Glcoin

A Permanent Proof Network

Trust Infrastructure · Not Speculation

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Abstract

The digital world faces a fundamental trust crisis. As AI-generated content becomes indistinguishable from human-created work, as identity fraud proliferates, and as document provenance becomes impossible to verify with confidence, the world urgently needs new infrastructure — not a payment system, but a proof system.

Glcoin is that infrastructure: a blockchain designed from the ground up for permanent, immutable verification of digital facts. Unlike networks that prioritize financial speculation, Glcoin prioritizes accountability, provenance, and permanent proof. Every participant is known. Every record is immutable. Every document anchored becomes legally and cryptographically undeniable.

1. The Trust Crisis

The internet was built without a native mechanism for truth. When a document is sent by email, there is no reliable way to verify it has not been altered. When a photograph appears online, there is no proof of when or where it was taken. When a contract is signed, the digital signature can be copied, replayed, or denied. And now, with the rise of large language models and generative image systems, even human authorship has become questionable.

These are not theoretical problems. Every day:

- Deepfake images and videos destroy reputations and manipulate public opinion
- AI-generated text is presented as original research or journalism
- Legal documents are backdated and digital timestamps are easily forged
- Certificates, diplomas, and identity documents are fabricated at scale
- Supply chain records are manipulated to conceal fraud or safety violations
- AI models are trained on undisclosed data with no traceable lineage

Traditional solutions — certificate authorities, notaries, audit firms — are centralized, expensive, and prone to corruption or coercion. A notary can be bribed. A certificate authority can be hacked. An audit firm can be pressured. What is needed is a system where **nobody has the power to lie retroactively**, and where anyone can independently verify any claim without trusting any single party.

2. Vision: The Permanent Proof Network

> *"A blockchain is, at its core, a time-stamping machine. Each block contains a cryptographic commitment to everything that came before it, making retroactive modification detectable and practically impossible."*

Glcoin leverages this property for one specific purpose: **permanent, verifiable proof**. The network is not designed to replace financial systems. It is designed to replace the need for trust in any centralized authority when verifying digital facts.

The key insight is that *what gets recorded matters as much as how*. Glcoin is designed so that:

- Any digital fact — a document hash, an identity claim, a timestamp, an event record — can be permanently anchored to the chain
- The anchoring cannot be reversed, altered, or denied by any party
- Any third party can verify the proof independently, without trusting any central authority, at any time in the future
- The record persists for as long as the network exists, independent of any company, government, or individual

This transforms Glcoin from a "currency" into **trust infrastructure** — a public utility for permanent proof that is as open and accessible as the internet itself.

3. Technical Architecture

3.1 Network Parameters

Glcoin operates on a dedicated peer-to-peer network with the following parameters:

PARAMETER	VALUE
P2P Port	1618
RPC Port	1617
Native address prefix (bech32)	gc
Example address	gc1q…
Genesis block hash	6e605c9c…
Target block time	~10 minutes
Proof-of-Work algorithm	SHA-256d

The use of unique ports (1618, 1617) and a dedicated address prefix (`gc`) ensures that Glcoin nodes cannot be confused with or accidentally interact with other networks, preventing cross-chain contamination of proof records.

3.2 Block Structure

Each Glcoin block contains:

- **Block header**: previous block hash, Merkle root of all transactions, timestamp, difficulty target, nonce
- **Coinbase transaction**: validator reward plus proof fee collection
- **Proof transactions**: `OP_RETURN` outputs embedding document hashes and attestation records
- **Standard transactions**: GLC transfers for network operation costs

The Merkle tree structure ensures that any individual proof transaction can be cryptographically proven to be included in a specific block without downloading the entire blockchain (simplified payment verification / SPV proofs).

3.3 Proof Ledger Design Principles

Unlike blockchains optimized for payment throughput, Glcoin's protocol is designed around three core principles:

1. **Permanence first**: full nodes are incentivized to maintain complete chain history; pruned nodes are not recommended for proof infrastructure

2. **Proof density**: each block can contain thousands of individual proof anchors at minimal cost per proof
3. **Verification efficiency**: SPV proofs for any anchored document are compact, fast, and do not require trust in any relay node

4. The Proof Protocol

4.1 Anchoring a Document or Digital Fact

To permanently prove that a document or dataset existed in its exact form at a specific point in time, a participant follows this process:

1. **Hash the document**: produce a SHA-256 hash of the file or data (e.g., `a3f8c2d1…`)
2. **Embed the hash on-chain**: submit a transaction containing `OP_RETURN <hash>` as an unspendable output
3. **Await block confirmation**: the transaction is included in a block with a specific block height and network timestamp
4. **Store the receipt**: the transaction ID, block height, and Merkle proof form a compact Permanent Proof Receipt

The resulting receipt proves, to any third party at any future time, that:

- The exact document existed at or before the block's timestamp
- The document has not been altered since anchoring (any modification produces a different hash)
- No central authority can revoke, alter, or deny this record

4.2 Trustless Verification

Verification requires no account, no API key, and no trust in any single party. Any verifier — anywhere in the world, at any time — can:

1. Hash the document independently using standard SHA-256
2. Query any Glcoin full node or block explorer for the transaction
3. Confirm the hash matches and the block is part of the canonical chain
4. Verify the Merkle proof without trusting the queried node

> *This is the fundamental value proposition: trustless verification by any party, at any time, anywhere in the world — without intermediaries.*

4.3 Identity Proof Extension

Beyond documents, Glcoin supports identity attestation. A verified identity record links a Glcoin address (cryptographic identity) to a real-world identity verified through the KYC process. The on-chain attestation, signed by an authorized verifier, creates **accountable digital identity**: not anonymous, not invasive, but verifiably real and permanently recorded.

