasury bonds and use them as collateral for **same-day repurchase agreements** (often hourly liquidity needs) – a process that is faster and more efficient than the traditional repo market. Now JPM is expanding this into **Kinexys**, a broader tokenized collateral network. According to JPMorgan, the platform has settled **$1.5 trillion+** in notional tokenized assets to date, averaging $2B daily [46]. This is a *permissioned*, institution-only DeFi analogue where tokens represent real Treasuries and cash, and the impact is tangible (2-hour repo trades instead of overnight). It illustrates that large banks are *actually deploying capital on DLT*: not just POCs, but routine operations (JPM's CEO famously said Onyx's repo app "saves 25% of settlement costs").

- **Societe Generale – Forge:** The French bank SocGen, via its Forge division, has issued multiple *security tokens* and even a euro stablecoin. In 2021, SocGen issued **€100M of covered bonds as Ethereum tokens**, and in 2022 it opened a MakerDAO vault to borrow DAI against €30M of tokenized bonds [8]. By Aug 2022, SocGen-Forge drew down a first **$7 million DAI loan** from that vault, effectively becoming the first real bank to borrow from a DeFi protocol using on-chain collateral [8]. SocGen also launched a fully regulated euro stablecoin (EUR CoinVertible) on Ethereum in 2023 for institutional settlement. These moves are small in size but *huge in significance* – a Tier-1 European bank is integrating DeFi into its funding operations. It required extensive legal structuring (e.g. the Maker vault had to recognize French law collateral), but it's live. SocGen's efforts demonstrate how a bank can serve as its own issuer and user of DeFi instruments.

- **Goldman Sachs & BNY Mellon:** These Wall Street firms have pursued tokenization of **money market funds** and bonds. Goldman's tokenization platform *GS DAP* was used to issue the European Investment Bank's **€100M digital bond on Ethereum** in April 2021 (with Santander and SocGen) [47].

Now, Goldman and BNY are collaborating to tokenize **fund shares**: BNY Mellon's LiquidityDirect platform (which serves institutional cash investors) is integrating with Goldman's blockchain to let clients *subscribe and redeem tokenized money-market fund shares* [48]. In other words, a client could get a token representing a MMF share, use it in DeFi, or as collateral, then redeem seamlessly via BNY. This project was reported in late 2023 and signals an upcoming wave of tokenized **liquidity funds** by major asset managers [48].

- **Franklin Templeton:** Beyond its U.S. fund noted earlier, Franklin launched a *Luxembourg-based* tokenized money market fund in 2023 and is working with platforms like Polygon and Stellar. Franklin's on-chain Government Money Fund has seen *hundreds of unique wallet holders* (over 400 by early 2024 [49]), indicating broader distribution than BlackRock's fund (which initially had only ~13 holders, mostly large institutions [50]). Franklin has proven out operational aspects: they handle on-chain share transfers and have integrated with crypto wallets (via the Benji Investments app) [51] [52]. It shows that even conservative mutual fund providers can tokenize a regulated fund and find an investor base on blockchain.

**Tokenized Lending Pools (Case Study – Maple Finance):** *Who are the lenders and borrowers in DeFi credit?* Protocols like Maple operate as marketplaces connecting accredited lenders to institutional borrowers on-chain. Maple's typical lenders include crypto hedge funds, family offices, and even traditional firms seeking high yields (often 8–15% APY) [53]. Lenders deposit USDC (or other assets) into **"syrup pools"**, receiving yield-bearing tokens in return [43]. Borrowers are vetted entities such as market makers, trading firms, and Web3 companies – for example, Blockchain.com and Alameda Research were borrowers (though some, like Orthogonal Trading, defaulted in 2022) [54]. Today, Maple's borrowers must post collateral (BTC, ETH, etc.) or have structuring like real-world asset backing, since the protocol tightened risk controls [55]. Actual capital deployed: Maple has ~120k users across its open and permissioned pools and has facilitated over **500 loans to date** totaling $4B+ [41]. In 2024, Maple launched a *Secured Lending* arm with zero lender losses so far on $200M in originations [53] – indicating institutional-grade underwriting. Another example, **Centrifuge**, connects real-world originators (like invoice factoring firms, mortgage lenders) with DeFi liquidity via "Tinlake" pools. Lenders (including MakerDAO in some cases) fund tokenized assets (e.g. invoices, trade loans) and earn yield; borrowers are small businesses who get fiat financing off-chain from those proceeds. This model has brought *real SMEs* into DeFi indirectly. By end-2023, active loans across the top 7 RWA lending protocols rebounded to ~$446M, led by Centrifuge (53% share) and Goldfinch [44] [45]. These case studies show *real capital flows*: DeFi lending isn't just crypto collateral anymore – it's financing cash flow for companies, with crypto investors acting as the bank.

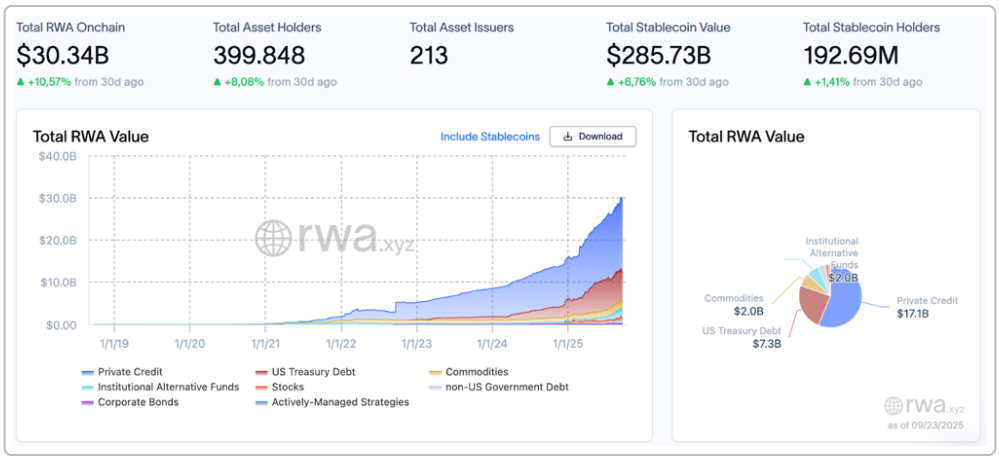
**On-Chain Trading and Exchanges for Institutions:** A newer area is *order-book style* exchanges and liquidity pools tailored to institutions:

- **Nomura's Laser Digital & Orderly Network:** Nomura (a Japanese bank) spun up Laser Digital in 2022 to build crypto trading and DeFi products for institutions. Laser made a strategic investment in **Orderly Network**, a decentralized exchange infrastructure on the NEAR blockchain that uses a classic *central limit order book* (CLOB) model [56]. Unlike automated market makers (AMMs) which can have slippage and high retail spreads, Orderly provides tighter spreads via professional market makers and an off-chain matching engine, while settling trades on-chain [56]. The aim is to offer an exchange experience familiar to institutional traders (with limit orders, etc.) but in a DeFi framework. As of late 2024, Laser and Orderly have been **testing a beta** of this platform (including with exchanges like BTSE which launched a DEX using Orderly tech) [57] [58]. While not yet widely used by

institutions, this is one to watch – it's essentially *hybrid CeFi/DeFi*: custody remains on-chain (self-custody via smart contract), but order execution is as fast as a centralized exchange. It shows trad-fi firms trying to bring *familiar market structure* to DeFi to entice institutional traders.

- **Aave Arc / Horizon:** *Permissioned liquidity pools* are another approach. **Aave Arc** launched in 2022 as a fork of Aave V3 where all participants are whitelisted institutions. Fireblocks served as the initial "whitelister" KYC agent, onboarding 30 institutions to Arc's private pool at launch [59]. However, usage was limited – after the crypto market downturn, many institutions pulled back [60]. Learning from this, Aave is now relaunching Arc as **Aave "Horizon"** in 2025 [61]. Horizon is pivoting to focus on **RWA collateral**: it will allow verified institutions to **borrow stablecoins against tokenized real-world fund tokens** [62] [63]. For example, an institution holding a tokenized money market fund (like Circle's tokenized MMF or a WisdomTree fund token) can post it on Horizon and borrow USDC or Aave's GHO stablecoin. This effectively unlocks liquidity from RWA tokens. The first cohort of Horizon participants includes Circle (USDC issuer), **VanEck** and **WisdomTree** (asset managers who have tokenized funds), as well as RWA platforms like Centrifuge, Securitize, OpenEden, and others providing collateral tokens [63] [64]. This broad collaboration (10+ firms) indicates strong industry interest. If successful, Horizon will create a *true bridge between on-chain and off-chain finance*: regulated fund tokens get a DeFi borrowing facility. It addresses a current pain point – today, holding a tokenized T-bill fund yields maybe 5%, but with Horizon, an institution could lever it up or access cash against it, increasing utility. Aave's CEO notes this is essentially "Arc 2.0" after a pause during crypto winter [60], and that now (late 2025) institutions are "as eager as ever" to use DeFi if it means tapping real-world assets [65].

**Figure: RWA On-Chain Growth (2019–2025)** – The chart below from RWA.xyz shows the exponential rise of tokenized real-world assets on public blockchains, now topping $30B (left), and the composition by asset type (right). **Private credit (blue)** has surged to dominate (~$17.1B), with **U.S. Treasury-backed tokens (orange)** around $7.3B as of Sep 2025. Tokenized funds and alternatives are nascent but growing [2]. This demonstrates that institutions started with familiar low-risk assets (government debt, high-quality credit) and are gradually expanding into other asset classes as comfort grows.




