Rayls

Rayls litepaper

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info@rayls.com

https://rayls.com

1. Abstract

Financial markets need a new unified infrastructure that combines the scale, control, and privacy of TradFi with the programmability and liquidity of DeFi to unlock $100 trillion in financial assets and 6 billion users onchain.

Rayls is the financial assets chain ecosystem, designed to connect private, traditional finance chains with public DeFi markets through privacy-preserving, compliant, and high-performance infrastructure. Its multi-layer architecture of Privacy Nodes, Private Networks, and a Public Chain are underpinned by unique technologies of the Rayls Axyl consensus mechanism and private transactions using Rayls Enygma. This private-public architecture enables institutions to bring core operations onchain while unlocking deeper liquidity, new revenue streams, and global DeFi user access to regulated financial assets at scale.

To satisfy unmet market needs, Rayls' roadmap brings key innovations in institutional chain infrastructure, USD-pegged gas fees, fast deterministic finality, harmful MEV (Maximal Extractable Value) protection, privacy-preserving transactions, inherited Ethereum security, and onchain identity services, all powered by the RLS token (see section 3.3.2. Fixed and premium gas fees).

Rayls is already live in production with Núclea, the largest Financial Market Infrastructure provider in the Southern Hemisphere, and is bringing Cielo, the largest credit card acquirer in Brazil to production in Q4 2025. Rayls was recognised J.P. Morgan in their EPIC report, came in second place (out of ~70 entries) in the 2023 BIS G20 Tech Sprint.

Rayls' private-permissioned chains have already been installed in more than 25 large financial institutions around the globe, are already processing significant transaction volumes, and the project is soon to launch the Rayls L1 public chain to enable financial institutions and investors around the world to tokenise, distribute and buy yield bearing assets that align with their privacy, security and compliance requirements.

2. Introduction

Financial markets are at an inflection point.

Traditional finance (TradFi) infrastructure offers scale, governance, and well-understood risk management, but it is slow, siloed, and expensive. Settlement cycles can take days, cross-border transfers are cumbersome, and interoperability across systems and jurisdictions is minimal.

By contrast, decentralised finance (DeFi) brings programmability, global liquidity, and open access, yet it lacks privacy, compliance, and the regulatory safeguards necessary for institutional use at scale. The transparency that makes DeFi trustless also makes it unusable for financial institutions that cannot expose sensitive transaction data.

In response, institutions have experimented with permissioned blockchains to capture some of blockchain's benefits whilst maintaining control and confidentiality. These networks can provide privacy and custom governance, but they come at the cost of scalability and liquidity. Each permissioned ledger becomes a closed system, hindering interoperability and creating fragmentation across financial markets. Without connection to broader pools of capital and global distribution channels, the value of these networks is limited, and the risk of inconsistency or double spending across separate ledgers remains unresolved.

The result has been a patchwork of institutional pilots and isolated systems, but no unified infrastructure capable of bridging traditional finance with the programmability and liquidity of decentralised finance.

To adopt DeFi at scale, institutions need to satisfy their must-have requirements of scalability, control, compliance, privacy and low risk, all at the same time.

A bold new approach is needed. An approach that unites the best of TradFi and DeFi together, creating the next generation of tokenised financial market infrastructure that will bring TradFi's US$100T in liquidity (1) and 6 billion users (2) onchain into public DeFi.

For DeFi investors and users, this huge influx of institutional onchain activity, capital and customers will provide access to a wide range of new high-yield, low-risk financial assets, lower fees from deeper liquidity, and better customer service. For developers and DeFi projects, this will open up new B2B sales opportunities, improved customer experiences, and direct connectivity between onchain and offchain financial markets.

3. Rayls

Rayls is the financial assets chain ecosystem.

Rayls has been designed and built in collaboration with global financial institutions to tokenise assets privately, access public DeFi markets securely, and transact with other institutions and retail crypto users in a compliant manner. By bringing TradFi and DeFi into a single connected ecosystem, Rayls enables entirely new workflows, products, and value creation for all stakeholders.

For financial institutions, this means bringing their core operations onchain for real time settlement, deeper aggregated liquidity, compliant operations, access to new global investors and DeFi innovation.

For DeFi developers and DeFi retail users, this translates into a significant inflow of institutional capital, deeper liquidity with lower risk, and access to tens of millions of new customers each time a bank is onboarded. It also opens high-yield opportunities tied to regulated financial instruments that have never before been available to a global retail market.

To unite TradFi with DeFi within one ecosystem, Rayls brings the following innovations:

Rayls Privacy Node - an institution's own private, high-performance EVM chain to manage operations and connect to both private networks and public chains, bridging TradFi users and assets into DeFi.

Dollar-pegged gas fees – standard transaction fees pegged to USD, ensuring zero volatility for onchain transactions

Deterministic, fast finality – near-real time final settlement without risk of reorgs. Deterministic finality is required by institutions to operate at high frequency and scale.

Harmful MEV protection – protocol-level safeguards against harmful maximal extractable value (MEV), including encrypted mempools, batch transactions and fair ordering mechanisms.

Privacy-preserving transactions – EVM compatible transaction privacy with Zero-knowledge technology using Rayls Enygma, retaining user anonymity and confidentiality of transaction data with auditor selective disclosures.

