



Ri-Nn (RIN)

WHITEPAPER

The Native Coin of Ri-Nn Chain

EVM-Compatible Layer 1 Blockchain for IoT/DePIN

209

CHAIN ID

3 sec

BLOCK TIME

30B RIN

MAXIMUM SUPPLY

Version 1.02

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00 Important Notice

Technical and informational document

This whitepaper describes the architecture, economics, current implementation status of Ri-Nn Chain and its native coin, RIN. It is not an offer to sell securities, a solicitation to invest, or a promise of profit or return.

Ri-Nn Chain is an evolving software protocol. Features described as planned, under development, or future-phase functionality - including Proof of Things (PoT), native PoT reward emission, bridge functionality, and IoT attestation - may change before implementation. Protocol parameters may also be revised where required for security, supply integrity, operational resilience, or legal and regulatory compliance.

Digital assets and blockchain networks involve material risks, including software defects, cybersecurity incidents, network disruption, validator failure, market volatility, regulatory change, loss of credentials, and third-party service failure. Users are responsible for evaluating these risks and for complying with applicable laws in their jurisdictions.

No statement in this document should be interpreted as a guarantee of exchange listing, market liquidity, price, reward, profitability, availability, or future functionality. References to rewards describe protocol mechanics or development targets, not investment returns.

This English-language document is the official Ri-Nn whitepaper for Version 1.00. Official resources should be verified through the domains listed in Section 13.

Document Status

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Core distinction

RIN is the native coin of Ri-Nn Chain. Ri-Nn Chain uses QBFT Proof of Authority for consensus. Proof of Things (PoT) is a separate lightweight verification and attestation layer performed by physical Ri-Nn Nodes; PoT Nodes are not validator nodes.

02 Executive Summary

Ri-Nn Chain is an EVM-compatible Layer 1 blockchain designed to connect conventional blockchain execution with a future network of compact physical devices and signed real-world data. RIN is the native coin of Ri-Nn Chain and is used for network gas, validator economics, and ecosystem functions.

The Mainnet uses Hyperledger Besu with QBFT Proof of Authority consensus. The current production configuration targets a three-second block period and four validators. EIP-1559 fee mechanics are enabled: the base fee is burned and the priority fee is paid to the block proposer.

Ri-Nn Chain was launched with a genesis allocation of 10,000,000,000 RIN and a maximum supply of 30,000,000,000 RIN. The difference between the genesis supply and the maximum supply is reserved for protocol-defined emissions, including validator rewards and the Things (PoT) mechanism. The project does not intend to rely on unrestricted discretionary administrator minting.

Phase 2 is designed to integrate Ri-Nn Node, an ultra-compact physical device, into a protocol named Proof of Things (PoT). PoT is not the consensus mechanism of Ri-Nn Chain: block consensus remains QBFT Proof of Authority. PoT is an additional verification and attestation layer in which registered physical devices perform low-compute chain-related tasks, sign the results with device-specific keys, and receive protocol-defined RIN rewards after successful verification.

10B RIN	30B RIN	0.01 RIN
GENESIS SUPPLY	MAXIMUM SUPPLY	VALIDATOR / BLOCK

Current implementation status

- Ri-Nn Chain Mainnet is operational with four QBFT validators and three-second block production.
- Public JSON-RPC is available at rpc.ri-nn.io with a deliberately restricted API surface.
- Ri-Nn Scan, powered by a customized Blockscout deployment, is available at scan.ri-nn.io.
- MetaMask compatibility has been confirmed through successful EIP-1559 transactions on Mainnet.
- Proof of Things (PoT) functionality, including native PoT reward emission, is a Phase 2 development objective and is not represented as complete in this version of the whitepaper.

03 Vision and Design Principles

Ri-Nn is being developed around a simple progression: establish a reliable EVM-compatible Layer 1 network, connect physical devices to that network through Proof of Things (PoT), and extend the same device identity and signed-attestation architecture toward IoT and machine-originated data. The long-term objective is a verifiable path from physical devices to signed data and Ri-Nn Chain.

