

Harpreet Singh Siddhu

AWS Cloud Solutions Architect & Lead Software Engineer

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PROFESSIONAL SUMMARY

AWS Cloud Solutions Architect and lead software engineer with 18+ years designing and delivering mission-critical cloud-native solutions for insurance and financial services. Deep expertise in serverless architecture, cloud migration strategy, infrastructure as code, and enterprise-scale AWS solution design. Proven record of independently owning end-to-end solution architecture — from design reviews and security governance to production readiness — for regulated, high-availability environments. AWS Community Builder, 5x AWS-certified, IEEE-published researcher, and international conference speaker (GraphQLConf, TMMi America, AWS Summit New York 2026).

KEY ACHIEVEMENTS

\$240K+	Cumulative savings from Pilotfish vendor replacement since 2018 (\$30K/yr)	80%	Cost reduction across modernization program; 5+ mission-critical apps migrated to AWS
70%	Annuity application processing time reduced — order entry cloud-native rearchitecture	10+	Downstream integrations rebuilt on AWS via legacy Mule/Java STP rearchitecture
\$100K	AWS re:Invent Hackathon Champion — Road to re:Invent 2025	79%	Cost benchmark: Lambda Durable vs Step Functions (open-source reproducible study)
80%	IEEE-published GenAI compliance-aware architecture — 80% reduction in unsupported claims	5x	AWS Certified: CloudOps, Developer, Solutions Architect, Practitioner, Security

CORE COMPETENCIES

Solution Architecture	AWS Well-Architected, serverless-first design, microservices, event-driven	Cloud Migration	Lift-and-shift, re-platforming, re-architecture; AWS Migration Hub, CDK, SAM
Compute & Serverless	Lambda, EC2, ECS Fargate, Step Functions, SnapStart	Networking & Delivery	API Gateway, AppSync, CloudFront, Route 53, Amplify, Transfer Family
Messaging & Events	SNS, SQS, EventBridge, Kinesis	Storage & Data	S3, DynamoDB, RDS, OpenSearch, Glue, Athena
Security & Governance	IAM, KMS, WAF, Secrets Manager, Cognito, Cedar, AVP, CloudTrail	Infrastructure as Code	Terraform, AWS CDK, SAM, CloudFormation, Docker, GitHub Actions, CodePipeline
GenAI & ML	Amazon Bedrock, AgentCore, RAG, LangChain, Strands SDK, vector search	Languages & Frameworks	Java, Spring Boot, Python, TypeScript, JavaScript, Node.js, React, GraphQL
Compliance	HIPAA, GLBA, NAIC — insurance & financial services regulated environments	Domain Expertise	Life insurance, annuities, STP platforms, ACORD XML, DTCC/NSCC standards

PROFESSIONAL EXPERIENCE

Penn Mutual Life Insurance

May 2013 – Present

Lead Software Engineer / Cloud Solutions Architect

Horsham, PA

- Own end-to-end solution architecture for cloud modernization initiatives — designing AWS-based solutions aligned with resilience, cost-efficiency, and insurance regulatory compliance requirements.
- Led cloud migration of 5+ mission-critical applications from on-premises to AWS, owning architecture design, Well-Architected reviews, security governance, implementation planning, and production readiness.

- Drove large-scale modernization program delivering up to 80% infrastructure cost reduction while improving availability, agility, and security posture across the insurance platform.
- Mentored engineers and established reusable architecture patterns and cloud design blueprints adopted across delivery teams.

Claims Modernization

Lambda · ECS Fargate · Docker · SQS · S3 · Glue · CloudTrail · IAM · KMS

- Delivered Lambda performance and cost optimizations — memory right-sizing, SQS long-poll tuning, SnapStart cold-start config, and Init duration fixes; published findings as open-source benchmark articles.
- Designed Glue + S3 ETL pipelines and mainframe integration jobs for tax, disbursement, accounting, and analytics across multilife and annuity product lines.
- Architected HIPAA, GLBA, and NAIC compliant solutions using IAM least-privilege policies, KMS encryption, and CloudTrail audit logging — extended to cover fixed, indexed, UL, VUL, and variable annuity products.

Annuity Order Entry (AOE) Modernization

EC2 · AWS Transfer Family · S3 · Lambda · SQS · RDS · Spring Boot

- Served as technical lead and solution architect for rearchitecting a legacy Mule/Java straight-through processing (STP) platform into a secure, cloud-native AWS solution — enabling financial professionals to submit annuity applications digitally.
- Rebuilt 10+ downstream system integrations on AWS, directly enabling Firelight (Hexure) as the firm-wide digital annuity application platform and eliminating dependency on the legacy STP stack.
- Reduced annuity application processing time by 70%, accelerating the submission-to-approval cycle and improving financial professional experience across all annuity product lines.
- Designed secure SFTP ingestion pipeline via AWS Transfer Family with S3-backed staging, SQS-driven async processing, and RDS persistence — delivering compliant, audit-ready data flows end to end.

Pilotfish Vendor Replacement

Java · Spring Boot · EC2 · REST APIs · DTCC/NSCC · ACORD XML · AWS Migration Hub

- Independently architected and delivered a full in-house replacement of Pilotfish — a commercial data transformation platform — in under 2 months, timed to cut off the next annual maintenance renewal and eliminate \$30K/yr in licensing costs (\$240K+ cumulative savings since 2018).
- Built a Spring Boot microservice to ingest DTCC/NSCC flat-file annuity transactions and transform them to ACORD XML schema, handling complex business rules across multiple annuity and life insurance product types.
- Solution adopted beyond original scope — integrated with the modernized AOE platform and consumed by multiple downstream systems requiring DTCC-to-ACORD transformation enterprise-wide, demonstrating platform reusability.
- Led migration of the on-premises deployment to AWS EC2, enabling cloud-native integration with the broader AWS modernization program.

