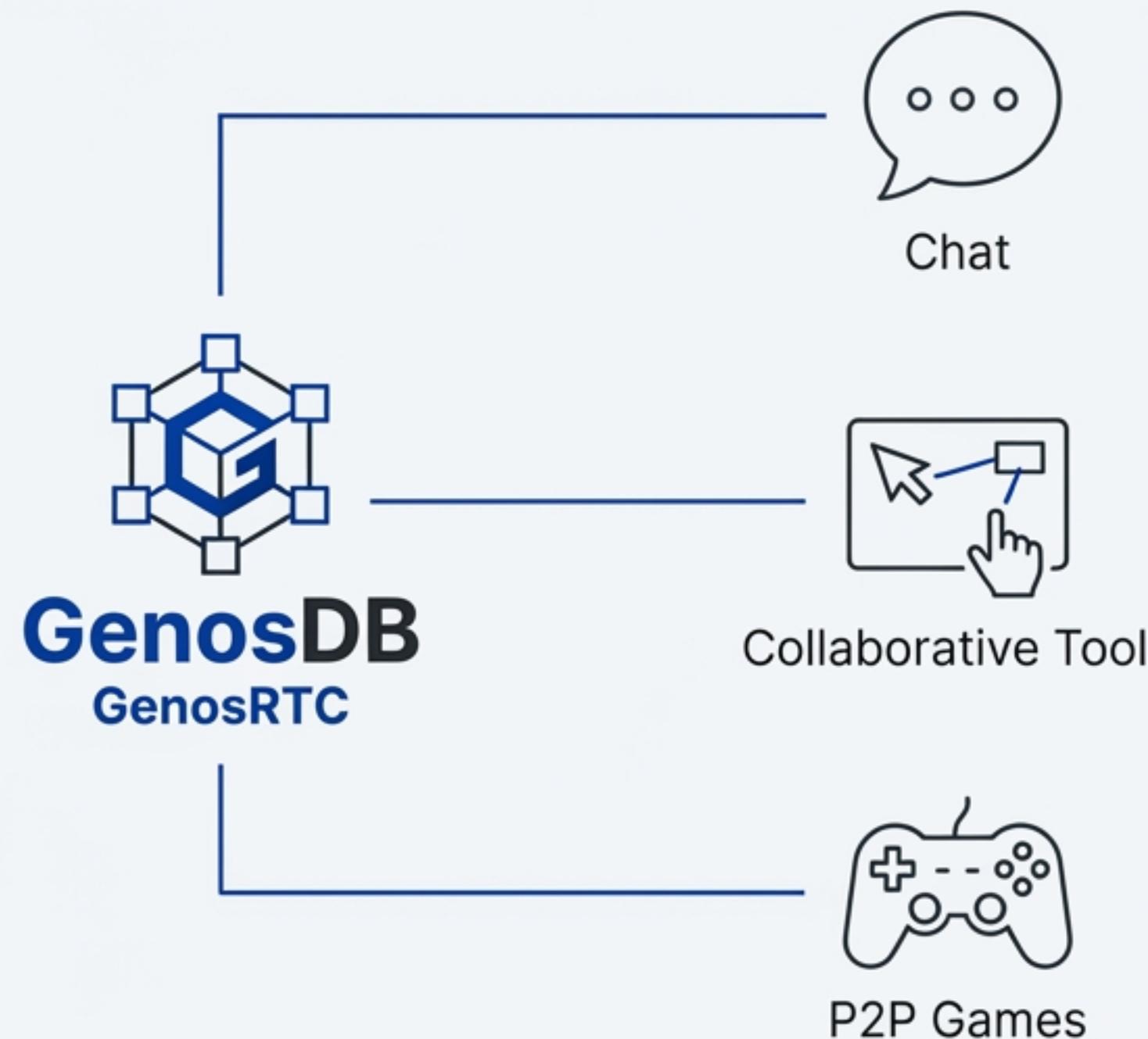


GenosRTC: Intelligent Relay Management for Unstoppable dApps

How GenosDB navigates the complexities of a growing decentralized network to keep your apps fast, reliable, and efficient.

G GenosDB

In the World of dApps, the Quality of the Connection is Everything.



Real-time chats, collaborative tools, and P2P games are only as good as the network that powers them.

