Glcoin

A Permanent Proof Network

Trust Infrastructure · Not Speculation

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Abstract

The digital world faces a fundamental trust crisis. As SI-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 block producer is known. Every record is immutable. Every anchored document can be verified cryptographically by anyone, without trusting the party that anchored it.

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
- SI-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
- SI 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**: block reward plus the transaction fees of the block, paid to the approved miner
- **Proof transactions**: `OP_RETURN` outputs embedding document hashes, site anchors and registry records
- **Standard transactions**: GLC transfers; transaction fees are paid in GLC

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 keep the complete chain history; pruning is possible but not recommended for proof infrastructure
2. **Proof density**: a hash anchor is a transaction of about 165 virtual bytes, so one block (at most 1,000,000 virtual bytes) can hold about 6,000 anchors
3. **Verification efficiency**: SPV proofs for any anchored document are compact, fast, and do not require trust in any relay node

3.4 Reference Implementation: Glcoin Core

The reference implementation is **Glcoin Core**, released under the MIT licence. Version 0.3.0 unites the node, the Qt 6 graphical wallet (`glcoin-qt`), the command-line client, the unit and functional tests and the documentation in one source tree. It changes no consensus rule of the main chain. With the wallet enabled, the node offers 202 RPC commands in 13 groups, among them the miner registry, the IPFS content layer, site anchors, encrypted content and ISO 20022. Binaries and sources are published at glcoincore.org.

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, the block, and the Merkle proof of inclusion (`gettxoutproof`, checked with `verifytxoutproof`) form a compact 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 (planned)

Today, the identity of every block producer is established through the KYC step of the miner registry (section 5). An extension to ordinary addresses is planned: a verified identity record would link a Glcoin address to a real-world identity verified through KYC, attested on-chain by an authorized verifier — **accountable digital identity**: not anonymous, not invasive, but verifiably real. This is not part of Glcoin Core 0.3.0; it belongs to the Structured Data Layer of the roadmap (section 8).

4.4 Site Anchors and Private Anchors

Beyond single document hashes, an owner can anchor the IPFS content identifier (CID) of a whole site with `createsiteanchortx`. Every node keeps a site index with one current record per owner (`listglcsites`, `resolveglcsite`). A node running with its own Kubo daemon pins the content of a site anchor as soon as the block carrying it is connected, and catches up on anchors it missed at regular intervals (`repinglcsites` does the same on demand).

An anchor can also be marked **private** (`private=true`). Nodes and the site gateway then never fetch, pin or list its content by themselves. What private does not mean: the anchor is an ordinary transaction output — its CID, its owner address and its time remain readable in the chain for good, and anyone who can reach the content by other means can fetch it with that CID.

5. The Validator Network

5.1 Block Validators — Not Miners

Glcoin deliberately uses the term *block validator* rather than *miner*. Today, blocks are still found by proof-of-work (SHA-256d), but only by miners approved in the registry: anonymous hash power cannot produce a valid block. Their role is not a race for reward but the accountable work of validating, permanently recording, and securing proof records for the entire network. Replacing proof-of-work by signed block rotation among approved validators is planned (roadmap v3.5).

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: a registry transaction sent by the network authority

