

ECOSYSTEM WHITEPAPER

Achieving Institutional RWA Composability

**A Framework for User-Owned,
Ecosystem-Delivered Financial Services**

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Acknowledgements

Allium

allium.so

Chainlink Labs

chainlinklabs.com

HydraX

hydrax.io

Particula

particula.io

Persona

withpersona.com

GBBC

Global Blockchain Business Council

rmf.gbbsc.io

GLEIF

Global Legal Entity Identifier
Foundation

gleif.org

GRADE Alliance

Global Regulated Asset & Digital
Exchange Alliance

gradealliance.xyz

EXECUTIVE SUMMARY

Achieving Institutional RWA Composability

The Core Thesis

The tokenization of real-world assets promises a fundamental shift: from a financial system organized around custodial intermediaries to one organized around direct investor ownership and open ecosystem participation.

This shift is not yet occurring at scale. The primary obstacle is the absence of a coherent operating model for composable RWA finance.

Who This Paper Is For

This paper is written for institutional asset managers, issuers, financial intermediaries, and infrastructure providers who are engaged in or evaluating participation in the tokenized real-world asset (RWA) ecosystem. It is intended for readers who understand the mechanics of digital securities at a working level, and who are thinking carefully about how the ecosystem can be structured to deliver the composability that makes tokenization genuinely valuable.

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Argues that the next phase of institutional RWA growth depends on deliberate ecosystem design.

SECTION I

The Composability Opportunity

\$30BN

Est. RWA Today

\$1BN

Used in DeFi (proxy of composability)

Source:

Allium, as of 27 July 2026.
Market: Current market value of tokenized real-world assets tracked by Allium, excluding stablecoins; DeFi usage: Tokenized RWA value deposited across decentralized lending, DEX, and yield protocols.

All figures in USD.

For more information visit <https://app.allium.so/terminal/rwas/key-metrics>.

Why Composability Is the Central Value Proposition

The tokenization of financial assets has moved through identifiable phases. The first was efficiency: faster settlement and reduced reconciliation costs. The second was access: opening products to investor classes previously excluded by high minimums or distribution barriers. Both phases deliver meaningful but incremental improvements.

The phase now beginning is composability — and it represents a structural shift. Composability means an investor can hold a tokenized RWA in their own name. The holder of the assets gets free choice on how to use them, detaching them from any constraints of traditional custodians: either using it as collateral with one institution, lending it through a protocol run by another and trading across whichever marketplace they prefer.

Without composability, the marginal advantage of a tokenized RWA over its traditional equivalent remains limited, missing a key adoption driver and risking failure to achieve the industry's growth targets — scaling from today's estimated USD 30BN to the trillions in tokenized volumes by 2030.

With it, the investor gains greater control over how their assets participate in the financial system, alongside greater service provider choice, demonstrating a truly differentiated value proposition.

Traditional Model: Vertical Integration

In traditional securities markets, investors rarely hold securities directly. They hold beneficial interests in assets registered in the name of a custodian — a bank, broker-dealer, or nominee entity. This arrangement reflects deep historical logic: registering and maintaining the identity records required for regulated asset ownership is complex, jurisdiction-specific, and liability-laden work.

The result is a vertically integrated model in which the investor's financial services — payments, investments, credit, custody — are delivered by a single institution that controls the account, the identity record, and the asset register.

Moving to a competitor is costly because the custodial relationship does not transfer easily. Assets held in custodial form are not reusable outside that relationship; composability, in the traditional model, is a privilege of the intermediary, not a right of the investor.

Tokenized Model: Horizontal Integration

Tokenization, designed with composability as the objective, inverts this structure. An investor holding legal title to a tokenized security in their own name — accessed directly by interacting with a smart contract — can consume financial services from an open and competitive, horizontal ecosystem, for example:

- a regulated broker for access and execution,
- a lending protocol for credit,
- a collateral network for margin obligations,
- an exchange for secondary liquidity,
- a payment service provider for settlement,
- a vault for managed investment strategies.

