

# Kasun Abaywardana

Full-Stack Developer & AI Engineer

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Senior Full-Stack Software Engineer with 9+ years of experience specializing in **Frontend optimization**, **AI integration**, and **Cloud-Native AWS Architecture**. Expert in architecting enterprise applications using **React** and **(NestJS, Fast API) microservices**. Proven expertise in designing scalable **Serverless systems** with AWS Lambda, API Gateway, and **Infrastructure as Code (IaC)** via CloudFormation. Deep hands-on experience developing AI solutions, including **Retrieval-Augmented Generation (RAG)** Systems with Agentic features and **LLM orchestration**.

## Technical Skills

- **Languages:** JavaScript (ES6+), TypeScript, Java, Python.
- **AI & LLM Engineering:** RAG Systems, Agentic Pipelines, LLM Orchestration (OpenAI, Hugging Face), Ollama, MCP, LangChain, LangGraph
- **Frontend & UI Architecture:** Micro Frontend Architecture, React (Next.js, Vite), Vue.js, Angular, Tailwind CSS, Ant Design, Material UI.
- **Backend & Microservices:** Node.js, NestJS, Express.js, Python (Django), Java (Spring Boot).
- **AWS Cloud Architecture (IaC):** Serverless (Lambda, API Gateway), CloudFormation, S3, EC2, RDS, CloudFront, AWS Secrets Manager.
- **Databases & Storage:** PostgreSQL (including pgvector), MySQL, MongoDB, DynamoDB, Redis.
- **DevOps & Deployment:** Docker, Kubernetes/OpenShift, CI/CD (Jenkins, Ship-Hats, Bamboo), Bitbucket, Github Actions.
- **Mobile Development:** React Native, Cordova.
- **Tools & Testing:** Git (GitHub, GitLab), Jest, JIRA, Confluence.

## Professional Experience

<b>Software Consultant</b> - IBM (deployed at Monetary Authority Singapore), Singapore	Aug 2023 - Present
<b>Senior Software Engineer</b> - Cognizant Technology Solutions, Singapore	Nov 2022 - Aug 2023
<b>Associate Tech Lead</b> - BISTEC Global Services (Pvt) Ltd, Sri Lanka	Feb 2022 - Nov 2022
<b>Senior Software Engineer</b> - Softcodeit Solutions (Pvt) Ltd, Sri Lanka	Mar 2021- Feb 2022
<b>Senior Software Engineer</b> - Payment Services (Pvt) Ltd / SDB ( <b>UPay</b> ), Sri Lanka	Jan 2018 - Feb 2021
<b>Software Engineer</b> - Payment Services (Pvt) Ltd ( <b>UPay</b> ), Sri Lanka	Apr 2017 - Dec 2017
<b>Software Engineer</b> - Crowderia (Pvt) Ltd, Sri Lanka	April 2016 - Apr 2017
<b>Software Engineer, Intern-</b> Crowderia (Pvt) Ltd, Colombo, Sri Lanka	Aug 2015 - Apr 2016

## Key Project Experience

<b>Financial AI Platform - Full-Stack Lead Developer</b> (MAS through IBM)	Sep 2024 - Present
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A strategic enterprise platform designed to accelerate AI adoption within the financial sector by enabling the discovery and implementation of peer-recommended AI use cases.

### Major Technologies & Tools

React (Vite), Node.js, Python/Django, AWS (Lambda, API Gateway, S3, RDS, Secrets Manager), PostgreSQL, OpenAI, Docker, Jenkins, MCP

### Key Achievements

- **AWS Infrastructure Optimization:** Architected a serverless backend that reduced deployment time by ~60% and operational costs by 40% through **AWS Lambda** auto-scaling and **Infrastructure as Code (IaC)** via the **Serverless Framework**.
- **Quality Engineering:** Established a rigorous testing culture, achieving **80%+ unit and integration test coverage** across all system layers.
- **Operational Efficiency:** Integrated **Google Sheets API** for real-time content/event synchronization, cutting administrative update times by ~80% and enabling non-technical stakeholders to manage data without code changes.