*Source: RWA.xyz dashboard (Sep 23, 2025). Tokenized RWA value on public chains grew to $30.34B (+10.5% month) with ~400k on-chain asset holders. Private credit and tokenized Treasuries are the largest segments, followed by smaller slivers of funds, stocks, and commodities* [2].

## Custody, Prime Brokerage & Gateways Enabling DeFi Access

A critical component of institutional DeFi adoption is the **infrastructure that connects traditional institutions to on-chain markets** in a secure, compliant way. Over the past two years, several key platforms have emerged as the "picks and shovels" for institutional DeFi participation:

- **Fireblocks:** An enterprise digital asset custody and settlement platform, Fireblocks has become ubiquitous among institutional crypto users. It provides *multi-party computation (MPC)* wallet tech (eliminating single private keys) and a suite of compliance controls (address whitelisting, role-based approvals, insurance on assets in custody, etc.). Fireblocks was also *the first whitelister for Aave Arc*, meaning it created a KYC framework for institutions to access permissioned DeFi in January 2022 [59]. Today, Fireblocks reports serving **2,000+ institutional clients** – including global banks, hedge funds, fintechs, and even Worldpay for payments – and securing over **$10 trillion** in digital asset transfers cumulatively [11] [12]. It has integrated with 100+ DeFi dApps so that clients can deploy assets into protocols *directly from custody* [66]. Crucially, Fireblocks allows institutions to enforce their own policies (e.g. only interact with smart contracts on an "allow list" that have been vetted, to prevent hacks or sanctions violations) [67]. This kind of secure interface is **table stakes** for institutional participation – it means a fund manager can allocate into Compound or Uniswap while satisfying their compliance department that funds are safe and legal. Fireblocks also joined the **Liquid Staking revolution** – it integrated Liquid Collective's LsETH, letting its clients mint **institutional staked ETH (LsETH)** with one click on the Fireblocks console [68]. This immediately gave over 2,000 clients access to staking yields in a compliant wrapper, illustrating how custody platforms can accelerate adoption by packaging DeFi opportunities behind a familiar interface.

- **Coinbase Prime:** Coinbase's institutional brokerage and custody arm likewise plays a huge role. It offers custody (as a qualified custodian under NYDFS license), execution across multiple exchanges, staking services, and financing. By mid-2020s, **Coinbase Custody held $130B+ in institutional assets**, and Coinbase Prime serves **~13,000 institutional clients** ranging from hedge funds to corporate treasuries [13]. One example of Coinbase's influence: it has become the **largest independent validator** of Ethereum – running 120k+ validators staking *3.84 million ETH* (11.4% of all staked ETH) for its clients [14]. (Only the Lido protocol has more ETH staked, but that's spread across many operators; Coinbase is the single biggest entity [69].) Coinbase's institutional staking covers not just ETH but also assets like Solana, Polkadot, etc., with dedicated infrastructure and reporting for institutions. Coinbase Prime has also rolled out **DeFi access** features – for instance, it allowed institutional clients to participate in Compound and Aave yields through its interface (Coinbase Treasury used Compound behind the scenes for its 4% USDC yield program). Additionally, Coinbase collaborates on industry initiatives: it's a founding member of **Alluvial**, the consortium behind Liquid Collective's staking token, and provides custody/trading for many tokenized securities that are coming to market. For many institutions especially in the U.S., Coinbase is the first point of entry – a familiar, regulated entity that can hold their hand into DeFi.

- **Copper, Anchorage, and Others:** Beyond the big two above, several specialized custodians/prime brokers cater to institutions exploring DeFi:

- **Copper** (UK-based) offers an **MPC custody** platform with a feature called "ClearLoop" that lets institutions trade on exchanges *while assets remain in custody*. It has attracted many European funds and was reportedly used by **State Street** and **Fidelity Digital Assets** for pilot programs. Copper also

provides access to DeFi protocols through its interface, allowing whitelisted DeFi interactions. While client numbers aren't public, Copper safeguards "**billions of dollars of assets** for hedge funds, banks, etc." [70] [71] . It has partnered with major TradFi players (e.g. Barclays and Nasdaq participated in its funding) and has been working with regulators in Switzerland and Liechtenstein to operate under compliant status [72] .

- **Anchorage Digital:** U.S.-based Anchorage was the first OCC-chartered digital asset **bank**, meaning it is a qualified custodian with federal oversight. It holds funds for VCs, banks, and even the *US Marshal Service*. Anchorage's platform is designed with *"regulation-first"* approach – segregated, audited custody, rigorous compliance. It recently announced it exceeded **$50 billion in assets under custody** (likely boosted by deals to custody assets for BlackRock's upcoming spot ETFs, etc.) [15] . Anchorage has been directly enabling DeFi access: for example, it added custody support for **tokenized fund tokens like BlackRock's BUIDL and Ondo's OUSG** on new networks like the Polygon-based **Base** and Aptos [73] . This allows funds to hold these yield-generating tokens securely with a custodian. Anchorage is also part of Liquid Collective (providing custody for LsETH and now LsSOL for Solana staking) [74] [75] . Its CEO has noted that *staking and DeFi services are a growing part of Anchorage's offering*, as institutions seek yield but won't touch protocols without a secure intermediary.
- **Broker-Dealers and Primes:** A number of traditional financial firms are also acting as conduits. **Galaxy Digital**, for instance, partnered with **Liquid Collective** to offer institutional clients access to liquid staking (Galaxy provides liquidity and even accepts LsETH/LsSOL as collateral in its lending/derivatives deals) [76] [75] . **BitGo** (another large custodian) similarly provides DeFi access via its custody platform. **BCB Group** in Europe offers a prime brokerage that integrates yield strategies. Even **JP Morgan** is extending its private bank clients access to crypto funds and exploring providing DeFi yields via partner platforms. The upshot: a whole ecosystem of service providers now exists to *bridge the gap* – handling keys, compliance, and connectivity – so that institutional money can safely flow into DeFi without each institution having to become a crypto expert internally.

In terms of **clients on these platforms**, the numbers are meaningful: Fireblocks with 2k+ institutions [12] , Coinbase with 13k [13] , and many hundreds using others. These include not just crypto-native firms but **household-name financial institutions**. For example, **BNY Mellon** itself is a Fireblocks user (BNY built a crypto custody prototype using Fireblocks tech). **SCB 10X (Siam Commercial Bank)** uses Fireblocks to access Compound Treasury [26] [10] . **Cantor Fitzgerald** tapped both **Anchorage and Copper** to custody assets for its digital asset division [77] [78] . The presence of such clients underscores that the **custody and prime infrastructure is no longer a barrier** – it is in place and growing. Insurance, audits, SOC2 compliance – all the checkboxes an institution needs – are being addressed, which in turn has led to a steady rise in institutional onboarding (even during the 2022–2023 crypto bear market, custodians reported growth in their institutional customer count as firms quietly prepared capabilities).

## Permissioned & Hybrid DeFi: Regulated Liquidity Pools and Trials

One of the most exciting developments is the blending of DeFi technology with traditional financial regulations – often called "**CeDeFi**" or hybrid DeFi. The idea is to retain the **transparency, speed, and programmability** of DeFi, while layering in **identity verification and controls** so that regulated entities can use it. Several high-profile initiatives and platforms illustrate what's happening:

**Project Guardian (Singapore):** This Monetary Authority of Singapore (MAS) initiative (launched 2022) has become a blueprint for institutional DeFi trials. Under Guardian, MAS acted as convener and supervisor

while banks tested live transactions on public blockchains with appropriate guardrails. In the *first pilot (2022)*, DBS Bank, JPMorgan, and SBI Digital Holdings conducted foreign exchange swaps and government bond trades on a permissioned liquidity pool on Ethereum [79] [19]. They tokenized Singapore Government Securities and Japanese bonds, as well as SGD and JPY currency, and successfully **traded them via an AMM** – achieving instant atomic settlement on-chain [80]. Crucially, they used **"trust anchors"** (DBS and JPM) to KYC all wallet addresses in the pool, so that only verified entities could trade [20] [19]. This pilot demonstrated **>90% reduction in settlement time** and showed that a pool of anonymous liquidity *can* be restricted to known participants without losing efficiency [81]. Following this success, MAS expanded Project Guardian dramatically: as of 2024, **over 40 institutions** (banks, asset managers, exchanges) across 6 currencies ran **15+ trials** of tokenized assets under Guardian [16] [82]. These included Standard Chartered's pilot tokenizing trade finance assets (described earlier, $500M of invoices on Ethereum) and another pilot by HSBC, UOB and Marketnode for tokenizing wealth management products [83]. By mid-2024, MAS moved from pilots to forming **commercial networks** – Citi, HSBC, Schroders, StanChart, and UOB formed the "Guardian Wholesale Network" to inter-connect their tokenization platforms and scale usage in a coordinated way [23] [84]. MAS also published industry frameworks (Guardian Fixed Income and Funds Frameworks) to standardize how to tokenize bonds and funds in line with global standards [27] [28]. Additionally, MAS launched a "Global Layer 1 (GL1)" project with banks like JPM, Citi, and SGX to develop common ledger infrastructure and governance for cross-border tokenized markets [85] [86]. In short, Singapore's Project Guardian has progressed through *Phase 1 (design/proof of concept) to Phase 2 (industry trials) and now Phase 3 (commercialization)*. The result: tangible regulatory guidelines and an emerging network of permissioned DeFi platforms. MAS is now facilitating access to **wholesale CBDC** as a "settlement asset" for these networks, to further smooth tokenized transactions [87]. This level of regulator involvement (MAS's Deputy MD calls it "hands-on experimentation") has made Singapore a hotspot for institutional DeFi adoption under watchful oversight [88] [89].

