Service Name

AWS IoT FleetWise

Service Overview

AWS IoT FleetWise is a managed service that enables the collection, organization, and transformation of vehicle data in the cloud. The service helps improve vehicle quality, performance, and autonomy by collecting and standardizing data from vehicles using different protocols and data formats. It transforms low-level messages into human-readable values and keeps both structured and unstructured data synchronized in the cloud. FleetWise uses Edge Agent software running on vehicles to collect data based on intelligent campaigns that specify what data to collect and when to transfer it to the cloud for analysis and machine learning applications.

Key Use Cases

- Train AI/ML models: Continuously improve machine learning models used for autonomous and advanced driver assistance systems by collecting data from production vehicles
- Enhance digital customer experience: Use data from infotainment systems to make in-vehicle audiovisual content and in-app insights more relevant
- Maintain vehicle fleet health: Use insights from fleet data to monitor EV battery health and charge levels, manage maintenance schedules, analyze fuel consumption, and identify potential maintenance issues
- Create and manage commands: Remotely send commands to vehicles from the cloud, such as locking doors or setting temperature within seconds
- Create and manage state templates: Provide mechanisms for vehicle owners to track the state of their vehicles through collected signal updates

Features

- **Vehicle Modeling Framework**: Define and model vehicles with their sensors and actuators in the cloud using signals, signal catalogs, vehicle models, and decoder manifests
- **Edge Agent Software**: Reference implementation for developing software to facilitate secure communication between vehicles and cloud
- **Intelligent Data Collection**: Campaign-based data collection with condition-based and time-based schemes to control what vehicle data to collect and when to transfer
- **Multi-Protocol Support**: Support for various network interfaces including Controller Area Network (CAN bus), On-board Diagnostic (OBD) II, and custom interfaces

- **Data Compression**: SNAPPY compression to save wireless bandwidth and reduce network traffic during data transmission
- **Multiple Data Destinations**: Send data to MQTT topics, Amazon S3, or Amazon Timestream with support for MQTT v3.1.1 and v5.0 specifications

Value Proposition

AWS IoT FleetWise provides unique value through intelligent data collection that sends only relevant data to the cloud, reducing transmission costs and bandwidth usage. The service offers standardized fleet-wide data analysis without requiring custom data collection systems, automatic synchronization of both structured sensor data and unstructured vision system data in the cloud. Key differentiators include edge data storage capabilities that forward data under optimal conditions (such as Wi-Fi connectivity), built-in data transformation from binary to human-readable formats, and seamless integration with AWS analytics and machine learning services for advanced vehicle insights and autonomous driving improvements.

Service Integration

AWS IoT FleetWise integrates deeply with core AWS services to provide comprehensive vehicle data management. Primary integrations include AWS IoT Core for device provisioning and secure MQTT communication, Amazon Timestream for real-time time-series data storage and analytics, and Amazon S3 for cost-effective long-term data storage with Apache Parquet or JSON formats:

- Additional integrations support the broader ecosystem: Amazon SageMaker for machine learning model training, AWS Glue for data processing and cataloging, Amazon Athena for data querying, and AWS Step Functions for workflow orchestration
- The service also leverages AWS Key Management Service (KMS) for encryption and works with Amazon Macie for sensitive data protection

Onboarding and Offboarding

Customers get started with AWS IoT FleetWise by first setting up an AWS account and creating administrative users. The onboarding process involves deploying Edge Agent software using provided CloudFormation templates, creating vehicle models to standardize vehicle formats, establishing signal catalogs to define vehicle data structures, and setting up decoder manifests to transform binary data into readable values:

- Customers then create virtual vehicle representations, associate them with fleets, and configure data collection campaigns
- The service provides comprehensive tutorials, SDK examples in multiple languages (Java, Kotlin), and integration guides for connecting with existing AWS IoT Core infrastructure and downstream analytics services

Getting Started Guide: https://docs.aws.amazon.com/iot-fleetwise/latest/developerguide/fleetwise-getting-started.html

Data Removal

AWS IoT FleetWise enables customers to remove their data through standard AWS data deletion processes. Customers can delete campaigns, vehicles, decoder manifests, model manifests, fleets, and signal catalogs using provided API operations or console interfaces. Data stored in integrated services like Amazon S3 and Amazon Timestream can be removed using those services' respective data deletion capabilities. The service provides CloudFormation stack deletion options to remove all created resources and avoid further charges during offboarding.

