

# Abhilaash Velamati

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## TECHNICAL SKILLS

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**Languages:** Python, Java, Rust, TypeScript, C

**Cloud (AWS):** EC2, Lambda, DynamoDB, IAM, KMS, CloudWatch, Route 53, CodeDeploy, SSM, API Gateway, CloudFront, Cognito

**Infrastructure:** CDK / CloudFormation (IaC), CI/CD pipelines, multi-region/multi-AZ deployments, container orchestration, Salt, SELinux policy

**Security & Distributed Systems:** PKCS#11, HSMs, certificates / OpenSSL, IAM least-privilege, zonal/regional architecture, IPv4/IPv6 dualstack

## PROFESSIONAL EXPERIENCE

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**Amazon Web Services** — CloudHSM (Hardware Security Module Service) **Software Development Engineer · 2020 – Present**  
**Cryptographic SDK Development (Rust)**

- Shipped core PKCS#11 cryptographic operations (RSA-PKCS sign/verify, CMAC, multi-part sign/verify, key management) in a Rust-based HSM client SDK; added DKM and counter-width validation, session-handle matching, and license deny-list enforcement; updated CloudHSM's public PKCS#11 sample code

### AI Engineering Automation & Platform Reliability

- Built JiraBot — a self-learning AI agent that autonomously plans, implements, tests, and submits CRs for engineering tickets the agent is confident it can resolve, deferring the rest to human review; persists confidence-scored lessons to a knowledge store of 877 records across 13 auto-distilled playbooks
- Shipped a multi-region Lambda backup-integrity validator (validating millions of customer backups since 2022), self-healing HSM replacement workflows, and an autonomous cleanup Lambda for orphaned CFN/EC2/HSM resources — eliminating recurring operator toil
- Migrated legacy SWF orchestration to asynchronous, idempotent Lambda-based workflows, reducing execution times by 75% and improving fault isolation
- Redefined HSM canary integration testing by skipping live-fleet allocation (each canary previously provisioned dedicated HSM hardware), saving \$1M+/month in unnecessary infrastructure cost

### Multi-Region Infrastructure & Global Expansion

- Led end-to-end launch of CloudHSM into 5 new AWS regions — Europe (Zurich), Europe (Spain), Asia Pacific (Malaysia), Mexico (Central), Canada West (Calgary) — coordinating changes across 30+ interdependent packages spanning API, orchestration, infrastructure, canary, and instance deployment stacks
- Reduced region launch cycle time by 75% (3 months → 1 month) via a region-build automation framework with templated pipelines, automated ticket creation, and operator guardrails
- Architected a hardware-generation-specific pipeline system for parallel next-gen / legacy deployments, and migrated 15+ CDK packages from legacy CloudFormation to a modern IaC framework with automated region discovery — cutting per-region onboarding from days to hours

### Security Hardening & Access Control

- Implemented infrastructure-level credential redaction across all service log groups via regex-based data protection policies — resolving a Correction of Error action item
- Built resource-level IAM authorization for internal APIs with fail-closed validation, preventing unauthorized cross-resource access; guarded 71 public API operations against a JSON-depth DoS and added pagination input validation
- Extended the InitializeCluster API to accept multi-cert X.509 chains for Payments HSM customers; tightened OpenSSL validation for newer OpenSSL versions and built sweep tooling to validate existing customer certs against the new rules — preventing silent breakage during the upgrade
- Authored the STM unlock key ceremony procedure (team's standard runbook) and updated offline claiming ceremony docs; led multiple production HSM key ceremonies including GovCloud ITAR-controlled material flows

### Observability & Networking

- Designed and deployed IPv4/IPv6 dualstack networking for the control plane API, including DNS configuration, canary infrastructure, and end-to-end integration tests across all 25+ regions and 70+ AZs
- Built CloudWatch dashboards, subscription filters, and hardware-agnostic canary monitoring covering heterogeneous fleet types globally

### Mentorship

- 2025 — Mentored summer intern through prototyping an AI-powered operational assistant on Amazon Bedrock to surface customer usage patterns and improve service insight into customer workflows
- 2024 — Mentored intern through designing and shipping cluster-level DNS, improving customer experience during HSM replacements
- Recurring onboarding buddy for 4+ new SDEs across CloudHSM and adjacent teams; authored and delivered service-101 walkthroughs covering architecture, dependencies, and oncall workflows

### Software Engineering Intern

May 2019 – August 2019

- Automated customer provisioning limits by integrating the service API with an internal limits platform (Minerva), shipping 17 CRs across 4 packages; built backfill tooling for real-time customer usage metrics

## PERSONAL PROJECT

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### Personal Portfolio & Hoop Session Manager

[abhilaash.dev/#projects](http://abhilaash.dev/#projects)

- Serverless multi-tenant pickup-basketball signups app (Hoop Session Manager) + portfolio on AWS — CloudFront/WAF (origin locked via custom-header secret), Cognito JWT auth, API Gateway + Lambda + DynamoDB, SES + EventBridge reminders; hardened CSP and security headers

## EDUCATION

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George Mason University, Honors College · B.S. Computer Science, Minor in Business

May 2020