

Santhosh Raju

SENIOR SOFTWARE ENGINEER

About

Senior Software Engineer with deep open-source roots: NetBSD core committer and pkgsrc developer, FreeBSD ports committer. Currently shipping Go and Kotlin microservices at HelloFresh, with a background in kernel programming, formal verification (TLA+), and secure messaging systems.

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EXPERIENCE

Jul 2022 — Present

Senior Backend Engineer

HELLOFRESH SE

📍 BERLIN, GERMANY

- Promoted to Senior SE for engineering the last-mile data pipeline from the Recipe Developer tools to the HelloFresh website, enabling safe decommission of Mendix REMPS instances across UK, DK/SE/NO, BENELUX, and FR (~€480K/year per market in Premium-tier licensing eliminated; ~€2.4M/year total).
- Moved upstream to SCM Procurement; owned master data services for Suppliers, SKUs, allergen/nutrition data per SKU, Ingredient service, and Culinary SKUs.
- Architected and led SKU Seasonality across SCM, Culinary, and Recipe: authored the service RFC, led cross-functional stakeholder negotiations, decomposed work into independently releasable components, and delivered on schedule despite evolving requirements; cut missing-SKU complaints 52% → 18% and realised ~€2.4M in savings (€327K compensation + €2.1M retention).
- Orchestrated company-wide Kafka topic restructure with one partner engineer: migrated 80+ topics across 50+ repositories in Go, Python, Kotlin, and C# — 120+ commits in four weeks with near-zero consumer downtime, coordinating across multiple domain teams; on the squad's TRE-owned topics specifically, consolidated 180 → 20 (~€9K/month infra saved).
- Built WMS connectors for Infios Warehouse Management System, implementing Goods Received Notes (GRN) processing for fulfilment operations.
- Onboarded to Finance Tech as acting team lead after departure of PM/EM and senior engineer; took ownership of domain and stakeholder network in under two months.
- Delivered Guided Buying integration (Workday Procurement ↔ Oracle Cloud Fusion): routes ~\$4B/year in Direct Procurement POs and ~\$500M/year in Indirect Procurement POs — combined ~60% of HelloFresh's €6.8B 2025 group revenue — while preserving accurate two-way PO match for payment processing.
- Cut Finance Tech infrastructure costs by 73% through archiving cold data and retiring legacy services.
- Architecting an LLM-backed domain-specific support bot for Finance: auto-resolves 95%+ of incoming Direct/Indirect Procurement support requests, eliminating the dedicated-engineer-on-queue rotation.

May 2021 — Jun 2022

Backend Engineer

HELLOFRESH SE

📍 BERLIN, GERMANY

- Built and maintained backend components of the Recipe Developer tools — the internal tool recipe developers use to input recipe steps, photography, nutrition data, and allergen metadata.
- Implemented the nutrition + allergen aggregation pipeline that surfaces correct legal-compliance data on the public HelloFresh website per recipe — affects all ~950M+ meals/year delivered globally; drove a 25% YoY reduction in food-safety errors and deprecated hundreds of hours/year of manual nutrition-compliance verification.
- Architected the recipe-card data pipeline that backs ~945 unique recipe-card designs/week across 18 markets (1 recipe = 1 card; DACH markets carry an additional Thermomix variant per recipe).
- Contributed to Mendix monolith migration: modelling recipe and nutrition data in Go services backed by PostgreSQL and integrating with downstream publishing systems.

Sep 2019 — Jul 2020

Lead Backend Engineer

SEPIA OS (SEPIAOPENSOURCE S.A.)