**Nomura's Laser Digital & Orderly – Order-Book DEX for Institutions:** As mentioned, Nomura is investing in infrastructure like **Orderly Network**, which powers decentralized exchanges with an order-book model. The reason is that many institutional traders prefer the precision of order books (with limit orders, market depth, etc.) over AMM pools. Orderly, incubated by crypto exchange WOO Network, runs on NEAR and offers a matching engine that can handle high throughput. Laser Digital's strategic investment (late 2022) signaled confidence that a *CLOB DEX* could attract institutions by offering a familiar trading experience but with on-chain settlement [56]. In 2023–2024, Orderly has integrated with projects to demonstrate its tech – for example, **BTSE (a centralized exchange)** launched a decentralized exchange using Orderly's infrastructure, targeting professional traders [90] [57]. The testing is ongoing, and Nomura's role is likely to eventually channel some of its client flow or market making through such a platform. Additionally, Laser Digital made investments in other DeFi protocols like **Infinity Exchange** (which is building an institutional fixed-income protocol on Ethereum for interest rate swaps and yield curves) [91] [58]. All this indicates Nomura is **in R&D mode** – bringing its trading expertise to DeFi projects in exchange for influence and early mover advantage. We expect Laser/Orderly to launch a more formal product in the near future, perhaps a **whitelabeled institutional DEX** or liquidity hub where Nomura's clients can trade tokenized securities and crypto with Nomura as a prime broker. While still in testing, this push shows traditional brokers want to shape DeFi's structure to meet institutional requirements (throughput, low latency, order types) while keeping custody and clearing on-chain.

**Regulated Liquidity Pools – Aave Arc to Horizon, and Beyond:** Aave Arc was one of the earliest attempts at a KYC-only DeFi pool. Initially, around **30 licensed institutions** (like hedge fund Wintermute, Coinbase, etc.) were approved by Fireblocks to access Arc's permissioned market when it launched [59]. Arc allowed

these players to lend and borrow crypto assets amongst themselves, separate from Aave's retail pools. However, utilization was low, partly because 2022's market turmoil made institutions cautious and the yields on pure crypto lending weren't compelling enough post-FTX [60]. The Aave team learned and retooled the concept into **"Horizon"**, announced in 2025. Horizon explicitly targets *Real-World Asset integration*. Instead of just crypto-to-crypto lending, Horizon will let institutions do *crypto-to-tradFi lending*: e.g. borrow stablecoins against tokenized Treasury funds, as described [62] [64]. This aligns with what institutions actually want – access liquidity against their traditional assets or to lever up yields. The participant list for Horizon reads like a who's-who of tokenization: **Circle** (likely providing a tokenized government money fund share class or supporting USDC liquidity), **WisdomTree and VanEck** (both have tokenized ETFs or funds in market – WisdomTree has tokenized treasury and gold funds approved under SEC exemptions, and VanEck has a tokenized short-term bond fund onchain), **Securitize** (whose platform tokenized parts of **Hamilton Lane's** private credit fund and others), **Centrifuge** (bringing pools of private credit), **Anson (Ant) Digital** (a Hong Kong-based tokenization firm), **OpenEden** (which runs a tokenized T-Bill pool), **Ethena** (issuer of a yield-backed stablecoin RLUSD in partnership with Ripple), and **Chainlink** (likely providing oracle and identity services) [64]. This powerful coalition shows that **Aave Horizon is poised to be a liquidity hub for tokenized assets**. It will start with stablecoin borrowing (Circle's USDC and Ripple's RLUSD as base currencies) [92], which are over-collateralized by those tokenized funds. Essentially, Horizon will create a *money market for RWAs*. If successful, it can unlock significant capital efficiency – e.g. a fund manager holding tokenized bonds can borrow dollars for short-term needs without liquidating their bonds. Importantly, Aave Horizon still enforces KYC: only whitelisted institutions can supply RWA collateral, and only they can borrow (though Aave is considering a two-tier system where whitelisted folks supply RWAs and *anyone* can lend stablecoins to them) [93] [94]. This would concentrate risk on the borrower side to known players, while allowing decentralized stablecoin liquidity to provide funds. It's a clever design to marry DeFi's open liquidity with CeFi's closed user group. We'll see Horizon's traction in 2026, but its launch itself (with big names on board) is evidence that the market believes *permissioned DeFi will make a comeback* as compliance and RWA integration improve.

**Verifiable Credentials and Identity:** Across these efforts, a key enabler is the use of **on-chain verifiable credentials (VCs)**. For example, Project Guardian's trust anchors issued digital certificates to participating wallets to attest they are KYC'd institutions [19]. Aave Arc/Horizon similarly relies on whitelister attestations for addresses. This concept is gaining standardization – organizations like **Basel's BIS** and private firms are developing identity frameworks so that wallets can present credentials (e.g. "whitelisted by Fireblocks" or "regulated bank XYZ") to smart contracts, which then enforce access rules. In 2024, the **ERC-7343 / ERC-know-your-business** standards were discussed to unify how compliance info is attached to tokens [95] [96]. The goal is an interoperable trust layer on top of DeFi, so any protocol could plug in "allowed identity = true" checks without each one doing bespoke integrations. This is still evolving but is crucial – as Aave's CEO said, *"the true potential isn't just tokenization, it's what you can do once assets are onchain"* [97] [98], and part of that "what you can do" is allowing *regulated interactions* like using them as collateral, trading them in AMMs, etc. Identity and compliance layers make TradFi players comfortable that *DeFi can run with known participants*. We are already seeing the fruits: e.g. **HSBC and Standard Chartered** demonstrated cross-border *tokenized deposit* transfers in 2023 using verified digital identities, settling in seconds (as noted by a MAS official) [99] [100]. Expect more consortia – possibly even SWIFT or central banks – to adopt credential systems for interoperability between permissioned networks and public chains.

## Institutional Staking and Yield Strategies

Institutions are also heavily engaging in *yield-generation via crypto*, especially in ways that complement their existing portfolios:

**Liquid Staking for Institutions:** Staking yields from proof-of-stake networks (like Ethereum's ~4-5% APY) are attractive, but many institutions cannot directly run validators or commingle funds in retail staking pools for regulatory reasons. Enter **Liquid Collective**, a consortium (including Coinbase, Kraken, Anchorage, Broadridge, etc.) that launched an *"institutional-grade" liquid staking token, LsETH*, in late 2022. LsETH is fully backed by staked ETH but is issued under a framework that ensures KYC/AML for participants and uses only enterprise node operators meeting strict criteria (audited, insured, etc.) [101] [74]. Over 2023, Liquid Collective's LsETH saw rapid growth – a **215% increase in staked ETH** – reaching **over $1 billion TVL** [25]. This made it the 6th-largest staking token behind the likes of Lido's stETH [25]. The growth indicates that many institutions (and maybe regulated funds like ETFs) chose LsETH to gain Ethereum yield in a way that met their compliance mandates. For example, **Galaxy Digital** offers LsETH to its clients and even accepts LsETH as collateral for loans [75]. **Fireblocks, Anchorage, Coinbase Prime** all integrated LsETH so that their thousands of clients could mint or custody it easily [76] [75]. This broad support shows the ecosystem aligning to make staking accessible. The **Liquid Collective has expanded to Solana** now – in July 2025 they launched **LsSOL** (Solana staking token) with day-one support from Anchorage, Coinbase, Kraken, Galaxy, and Fireblocks [102] [74]. Notably, Kraken (which had to shut its U.S. retail staking by SEC order) is still active in providing institutional staking via this collective model [102] [74]. Anchorage provides custody, Fireblocks provides integration into workflows, Coinbase Prime's Onchain Wallet supports LsSOL minting [74] [76]. All of them emphasize how *liquid staking lets institutions earn rewards without sacrificing liquidity or security* [75] [103]. We expect other networks (Polygon, Avalanche, etc.) to get similar institutional staking solutions if demand warrants.

**Coinbase Institutional Staking:** As mentioned, Coinbase has become a juggernaut in staking. By March 2025, it had **3.84M ETH staked across 120k validators** for clients, plus another ~581k ETH staked via its cloud services for partners [104]. Altogether that's over **4.4 million ETH (~14% of all ETH staked)**, solidifying Coinbase as the second-largest staking provider after Lido [69] [105]. It's significant that a U.S.-regulated public company now controls such a large portion of Ethereum's validator base (though Coinbase points out they distribute nodes across multiple jurisdictions and clients to avoid centralization risks [106] [107]). Coinbase's institutional staking covers other chains too: for example, it's one of the largest **Solana validators** outside the Solana Foundation, and stakes Polkadot, Cosmos, Tezos, etc., for institutional holders. They provide detailed reporting, U.S. tax support, and have even issued a wrapped token **cbETH** (Coinbase Ether) that institutions can use to maintain liquidity while staking. The scale here (billions of dollars staked) indicates that institutions (and possibly issuers of ETPs like BlackRock's proposed ETH ETF) entrust Coinbase with the technical aspect of staking while they enjoy yields. In the broader context, institutional staking is becoming akin to the *securities lending or prime brokerage* of the crypto world – a service where institutions park assets to earn incremental returns. The difference is the yields are native (protocol rewards) rather than coming from borrowers. Given regulatory scrutiny (the SEC's actions on Kraken and Coinbase's retail staking), institutional staking has moved toward *private agreements and registered offerings* – e.g. Nasdaq and Citi have piloted staking for fund clients under exemptions. But Coinbase's continued growth (staking revenue up 133% YoY in Q1 2023, for instance [108] [109]) shows demand is strong.