New Business System Modernization

Spring MVC · JAX-RS · JAXB · XSD · Node.js · JavaScript · React

- Re-architected core data ingestion and processing layers using Spring MVC, JAX-RS REST APIs, and JAXB/XSD-driven XML validation — served as mainframe integration SME ensuring data integrity across policy issuance workflows.
- Delivered a modernized React front-end with Node.js API layer, improving agent and underwriter experience and reducing manual processing touchpoints in the new business workflow.

DXC Technologies

Dec 2009 – Feb 2013

Team Leader, Allstate Product Development

Lincoln, NE

- Led a team of six offshore developers supporting life insurance product development for Allstate — managing delivery, quality, and cross-functional coordination.
- Served as primary technical SME, improving product quality through architecture design reviews, coding standards governance, and stakeholder communication.
- Built internal tools and delivered technical training that improved team delivery efficiency and reduced research and onboarding time.

Software Engineer, General Motors Vehicle Management System

India

- Contributed to enterprise application development for General Motors vehicle management systems using Java and mainframe technologies.
- Developed system design artifacts, technical documentation, and API documentation supporting multi-team delivery programs.

SIDE PROJECTS

GenAI Personalized Advisor Dashboard (POC)

Amazon Bedrock · LangChain · Lambda · S3 · RDS · EC2 · Streamlit

- Built a Bedrock-powered advisor dashboard POC with a custom Bedrock agent, LangChain orchestration, and Streamlit UI — surfacing policy recommendations and client insights in a regulated insurance context.

GenAI Life Insurance Knowledge Assistant – RAG Chatbot (POC)

Amazon Bedrock · OpenSearch · Lambda · API Gateway · Cognito · Amplify · S3 · Strands SDK

- Serverless RAG solution for querying insurance product manuals via natural language — S3 ingestion → Bedrock embeddings → OpenSearch vector store → Lambda API, secured with Cognito; Strands SDK for multi-turn agentic Q&A with document citations.

AWS Lambda Durable Functions vs Step Functions – Cost Benchmark github.com/hsiddhu2/aws-lambda-durable-vs-stepfunctions

Python · AWS Lambda · Step Functions · SAM · DynamoDB · SNS

- Reproducible open-source benchmark across 1,000 real ETL workflows — demonstrated 79% cost reduction; published on DZone with 25K+ views.

Compliance-Aware GenAI Evaluation Framework (IEEE companion)

github.com/hsiddhu2/compliance-aware-genai-insurance-evaluation

Python · Amazon Bedrock · RAG · LLM Evaluation

- Open-source harness behind the IEEE ICAISET 2026 paper — 186 test cases, 4 production LLMs, 80% reduction in unsupported claim generation.

KiroForge – VS Code Extension for AWS Kiro

kiroforge.dev

TypeScript · VS Code API · AWS Kiro · MCP Server

- Open-source VS Code extension enforcing org code-quality standards via steering packs, validation hooks, and MCP server — originated from the \$100K AWS re:Invent 2025 hackathon win.

Serverless Insurance Quote System

github.com/hsiddhu2/Serverless-Insurance-Quote-System

Python · Lambda · API Gateway · DynamoDB · SAM

- Reference serverless quoting system on AWS demonstrating event-driven ingestion, pricing logic, and policy issuance end to end.

SPEAKING & PUBLICATIONS

Build Policy-Controlled Multi-Agent Workflows on AWS

AWS Summit New York 2026 · Dev Chat DEV202 · Jacob K. Javits Convention Center

The AI Testing Paradox: Three Strategies for Validating AI Test Agents

TMMi America TestFormation 2026 · Session · Virtual

When GraphQL Gets Expensive: Performance & Cost Patterns in Production Serverless Architectures

GraphQLConf 2026 · Session · Fremont, CA · Co-presented with Shравanth Gowda Venkatesh

Compliance-Aware GenAI Reference Architecture for Life Insurance Document Synthesis

IEEE ICAISET 2026 · Peer-reviewed publication · ORCID: 0009-0008-5397-7495

Lambda Durable Functions vs Step Functions: A Cost Benchmark Study

DZone · Open-source reproducible benchmark — 79% cost reduction demonstrated · 25K+ article views

CERTIFICATIONS

- ✓ AWS Certified Solutions Architect – Associate
- ✓ AWS Certified Developer – Associate
- ✓ AWS Certified CloudOps Engineer – Associate
- ✓ HashiCorp Terraform Associate (003)

- ✓ AWS Certified Cloud Practitioner
- ✓ AWS Knowledge: Security Champion
- ✓ AWS Serverless Demonstrated
- ✓ FLMI — Fellow, Life Management Institute

EDUCATION

University of Illinois Urbana-Champaign

Master of Computer Science in Data Science

2020 – 2022 · GPA 3.91 / 4.00

Rajiv Gandhi Technical University

Bachelor of Engineering

2006 · GPA 4.0 / 4.0

COMMUNITY & RECOGNITION

- › **AWS Community Builder** — content creation, open-source contributions, and community impact in serverless and cloud modernization.
- › **AWS re:Invent 2025 Hackathon Champion** — \$100K Road to re:Invent win; ORIK.dev announced from main stage.
- › **Judge** — Major League Hacking (MLH), Business Intelligence Group, and IEEE Technical Program Committee.
- › **20+ technical articles** on Medium, DZone, LinkedIn, and IEEE; 50+ educational videos on YouTube (Cloud With Harry).