SmartAnswer Bot: AI-Powered Knowledge Engine

AWS Lex Chatbot with Bedrock RAG Integration

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Project Overview

This project builds a robust, AI-driven chatbot that answers user questions by extracting information from unstructured PDF documents stored in Amazon S3. The integration of Amazon Lex with Amazon Bedrock knowledge base using Retrieval-Augmented Generation (RAG) delivers accurate and contextually relevant responses, showcasing proficiency in AWS technologies and advanced AI techniques.

AWS Services Used

aiblueCore Components	
Amazon Lex V2	Conversational interface handling user intents
Amazon Bedrock	Knowledge base with Claude 3 Haiku and Titan Embeddings
Amazon S3	Secure document storage for PDF knowledge base
OpenSearch Serverless	Vector store for semantic search
AWS IAM	Permission management for secure access

Implementation Guide

Step 1: Enable Amazon Bedrock Model Access

- Enable Anthropic Claude 3 Haiku and Titan Embeddings G1
- Request model access if unavailable (approval may take time)
- Verify regional availability of models

Step 2: Create S3 Bucket for Documents

- Globally unique name (e.g., `asif-chatbot`)
- Same region as Bedrock for low latency
- Block All Public Access enabled
- Supported formats: PDF, TXT, CSV

Step 3: Configure Bedrock Knowledge Base

- Create knowledge base with vector store
- Select S3 as data source
- Use Amazon Titan Embeddings for RAG
- Configure OpenSearch Serverless vector store
- Sync documents and verify availability status

Step 4: Set Up Lex Bot

- Create traditional bot (e.g., `Question0-Answer-Bot`)
- Define welcome intent with sample utterances
- Configure appropriate IAM role
- Select language and voice preferences
- Build and test initial responses

Step 5: Add QnA Intent

- Use built-in `AMAZON.QnAIntent`
- Connect to Bedrock knowledge base
- Select Claude 3 Haiku as AI model
- Enter correct Data Source ID
- Test with PDF-based queries

Validation & Outcomes

✓ Functional Testing	Verify accurate responses from PDF content
Knowledge Base Sync	Confirm documents are properly indexed
Security Check	Validate IAM permissions and data protection
📈 Performance	Measure response latency and accuracy

🏆 Project Outcome

The SmartAnswer Bot successfully delivers accurate, context-aware responses by combining Lex's conversational interface with Bedrock's RAG capabilities. The solution is ready for deployment on websites or messaging platforms, demonstrating a scalable AI knowledge engine.

Cleanup Procedure

1. Delete Lex bot and associated resources
2. Remove Bedrock knowledge base and vector store
3. Empty and delete S3 bucket
4. Revoke IAM roles created for the project
5. Verify no residual charges in AWS Billing