### Responsibilities

- **Backend & Cloud Architecture:** Designed and implemented a scalable serverless architecture featuring **DynamoDB** schema design and **CloudFormation** stacks for automated, resilient deployments.
- **API Orchestration:** Configured **API Gateway as Code** with secure API key management, orchestrating REST endpoints for the frontend, **RAG chatbot**, and Lambda services.
- **AI Engineering:** Developed high-performance backend APIs for an **AI-powered RAG chatbot** using **Python/Django** and **PG vector store** for precision financial knowledge retrieval.
- **Frontend Leadership:** Delivered a mobile-responsive, pixel-perfect **React** frontend using a modular **Micro Frontend-ready** component architecture.
- **Security & Auth:** Led end-to-end secure integrations across all services using **JWT/OTP authentication** and established robust **CI/CD pipelines**.

**CBDC Platform- Full-Stack Lead Developer**  
(MAS through IBM)

Aug 2023 - Present

The CBDC (Central Bank Digital Currency) platform is a high-security, two-phase request and issuance platform developed for the Monetary Authority of Singapore (MAS). It facilitates the digital currency lifecycle, including minting, burning, and auditing, within a strictly regulated environment.

### Major Technologies & Tools

React (Next.js/Vite), NestJS, Solidity/OpenZeppelin, Hyperledger Besu (ERC-20), PostgreSQL, AWS (EC2, S3, RDS), Docker, OpenShift, Jenkins

### Key Achievements

- **Smart Contract Development:** Deployed upgradeable **ERC-20 contracts** utilizing the **OpenZeppelin UUPS proxy pattern**, ensuring secure mint/burn operations for simulated financial transactions with **zero downtime**.
- **Observability & Auditability:** Integrated a private **Blockscout explorer** for real-time on-chain monitoring, reducing transaction debugging time by ~70% and establishing live audit trails for stakeholders.

- **Security & Compliance:** Achieved **~99% compliance** in **MAS security audits** by implementing **Role-Based Access Control (RBAC)** integrated with **OpenID SSO** and **Active Directory**.

## Responsibilities

- **Project Architecture:** Engineered a modular, component-driven frontend in **React JS**, implementing **Micro Frontend** principles to deliver net-new features and UX improvements.
- **Blockchain & API Orchestration:** Designed and built **RESTful APIs** using **Node.js / NestJS**, successfully abstracting complex **JSON-RPC** calls to a private **Hyperledger Besu** node.
- **Data Modeling:** Architected relational databases in **PostgreSQL** using **TypeORM**, managing complex migrations to ensure data integrity.
- **Cloud Infrastructure & DevOps:** Containerized microservices using **Docker** and authored **Kubernetes/OpenShift** manifests for multi-environment rolling releases (Dev, QA, Prod).
- **AWS Security Management:** Secured runtime secrets and assets using **AWS Secrets Manager**, **S3**, and **RDS**, enabling high-availability and zero-downtime schema changes.
- **Technical Governance:** Conducted comprehensive **unit testing**, maintained **CI/CD pipelines**, and authored detailed technical specifications for enterprise-grade maintainability.

## Custom AI Knowledge Base Platform – R&D AI (Side Project)

Jan 2024 - Jul 2024

The Custom AI Knowledge Base Platform was a specialized R&D project focused on building a secure, private environment for document-based intelligence and retrieval.

## Major Technologies & Tools

React (Vite), NestJS, PostgreSQL, Ollama/Llama3, TypeScript, Docker, AWS EC2

## Key Achievements

- **AI Validation Engineering:** Developed a custom ML response scoring system using embedding similarity thresholds, achieving **~65% accuracy** in validating LLM outputs against document context for reliable Q&A.
- **Agentic Pipeline Implementation:** Engineered an **Agentic pipeline** that autonomously handles prompt transformation and context retrieval, significantly improving the relevance of AI-generated answers.