Each participant consumes the investor's identity context, but none needs to take custody nor needs to be connected to the custodian of the asset in order to provide services. The custodial lock-in that defined the traditional model gets disintermediated. Consequently, intermediaries will need to compete across all services of the value chain. **This is the architecture of user-owned, ecosystem-delivered financial services.**

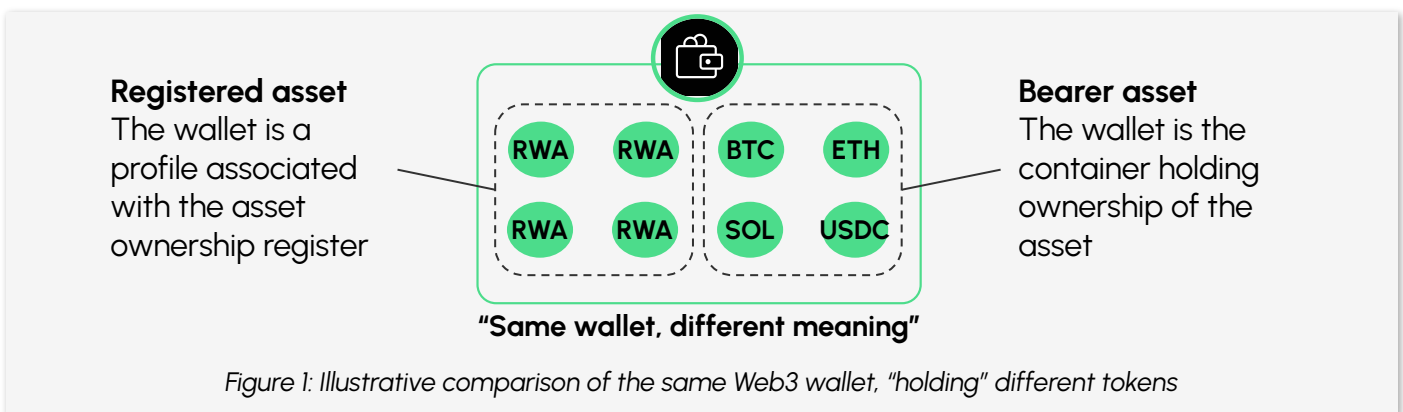
SECTION II

Why RWA Composability Is Different

The Problem That Has Not Been Solved

Of approximately USD 30BN in RWAs issued on public blockchain rails today, very few can be owned directly, and even fewer are genuinely composable. The common assumption has been that this gap is a function of market maturity: that as more assets are issued, liquidity will accumulate, infrastructure will develop, and composability will follow naturally.

This paper argues that assumption is mistaken. The gap is a consequence of applying composability patterns designed for bearer instruments — where possession equals ownership — to registered instruments, where ownership depends on identity context that the instrument itself does not carry.



Bearer vs. Registered: The Foundational Distinction

Consider a wallet holding two tokens: a stablecoin and a tokenized RWA. Displayed in a wallet interface, they sit side by side. Their visual representations are identical. But the operational interpretation of what it means to "hold" each token is entirely different, and that difference explains the composability problem.

Bearer Asset (e.g., Stablecoin)

The stablecoin is a bearer instrument in digital form. Possession of the private key that controls the wallet address holding the token is, for practical purposes, equivalent to ownership. Peer-to-peer transactions require limited additional identity context. **Composability is, therefore, primarily a technical construct.**

Registered Asset (e.g., Tokenized RWA)

A tokenized RWA, by contrast, is a registered instrument in digital form. Its ownership is recorded in a blockchain-based register maintained by a transfer agent or issuer. **Its transferability and extension of investor rights is subject to the token holder's identity context:**

- parties must be eligible investors in the relevant jurisdiction
- must have completed identity verification for AML purposes
- must meet any product-/transaction-specific suitability / appropriateness criteria

The wallet address, on its own, provides none of this identity-related context. **Composability for tokenized RWAs is, therefore, not only a technical construct, but also a legal and operational one.**

SECTION II

How Traditional Finance Manages Identity Context

Traditional financial markets did not ignore the identity requirements of registered assets. They solved them — but in a way that created the lock-in composability now seeks to reverse. Over time, the infrastructure for verifying the full set of identity context consolidated toward custodial financial institutions.

Banks and broker-dealers had the regulatory licenses, the operational infrastructure, and the counterparty relationships to manage identity context at scale. And they had strong incentives to make that infrastructure proprietary: an investor whose identity context resided exclusively within one institution was an investor who was difficult to move to a competitor.

The reality posed by composable tokenized finance is that it requires the dissolution of this custodial arrangement without eliminating the underlying identity requirements the custodial intermediary was solving.

Re-positioning Identity Context and Governance in New Market Structure

What is required is the redistribution of identity-related verification activities: away from custodial intermediaries as their exclusive domain, and toward investors and new, incentive-aligned service providers in a tokenized ecosystem.

