

The background features a vibrant blue gradient with subtle, wavy horizontal lines. In the bottom right corner, there are abstract, flowing shapes in shades of purple, pink, and orange, creating a dynamic and modern aesthetic.

aws SUMMIT

INDIA | MAY 25, 2023

MFGA007

Monitoring EV battery health using AWS IoT FleetWise

Reetesh Varshney (He/Him)

Senior Solutions Architect - IoT

AWS India



Agenda

- Growth of 'Electric Vehicles' in India
- The challenges that they bring
- AWS IoT FleetWise for intelligent and efficient fleet data management

Shift towards sustainable and safer mobility

49%



CAGR of EV in India between
2022 - 2030

10M



Annual sale in India
by 2030

30%



Electrification of India's
vehicle fleet by 2030

Source: [Economic survey of India, 2023](#)

Battery monitoring is key to adoption

Safety

Charging
Time

Performance



Batteries in electric vehicles don't last forever!



Specific
Energy



Battery degradation is a critical aspect to be monitored

Lifespan

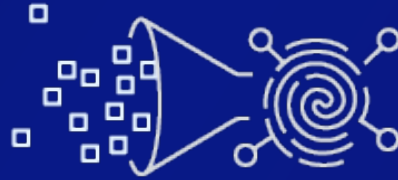
Specific
Power

Challenges with vehicle data



Data fragmentation

Unique data formats across vehicle models and components makes it challenging to generate fleet-wide insights



Data tsunami

Vast amounts of data from advanced sensors like cameras make it difficult and expensive to isolate the data signals you need in a sea of noise



Data delays

Data comes too late for users to quickly mitigate fleet-wide problems or provide customers with preventative maintenance



AWS IoT FleetWise

Making it easier and more cost-effective to collect, transform, and transfer data from millions of vehicles to the cloud in near real time

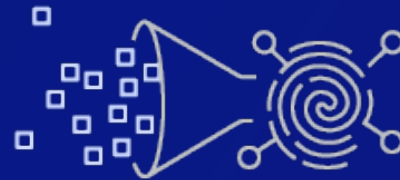
AWS IoT FleetWise

EASILY COLLECT, TRANSFORM, AND TRANSFER VEHICLE DATA TO THE CLOUD AT SCALE



Easily access standardized, fleet-wide vehicle data

Build virtual representations of vehicles and apply a common data format to structure and label vehicle attributes, sensors, and signals