📍 QUITO, ECUADOR

- Sole backend engineer on Erol — a salary-advance fintech that now serves 70+ companies / 8,000+ employees, with \$4M+ in advances processed across 20K+ requests.
- Reverse-engineered legacy payment-advancement business logic into a new Django + GraphQL API backed by PostgreSQL; exposed data via Django REST Framework (DRF) alongside the GraphQL endpoint.
- Integrated with banking APIs to upload and download bulk cash management files for automated fund disbursements to multiple financial institutions.
- Implemented JWT auth and OTP second-factor via Infobip SMS.
- Maintained 100% test coverage across the backend; deployed via Docker Swarm on AWS S3/EC2, provisioned with Ansible and Terraform, CI on CircleCI.
- Collaborated on React-based frontend to close full-stack requirements.

Apr 2019 — Jul 2019

Senior Software Engineer

CENTRO DE AUTONOMÍA DIGITAL

📍 QUITO, ECUADOR

- Implemented in-band password change (XEP-0077) for coyim, an OTRv4-compliant XMPP messenger, enabling live credential rotation without session teardown.

		• Researched and prototyped trusted Tor entry guard selection for systems running under Tails OS. • Ported and maintained the full OTRv4 library suite — libotr-ng, pidgin-otrng, and libgoldilocks — for NetBSD (pkgsrc) and FreeBSD (ports), including fixes for critical bugs upstream was not yet ready to accept. • Maintained FreeBSD-based infrastructure for the organisation.
Jan 2018 — Sep 2018		Founding Engineer / Tech Lead BACKYARD INNOVATIONS PTE. LTD. (BYI SYSTEMS) 📍 BENGALURU / CHIBA, JAPAN / SINGAPORE • Studied RFC 3506 in detail and decomposed it for adoption by consensus protocols. • Wrote formal verification proofs for a voucher trading system in TLA+. • Implemented Two-Phase and Three-Phase commit protocols in Erlang as proof of concept. • Set up and maintained company infrastructure on FreeBSD with jail-based containerization.
Jul 2016 — Jan 2017		Software Engineer THE NETBSD FOUNDATION, INC. 📍 REMOTE • Co-implemented uvm_hotplug(9) with Cherry G. Mathew — a portable memory hotplug API for the NetBSD virtual memory subsystem, using TDD methodology. • Replaced the static vm_physmem array in uvm_page.c with a dynamic rbtree(3)-backed segment store, enabling runtime memory hotplug. • Wrote extensive kernel unit tests using ATF(7) drove the implementation entirely in userspace before any kernel code was committed. • Authored the uvm_hotplug(9) man page and project documentation. • Granted NetBSD community membership and commit rights as a result of this work. • Continued follow-up maintenance post-merge: test-case fixes (uvm_page_physunload_delete_end, uvm_physseg_atboot_free_leak, uvm_physseg_plugin), VM_PHYSSEG > 1 build failures, type-comparison fixes. • Published a paper and presented at AsiaBSDCon 2017 and EuroBSDCon 2017.
Apr 2017 — Nov 2018		Network Infrastructure Consultant FREELANCE / PROJECT BASIS 📍 BENGALURU, INDIA • Designed and deployed wired and wireless networks for HasGeek events (The Fifth Elephant, Anthill Inside, and others) and community conferences, supporting 1000+ concurrent clients. • Diagnosed and resolved a live pf(4) state-table exhaustion incident at The Fifth Elephant 2017 with no session interruption. • Configured enterprise-grade UniFi equipment (APs, switches, gateways) with load balancing, failover, pf(4) firewalling, dhcpd(8), and unbound(8) on FreeBSD. • Segregated networks by QoS tier to support simultaneous live streaming and attendee traffic.
Mar 2016 — Aug 2016		Drupal Consultant DRUP1 CONSULTING 📍 TRIVANDRUM, INDIA • Planned and executed migration from end-of-life Drupal 6 to Drupal 7 for Stemulite Fitness Formula. • Worked extensively with Ubercart for Drupal 7 e-commerce. • Ensured correct operation of the website after migration.
Aug 2008 — Mar 2015		Senior Drupal Developer KEENFX 📍 DALLAS, TEXAS, US (REMOTE) • Built custom ETL backends for product data synchronization between offline CRM systems and Drupal for fashion e-commerce clients including TruLuxe Jeans and Slim-Sation. • Worked extensively with Drupal Commerce (Drupal 7) and Ubercart (Drupal 6) for e-commerce customization. • Implemented SKU management, discount systems, faceted search, and payment gateway integrations. • Contributed modules back to Drupal: Commerce Fancy Image Attributes, Commerce Default Product Variant.
Jun 2008 — Feb 2012		Senior Programmer ZYXWARE TECHNOLOGIES PVT. LTD. 📍 TRIVANDRUM, INDIA • Built a rolodex and mail merge system for Narrative Magazine, an online publishing house. • Implemented PDF conversion, workflow automation, and story scheduling in Drupal 5/6/7. • Ported and supported popular Drupal modules (Search404, MailQ, Conference module). • Built payment gateway integrations (CCAvenue for Ubercart, LM Paypal). • Developed connectors for integrating Drupal 6 with SugarCRM and DimDim.
Sep 2006 — May 2007		Programmer Analyst COGNIZANT TECHNOLOGY SOLUTIONS (DUN & BRADSTREET SWISS, FACTIVA — DOW JONES) 📍 CHENNAI, INDIA • Production support for Factiva (Dow Jones) billing system on Tru64 UNIX with IBM Informix and Vertex tax engine. • Automated server health check report generation, reducing time from 2 hours to 20 minutes. • Debugged and permanently fixed the "Credit Adjustments" module (C/C++), a long-standing open issue. • Set up CI environment for the DnB Swiss engagement using .NET 2.0, NUnit, and CruiseControl.NET, achieving 95% code coverage.