Inherited Ethereum security – Rayls L1 is linked with Ethereum to prevent censorship, reduce downtime risk and inherit Ethereum's economic security.

Onchain identity services – improving onchain safety and supporting institutional compliance requirements, whilst retaining onchain anonymity.

All transaction activity across the Rayls ecosystem is underpinned by the Rayls tokenomics model, powered by the RLS token (see section 4. Tokenomics).

3.1. Architecture

Rayls satisfies both TradFi and DeFi requirements through a segregated but seamlessly connected ecosystem of chains and protocols. This architecture has been designed to provide each stakeholder with the right networks and tools to fully satisfy their needs, whilst seamlessly connecting them all together into one EVM

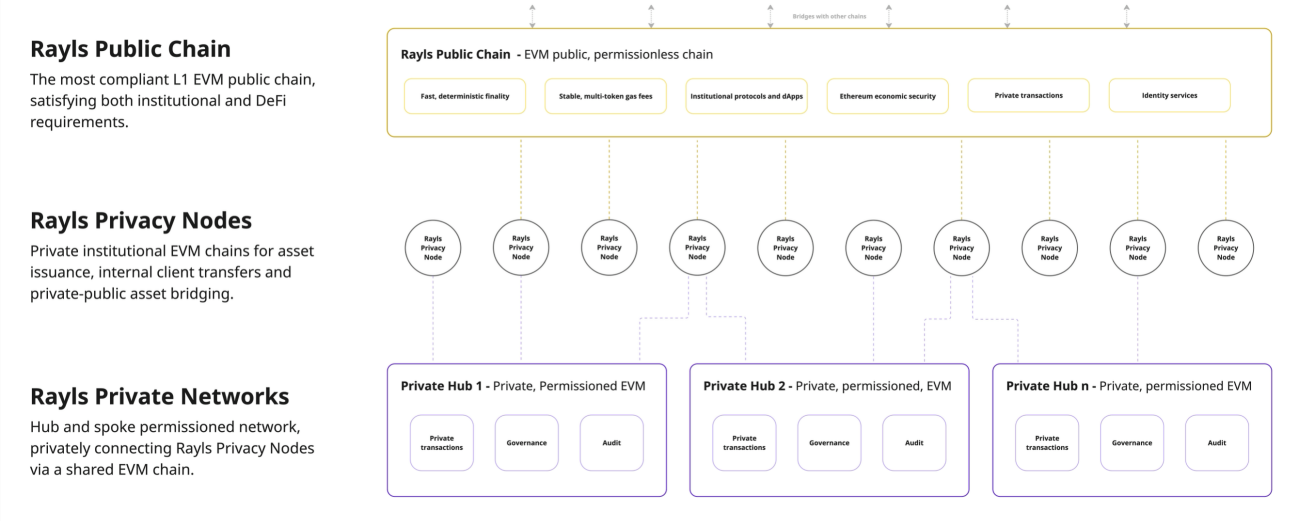

Figure 1: The Rayls ecosystem of Public Chain, Privacy Nodes and Private Networks

ecosystem to allow value to flow between private and public networks. See Figure 1.

The Rayls ecosystem is comprised of the following core products:

Rayls Privacy Node – A private EVM chain that is independently run inside each institution, used to issue tokenised assets and transfer them confidentially across millions of client accounts. Single-node, high performance, with enterprise-grade security. Each Privacy Node can be operated standalone or connected to one or more Private Networks and/or the Public Chain.

Rayls Private Network – Multiple Privacy Nodes can connect via a Private Hub chain into a permissioned hub-and-spoke network, providing privacy, governance, auditability, scalability and adherence to local regulations.

Rayls Public Chain – An EVM-compatible Layer-1 public chain, designed for institutional adoption while retaining the core principles of DeFi, including fixed gas fees, multi-token fee support (e.g. stablecoins, ETH and approved ERC-20 tokens), high throughput, permissioned validators, low costs, and private transactions via Rayls Enygma.

3.2. Technology

3.2.1. High performance core

The core of each Rayls product is comprised of a high-performance Reth execution client, which has been modified to use the RBFT (Rayls Byzantine Fault Tolerant) consensus mechanism initially, and to be upgraded with the novel Rayls Axyl consensus mechanism, which will deliver near-instant finality, sub-second block times and thousands of TPS. Reth has been selected for its speed, modularity, and compatibility with the Ethereum Virtual Machine (EVM).

Today, some of the Rayls products are based on Geth, an older yet popular, Golang based Ethereum client. We are in the process of switching away from Geth and use Reth across all Rayls EVM solutions, from the Rayls Privacy Node to the Rayls Private Network Hub and Public Chain. As such, the entire Rayls product suite is built on a single, unified EVM technology stack,

providing a consistent foundation across all products that simplifies composability, developer tooling and upgrades, but with specific customisations for each product to meet the unique requirements of its users.

Across the product suite, Rayls has been designed for exceptional developer experience. Complementing this modern, unified technology stack, Rayls provides a range of SDKs, APIs, libraries and guides to accelerate developer workflows and abstract complexity.

For the Privacy Node, operated by a single institution, the Rayls technology stack runs in a centralised, gasless configuration using a centralised Proof of Authority (PoA) RBFT consensus. Transaction fees are calculated and paid via an alternate method (see section 3.3.1. Rayls Privacy Node). This privately controlled implementation enables institutions to issue, manage, and govern assets on their own chain with ultra-low latency and zero transaction costs, making it perfectly suited for high-volume institutional workflows such as asset tokenisation, internal transfers and real-time compliance checks.