Reduce costs with intelligent data filtering

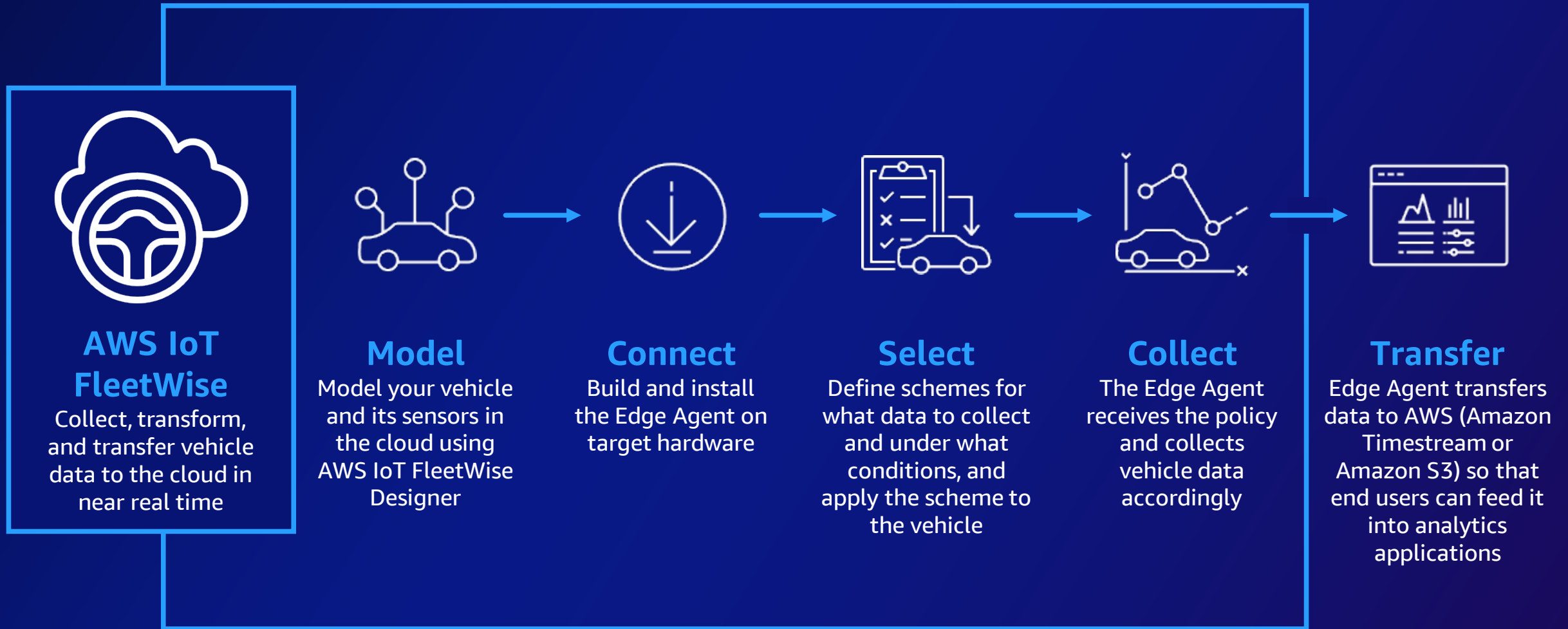
Select which data to transfer and define rules and events for when to transfer it, and dynamic