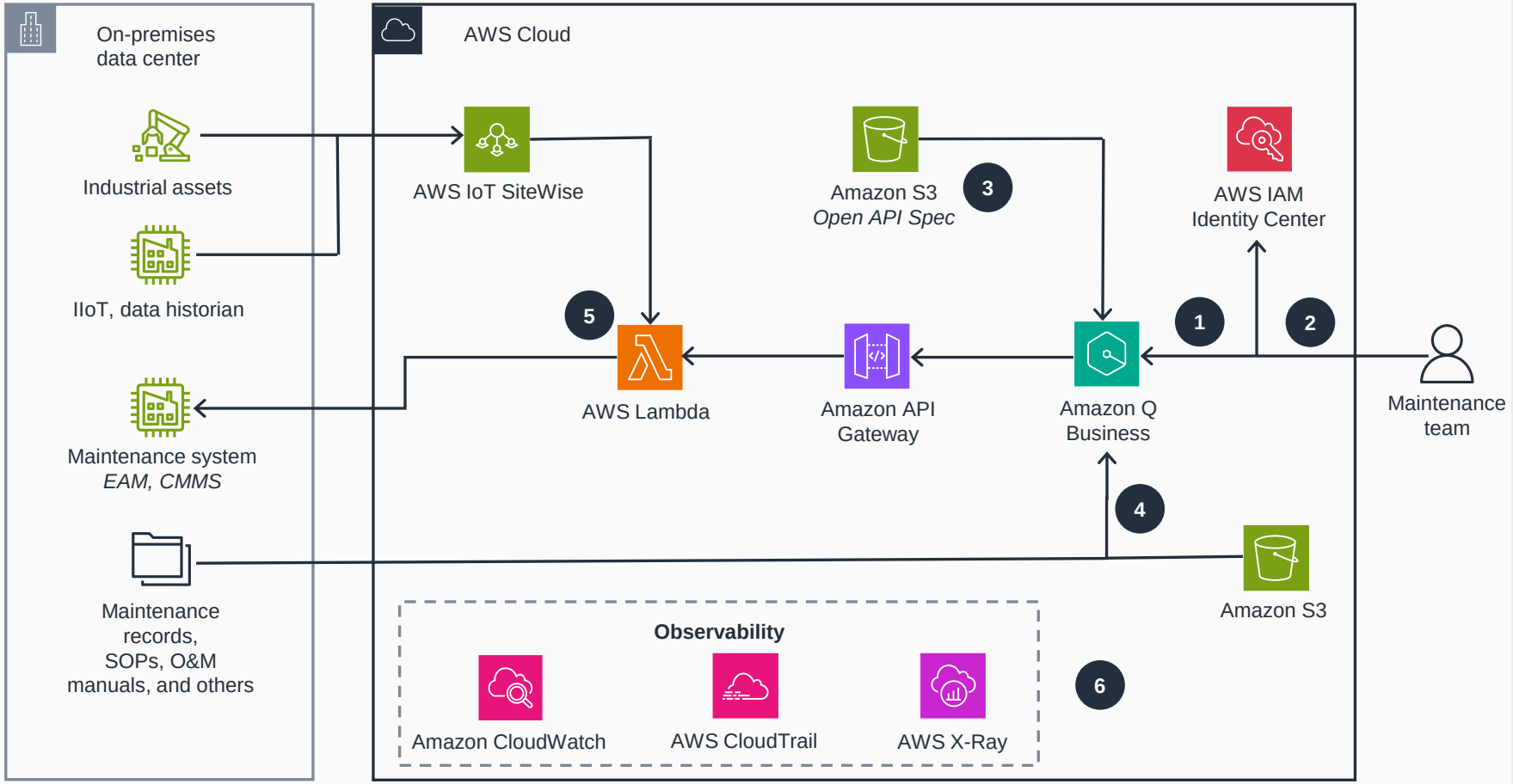
Guidance for Assisted Diagnosis and Troubleshooting on AWS

Amazon Q Business deployment

This architecture diagram illustrates how to build an AI-powered diagnostic system using Amazon Q Business. This accelerates equipment troubleshooting through natural language conversations with maintenance documentation and real-time telemetry data.



1. To initiate a troubleshooting session, a member of the maintenance team interacts directly with the system by typing their issue into the built-in **Amazon Q Business** chat interface.

2. **Amazon Q Business** implements role-based access through: **IAM Identity Center** as a primary authentication gateway, ACLs to control resource permissions**,** principal mapping to connect users and groups with data sources, and **AWS Identity and Access Management (IAM)** roles to manage data source access and protect against unauthorized actions.

3. **Amazon Q Business** leverages custom plug-ins with OpenAPI specifications stored in **Amazon Simple Storage Service (Amazon S3)**. It uses **Amazon API Gateway** and **AWS Lambda** to integrate with backend services, enabling dynamic API calls based on user context.

4. **Amazon Q Business** accesses documentation through **Amazon S3** and on-premises connectors, providing maintenance guidance from standard operating procedures (SOPs) and operations and maintenance (O&M) manuals during troubleshooting sessions. To learn more about connecting connectors to on-premises data source, review the following sections in the Amazon Q User Guide: data source connector concepts and using **Amazon Private Cloud (Amazon VPC)** with **Amazon Q Business** connectors in addition to the AWS Hybrid Connectivity whitepaper.

5. A telemetry custom plug-in uses **Lambda** to fetch data from **AWS IoT SiteWise**. The maintenance plug-in connects to computerized maintenance management system (CMMS) and enterprise asset management (EAM) systems for automated work order creation.

6. To monitor the Guidance, use **Amazon CloudWatch** for logs and metrics, **AWS CloudTrail** for API tracking, and **AWS X-Ray** for performance analysis.

