

Akash Agarwal

Full-stack, Platform Engineer

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Professional Summary

Full-stack & platform engineer with 8+ years architecting distributed systems, cloud infrastructure, and AI-integrated applications across GCP, Azure, and on-prem. Owns technical direction end to end—identifying the high-leverage path through ambiguous problems and delivering it from planning to production, whether a risk-critical database migration, platform-wide performance work, or a GenAI product shipped solo. Combines deep technical expertise with client-facing communication in research and enterprise settings.

Technical Skills

Languages: TypeScript, JavaScript, Python, Java, Dart, Ruby, C#, Zsh/Bash

Frontend: Next.js, React, Vue, Flutter, SurveyJS, Material UI, Tailwind

Backend: Spring Boot, FastAPI, Node.js (Hapi/Express), Ruby on Rails, Supabase

Databases: PostgreSQL (pgvector, Drizzle ORM, pgBackRest, TimescaleDB, foreign data wrappers), BigQuery, RabbitMQ, Redis, MySQL, MongoDB

Cloud & DevOps: GCP (GKE, Cloud Run, IAM, Logging), Azure (Container Apps, AI Foundry), Kubernetes, Docker, Terraform, Pulumi, Bicep, GitHub Actions

AI/ML: LangChain, Azure OpenAI, Groq, MLFlow, TensorFlow/Keras, Weights & Biases

Auth & Security: Auth0, Keycloak (OAuth2.0/OIDC), Row-Level Security, network sandboxing (nftables, mitmproxy), traffic analysis (Zeek, tshark, tcpdump)

Third-Party Integrations: Twilio, Mailgun, Brevo, Metabase

Experience

Software Engineer | Aug 2020 - Present | Applied Artificial Intelligence Institute (A2I2), Deakin University, Melbourne, AU

Principal Responsibilities

- Primary technical contact for Deakin's GCP Subject Matter Expert; drive security initiatives and enterprise-grade implementations across multiple GCP projects.
- Budget technical infrastructure for 5+ research grant applications, evolving processes for improved forecasting reliability.
- Mentor developers in modern technologies, cloud platforms, and best practices.
- Architect monitoring, alerting, and governance policies across multi-project infrastructure with 2 billing accounts.
- Lead CI/CD initiatives including GitHub Actions migration, comprehensive code reviews, and technical documentation.
- Conduct security audits, performance optimization, and feasibility assessments for third-party integrations.
- Built AI-assisted engineering tooling, including a Claude-based platform-wide log-analysis workflow.

Project: Conductor (2020 - Present)

Cloud Infrastructure & Platform Engineering

- Manage multi-cloud infrastructure across Google Cloud Platform with comprehensive cost analysis for research grant applications.
- Implement Infrastructure-as-Code using [Terraform](#) and [Pulumi](#) to provision IAM policies, Workload Identity Federation pools, GCS buckets, Secret Manager, Compute Engine, Cloud Run/Functions, and monitoring/alerting resources—refactoring shared modules for reuse across multiple projects.
- Migrated cluster authentication to Workload Identity Federation with Secret Manager, eliminating static service-account keys.
- Led Spring Boot migration from 2.2.7 to 3.3.4 with zero downtime for platform serving hundreds of research participants.
- Architect GCP observability at scale: log-based metrics, uptime checks, and alert policies for database, node-scaling, message-queue, and load-balancer health, routed to dedicated Slack channels.
- Optimize Kubernetes resource consumption using custom capacity-analysis tooling, achieving significant hosting cost reductions.
- Pro-active mitigated multiple critical security vulnerabilities throughout the project's lifespan.
- Built a hardened, network-isolated sandbox (Docker, non-root, nftables egress control, mitmproxy TLS interception) to safely execute and audit untrusted third-party tooling—capturing and inspecting all outbound traffic, including JVM TLS, to vet what open-source dependency tools exfiltrate.
- Migrate to managed SSL certificates across multiple domains.
- Hardened production disaster recovery with resilient backup pipelines and failure diagnostics.

Application Development

- Contribute to and review code for a complex asynchronous distributed system involving AI, Postgres, SpringBoot, RabbitMQ, etc.
- Implement contract testing using [Pact](#) with guidelines for team adoption.
- Established centralized dependency management with [OpenRewrite](#) integration for automated updates.

Platform Modernization & Performance (2025 - Present)

- Led an in-place PostgreSQL 11→18 / TimescaleDB upgrade of a ~300GB production cluster on Kubernetes, reducing downtime from days to minutes via a rehearsed, snapshot-based migration strategy.

- Added GraalVM native-image support across all Java services with a benchmarking harness for faster startup and lower resource footprint.
- Upgraded Spring Boot from 3.3.4 to 3.5.x and rolled out ECS structured logging platform-wide.
- Modernized toolchain: migrated frontend from npm to pnpm and CI to Node 24 LTS.