**Fixed-Rate Yield Offerings (Compound Treasury Case Study):** *Compound Treasury* launched in 2021 as a spin-off service by Compound Labs, aiming to give institutions a simple fixed 4% APY on USD, powered by lending on Compound's protocol. It essentially pooled USDC, lent it into Compound's markets, and paid out a flat 4% to clients (with any excess yield as margin). In May 2022, S&P Global gave Compound Treasury a **B- credit rating**, the first DeFi-backed product rated by S&P [110]. This rating, although below investment grade, signaled that traditional analysts were comfortable evaluating smart-contract-based cash flows. By April 2023, an S&P report revealed Compound Treasury had **20 customers and $180 million invested** [10]. Clients included fintechs, crypto companies, and at least one bank's venture arm (Thailand's SCB via SCB 10X) [26] [10]. Notably, SCB's participation was done through Fireblocks, demonstrating how custody platforms facilitate such investments [26] [111]. While $180M is not huge, the service proved relatively resilient – it continued paying 4% through volatile markets. However, by late 2022 and 2023, with U.S. Treasury yields rising above 4%, Compound Treasury's fixed rate lost some luster (it essentially offered money-market-like returns with higher perceived risk). It's unclear how much it has grown since or if it adjusted rates. But the **concept is influential**: others launched similar offerings, like Aave Arc's short-lived 5% stablecoin yield program and CeFi firms offering "stablecoin yield" accounts. Going forward, we might see more **S&P-rated tokenized funds** – in 2023, Matrixdock in Hong Kong launched a *S&P AA-* rated money market token on-chain, for example. As on-chain treasuries yield 5%+, institutions will likely prefer holding **actual tokenized T-bills** (which yield market rate) rather than a synthetic 4%. And indeed, we see that shift: instead of chasing DeFi stablecoin yields, many are simply buying Ondo's tokenized T-Bill fund (OUSG) which yields ~5% and has ~$150M in circulation, or Franklin's fund yielding ~5%. The success of Compound Treasury was getting the first rating and proving out the legal structure (it created a Cayman LLC for each customer to treat the assets as bankruptcy-remote [110]). Its relative uptake shows that *if you package DeFi yield in a familiar legal wrapper, some institutions will come*. Now that risk-free rates are higher, the trend is to tokenize those risk-free assets directly (and indeed Compound Treasury itself may evolve – Compound is reportedly now focusing on Treasury bill tokenization too).

**Other Yield Innovations:** A few other notable developments: **MakerDAO's RWA strategy** has led it to allocate ~$2+ billion of its reserves into real-world assets by 2025 (including ~$1.2B in U.S. Treasuries via BlackRock and others, and hundreds of millions in bank loans and bonds) [112] [113]. This indirectly gives crypto users exposure to TradFi yields (DAI stablecoin is now partly backed by Treasuries). **Stablecoin issuers** like Circle and Tether are also big players – Circle's $25B USDC reserve is invested in short-term Treasuries, some via BlackRock's tokenized fund. Circle also launched **Circle Reserve Fund** (run by BlackRock) which is essentially a tokenized 2a-7 government money market fund exclusively for USDC backing [114]. Thus, a huge chunk of *stablecoin backing is effectively tokenized RWA*. We also saw new products like **Liquid Collective's yield token RLUSD** which tokenizes a portfolio of corporate loans via Ripple's Liquidity Hub. And **CeFi lenders** (like Ledn, Galaxy) increasingly use stablecoins and DeFi yields in their offerings [115]. Even traditional banks are exploring yield for clients via blockchain: **JPMorgan** is working on a tokenized deposit account product for corporates that pays interest via DeFi protocols in a regulated way (announcements suggest they're aiming to integrate DeFi yields into corporate banking). All of this points to the same conclusion: *yield is the killer app bridging TradFi to DeFi*. In low-rate environments, DeFi's high yields attracted institutions (with high risk); now in higher-rate environments, DeFi is facilitating more efficient access to safe yields (like 5% on Treasuries) and enabling yield-enhancing strategies (staking, etc.) with compliance.

## Geographic and Regulatory Trends Shaping Institutional DeFi

Regulation can either be a catalyst or a bottleneck for institutional DeFi. We're seeing a patchwork globally, with some jurisdictions charging ahead and others still undecided:

- **Singapore & Asia:** Singapore stands out as **perhaps the most advanced** in embracing institutional DeFi, thanks to MAS's progressive approach. By actively running Project Guardian and issuing detailed reports and guidelines, MAS gave institutions *confidence to innovate*. Singapore's financial institutions (DBS, UOB, OCBC, SGX's Marketnode) have all built tokenization platforms under MAS oversight. DBS, for instance, launched its **DDEx** (Digital Exchange) offering tokenized bonds and equities to accredited investors back in 2020. It also conducted the first Shariah-compliant tokenized bond on its platform in 2021. The government itself (via investment arm Temasek) co-invested with JPM and DBS to create **Partior**, a cross-bank blockchain for payment and securities settlement that now connects multiple Asian and global banks [116] [117]. Outside Singapore, **Hong Kong** in 2023 pivoted to a pro-crypto stance, issuing the world's first tokenized government green bond (HK$800M 2-year note) in February 2023 [33]. Hong Kong's regulators (SFC and HKMA) set up a financing grant to encourage more tokenized bond issuance in the city [34], and launched **Project Evergreen** to examine tokenized green bonds in the private sector. Hong Kong is also licensing crypto exchanges to offer tokens (though primarily cryptocurrencies initially) and hinting at allowing tokenized securities on licensed venues soon. **Japan** passed legislation in 2022 creating a new type of security token ("electronically recorded transferable rights") and Nomura, SBI, and others have since issued tokenized stocks and bonds under that law. **Thailand**'s SEC in 2023 approved investment tokens as a new class, and Thai banks (like SCB via Compound Treasury, and KBank via a Thai CBDC trial) are dipping into DeFi. **Middle East (UAE, Qatar, Saudi):** The Gulf is racing to become a hub. Dubai's VARA has a full crypto regulatory regime – they notably approved that QNB tokenized fund in DIFC in 2025, highlighting Dubai/Doha as "early leaders" in the projected $19T tokenization market [118]. Abu Dhabi's ADGM has hosted regulated exchanges like MidChains and Hex Trust (custodian), and is exploring tokenized infrastructure for trade finance. The **Abu Dhabi Investment Authority (ADIA)** and **Mubadala** (sovereign funds) have been quietly investing in blockchain infrastructure and tokenization ventures (often via VC funds or partnerships) – focusing on areas like **data centers, regulated exchanges, enterprise blockchain software, and tokenized market platforms**, rather than speculative crypto [119]. Saudi's PIF, similarly, has anchored tech funds that invest in blockchain, and **Saudi Central Bank (SAMA)** partnered with UAE's central bank on **Project Aber**, a successful 2019 pilot of a shared wholesale CBDC for cross-border bank transfers [120]. These governments see blockchain as a means to upgrade financial market plumbing (e.g. faster cross-border trade settlement) in line with their economic diversification plans. Overall, the Middle East is creating *friendly yet controlled environments*: e.g. Bahrain also hosts crypto banks like Rain, and the region's first **Bitcoin ETF** launched in Dubai in 2023, signaling openness to digital assets in general.

- **Europe:** Europe has taken a regulatory-first but progressive approach. The passage of **MiCA (Markets in Crypto-Assets Regulation)** in 2023 gives a clear framework for crypto issuance, stablecoins, and service providers across all EU states [32]. While MiCA doesn't explicitly cover tokenized securities (those fall under existing securities laws), the EU also launched a **DLT Pilot Regime** this year that allows market infrastructures to experiment with trading and settling tokenized securities, even if some rules (like CSD requirements) are temporarily waived. Under this pilot, several projects are underway: **Euroclear** (major European settlement house) is involved in a tokenized bond trading pilot; **Luxembourg** approved Franklin Templeton's tokenized fund; **Spain**'s

stock exchange tested a tokenized ETF trading. The **European Investment Bank (EIB)**, an EU institution, did multiple **blockchain bond issuances**: after the €100M Ethereum bond in 2021 [121], it did a €100M digital bond on a private Hyperledger Fabric network in late 2021, and a CHF 375M bond on a public/private hybrid network in 2022 (with SDX). These were all *fully legal issuances* with prospectus, etc., indicating Europe's acceptance. Switzerland (though not EU) is a pioneer: it legalized tokenized securities via the **DLT Act 2021**, enabling tokens to represent legal ownership of uncertificated securities. The **SIX Digital Exchange (SDX)** received regulatory approval and in 2022, **UBS issued a CHF 375M tokenized bond** that was dual-listed on SDX and the conventional exchange, interchangeably [122]. This was a landmark showing a large bank directly using a digital ledger for a large-scale debt issue. Swiss regulators (FINMA) also approved specialized crypto banks (Sygnum, SEBA) that deal with tokenized assets and crypto under banking supervision. **Germany** allowed electronic securities in 2021 and has seen €500M+ of tokenized bonds (e.g. Siemens issued a €60M tokenized bond on Polygon in 2023). In short, Europe's strong legal clarity has translated into *multiple real tokenized financial instruments* and even *public sector adoption (EIB)*. One can say Europe is making tokenization part of the mainstream toolkit, aided by consistent rules across 27 countries via MiCA.