data selection automatically reduces redundant data



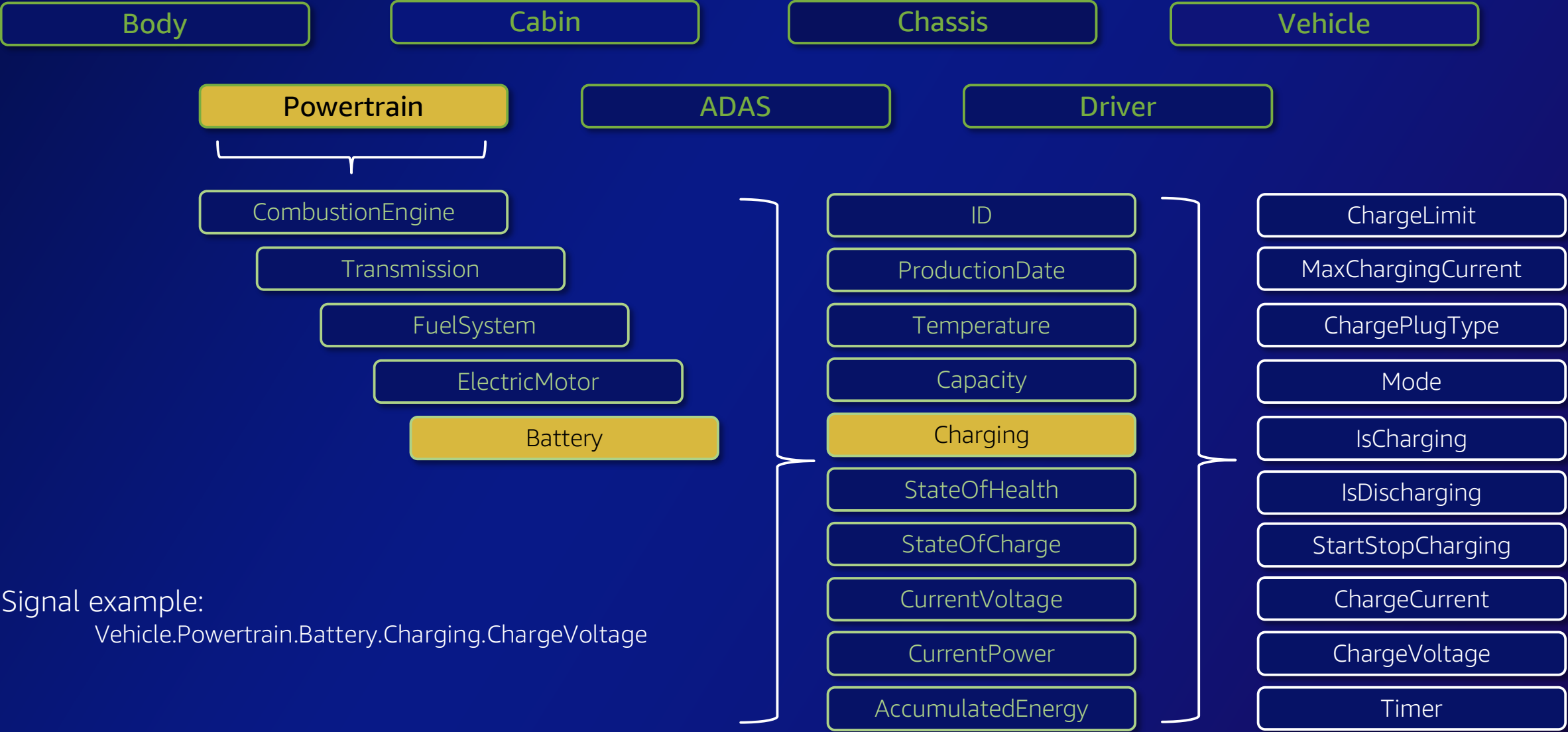
Detect and mitigate problems more quickly by surfacing vehicle data in near real time

