RetireChain Grant Summary – October 2025

Blockchain Proof-of-Integrity Infrastructure for Retirement Data

Project Type: Infrastructure / Tooling / Enterprise Integration

Funding Request: $10,000 USD (SOL equivalent)

Timeline: 3 months (January – March 2026)

GitHub Repository: https://github.com/lyons6563/retirechain-poc-summary

Contact: theretirechain@gmail.com

Executive Summary

RetireChain is an open-source proof-of-integrity layer that validates retirement contribution and plan-event data, then posts immutable proofs to Solana in under 5 seconds with zero Personally Identifiable Information (PII) exposure. The completed Proof of Concept achieved 100% success, an average confirmation time of 4.04 seconds, and transaction costs of roughly 0.000005 SOL per event. This grant funds development of the MVP Alpha: a REST API, PostgreSQL storage layer, minimal web dashboard for proof visualization, and mainnet integration testing—creating reusable, open-source infrastructure for regulated enterprises requiring cryptographic data integrity without privacy compromise.

Problem Statement

The U.S. retirement industry—representing over $45 trillion in assets—relies on a patchwork of legacy payroll, recordkeeping, and custodial systems that were never designed to communicate in real time. Today, when an employee updates a 401(k) deferral or makes a contribution, it typically takes two to three business days for that transaction to propagate from the employer's payroll file to the recordkeeper's system and finally to the custodian bank. During that lag, money is deducted but not yet invested, creating potential lost earnings and fiduciary exposure under ERISA.

Even more critically, the lack of immutable proof linking each payroll deduction to its funding event leaves administrators and auditors dependent on email trails and spreadsheet reconciliations. These manual processes lead to 2–5% data mismatches, millions in unnecessary reprocessing costs, and recurring audit findings for plans of all sizes. The result is a system that is operationally fragile, opaque to participants, and increasingly out of step with modern financial infrastructure. A cryptographically verifiable record of each plan event—anchored to Solana's public ledger—eliminates these trust gaps and brings real-time transparency to an industry that still runs on batch files.

Solution & Technology Architecture

RetireChain introduces a five-layer proof architecture: 1) Validation Layer (JSON schema rules), 2) Hashing Layer (SHA-256 with salt; no PII on-chain), 3) Proof Layer (compact Solana memo transactions), 4) Storage Layer (PostgreSQL metadata and audit logs), and 5) Compliance Layer (Phase 3: anomaly detection and predictive compliance scoring). Solana's Proof-of-History consensus provides deterministic timestamping with sub-second finality, making per-event proofing economically viable at scale.

Proof of Concept Results (Completed October 2025)

Metric	Target	Achieved	Status
Confirmation Time	< 30 s	4.04 s average	Pass
Success Rate	≥ 99%	100% (valid events)	Pass
Transaction Cost	< 0.005 SOL	~ 0.000005 SOL	Pass
Data Integrity	Hash + signature	Versioned memos; audit trail	Pass

MVP Roadmap & Deliverables (3 Months)

Month 1: API & Database Foundation — REST endpoints (/events, /proofs/{id}, /status); PostgreSQL integration; OpenAPI 3.1 spec. Success: 5,000 events/minute with < 30 s confirmation.

Month 2: Dashboard & Mainnet Testing — React/Next.js dashboard for live proof visualization; devnet-to-mainnet testing and performance validation. Success: dashboard operational with live tracking.

Month 3: Documentation & Pilot Readiness — Integration guides, automated tests, security review, and pilot deployment package. Success: MVP ready for non-ERISA pilot engagement.

Budget Breakdown

Category	Deliverable	Amount (USD)
API & Dashboard	REST API; React front-end	$3,500
Mainnet Integration	Migration and load testing	$2,500
Security & Infrastructure	Hosting; encryption review	$1,500
Documentation & Testing	Guides; automated tests	$1,500
Developer Continuation	Carry-over from PoC	$1,000
Total		$10,000

Public Good & Ecosystem Benefit

RetireChain extends Solana’s utility beyond DeFi into regulated enterprise infrastructure. The open-source tooling enables cryptographic anchoring of off-chain records (payroll, healthcare, supply chain) without exposing PII, broadening Solana’s enterprise adoption.

Team & Organization

Founder: Sam Lyons — domain expert in retirement operations and data integrity; funded and directed PoC delivery to 100% success. Execution approach: lean, milestone-driven, and compliance-aware.

Future Sustainability

Post-MVP plans include pilot programs with mid-tier recordkeepers and payroll APIs (Q3 2026), SaaS monetization at $0.001–$0.005 per validated event, and a $250K–$500K pre-seed for commercialization and compliance. First-year ARR target per institutional client: $100K+.