For the Private Network Hub, Rayls is configured to use a decentralised Proof of Authority (PoA) RBFT consensus model, enabling a group of trusted institutions to jointly operate and govern the network. Like the Privacy Node, these networks remain gasless (with fees paid via alternate method), reducing friction for institutional participants while maintaining a robust and censorship-resistant environment for transaction settlement. This setup is ideal for permissioned financial networks where institutions require transaction privacy, high volumes, complex multi-party workflow logic and fast finality.

On the Public Chain, Rayls will be deployed in a decentralised RBFT configuration, operated by a diverse set of validators who ensure the integrity and security of the global Rayls ecosystem via a Proof of Staked Authority (PoSA) consensus model. Standard transaction gas fees are fixed to USD and paid using the native gas token, supporting predictable costs and institutional adoption. This layer provides a transparent and compliant settlement environment, connecting private issuance and permissioned settlement networks to the broader public DeFi ecosystem. By sharing the same execution client and underlying architecture as the private layers, the Rayls Public Chain enables seamless asset portability, verifiable audit trails, and consistent developer experiences across all Rayls products.

While the initial versions of Rayls will use the RBFT consensus across all products, during 2026 Rayls will launch the Axyl consensus system, which will significantly improve scalability, decentralisation and performance (see Figures 2, 3 and 4 for prototype test results). All systems will be upgraded from RBFT to Axyl eventually, starting with the public chain.

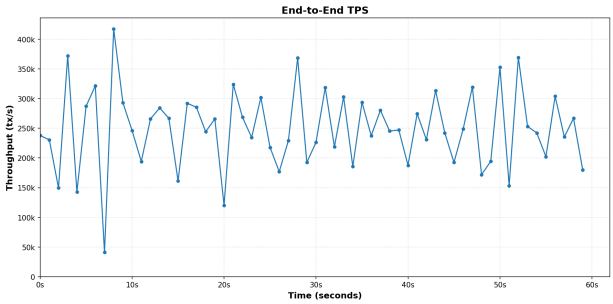

Figure 2: Chart showing transaction throughput performance test using Rayls Axyl consensus

