

Mohan Embar

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Senior Backend Software Engineer — Payments, PCI Compliance & High-Scale Systems

Backend engineer with deep, hands-on ownership of payments infrastructure and PCI DSS Level 1 compliance at a commercial SaaS platform: sole architect and author of the card-data security layer that carries every credit-card transaction for every customer. Core maintainer of a multithreaded C++ engine delivering millions of emails per day. Winner of the 2012 Loebner Prize in artificial intelligence. Rare combination of hardcore systems skills and communication skills honed over two decades of consulting — and eleven human languages.

Experience

Ontraport — Senior Backend Software Engineer (2012 – *present, remote*)

Marketing-automation SaaS platform (CRM, email, e-commerce, payments) based in Santa Barbara, CA.

Payments & PCI compliance (primary owner):

- Sole author of the software at the heart of the platform's **PCI DSS Level 1 certification** — an OpenResty/Lua tokenization layer that strips raw card data from inbound traffic, a C++ card-data cache, and the PHP payments application — isolating cardholder data from the general-purpose infrastructure and keeping the main application out of PCI scope. (The certification itself was a cross-team effort; infrastructure and ops own the running stack.)
- Designed the **cryptography and key-splitting scheme** protecting stored card data; own the recurring key-rotation and card-data lifecycle/scrubbing operations.
- Built a C++ **in-memory card-caching server that speaks the Redis wire protocol**, so OpenResty/Lua and other clients integrate with off-the-shelf Redis libraries — zero custom client code.
- Designed a **PCI-compliant iframe field-isolation service** (2025) and built its backend and REST API: card fields served from a dedicated secure domain into customer landing pages on any domain, with HMAC request verification, distributed nonces, HTML sanitization, and Redis-backed caching at sub-100ms response times. (In-page frontend built with a colleague.)
- Maintain the platform's **payment-gateway integrations**: Stripe, PayPal (Standard and Website Payments Pro), Authorize.Net, eWay/eWay Rapid, and others.
- Ringleader for the PCI re-architecture across backend, frontend, and infrastructure teams: spec'd the servers, Helm charts, and isolation requirements, and kept the C-suite informed in plain English.
- Wrote the audit-facing documentation for the PCI assessments — data-flow diagrams, architecture and narrative docs — most recently produced with AI under my direction.

Distributed systems & scale:

- Core maintainer of the **multithreaded C++ email engine** that delivers millions of messages per day: job queues, thread pools, atomic stats aggregation, abort/recovery paths, race-condition hunting.
- Key engineer on the platform's **migration from on-premise infrastructure to AWS** (Kubernetes/Helm): wrote the payments services and the Docker image and Helm chart definitions for the new AWS environment — **certified in the 2026 PCI DSS Level 1 assessment** — working alongside the infrastructure team that owns the running stack; customer-account migration is the next phase.
- Retooled the PCI payments codebase to run **bilingually against MySQL (legacy) and PostgreSQL (AWS)** behind a common database layer, keeping the parallel deployments in lockstep so AWS-bound changes ship to existing production infrastructure first — real traffic as the canary. Built the phased live-sync tooling (bulk copy, incremental change replication, finalize/cutover) for **near-zero-downtime migration of the live payments database** from MySQL to PostgreSQL — having executed a trivial-downtime payments-database move once before.
- Deep production **PostgreSQL, MySQL, and Redis**: complex query optimization, distributed locking (Redlock), write aggregation ahead of database commits.

Engineering practice:

- Instituted the company's unit-test methodology; significant contributor to the shared C++ and PHP frameworks.
- Early, heavy adopter of **AI-assisted engineering**: run multiple AI coding agents in parallel under a verification-first discipline (regression tests proven to fail on unfixed code, production-data verification kits, file:line-cited audits) — absorbing a large share of the team's maintenance load without added headcount.
- Wrote and recorded the internal payments training curriculum; the go-to translator between engineering and customer-facing teams.

Earlier career (highlights)

- **NTT Data (2017, concurrent consulting)** — Replaced the Access database of a massive mid-90s C++ codebase with an ODBC-emulation layer over in-memory/read-only-file storage, turning a single-machine process into one serving many concurrent clients.
- **CTO, DocuDesk Corporation (2011–2012)** — Led development of commercial PDF products; wrote the Mac (Cocoa) version of deskPDF Creator from scratch.
- **Cofounder, MODA Interactive (2011–2012)** — Sole developer of shipped Mac/Windows/iOS products (PandaTunes, PandaRemote, Num-Num).
- **Northwestern Mutual Life (1997–2005, consultant)** — Nicknamed “The Jackknife.” Co-created the C++ and Java application frameworks that powered hundreds of internal applications; helped institutionalize that knowledge into the Engineering Competency Center; mentored dozens of developers; ported frameworks, built an MQ-emulation library, code generators, and translators.
- Earlier: Bloomberg and Deluxe Data Systems (US); Forsk and doctoral research in machine translation (France); Cyco (Netherlands).

Open source & distinctions

- **Winner, 2012 Loebner Prize** — Chip Vivant, a commonsense-reasoning chatbot built solo from scratch (custom forward/backward-chaining inference engines), years before LLMs made it look easy. First place over all entrants.
- **GCC contributor (gcj)** — 50+ accepted patches to the Java front end and class libraries; earned commit access; my enhancements are named in the official GCC 3.4 release notes.
- **Author** — *The Renaissance Software Engineer's Guide to Learning a Foreign Language* (youcanlearnthatlanguage.com), a book-length guide to foreign-language learning for software engineers.

Languages

English (native) · Dutch, French (C2) · Spanish, Italian (C1) · Portuguese, Swedish, Russian, German (B2) · Turkish (B1) · Vietnamese (A2) · currently learning Greek

Education

B.S. Applied Mathematics / Computer Science, Carnegie Mellon University · Exchange year at EPFL (Lausanne, Switzerland) · Doctoral study in machine translation (France)

Additional

US citizen; eligible to live and work in the EU (Dutch spouse). Remote-first since 2012. One of a handful on the company-wide 24/7 PagerDuty rotation for 13+ years.