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 (pending)
approveminer   "address"                            # Approval
renewminer     "address" new_expires_at             # Extend an approval
suspendminer   "address" until_timestamp            # Temporary suspension
revokeminer    "address"                            # Permanent revocation
listminers     ( "status" )                         # Read the registry
getminerinfo   "address"                            # One miner's record
```

An application is public and needs no signature. Approval, renewal, suspension and revocation are **GLCM registry transactions**: an `OP_RETURN` output carrying the action and the miner's key hash. A node accepts such a transaction only if it spends from the current authority address, and every node updates its registry when the transaction is mined. On the main chain, only approved miners may produce blocks from block 1111 on. Since block 5000 (GLCMv2) the authority address itself can be rotated by an on-chain transaction, so the loss of one key does not require a hard fork.

6. Running a Node: RaspiBlesk

Glcoin's philosophy of accessible infrastructure extends to node operation. **RaspiBlesk** is an open-source build system for the Raspberry Pi: it takes a plain Raspberry Pi OS and installs, configures and connects a complete node on the device, so that anyone can run a full Glcoin node at home (raspiblesk.org).

6.1 What RaspiBlesk Provides

- **Glcoin full node** (Glcoin Core 0.3.0): complete blockchain validation and proof anchoring capability
- **IPFS content layer**: a local Kubo daemon that holds the off-chain content behind on-chain anchors
- **Lightning Network node**: LND and Core Lightning support for second-layer payment channels
- **Electrum server**: electrs and Fulcrum for lightweight wallet connectivity
- **Explorers**: a mempool explorer and an RPC explorer, both showing the on-chain miner registry
- **Web interface**: browser-based node management, no command line required

RaspiBlesk builds the node from source on the device itself. During installation and updates it fetches the sources from IPFS first, then from the project's forge, then from upstream, and compares checksums in every step.

6.2 Supported Hardware

PLATFORM	ARCHITECTURE	HOW
Raspberry Pi 4 / 5 (Raspberry Pi OS 64-bit, Debian 13)	arm64	RaspiBlesk
Linux desktop / server (Debian 12)	amd64	Glcoin Core binaries (glcoincore.org)
Linux, Windows	amd64	Glcoin Core built from source

7. Use Cases

7.1 SI Output Provenance

Any organization producing SI-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 complement traditional notarization with Glcoin proof anchoring; whether an anchor is accepted as evidence depends on the jurisdiction. 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 (planned)

With the planned identity extension (section 4.3), Glcoin could support 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 would be immutable; the personal details would remain off-chain with the KYC provider.

7.6 ISO 20022 Payment Records

Financial institutions can link payment messages to the chain. The node stores records about ISO 20022 messages and links an on-chain commitment to its record by content ID; a registry maps LEI, BIC and DTI identifiers to Glcoin addresses. The accompanying gateway accepts pacs.008, pacs.009 and pain.001 messages that are valid against the official ISO 20022 schemas and returns pacs.002, pacs.004 and camt.053 messages that are valid against them. Schema validity is not full conformance: usage guidelines such as CBPR+, HVPS+ or SEPA are not checked, and the currency code `GLC` is not part of ISO 4217.

8. Roadmap

Glcoin is built in stages. Each version delivers something real before the next begins. Status as of November 2026; the live status is on the glcoin.org home page.

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. The glcoin.org seed node runs its own IPFS daemon; a registry of verified IPFS operators is not yet part of the node	In progress
v2	Blockchain as Content Index — any transaction anchors an IPFS CID on-chain (`createsiteanchortx`); documents permanently notarized; site resolver (`resolveglcsite`, `listglcsites`) operational	Current
v2.5	Structured Data Layer — machine-readable records anchored permanently. First: ISO 20022 payment messages, indexed by the node and committed on-chain, with a registry mapping LEI, BIC and DTI identifiers to Glcoin addresses; contract terms, asset descriptors and KYC attestations follow	In progress
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, SI 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, SI 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. A validator participating in Glcoin is permanently identified, and with the planned identity extension, so can be any attested address. 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.**

Revision History

VERSION	DATE	CHANGES
1.1	November 2026	Reference implementation Glcoin Core 0.3.0 (3.4); site anchors and private anchors (4.4); miner registry as it works on the main chain — GLCM transactions, enforcement from block 1111, authority rotation from block 5000 (5.2, 5.3); proof-of-work stated as today's block production (5.1); identity attestation marked as planned (4.3, 7.5); block contents, proof density and proof receipt stated as implemented (3.2, 3.3, 4.1); supported platforms (6.2); RaspiBlesk with IPFS, explorers and source verification (6); ISO 20022 payment records (7.6); roadmap status (8); "AI" now written "SI".
1.0	May 2026	First edition. PDF

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