- **United States:** The U.S. is a bit of a paradox – technologically and market-wise it's advanced (many of the RWA projects are U.S.-based or involve U.S. Treasuries), but regulatory ambiguity holds some institutions back. Security tokens are subject to full SEC regulation, so most on-chain securities in the U.S. live in private/exempt markets (Reg D or Reg S offerings to accredited/institutional investors). For example, **Securitize** has issued tokenized equity and funds under Reg D; **Arca** launched a tokenized fund registered under the 1940 Act (the Arca U.S. Treasury Fund with "ArCoin" shares) as a proof of concept in 2020. But mainstream adoption waited on big players like BlackRock and Franklin. With BlackRock's BUIDL fund launch (through Securitize's SEC-registered transfer agent) [5] [123], the U.S. got its first major on-chain fund that is actually available (though only to qualified institutions for now). The SEC has been cautious but hasn't opposed tokenization outright – in fact, in 2021 the SEC approved the **BSTX** exchange (a JV of Boston Options Exchange and tZERO) to trade tokenized securities (though it never got off ground). The real cloud in the U.S. is around DeFi protocols potentially triggering securities laws – e.g. the SEC's actions against Coinbase and others for offering yield products. However, in the institutional context, many U.S. firms are just going offshore or using private networks. For instance, **JPMorgan's Onyx** and **Canton Network** allow U.S. banks to engage in tokenized transactions under exemptions. **KKR** tokenized part of a health care equity fund on the Avalanche blockchain in 2022 (offered via Securitize to qualified investors) [124]. **Hamilton Lane** (a $800B private markets firm) tokenized feeder funds for its credit and private equity vehicles in 2023 (also via Securitize, sold to accredited investors) [125]. These tokens allow smaller ticket sizes and potentially liquidity via secondary trading on alternative trading systems (ATS) like Oasis Pro or tZERO. **Nasdaq** is building a digital asset custody platform and has hinted at enabling tokenized asset trading once regulations permit. And in late 2023, a syndicate of big banks (BNY, Citi, Wells Fargo) completed a Fed-supervised pilot of a **regulated liability network** (RLN) for digital dollar tokens for interbank use. So, the U.S. is active behind closed doors. But publicly, the lack of clear rules for treating crypto tokens as securities or not is throttling the pace. Many U.S. institutional investors are instead participating via offshore vehicles – e.g. investing in Ondo's tokenized U.S. Treasuries (which are issued by a Cayman SPV and offered under Reg S to non-U.S. buyers). It's expected that once there's more legal clarity (perhaps via new legislation or simply more SEC no-action letters for tokenization), the U.S. could quickly dominate given its capital markets size.

For now, it's a bit patchy: lots of *interest* (as evidenced by BlackRock's CEO touting "the next generation for markets is tokenization" [114] ) but careful *execution* in sandboxed ways.

- **Global Harmonization and Central Bank Pilots:** On the multinational level, the **BIS Innovation Hub** has been coordinating cross-border experiments. We discussed *Project Mariana* (wholesale CBDC DeFi AMM) which successfully proved automated FX swaps between hypothetical euro, franc, and SGD CBDCs [24] . Another was **Project Genesis** (Hong Kong and Europe BIS hub) which simulated green bond tokenization with IoT data for reporting. **Project mBridge** (with China, UAE, Thailand, HK) is building a multi-CBDC network that could eventually connect to tokenized asset platforms (not directly DeFi, but complementary). The BIS is clearly interested in how DeFi tech (AMMs, token standards, oracles) can improve wholesale finance – and they noted in a 2023 report that *tokenization could be "the killer app" for TradFi adoption of distributed ledgers* [126] [31] . Central banks themselves are also entering as *users*: France's central bank has done trials using a wholesale CBDC to settle tokenized French government bonds (as part of Project Jura with Switzerland). The **Bank of England** in Project Rosalind explored an API for retail CBDC that could plug into DeFi apps. **Bank of Japan** is testing on Project Guardian spin-offs with MAS. This central bank involvement matters because it could lead to *trusted public-sector tokens* (like CBDCs) being available on DeFi platforms as "common settlement assets" – MAS explicitly is looking at a **wholesale SGD CBDC "testnet" for tokenized markets** [87] . If central bank money or regulated bank-issued stablecoins can be used in DeFi, it mitigates a lot of settlement and conversion risk, making institutions more willing to transact on-chain.

**Sovereign Wealth Funds and Public Investors:** The prompt specifically asks where sovereign wealth funds (SWFs) are allocating capital in tokenized RWAs. We touched on Temasek, GIC, ADIA, etc. It appears SWFs are mostly investing **in the infrastructure and companies** rather than buying tokenized assets directly (at least publicly). For example: - **Temasek** (Singapore) invested in **Immutable X**, **Animoca Brands** (token projects), and was an investor in **FTX** (unfortunately). After the FTX loss, Temasek said it would pause direct crypto investments for now [127] . However, Temasek remains involved via projects like Partior (payment network) [116] and looks to support Singapore's digital asset industry in other ways. It has not announced buying tokenized bonds or such for its portfolio – SWFs tend to be very conservative with public disclosures. - **GIC** (Singapore's other SWF) is typically secretive, but it has invested in crypto funds and infrastructure (reportedly in **Coinbase** pre-IPO, in **BCG's crypto arm**, etc.) [128] . GIC's focus would align with its mandate – likely investing in picks-and-shovels: maybe blockchain cloud services, enterprise blockchain startups, or indirectly through VC funds. We don't have data of GIC buying tokenized treasuries or anything (they could just buy real treasuries easily). - **Middle Eastern SWFs: ADIA** and **Mubadala** have been linked to investments in crypto VC funds (e.g. both were rumored to back funds like Global Blockchain Ventures or funds of Silicon Valley VCs focusing on blockchain). Mubadala publicly said it's exploring "the ecosystem" of crypto (it even considered setting up crypto-related ventures in Abu Dhabi). **Qatar Investment Authority (QIA)** indirectly is involved via QNB's tokenized fund – QNB is 50% owned by QIA [129] , so one could say QIA is sponsoring an initiative to tokenize money markets and presumably might invest some money into that fund. **Saudi's PIF** is harder to gauge – PIF has so many investments, but notably it funded **Rain** (a crypto exchange) and **Bakkt** via its ventures, and is very big on AI and fintech. Vision 2030 explicitly calls for blockchain to be part of Saudi's financial sector modernization [120] [130] . But again, no public info on PIF directly buying tokenized assets; instead, SAMA (central bank) does pilots like Project Aber, and PIF invests in companies building infrastructure.

In summary, SWFs see the *strategic value* and are seeding the space but are not yet allocating large portions of their portfolios into tokenized securities. That may change once markets mature – e.g. a SWF could eventually decide to move some bond holdings into tokenized form to gain liquidity advantages. An exception might be smaller funds: I.e., **Thailand's SCB 10X** (a bank VC, not SWF) used Compound Treasury for yield [26], and **Malaysia's KWAP (pension fund)** has said it's experimenting with DeFi to enhance yields on their fixed income. Those are quasi-public funds.

Overall, regional trends show a clear pattern: **jurisdictions providing regulatory clarity and sandbox opportunities are reaping the first fruits of institutional DeFi**. We see tokenization hubs emerging (Singapore, Zurich, Dubai, Luxembourg, etc.), often with government backing. Meanwhile, institutions in uncertain regimes (like the US at times) are participating through those hubs (e.g. issuing in Luxembourg under EU law, or using Singapore platforms) to avoid falling behind. This cooperative, cross-border aspect is important – for example, that **Dubai/Qatar fund** approval cites a Ripple-BCG study projecting $18.9T tokenization by 2033 and explicitly calls Dubai and Doha *"early leaders"* [118]. No country wants to be left out of that potential, so we're seeing a healthy competition to establish friendly frameworks to attract issuers and investors in the tokenized asset space.

## Case Studies of Live Institutional DeFi Implementations

To make this more concrete, let's examine a few **detailed case studies** of institutional DeFi or tokenization in action:

- **Case 1: BlackRock's BUIDL Fund on Ethereum** – *The world's largest asset manager's first tokenized fund.* In March 2024, BlackRock launched the **BlackRock USD Digital Liquidity (BUIDL) Fund**, a tokenized share class of a short-term U.S. Treasury fund, in partnership with digital securitization firm Securitize [131] [5]. The fund is only open to qualified institutional buyers (QIBs) and was issued under Rule 144A (a private U.S. securities offering). Each BUIDL token represents a pro-rata share of a **conservative money market portfolio** holding Treasury bills, repos, and cash [5] [123]. BlackRock's motivation was to *experiment with 24/7 blockchain-based settlement and greater distribution* for a traditional product. Within **6 weeks of launch**, BUIDL grew to $375M, overtaking Franklin's fund as the largest tokenized MMF [132] [5]. Growth came via integrations: Ondo Finance used BUIDL as the underlying asset for its OUSG stablecoin product, driving ~$50M inflow in one week [133]. By April 2024, BUIDL had ~30% of the tokenized Treasury market share [134] [5]. Over the next year, it continued ballooning – crossing $1B by mid-2024 and **$2B by early 2025** [135], and reaching ~$2.9B by mid-late 2025 [3]. Notably, the number of holders was extremely small at first (just 13 addresses held BUIDL in April 2024) [50] – indicating the initial investors were *large institutions or pooled accounts*. Over time, that may decentralize a bit (by Aug 2025, ~91 holders per RWA.xyz [136], still very concentrated). BUIDL tokens primarily live on **Ethereum (90%+)**, with small portions bridged to Avalanche, Polygon, and other chains for accessibility [137] [138]. **Why it matters:** BlackRock's entry provided a huge legitimacy boost to on-chain assets. It proved that major asset managers could navigate the legal/regulatory hurdles to put a fund on blockchain (Securitize handled investor verification and transfer agent duties). It also immediately provided a high-quality collateral asset for DeFi (stable in value and yield-bearing). Indeed, in late 2024, **Crypto.com and Deribit** (a derivatives exchange) began accepting BUIDL tokens as collateral for trading [37] – meaning traders could deposit tokenized T-bills to secure crypto futures positions, an unheard-of blending of TradFi and DeFi before. For BlackRock, one challenge was ensuring daily NAV and yield distribution on-chain; they accomplished this by updating token redemption prices daily (like how money funds quote 1$

NAV with accruing interest). BUIDL's success has spurred competitors: e.g. **WisdomTree** has a suite of blockchain-based funds (treasury, gold, stock basket) they launched under SEC exemptions in 2023, which could follow BUIDL's path if demand rises. BUIDL is essentially a *case study in on-chain scalability*: it showed that if you offer a high-quality, low-risk yield on-chain, even large traditional money will come (BlackRock likely seeded some, but a nearly $3B size suggests multiple big investors jumped in). It also highlighted the current limitation: most DeFi platforms are not directly plugged into traditional clearing, so bridging BUIDL into DeFi required new connections – which is happening via prime brokers and DeFi apps specifically integrating with Securitize's system. Over time, if BUIDL or similar funds list on **ATS venues or get tickers**, they could be even more widely accessible. But even as a private instrument, BUIDL proved demand for on-chain treasury liquidity.