## Responsibilities

- **AI Architecture:** Implemented a modular AI agent platform featuring a decoupled frontend and backend for high scalability.
- **Vector Pipeline:** Built high-performance APIs to ingest documents as byte streams, generate **vector embeddings**, and store contextual matrices in a **PostgreSQL** backend.
- **Agentic Orchestration:** Designed and optimized **Agentic workflows** and LLM interaction patterns to generate precise, user-specific answers.
- **Scoring Logic:** Developed and fine-tuned a custom ML-based response scoring system utilizing embedding similarity thresholds for output verification.
- **Development:** Created a responsive, interactive chat interface using **React** and **Tailwind CSS**.
- **Cloud Deployment:** Containerized the entire ecosystem (FE, BE, and Embedding Engine) using **Docker** and deployed via **AWS EC2** instances.

## Public Service Discovery Platform - Senior Developer (Govtech through Cognizant Technology Solutions)

Nov 2022 - Aug 2023

A comprehensive set of web applications aims to aid the general public in Singapore in discovering places and acquiring knowledge about the diverse services offered by these establishments. The application comprises both back-end and front-end components, back-end based on AWS serverless architecture.

### Major Technologies & Tools

React, NestJS, AWS (Lambda, API Gateway, S3, CloudFront), Jest, Bamboo CI/CD

### Key Achievements

- **Scalable Public Infrastructure:** Delivered high-performance **React/NestJS** features for a Singapore public service discovery application, successfully supporting **100K+ monthly users** with **~99% uptime** via **AWS Serverless architecture**.
- **Performance Engineering:** Optimized **AWS Lambda APIs** and **CloudFront CDN** configurations, resulting in a measurable **~25% reduction** in page load times.
- **Quality Assurance:** Maintained a stable, error-free production environment through the implementation of rigorous **unit testing** and **end-to-end testing** suites.

### Responsibilities

- **Development:** Engineered new features and resolved complex bugs using **React JS** for frontend enhancements and **Node.js/NestJS** to extend backend functionality.
- **Cross-Functional Collaboration:** Partnered with project managers and UI/UX designers to translate business requirements into high-quality, user-centric interfaces.
- **Technical Governance:** Upheld high code quality and architectural standards through active participation in **peer code reviews** and the documentation of technical specifications.
- **DevOps & CI/CD:** Managed minor configurations for **CI/CD pipelines** (Bamboo) to ensure streamlined deployment workflows.
- **Agile Execution:** Contributed to a fast-paced development lifecycle by engaging in **Agile processes**, including daily stand-ups, sprint planning, and retrospectives.

## TAFI - Associate Tech Lead (BISTEC Global Services (Pvt) Ltd)

Mar 2022 - Nov 2022

AFI is a cloud-native tax planning and lodgment application designed for individual income taxpayers to automate the end-to-end tax filing process. The ecosystem consists of three specialized web-based applications: an Admin portal, a Tax Practice portal, and a Client portal.

### Major Technologies & Tools

React JS, Node JS, Express, TypeScript, ANT Design, MongoDB, Redis, SCSS, NX Console, Azure DevOps, VS Code, Jira, Confluence

### Key Achievements

- **Technical Leadership:** Successfully guided and mentored a team of 3 junior members to ensure high-quality delivery and professional growth.
- **Architecture & Design:** Collaborated directly with the Tech Lead to architect scalable software systems and design technical specifications for long-term maintainability.

## Responsibilities

- **Development:** Engineered the full project structure and developed new frontend features using **ReactJS** while building robust backend APIs with **Node.js Express**.
- **Database Architecture:** Designed and implemented complex database structures utilizing **PostgreSQL** and **Sequelize**.
- **Strategic Collaboration:** Partnered with Product Owners and Tech Leads to define critical project goals, deliverables, and timelines.
- **Quality & Governance:** Enforced high-quality code standards through rigorous peer code reviews and contributed to UI design reviews to improve application quality.
- **Agile Execution:** Actively participated across the full SDLC and engaged in **Agile processes**, including daily stand-ups and sprint planning, to meet business objectives.