Take quick, corrective action by notifying operations or manufacturing groups when problems occur in near real time

How AWS IoT FleetWise works



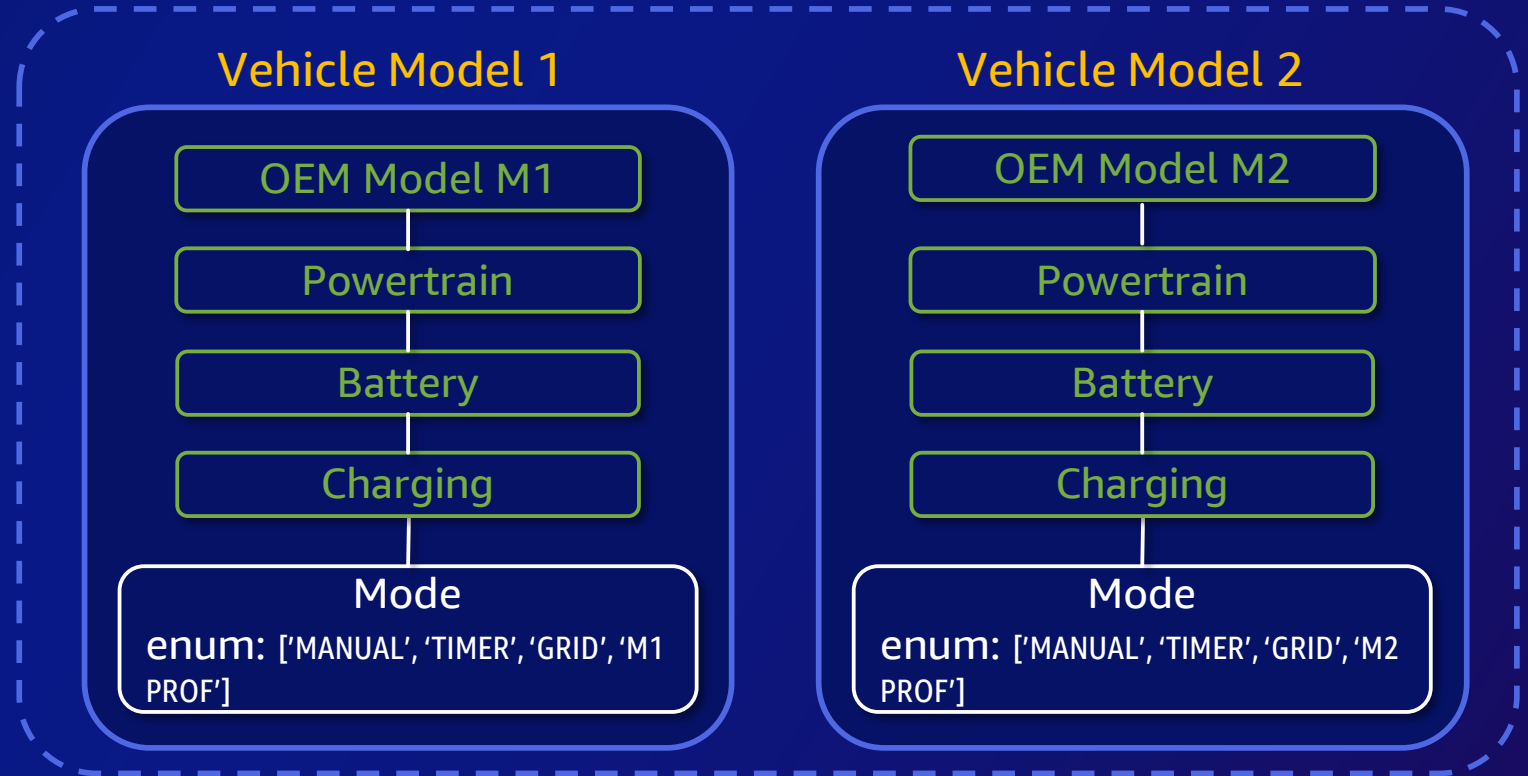
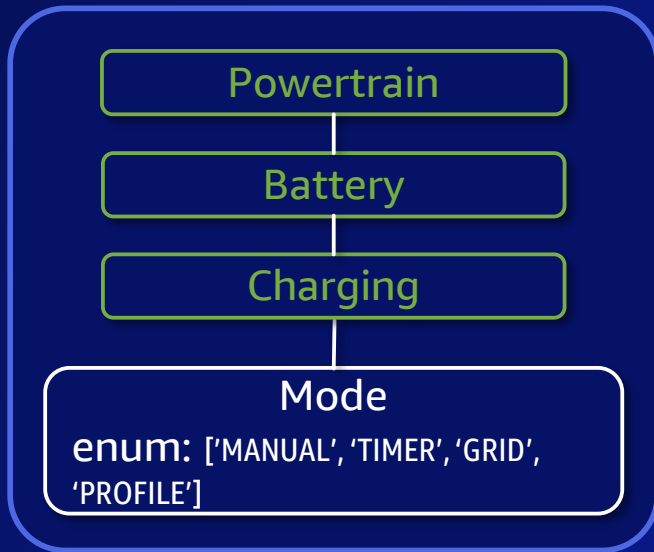
Modeling vehicle data with 'Vehicle Signal Specification'



