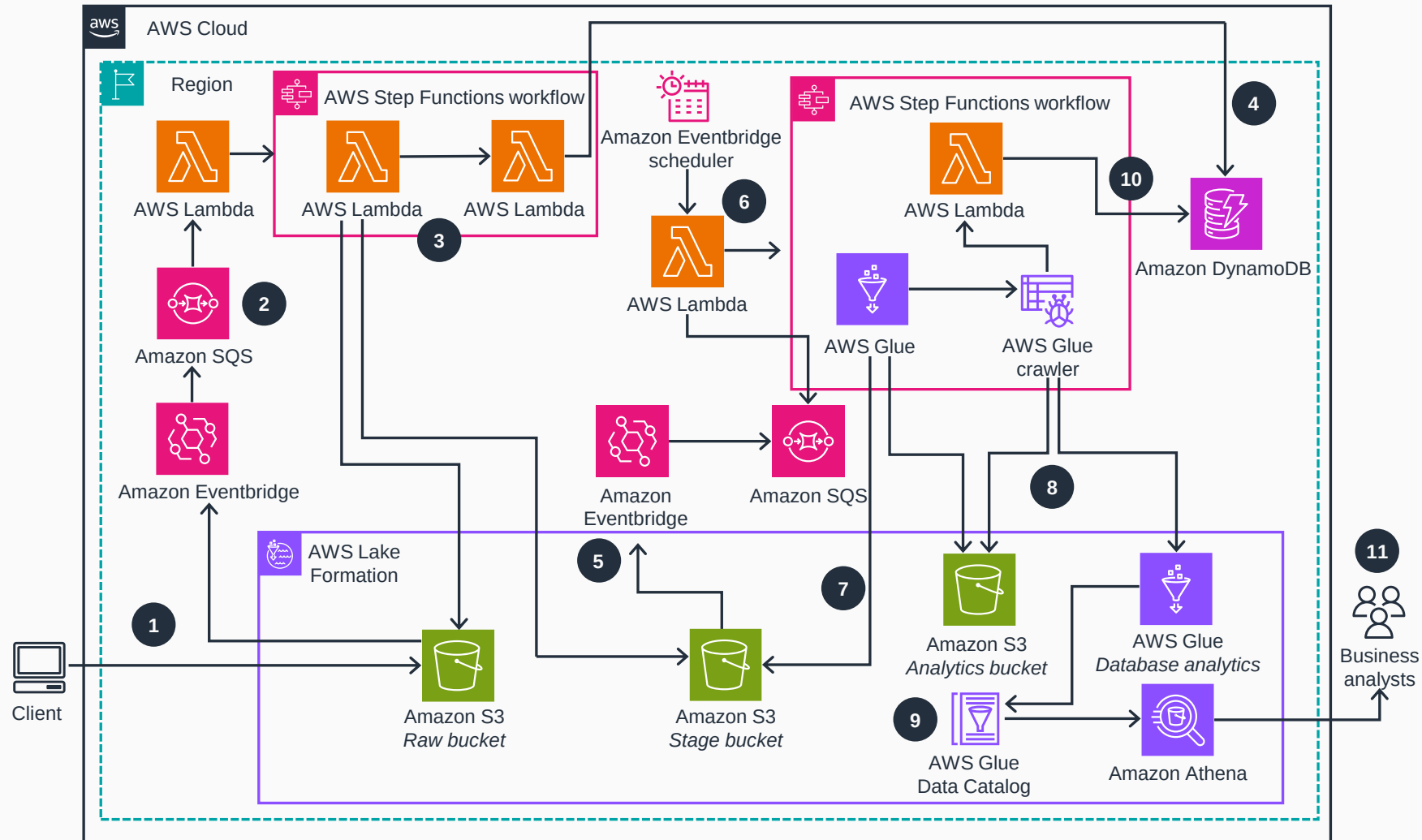


Guidance for Data Lakes on AWS

AWS Serverless Data Lake Framework

This architecture diagram shows how to build a data lake on AWS in addition to demonstrating how to process, store, and consume data using serverless AWS analytics services.