3.1 Three-phase architecture

Parameter	Value
Phase 1 - Blockchain Core	Ri-Nn Chain Mainnet/Testnet, validators, RPC infrastructure, explorer, operational security and public network interfaces.
Phase 2 - Proof of Things (PoT)	Integration of Ri-Nn Node into a lightweight verification and attestation protocol using registered device identity, challenge-response signatures, protocol-defined rewards, and native RIN Batch Emission.
Phase 3 - Data Infrastructure	Extension of the PoT identity and signed-attestation model to IoT and sensor-data attestation, anchoring, and other machine-originated information.

3.2 Design principles

- EVM compatibility: use mature Ethereum tooling, wallet interfaces, and developer conventions wherever practical.
- Protocol transparency: make supply, reward rules, public RPC parameters, and explorer data independently observable.
- Separation of roles: validator nodes, public RPC nodes, explorer RPC nodes, physical PoT Nodes, reward services, and reward wallets have distinct roles and security boundaries.
- Physical identity without wallet custody: a device identity key is separate from a user-controlled reward wallet key.
- Progressive decentralization and extensibility: start with a controlled validator architecture while keeping application and device layers modular for future expansion.
- Meaningful device work: PoT is intended to perform verifiable chain-related or data-attestation tasks rather than function as a simple heartbeat or ping.

04 Ri-Nn Chain

Ri-Nn Chain is an EVM-compatible Layer 1 blockchain. Applications can use familiar Ethereum-style accounts, transactions, JSON-RPC methods, smart contracts, and wallet integrations while operating on a dedicated network with RIN as the native gas currency.

4.1 Mainnet parameters

Parameter	Value
Network name	Ri-Nn Chain
Chain ID	209 (0xd1)
Native coin	Ri-Nn
Symbol	RIN
Decimals	18
Client	Hyperledger Besu 26.7.1
Consensus	QBFT Proof of Authority
Block period	3 seconds
Validator set	4 validators in the current production configuration
EIP-1559	Enabled
Initial base fee	100,000,000 wei (0.1 Gwei)
Block gas limit	30,000,000
Public RPC	https://rpc.ri-nn.io
Explorer	https://scan.ri-nn.io

4.2 Testnet parameters

Parameter	Value
Network name	Ri-Nn Testnet
Chain ID	219 (0xdb)
Native test coin	tRIN
Environment separation	Mainnet and Testnet are operated as separate environments with separate validator infrastructure.

4.3 Public interface separation

The Mainnet public RPC intentionally exposes a limited Besu API surface for ordinary wallet and application use. Administrative or high-cost namespaces such as QBFT, TXPOOL, DEBUG, and TRACE are not exposed through the public endpoint. Explorer indexing uses a separate internal RPC interface with the additional methods required by Blockscout.

05 RIN Native Coin

RIN is the native coin of Ri-Nn Chain. It is not an ERC-20 token deployed on another blockchain. RIN exists at the protocol level and is used by the network in the same general way that native assets are used on other EVM-compatible Layer 1 networks.

5.1 Intended utility

- Gas payment for transactions and smart-contract execution on Ri-Nn Chain.
- Validator economics, including protocol-defined block rewards and priority fees.
- Proof of Things (PoT) protocol rewards for eligible Ri-Nn Nodes in Phase 2.
- Application and ecosystem utility developed on top of Ri-Nn Chain.
- Potential future bridge, liquidity, device-service, and IoT-related use cases, subject to implementation and security review.

5.2 Fee mechanics

Ri-Nn Chain uses EIP-1559-style transaction fee mechanics. The base fee is burned, reducing the circulating supply by the amount of base fees consumed, while the priority fee is paid to the block proposer. This creates a direct protocol-level relationship between network usage and RIN supply.

No guaranteed economic return

RIN utility and protocol rewards should not be interpreted as a guarantee of price appreciation, liquidity, profitability, or any fixed investment return.

06 Supply and Emission

10,000,000,000	30,000,000,000	20,000,000,000
GENESIS INITIAL MINT	MAXIMUM SUPPLY	MAX. FUTURE EMISSION ENVELOPE

The genesis state allocated 10 billion RIN. The maximum protocol supply is 30 billion RIN. Accordingly, up to 20 billion RIN may be emitted after genesis under protocol-defined mechanisms. The intended design is not to provide an unrestricted administrator with discretionary minting authority.

