AWS LAMBDA: INTERNET OF THINGS BACKEND

With the Internet of Things comes the need to handle an ever increasing set of connected devices and data in a robust and cost-efficient way. Amazon Web Services provides services and infrastructure to build reliable, fault-tolerant, and highly available IoT solutions in the cloud for handling both event ingestion and synchronous calls from devices.

**System Overview**

1. Devices send events with data to **Amazon Kinesis**, which provides large scale durable storage of the events for 24 hours and allows multiple **AWS Lambda** functions to process the same events.

2. In **AWS Lambda**, **Lambda Function 1** processes the incoming events and stores the event data in a table in **Amazon DynamoDB** for low-latency access. DynamoDB allows the needed capacity of the table to be provisioned just by changing a configuration value. The Lambda function also sends the values to **AWS CloudWatch** for simple monitoring of aggregate metrics.

3. **Lambda Function 2** processes the same events as **Function 1** but stores the incoming events in **Amazon S3** for cost effective long-term durable archival. Storing data in S3 makes it easily accessible for analytics processing with **Amazon Elastic MapReduce (Amazon EMR)** and **Amazon Redshift**.

4. **Lambda Function 3** provides a synchronous interface that devices call directly to retrieve data from **DynamoDB**. This can, for instance, be used to retrieve configuration information or historical event data that the devices need.

5. To lower cost, event data stored in **Amazon S3** that is no longer needed online is automatically migrated to **Amazon Glacier** or deleted after a certain retention period using S3 object lifecycle management.

6. **Amazon EMR** runs jobs that read and write directly to **DynamoDB** and **S3** to analyze the data, generate aggregations, and create billing reports from the large set of events gathered from the device. Event data from **S3** is loaded into **Amazon Redshift** to allow interactive exploration and analysis of the data using standard SQL queries.