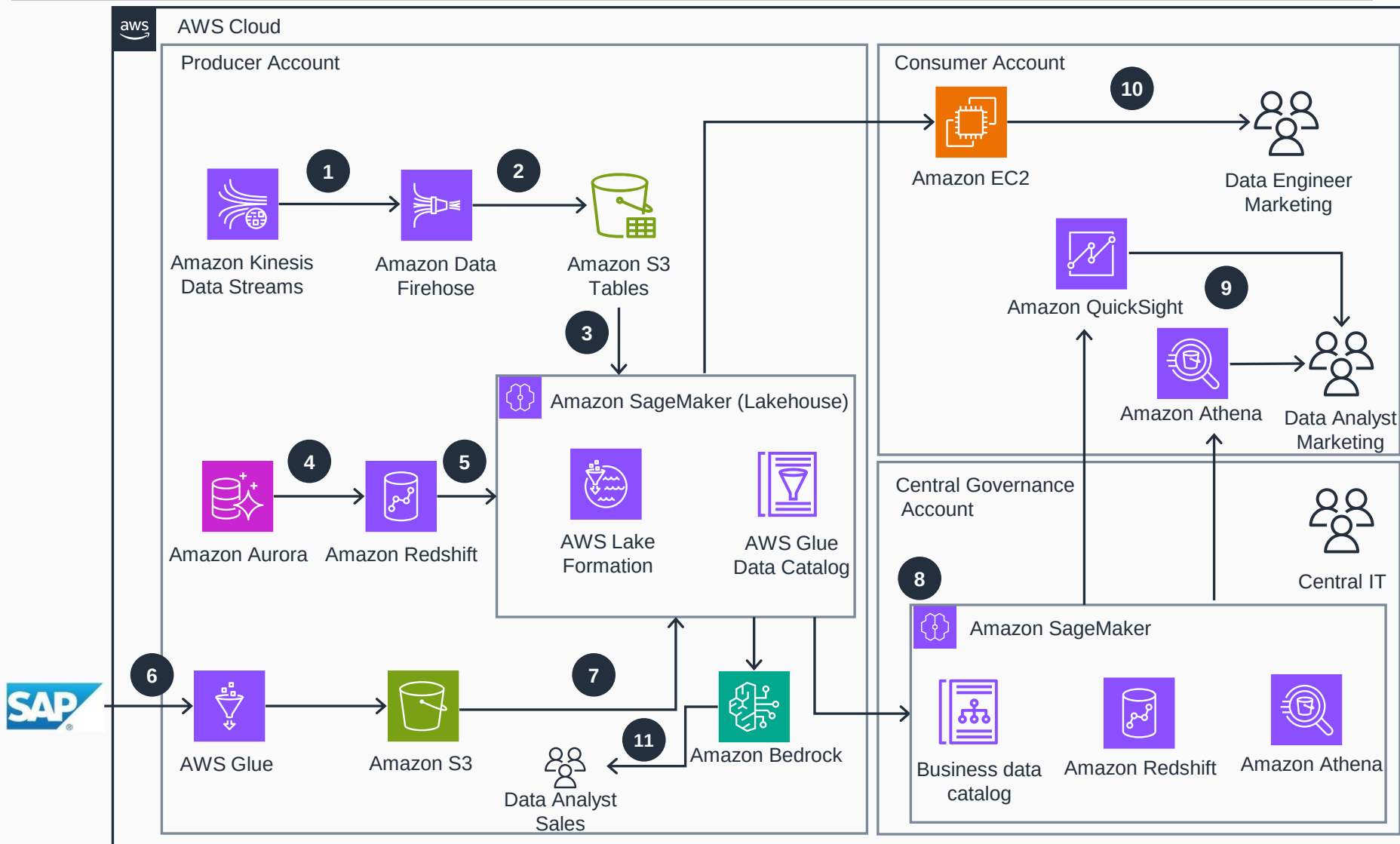
- 1 The data administrator uploads JSON files in the **Amazon Simple Storage Service (Amazon S3)** raw bucket. Object creation in **Amazon S3** triggers an event in **Amazon EventBridge**.
- 2 **EventBridge** has a rule that sends a message in **Amazon Simple Queue Service (Amazon SQS)**, which invokes an **AWS Lambda** function.
- 3 The **Lambda** function triggers the **AWS Step Functions** workflow, in which another **Lambda** function reads files from the **S3** raw bucket and performs transformation. It also writes the new set of JSON files in the **S3** stage bucket.
- 4 A **Lambda** function updates the **Amazon DynamoDB** table with the **Step Functions** job status.
- 5 Once the files are created in the **S3** stage bucket, it triggers an event in **EventBridge**, which has a rule that sends a message in **Amazon SQS** with created file details.
- 6 The **Eventbridge** scheduler runs at certain intervals and invokes a **Lambda** function that retrieves messages from **Amazon SQS** and starts another **Step Functions** workflow.
- 7 **AWS Glue** extract, transform, load (ETL) reads the data from the **AWS Glue** database stage, then converts the files from JSON to Parquet format.
- 8 **AWS Glue** ETL writes the Parquet files in the **S3** analytics bucket. **AWS Glue** crawler crawls the Parquet files in the same bucket and then creates analytics tables in **AWS Glue** database analytics.
- 9 All the staging and analytics catalogs are maintained in the **AWS Glue** Data Catalog.
- 10 A **Lambda** function updates the **DynamoDB** table with the **Step Functions** job status.
- 11 Business analysts use **Amazon Athena** to query the **AWS Glue** database analytics.