**SharpCloud - Associate tech lead**  
(BISTEC Global Services (Pvt) Ltd)

Jan 2022 - Mar 2022

Legacy Web application that comprises a data visualisation tool at its core and a low-code suite for enterprises to support road-mapping, risk planning, and strategic decision-making.

## Major Technologies & Tools

Angular 9, JavaScript, .NET Core, SQL Server, Azure, git, Jira, Confluence

## Key Achievements

- **System Modernization:** Led the identification and resolution of critical legacy issues within the web client to stabilize production environments.
- **Performance Optimization:** Successfully refactored unscalable code segments, significantly improving the maintainability and execution speed of the client application.

## Responsibilities

- **Legacy Refactoring:** Collaborated with cross-functional team members to diagnose and fix deep-seated legacy defects in the web client.
- **Code Quality & Maintenance:** Refactored non-performant codebases to align with modern scalability requirements and long-term maintainability standards.
- **Technical Requirement Analysis:** Partnered with Project Managers to define project domains, core functionalities, and complex technical specifications.
- **Governance & Standards:** Enforced strict adherence to industry best practices, coding standards, and internal company guidelines.
- **Agile Execution:** Engaged in high-velocity **Agile processes**, including daily stand-ups and sprint planning, to ensure project alignment with business objectives.

**AVATARIN - Senior Software Engineer**  
([avatarian.com](https://avatarian.com) Side Project)

Oct 2020 - Sep 2021

AVATARIN is a specialized web and mobile-based platform designed to empower physically disabled individuals by facilitating seamless connections with robots in public spaces. The platform allows users to purchase time slots and remotely control robots through an intuitive interface.

## Major Technologies & Tools

React (Redux, MUI), Node.js, TypeScript, MongoDB, JWT, SCSS, AWS (EC2/S3), Jira

## Key Achievements & Responsibilities

- **Frontend Engineering:** Implemented new user journeys and UI enhancements using **React JS** and **Material UI (MUI)**.
- **Backend Development:** Developed robust APIs with **Node.js** and **MongoDB** to support cross-platform functionality.
- **Real-time R&D:** Conducted research and development on real-time communication protocols between web servers and physical robotic devices.
- **System Optimization:** Collaborated with the Tech Lead to improve performance and project scalability while enforcing code quality through peer reviews.
- **Agile Execution:** Actively engaged in daily stand-ups and sprint planning to ensure rapid, high-quality delivery.

## ONLINE BANKING SOLUTION - Senior Software Engineer

Mar 2021 - Jan 2022

Online Banking solution for credit union (USA) customers to facilitate online banking and specific third-party services. The application is comprised of separate web and mobile components, both based on a customised JavaScript framework (Kony).

### Major Technologies & Tools

Kony, JavaScript, Java, Fabric pre-processors, Bitbucket, Android Studio

### Key Achievements & Responsibilities

- **Development:** Developed and customized frontend functionality using **JavaScript** while engineering high-performance **Java** backend pre-processors to enhance system scalability.
- **Java Backend Optimization:** Leveraged **Java** to build robust Fabric pre-processors, improving core functionality and backend data handling.
- **Performance & Clean Code:** Refactored legacy codebases to improve maintainability and conducted rigorous **unit testing** and **peer code reviews** to ensure production stability.
- **Problem Solving:** Troubleshoot complex technical issues and collaborated with designers to align the application with business requirements and user needs.
- **Agile Execution:** Actively participated in **Agile practices**, including sprint planning and retrospectives, to ensure timely project delivery.