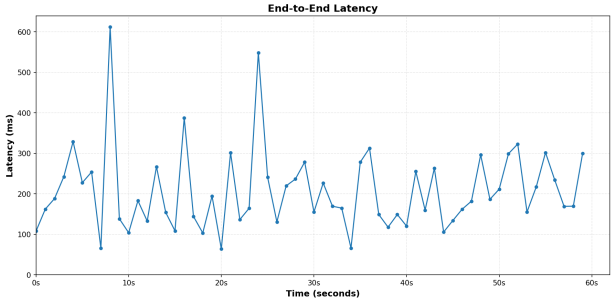

Figure 3: Chart showing transaction latency performance test using Rayls Axyl consensus

```
-----------------------------------------
 SUMMARY:
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 + CONFIG:
 Faults: 0 node(s)
 Committee size: 4 node(s)
 Worker(s) per node: 1 worker(s)
 Collocate primary and workers: True
 Input rate: 250,000 tx/s
 Transaction size: 512 B
 Execution time: 60 s

 Header size: 50 B
 Max header delay: 250 ms
 GC depth: 50 round(s)
 Sync retry delay: 10,000 ms
 Sync retry nodes: 3 node(s)
 Batch size: 500,000 B
 Max batch delay: 50 ms

 + RESULTS:
 Consensus TPS: 249,987 tx/s
 Consensus BPS: 127,993,343 B/s
 Consensus latency: 166 ms

 End-to-end TPS: 249,912 tx/s
 End-to-end BPS: 127,954,799 B/s
 End-to-end latency: 241 ms
-----------------------------------------
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Figure 4: Performance test summary of Rayls Axyl consensus prototype, reaching **250k TPS**

Through this modular yet unified design, Rayls delivers a cohesive multi-layer ecosystem, where institutions can scale from private, internal operations to global, public market interactions, all while operating on a single, deeply integrated technology stack. This not only reduces complexity but also ensures that every product in the suite evolves in lockstep, maintaining compatibility and performance as the ecosystem grows.

3.2.2. Onchain privacy

Privacy is a foundational requirement for the design and deployment of a blockchain ecosystem that combines TradFi with DeFi.

To succeed, the approach to onchain privacy must be robust and scalable, ensuring institutions retain their competitive advantages and meet their compliance requirements, while DeFi users preserve their anonymity and avoid censorship.

Rayls Enygma is a fully EVM compatible, next-generation quantum-private transaction protocol designed to deliver confidentiality, compliance, and performance for institutional DeFi. Conceived in close collaboration with major central banks and global commercial banks, Enygma was built to solve the dual challenge of providing regulators with the oversight they require while preserving the privacy and security demanded by financial institutions and their customers.

Rayls Enygma combines advanced cryptographic approaches to meet these requirements while delivering institutional-grade performance, including post-quantum authenticated key exchange (AKE), Pedersen commitments, zero-knowledge proofs (ZKPs), private information retrieval and ephemeral symmetric encryption keys per block.

For a technical explanation of Rayls Enygma, see the peer reviewed paper by Yaksetig et al, 2025 (**3**).

Enygma provides a powerful suite of privacy-first capabilities, with both anonymous and confidential transactions, atomic settlement for payments and delivery-versus-payment (DvP), and support for multiple token standards such as ERC-20, ERC-721, and ERC-1155. Its unique double-batching feature enables very high throughput with fast finality, delivering the speed and reliability needed for mission-critical financial applications at global scale.

Incorporating quantum-private cryptography, Enygma ensures that all private transactions remain secure not only today but also against the future threats posed by quantum computing, making it a future-proof foundation for digital financial infrastructure.

Enygma is currently implemented within the Rayls Private Networks, combining Privacy Nodes, where wrapped versions of assets are held and transacted privately, with a Private Network Hub, where the original underlying value is securely issued and managed within the Enygma smart contract. This design ensures that all confidential activity remains private on the nodes while the hub chain maintains a verifiable, regulator-accessible record of supply, transactions and balances.

In the coming months, Enygma will be brought to the Rayls Public Chain, enabling private transactions for institutions and, in future, for retail users.

3.3. Rayls differentiators

Rayls has worked closely with a range of TradFi and DeFi stakeholders to capture requirements, validate hypotheses, and identify the key features needed to unite these two worlds.

In addition to core essentials like EVM compatibility, low-cost transactions, verifiability, security, resilience and interoperability, Rayls delivers unique differentiators that meet institutional demands while preserving decentralisation.

These include the Rayls Privacy Node for confidential institutional workflows, fixed and premium gas fees for predictable costs and priority transactions, deterministic fast finality to eliminate settlement risk, and harmful MEV protection for fair markets. Rayls also provides privacy-preserving transactions via Enygma, Ethereum-inherited security, and onchain identity services, creating trusted infrastructure while preserving the core ethos of Web3 for the seamless convergence of TradFi and DeFi.

3.3.1. Rayls Privacy Node

Financial institutions face hurdles engaging with DeFi, as they rely on centralised, private systems with strict controls, full custody, privacy, and regulatory compliance. Blockchains, by contrast, emphasise transparency and decentralisation, which can lead to complexity, high fees, and missing features institutions consider standard. This clash creates adoption barriers: institutions want to retain control, privacy, custody, and compliance while gaining tokenisation, programmability, interoperability, and DeFi access.

The Rayls Privacy Node solves this by giving each institution its own independent EVM chain, deployed on-premises or in private cloud, with institutional-grade performance and seamless integration with existing systems.

All client data, transaction activity, and asset custody remain private to the institution, secured by enterprise-grade security and compliance controls, whilst providing a full EVM chain for tokenisation, programmable workflows, and secure onchain value transfer.

