Rahul Bane

Smart Contract & Protocol Engineer · Solidity, Rust, Golang

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SUMMARY

Protocol engineer, **5+ years** on blockchain infrastructure. Currently lead engineer at **Blinq**, a leveraged trading layer on Polymarket's prediction markets, working across a **10-contract upgradeable Solidity suite** handling margin, liquidation and settlement, and the **27-crate Rust backend** that reconciles it against an external order book. Previously five years at Router Protocol: **Golang** solvers and orchestrators for interoperability across **40+ chains**, Bitcoin execution engines, and the Rust routing engine behind Router's Open Graph Architecture. Working areas: upgradeable proxies and storage layout, ERC-4626 share accounting, liquidation and risk engines, EIP-712 signature systems, and reconciliation between an on-chain ledger and an asynchronous off-chain one.

TECHNICAL SKILLS

- **Smart contracts / EVM:** Solidity (0.8.x), Yul/inline assembly; UUPS and Transparent proxies, delegatecall peers, EIP-1167 minimal proxies, CREATE2 factories; ERC-20/721/1155/4626; EIP-712/1271/1967; custom errors, storage-layout discipline, gas optimization, CEI and reentrancy, SafeERC20
- **DeFi protocol design:** lending pools, collateralization, **liquidation engines**, interest-rate and borrow-fee models, ERC-4626 vaults, accounting invariants and conservation checks, oracle deviation and freshness bands, settlement waterfalls, AMMs, concentrated liquidity, on-chain limit orders, CLOB integration and settlement
- **Rust:** Axum, Tokio, ethers-rs/alloy, serde, sqlx, tonic/gRPC; async services, durable leased job queues, reorg-safe chain indexers, distributed nonce allocation, EOA broadcast with RPC failover, typed-error state machines
- **Backend & distributed systems:** Golang (protocol services, solvers, orchestrators, SDKs), TypeScript/Node.js (APIs, indexers), Python, React; microservices, event-driven pipelines, idempotent at-least-once processing, CQRS read-models, caching strategy, graceful degradation
- **Cryptography:** EIP-712/1271 typed-data signing, quorum multisig with strictly-ascending signer recovery and replay guards, ECDSA, GG20 threshold signing, Merkle proofs, SegWit P2WSH multisig witnesses
- **Cross-chain & Bitcoin:** interchain messaging, native asset bridges, bridge and DEX aggregation, deposit-address bridges, event indexing; UTXO scripting (P2PKH/P2SH/P2WPKH/P2WSH), SegWit/Bech32 signing, PSBT generation, OP_RETURN encoding, multisig witness construction
- **Testing & security:** Foundry (unit, **fuzz, invariant**, fork), Hardhat, Tenderly, Slither; adversarial modelling of insolvency, oracle failure, liquidation stress and upgrade risk; audit-finding remediation
- **Infrastructure & operations:** AWS, GCP, Docker, Kubernetes (working knowledge), CI/CD, PostgreSQL, MongoDB, Redis, Kafka, Prometheus; metrics, structured logging, alerting, on-call for production services
- **Ecosystems:** EVM, Bitcoin, Solana, Sui and Aptos (Move-based), NEAR, Cosmos SDK, Aleph Zero

EXPERIENCE

Lead Engineer, Solidity Contracts & Rust Backend · Blinq *(Dubai, Hybrid)*

Feb 2026 - Present · live POC

Leveraged trading on Polymarket's prediction markets. Traders open leveraged positions on binary-outcome tokens; orders match on **Polymarket's external CLOB** and settle on-chain against an LP vault that funds positions and absorbs P&L. Deployed on Polygon, internal beta.

- **10-contract suite** (OZ v5): seven **UUPS** behind ERC-1967 proxies plus two delegatecall peers carrying settlement and emergency logic to keep `MainProtocol` inside the EIP-170 code-size limit, with `_disableInitializers` and reserved storage gaps throughout.
- **Settlement money-waterfall**: vault principal is repaid first, any shortfall is socialised across LPs before fees are taken, and the trader is paid last. Alongside it, an **EIP-712 quorum multisig** with strictly-ascending signer recovery and per-action replay guards, and an **oracle deviation-band and freshness** check that rejects manipulated settlements.
- Built an **ERC-4626-style LP vault** with virtual-offset donation protection, a utilisation-capped borrow facility, a utilisation-slope borrow fee, and pro-rata bad-debt socialisation across LPs.
- Built a **time-ramped Dutch-auction liquidation engine**: an on-chain discount ramp priced by single-use EIP-712 oracle quotes, executed by permissionless bots posting USDC for the position's ERC-1155 shares atomically, with a vault-loss circuit breaker that cancels new opens once bad debt in a rolling window crosses a configured limit.
- **27-crate, 11-service Rust backend** (Axum, Tokio, ethers-rs) that reconciles an on-chain ledger with an asynchronous off-chain order book: stateless API, orchestrator state machine, reorg-safe chain indexer, CLOB executor, settlement executor, and a price oracle signing marks under **GG20 threshold ECDSA**.
- Distributed-systems core: Postgres **leased job queues** (claim, lease, heartbeat, reap), a **distributed nonce allocator** letting replicas share one executor EOA (`FOR UPDATE SKIP LOCKED`, up and down resync), RPC failover, and a **landed-transaction probe** that recomputes the signed-transaction hash and checks the chain before retrying, so an RPC that errors after actually mining a transaction cannot cause a double spend.