Guidance for Data Lake on AWS

Multi-Source Analytics Lakehouse with AI-Powered Insights

This architecture diagram shows how to build a data lake on AWS in addition to demonstrating how to process, store, and consume data using Lakehouse for Amazon SageMaker and Amazon SageMaker Unified Studio.



- 1 Ingest store inventory data with **Amazon Kinesis Data Streams**, which feeds the data into **Amazon Data Firehose**.
- 2 Upload store inventory streaming data into **Amazon Simple Storage Service (Amazon S3)** Tables.
- 3 Catalog store inventory data into Lakehouse for **Amazon SageMaker**, managed with **AWS Lake Formation**, as a federated **AWS Glue** catalog.
- 4 Ingest store, product, and promotions dimension data from **Amazon Aurora** (MySQL) to **Amazon Redshift Serverless** via Zero-ETL.
- 5 Catalog dimension data into Lakehouse for **Amazon SageMaker** as a federated catalog.
- 6 Ingest store sales data from SAP using **AWS Glue** via Zero-ETL. **AWS Glue** writes the store sales data into **Amazon S3** in Apache Iceberg open table format.
- 7 Catalog store sales data into Lakehouse for **Amazon SageMaker** as a federated catalog.
- 8 Control access and governance through **Amazon SageMaker Unified Studio** from the central governance account. The producer account publishes the sales data. The consumer account subscribes and accesses the sales data.
- 9 The marketing team generates insights from unified data using **Amazon Athena**. The data is pulled from Lakehouse for **Amazon SageMaker**. The sales team can also use **Amazon QuickSight** to visualize the data.
- 10 The marketing team's data engineer with an existing Spark platform accesses sales data from Lakehouse for **Amazon SageMaker** by running Spark jobs on **Amazon Elastic Compute Cloud (Amazon EC2)** using an open Iceberg REST API.
- 11 Sales team generates insights from unified data using **Amazon Bedrock** foundation models with **Amazon Bedrock Knowledge Bases** using Retrieval Augmented Generation (RAG) in the Producer account by using natural language queries.

