IOT REFERENCE ARCHITECTURE

IOT

1 IoT Devices

2 IoT Message Broker
- AWS IoT Core
- Azure IoT Hub
- Cloud IoT Core
- HiveMQ

MQTT

3 Streaming Services
- kafka
- Amazon Kinesis
- Cloud Pub/Sub
- Azure Event Hub

4 Cloud Object Storage
- Google Cloud Storage
- Amazon S3
- Azure Blob Storage

6 IoT Rules Engine

5 snowflake
- Native JSON Support
- Aggregation Using Streams & Tasks
- Time-series Optimized Data Ingestion with Snowpipe
- Query Data in Object Storage via External Tables

IoT Analytics

Azure   aws   (Google Cloud)
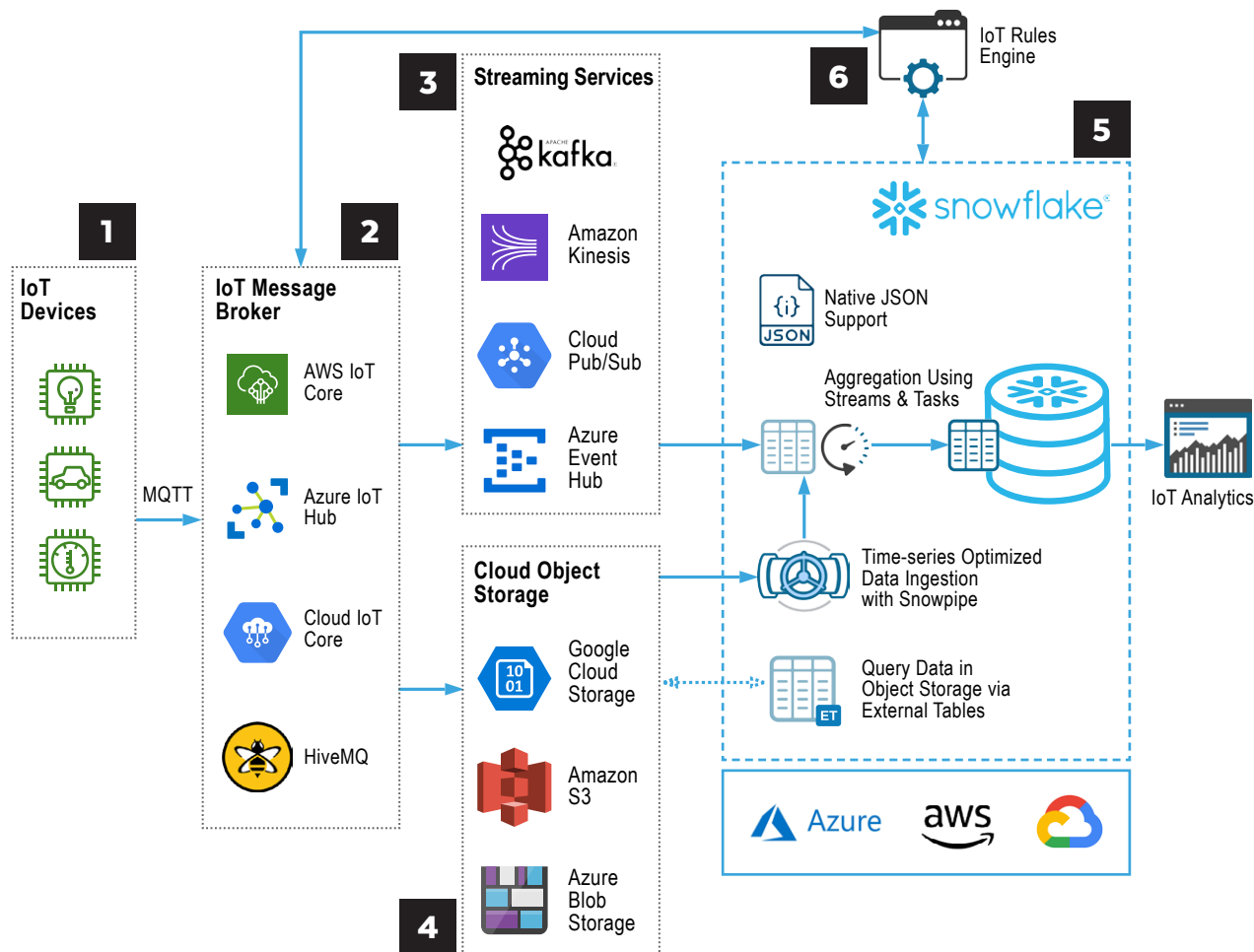
OBJECTIVE
Build applications that analyze large volumes of time-series data from IoT devices and respond in real time.

DESCRIPTION

1 Smart devices, sensors, and other IoT devices generate continuous data.

2 Due to frequently unreliable internet connectivity, IoT devices communicate using the MQTT protocol and an IoT message broker. The message broker uses a publish and subscribe mechanism to interact with other services, which subscribe to specific topics within the broker to access device data.

3 A streaming service is used to ingest and buffer real-time device data, thus ensuring reliable ingestion and delivery to a staging table in Snowflake (5).

4 In cases where the application requires it, cloud object storage is used to stage batch data prior to ingestion. For example, minute-by-minute data may be stored in cloud object storage, whereas aggregated data over a longer period may be stored in Snowflake (5).

5 Snowflake offers native support for JSON and other semi-structured data formats for easy ingestion of device data. Snowpipe automatically optimizes time-series queries by ingesting data chronologically. Snowflake's Streams and Tasks features automate the workflows required to ingest and aggregate incoming data.

6 An IoT rules engine hosts the business logic required by the application and operates on data available in Snowflake and in the message broker. The rules engine sends messages back to controls devices.