Cloud Contraptions
TRAINING & CONSULTING

To discuss this course and customizations:
Call: +1 434-509-6890 or Email: sales@cloudcontraptions.com

Generative AI on AWS with Amazon Bedrock

Class Duration

21 hours of live training delivered over 3 days.

Student Prerequisites

- Professional software development experience (Python is helpful)
- Familiarity with REST APIs and cloud fundamentals
- An AWS account with access to Amazon Bedrock

Target Audience

Developers, solution architects, and platform teams building generative AI applications and agents on AWS with Amazon Bedrock. Relevant for teams adding AI capabilities to existing AWS workloads, and for organizations standardizing how they build, secure, and govern generative AI on AWS. This is the AWS counterpart to the Azure AI Foundry course. For general AWS infrastructure foundations, see Architecting on AWS Essentials and AWS Cloud Foundations.

Description

Amazon Bedrock is AWS’s managed platform for building generative AI: a broad foundation-model catalog plus the managed services around it for retrieval, agents, safety, orchestration, and evaluation. This three-day course teaches building production generative AI on AWS end to end. Participants start with model selection across the Bedrock catalog (Anthropic Claude, Amazon Nova, Meta Llama, and others), then prompt engineering, structured outputs, and tool use. The course moves into retrieval-augmented generation with Knowledge Bases for Amazon Bedrock, agents with Bedrock Agents and the AgentCore runtime, Bedrock Guardrails for content safety and grounding, and Bedrock Flows for orchestration. The final day covers model customization through fine-tuning, distillation, and Nova Forge, systematic evaluation, where Amazon Q fits for developers and the business, and deploying generative AI on AWS with sound identity, security, cost, and

observability controls. Labs build a realistic Bedrock application and agent throughout.

Learning Outcomes

- Navigate Amazon Bedrock: the foundation-model catalog, the playground, and the core APIs.
- Select and compare models (Anthropic Claude, Amazon Nova, Meta Llama, and others) for cost, quality, and latency.
- Build prompt pipelines with structured outputs and tool use on Bedrock.
- Implement retrieval-augmented generation with Knowledge Bases for Amazon Bedrock.
- Build agents with Bedrock Agents and the AgentCore runtime, connecting tools and knowledge.
- Apply Bedrock Guardrails for content safety, grounding, and sensitive-data protection.
- Customize models through fine-tuning, distillation, and Nova Forge, and evaluate quality systematically.
- Deploy generative AI on AWS with sound identity, security, cost, and observability controls.

Training Materials

Comprehensive courseware is distributed online at the start of class. All students receive a downloadable MP4 recording of the training.

Software Requirements

An AWS account with Amazon Bedrock model access enabled, the AWS CLI with an IAM role granting appropriate permissions, Python 3.12+ (Boto3) and/or Node.js 22+, a vector store for Knowledge Bases (such as Amazon OpenSearch Serverless), and Git.

Training Topics

Generative AI on AWS in 2026

- Amazon Bedrock as AWS’s managed generative AI platform
- The services around the models: RAG, agents, guardrails, flows, and evaluation
- Reference architectures for generative AI on AWS

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- How Bedrock relates to SageMaker and Amazon Q

The Bedrock Model Catalog

- Foundation models from Anthropic, Amazon, Meta, Mistral, Cohere, and others
- Amazon Nova and Titan model families
- The Bedrock Marketplace and specialized models
- Choosing a model for cost, quality, and latency

Invoking Models and Prompt Engineering

- The Invoke and Converse APIs
- Streaming responses
- Prompt engineering patterns on Bedrock
- Prompt management and versioning

Structured Outputs and Tool Use

- Structured and JSON output
- Tool use and function calling
- Multi-step tool pipelines
- Validation and error recovery

Retrieval-Augmented Generation with Knowledge Bases

- Knowledge Bases as a managed RAG pipeline
- Document ingestion, chunking, and embeddings
- Vector stores and retrieval configuration
- Citations and grounding quality

Bedrock Agents

- Defining agents, instructions, and action groups
- Connecting tools and Knowledge Bases
- Orchestration and reasoning traces
- Testing and iterating on agents

AgentCore and the Agent Runtime

- AgentCore as a microVM-based agent platform
- Running agents in isolated, production-grade environments
- Memory, identity, and tool gateways
- Moving from prototype agents to production

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Bedrock Flows and Orchestration

- Visual orchestration of prompts, models, and logic
- Composing knowledge bases, agents, and guardrails into flows
- Conditional and multi-step workflows
- Versioning and deploying flows

Guardrails for Bedrock

- Content filters and denied topics
- Grounding and hallucination checks
- Sensitive-information and PII protection
- Associating guardrails with agents, knowledge bases, and flows

Model Customization

- Fine-tuning and continued pre-training
- Model distillation for cost and latency
- Customizing Amazon Nova with Nova Forge
- Managing custom models and provisioned throughput

Evaluation and Quality

- Model and application evaluation on Bedrock
- Automated and human-in-the-loop evaluation
- Building evaluation datasets and scorers
- Gating releases on quality results

Amazon Q on AWS

- Amazon Q Developer for building and operating on AWS
- Amazon Q Business for enterprise knowledge
- How Amazon Q builds on Bedrock
- When to use Q versus a custom Bedrock application

Security, Cost, and Operations

- IAM, identity, and access for Bedrock
- Data privacy, residency, and VPC integration
- Observability, logging, and tracing
- Cost tracking and model-selection controls