Current emission mechanisms include validator block rewards and Proof of Things (PoT) rewards. PoT is designed to use protocol-defined native RIN emission rather than discretionary transfers from an administrator wallet. Any future emission mechanism must be constrained so that aggregate issuance across validator rewards, PoT rewards, and any later protocol mechanisms cannot exceed the 30 billion RIN maximum supply.

6.1 Validator emission

The current validator block reward is 0.01 RIN per block. At a nominal three-second block period, the theoretical maximum is approximately 288 RIN per day and approximately 105,120 RIN per 365-day year before considering any network interruptions or future protocol changes.

6.2 Proof of Things (PoT) emission

The initial Phase 2 design target is 0.07 RIN per successful PoT task, with a maximum of one rewarded task per hour and 24 rewarded tasks per day per eligible Node. The target reward rate decays by 4% on the first day of each month at 00:00:00 UTC. The production design is intended to calculate rewards centrally from protocol rules, batch verified reward events, and mint native RIN directly through a constrained Ri-Nn Besu extension. The exact activation block, batch limits, and final implementation details will be established only after Testnet validation.

07 Genesis Allocation

The 10 billion RIN genesis supply was allocated across ten designated addresses. Each category received 1 billion RIN, representing 10% of the genesis supply.

Allocation	Genesis address	RIN	Share
Treasury	0x87A301B2CBc4cE82EdF600b06DDa649BCe0c014a	1.0B	10%
Community	0xEc7aE974eB02EC1d9bCa16C69F58c46C0FC11BA0	1.0B	10%
Ecosystem	0xa8f827A9eba2782251FEb48Dde9aD8C16D6E0215	1.0B	10%
Liquidity	0xF7D4b401443cD9d87d4a42036E3af6acaa8A84a5	1.0B	10%
Market Making	0x7A62Ba1A7895F780d3181a22B8718878215e83d3	1.0B	10%
Validator Reserve	0x9e64C2c9E6cf7640D65cF23086145A2CB9eC0510	1.0B	10%
Marketing	0xC2c5975D11331f372f3461629D97c1596836046D	1.0B	10%
Development	0x791937448b70437A805f6CB0B2D742F816910f88	1.0B	10%
Partnership	0x84DC33f72A12F2195021eb02312B71F0E025F909	1.0B	10%
Exchange Listing Reserve	0xB1DB5cDC7704dD3348385F0730d0e9e90d79D321	1.0B	10%

Genesis allocation addresses are included for transparency and can be independently verified against Ri-Nn Chain. Address ownership, custody arrangements, transfer policies, and downstream use may be subject to separate operational controls and disclosures.

7.1 Genesis integrity

Parameter	Value
Genesis SHA-256	1a744d7beb37f20b3a26ad316ced7c3bfb2e42d1616708377eb429244ec71691
Static nodes SHA-256	ced17e4e12b417b6c9cd634fa978a80ee5dc44ae9307d190163ae68b3c0fc9e2
Operational policy	The production Mainnet genesis is treated as immutable and is not to be regenerated as part of normal operations.

08 Validator Economics

Ri-Nn Chain currently operates QBFT Proof of Authority with four validators. Validators participate in consensus and block finalization. This role is distinct from Proof of Things (PoT). PoT Nodes do not propose or

finalize blocks, and the absence of PoT signatures does not stop block production. PoT provides an additional verification and attestation layer above the core consensus system.

Parameter	Value
Consensus	QBFT Proof of Authority
Current validators	4
Block period	3 seconds
Block reward	0.01 RIN per block
Base fee	Burned
Priority fee	Paid to block proposer
Public validator admin APIs	Not exposed through the public RPC endpoint

8.1 Economic separation from Ri-Nn Node

Validator block rewards compensate consensus participation at the blockchain infrastructure layer. PoT rewards are intended to compensate successful verification or attestation work performed by registered physical Ri-Nn Nodes. The two reward systems are economically and operationally distinct.