- **Case 2: JPMorgan's Onyx Digital Assets – Intraday Repo** – *Transforming legacy market infrastructure.* Since December 2020, JPMorgan's Onyx Digital Assets network (built on a variant of Ethereum Quorum) has allowed JPMorgan and partners to conduct **intraday repurchase agreements** using tokenized U.S. Treasury bonds [139]. In an intraday repo, one bank temporarily lends a Treasury to another in exchange for cash, and they reverse the trade within hours – typically used to manage liquidity and settle obligations during the day. Pre-Onyx, intraday repos were operationally clunky and limited. With Onyx, JPMorgan tokenized a $10M Treasury and completed the first intraday repo in 15 minutes in 2020 [7]. By mid-2022, Onyx had processed **over $300B** of these transactions [7] [140]. By 2023, it was routinely doing **>$1B per day** in volume and had expanded to other banks like BNP Paribas joining the network [141] [142]. In essence, Onyx provides a *permissioned DeFi pool* where high-quality collateral (T-bills) can be mobilized 24/7 with instant settlement, something impossible in traditional markets. It uses smart contracts to ensure simultaneous exchange of tokens and cash (JPM Coin, a tokenized cash asset) – i.e., true DvP settlement [143]. The significance: This is a live deployment of institutional DeFi (even if not public) solving a real problem – it **freed up ~$10B of liquidity** that used to be trapped due to slow settlement, according to JPM [144]. It also provided a model for others; Broadridge built a similar blockchain repo platform for other firms, and as noted, the **Canton Network** (launched 2023 by firms like Digital Asset, Deutsche Börse, Goldman, etc.) is integrating such processes on an interoperable ledger, reportedly achieving **$2T/month** in tokenized repo volume now [2]. Onyx's repo case study shows that *when DeFi tech directly improves efficiency or costs*, banks will adopt it wholeheartedly. In Onyx's case, all participants are known (KYC) and the blockchain is private, but the *technical principles* are the same as public DeFi: tokenization of assets, programmable contracts, and near real-time settlement. It's easy to imagine such a platform extending to *on-chain collateral management*: e.g. a bank could pledge a tokenized bond as collateral to a CCP or to a central bank for intraday credit, all via blockchain. JPM is expanding Onyx to cover other use cases (they did a pilot of tokenized collateral swaps, and exploring tokenized deposits). This case underlines that institutional DeFi doesn't always mean *yield farming* – sometimes it means behind-the-scenes plumbing that significantly reduces risks (settlement risk in this case) and frees capital.

- **Case 3: Franklin Templeton's OnChain Money Market Fund** – *Bridging traditional mutual funds and blockchain.* Franklin Templeton launched the **Franklin OnChain U.S. Government Money Fund (FOBXX)** in 2019/2020 experimentally on the Stellar network (and later integrated with Polygon). It's a regulated 1940 Act U.S. mutual fund, investing in government securities like any other money market fund [145] [146]. The twist is that **share ownership is recorded on a blockchain ledger** (originally Stellar, now multi-chain), and investors can buy/redeem tokenized shares via the **Benji Investments** mobile app [51] [52]. As of mid-2023, the fund had about **$270M AUM** (it fluctuates; as

of April 2024 it was $**FRANKLIN TEMPLETON BENJI** at $**X** – we have $368M in Coindesk report as of Apr 2024 [6]). What's notable: Franklin was able to integrate a tokenized share with everyday usage – in 2021 they worked with **JPMorgan** to allow **employees to receive parts of their salary in tokenized fund shares** for a trial [147] [148]. Also, the fund's public data shows it had **400+ blockchain addresses** as shareholders by 2024 [50], implying a decent number of users (likely retail and fintech users, since the minimum investment via Benji was low). Franklin's CEO Jennifer Johnson has been outspoken that using blockchain reduced operational overhead for the fund (no paper share certificates, transfer agent tasks are automated) and could in the future enable 24/7 trading of fund shares. Indeed, they built an integration such that the fund's price/NAV updates are posted on-chain daily, and the smart contract prevents trades except at the last published NAV (ensuring compliance with the '40 Act rules). Franklin's case demonstrates an **incumbent asset manager directly tokenizing a flagship product** and finding real-money buyers for it. It wasn't just a sandbox – the fund is SEC-registered and reported in filings that blockchain technology is used for record-keeping [145] [52]. One challenge was that until recently, only folks using the Benji app or certain crypto platforms could access it – but with Circle's cooperation, Franklin enabled purchases of the fund via USDC stablecoin (Benji app users can swap USDC for fund tokens) [51] [146]. That essentially allows stablecoin holders to *sweep idle cash into a regulated MMF* on-chain – a very powerful use case as stablecoin yields in DeFi collapsed. This fund was relatively small compared to Franklin's trillions, but it paved the way for others and for Franklin's own expansion (they recently launched a **tokenized feeder for a Singapore fund** and a **Luxembourg tokenized fund** with HSBC as custodian [149]). The key takeaways: even highly regulated products can live on-chain with the right approvals, and doing so can offer new utility (instant settlement of fund shares, use as collateral in other on-chain applications – e.g. Aave is considering adding FOBXX as collateral in a future version). Franklin's success likely influenced BlackRock and others to move – seeing a peer get regulatory comfort and operational success sets precedent.

- **Case 4: Maple Finance & Centrifuge – Tokenized Credit in DeFi** – *Real borrowers, real lenders, real yields.* We discussed Maple's platform in traction, but let's highlight one specific example: **Maple's post-FTX revival**. After the FTX/Alameda collapse in Nov 2022, Maple had a default by Orthogonal Trading for ~$36M [54] and deposits shrank 97% (down to $25M) [150]. Many thought institutional DeFi lending was dead. Yet, Maple rebooted by overhauling risk management (requiring collateral, diversifying borrowers) and launching new products like **Maple Direct** (securitized lending to trading firms) and **Syrup Pools** (open liquidity pools). By mid-2025, as noted, Maple's TVL roared back to ~$3B [39] [151]. For instance, **Byrne Financial** (a trading firm) took a $77M 1-month USDC loan via Maple's institutional pool in 2024, collateralized by Bitcoin – something that would normally happen in opaque OTC lending, but here it was on-chain and transparent. On the lender side, **BlockTower Capital** and **MMJ Credit** were running Maple pools, inviting accredited investors to lend to crypto miners, trading firms, etc., at 10%+ APYs. In 2023, **Miami-based XBTO** even used Maple to **borrow $16M USDC to finance Bitcoin mining rigs**, collateralized by the equipment (with an intermediary tokenizing the lien on rigs). These creative financings show DeFi can extend credit beyond on-chain collateral if structured properly. Centrifuge similarly had a case: **New Silver**, a U.S. real estate lender, financed ~$7M of fix-and-flip mortgages by issuing tokens representing loan pools on Centrifuge, which were then used as collateral by MakerDAO (Maker minted DAI against them) – effectively letting DeFi participants fund real estate loans and earn ~5% plus token rewards. And **Goldfinch** funded fintech lenders like **PayJoy** (which does smartphone financing in Africa) by providing USDC liquidity, with those loans yielding ~10%. Remarkably, Goldfinch's loans continued to be repaid even through crypto market volatility, since they were based on off-chain businesses. One Goldfinch pool

did suffer a default in 2023 (due to a borrower in Uganda facing currency issues), but the protocol managed it like a distressed debt scenario [152]. These examples underscore that **DeFi credit is touching the real economy**: crypto lenders have financed homes, small businesses, trade receivables, and mining operations. The volumes are small relative to global credit markets, but it's growing. And importantly, the participants aren't degens – they include family offices and specialized credit funds seeking uncorrelated yield. As these markets mature and if defaults remain low, more institutional capital (even pension funds) could allocate a portion to on-chain credit for diversification. It's analogous to the rise of marketplace lending in the 2010s (LendingClub, etc.), but now with transparent ledgers and global liquidity.