Project: CARES (2025 - Present)

Full-Stack Development & Generative AI Integration

- Sole-engineer delivering a clinical survey platform in 6 weeks for overseas conference demonstration, translating an 1800+ question psychological assessment instrument into [SurveyJS](#) with integrated GenAI workflows.
- Integrated [Azure AI Foundry](#) to elicit comprehensive, clinically-relevant responses from UK families reporting children’s mental health concerns, reducing clinician-family communication cycles.
- Built production solution using [Next.js](#) with TypeScript, SurveyJS for dynamic form generation, and [Drizzle ORM](#) for type-safe database operations.
- Deployed on [Azure Container Apps](#) with [MLFlow](#) for experiment tracking, implementing TDD in an unfamiliar tech stack under strict deadline.
- Provisioned Azure infrastructure with Bicep IaC—Container Registry, Container Apps, Blob Storage, and Functions—with a PowerShell auto-stop runbook for cost control.
- Engineered a resilient async pipeline with Dead Letter Queue handling and a self-hosted, auth-secured MLFlow deployment for experiment tracking.
- Built a survey ETL pipeline converting the 1800+ question instrument to SurveyJS with DSM-5 mapping, conditional visibility, and PII filtering of children’s identifiers.
- Serve as primary client liaison with BlackDog Institute, translating clinical requirements into technical specifications.

Project: MemoryAid (2025 - Present)

Mobile Development & Backend Architecture

- Established [Supabase](#) backend architecture including schema design with linting, Row-Level Security policies, pgTap testing, and edge functions for multi-database operations.
- Implemented [Flutter](#)/Dart mobile application with local storage and Supabase integration.
- Developed reliable data migration pipelines between Conductor and Supabase platforms.
- Contributed to project direction through technical documentation and pull request reviews.

Project: Living Knowledge (2024)

Machine Learning & AI Engineering

- Architected PDF processing solutions leveraging GPT-3/4 integration with fuzzy matching and semantic search for document analysis.
- Implemented database solutions using pgvector and tsvector for vector similarity and full-text search.
- Deployed containerized MLFlow experiment tracking infrastructure for reproducible ML workflows.
- Developed proficiency with open-source LLMs and SLURM cluster management for HPC environments.

Project: Cognitive Reviewer (2023)

Full-Stack Development

- Authored engineering specifications for user feedback collection systems, leading full-stack implementation from design to deployment.
- Developed RESTful APIs using [FastAPI](#), establishing comprehensive Python testing frameworks.
- Implemented frontend features using React for cognitive assessment tools.

Software Engineer | Mar 2019 - Jun 2020 | Deakin University, Melbourne, AU

- Led engineering and product ownership across projects using React, [Hapi](#), MySQL, MongoDB, Redis, [Socket.io](#), and PostgreSQL.
- Primary technical liaison for multiple clients, managing stakeholder expectations while implementing Agile methodologies.
- Developed standards for secure, maintainable code and deployments using Docker Swarm and docker-compose.

Project: Educator Health Reporting System (2019-2020)

- Developed backend using Hapi framework integrating with [REDCap](#) API, syncing participant data across systems with [Sequelize ORM](#).
- Designed 4NF database schema and migrated ~19K records using parallel batch processing.
- Built React frontend with [Material UI](#), iterating wireframes with stakeholders using Balsamiq and Adobe XD.

Project: Overseer (2019)

- Engineered containerized Ruby application for executing and evaluating untrusted student code submissions within the [OnTrack](#) learning management system.
 - Developed Ruby gem for shared functionality between Overseer and OnTrack with RabbitMQ integration via [Bunny](#).
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Casual Academic | Mar 2019 - Jun 2020 | Deakin University, Melbourne, AU

Tutored Object-Oriented Programming (C#), Data Structures & Algorithms, and IoT Software Architecture using AWS and IBM Cloud.

Software Engineer Intern | Nov 2018 - Feb 2019 | Deakin University, Melbourne, AU

Developed React frontend and Hapi/MongoDB backend applications. Executed Agile spikes and authored technical documentation using UML methodologies.

Freelance Software Developer | Jul 2016 - Jan 2018 | India

Built mobile applications using Qt and Android with Node.js and Ruby on Rails backends. Deployed WordPress solutions with optimized Nginx configurations.

Education

Masters of IT (Professional) | 2019 | Deakin University, Melbourne, AU

Specialization in Cyber Security

Minor thesis on automatic assessment systems led to Project Overseer implementation.

Open Source

- doubtfire-api: github.com/doubtfire-lms/doubtfire-api
- smartCapitaliseJs: akashagarwal7.github.io/smartCapitaliseJs