- Integrated Factiva billing (CIBS) with Dow Jones FIS after acquisition — project delivered ahead of schedule with zero errors.

OPEN SOURCE

2026 — Present **Annot**

HUMAN-IN-THE-LOOP ANNOTATION TOOL FOR AI WORKFLOWS (RUST + SVELTE + TAURI)

- Contributed the Linux/NixOS port — **13 merged PRs** in 4 weeks: initial Nix flake, Wayland/WebKit2GTK rendering fixes, macOS flake target, borderless window with custom chrome and resize handles, GitHub Actions CI for Ubuntu + macOS, jsdom test mocks, and Mermaid demo target.
- Packaged Annot in the numtide/llm-agents.nix flake registry.

2016 — Present **NetBSD**

A FREE, FAST, SECURE, AND HIGHLY PORTABLE UNIX-LIKE OPEN SOURCE OPERATING SYSTEM

- Co-authored uvm_hotplug(9) with Cherry G. Mathew — a portable kernel memory hotplug API now in NetBSD-CURRENT, with continued follow-up maintenance (test-case fixes, VM_PHYSSEG > 1 build failures, type-comparison fixes).
- Implemented native NetBSD support for htop (replacing procfs with sysctl(3)/kvm(3) APIs) and set up its build pipelines for BSDs and Illumos — 12 merged upstream PRs.
- Contributed NetBSD platform support to psutil (Python) and gopsutil (Go), removing procfs dependencies and enabling pkgsrc ports for py-Glances, gotop, and bottom.
- Contributed full NetBSD support to btop (4 merged PRs): CPU, memory, battery, and thermal stats via kvm(3), CMake build, and CI integration.
- Added NetBSD, FreeBSD, and OpenBSD CI pipeline support to eza (7 merged PRs), ensuring continuous BSD builds of the Rust-based ls replacement.
- Mentored GSoC 2020 for The NetBSD Foundation — co-mentored "Enhance Syzkaller support for NetBSD" alongside William Coldwell, Siddharth Muralee, and Kamil Rytarowski; raised NetBSD syscall coverage to 50.35%.
- Fixed LLVM build failures in external/gpl3/gcc, external/mpl/dhcp, and external/bsd/ipf, enabling NetBSD builds under the Clang/LLVM toolchain.
- Added USB HID support to the kernel for Logitech Gamepad F310 and Logitech Dual Action Gamepad.
- Contributing to code sanitisation and fuzzing efforts with the NetBSD QA team: 38+ compiler-warning fixes (-Werror=stringop-truncation, -Werror=format-overflow, -Werror=maybe-uninitialized, -Werror=conversion, and others) across 25+ subsystems spanning kernel, userland, and third-party imports.
- Author and maintainer of 20+ pkgsrc packages including wolfssl, btop, din, fasttracker2, libdecaf, msedit, coyim, and py-Glances.