5. The Validator Network

5.1 Block Validators — Not Miners

Glcoin deliberately uses the term *block validator* rather than *miner*. Validators are not competing to solve arbitrary mathematical puzzles for financial reward alone — they are performing the critical work of validating, permanently recording, and securing proof records for the entire network.

This distinction reflects Glcoin's core purpose: the network exists to provide permanent proof infrastructure, not to distribute speculation rewards. Validators who understand and accept this responsibility are the foundation of the system's integrity.

5.2 The Approved Validator Program

Running a Glcoin block validator requires approval through the on-chain Miner Registry protocol. This creates a network where every block has a known, accountable validator:

1. Submit a Glcoin address, a real-world identity via KYC, and a public display name
2. Pass review by the Glcoin network authority
3. Receive an on-chain approval signed by the authority with a time-windowed signature

Validators who behave maliciously or incompetently can be suspended or permanently revoked — and the revocation is itself an immutable on-chain record. This is not censorship; it is accountability infrastructure. The ledger is public. The proofs are verifiable by anyone. The people securing the network are known and responsible.

5.3 Miner Registry Protocol

The registry is maintained on-chain via the following RPC commands:

```
registerminer  <address> <kyc_id> <display_name>   # Application
approveminer   <address> <authority_sig>              # Approval
revokeminer    <address> <authority_sig> [reason]     # Permanent revocation
suspendminer   <address> <authority_sig> <until_ts>  # Temporary suspension
```

Authority signatures are time-windowed with 1-hour validity to prevent replay attacks. The signing message format is: `GLCOIN-MINER-{ACTION}:{address}:{hour_epoch}`

6. Running a Node: RaspiBlesk

Glcoin's philosophy of accessible infrastructure extends to node operation. **RaspiBlesk** is an open-source, one-click node deployment system designed for Raspberry Pi hardware, making it possible for anyone to run a full Glcoin node at home for approximately €75 in hardware cost.

6.1 What RaspiBlesk Provides

- **Glcoin full node**: complete blockchain validation and proof anchoring capability
- **Lightning Network node**: LND and Core Lightning support for second-layer payment channels
- **Electrum server**: electrs and Fulcrum for lightweight wallet connectivity
- **Web interface**: browser-based node management, no command line required

6.2 Supported Hardware

PLATFORM	ARCHITECTURE	STATUS
Raspberry Pi 4 / 5	arm64	Primary support
x86-64 desktop / server	amd64	Full support
Other ARM64 SBCs	arm64	Community support

7. Use Cases

7.1 AI Output Provenance

Any organization producing AI-generated reports, analyses, or creative works can anchor each output's hash on Glcoin at generation time. Clients and regulators can independently verify that a specific report was produced on a specific date and has not been altered — even if the producing organization were to be acquired, shut down, or compromised.

7.2 Legal Document Certification

Law firms, notaries, and contract parties can replace expensive traditional notarization with Glcoin proof anchoring. A contract signed at a specific timestamp with a known hash is permanently recorded in a specific block. No notary can be bribed, coerced, or destroyed. The proof persists independently of any institution.

7.3 Supply Chain Audit Trails

Every step in a supply chain — raw material sourcing, manufacturing batch records, quality certification, shipping manifests — can be anchored on Glcoin. Consumers, regulators, and insurers can independently verify the complete, unalterable provenance of any product without relying on any single company's records.

7.4 Academic and Research Integrity

Researchers can anchor preprint hashes before formal submission, permanently establishing priority of discovery. This protects against plagiarism claims, retroactive data manipulation, and disputes over intellectual precedence — even if the original publication platform ceases to exist.

7.5 Identity Attestation Services

Glcoin's identity layer enables privacy-preserving verification: "this address is controlled by a real, verified person in a specific jurisdiction" — without revealing the person's name publicly on-chain. The attestation record is immutable; the personal details remain off-chain with the KYC provider.

8. Roadmap

Glcoin is built in stages. Each version delivers something real before the next begins.

PHASE	FOCUS	STATUS
v1	Permissioned Foundation — verified participants produce blocks; off-chain IPFS storage; KYC miner registry	Delivered
v1.5	Trusted Content Infrastructure — verified, identified IPFS nodes onboarded; content layer operational	In progress
v2	Blockchain as Content Index — any transaction anchors an IPFS CID on-chain; documents permanently notarized	Current
v2.5	Structured Data Layer — machine-readable records anchored permanently (receipts, contracts, KYC attestations)	Planned
v3	Archive Network — universities, libraries, certified custodians as archive nodes; active preservation	Planned
v3.5	Proof of Authority — verifier rotation replaces PoW; instant, deterministic, provably green block production	Planned
v4	Decentralized Trust Infrastructure — W3C DID, programmable content contracts, AI provenance, cross-chain oracle	Planned

9. Conclusion

The internet's original design assumed trustworthy participants. That assumption has failed at scale. Every layer built on top of it — social media, cloud storage, digital contracts, AI systems — inherits the same fundamental problem: there is no native mechanism for permanent, verifiable truth.

Glcoin does not attempt to restore trust through centralized authority. It provides the infrastructure for **trust that requires no authority at all**.

A document anchored on Glcoin is permanently, publicly, independently verifiable. An identity attested on Glcoin is permanently accountable. A validator participating in Glcoin is permanently identified. This combination — cryptographic permanence plus real-world accountability — creates a new primitive for the digital world.

> **The age of deniability is ending. Glcoin is the infrastructure for what comes next.**

Glcoin Core Team

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