Emerging onchain identity infrastructure — anchored in verifiable credential standards and oracle-delivered attestations — provides the technical substrate for this redistribution. Portable, cryptographically verifiable identity claims, consumable across ecosystem participants without requiring duplicated re-verification at each touchpoint, are the mechanism by which investor-controlled identity context becomes operationally real.

Paired with the digital native tokenized product structuring, enabling issuers to modularize and broaden roles (such as transfer agents, compliance operators, and oracle providers) across their smart contract systems without single service provider lock-in / dependency, **this new market structure sets the foundations needed to practically support RWA composability, while preserving the regulatory objectives the traditional model was designed to achieve.**

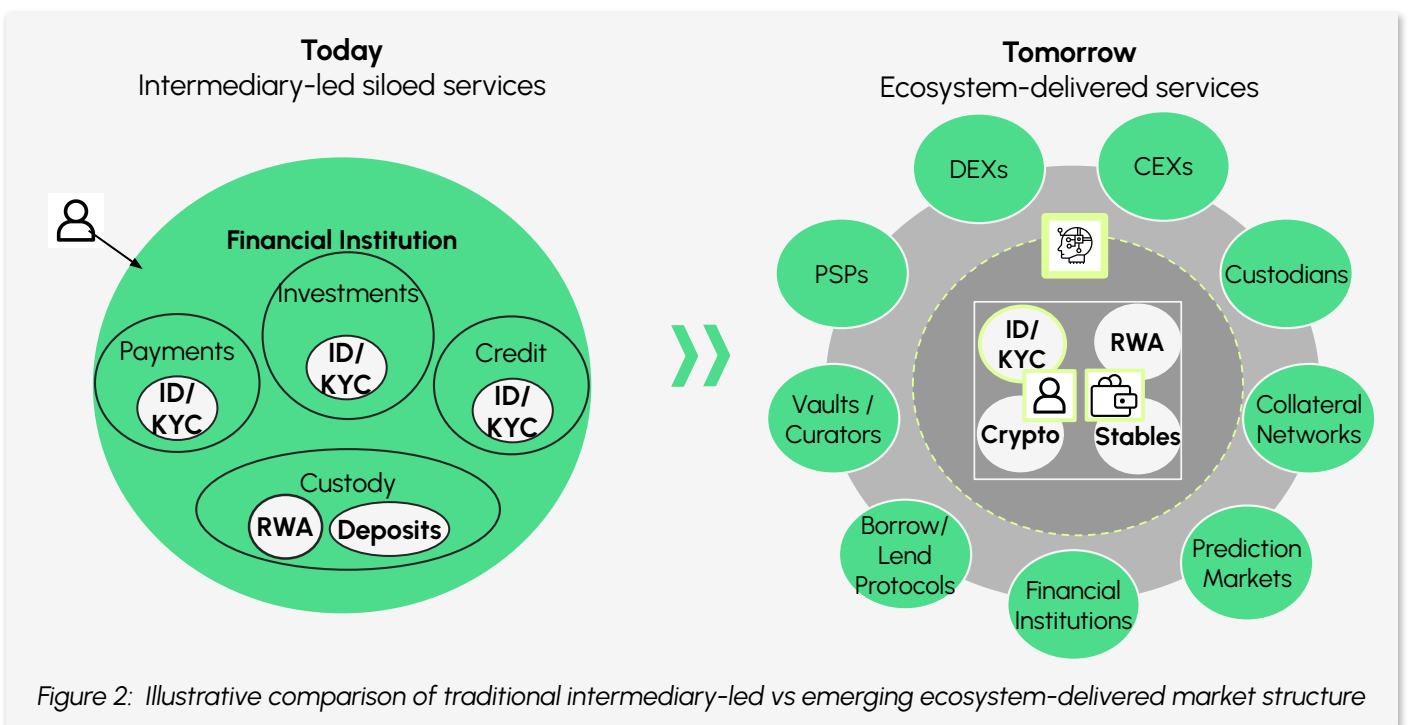


Figure 2: Illustrative comparison of traditional intermediary-led vs emerging ecosystem-delivered market structure

SECTION III

A New Ecosystem Operating Model

In a tokenized finance market structure, the fundamental parties to the regulated financial relationship have not changed. There is still an issuer who creates an asset and an investor who wishes to own it.

What tokenization changes — and what the new ecosystem can be designed to deliver — is two distinct but related things. First, the legal nature of ownership changes: from intermediated beneficial interests held in a custodian's name, to direct legal title recorded in a blockchain-based register maintained by the issuer directly or the issuer's digital transfer agent. Second, the operational infrastructure connecting issuer and investor becomes disaggregated and portable — no longer proprietary to a single custodial channel.