Privacy Nodes can also connect to Rayls Private Networks for private interbank transactions or to the Public Chain for compliant access to global DeFi. The result is the most institutionally aligned blockchain infrastructure: a high-performance, tokenised banking platform that bridges private TradFi liquidity and users into public DeFi markets in a fully compliant manner.

Within Rayls Privacy Nodes and Private Networks, transaction fees are fixed in fiat terms, ensuring predictable usage costs for institutions. Although denominated in fiat, these fees must be settled in RLS via a smart contract on the Rayls Public Chain. Every Privacy Node has a default link to the Public Chain and is incentivised to publish anonymised proofs of institutional activity, creating verifiable

"Proof of Usage" to provide public transparency of private chain usage.

The Privacy Node is live in production with leading institutions worldwide, generating hundreds of thousands of dollars in monthly transaction fees, with plans to open-source in Q1 2026.

3.3.2. Fixed gas fees

Rayls Public Chain introduces a gas fee model built for predictability, flexibility, and efficiency. Standard token transfers and trading fees are fixed in USD, removing volatility and slippage to provide cost certainty.

3.3.3. Deterministic, fast finality

Institutions require certainty, determinism, and atomicity. Every transaction must settle instantly and irreversibly, without risk of reversal from chain reorganisations or probabilistic consensus.

This deterministic finality is critical for compliance, reducing settlement risk, and optimising capital efficiency. In regulated markets, delayed or uncertain settlement increases counterparty exposure, capital buffers, and operational inefficiency, making it incompatible with modern financial standards.

Rayls solves this challenge across its product suite with its high-performance core built with the Reth execution client and its consensus mechanisms. Both RBFT and Axyl consensus mechanisms offer instant finality within one confirmed block.

Axyl in particular is designed for speed and determinism, delivering true "hard" finality in less than a second, rather than hours or days, as is the case with L2 rollup dispute windows. Combined with high throughput, this ensures atomic settlement of complex transactions without rollback risk, enabling institutions to process high-value transfers, tokenised asset issuance, and cross-network flows with the confidence required by global regulatory frameworks.

3.3.4. Harmful MEV protection

Maximal Extractable Value (MEV) is a major source of inefficiency and harm on public blockchains, where actors exploit transaction ordering for profit. Rayls prioritises market integrity, distinguishing constructive MEV, like arbitrage that improves liquidity, from harmful MEV, such as sandwich attacks, front-running, and toxic back-running, which erode trust and create settlement uncertainty.

To minimise harmful MEV, the Rayls Public Chain is working to provide:

- **Encrypted mempools** to hide transaction content pre-inclusion.
- **Batch transaction processing** into groups to reduce front-running opportunities.
- **Fair ordering mechanisms** with both RBFT and Rayls Axyl consensus, ensuring block proposers cannot arbitrarily reorder user flows.
- **Premium fee lanes** for transparent prioritisation of time-critical transactions.
- **Ethereum transaction inbox routing** (see section 3.3.6. Inherited Ethereum security) for guaranteed, censorship-resistant inclusion.

These measures give Rayls a fair, transparent, and predictable environment, preserving the benefits of constructive arbitrage while eliminating toxic MEV that has undermined trust in DeFi.

3.3.5. Privacy-preserving transactions

For financial institutions, privacy isn't optional, it's essential. Every transaction involves sensitive data and high-value transfers that must remain confidential to meet regulatory requirements and protect competitive advantage. Traditional permissioned blockchains attempted to address this by restricting participation, but most of these networks expose all transaction details to validators. True onchain EVM privacy, capable of institutional scale has remained elusive, until now.

Rayls has spent years tackling this challenge, working with central banks, global financial institutions and world-class cryptographers to design privacy solutions that combine confidentiality, compliance, and performance. The result is Rayls Enygma, a next-generation privacy protocol built using advanced cryptography (see section 3.2.2. Onchain privacy).

Rayls Enygma allows transactions to be validated without revealing critical details such as sender, recipient, or transaction value. By leveraging encrypted state commitments and zero-knowledge execution proofs, Enygma ensures that transaction integrity is mathematically guaranteed while keeping data fully confidential.

Optional selective disclosure and audit features allow institutions to provide verifiable proofs to regulators without compromising privacy for the rest of the network, striking the perfect balance between confidentiality and compliance.

Enygma aligns well to Vitalik's privacy roadmap for Ethereum (**4**), including shielded balances, private transfers, full EVM compatibility, no special wallets and real-world adoption. In other areas, Enygma has been purposefully tailored to meet the requirements of financial institutions, such as auditor selective disclosures and prioritising single-party throughput over multi-user proof aggregation. In future, Rayls will explore how Enygma can also support onchain privacy for retail users, aligning to the broader Ethereum roadmap.

Enygma is already live and in production across Rayls Private Networks, powering real-world use cases for leading institutions including the Central Bank of Brazil, JP Morgan, and other major banks. These deployments demonstrate that privacy can be delivered at scale without sacrificing interoperability or performance.

On the roadmap, targeting Q1 2026, Enygma will be available for institutional users on the Rayls Public Chain.

3.3.6. Inherited Ethereum security

