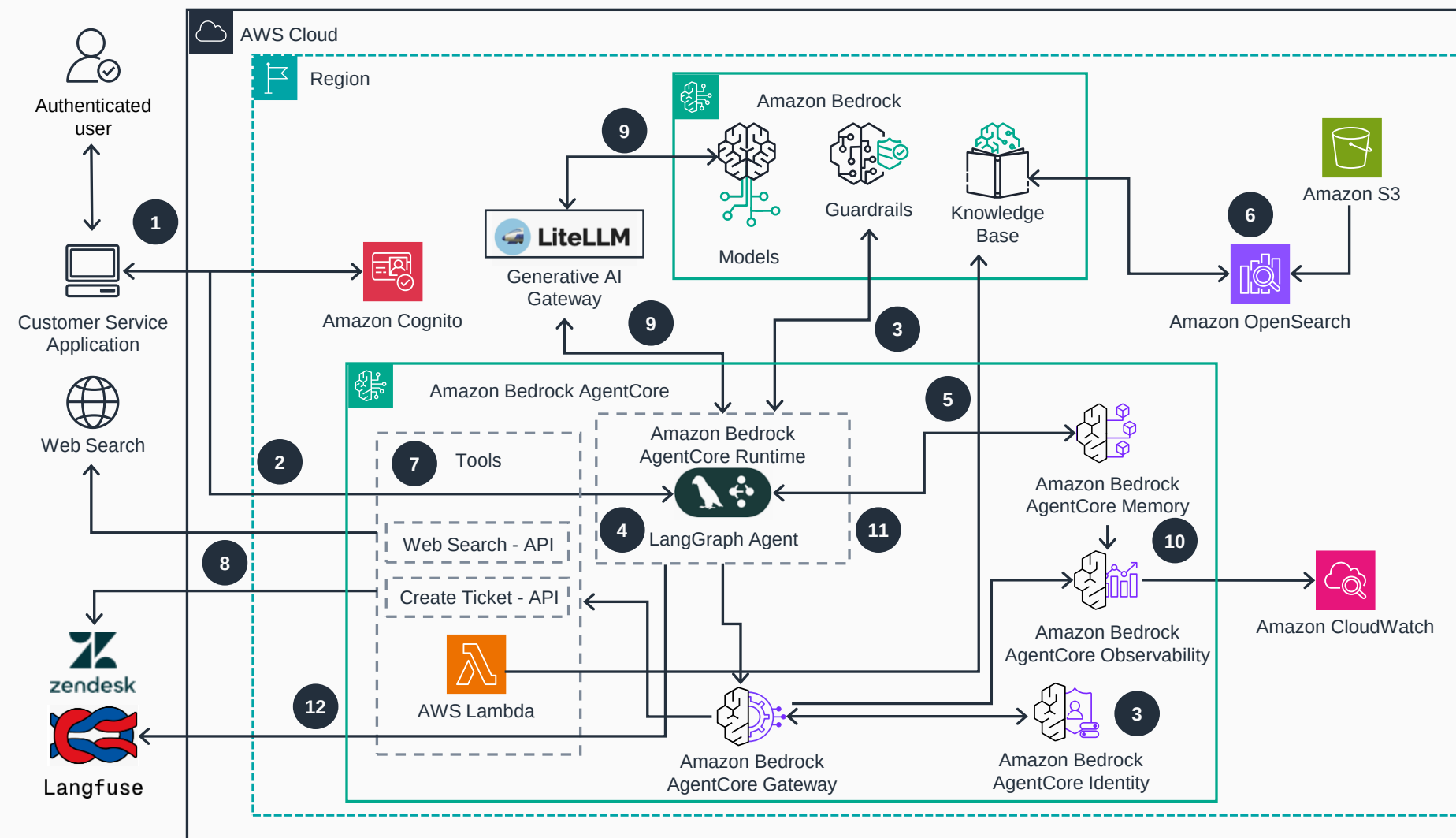


Guidance for Agentic AI Operational Foundations on AWS

This architecture diagram illustrates how to effectively support intelligent customer service automation using agentic AI on AWS. It shows the key components and their interactions, providing an overview of the architecture's structure and functionality. The guidance enables authenticated users to interact with AI-powered agents through a customer service application, where Amazon Bedrock AgentCore orchestrates LangGraph-based agents that access knowledge bases, perform web searches, and create support tickets. The architecture incorporates comprehensive security, scalable storage, external integrations, and monitoring capabilities to deliver intelligent, contextual customer support experiences. This slide shows Steps 1-7.