8.2 Network observability

Validator rewards and transaction activity are intended to be observable through Ri-Nn Scan. The explorer infrastructure uses an internal RPC with trace capabilities so that internal transactions and protocol reward information can be indexed without exposing those high-cost APIs publicly.

09 Ri-Nn Node and Proof of Things (PoT)

Ri-Nn Node is a compact physical device under development for integration with Ri-Nn Chain. In Phase 2, the device participates through Proof of Things (PoT), Ri-Nn Chain's lightweight verification and attestation protocol for physical devices. A PoT Node is not a full validator and does not participate in QBFT block consensus. Its role is to receive a verifiable task or challenge, perform a bounded computation, sign the result with a device identity key, and submit the signed result for verification.

9.1 Current hardware baseline

Parameter	Value
Device	Ri-Nn Node
Product dimensions	Approximately 19 x 19 x 4 mm
Dock	USB-C + pogo pin interface
Confirmed functions	Dock power supply, firmware writing, LED operation, wireless communication
Onboarding	Smartphone-assisted Wi-Fi provisioning via Bluetooth or a comparable local setup channel

9.2 PoT parameters

Parameter	Value
Frequency	Up to one rewarded PoT task per hour
Daily maximum	24 rewarded PoT tasks per Node
Initial target reward	0.07 RIN per successful PoT task
Monthly decay	4%
Decay timing	First day of each month at 00:00:00 UTC
Status	Phase 2 PoT design target; not represented as completed functionality in Version 1.00

9.3 Candidate PoT tasks

- Verify a recent block header against a trusted challenge specification.
- Confirm the existence or specified properties of a transaction.
- Verify a Merkle proof or other compact cryptographic inclusion proof.
- Respond to a validator- or server-issued challenge with a device-signed result.
- Compare a specified smart-contract state value against an expected challenge condition.
- Perform a compact consistency check on data produced by another registered Node.

The first production PoT task type will be deliberately narrow. It should be feasible on hardware, meaningful to the chain, straightforward for the verifier to check, and resistant to forgery or replay. The initial implementation will complete one end-to-end path - Registration -> Challenge -> Signature -> Verification -> Reward - before additional task types are introduced.

9.4 Identity architecture

A Node identity is separate from the user's reward wallet. Each physical device is intended to have a unique device identity and public key, potentially provisioned during manufacturing or activation. The device private key is used to authenticate PoT results and should never be reused as a user wallet private key. The reward address can therefore be changed independently of the hardware identity, subject to authenticated account controls and effective-time history.



Security boundary

Node private key != user wallet private key. The device signs PoT results with its device identity key; it should not need custody of the user's wallet secret.

10 PoT Reward and Native Emission Architecture

The PoT reward architecture is designed around native RIN protocol emission. A successful PoT result is first verified by the PoT service layer. Verified events are accumulated into reward batches. An authorized Reward Authority submits each batch through a dedicated System Reward interface, and a small Ri-Nn-specific Besu extension applies the protocol-defined native balance changes. The Reward Authority is intended to submit rule-compliant batches; it is not intended to have discretionary power to mint arbitrary amounts.

10.1 Solo Mining

1. Ri-Nn Node obtains a valid PoT challenge or task.
2. The device performs the task and signs the result with its device identity key.
3. The PoT verifier checks Node identity, signature, challenge validity, timing, replay status, and task result.
4. A successful result creates a protocol-defined reward event that is included in a Reward Batch.
5. At batch execution, native RIN is minted directly to the user-designated Reward Address, without first passing through a Ri-Nn X payout wallet.

10.2 Pool Mining

6. A successful PoT result creates the same protocol-defined reward event used by Solo Mining.

7. For Pool Mining, the Reward Address for the relevant Node points to a designated pool reward address.
8. Native RIN is minted to the pool reward address through the same Reward Batch process.
9. Ri-Nn Mining records the corresponding user-level reward balance in its internal accounting system.
10. When the user requests withdrawal, RIN is transferred on-chain from the pool payout mechanism to the user wallet.

Under the current operating concept, Pool Mining uses pooled reward custody and user-level internal accounting, while Solo Mining routes protocol emission directly to a user-designated wallet. Availability of either mode may vary by jurisdiction, customer type, legal review, and operational policy. The technical implementation is designed so that a Node can use either mode by changing its authenticated reward destination without changing the PoT verification logic.