In the traditional model, the pipes were proprietary to the custodial intermediary: identity, settlement, and corporate action flows all ran through the same institutional channel, at the discretion of the institution that controlled it. In the tokenized model, those same flows can be disaggregated, standardized, and made portable — enabling investors to hold direct ownership and access new value propositions from their assets across an open ecosystem of providers.

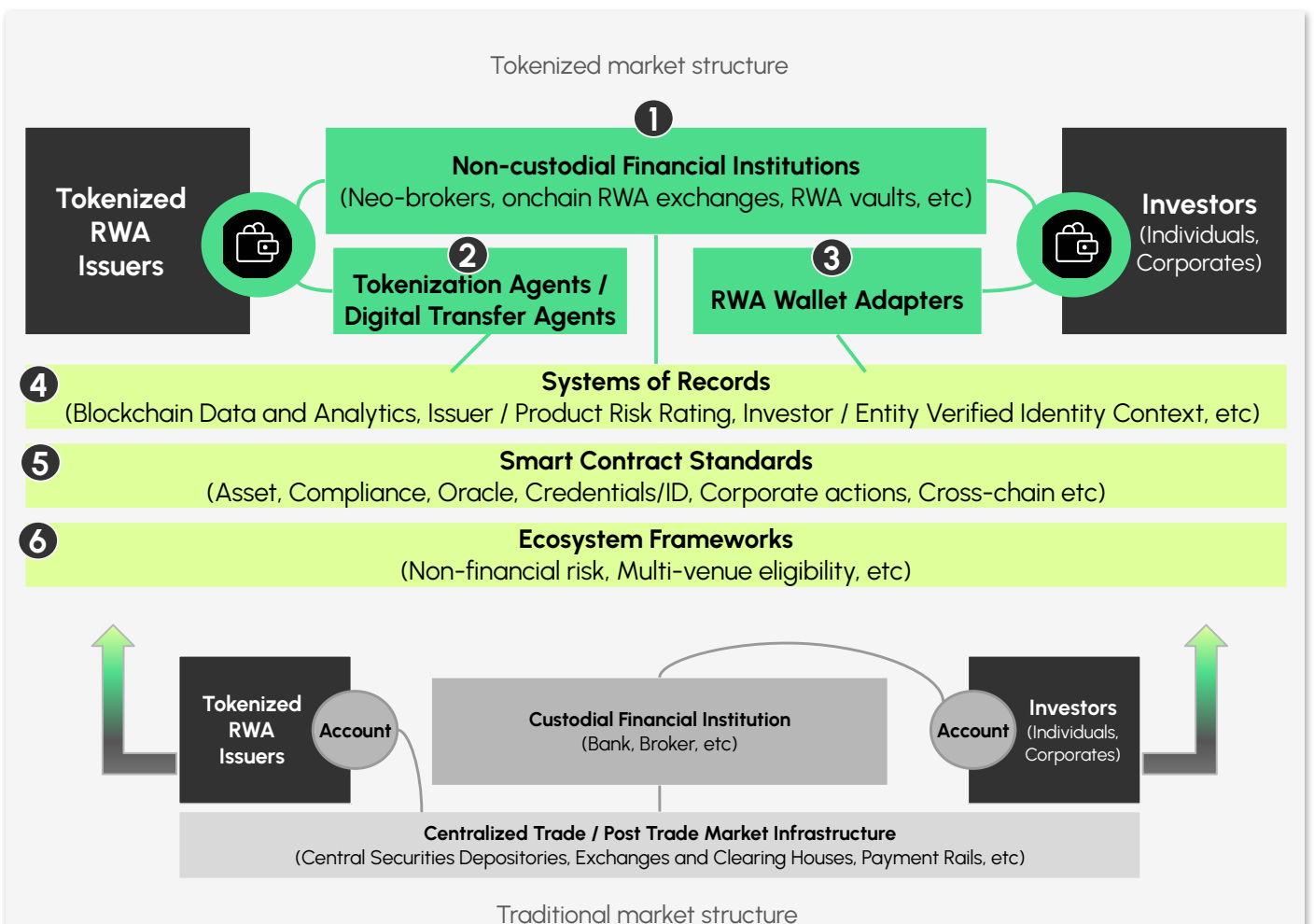


Figure 3: Evolution of traditional securities market structure (bottom) to tokenized market structure (top)

SECTION III

The Roles and Responsibilities in the New Ecosystem:

Making this operating model function requires a 3+3 architecture: Three New Roles, Three Rails.

