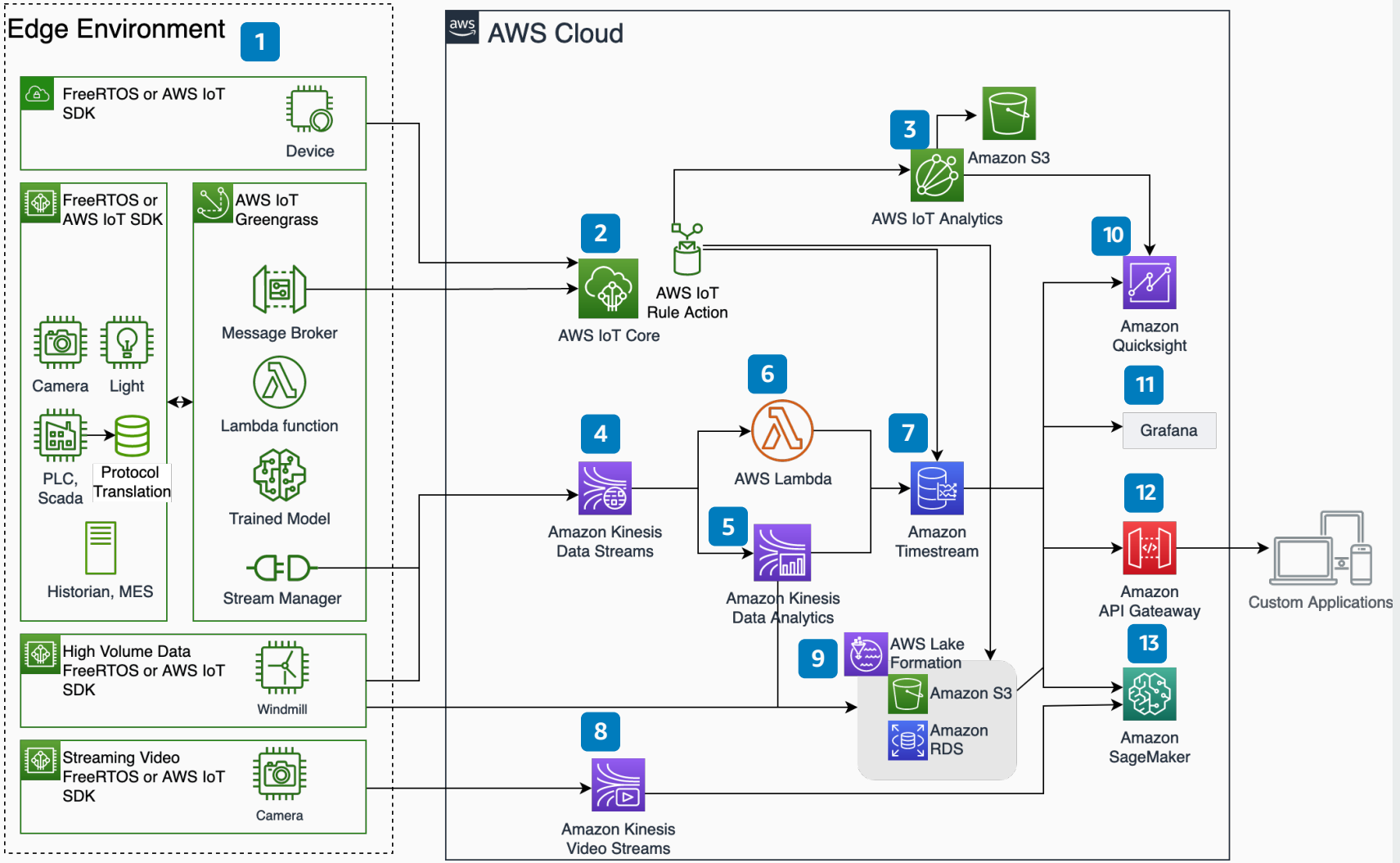
Time Series Data Processing

Processing Internet of Things (IoT) Time Series Data on AWS



1. Devices send messages directly to AWS from **FreeRTOS**, **AWS IoT SDK**, or **AWS IoT Greengrass** for edge computing or communication over industrial protocols.
2. **AWS IoT Core** ingests data via MQTT, HTTP, or WebSocket. An **AWS IoT Rule Action** is configured to pick up messages and route them to AWS services like **AWS IoT Analytics** or non-AWS services supported as real-time targets.
3. **AWS IoT Analytics** is used to enrich data. Processed datastore messages are stored in a service or user-managed **Amazon S3** bucket.
4. A connector or stream manager in **AWS IoT Greengrass** can be configured to send high volume data to **Amazon Kinesis Data Streams**. Or, devices can send messages directly to **Kinesis Data Streams** using the **Kinesis Producer Library**.
5. Integrate **Kinesis Data Streams** with **Amazon Kinesis Data Analytics** to filter, transform, and aggregate high volume streaming data.
6. For custom logic, **Amazon Kinesis Data Streams** can integrate with an **AWS Lambda** function to process data before storing in **Amazon Timestream**.
7. Data can be exported to time series databases like **Timestream** as a serverless and scalable database option.
8. Time encoded video data can be sent to **Amazon Kinesis Video Streams** which can route the video data to other AWS services.
9. Ingest data from persistent data stores like **Amazon S3** or **Amazon RDS** and use **AWS Lake Formation** to build, secure, and manage your data lake.
10. **Amazon QuickSight** can consume data directly from **AWS IoT Analytics** or **Timestream** to visualize historical data and deliver insights.
11. Install **Amazon Timestream** plugin for Grafana to query, visualize, and generate alerts on your data using Grafana.
12. Make this data available to your applications or third-party applications by creating an **Amazon API Gateway** that can return data to your users.
13. Integrate with **Amazon SageMaker** to run and train machine learning algorithms on data stored in **Timestream** or **Kinesis Video Streams**.

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AWS Reference Architecture