## UPay - Senior Software Engineer

Apr 2017 - Feb 2021

SDB Bank (UPay)

UPay is an award-winning digital payments ecosystem in Sri Lanka. It provides high-performance retail payment solutions, including utility bill settlements, instant mobile reloads, and online banking facilities.

### Major Technologies & Tools

Angular 6, Cordova, Spring Boot, MySQL, Node.js, Firebase, Google Cloud Functions

### Key Achievements

- **Mobile Architecture Excellence:** Engineered modular components for an award-winning hybrid mobile application, significantly enhancing user experience and app functionality.
- **FinTech Connectivity:** Successfully developed and integrated native **Android and iOS plugins** to bridge the digital wallet with the **JUST PAY** switch system.
- **High-Performance Scaling:** Improved application scalability and performance by implementing targeted backend logic using **Node.js** and **Firebase**.

- **Technical Leadership:** Drove team excellence by leading **tech talk sessions** and conducting rigorous peer code reviews to ensure clean code standards.

## Responsibilities

- **Hybrid Mobile Engineering:** Developed new features and modules using **Angular** and **Cordova** for cross-platform mobile deployments.
- **Backend & Cloud Development:** Built partial backend functionality and serverless tasks using **Node.js**, **Firebase**, and **Google Cloud Functions**.
- **Native System Integration:** Authored native mobile plugins (Java/Swift) to facilitate secure financial transactions.
- **Agile Collaboration:** Partnered with UI designers and product owners to deliver visually appealing features aligned with business goals.
- **Governance & Process:** Actively participated in **Agile practices**, including daily stand-ups, sprint planning, and retrospectives to ensure timely delivery.

## Back-Office Admin Panel for Upay - Software Engineer SDB Bank (UPay)

Feb 2018 - Mar 2019

The Admin Panel serves as the central operational hub for the UPay payment wallet, managing all critical back-office functions and supporting the core banking wallet infrastructure.

### Major Technologies & Tools

React JS, Redux, TypeScript, JS PDF, SCSS, Java 8, Spring Boot, MySQL, Bitbucket

### Technical Contributions

- **Development:** Developed the application's front-end using **React with MUI** and engineered the back-end using **Java (Spring Boot)**, **Firebase**, and **MySQL**.
- **State & Type Management:** Implemented **Redux** for state management and utilized **TypeScript** to ensure clean, maintainable, and type-safe code.

## Grade5 (Examination Portal) - Associate Software Engineer Crowderia (Pvt) Ltd, Colombo

Aug 2015 - Mar 2017

An end-to-end educational portal for Grade 5 students featuring scholarship examinations, automated results, and progress analytics for parents.

### Major Technologies & Tools

Angular 2, CSS, Node JS, MongoDB, Android, Java, Bitbucket

### Technical Contributions

- **Development:** Engineered the client front-end and administrative panel using **Angular 2** and developed the core **API** with **Node JS**.
- **Mobile Engineering:** Contributed to the development of native **Android and iOS** mobile applications to extend platform accessibility.
- **Database Management:** Designed and maintained the data layer using **MongoDB** to store examination papers and student progress metrics.

## **Education Qualifications**

- **B.Sc. in Computer Science (full-time)** - University of Colombo, Sri Lanka  
(Feb 2013 - Apr 2016)
- **Advanced Business Solution Developer** - IJSE, Sri Lanka  
(Nov 2011 - Oct 2012)

## **Certifications**

- [Frontend Developer \(React\) Certificate](#) - HackerRank (Jan 2026)
- [Generative AI for Executives](#) - AWS (Aug 2024)
- [AWS Lambda & Serverless Architecture Bootcamp](#) - Udemy (May 2023)

## **Languages**

- English (Fluent Reading and writing)
- Sinhalese (Native)

## **Professional Links**

- **Portfolio:** <https://kasun002.github.io/portfolio.me/>
- **Git:** <https://github.com/Kasun002>
- **Medium:** [@abaywardanakasun](#)