Sanath N Upadhyaya

Boston, MA | +1 (617) 331-5342 | sanathn.upadhyaya@gmail.com | @sanath-n-u | Webpage | Github

PROFESSIONAL SUMMARY

Cloud and AI Infrastructure Engineer specializing in Kubernetes automation, secure identity, and zero-trust architectures. Builds and operates scalable cloud platforms, emphasizing infrastructure automation, observability, and operational reliability.

EDUCATION

Master of Science in Computer Science Aug 2025 - Present
Northeastern University, Boston, MA GPA: 4.0
Coursework: Programming Design Paradigm, Reinforcement Learning, Algorithms, Database Systems

Bachelor of Engineering in Electronics and Communication Engineering 2019 - 2023
BMS College of Engineering, Bengaluru, India GPA: 9.15 / 10
Coursework: Operating Systems, Machine Learning, Internet of Things, Number Theory

WORK EXPERIENCE

Cloud Developer | Hewlett Packard Enterprise , Bengaluru, India Aug 2023 - Aug 2025

- *Infrastructure Automation:* Automated RedHat OpenShift cluster deployments using Python and REST APIs, reducing setup time by 30%.
- *AI Enablement:* Led the development of Private Cloud AI Essentials (PCAI) on developer systems (XS) to enable faster iterative access to AI hardware, reducing deployment time by 40%. Implemented storage solution with Minio S3 and storage operators in Kubernetes.
- *Security Engineering:* Implemented Keycloak- and OAuth2-based authentication pipelines; migrated from legacy LDAP to Greenlake IAM and Okta.
- *Zero-Trust Architecture:* Implemented zero-trust microservice authentication with Istio and SPIRE.
- *Prototyping & LLM Research:* Developed a multi-agent system generator using LangChain and CrewLLM as part of HPE's LLM Tool Mesh initiative.
- *CI/CD & Reliability*: Integrated backend services and automation into CI/CD pipelines (Jenkins, GitHub Actions), and added basic unit and integration tests using pytest to improve reliability of deployments.

Software Engineering Intern | Hewlett Packard Enterprise, Bengaluru, India Jan 2023 - July 2023

- Implemented secure access for Ezmeral Runtime Engine using Keycloak and OAuth2-proxy; enabled OpenShift support for HPE Unified Analytics and optimized Prometheus performance.
- Automated Red Hat OpenShift cluster installation using Python and REST APIs, reducing deployment time by 30%.

Software Engineering Intern | Bosch Global Software Services, Bengaluru, India Jun 2022 - July 2022

- Worked on UDS in Automotive Embedded systems. Wrote scripts for diagnostic testing of ECUs in car. Used the CAN Protocol and worked on Tools like CANanalyzer and CANoe. Explored CAPL language for testing.

PROJECTS

Akshara Mantapa: Infinite Kannada Text Library | Github **|** Web-Demo **Rust, WebAssembly, SvelteKit**

- Designed and built a distributed text-generation and search system inspired by the Library of Babel, enabling deterministic generation and retrieval of massive synthetic text spaces.
- Implemented a Unicode-aware indexing pipeline using a 57k-symbol Kannada (Indic) grapheme cluster alphabet for correct segmentation and search
- Architected a Rust (Axum + WebAssembly) backend with a minimalist SvelteKit frontend for search and navigation

Post-Quantum & ZK Proof Benchmarking Framework | Github **Rust, ml-kem, arkworks, Docker, Kubernetes**

- Designed HTTP microservices wrapping ml-kem (NIST FIPS 203) and arkworks R1CS Groth16 implementations.
- Measured ~17x throughput gap between lattice-based KEM and ZK proving across parameter sets.
- Containerized services with Kubernetes manifests for horizontal scaling experiments

End-to-End Encryption Engine with Double Ratchet | Github **Java, Java Cryptography Extension (JCE),**

- Implemented Double Ratchet–based end-to-end encrypted asynchronous messaging in Java
- Achieved forward secrecy and post-compromise security using ECDH, HKDF, AES-GCM, and HMAC-SHA256

TECHNICAL SKILLS

Languages : Python, Go,Rust, C++, Java, Bash
Cloud Platforms: AWS, GCP, Azure
Operating Systems: Linux(Ubuntu, Debian, RHEL/CentOS, Arch), Windows Server, MacOS
Virtualization and Containers: Kubernetes, Docker, Rancher, OpenShift, Istio
Infrastructure automation and Security: Jenkins, Github Actions , Prometheus, Ansible, Terraform, Keycloak
Data & AI : PyTorch,NumPy, Pandas,scikit-learn, OpenCV,Google-ADK, LangChain, CrewAI, MCP, MLX, RAG Pipelines
Certifications : Certified Kubernetes Administrator (**CKA**), Certified Kubernetes Security Specialist (**CKS**)

PRESENTATIONS

VLSI Design Contest 2023 – Top 15 Finalist **Jan 2023**

- Presented "Hardware Acceleration of Convolution Core on SoC FPGA" using the PolarFire FPGA board at VLSID 2023. Tested Multiple Sliding Window (MSW) and Flexible Parallel Convolution (FPC) approaches, achieving a 5.26% increase in additions per clock cycle.
- Successfully synthesized and accelerated small convolutional networks on the PolarFire SoC using SmartHLS. Gained insights and feedback from industry leaders on best practices and potential advancements in hardware-accelerated designs