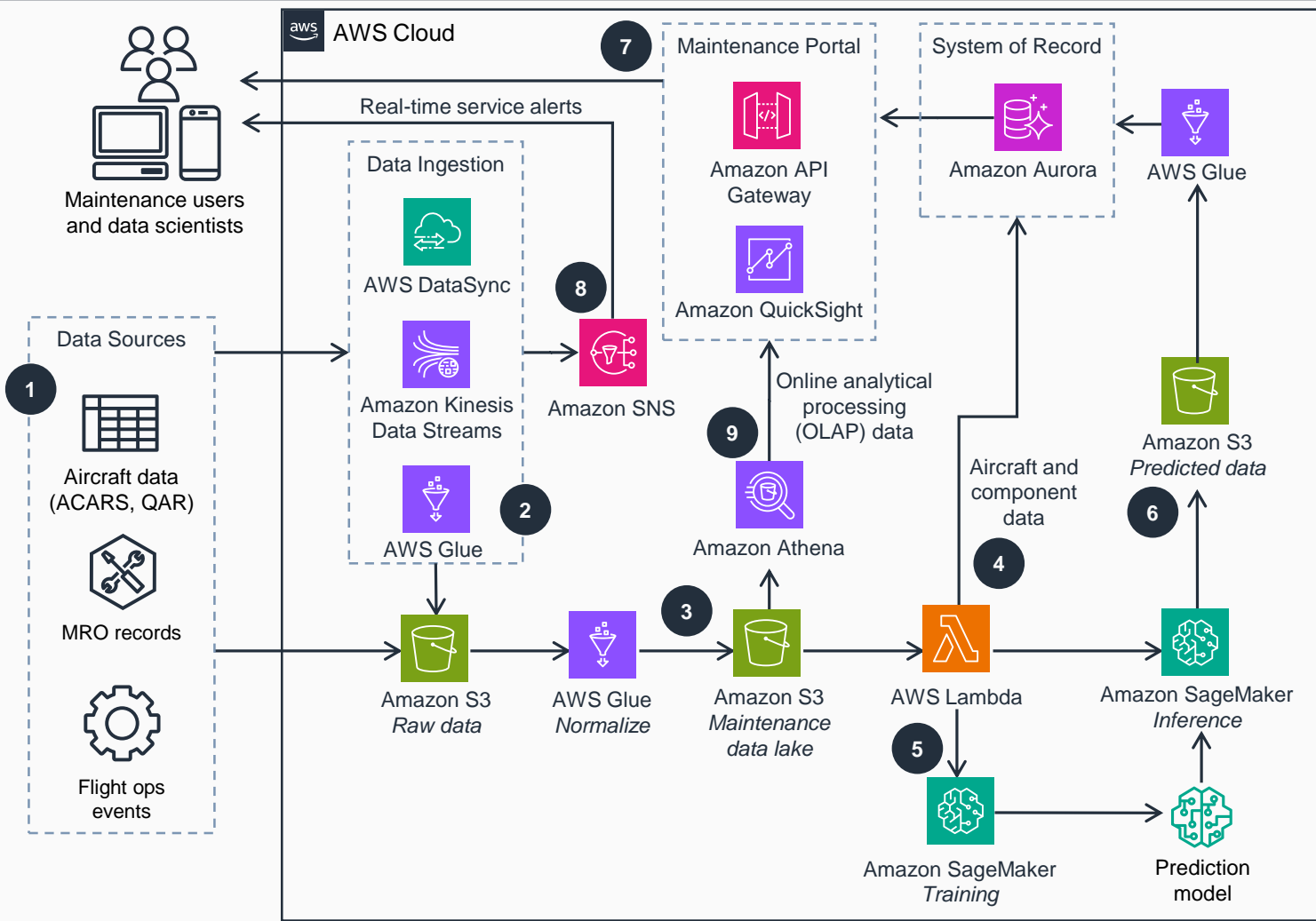


# Guidance for Aircraft Predictive Maintenance on AWS

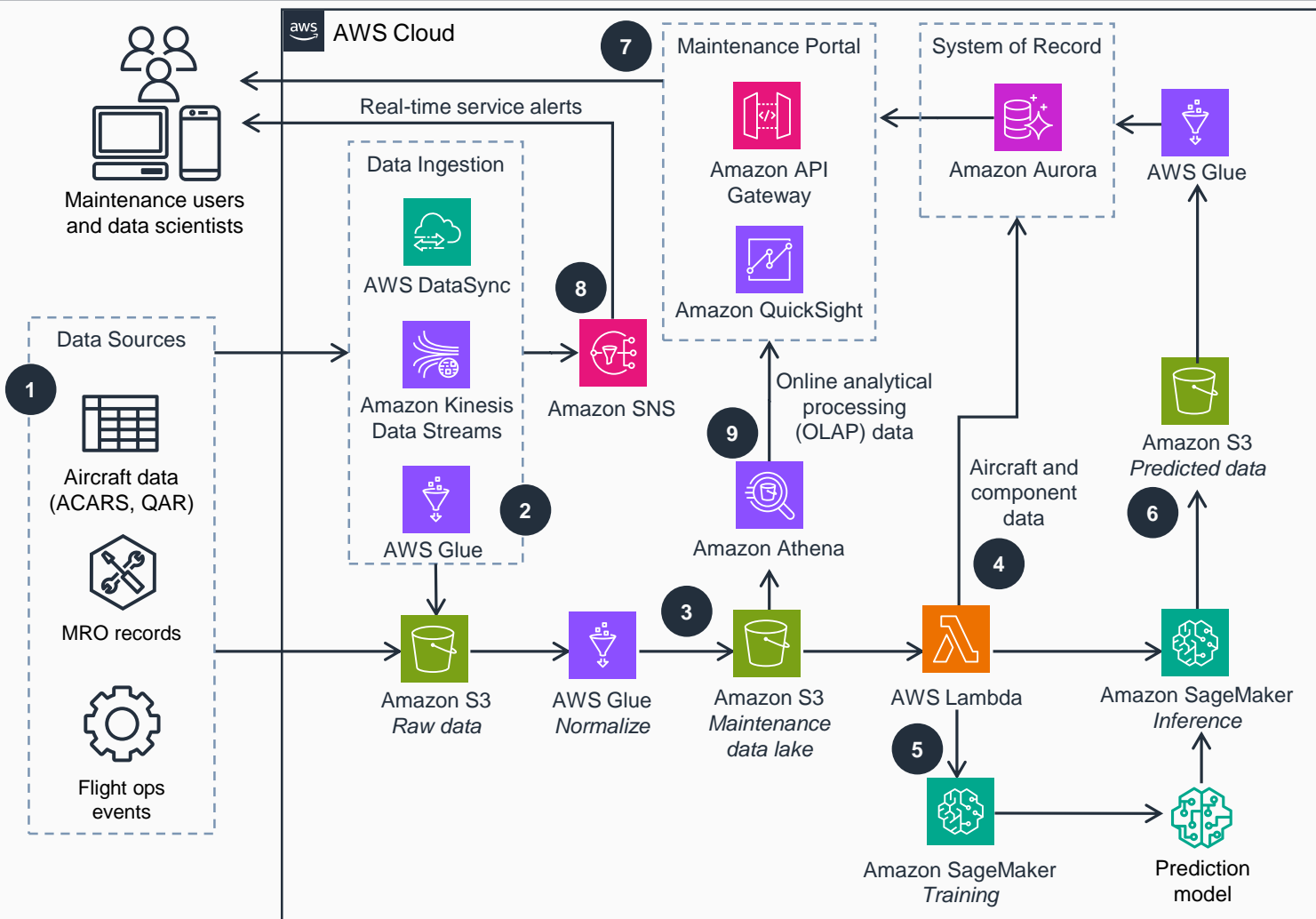
This architecture diagram shows how to predictively reduce unscheduled maintenance delays and flight cancellations using ML and data from IoT devices. This slide details Steps 1-7.



- 1 Source data is generated by multiple sources. The aircraft generates flight logs, transmitted wirelessly through the Aircraft Communication Addressing and Reporting system (ACARS) or recorded through a Quick Access Recorder (QAR). Maintenance, Repair, and Overhaul (MRO) facilities generate maintenance records. Airlines broadcast delay and cancellation notices as flight ops events.
- 2 Raw data is ingested to an **Amazon Simple Storage Service (Amazon S3)** bucket by a variety of channels, depending on source type. **Amazon Kinesis Data Streams** manages event streams, and **AWS DataSync** or **AWS Glue** manage bulk transfers from databases and file storage.
- 3 **AWS Glue** transforms raw data into a second **S3** bucket, redacting sensitive fields from QAR records, normalizing values, and other data.
- 4 **AWS Lambda** records each normalized flight and maintenance event into an **Amazon Aurora** database. These records capture usage and failure history per tail number and serviceable component.
- 5 Once a data baseline is established, **Lambda** queues up an ML training job in **Amazon SageMaker**, training unique prediction models per serviceable component.
- 6 Once prediction models are established, **Lambda** invokes those models to predict time to next service based on each new record. **SageMaker** stores predicted results in a separate **S3** bucket, and **AWS Glue** updates the corresponding component records in **Aurora**.
- 7 MRO technicians access aircraft and component service history and maintenance recommendations through a cloud-hosted web portal. **Amazon API Gateway** provides API-level access for maintenance apps, and **Amazon QuickSight** provides pre-built dashboards.

# Guidance for Aircraft Predictive Maintenance on AWS

This architecture diagram shows how to predictively reduce unscheduled maintenance delays and flight cancellations using ML and data from IoT devices. This slide details Steps 8-9.



- 8 Amazon Simple Notification Service (Amazon SNS)** sends priority service requests to technicians by text message or email, as identified directly from source messages (for example, ACARS alarm messages).
- 9 Amazon Athena** performs direct analytical SQL queries to the maintenance data lake for insights for data scientists.