AWS re:Invent

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AUT303

Intelligent vehicle fleet data collection using CMS

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Workshop goals

Starting with a CMS Deployment, you will

1. Add simulated vehicles to system
2. Create and onboard a custom simulation using pre-canned, randomized, or model-generated telemetry
3. Generate and collect additional metrics, move the new data through the system, and add it to the visualization

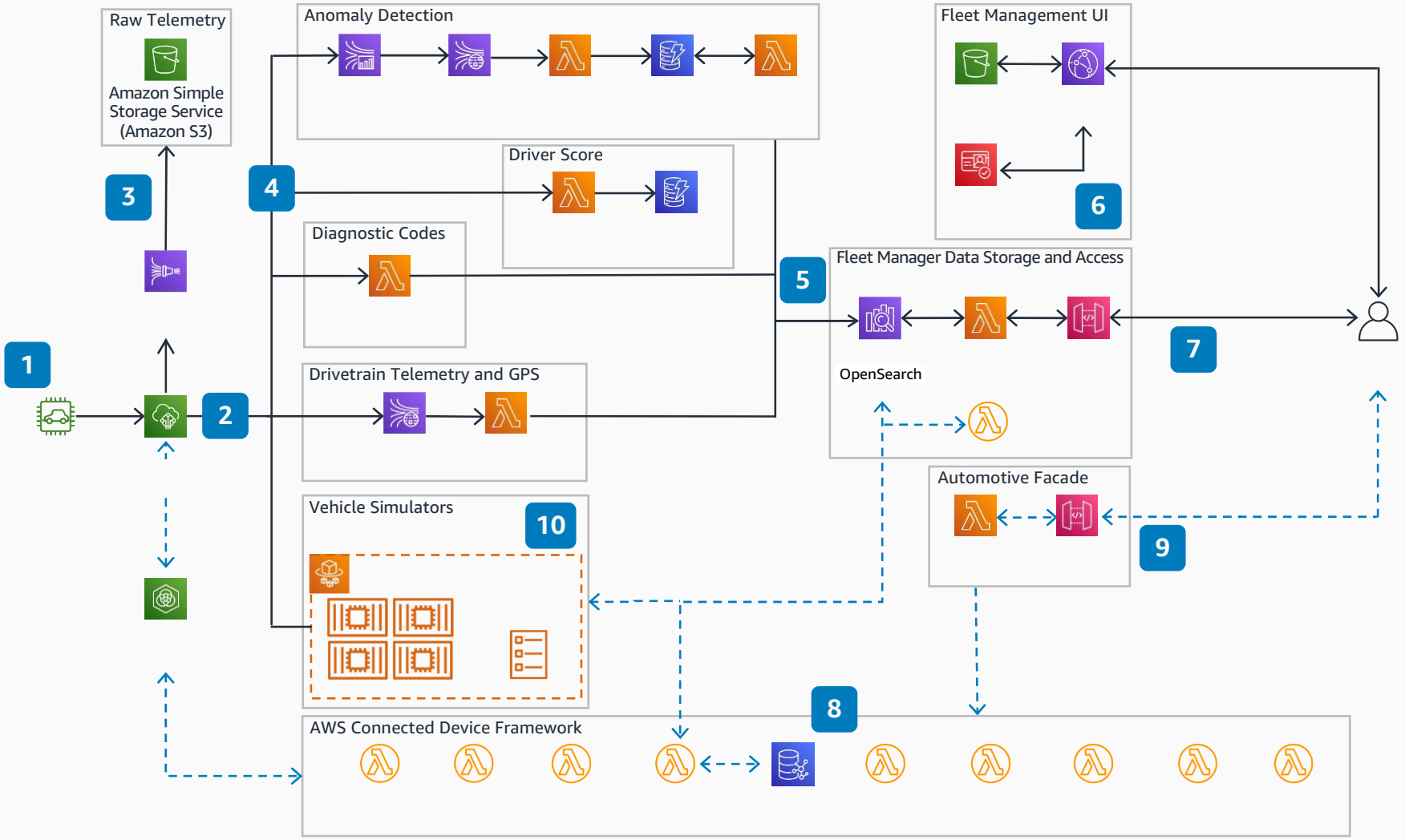
You are also free to explore other options, such as

- Other ways to visualize data
- Enrich or transform data

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AWS Connected Mobility Architecture

Gather, process, analyze, and act on connected vehicle data.



1. AWS IoT devices running FreeRTOS, **AWS IoT** Device SDK, or **AWS IoT Greengrass** SDK embedded in vehicles with an unique identity principal (X509 certificate) publish telemetry via MQTT to **AWS IoT Core**.
2. The **AWS IoT Core** Rules Engine evaluates inbound messages published from devices and delivers them to connected services based on business rules.
3. Raw telemetry is stored in **Amazon Simple Storage Service (Amazon S3)** using **Amazon Kinesis Data Firehose** to buffer the incoming stream.
4. Serverless applications built with **Amazon Kinesis Data Streams**, **Amazon Kinesis Data Analytics**, **AWS Lambda (Lambda)**, and **Amazon DynamoDB** process and analyze telemetry.
5. Processed data is pushed to **Amazon OpenSearch Service** for enterprise-scale search and geolocation-based queries.
6. The Fleet Management UI is a static web app hosted in **Amazon S3** behind an **Amazon CloudFront** distribution with **Amazon Cognito** authentication.
7. APIs behind **Amazon API Gateway (API Gateway)** and **Lambda** pull data from **Amazon OpenSearch Service** for real-time views of connected vehicle status (including drivetrain and location, trip data, and anomalies) and enable over-the-air updates pulled from the Asset Library.
8. The AWS Connected Device Framework supports building, deploying, and maintaining scalable IoT solutions with serverless microservices: The solutions include provisioning and lifecycle management and over-the-air update command handling.
9. **API Gateway** exposes APIs from the AWS Connected Device Framework automotive façade for provisioning, certificate rotation, commands, notifications, asset library, and more.
10. An **AWS Fargate** cluster implements definable simulators for trip routes and telemetry data. Simulators are provisioned in the Asset Library and publish data to **AWS IoT Core**.

Reviewed for technical accuracy August 31, 2021

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AWS Reference Architecture

Getting started

Each team (table) has a CMS environment to work with, including:

- Full, functional CMS deployment
- A Cloud9 IDE that was used for the deployment with all the source for the workshop pre-loaded
  - You can create additional Cloud9 environments and pull all the source from the s3 bucket in your account (`s3://cms-source-<team-name>/source.tgz`). Or…use Cloud9's collaboration features

Log in to Event Engine, enter the hash for your table, then

1. Explore the Fleet Manager UI
2. Run simulations using `curl` scripts, Postman on your laptop or Postman on the web: https://identity.getpostman.com

Explore the workshop and exercises at your own pace. Collaborate with teammates (e.g., one modifies the simulator, another modifies ingest rule, etc.)

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Accessing the Event account

Region: **us-east-1**

Go to: https://dashboard.eventengine.run/

- Enter the Event Hash (e.g., `3d49-13169b5a24-1e`)
- Log in, take note of credentials, then open AWS Console

Access the workshop guide: here

- Work through the guides starting from “Running Simulations”
  - “Build and Deploy” has been completed for you
- You will need to acquire a Mapbox token from https://docs.mapbox.com/help/glossary/access-token

Staff are available to help resolve any issues or discuss specifics

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Thank you!

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