2019 — Present **FreeBSD**

A POWERFUL, OPEN SOURCE OPERATING SYSTEM

- Author and maintainer of 21+ FreeBSD ports including babashka, opengist, wolfssl, din, fasttracker2, markless, headscale, and pdfrip.
- 35 Bugzilla bugs handled as port maintainer; 83 total Bugzilla contributions across all states (zero unresolved tickets).
- Contributed LDAP authentication upstream to opengist (thomiceli/opengist#470, #385); SQLite scheme-URI fix (#387).

2005 — Present **SICvm**

A SIC BASED VIRTUAL MACHINE

- Developed a virtual machine emulating the SIC architecture (assembler, macro processor, VM). BSD-licensed.

2009 — 2015 **Drupal**

THE WEB'S MOST POWERFUL OPEN SOURCE CMS

- Authored Commerce Fancy Image Attributes and Commerce Default Product Variant modules.
- Contributed features and bug fixes to Search404, MailQ, Pop-up Announcement, and Conference modules.
- Ported modules across Drupal 5, 6, and 7.

PERSONAL PROJECTS

2005 — Present **SICvm — Virtual machine emulator in C**

 [GITHUB.COM/FRAGGERFOX/SICVM](https://github.com/FRAGGERFOX/SICVM)

- Developed a virtual machine emulating the Simplified Instruction Computer (SIC) architecture, including assembler, macro processor, and VM. B.Tech thesis project, re-licensed to BSD in 2014.

2016 **decant — Android notification filter framework**

 [GITHUB.COM/DECANT/DECANT](https://github.com/DECANT/DECANT)

- Android framework for filtering SMS notifications via JavaScript — embedded Mozilla Rhino runtime, hot-loaded .js plugins from external storage, three shipped example plugins (IRCTC train tickets, Domino's coupons, Amazon delivery). "If you can't decant, distil it." Presented at JSFoo 2016.

2014 — 2015 **evend — Conference event-management app**

[GITHUB.COM/CHERRYMATHEW/EVEND](https://github.com/CherryMathew/evend)

- Three-tier event-management app for HasGeek's Hillhacks 2015 conference (Android + GWT + Node.js/MongoDB), co-built with Cherry G. Mathew (NetBSD developer). Attendee sign-up with OAuth, accommodation booking, taxi-pickup scheduling (FIFO dispatch), talk submission, venue map, IRC chat. First step in a four-year engineering partnership with Cherry that later led to NetBSD uvm_hotplug(9) and BYI Systems voucher trading.

2026 — Present **Annot — Linux/NixOS port maintainer**

[GITHUB.COM/DENOLEHOV/ANNOT](https://github.com/denolehov/annot)

- Owns the Linux/NixOS port for Annot — a Tauri-based human-in-the-loop annotation tool for AI workflows. 13 merged PRs in 4 weeks: Nix flake packaging (Linux + macOS), Wayland/WebKit2GTK fixes, borderless Linux window with custom chrome and resize handles, GitHub Actions CI for Ubuntu + macOS, and jsdom test infrastructure.

2015 — 2017 **KeK (Kovalam e-Kalari) — Community hackerspace**

[KEK.ORG.IN](https://kek.org.in)

- Co-founded a hackerspace focused on hands-on learning. Maintained infrastructure, taught children about computers, organized Hackbeach conferences (2015, 2016).