Signal example:
Vehicle.Powertrain.Battery.Charging.ChargeVoltage



Securely mapping private signals to a global signal catalog



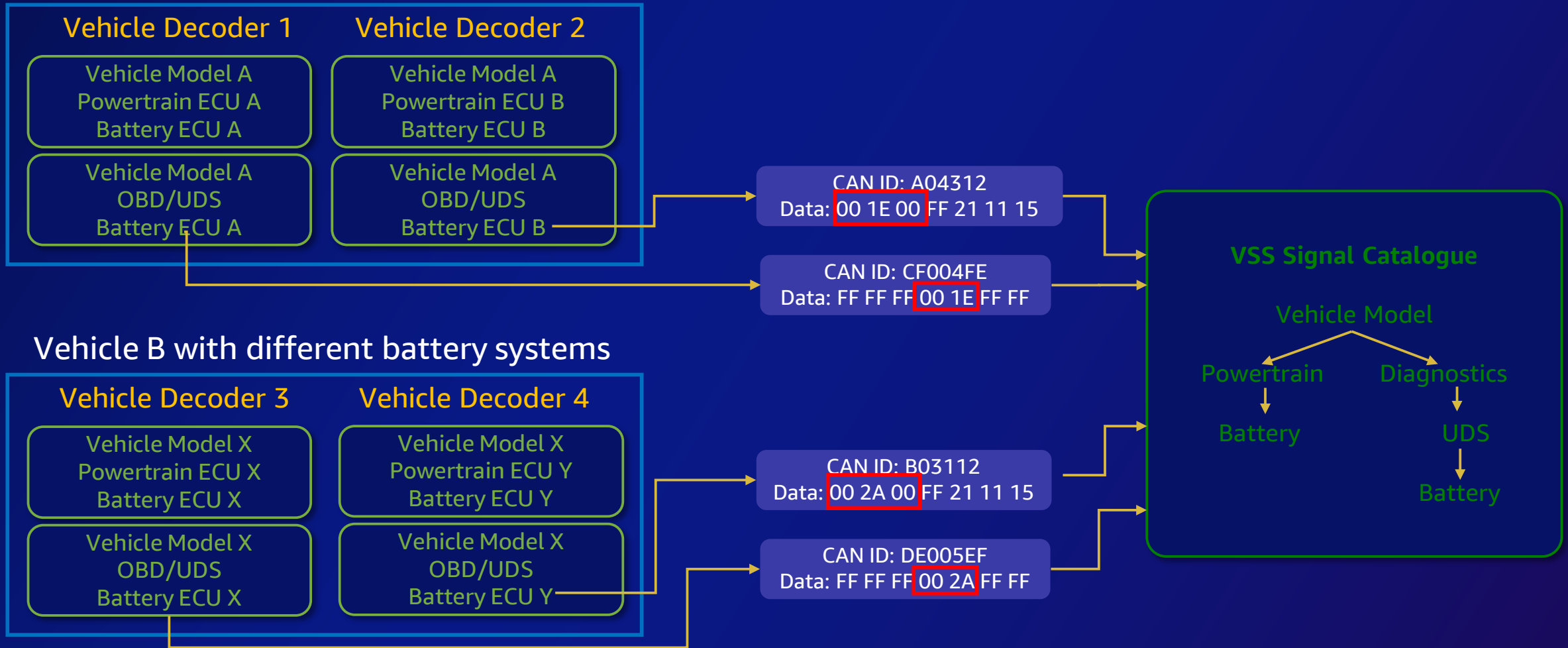
VSS global signal catalog



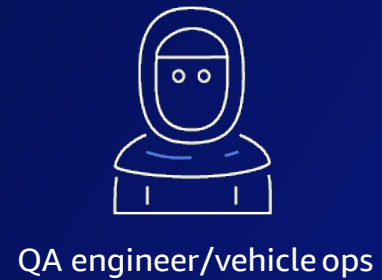
OEM proprietary signals
(VSPEC, CAN DBC)

Decoding proprietary signals to standard model

Vehicle A with different battery systems



Easy and flexible data collection



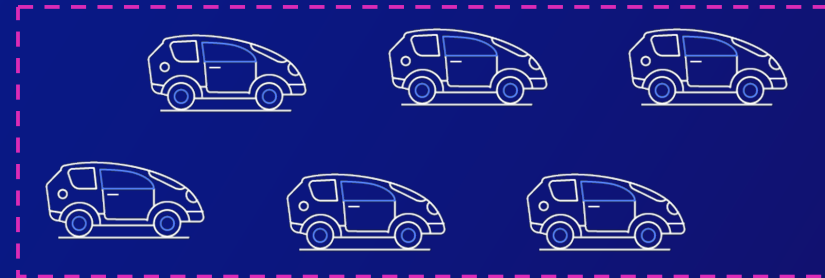
Create campaign

Name, ARN



Select vehicle fleet

Fleet X: All 2020 electric vehicles in North America



Data collection campaign

Battery_Data_1:

```
{  
  Vehicle.Powertrain.Battery.Charging.ChargeVoltage,  
  Vehicle.Powertrain.Battery.Charging.ChargeCurrent,  
  Vehicle.Powertrain.Battery.Charging.IsCharging,  
  Vehicle.Powertrain.Battery.Charging.IsDischarging,  
  Vehicle.Powertrain.Battery.Charging.Temperature  
}
```

```
mode: heartbeat,  
sample: 100msec,  
duration: 10sec
```

Example campaign setup for EV battery health

Vehicle modeling

Attributes

Serial No.