- **At-least-once delivery with idempotent effects**, typed-error reconciliation driving the state machine, and metrics, structured logs and alerting on every service covering queue lag, nonce-lane divergence, settlement failures and oracle staleness.
- Test suite of **~1,175 tests** across 6 CI jobs, covering Foundry unit, fuzz, invariant and fork suites on the contracts and integration suites across the Rust services.
- Reworked custody and funding mid-build when **Polymarket migrated v1 to v2** and a 2-of-2 trading Safe became a Polymarket-deployed deposit wallet whose relayer will not approve an arbitrary spender. Split custody into a user-owned deposit Safe plus a Blinq-controlled deposit wallet, and rebuilt funding as a two-hop push with a different arrival proof per token standard.

Full Stack Blockchain Engineer · Router Protocol *(Dubai, Hybrid)*

June 2021 - Mar 2026

Xplore / Open Graph Architecture (Aug 2025 - Mar 2026) · the off-chain cross-chain routing engine behind OGA

- Built provider nodes on the **external-node framework**, which lets SDK-only providers join the Rust routing engine as dynamic nodes at runtime: **Everclear** end to end, **NEAR Intents** spanning EVM, Solana, NEAR and Bitcoin, **Chainflip** (self-run broker with FLIP-shortfall detection and BTC PSBT generation), plus **Meson** and **GasZip**.
- **Deposit-address discovery**, which inverts a source transaction hash back to a bridge deposit address for providers that index by address rather than hash: hash-format detection to prioritise chains, two multi-chain explorers raced in parallel, and batched per-chain probes with error isolation, behind a cache and in-flight request de-duplication. Now shared by every deposit-style bridge in the system.
- **Health-monitoring service**: scheduled CSV route-scenario probes, transaction-status checking, Tenderly pre-flight simulation, daily reporting, and Slack alerting with a separate channel for repeated failures.
- **Redis response-persistence layer** (storage trait, TTL expiry, admin endpoints, metrics, integration tests) and end-to-end `request_id` tracing across gRPC middleware, services, proxy and Protobuf types, making any quote replayable by id.
- Wrote the **Node Integration Guide**, now published as the "Integrate into OGA" section of Router's public developer docs and the working design documentation for the node contract.

Cross-chain interoperability infrastructure (June 2021 - Aug 2025)

- **Golang** solvers, orchestrators and **SDKs** for interoperability across **40+ chains** on a Cosmos SDK chain, with distributed messaging pipelines and intent-based execution engines.
- **Bitcoin** execution engines and cross-chain relayers: raw transaction builders with **UTXO aggregation**, **P2WPKH SegWit witness signing**, **2-of-3 P2WSH multisig** generation and spending, and a binary **OP_RETURN** memo protocol carrying bridge intent on a chain with no contracts. Built the Bitcoin and Sui sides of native bridging end to end, inbound listener and outbound settlement, including the refund path for undecodable deposits and a USD profitability gate.
- **XPloreRouter**, a UUPS-upgradeable cross-chain router: ERC-20 and native transfers, arbitrary calls, unified multicall, whitelisted targets, a fee module and emergency rescue.
- Backend **APIs and indexers in TypeScript and Node.js** for wallet UIs, transaction-metadata enrichment, and explorer and analytics features.

Full Stack Blockchain Engineer · Dfyn Network *(Dubai, Hybrid)*

June 2021 - August 2023

- Architected **Dfyn V2**, a concentrated-liquidity and on-chain limit-order DEX (tick math, NFT liquidity positions, router), and wrote its quoter contracts; published protocol research on Superimposed Liquidity on ethresear.ch.
- Real-time monitoring and alerting for deployed DeFi contracts.

Solidity Developer, Freelance · PAYZUS

Jan 2021 - April 2021

- Solidity smart contracts for a payments-focused product.

HACKATHONS · NEAR HACKATHON, NOV 2026

- **Cashflow Fi** · repo · live app: merchant receivables financing on NEAR in **Rust**. Investors fund **senior and junior tranches** held as transferable NEP-171 position NFTs; an **on-chain waterfall** repays senior, then junior, then a **Sputnik DAO**-governed insurance reserve. Cross-chain repayment through **NEAR Intents**; **TEE-attested** AI underwriting that cannot move funds.
- **Wavefund** · repo · live app: a fund steered by a market of AI agents, implementing Paradigm's **Quantum Markets** in **Solidity**. Forecasters back every agent proposal with one deposit through a **Uniswap v4 hook**; the TWAP winner executes through a restricted **Safe module**. **451 Foundry tests** including fuzz and invariant suites. Started at ETHGlobal Mumbai.

EDUCATION

- **B.Tech, Computer Science**, St. Francis Institute of Technology, Mumbai University · 2017-2021 · **GFMP Edge FinTech**, BSE Institute · 2019-2020

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