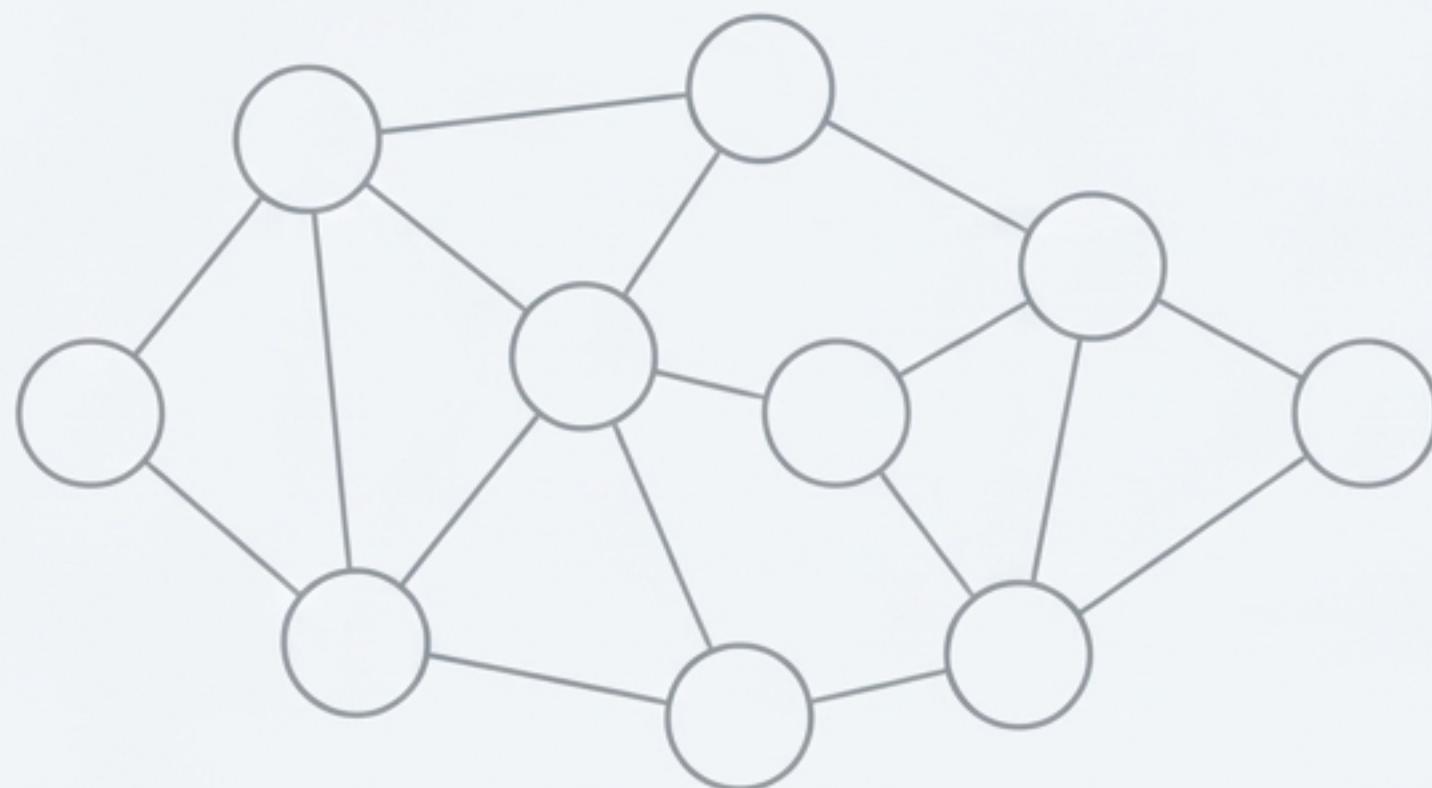
GenosDB is built to provide the most robust and efficient foundation for these experiences.

Our real-time module, GenosRTC, leverages the power of Nostr relays for brilliant, decentralized peer discovery.

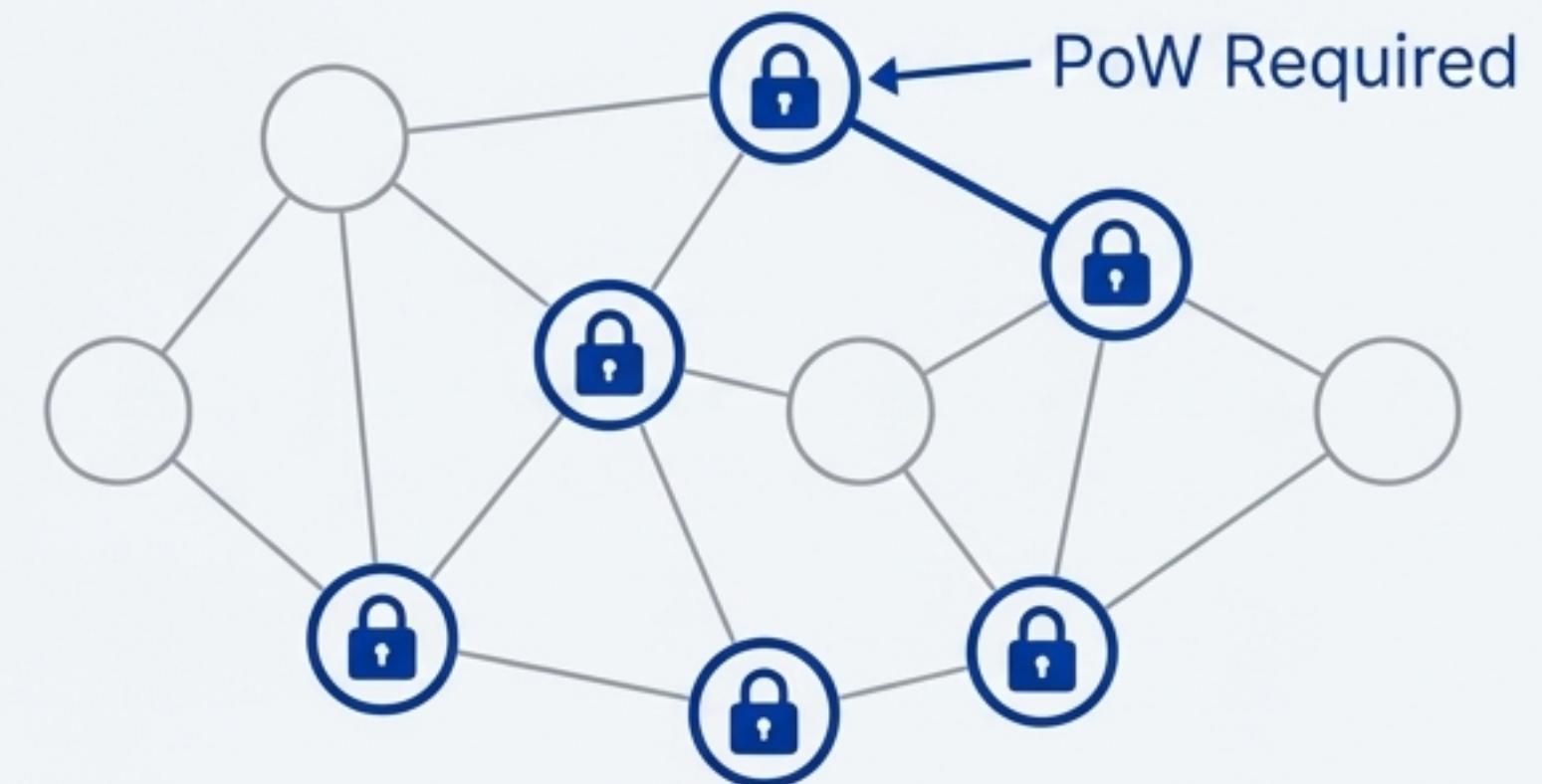
But as the Decentralized Network Grows, So Do the Obstacles.