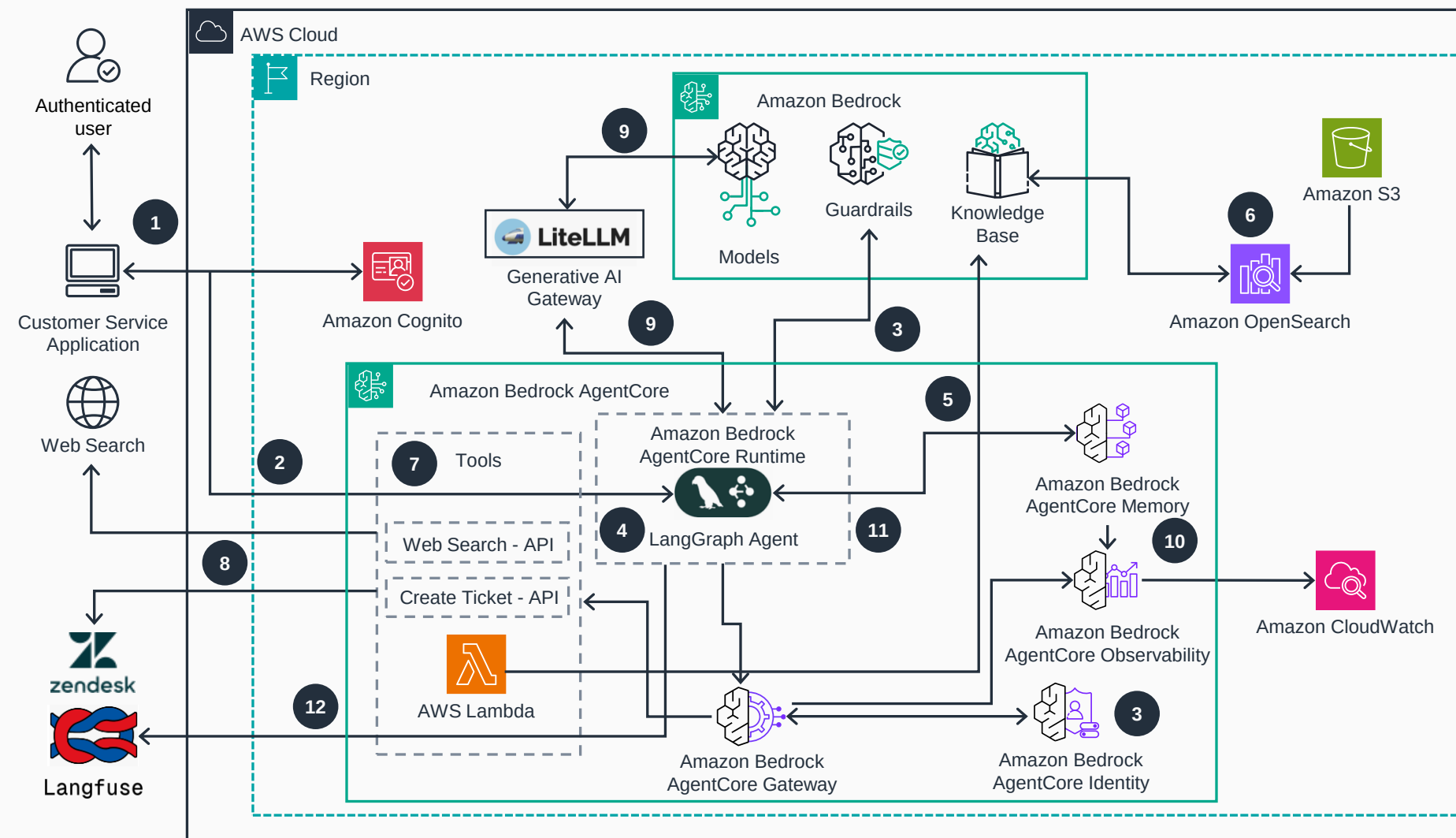


- 1 An authenticated user interacts with the Customer Service Application, which validates their identity through **Amazon Cognito**.
- 2 The customer service application forwards the user's request to the **Amazon Bedrock AgentCore** runtime.
- 3 **Amazon Bedrock AgentCore** Identity validates user permissions and establishes secure service-to-service authentication, while **Amazon Bedrock** Guardrails evaluate the incoming request to ensure it meets safety and compliance requirements before proceeding.
- 4 **Amazon Bedrock AgentCore** Runtime initializes the LangGraph Agent, which acts as the central orchestrator that will make decisions about the workflow path and coordinate all subsequent processing steps.
- 5 The LangGraph Agent queries **Amazon Bedrock AgentCore** Memory to retrieve conversation history and contextual information, enabling continuity across sessions and personalized interactions based on previous exchanges.
- 6 Based on the request analysis, the LangGraph Agent orchestrates a search through the Knowledge Base stored in **Amazon Simple Storage Service (Amazon S3)** and indexed by **Amazon OpenSearch** to find relevant domain-specific information.
- 7 The LangGraph Agent analyzes the request type and available context to determine the appropriate processing path, selecting from the available Tools including Web Search API for external information gathering or Create Ticket API for issue management.



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8

When external capabilities are needed, the LangGraph Agent coordinates tool execution through **AWS Lambda** functions, which handle either Web Search operations for retrieving current information or Create Ticket operations for Zendesk integration.

9

The LangGraph Agent orchestrates response generation using **Amazon Bedrock** Models, via Generative AI Gateway (LiteLLM) combining retrieved knowledge from the Knowledge Base, tool outputs from external services, and conversation context to create intelligent, contextually appropriate responses.

10

Throughout the entire LangGraph workflow execution, **Amazon Bedrock AgentCore** Observability tracks system performance, logs decision paths, tool usage patterns, and interaction outcomes, while **Amazon CloudWatch** monitors the overall system health and collects metrics from all AWS services.

11

The LangGraph Agent updates **Amazon Bedrock AgentCore** Memory with new conversation state and user interaction data, then coordinates the final response delivery through the **Amazon Bedrock AgentCore** Runtime back to the Customer Service Application and ultimately to the authenticated user.

12

The workflow state and observability data flows to Langfuse for comprehensive tracking and analysis of agent interactions, providing detailed insights into conversation quality and system performance for continuous improvement.

