

# Building and Deploying Generative AI with Amazon Bedrock

## Course Objective

This hands-on Amazon Bedrock workshop is designed to equip participants with in-depth knowledge and practical skills to harness the power of Amazon Bedrock for generative AI applications. Over the course of 2-3 days, participants will gain a foundational understanding of Bedrock's services, learn to configure and integrate its APIs, and customize models to meet specific use cases. By the end of the workshop, participants will be able to build, deploy, and scale generative AI models, applying best practices for performance and cost-efficiency in real-world scenarios.

## Course Prerequisites

To maximize the benefit from this workshop, participants should have:

- **Basic Knowledge of AWS Services:** Familiarity with AWS Console, Identity and Access Management (IAM), and basic AWS services like S3 and Lambda.
- **Foundational Understanding of Machine Learning:** Knowledge of machine learning concepts and model tuning is recommended but not essential.
- **Programming Skills:** Experience with Python or another programming language for working with APIs and integrating model calls into applications.

- **API Basics:** Understanding of API endpoints, authentication, and call handling will be beneficial.

## What You Will Learn in This Class

Participants will learn to:

- Set up, configure, and secure Amazon Bedrock environments
- Explore and utilize Bedrock's foundation models for text, image, and chatbot generation
- Customize and fine-tune foundation models with domain-specific data
- Integrate Bedrock's API into applications and automate workflows using AWS services
- Build an end-to-end generative AI application, including deployment, monitoring, and optimization
- Scale applications with Amazon Bedrock while optimizing for cost and performance

## Course Audience

This workshop is ideal for:

- **Data Scientists and ML Engineers:** Looking to apply generative AI techniques in their projects using Amazon Bedrock.
- **Software Developers:** Interested in building and integrating generative AI applications with real-world functionalities.
- **Cloud Engineers and Architects:** Wanting to understand how Amazon Bedrock fits into the broader AWS ecosystem and how to scale AI workloads.
- **Business Analysts and Technical Leaders:** Aiming to explore and lead generative AI initiatives using AWS's powerful Bedrock service.

Each day allows for 6-8 hours of content, including hands-on labs and time for troubleshooting. Adjustments can be made for a 2-day workshop by combining or shortening less technical sections.

## **Day 1: Foundations of Amazon Bedrock and Initial Setup**

### **Module 1: Introduction to Amazon Bedrock and Generative AI (1 hour)**

- Overview of Generative AI and Bedrock's role in AWS ecosystem
- Key use cases and industry applications

### **Module 2: Amazon Bedrock Architecture and Services (1 hour)**

- Components of Bedrock (foundation models, infrastructure, and APIs)
- Supported models (Anthropic, AI21, Stability AI, etc.) and use cases

### **Module 3: Setting Up Bedrock Environment (2 hours)**

- Hands-on environment setup in AWS console
- Role setup, API access, and basic configuration
- Security and permissions management

### **Module 4: Using Bedrock for Text and Image Generation (2 hours)**

- Exploring text generation and image generation capabilities
- Hands-on labs: Running first API calls for text and image generation

## **Module 5: Basics of Model Customization (1 hour)**

- Intro to model tuning and fine-tuning options in Bedrock
- Hands-on: Running basic model customization

## **Day 2: Deep Dive into Amazon Bedrock APIs and Customization**

### **Module 6: Working with Bedrock APIs (2 hours)**

- API configurations and methods
- Securing API calls, setting quotas, and understanding rate limits
- Hands-on labs: Integrating API calls into a simple application

### **Module 7: Advanced Model Customization (2 hours)**

- Techniques for fine-tuning with industry-specific data
- Custom prompts and specialized outputs
- Hands-on: Tuning and deploying a customized foundation model

### **Module 8: Bedrock Pipelines and Automation (1.5 hours)**

- Building automation pipelines with Bedrock
- Integrating with other AWS services (Lambda, S3, etc.)
- Hands-on lab: Creating a pipeline for automated model deployment and monitoring

### **Module 9: Cost Management and Performance Monitoring (1 hour)**

- Tools for monitoring model performance and managing costs
- Strategies for balancing performance and resource use

# **Day 3: Real-World Applications, Scaling, and Troubleshooting**

## **Module 10: Real-World Applications with Amazon Bedrock (1.5 hours)**

- Case studies in industries like customer service, e-commerce, and content creation
- Example workflows and architectures

## **Module 11: Hands-On Lab: Building a GenAI Application (3 hours)**

- Developing an end-to-end generative AI application
- Integrating Bedrock models for text or image generation
- Troubleshooting and refining the application in real-time

## **Module 12: Scaling and Optimization (1 hour)**

- Best practices for scaling Bedrock applications
- Optimizing for performance and cost-efficiency
- Hands-on: Experimenting with scaling scenarios

## **Module 13: Troubleshooting and Support (1 hour)**

- Common challenges and resolutions
- Support resources and community insights

## **Wrap-Up and Q&A (30 mins)**