To combat spam, many Nostr relay operators now require Proof-of-Work (PoW)—a computational puzzle a client must solve. While effective against spam, this creates a new challenge for applications not equipped to handle it. A previously open door now has a special lock.

Early Network

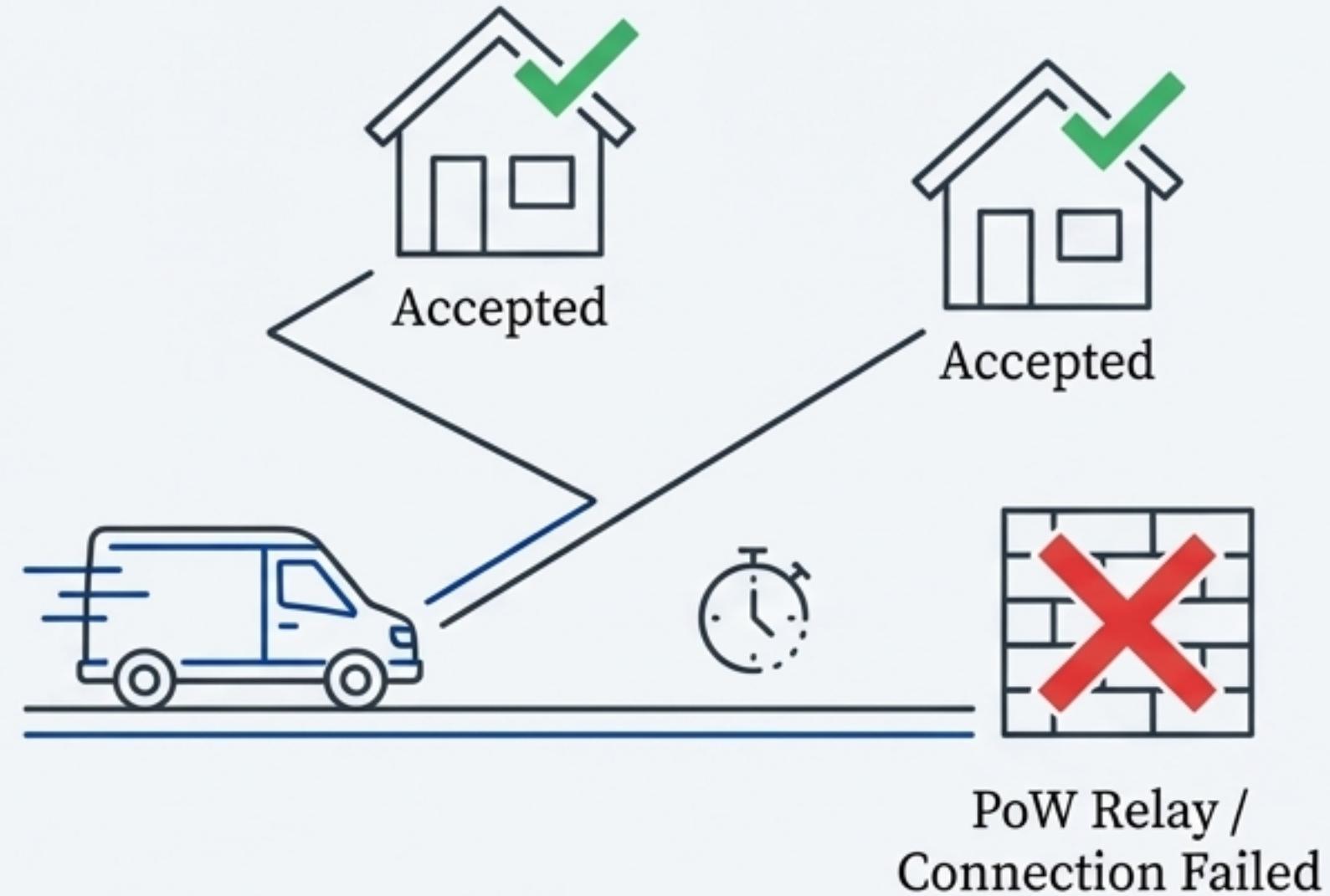


Modern Network



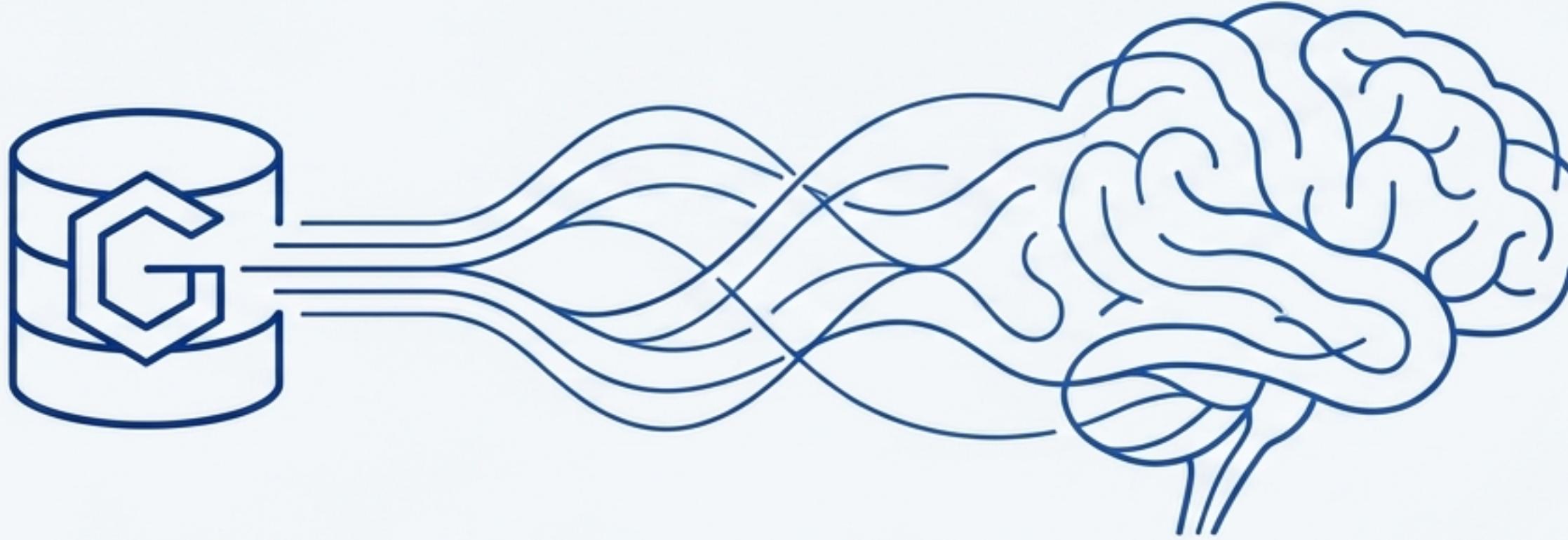
The Old Way Was Like Talking to a Brick Wall.