10.3 System Reward Contract, Besu extension, and Batch Emission

Verified PoT reward events are intended to be aggregated into periodic Reward Batches, initially on an hourly cycle. A dedicated System Reward interface will accept a signed batch identifier and reward entries. Ri-Nn's Besu extension will recognize only valid protocol reward calls and apply native RIN balance increases to the specified addresses. This design avoids one reward transaction per Node per hour while preserving address-level reward attribution. Batch size may be split across multiple transactions where required by block gas limits.

10.4 Protocol safeguards

The PoT emission path is intended to enforce, at minimum, an authorized Reward Authority, unique batch identifiers, duplicate and replay rejection, protocol-derived reward amounts, timing and daily limits, and a global supply-cap check. The implementation must reject any PoT emission that would cause aggregate native RIN supply to exceed 30,000,000,000 RIN.

10.5 Reward Authority

The Reward Authority is an operational submitter, not a discretionary mint administrator. Its role is to submit PoT Reward Batches produced by the verified reward engine. A valid authority signature alone is not intended to bypass protocol rules, reward schedules, duplicate protections, or the maximum-supply constraint.

11 Security Architecture

Ri-Nn Chain uses layered separation between consensus, public access, indexing, device identity, and reward operations. The objective is to minimize the consequences of compromise in any single component and to keep privileged interfaces away from the public network surface.

11.1 Mainnet infrastructure separation

- Validators operate on private network segments and are administered primarily through AWS Systems Manager Session Manager rather than public SSH exposure.
- The public RPC endpoint exposes ordinary ETH, NET, and WEB3 APIs only.
- Explorer indexing uses a separate non-public RPC with the additional namespaces required for indexing and trace retrieval.
- The explorer, RPC, and validator roles are operated as separate service components rather than a single public node.

11.2 PoT anti-replay controls

- Unique challenge nonce and PoT task / approval identifier.
- Explicit challenge expiry.
- Server-validated timestamp window.
- Device signature verified against the registered public key.
- Node ID bound to each accepted challenge.
- Server-side and protocol-side enforcement of no more than one rewarded PoT task per hour and 24 per day per eligible Node.
- Duplicate-result detection and replay rejection.

11.3 Physical-device and Sybil controls

The target model is one unique Node identity per physical Ri-Nn Node. The Node Registry is expected to maintain fields such as node ID, public key, serial identifier, status, owner reference, reward address, activation status, firmware version, and reward mode. Manufacturing-time or activation-time provisioning is intended to make large-scale software-only identity cloning materially harder.

11.4 Operational hardening

Ongoing Phase 1 hardening includes rate limiting and WAF evaluation, monitoring and alerting, database backup strategy, secret rotation, container image pinning, and reduction of unnecessary host-published ports. Before PoT native emission is activated on Mainnet, the Ri-Nn-specific Besu build will be validated on Testnet and deployed to Mainnet validators by rolling update. Protocol activation is intended to occur at a predetermined future activation block only after all validators are running the compatible software, allowing Mainnet to continue without regenerating genesis or requiring a full-network stop.

12 Roadmap

The roadmap is organized around implementation milestones rather than fixed promises of delivery dates. Items described below may change in sequencing or detail as security, performance, legal, and operational requirements are validated.

Phase 1 - Core blockchain and public infrastructure

- Ri-Nn Chain Mainnet and Testnet environments.
- QBFT validator operation and stable block production.
- Public RPC and internal explorer RPC separation.
- Ri-Nn Scan / Blockscout indexing and branding.
- Operational security, backups, monitoring, rate limiting, and remaining infrastructure hardening.
- Public chain registry preparation and ecosystem metadata.

Phase 2 - Proof of Things (PoT)

- Node Registry, device registration workflow, and device public-key provisioning.
- First production PoT task type and end-to-end Registration -> Challenge -> Signature -> Verification -> Reward flow.
- Reward calculation engine, monthly 4% decay, hourly cadence, and 24-per-day limit.
- System Reward interface, Reward Authority, Reward Batch generation, and Ri-Nn Besu native-balance extension.
- Solo Mining direct-to-wallet native RIN emission and Pool Mining pooled reward accounting.

