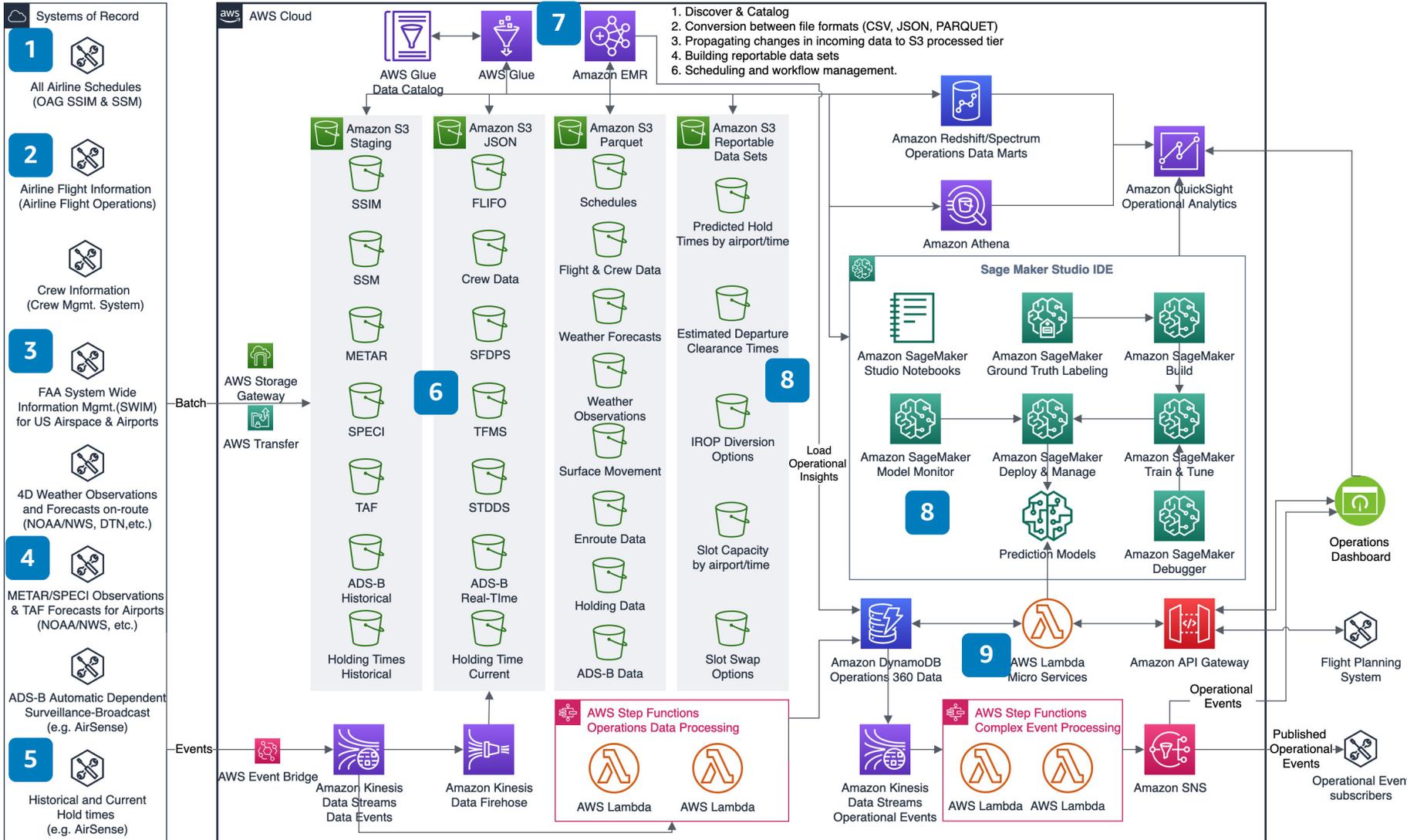


Flight Planning Using Data Lakes and AI/ML

Use published schedules, flight information, airport weather observations/predictions, historical estimated and actual holding times, and on-route/surface aircraft data to improve hold time prediction, and estimation of departure clearance times.



- Use published schedules of all airlines from OAG to create a full picture of the flights arriving at an airport by the time of day.
- Augment the schedule with actual flight data through real-time updated flight information. (This data is limited to the airline currently implementing this solution.)
- Use flight plans, surface movement, and on-route information of all the flights from all the airlines (FAA SWIM in US) to create an accurate up-to-date picture of airspace and airport taxiways.
- Use weather observations reported through Meteorological Terminal Air Report (METAR) format and weather forecasts reported through Terminal Aerodrome Forecast (TAF) to correlate hold time to adverse weather conditions.
- Use historical estimated and actual hold times to build predictive models by airport, time of day, and weather forecasts. Also, use historical data to remove outliers like landing time restrictions.
- Tiered data lake architecture using **Amazon S3** allows for ingestion and processing of data from a variety of batch and real-time data feeds. In addition, this architecture allows for adding new data feeds and propagating data changes easier.
- Use **AWS Glue** and **Amazon EMR** to discover, catalog, process inputs, and create the processed data in **Amazon S3**. These services process batch data to create PARQUET format for all the data.
- Use **Amazon SageMaker** to access, label, build, train, tune, deploy, and manage predictive models to predict hold times and estimated departure clearance times. Use **Amazon SageMaker Debugger** for facilitating training and tuning of model. Use **Amazon SageMaker Model Monitor** to detect and remediate concept drift.
- Build an operational data store to ingest real-time data and use that data to run a prediction model to adjust predictions based on the latest data. Provide services and events for integration into operational systems like flight planning.