Previously, GenosRTC would optimistically try to connect to every relay in its list. When it encountered a PoW-protected relay, it would wait, try again, and eventually fail, wasting precious time and resources.



The Impact:

- * Slower Connection Times: Users wait longer.
- * Unreliable Messaging: Critical signaling messages are dropped.
- * Wasted Resources: CPU and bandwidth are spent on attempts doomed to fail.



GenosRTC No Longer Just Connects. It Learns.

With the latest update, GenosDB and GenosRTC are no longer just optimistic—they’re intelligent. Our new module actively listens to the network, identifies roadblocks, and adapts its strategy in real-time to find the most efficient path for communication.

An Intelligent, Three-Step Approach: Detect, Remember, Adapt.

When GenosRTC encounters a relay that requires PoW, it follows a simple, powerful protocol:



1. Detect

Instantly recognizes the PoW requirement (the “Special Key Required” sign).

2. Remember

Marks that relay as one to be avoided for the current session.

3. Adapt

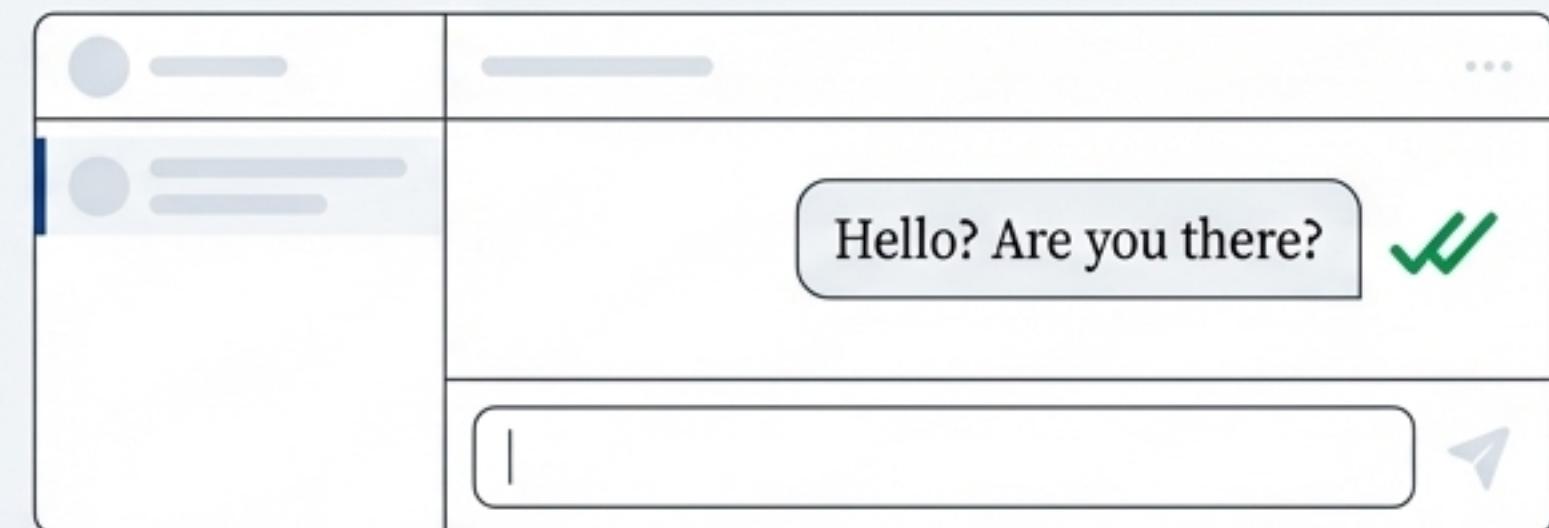
Immediately closes the connection and focuses all its energy on relays that are open and responsive.

The Result: A Flawless Decentralized Chat Experience.

BEFORE



WITH NEW GENOSRTC



Scenario:

A connection attempt goes through a PoW relay.

Outcome:

The message hangs with a dreaded “sending...” spinner that never resolves. User frustration.