Market Participants (Roles)

1 Non-custodial Financial Institutions

A new segment of regulated non-custodial financial institutions — neo-brokers, onchain exchanges, and managed vaults. Being non-custodial, their incentive structure is oriented toward connectivity rather than capture. Asset portability is the structural discipline: when custody cannot be used as a lock-in mechanism, competitive advantage must be earned through service, not friction. This creates competitive pressure that benefits investors directly, and it creates commercial incentives to participate in shared infrastructure and open standards rather than building proprietary silos.

2 Tokenization / Digital Transfer Agents

A new segment of issuer-facing service providers responsible for deploying, managing, and/or configuring the smart contract systems that underpin tokenized RWAs. Tokenization Agents and Digital Transfer Agents operate across the full asset lifecycle — coordinating mint/burn operations, configuring compliance engines, executing guided issuer-side verification of investor-portable identity credentials, integrating oracles, and orchestrating onchain corporate actions. This is made possible by tokenized RWA smart contracts' inherent technical design being directly callable from any participant's preferred wallet.

3 RWA Wallet Adapters

A new segment of non-custodial investor-facing service providers supplying tools needed to interact with feature-rich tokenized RWA smart contracts, and orchestrate identity context to meet compliance requirements in composable financial services use cases. RWA wallet adapters plug into investors' existing Web3 wallets to provide: portfolio analytics and interfaces for RWA token standards; workbenches to self-manage compliance and verification workflows — with verification outcomes owned by the investor and portable across adapter providers; programmatic capabilities for ecosystem discovery and onboarding.

Supporting Infrastructure (Rails)

4 Systems of Record

The underlying infrastructure that all other layers depend upon: transformed onchain data, issuer and onchain product risk analytics, identity verification, and legal entity frameworks (e.g., GLEIF-governed Global LEI System and vLEI ecosystem, including Official Organizational and Engagement Context Role credentials) that serve as authoritative systems of record for the data types required to satisfy various legal, regulatory, and compliance obligations in the delivery of financial service use cases. This layer is extensible by design — additional infrastructure can be plugged in as the ecosystem matures and new use cases emerge.

5 Onchain Standards

Standardized smart contract interfaces, protocol specifications, and interoperability frameworks governing all aspects of the tokenized RWA lifecycle — including, but not limited to: asset issuance and redemption requirements, compliance engines specifications, onchain ID and credential schemas, oracle integration standards, cross-chain interoperability specifications, and corporate action event formats. These standards define the interfaces and modular governance designs that participants can independently implement to improve composability.

6 Ecosystem Frameworks

Frameworks for institutions to manage ecosystem risk unique to operating on open shared infrastructure (i.e. public blockchains) and cross-institution interoperability. These include, but are not limited to, emerging industry-supported non-financial risk frameworks adapted for public blockchain ecosystems (like the industry-led Capital Markets Risk Mitigation Framework facilitated by GBBC and Oliver Wyman, which introduces novel risks of operating in public blockchain environments), multi-venue RWA listing and investor/wallet onboarding frameworks (like the GRADE Issuer-Venue Eligibility Framework).

CONCLUSION

Building Together

The promise of user-owned, ecosystem-delivered financial services is not a distant horizon.

The infrastructure required to fulfill it — regulated non-custodial institutions, onchain lifecycle automation, standardized identity verification infrastructure, context-rich onchain RWA accounts, and the risk and interoperability frameworks that govern them — is being built today. What has been missing is not the components, but the shift to an ecosystem-based operating model to connect them.

The coordination incentive is commercial. For issuers, composability is differentiation — a product usable across an open ecosystem accumulates AUM/volumes faster than one confined to a single venue. For investors, composability is choice — direct ownership with access to services not practical under custodial arrangements, and no structural lock-in. For the ecosystem of FIs, new service providers, and the standards and frameworks that support them — composability represents a new addressable fee pool created by the transformation from the current market structure to the new. The result is a compounding network effect: every new participant enlarges the opportunity for every other. This is not a coordination cost — it is a moat that deepens with adoption.

The next phase of institutional RWA growth will not be driven by issuance volume alone. It will be driven by the breadth of utility that issued tokens can provide once they are in investor hands. That utility depends on composability. Composability depends on ecosystem coordination. **That work begins here.**

Disclaimer

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