Fully censorship-resistant chains like Ethereum prioritise openness and neutrality: anyone can transact, and transactions can't be blocked by any single party. This model provides strong guarantees for user autonomy, but it comes with trade-offs, such as high transaction fees, variable throughput, and slower finality, which make it less suitable for regulated institutions that need predictability, compliance, and performance.

On the other hand, independent L1s can optimise for speed, cost, and customisation, but they often lack the proven economic security of Ethereum and the escape hatches that guarantee censorship resistance or recovery during outages. For institutions, this creates risk: if the network fails, there's no external fallback; if governance misbehaves, users have limited recourse.

Rayls combines the best of both options, delivering the performance, compliance, and cost predictability institutions demand, while inheriting the censorship resistance, recovery assurances, and economic security of Ethereum that aligns with the core ethos of the crypto community.

To achieve this, the Rayls Public Chain plans to regularly post state root commitments (Merkle roots) to the Ethereum L1, ensuring that the canonical chain state is both available and secured by Ethereum's unparalleled economic security.

We support the decentralised ethos of censorship resistance and as such, we aim to provide mechanisms for transactions to be submitted even if attempts are made (by validators, users, or other actors) to prevent transactions from being confirmed.

3.3.7. Onchain identity services

Institutions face significant compliance challenges when engaging on public blockchains: anonymous users, dust attacks, contaminated funds, mixers, and transactions from sanctioned jurisdictions introduce unacceptable risk. Regulatory obligations like KYC, AML, CFT, and investor suitability are non-negotiable, yet public chains currently lack the infrastructure to enforce these requirements.

To stay compliant, institutions are limited to transacting with other regulated entities, their own customers, or users that have passed full KYC onboarding on compliant platforms. Current workarounds, such as dApps implementing their own KYC, are fragmented, inconsistent, and create barriers for interoperability.

Rayls addresses these challenges with onchain identity services, built on cryptographic attestations that can be independently verified by Rayls validators. This complements institutional processes while preserving EVM compatibility, user anonymity, and censorship resistance. The approach used depends on which counterparties are transacting:

1. Institution < > Institution: onchain KYB (Know Your Business) attestations enable counterparty verification without revealing sensitive details, enabling compliant liquidity, settlement, and interbank operations.

2. Institution < > Retail: Compliance is managed by dApps handling KYC and suitability, where standardised LayeredID user identity credentials can be used by dApp developers to streamline and control retail access to specific investment opportunities.

3. Retail < > Retail: Users can transact onchain without identity validation, but they are incentivised to add LayeredID credentials to access benefits like lower fees, higher yield, faster settlement, and priority transaction inclusion. Institutions can set baseline and conditional credential rules for which identity credentials they require from other users, dynamically tailoring their risk requirements without disrupting open access.

This approach reinforces regulatory compliance and reduces counterparty risk for institutions, while preserving DeFi's openness and usability, creating a trusted, flexible foundation for the future of finance on Rayls.

3.4. Market traction and use cases

3.4.1. Traction and growth strategy

Rayls is live in production today, delivering blockchain infrastructure to multiple regulated institutions. Privacy Nodes and Private Networks are already deployed with major financial entities, generating tens of thousands of dollars in monthly recurring transaction fees (see Rayls "Proof of Usage" dashboard).

Initially established in Latin America, one of the most active markets for digital asset innovation, Rayls has secured a strong foothold with leading

institutions and is now leveraging this success to expand globally, targeting other fast-moving emerging markets.

A selection of Rayls institutional engagements includes:

- Core settlement infrastructure for the Central Bank of Brazil's Drex CBDC program pilots I & II
- Live, production Rayls commercial receivables with Núclea (largest FMI in the Southern Hemisphere)
- Live, production Rayls platform for yield-bearing asset tokenisation with Cielo (largest credit card acquirer in Brazil)
- Several yet undisclosed projects with central banks and major Institutions globally.

This growth is backed by DeFi and institutional investors with deep expertise in finance and blockchain. Parfin, the core contributor to Rayls, is backed by leading venture capital firms including ParaFi Capital, Framework Ventures, Valor Capital Group and Borderless Capital. These investors provide both capital and strategic insight into regulated and decentralised financial ecosystems.

The Rayls ecosystem continues to scale rapidly. It now includes one of the largest institutional-crypto communities globally, with more than 340,000 users on the Rayls Testnet waiting list and over 300,000 community members across X and Discord. This fast-growing network demonstrates the market's demand for compliant, privacy-preserving blockchain solutions that bridge traditional and decentralised finance.

3.4.2. Rayls real-world financial asset tokenisation use cases

1. **Private issuance and distribution of yield-bearing financial assets**

With Rayls, institutions can issue and manage tokenised assets like credit receivables and loans in Privacy Nodes, transfer them privately via Private Networks, and distribute to DeFi through the Public Chain. Rayls is live with Núclea, Brazil's largest financial market infrastructure provider, registering over 10,000 assets weekly within a network processing 31B transactions and $4T annually, proving its institutional-scale tokenisation capability.