Scenario:

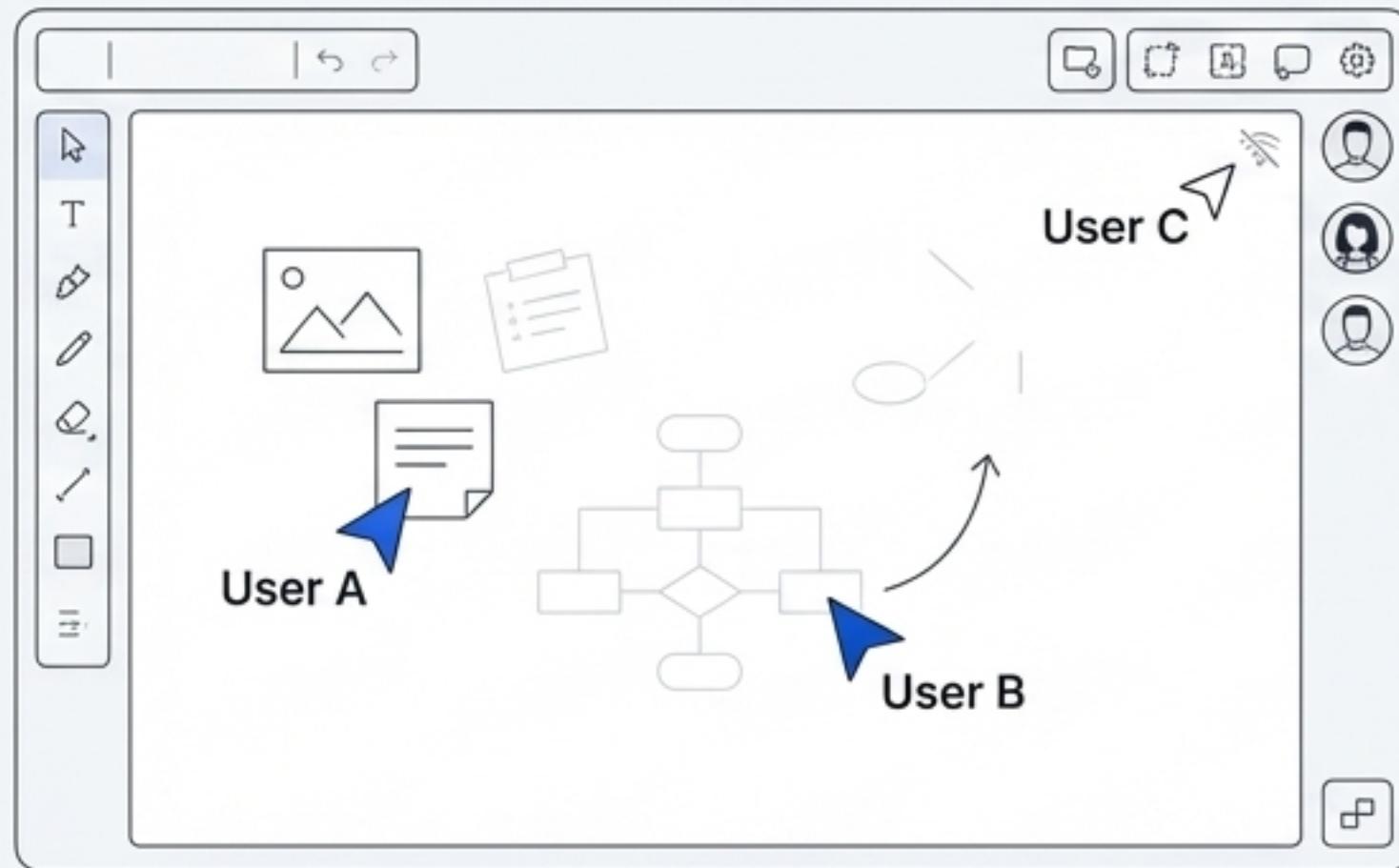
The app instantly identifies and ignores the PoW relay.

Outcome:

The connection is established through a working relay. The message is delivered instantly. Seamless user experience.