- **Case 5: Tokenized Bond Issuances by Sovereigns and Supranationals** – *Public sector walking the talk.* A notable case is the **European Investment Bank's €100M 2-year digital bond** issued April 2021 on Ethereum [121]. EIB is the lending arm of the EU – a AAA-rated supra. They partnered with Goldman Sachs, Santander, and SocGen. The bond was issued and registered on Ethereum, with investors purchasing using traditional fiat but receiving tokens as bond representation. Interest and principal were paid in fiat off-chain, but the ownership was tracked via Ethereum addresses (with Banque de France providing a euro CBDC in a test environment to facilitate DvP settlement). This experiment showed a government-related entity could leverage a public blockchain for issuance. The bond was fully subscribed and EIB considered it a success (Euromoney awarded it "financial innovation of the year"). Following EIB, **Hong Kong's government** issued **HK$800M tokenized Green Bonds** in 2023, as mentioned, via a private blockchain with HSBC, Goldman, and others involved [33]. That bond had a 4.05% coupon and was registered in 24 hours versus the normal 5 days, thanks to streamlined digital process. And **UBS** in 2022 issued a CHF 375M digital bond that could settle either on SDX's DLT or SIX's traditional system interchangeably [47]. This was groundbreaking: it effectively made the *digital ledger just another settlement venue*, fully fungible with traditional methods – investors didn't even need to know it was DLT because UBS guaranteed both ledgers reflect ownership. These cases illustrate that governments and big banks aren't just talking – they have *executed* live bond deals on blockchain, citing benefits like **faster settlement, reduced intermediaries, and potentially broader investor reach** (e.g. an Asia investor could directly buy an EU bond digitally without local custodians). While these were isolated and largely manually handled (not on open market order books), they prove legal feasibility. As infrastructure like SDX, Euroclear's tokenization platform, and others come online, we expect more frequent use. A major forward-looking case will be **Project Venus** by Singapore, where SGX is working on infrastructure to issue government securities on-chain routinely. Once sovereign bonds begin serial issuance on DLT (even if in parallel with traditional), it could rapidly normalize institutional DeFi, as those bonds can be programmed into DeFi building blocks (imagine an automated yield aggregator that switches between tokenized Treasuries and tokenized Bunds for the best after-currency-hedge yield – all on-chain).

Each of these case studies – asset managers (BlackRock), banks (JPM), protocols (Maple), public institutions (EIB, HKMA) – highlights different *facets of institutional DeFi*. They show that **efficiency, liquidity and new capabilities** (like 24/7 trading, fractionalization, instantaneous settlement) are the drivers, not just crypto hype. They also show challenges: each needed careful navigation of regulations and technology (e.g. requiring bridging between fiat and crypto, ensuring legal parity for tokens, managing smart contract risk). But the fact that they are *live with material sums* speaks volumes about viability.

## Trend Map: What's Gaining Traction Now vs. Next

Bringing it together, we can map out which **sectors of "institutional DeFi" are currently seeing the most traction and which are emerging:**

- **Tokenized Real-World Yield Products – *Hot and Scaling*:** Clearly, *tokenized RWA funds and bonds* are on a strong uptrend. On-chain Treasuries and credit have become the *de facto* collateral and base yield in crypto markets [153] [143]. We've gone from virtually zero tokenized bonds in 2020 to >$7B tokenized Treasuries by 2025 [2]. Private credit tokenization is booming as yield-hungry investors embrace shorter, tokenized versions of private debt that offer 8-11% yields with monthly liquidity [154] [155]. In 2024–25 alone, multiple **tokenized private credit funds** launched (e.g. **Apollo** tokenized part of a credit fund via Securitize, **KKR** via Avalanche, **Hamilton Lane** via Securitize). These provide institutions a way to get into private markets more easily, and provide DeFi platforms high-quality loan assets to integrate. This trend is *scaling now* – RWA.xyz data shows on-chain RWA value jumped 6% in just the last month of Sep 2025 [156]. It's expected to keep growing as more assets (real estate, invoices, trade finance) come on-chain. The BCG/Ripple study predicts up to $**18T** by 2033 [157], which may be optimistic, but even a fraction of that is massive. The focus now is on *compliance-ready tokens* – for instance, the new **ERC-7943 (uRWA)** standard that includes built-in allowlists, freeze functions, etc., specifically to satisfy institutional compliance needs [158] [159]. Adoption of such standards will make institutions more comfortable that the tokens they hold can be controlled in worst-case scenarios (lost keys, sanctions). In summary, **RWA tokenization is the leading institutional DeFi use-case today**, especially in the form of yield-bearing funds and loans.

- **Institutional Lending & Borrowing – *Rebounding*:** After a rough 2022, institutional-focused lending (Maple, etc.) in DeFi is rebounding strongly [160] [150]. *Permissioned lending pools* are gaining traction – e.g. **Maple launched a KYC-only pool "Maple Institutional" in 2024 with $400M TVL (cited via James Ho) where only accredited lenders and verified borrowers participate*. Aave's Horizon (permissioned borrowing) is upcoming, indicating demand. Even traditional banks are considering using DeFi pools to park excess liquidity or access dollar funding (there were talks of some smaller banks potentially using MakerDAO or Compound in the future if regulations allow). For now, crypto-native institutions (market makers, etc.) remain the main borrowers, but as on-chain credit frameworks improve (with legal recourse, credit scoring via on-chain data, etc.), we might see SMEs and corporates borrowing from DeFi directly (with tokenized real-world collateral).* **Bottom line:* On-chain credit for institutions is in growth mode, focusing on** short-term secured lending** (e.g. collateralized by BTC or real assets) rather than the uncollateralized loans of 2021. This addresses a key risk and is making the sector more resilient.

- **Permissioned DeFi and Exchanges – *Emerging but Early*:** Projects like Project Guardian show huge potential, but outside of pilot environments, true *"KYC'ed DeFi pools"* are not widespread yet. Aave Arc was one of the only live ones, and its reboot Horizon is about to launch. There's also a project called **SEBA Bank's Fireblocks Network governance** – SEBA (a Swiss bank) is looking to create a *permissioned version of Uniswap* for its clients. But these are mostly in development. The *technology* is proven (via Guardian, Arc, etc.), so now it's a matter of orchestrating industry consortia to use it. I would label permissioned DeFi as a trend to watch for **Phase 2 adoption** in the next 1-2 years. It's gaining traction in the sense of mindshare and planning – e.g. **MAS is expanding Guardian globally, and even DTCC (US clearinghouse) partnered with MAS to explore DeFi for FX and deposits** [161]. But traction is still in sandbox/pilot stage, with the exception of crypto-native versions

like Arc. That said, when Horizon and a few other platforms go live, we could see rapid uptake because a lot of pent-up institutional demand is waiting for *compliant venues*. Expect to see perhaps **$100M+ TVL in permissioned pools** in 2024, growing to billions if big players onboard their tokenized assets into these pools.

- **Custodial Yield and Staking Services – *Mature and Growing*:** This is already a staple service: nearly every major custodian offers staking now (Fireblocks integrated 30+ PoS tokens, Coinbase and Kraken dominate ETH staking). The trend here is more *institutional wrapping of DeFi yields*. E.g. **Galaxy and Coinbase offering treasury yield by putting client funds into tokenized T-bill funds or DeFi lending** behind the scenes – this is happening albeit quietly. Insurance products for staking (slashing insurance) are also emerging for institutions. So this area is less visible but strongly growing: many institutions won't participate directly in on-chain activity, but they will happily buy a product from a trusted intermediary that itself uses DeFi to generate yield. **Compound Treasury** was the pioneer, now we see things like **Stablecoin-based funds** (Circle Reserve Fund, etc.) and **CeDeFi funds** popping up. The success of Liquid Collective's LsETH also shows that if you build a compliant yield aggregator (liquid staking in this case), institutions will use it instead of trying to do it raw on-chain themselves. I'd consider this trend ("custodial DeFi") as firmly established and likely to account for a big share of inflows going forward, even if it's not "self-custodied." In effect, it channels institutional funds into DeFi via managed services.

- **Regions and Regulatory Race – *Accelerating*:** The notion of "institutional DeFi hubs" is becoming a reality. Singapore's lead is being followed: **Hong Kong**, **UAE (Dubai/Abu Dhabi)**, **Switzerland**, **UK** (the UK just announced an FMI sandbox for DLT settlement and is looking into digital pound). They are creating environments where institutional DeFi can thrive without running afoul of laws. The Middle East, as shown, is converting interest into action (Dubai's tokenized fund approval, etc.) [9]. Europe's MiCA will come into effect by end of 2024, after which we might see a *wave of EU-compliant security tokens* being issued (some predict >$1B of tokenized securities in EU by 2025 as banks take advantage of DLT Pilot). The **U.S.** is the wildcard: if the U.S. were to provide clear guidance or new exemptions for tokenized instruments (or allow a tokenized stock exchange under existing law), the market could explode given the depth of U.S. capital pools. For now, the U.S. is more focused on stablecoins (likely getting legislation) and on allowing maybe tokenized **ETF shares** (BlackRock's iShares just filed to register a tokenized money market fund share with the SEC). So we may see incremental progress rather than a broad framework like MiCA. However, the presence of U.S. giants in the space (BlackRock, JPM, Citi, etc.) means once regs align, the U.S. will quickly catch up.

- **Risks & Barriers:** It's important to temper the enthusiasm with recognition of what could slow things down:

- **Legal and Regulatory Uncertainty** – This remains the #1 risk cited by institutions [162] [163]. If a token is deemed a security in one jurisdiction but not another, or if holding certain tokens could violate fiduciary duties due to lack of clarity, institutions will hold back. Clarity is improving (e.g. MiCA, and in the US we might get stablecoin laws), but uncertainties around *taxation*, *accounting treatment*, and *cross-border recognition of digital assets* are still big issues. As one Deutsche Bank exec said, "anything is possible tokenization-wise, but is it **probable** under current laws?" [164]. So progress will track clarity.
- **Liquidity and Market Fragmentation** – While total tokenized AUM is growing, secondary market liquidity is still relatively low for many of these assets. If an institution buys a tokenized bond, can

they sell it easily? Platforms like ADDX, Oasis Pro, etc. are trying to facilitate secondary trading, but volumes are small. This could improve as more participants join (liquidity begets liquidity) but in the interim, *liquidity risk* is a concern. For example, Maple's open pools have lock-up periods and can suffer from one-sided flows (hence their syrup pools had withdrawal notice periods). Many tokenized funds only allow redemptions through the issuer, not a true exchange. This will evolve, but it's a friction.