2. **Interbank settlement using tokenised deposits, stablecoins and CBDCs**

Rayls has developed a wholesale settlement between central and commercial banks with strong compliance and auditable privacy controls. Rayls has been selected by the Central Bank of Brazil for the Drex CBDC program, deploying Rayls within the Central Bank and 16 of the country's largest banks to deliver private, secure and interoperable digital currency infrastructure.

3. **Cross-border payments using tokenised deposits and stablecoins.**

Rayls enables banks to tokenise deposits for near-instant, compliant FX and cross-border settlement, integrating with RTGS and legacy systems. Using Privacy Nodes, institutions run end-to-end workflows on private networks with stablecoin settlement on the Public Chain, as shown in Mastercard's Start Path program.

4. **Privacy-preserving settlement and delivery-versus-payment (DvP).**

Rayls Enygma enables confidential, EVM-native settlement for payments and asset swaps, combined with selective regulatory disclosure.

These capabilities have positioned Rayls as a trusted privacy and identity layer for institutional tokenisation stacks, as recognised in Project EPIC from Kinexys by J.P. Morgan (see page 33).

3.4.3. An experienced TradFi and DeFi leadership team

The core contributors of Rayls blend deep TradFi expertise with world-class blockchain and cryptography talent:

- **Marcos Viriato (CEO, Co-founder):** 25+ years in banking; ex-Deputy COO & CTO at BTG Pactual (LatAm's largest investment bank).
- **Alex Buelau (CPTO, Co-founder):** 20+ years in engineering; serial blockchain founder; ex-Global Product Director at Siemens.
- **CH Lopes (COO):** 21+ years in banking; ex-Head of Operations at BTG Pactual.
- **Dr Jacob Mendel (Co-CTO):** 20+ years in cybersecurity/DLT; ex-J.P. Morgan DLT Executive Director; ex-State Street Head of Cryptography; 23 patents.
- **Jiten Varu (Head of Growth):** 20+ years in tech & blockchain; ex-Head of Digital Assets at AWS.
- **Peter Bidewell (Head of Product):** 15 years in finance & 11 in DLT; led global digital asset, CBDC products for the UAE and Brazil central banks; ex-R3, ex-Accenture.
- **Mario Yaksetig (Head of Research):** 15 years in applied cryptography; BIS Tech Advisor; research cited by Vitalik Buterin.

Together, this team blends deep banking experience with crypto-native execution to deliver the next generation of tokenised financial market infrastructure uniting TradFi and DeFi.

4. Tokenomics

4.1. Token utility

The Rayls tokenomics have been designed to incentivise value to flow from TradFi into DeFi, while sustainably compensating institutions, developers, validators, DeFi investors and users for their network contributions.

At the heart of the Rayls ecosystem is the RLS token, which powers the entire Rayls ecosystem across Privacy Nodes, Private Networks and the Public Chain.

The core functions of the RLS utility token are:

- **Staking** – Rayls Public Chain validators must stake RLS to participate in the security of the Rayls system. This work includes: participating in the RBFT/Axyl network consensus to validate Rayls Public Chain transactions, and validating zero-knowledge proofs for Privacy Node transactions and onchain identity services, supporting ecosystem integrity. In return for securing the network, validators receive compensation in RLS. A slashing mechanism will enforce honest behaviour.
- **Transaction fees** – Transactions in both Privacy Nodes and by users on the Rayls Public Chain generate transaction fees that must be settled in RLS. Users on the public chain pay USD-pegged fees in a stablecoin with all payments being converted automatically into RLS for settlement. This means every transaction across the Rayls ecosystem, whether institutional or retail, directly increases demand for RLS, and that demand scales with overall network activity.
- **Governance** – All RLS holders can propose and vote on protocol upgrades, grant programs, and key parameters like validator thresholds and emission schedules. Voting impact is proportional to the number of RLS held by a user.

4.1.1. Tokenomics flywheel

These RLS utility functions power the following flywheel:

1. Institutional and user transactions create demand for RLS, as transaction fees must be settled in RLS
2. RLS is therefore purchased on the open market to settle transaction fees
3. The protocol automatically burns 50% of the RLS fees, and allocates the other 50% to the Network Security Pool to pay validators and providers for securing the network.
4. Greater validator compensation deepens liquidity and network performance
5. More usage → more staking → more demand - reinforcing the cycle

4.2. Deflation mechanism and distribution

For every transaction on both Rayls public chain and private chains, 50% of the RLS received by the system is automatically burned. The other non-burned 50% is sent to the Rayls Network Security Pool to automatically compensate validators for securing the network and to develop the ecosystem.

Mathematically, this can show be shown as:

$$S_{\text{after}} = S_{\text{before}} - 0.5f$$

Where:

S_{before} = RLS in circulation before the transaction

f = RLS fee generated by the transaction

S_{after} = RLS in circulation after the transaction

The more transaction fees generated on Rayls, on either the public chain or permissioned chains, the more RLS is automatically burned.

RLS supply is fixed at a maximum of 10 billion RLS tokens, meaning no new RLS tokens can be minted. Coupled with this automatic burning mechanism, RLS usage increases scarcity, creating deflation within the RLS token economy.

Once total RLS supply reduces to less than 70% of the original fixed supply (10 billion RLS), a governance decision will be voted upon by token holders to maintain or change the percentage of RLS fees burned per transaction.