Uninterrupted Creativity on a Real-Time Whiteboard

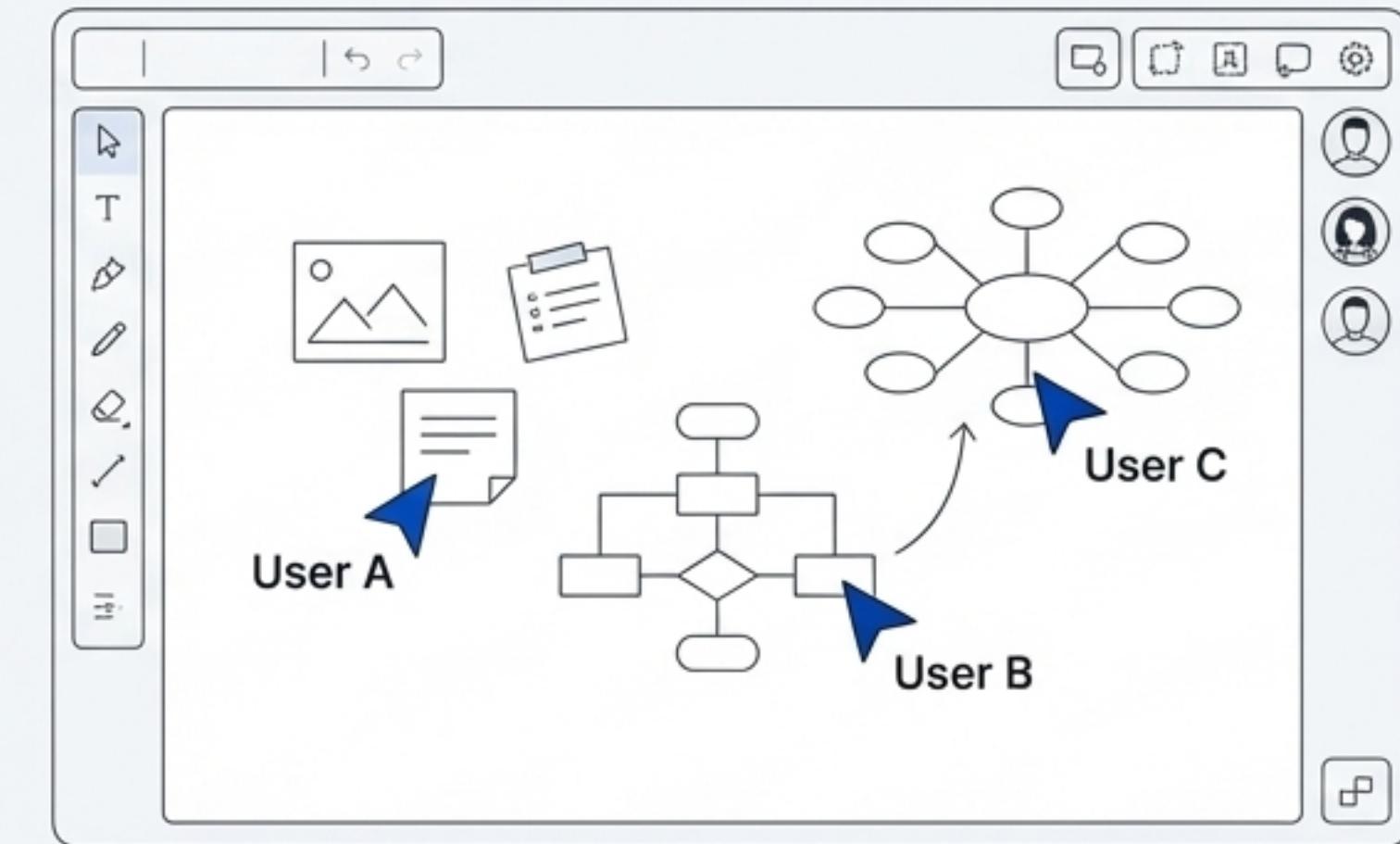
BEFORE



Scenario: A user's client is stuck trying to signal through a problematic relay.

Outcome: Their updates don't appear for others. The session becomes desynchronized and chaotic.

WITH NEW GENOSRTC



Scenario: GenosRTC ensures every participant has a stable connection by filtering non-compliant relays.

Outcome: Every stroke, note, and drawing appears for everyone in perfect real-time. Creativity flows.

The GenosDB Advantage for Your dApp.



Enhanced Reliability

Your dApp will “just work” by intelligently navigating the complexities of the Nostr network.

Superior Performance

Faster peer discovery and connection setup lead to a snappier, more responsive user experience.

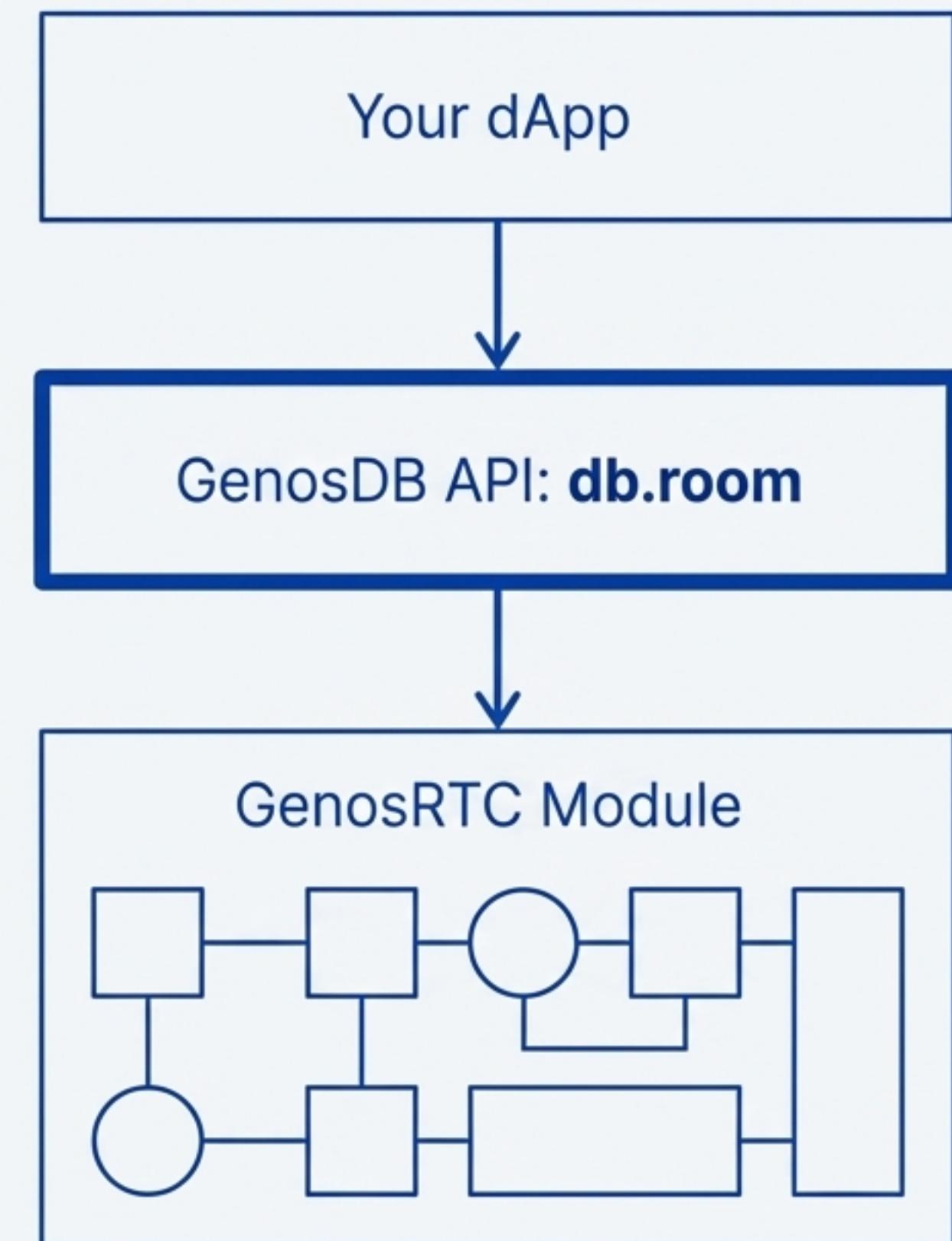
Greater Efficiency

By avoiding useless connections, your app consumes less battery, CPU, and data—critical for mobile users.