Type

Capacity

Energy

Weight

Cost

Signals

Voltage

Current

Charging station

State of charge

Duration of charge

Cost of charge

Charge energy

Braking energy

Discharge

Temperature

Selection and collection

What

Voltage,
current, and
temperature

Voltage,
current, speed,
acceleration,
and ambient
temperature

All battery
faults

When

Every 30
seconds

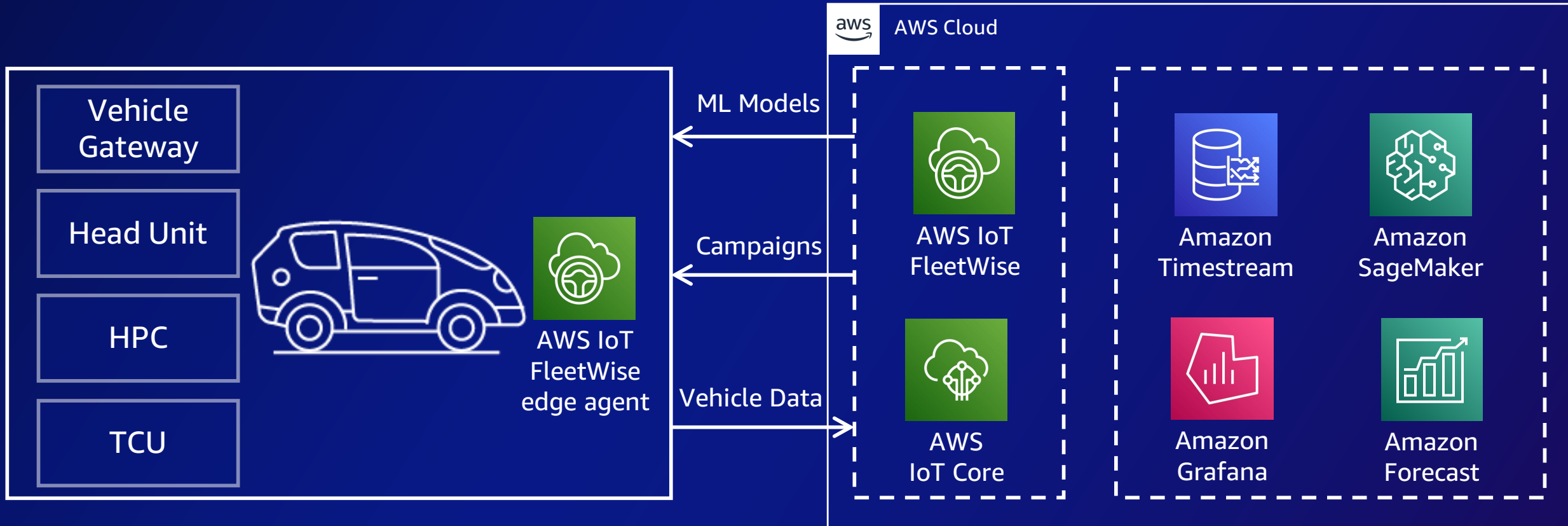
If battery
temperature
is <30 or >90

Overcharge,
overheat, short
circuit, thermal
runaway

Insights

- Anomaly detection/fire risk
- Failure prediction
- Performance degradation
- Charge optimization/
fast charge
- Range estimation
- Residual battery lifecycle/
value
- Test and simulation

Demo reference architecture



Demo



Customers that can benefit from AWS IoT FleetWise



Automakers
(OEMs)



**Tier 1
suppliers**



**Telematics solution
providers**
(Fleet operators)



**Other auto
providers**
(Rideshare, data
loggers, and more)

“ Think big, Start small, Scale fast ”

skillbuilder.aws 

Your time is now

Build in-demand cloud skills *your way*

Thank you!

Reetesh Varshney
Senior Solutions Architect - IoT
AWS India



Please complete the
session survey