

# Jeevan R

Software Engineer

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Portfolio | LinkedIn | GitHub

## Projects

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**Zelana** – Rust, TypeScript, Solana, Zero-Knowledge Proofs, SP1 zkVM Sept 2024 – Dec 2024

- Built a **privacy-preserving ZK rollup** on Solana, compressing and verifying batched transactions off-chain using **SP1 zkVM** before anchoring proofs to L1.
- Designed a custom **encrypted UDP transport layer** (Zephyr protocol) replacing HTTP/TCP for low-latency proof propagation between nodes.
- Implemented a **Solana L1 bridge** with a lock-and-hold mechanism for secure cross-layer asset transfers with ZK state verification.
- Placed **6th at Solana Cypherpunk Hackathon India** (200+ teams); awarded \$600 prize.

**Distributed Rate Limiter** – TypeScript, Bun, gRPC, PostgreSQL, Redis, Docker Feb 2026 – Mar 2026

- Production-grade **distributed rate limiting** service implementing the **Token Bucket** algorithm, exposed over gRPC with idempotent retry semantics and dual-backend support.
- PostgreSQL backend uses **SERIALIZABLE transactions** with exponential backoff to prevent race conditions; Redis backend uses **atomic Lua scripts** achieving **18,500+ RPS** – 5x faster than Postgres under load.

**CRDTs – Conflict-Free Replicated Data Types** – Rust Mar 2026 – Present

- Implemented core **CRDT data structures** in Rust including G-Counter, PN-Counter, OR-Set, and LWW-Register – enabling eventually consistent state across distributed nodes with no coordination.
- Designed a **merge semantics layer** ensuring commutativity, associativity, and idempotency guarantees, validated with property-based tests covering concurrent update scenarios.
- Benchmarked merge operations under high concurrency to verify **sub-millisecond convergence** with zero conflicts across simulated multi-node topologies.

**Autograd Engine** – Rust Jan 2026 – Present

- Built an **automatic differentiation engine** in pure Rust, inspired by Karpathy's micrograd, supporting forward and reverse-mode **backpropagation**.
- Implemented a **dynamic computational graph** with support for common ops (add, mul, relu, tanh) and gradient accumulation across arbitrary network depths.
- Demonstrated end-to-end learning on **XOR** and image classification tasks with custom neural network layers and SGD optimizer.

## Education

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**PES University**, B.Tech in Computer Science Engineering Sept 2023 – Sept 2027

- GPA: 8.5/10
- **Coursework:** Operating Systems, Computer Networks, Database Management Systems, Compiler Design, Object-Oriented Analysis & Design

## Technical Skills

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**Languages:** Rust, TypeScript, JavaScript (ES6+), C++, C, Java, Python, Solidity

**Backend & Systems:** gRPC, REST APIs, Tokio (async Rust), Actix-web, Node.js, Bun, Express.js, Docker, PostgreSQL, Redis, MongoDB

**Blockchain:** Solana, Anchor (Rust), Zero-Knowledge Proofs, SP1 zkVM, Solidity, Foundry

**Tools:** Linux/Unix, Git, Docker, Shell Scripting, Vim, Next.js, React.js, Tailwind CSS

## Achievements

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- **Solana Cypherpunk Hackathon India (2025–26)** – Placed **6th** out of 200+ teams in the India sidetrack for *Zelana*, a privacy-preserving ZK rollup built on Solana; awarded \$600 prize.
- **CNR Merit Scholarship** – Awarded by PES University for ranking in the **top 25%** of the B.Tech CSE batch.