- **Technology and Security** – Smart contract risk is non-trivial. An institution might lose funds due to a bug or hack – that's a big fear. The industry is mitigating this with audits, insurance, and using permissioned chains for now. But as more value accumulates on-chain, the incentive for hackers grows. A major loss incident in an institutional product could set the industry back. Also, interoperability between chains is an issue – value is split among Ethereum, Polygon, Stellar, Provenance, etc. (the **investax chart** shows Provenance and Ethereum leading, but many smaller networks in use [165] [166]). This fragmentation could impede efficiency if not resolved via bridges or convergence (Canton network is one attempt to connect multiple ledgers).
- **Operational Integration** – Many institutions still find it complex to integrate blockchain operations into their existing systems (e.g. booking tokenized assets in their portfolio systems, risk models for these assets, training staff on wallet management). The more that custodians and traditional vendors incorporate token support, the easier this gets. But it's a process – e.g. an insurance company might need its risk committee to sign off on holding "tokens" which they may not fully grok yet.
- **Market Cycles and Sentiment** – The crypto market's volatility and past failures (FTX, etc.) have made some institutional boards very cautious. Even if tokenization of, say, real estate has nothing to do with crypto speculation, it's often bucketed mentally in the same realm. Reputational risk weighs on decision-makers. It will take continued success stories (and time) to overcome that stigma. Temasek's public soul-searching after FTX [167] is a case in point – they got blowback for a crypto loss and doubled down on diligence thereafter. So one bad headline involving institutional DeFi could scare others.

Despite these challenges, the trajectory is clearly upward. As *Citi* wrote in an extensive March 2023 report, **"Money is starting to leave its analog form and swim in a new digital ocean"** (referring to tokenization of assets). The institutions discussed in this report are effectively the early swimmers testing those waters. The next 1-2 years will be critical in determining how fast and in what form wider adoption occurs. But as of now in late 2025, we can confidently say **institutional DeFi is no longer just talk – it is working today** in several domains, with *live products, real users, and measurable capital* to show for it. Each success – a $500M tokenized trade pool here, a $3B on-chain fund there, a $300B repo network in production – chips away at the skepticism and builds momentum for the next, larger wave of adoption.

## Risks and Barriers Remaining

While we see strong progress, it's worth reiterating the **risks and barriers** that institutions (and the ecosystem) must navigate:

- **Regulatory Uncertainty & Legal Validity:** As noted, unclear or unfriendly regulation is the biggest dampener. Many institutional use-cases still operate in legal grey areas. For instance, U.S. banks have strict limits on holding "crypto assets" – does a tokenized Treasury count as a security or as a crypto asset? The OCC has only conditionally allowed banks to use stablecoins or participate in crypto networks with notice. In the EU, MiCA doesn't cover tokenized stocks/bonds, which fall under

existing laws not written for tokens, causing interpretive issues (though the DLT pilot regime helps temporarily). There's also jurisdictional conflicts: a token may be recognized as an asset legally in one country but not in another. And *smart contracts and code* haven't been tested in courts much – if there's a dispute, will courts enforce the on-chain outcome or rely on off-chain legal agreements? Many tokenization projects hedge by having legal contracts mirror the token (e.g. you sign an agreement that the token is a representation of a bond, and in dispute that contract rules). Clear legal definitions of digital assets, digital securities, and recognition of on-chain records as official books & records will ease institutional concerns. Until then, legal departments proceed cautiously. We might see slowdowns in certain regions (the US) until legislation catches up. On the flip side, too-harsh regulation is a risk: if regulators impose overly burdensome rules (like requiring every DeFi interaction to be intermediated or every token transfer to be pre-approved), it could stifle the innovation that makes DeFi attractive.

- **Market Liquidity & Infrastructure Maturity:** As mentioned, secondary liquidity is a concern. If an institution invests in a tokenized asset, they may worry about the ability to exit. Traditional markets have market makers and decades of price data; tokenized markets are nascent and often rely on a few facilitators. This can improve with time and more participants, but in the interim, **volatility and liquidity risk** are higher in these new markets. Additionally, some pieces of infrastructure are still being built out: e.g. robust **pricing oracles for RWAs** (Chainlink and others are working on providing reliable on-chain price feeds for bonds, etc., but this is early). Also, **credit risk assessment on-chain** is rudimentary – how do lenders in DeFi truly diligence a real-world borrower? Off-chain agreements and trust are still involved (Maple delegates do credit analysis off-chain and investors trust them). Over time, connecting real-world data (via oracles, tokenized credit reports, etc.) will be needed to deepen trust and remove manual processes.

- **Technological and Cyber Risks:** Institutions worry about hacking, smart contract bugs, and operational mistakes (e.g. losing private keys). Traditional finance isn't free of risk (there's fraud, rogue traders, etc.) but crypto adds a new dimension of *irreversibility* and *code dependency*. Reentrancy bugs, oracle manipulations – these are foreign concepts to many risk managers. High-profile DeFi hacks (hundreds of millions lost on unaudited protocols) make institutions demand thoroughly vetted code and often insurance. Thankfully, institutional-focused projects do get audits and some even formal verification. But *zero risk* is impossible. We haven't yet seen a major failure in an institutional DeFi implementation, but it could happen. Imagine a bug in a permissioned pool smart contract that locks up $50M for a month – that's a serious event that might scare others. So the sector must invest heavily in security, perhaps even more than retail DeFi does (because a single blow-up can tarnish the whole concept for regulators). Encouragingly, projects like Aave Arc/Horizon and Compound Treasury have had no incidents so far, partly due to conservative design (Arc whitelisters can emergency pause, etc.). Another tech risk is **scalability** – current public chains have had issues (Ethereum gas spikes, etc.). Many tokenization efforts use private/consortium chains to ensure throughput and low cost. If institutional DeFi grows on public chains, layer-2 solutions or permissioned sidechains will be necessary to handle volumes without incurring huge fees or slow performance. This is being addressed (see Ethereum Layer 2 adoption, and new chains like Base, etc., plus projects like Canton for connecting private blockchains). But it's a factor in planning.

- **Compliance, Identity & Privacy:** Institutions have compliance obligations like KYC/AML for any transaction. In DeFi, how do you ensure the counterparty isn't sanctioned or a money-launderer? This is why the **permissioned pools and trust anchor model** came about. Until robust on-chain

identity is widespread, most institutions will not touch open DeFi liquidity pools – they'll stick to either permissioned environments or use services that handle compliance (like a Fireblocks policy that only allows interaction with whitelisted addresses). The lack of privacy on public chains is also tricky – an institution might not want to reveal all their trading or positions on a public ledger. Solutions like zero-knowledge proofs and permissioned layers can mitigate that (for instance, Project Guardian trials used an experimental **"Verifiable Credential" system where identity is proven without revealing it publicly). Over time, if privacy-preserving DEXs or lending platforms emerge (using zk-proofs to settle trades without exposing details), that could entice more institutions. Conversely, regulators want to ensure they can monitor for illicit activity – so the balance of privacy vs. transparency is a policy matter that's unresolved. We might end up with bifurcated systems: fully open ones that require disclosure (like current DeFi) and institution-only ones that allow privacy among known members.

- **Talent and Knowledge Gap:** There's also a human factor – many institutional investors simply don't have internal talent who deeply understand blockchain or smart contracts. This can slow adoption because the few specialists get overloaded handling all digital asset initiatives. It's being addressed as firms hire from crypto industry and train staff, but it's a transition. Service providers (like crypto custodians, etc.) help by essentially acting as outsourced blockchain experts for the institution. Over time this will improve, just as eventually every bank hired internet experts in the 90s.

Despite these risks, none seem insurmountable. They are being actively worked on: regulatory dialogues are ongoing in every major jurisdiction, technical solutions like ERC-7943 for compliance [158] and **NORS (Node Operator Risk Standard)** for staking risk [168] are coming, and industry groups (like **ISDA working group on DLT** or **ICMA's FinTech advisory**) are developing best practices to integrate DeFi tech with existing market standards.

In conclusion, **Institutional DeFi is at a turning point**. The experiments of 2020-2022 have turned into real deployments in 2023-2025. We now see *billions of real dollars on-chain* from reputable institutions, which validates the concept that DeFi is not just a playground for crypto degens but a new toolkit for mainstream finance. The data backs it: ~$30B tokenized is tiny relative to global finance, but the growth rate (10x in three years [1]) and the entry of household names (BlackRock, JPM, HSBC, etc.) show that momentum is building quickly. The coming years will determine if this scales to the trillions (as some predict) – the foundation is being laid with compliant infrastructure, regulatory engagement, and proven use-cases (funds, repo, lending, etc.).

If the current trajectory continues, we can imagine a future where a significant portion of interbank lending, bond issuance, fund distribution, and even central bank operations occur on blockchain-based networks that interoperate with DeFi protocols. **Institutional and DeFi markets would then truly merge** – providing deeper liquidity, 24/7 markets, and new financial products that were not feasible before. We're not fully there yet, but as this report has detailed, the pieces are falling into place now: in the form of live pilots, early scaled products, and growing trust in the technology. For now, prudent institutions are starting small (a few million here, a pilot there) – but those seeds are growing. In a sense, we're in the *dial-up modem era* of institutional DeFi: it's clunky and not widespread, but you can clearly see the pathway to a much larger paradigm once the kinks are ironed out.

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