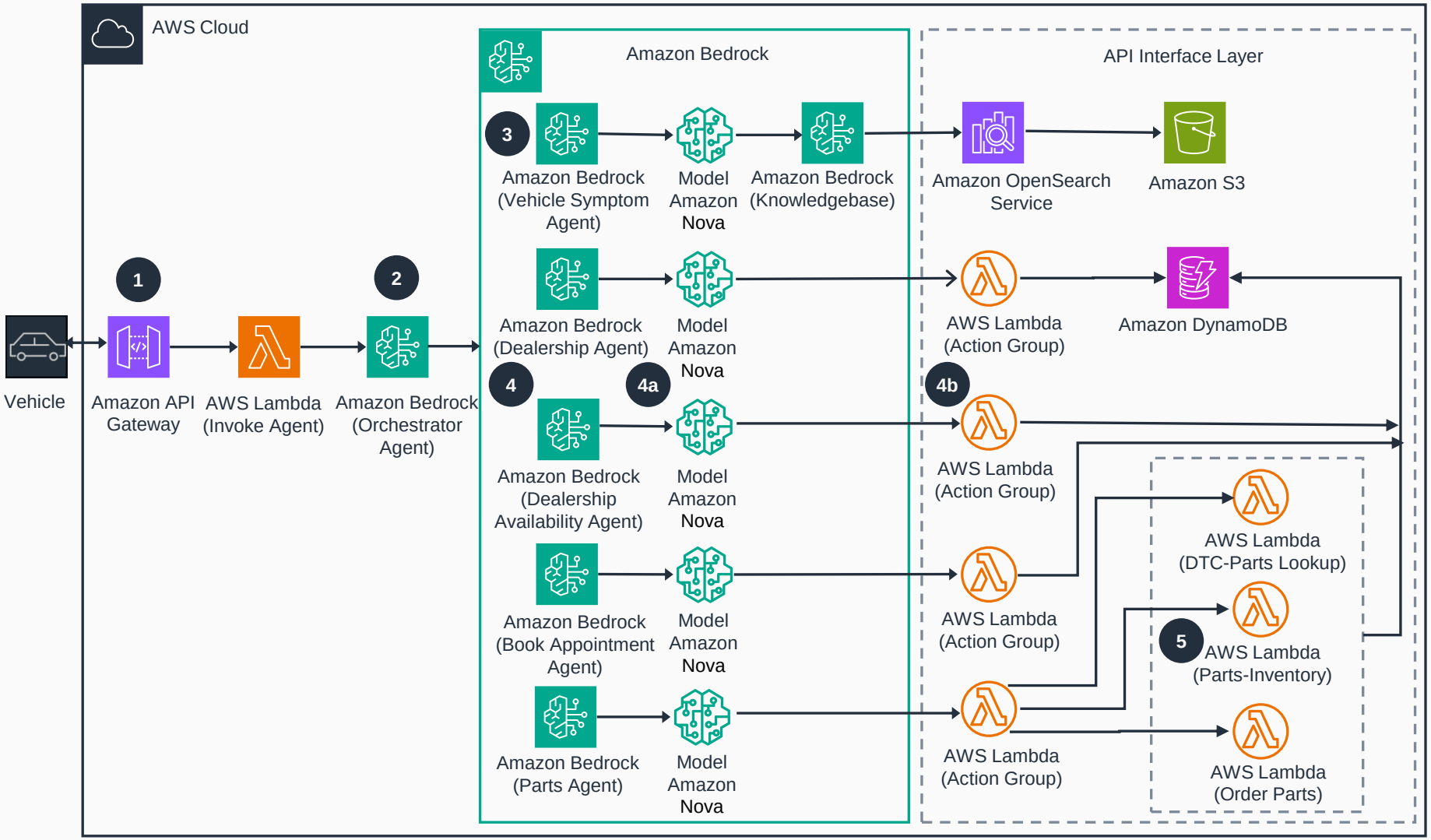
Guidance for AI-Powered Vehicle Service Assistant using Amazon Bedrock

This Guidance shows how to build an intelligent automotive service system that integrates in-vehicle AI with cloud and dealership operations. It helps organizations transform vehicle diagnostics into an automated, end-to-end service experience featuring real-time tracking, smart scheduling, and streamlined parts procurement through specialized AI agents.



1. While driving a dashboard warning appears, the driver activates smart assistant using a voice command. The system captures both the diagnostic data and converts the driver's voice request to text. This information flows through **Amazon API Gateway**, which securely authenticates and routes both inputs to **AWS Lambda** and invokes **Amazon Bedrock** orchestrator agent for immediate processing and response generation.

2. The **Amazon Bedrock** orchestrator (supervisor) agent receives input, uses instructions to understand the input, and manages and delegates tasks required to the group of **Amazon Bedrock** collaborator agents.

3. OEM manuals are ingested in **Amazon S3**. Embeddings are stored in vector databases, provided by **Amazon OpenSearch.** The Vehicle Symptom Agent uses Retrieval Augmented Generation (RAG) to analyze the issue, recommend diagnostic steps, and assess severity (Low/Medium/High). This enables rapid, accurate problem identification and tailored guidance for the driver based on the specific vehicle model and reported symptoms.

4. The group of **Amazon Bedrock** collaborator agents, including dealership agent, dealership availability agent, appointment agent, parts agent, receive tasks from the supervisor agent in parallel and as supervisor agent's predictions require.

4a. The collaborator agents use **AWS Lambda** actions to enable integrations with data sources and perform reads and writes to data sources in real-time. These data sources include **Amazon DynamoDB** that provides dealership information, availability, book appointments and parts availability based on diagnostic information

4b. The group of collaborator agents invoke **Amazon Nova (Pro, Lite)** models as needed.

5. The parts agent functions as a mini-orchestrator, coordinating multiple sub-functions to identify necessary automotive parts based on diagnostic codes. It checks real-time inventory at dealerships and automatically initiates orders for out-of-stock items to minimize service delays. This proactive approach ensures parts availability when the vehicle arrives for service.

AWS Reference Architecture