

RITESH KUMAR

EXPERIENCE

Perkpal Pte. Ltd. · Technical Co-Founder, Engineering & Product

Singapore · Aug 2024 – Dec 2025

Platform for FMCG brands to capture and incentivise real-world customer behaviour across channels and markets

Internationalised the platform from day one to support an early client operating across East Asia, Southeast Asia, and the UAE — content, currency, and compliance handled per-market via configuration, enabling rapid multi-market expansion without code forks.

Architected a predicate engine for perk eligibility validated at runtime using boolean logic trees stored as adjacency lists in `PostgreSQL`, exposed via a `GraphQL` DSL layer (P99 latency of ≈ 400 ms under 800 concurrent claims at live-events) — enabling growth and brand teams to reason about and iterate on campaign strategies independently without code changes, across enterprise & SME segments.

Enforced transaction correctness across external API integrations (`Privy` for wallet provisioning, `Solana` for settlement) via an FSM with state-transition invariants preventing double-issuance; classified error recovery and DLQ-pattern rescue isolated on-chain failures from internal logic.

Operated a git-opsed, hybrid-tenancy infrastructure on `Fly.io` & `AWS` that supported enterprise clients' data-isolation needs while keeping shared services lean; `Grafana`-based observability stack doubled as the client-facing analytics dashboard, eliminating a separate BI tool. `Node.js`, `TypeScript`, `NestJS`, `Terraform`

OutPoint Inc. · Software Engineer

Toronto, Canada · Jan 2022 – Apr 2024

Martech startup; acquired by Salt XC (Jan'23)

Reframed a latency-optimisation ticket as a communication-overhead problem: ML engineers and brand strategists needed synchronous handoffs to configure Media-Mix Models. Designed an async configuration interface using boolean predicates that let strategists self-serve initial setups — reduced the ML-engineer bottleneck by $\sim 3\times$, a key efficiency metric in OutPoint's investor updates during the pre-acquisition period.

Co-developed a social-boosting platform (DSP) that unified cross-channel ad management across `Meta`, `Shopify`, and `Amazon` platform APIs — cut managed-services turnaround from 1 week to 1 day; adopted by Fortune100 account teams post-acquisition ($\approx$ USD 1-5M/month budgets). `TypeScript`, `React`, `PostgreSQL`

Built and maintained core infrastructure powering a near-real-time Media-Mix Modelling pipeline alongside ML engineers and data scientists — including long-windowed caching layers for DAG-based model fine-tuning and OAuth token-management engines integrating with ad platform APIs. `Python` `Django` `AWS` `Redis` `Docker` `Kubernetes`

PROJECTS

Paxos Consensus Simulator | [blog series: Songs of the OCaml Compiler](#)

Oct 2025 – Present

Deterministic event-simulator for classic Paxos, built from scratch in `OCaml`

Built a JSON-driven scenario engine with deterministic replay to teach classic Paxos and distributed-systems intuition. Learned `OCaml` from scratch for this project; documented across a [multi-part blog series](#) with cross-language comparisons (`Python`, `Elixir`, `TypeScript`) and interactive diagrams.

Software Architecture Advisory

Nov 2025 – Mar 2026

NDA; frontier robotics startup, university R&D spin-off

Advised on software architecture for a robotics platform productising motion-capture research for teleoperation — scoped release models for stable R&D-to-product integration, designed data-model strategy around append-only logs and schema evolution, and evaluated cross-border IP security posture for a distributed team across 3 countries.

The Vyasa Project | [GitHub](#)

Jan 2024 – Present

Local-first platform for diaspora communities to share and preserve cultural texts

Built on `Elixir/OTP` for its shared, real-time experiences — tackles archival challenges for underrepresented Indic language corpora (OCR, multimedia sync). Crowdfunded; live-tested at temple events.

EDUCATION

National University of Singapore (NUS)

Singapore

Bachelor of Computing in Computer Science with Honours (Distinction)

Aug 2019 – Jun 2023

Specialisations: Computer Security, Software Engineering — with awards for meritorious performance.

Notable: wrote a `custom compiler` in `C++` and static-analysis query language (6-pax, full-semester project; mid-course architectural rewrite in week 9/12); graduate-level malware analysis including Stuxnet disassembly.

University of Toronto (UofT), St. George

Toronto, Canada

Entrepreneurial Studies

Jan 2022 – Dec 2022

Year-long entrepreneurship immersion via NUS Overseas Colleges (NOC); concurrent full-time work at OutPoint alongside studies with Rotman School of Management for 2 semesters.