

Kesavan R

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Summary

Experienced Engineer with strong expertise in AI, Cloud, and Automation, specializing in building scalable validation systems and cluster management solutions. Currently developing advanced test automation frameworks at Intel, contributing to a rebootless runtime firmware update architecture. This work enables innovative solutions that eliminate costly fleet-wide reboots, delivering significant operational savings (approximately \$100M annually) for cloud service providers and enterprise customers.

Work Experience

Intel Corporation

Aug 2023 – Ongoing

Job Type: Platform Validation Engineer (Automation & Validation):

- Developed Mutex, a fully autonomous AI-driven validation tool (Python, LangChain, Hugging Face) that scans the release branch for new microcode patches, auto-integrates them with IFWI, and performs automated flashing, system bring-up, and cross-domain stress cycles without human intervention.
- Built an AI-assisted failure isolation pipeline using vector embeddings and LLM-based log analysis for first-level root-cause identification, reducing manual triage effort by ~90%.
- Owned validation of Intel TDX Module runtime firmware updates — securing confidential computing firmware on live server platforms without reboot; verified rollback protection via SVN/SESVN checks and confirmed re-initialization of trust guarantees with zero downtime and zero data leakage.
- Performed RAS Offload, Platform Runtime Mechanism (PRM), and SMM validation — verifying SMM-to-BMC transfer of RAS error handling (CE handling, runtime PPR, ADDDC, ECS collection) and ACPI-based handler migration for improved platform reliability.
- Led development of a pre-silicon validation automation framework using Simics custom scripts, enabling early TDX, SGX, and SMM firmware validation ahead of silicon.
- Automated end-to-end (E2E) JBOF validation across multiple operating systems, achieving zero manual intervention and dynamic OS switching within a single system.
- Owned and led ESXi OS virtualization validation initiatives for Xeon D segment processors, executed via Docker-based containerized environments for scalable, consistent test execution.
- Contributed to the development of multiple generations of Python-based automation frameworks for Intel Xeon processors, evaluating feasibility and building scalable cluster/validation infrastructure across AWS/Azure environments.
- Designed and automated 100+ test cases across Boot, Accelerator, Security, Seamless, and Virtualization domains, contributing toward 1000+ coverage before Alpha release across Xeon segments.
- Validated Runtime Microcode Update alongside power management flows (P-state/C-state, RAPL, S-state) via ACPI-based BIOS/OS coordination.
- Owned end-to-end debug of failures across TDX Module updates, PRM, SMM, and Runtime Microcode Update — isolating root cause through low-level debug and partnering with firmware/architecture teams to closure.
- Applied kernel-internals expertise (process/memory/power management, interrupt handling, ftrace/kprobes, crash/GDB post-mortem analysis) using custom Python telemetry to capture kernel ring buffers (dmesg) and MCEs (mcelog/rasdaemon) during regression runs.
- Led migration of validation test suites from legacy frameworks to next-generation platforms, ensuring full functional parity and enhanced scalability.
- Reviewed 200+ code changes and pull requests, collaborating cross-functionally to improve code quality and accelerate automation development.
- Managed seamless domain validation pipelines, monitoring test workflows through Prometheus and Grafana dashboards for real-time visibility.

- Performed silicon and system bring-up activities, including hardware setup, test execution, and RCA of critical issues in lab environments.
- Coordinated cross-team activities through technical discussions, documentation, and resource tracking to ensure timely project delivery.

Education

Vellore Institute of Technology, Bhopal Campus.

Integrated MTech

Computer Science with Specialization in Artificial Intelligence

Cumulative GPA: 8.72/10

Sehore, Madhya Pradesh

May 2024

Certifications

- AWS Certified Solutions Architect – Associate (Cred ID: C80E731D490F45CF8970D534F8F4FBDC)
- AWS Certified Cloud Practitioner (Credential ID: CG5C7X5KZE1QQDSK)
- Microsoft Certified Azure Fundamentals, (AZ-900) (Credential ID: I676-8372)
- Microsoft Certified Azure AI Fundamentals, (AI-900) (Credential ID: I672-5677)
- Applied Machine Learning by python Coursera Nov 21.

Skills

Languages: Python, C

Tools and Proficiency: AWS (EC2, S3, VPC), Azure, Cloud Architecture, Distributed Systems, Cluster Management, Docker, Containerization, CI/CD Pipelines, Git, GitHub, Linux Systems, Shell Scripting, Prometheus, Grafana, Infrastructure Automation, Monitoring & Observability, CPU Architecture, Intel Xeon Platforms, Microcode (uCode), Firmware Validation, Pre-silicon & Post-silicon Validation, Silicon Bring-up, System Bring-up, Debug & Root Cause Analysis (RCA), SGX, Machine Check Architecture (MCA/MCE), BIOS, UEFI, SMM, ACPI, IPMI, BMC, CPLD, FPGA

Frameworks, Packages: PyTorch, TensorFlow, Scikit-learn, Hugging Face Transformers, LangChain, LangGraph, LLM Applications, Generative AI, Retrieval-Augmented Generation (RAG), Vector Embeddings, AI Agents, Prompt Engineering, ML Model Development, PyTest, Selenium, Python Automation Frameworks, Test Infrastructure Development, System Validation Automation, Streamlit