Built on a Foundation of Decentralization, Simplicity, and Security.

GenosRTC is designed from the ground up to provide a “serverless” communication model. Its architecture is guided by four core principles:

-  **Decentralization First:** No central point of failure or data bottleneck.
-  **Simplicity through Abstraction:** A clean, event-driven API (`db.room`) hides low-level complexity.
-  **Room-Based Scoping:** A natural container for managing groups of connected peers.
-  **Secure by Design:** Built-in support for end-to-end encryption.

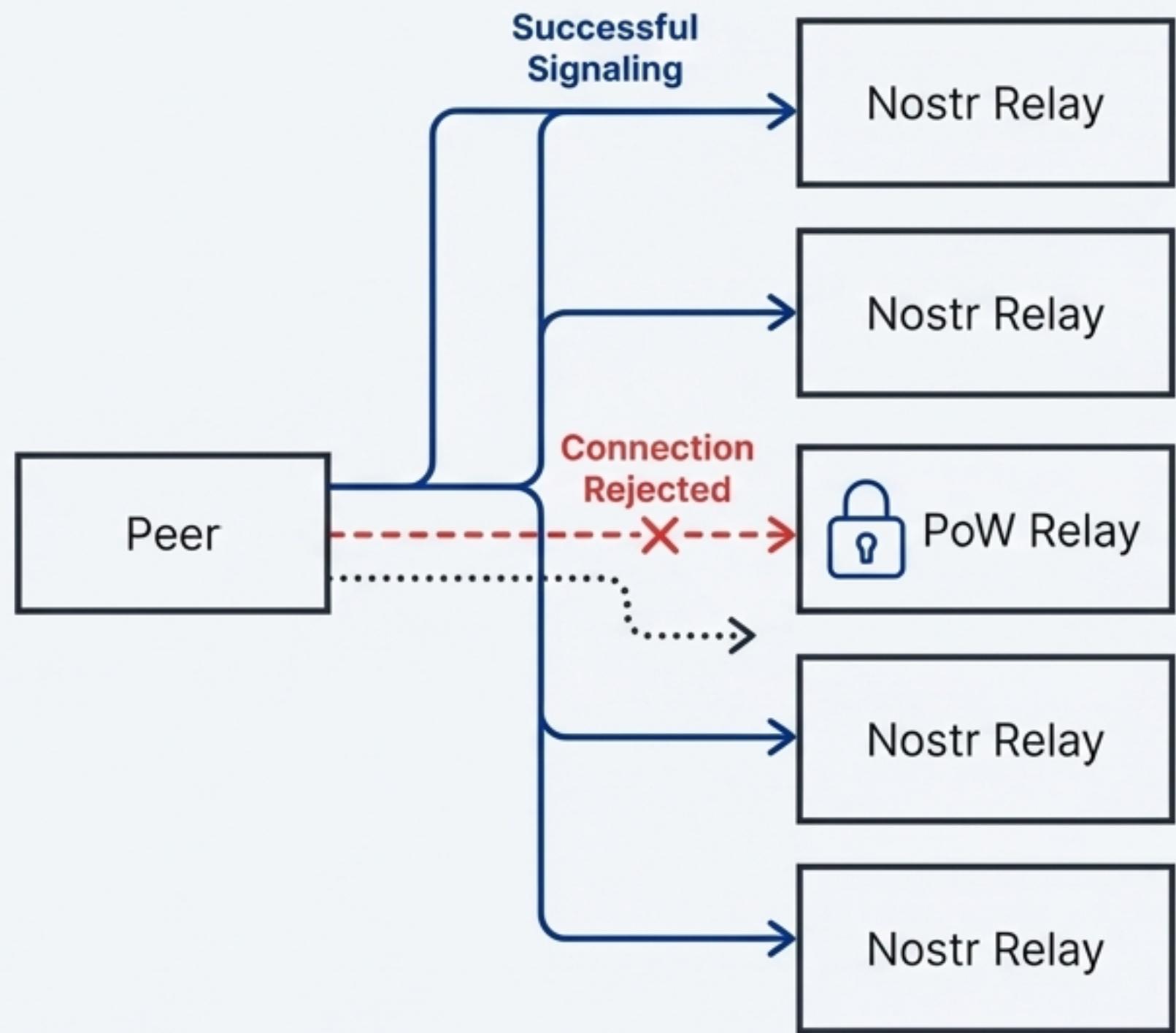


The Secret is an Intelligent, Decentralized Signaling Layer.