- Testnet protocol validation followed by rolling Mainnet validator upgrade and activation-block deployment.
- Firmware, Node API, Ri-Nn Mining integration, monitoring, replay protection, physical-device identity controls, and Sybil resistance.

Phase 3 - IoT and sensor data infrastructure

- Use the PoT identity and signed-attestation model for temperature, humidity, power-consumption, machine, and device-status data where appropriate.
- Device-origin data attestation and blockchain anchoring.
- Reusable identity and signature architecture for machine-generated information.
- Application-layer tools for consuming, validating, and referencing device attestations.

Implementation discipline

Phase 2 will begin with a single PoT task type and complete the full Registration -> Challenge -> Signature -> Verification -> Reward path before broadening the task catalog.

13 Official Resources and Verification

Users, exchanges, developers, and service providers should use official Ri-Nn domains when verifying network parameters or accessing public infrastructure.

Resource	URL
Official RIN portal	https://coin.ri-nn.io
Mainnet explorer	https://scan.ri-nn.io
Mainnet public RPC	https://rpc.ri-nn.io
Official assets CDN	https://assets.ri-nn.io
Official Minig	https://mining.ri-nn.io

13.1 Wallet network parameters

Parameter	Value
Network name	Ri-Nn Chain
RPC URL	https://rpc.ri-nn.io
Chain ID	209
Currency symbol	RIN
Block explorer URL	https://scan.ri-nn.io

13.2 Reference Mainnet transaction

Parameter	Value
Transaction hash	0x61d1ba16936a1cf168efe1c72f9d8714a59ca75fe97cab2b58f8ab26d6bfb625
Block	20928

Parameter	Value
Transaction type	EIP-1559 Type 2
Status	Successful

This transaction is provided as a historical reference demonstrating a successful Mainnet transaction during the early operating phase. Current chain data should always be verified directly through the explorer.

14 Risk Factors and Disclaimer

Participation in, development for, or use of Ri-Nn Chain and RIN involves significant technical, operational, legal, regulatory, market, and cybersecurity risks. The following list is non-exhaustive.

- Software risk: blockchain clients, smart contracts, APIs, wallets, bridges, explorers, and device firmware may contain defects or vulnerabilities.
- Consensus and infrastructure risk: validators, networking, cloud services, or critical dependencies may fail or become unavailable.
- Key-management risk: loss, theft, or compromise of private keys can result in irreversible loss of assets or control.
- Market risk: RIN may experience extreme volatility, limited liquidity, or no market at all. Exchange listing is not guaranteed.
- Regulatory risk: laws and regulatory interpretations applicable to blockchain networks and digital assets can change materially across jurisdictions.
- Third-party risk: wallets, exchanges, bridges, hosting providers, analytics services, and other external systems can fail or be compromised.
- Protocol-change risk: network parameters, reward mechanics, interfaces, and planned features may be modified to address security, supply, operational, or legal requirements.
- Device risk: physical Nodes can be damaged, modified, cloned, disconnected, or subjected to attacks that require additional anti-fraud controls.

14.1 No investment promise

Nothing in this whitepaper constitutes investment, legal, tax, accounting, or financial advice. No representation is made that acquiring, holding, using, validating, earning, transferring, or otherwise interacting with RIN will generate profit or preserve value.

14.2 Forward-looking statements

This document contains statements regarding planned and future technology, including Proof of Things (PoT), native PoT reward emission, System Reward interfaces, Ri-Nn-specific Besu extensions, Solo Mining, Pool Mining, bridge functionality, wallet integrations, IoT attestations, and ecosystem services. These statements describe development objectives rather than guarantees of implementation, timing, availability, regulatory treatment, economic value, or commercial success.

14.3 Version control

Ri-Nn X may publish updated versions of this whitepaper. The official RIN portal should be used to identify the current version. In the event of inconsistency between an outdated copy and a newer officially published version, the newer officially published version should be treated as the current project description.



Ri-Nn

The Native Coin of Ri-Nn Chain

<https://coin.ri-nn.io>