2017 **SudoCash — Peer-to-peer IOU system**

[GITHUB.COM/SUDOCASH](https://github.com/sudocash)

- Advised on protocol design for a decentralized IOU system inspired by India's 2016 demonetization. Led to subsequent work on RFC 3506 and consensus protocols with Backyard Innovations Pte. Ltd.

PUBLICATIONS & TALKS

2025 **The Future of Login**

HOW DRUPAL CAN CHAMPION USER CHOICE, PRIVACY, AND SIMPLICITY

[CONFERENCE TALK](#)

- Presented at DrupalCon Vienna 2025 with co-presenters Unnikrishnan and Anish Anilkumar, in collaboration with Hello Coop (founder Dick Hardt).
- Contributed to the hellocoop/php SDK (Playwright e2e tests + CI) and the hello_login Drupal module, integrating Hello's privacy-preserving identity system with Drupal's auth layer.

2017 **Portable hotplugging**

NETBSD'S UVM_HOTPLUG(9) API DEVELOPMENT

[PAPER](#)

- Replaced uvm(9)'s static vm_physmem array with a dynamic rbtree(3)-backed segment store, *enabling live memory hotplug API*; TDD-driven via atf(7) unit tests run in userspace before any kernel code; authored the uvm_hotplug(9) man page.
- Co-authored with Cherry G. Mathew paper + talk at AsiaBSDCon 2017, talk at EuroBSDCon 2017.

2016 **decant**

IF YOU CAN'T DECANT, DISTILL IT

[CONFERENCE TALK](#)

- Built a plugin-driven Android framework that intercepts SMS broadcasts and routes them through JavaScript filter/extractor functions; plugins load from external storage at runtime, enabling hot-swappable rules without app reinstallation.
- Embedded Mozilla Rhino at optimization level -1 for Dalvik/ART compatibility as the in-process JS engine, bridging Android broadcast events to user-defined JavaScript logic.
- Shipped plugins for Amazon order tracking, Domino's pizza delivery, and IRCTC railway reservations — parsing transactional SMS into structured key-value data via regex.
- Presented at JSFoo 2016.

2016 — 2017 **How World of Warcraft Made Me a Better Programmer**

[CONFERENCE TALK](#)

- Presented at Hackbeach 2016 and Hillhacks 2017.
- Mapped progressive raiding directly onto the software development lifecycle: boss analysis → problem decomposition → unit testing → integration testing → production deployment → performance optimisation.
- Argued that discipline in raids — like discipline in code — matters not for preventing failures but for minimising the time to trace and isolate them.
- Traced a personal leadership arc: mentored newcomer → core raider (individual contributor) → co-raid-leader in guild Foresight, paralleling the solo developer → team member → tech lead progression, including the trade-offs: sacrificing individual performance for team visibility, and making impartial decisions under pressure.

TECHNICAL SKILLS

- **Languages:** Go, Rust, Kotlin, C, Python, Java, Erlang, PHP, JavaScript, TypeScript, Shell scripting
- **Tools & Frameworks:** Kafka, Docker, PostgreSQL, Django, GraphQL, DRF, Tauri, Svelte, Nix, GitHub Actions, CircleCI, Git, CVS, SVN

- **Systems:** NetBSD, FreeBSD, Linux, NixOS, Tru64 UNIX, pf(4), jails, DHCP/DNS infrastructure
- **Networking:** UniFi (APs, switches, gateways), QoS, load balancing, failover
- **Practices:** TDD, TLA+ formal verification, microservices, pair programming, Agile

EDUCATION

2002 — 2006

Bachelor of Technology, Computer Science and Engineering

COLLEGE OF ENGINEERING, TRIVANDRUM — UNIVERSITY OF KERALA

📍 KERALA, INDIA

- Thesis: SICvm — A SIC based virtual machine (sicvm.sourceforge.net).
- Awarded with Distinction.