RetireChain Grant Summary

Blockchain Proof-of-Integrity Infrastructure for Retirement Data

Project Type: Infrastructure / Tooling / Enterprise Integration
Funding Request: $15,000 USD (SOL equivalent)
Timeline: 3 months (January – March 2026)
GitHub Repository: https://github.com/lyons6563/retirechain-poc-summary

Executive Summary

RetireChain is an open-source proof-of-integrity layer that cryptographically validates retirement contribution and plan-event data, recording immutable proofs on Solana in under five seconds while keeping all personally identifiable information (PII) off-chain. The completed proof of concept (PoC) achieved a 100% success rate with ~4.04-second average confirmation times and sub-$0.001 transaction costs per event. This grant will fund an MVP Alpha: a REST API, PostgreSQL storage layer, a minimal web dashboard for proof visualization, and mainnet testing. The outcome will be reusable Solana tooling for regulated financial data integrity.

Problem Statement

The U.S. retirement industry manages ~$45 trillion across employers, payroll processors, recordkeepers, and custodians. Current operations rely on batch files and delayed reconciliations that cause: multi-day latency, data mismatches, manual cleanup, and limited end■to■end auditability. These gaps drive compliance risk (ERISA/SOC 2) and billions in annual operational overhead.

Solution & Architecture

RetireChain provides a five-layer architecture: 1) Validation — Normalize/validate incoming JSON events (e.g., deferral change, contribution posted). 2) Hashing — Generate SHA■256 hashes with salt to ensure integrity and privacy. 3) Proof — Post compact memo transactions on Solana containing only the commitment (no PII). 4) Storage — Log event metadata, validation results, and chain receipts in PostgreSQL for audit trails. 5) Compliance (Phase 3) — Add anomaly detection and automated checks to flag exceptions.

Why Solana: Proof■of■History enables reliable timestamping; high throughput and low fees make per■event proofs economically viable at enterprise scale.

Proof of Concept Results (Completed)

Metric	Target	Achieved	Status
Confirmation Time	< 30 seconds	4.04 s average	Meets target
Success Rate	≥ 99%	100% (valid events)	Exceeds target
Transaction Cost	< 0.005 SOL	~ 0.000005 SOL	Well under target
Data Integrity	Hash + signature	Full audit trail	Meets target

Memo format used during PoC: `v1|event_type|base58(hash)|unix_ts`. All transactions were executed on Solana devnet with salts stored off■chain.

MVP Roadmap & Deliverables (3 Months)

Month 1 – API & Database Foundation
• REST endpoints: /events (submit), /proofs/{id} (retrieve), /status (monitoring)
• PostgreSQL integration and audit logging; OpenAPI 3.1 specification
• Success: handle 5,000 events/minute with < 30 s confirmation

Month 2 – Dashboard & Mainnet Testing
• React/Next.js dashboard for proof visibility and real■time status
• Devnet → mainnet testing and performance validation
• Success: live mainnet tracking with stable confirmation and costs

Month 3 – Documentation & Pilot Readiness
• Technical docs, integration guide, automated tests (unit/integration)
• Security review and packaging for pilot deployments
• Success: MVP ready for a non■ERISA pilot program

Updated Budget Breakdown ($15,000)

Category	Deliverable	Amount
MVP Dashboard & API Development	Front■end (React/Next.js), REST API, schema design	$5,000
Mainnet Integration & Testing	Performance validation, load testing	$3,500
Security & Infrastructure	Cloud hosting, encryption review, SOC 2 prep	$2,500
Documentation & Testing	Docs, automated test suite, guides	$2,000
Developer Compensation	Extend PoC developer engagement	$2,000
Total Grant Request		$15,000

Public Good & Ecosystem Benefit

The RetireChain stack is broadly applicable to any domain requiring tamper■evident proofs without exposing sensitive data (payroll, healthcare, fintech). Open documentation and modular components enable other teams to build on Solana for regulated enterprise use cases, expanding ecosystem reach.

Contact Information

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