The result: higher network activity → more RLS burned → lower circulating supply over time.

4.3. Initial token allocation and vesting

RLS has a fixed supply of 10 billion tokens. The initial allocation is structured to promote decentralisation, with all strategic investors and core contributors subject to 4-year vesting schedules. Ecosystem growth, validator support, and user incentives are funded from the Rayls Foundation Treasury.

Rayls has a working token economy that reflects the real-world activity flowing through the protocol. Every RLS token used is tied to usage, performance, and trust in the system. The initial distribution of the token reflects the commitment to the external community and ecosystem.

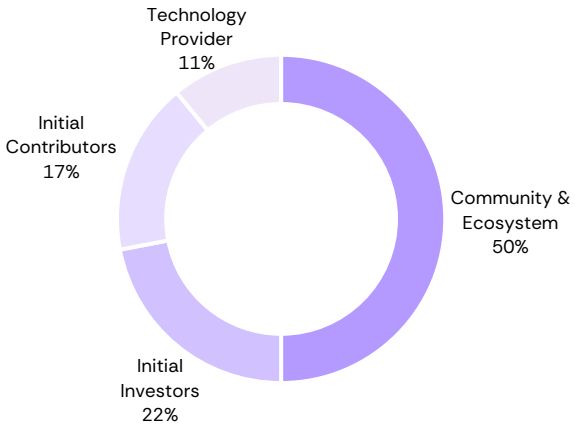
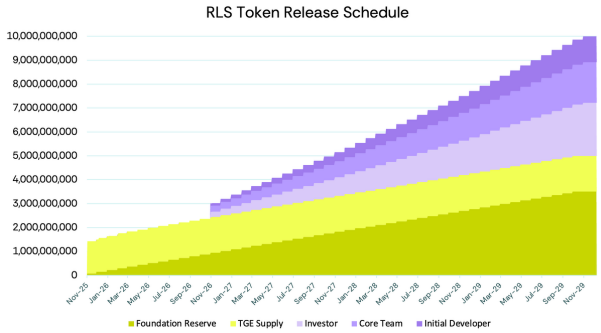


Figure 5: RLS distribution

4.3.1. Token vesting schedule

To ensure long term incentives and sustainable ecosystem growth, the unlock schedule for the investor, developers and team allocation of RLS is as follows:



4.3.2. Network bootstrapping

The Rayls Foundation will utilise reserves of RLS to catalyse growth and adoption through:

Developer grants and bug bounty program: allocate significant grants and bug bounty initiatives to

incentivise innovative DeFi protocols, onchain services and a secure ecosystem.

Liquidity provisioning: allocation of RLS to support market depth and settlement efficiency, ensuring institutions can seamlessly acquire the utility tokens required for network access.

Strategic partnerships: incentivise pivotal partnerships with leading financial institutions, DeFi protocols, dApps to drive transaction volumes, onchain liquidity and user adoption.

Network Bootstrapping: foster active network participation through user acquisition initiatives, governance facilitation, and adoption programs designed to accelerate the testing and utilisation of protocol features.

5. Roadmap

Rayls has been in active development for several years, with its first Private Network going live with a major financial institution in June 2024. Through extensive consultation and requirements gathering, Rayls has achieved strong product-market fit for its Privacy Nodes and Private Networks while aligning the Public Chain to satisfy the requirements of both TradFi and DeFi users.

The Rayls Steam Public Testnet has been live since June 2025, with significant capability upgrades coming in the Maglev Testnet release. See Figure 3 for a high-level overview of the upcoming Rayls roadmap.

5.1. Accelerating the flywheel

To drive adoption and network effects over the coming months, Rayls will prioritise:

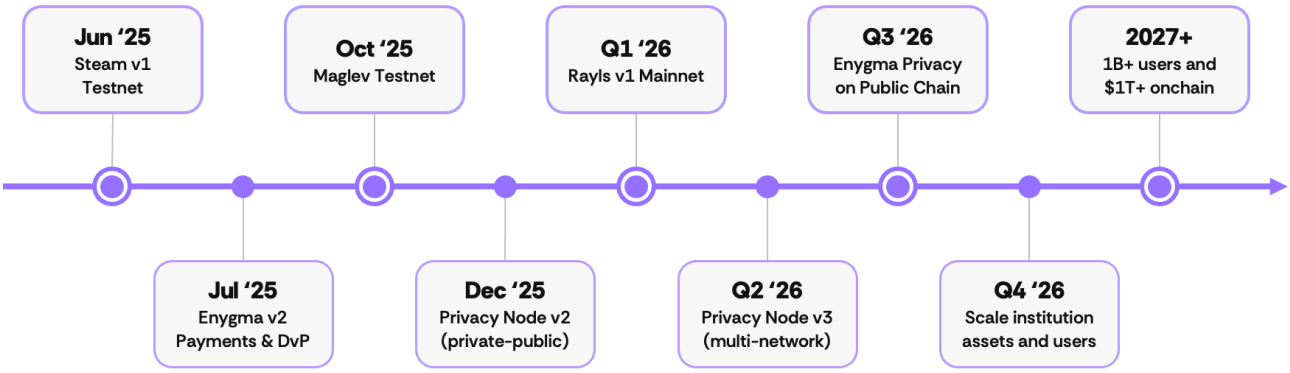
Product excellence – deliver all must-have requirements with standout features, simple adoption, and low operating costs, ensuring Rayls is the clear choice for institutions.

Institutional deployment of Privacy Nodes – engage institutions to install and actively use Privacy Nodes, building network density by connecting them to both Private Networks and the Public Chain, while increasing awareness and intent.

Frictionless onboarding – create or partner on essential tools and primitives that enable institutions to onboard quickly and with minimal barriers.

High-value use cases – focus on the highest value use cases, leverage Rayls' differentiated capabilities, and collaborate with partners to deliver packaged solutions that accelerate institutional time-to-value.

Vibrant DeFi community – cultivate a committed community of DeFi investors, protocol developers, users, and token holders to grow a thriving and sustainable token economy.



6. Conclusion

Rayls provides a clear pathway to unite TradFi and DeFi into a new tokenised financial infrastructure, bringing trillions of dollars and billions of users from traditional finance onchain. Every design choice has been made to satisfy the needs of all stakeholders within the ecosystem without compromise, delivering the must-have requirements of regulated financial institutions while preserving the core principles of censorship resistance, decentralisation, and open innovation.

Rayls is already live in production, being used at scale by large, global financial institutions, with a clear roadmap to launch the Rayls Public Mainnet and accelerate global adoption over the coming months.

Beyond standard blockchain capabilities, Rayls combines nuanced user insights to deliver differentiated value with the Rayls Privacy Node, USD-fixed gas fees, deterministic finality, harmful MEV protection, privacy preserving transactions, inherited Ethereum security, and onchain identity services.

These capabilities are powered by a high-performance modular infrastructure built on Reth and the novel Rayls Axyl consensus mechanism, delivering institutional-grade throughput, security, and resilience across seamlessly connected private and public chains. Rayls Enygma delivers onchain privacy at scale, meeting the performance and compliance requirements of regulated financial institutions.

The Rayls product suite connects private asset issuance, permissioned institutional settlement networks and a global public chain into a next-generation financial ecosystem, enabling assets and users to flow freely, while ensuring regulated entities meet their regulatory requirements.

This new financial market infrastructure is underpinned throughout by the RLS token, cultivating a thriving token economy that aligns economic incentives for everyone in the Rayls community: institutions, developers, validators and retail users.

7. References

(1) *McKinsey Global Institute, "The Future of Capital Markets," 2023*.

(2) World Bank. (2025). *The Global Findex 2025*. [Online] Available at: https://www.worldbank.org/en/publication/globalfindex [Accessed 10 September 2025].

(3) Yaksetig, M., Pereira, P., Yang, S., Nejadgholi, M. and Xu, J., 2025. *Rayls II: Fast, private, and compliant CBDCs*.

(4) Buterin, V. (2025). *Vitalik Buterin: Ethereum's roadmap and the future of blockchain*. YouTube. Available at: https://www.youtube.com/watch?v=oCANLFSCPq8 (Accessed: 10 September 2025).