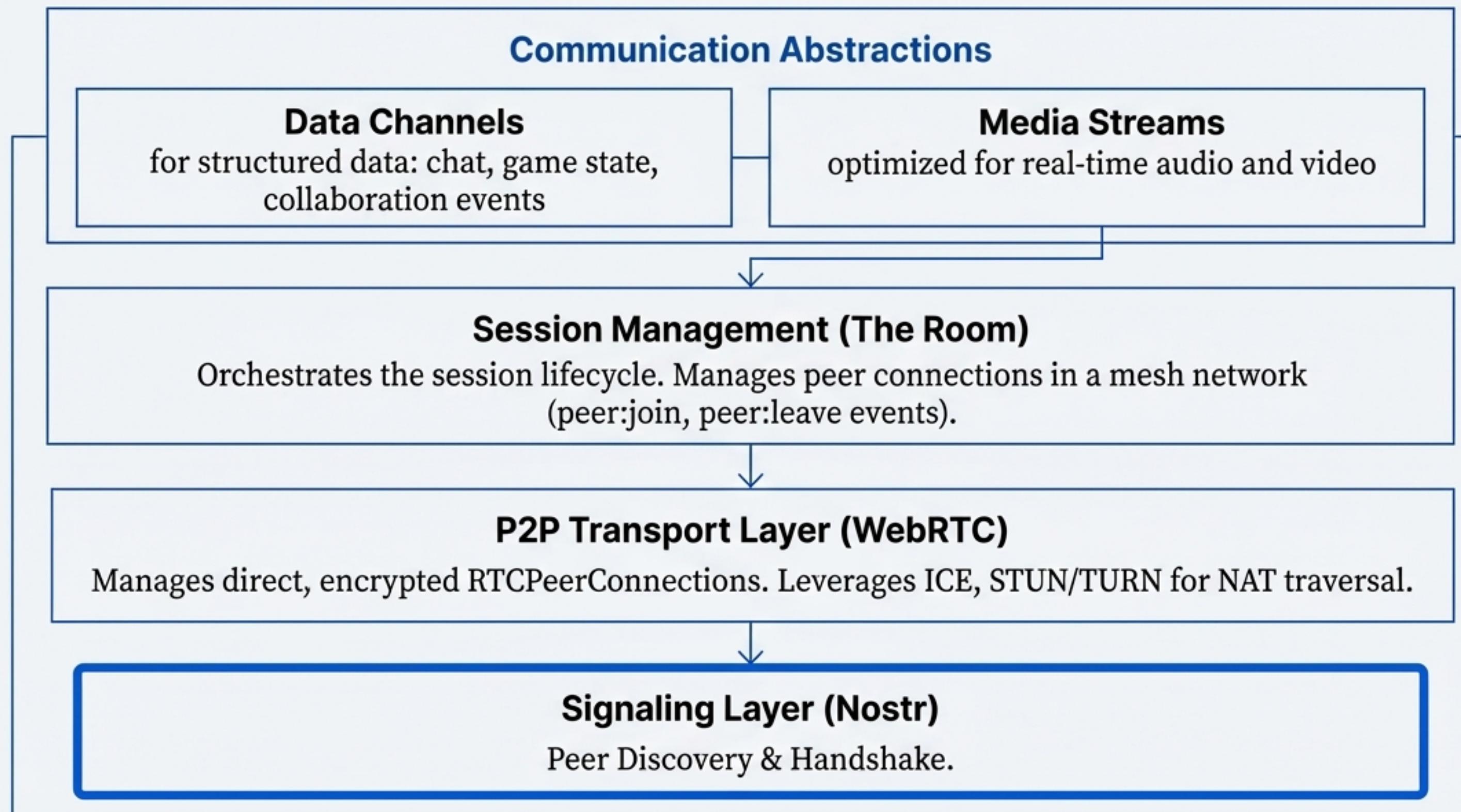
GenosRTC uses the decentralized Nostr network for peer discovery, eliminating the need for your own signaling server. This provides resilience and zero infrastructure overhead.

Key Feature: Adaptive Network Intelligence

- The architecture isn't passive; it actively manages its connections to the Nostr network.
- Upon detecting a PoW requirement or other issue, the system automatically disconnects and excludes that specific relay during the session.
- This self-healing behavior ensures resources are focused on healthy signaling paths, dramatically increasing reliability.



A Complete, Layered Architecture for Real-Time Communication.



A Secure and Predictable Connection Lifecycle.

Lifecycle of a Peer Connection



1. Initialization

Client joins a room (`rtc: true`).

2. Discovery

Client connects to Nostr, subscribes to the room's topic.

3. Signaling

Securely exchanges offers/answers with peers via relays.

4. Direct Connection

An `RTCPeerConnection` is established. Relays are no longer needed for direct communication.

5. Communication

App uses Data Channel / Media Stream APIs.

6. Disconnection

Connections are torn down on `db.room.leave()`.

Security Model



- **Transport Encryption**

All WebRTC communication is mandatorily encrypted using DTLS & SRTP. Prevents eavesdropping.

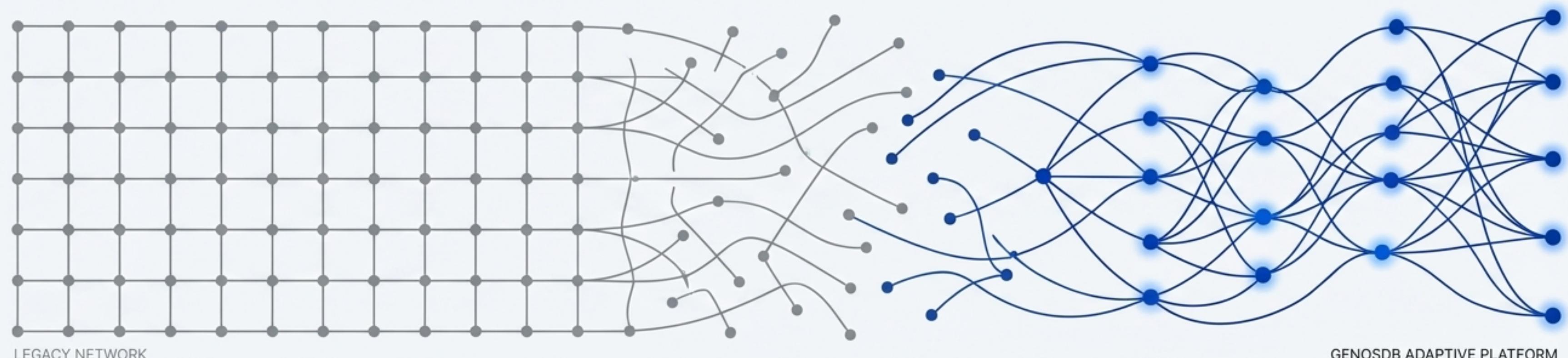


- **End-to-End Encryption (E2EE)**

An optional password encrypts all signaling data on Nostr and all application data sent through Data Channels. Ensures not even relays can decipher your data.

The Future of the Web is Decentralized. It Must Also Be Fast and Reliable.

By building intelligence directly into the network layer, GenosDB moves beyond providing simple tools. We deliver an adaptive platform that solves the real-world challenges of a dynamic, decentralized ecosystem. We handle the complexity so you can focus on building incredible applications.



Ready to build unstoppable dApps?
Get started with GenosDB today.

genosdb.org/docs
github.com/genosdb/genos



GenosDB