Backup/Restore and Disaster Recovery

AWS IoT FleetWise operates as a managed service with built-in resilience across multiple availability zones. The service does not provide traditional backup capabilities but relies on underlying AWS infrastructure durability. Data collected and stored in Amazon S3 and Amazon Timestream inherits those services' backup and disaster recovery capabilities. Customers can implement cross-region data replication using S3 cross-region replication and Timestream's multi-region features for additional data protection and disaster recovery scenarios.

Backup Capabilities

AWS IoT FleetWise does not have native backup capabilities as it is a data collection and transformation service. However, data collected through campaigns is automatically stored in durable AWS services like Amazon S3 and Amazon Timestream, which provide their own backup and versioning capabilities. Customers can configure S3 lifecycle policies and cross-region replication for backup strategies, while Timestream provides built-in durability and retention policies.

Disaster Recovery

AWS IoT FleetWise supports disaster recovery through its multi-availability zone architecture and integration with resilient AWS services. The service does not directly integrate with AWS Elastic Disaster Recovery but benefits from AWS infrastructure resilience. Customers can implement disaster recovery strategies using connected mobility reference architectures that include cross-region replication of IoT device registries, certificates, and policies, along with data replication in S3 and Timestream across regions.

Recovery Objectives

AWS IoT FleetWise helps customers meet recovery objectives through its distributed architecture and integration with durable AWS services. The service provides near real-time data collection and transfer, enabling low RTO for data availability. RPO objectives are

supported through continuous data collection campaigns and immediate transfer to persistent storage in S3 and Timestream. Edge data partitioning capabilities provide additional data resilience by temporarily storing data locally before cloud transfer.

Service Constraints

Service Quotas: https://docs.aws.amazon.com/general/latest/gr/iotfleetwise.html

FAQ: https://aws.amazon.com/iot-fleetwise/faqs/

Technical Requirements

Service Documentation: https://docs.aws.amazon.com/iot-fleetwise/latest/developerguide/what-is-iotfleetwise.html

User Guide: https://docs.aws.amazon.com/iot-fleetwise/latest/developerguide/

API Reference: https://docs.aws.amazon.com/iot-fleetwise/latest/APIReference/

Pricing Overview

Please see the AWS UK G Cloud 15 Pricing Document accompanying this service in the Digital Marketplace.

Public Pricing: https://aws.amazon.com/iot-fleetwise/pricing/

Cost Optimization

AWS IoT FleetWise offers several unique cost optimization features including intelligent data collection that transmits only relevant data based on configurable conditions and time periods, reducing bandwidth costs. SNAPPY compression reduces data transfer volumes by up to 70%:

- Edge data partitioning allows temporary local storage and batch transmission during optimal network conditions like Wi-Fi connectivity
- Customers pay only for active vehicles and messages sent, with no minimum fees
- Data destination flexibility allows choosing cost-effective storage in S3 for archival or Timestream for real-time analytics based on use case requirements

Savings Considerations

Main cost savings come from reduced data transmission through intelligent filtering and compression, eliminating unnecessary raw data transfer. Edge processing and selective data collection minimize cloud storage and processing costs:

- Batch data transfer optimization reduces cellular data charges
- The pay-per-active-vehicle model avoids costs for inactive fleet members

- Integration with cost-effective AWS services like S3 for long-term storage provides significant savings compared to proprietary vehicle data platforms
- Automated data lifecycle management and the ability to configure retention policies help optimize storage costs over time while maintaining compliance with data retention requirements