Reviewed for technical accuracy July 2, 2025

AWS Reference Architecture

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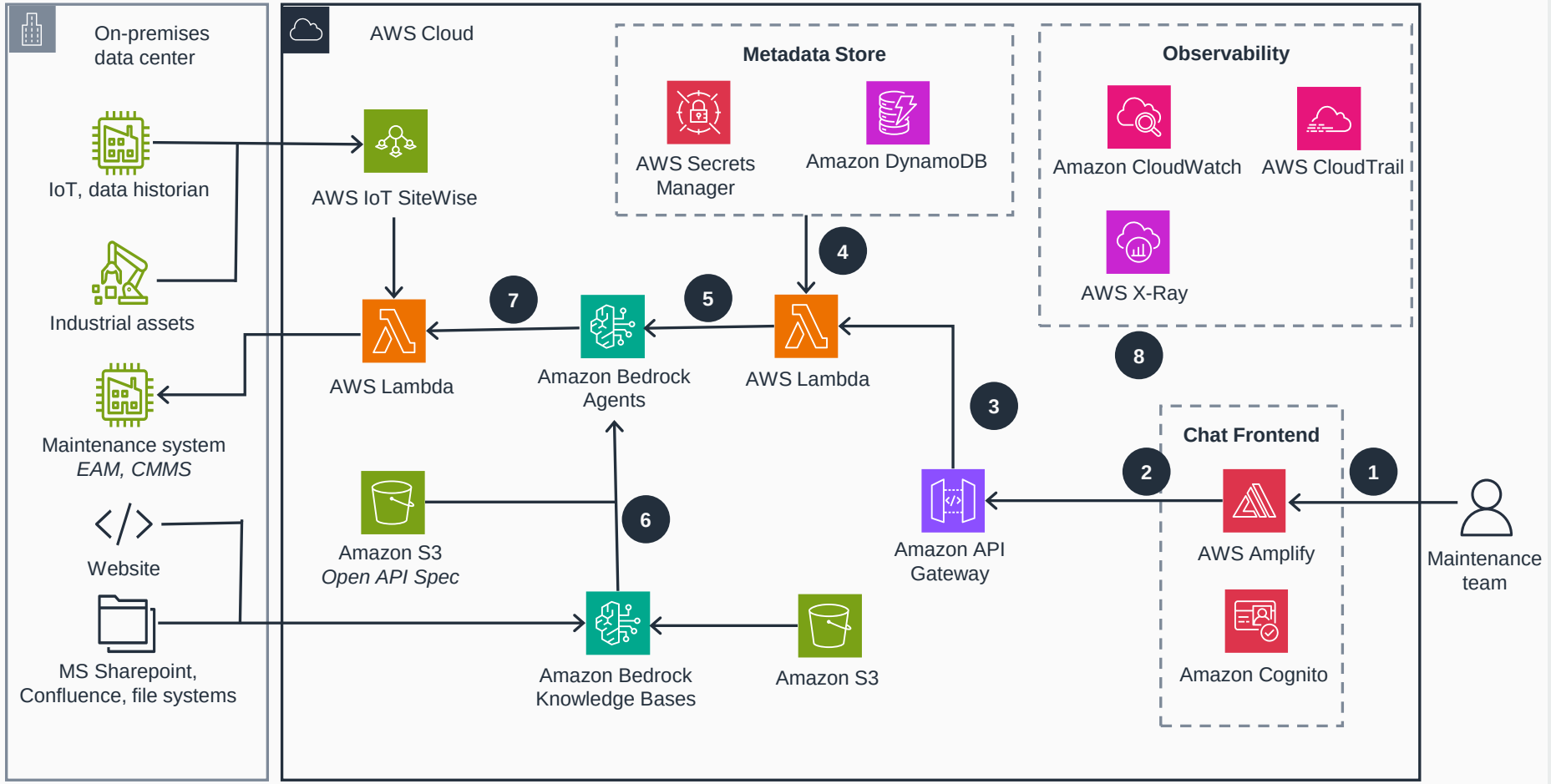
Amazon Bedrock RAG deployment

This architecture diagram illustrates how to build an AI-powered maintenance diagnostic system using Amazon Bedrock Agent. This accelerates troubleshooting through conversational interfaces with maintenance documentation and real-time IoT equipment data.



1. A maintenance team member begins the diagnostic process by accessing and interacting with a web-based chat interface built with **AWS Amplify**.
2. Authenticated requests route through **API Gateway**, providing centralized access control and request throttling.
3. **API Gateway** forwards the requests to a **Lambda** function which processes user prompts and communicates with **Amazon Bedrock Agents** for maintenance assistance and diagnostics.
4. **Amazon DynamoDB** stores large language model (LLM) configuration and conversation history. **AWS Secrets Manager** securely stores external system credentials.
5. An **Amazon Bedrock Agent** executes multistep troubleshooting using LLM reasoning. It performs retrieval augmented generation (RAG) on documentation and retrieves IoT data from **AWS IoT SiteWise**, dynamically assessing information needs.
6. **Amazon Bedrock Knowledge Base** support retrieval-augmented generation (RAG) using data from **Amazon S3** or on-premises repositories. To access on-premises data, connect your network to an **Amazon VPC** through **AWS Site-to-Site VPN** or **AWS Direct Connect**. Review the the AWS Hybrid Connectivity whitepaper for best practices.
7. **Lambda** fetches data from **AWS IoT SiteWise** for OT data and connects to CMMS and EAM systems for automated work order creation.
8. **CloudWatch**, **CloudTrail**, **X-Ray**, and **Amazon Managed Grafana** provide comprehensive monitoring, logging, tracing, and visualization capabilities to monitor the application

Reviewed for technical accuracy July 2, 2025

AWS Reference Architecture