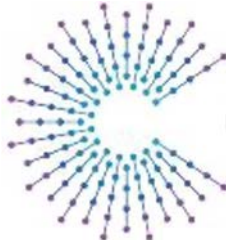




Beyond the Car Advancing Commercial Vehicles

Shareef Hakim, Director of Platform Architecture & Prototyping
Ford Motor Company



COVESA

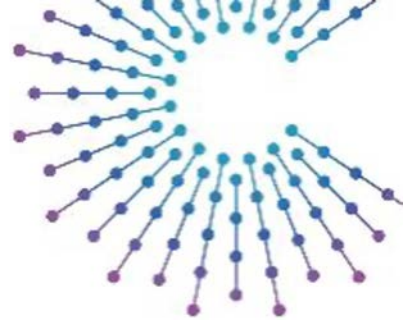
Accelerating the future of connected vehicles

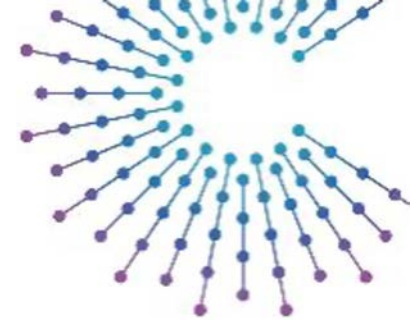


Shareef Hakim

Director of Platform Architecture and
Prototyping
Ford Motor Company

Beyond the Car - Advancing Commercial Vehicles - The Transforming Software to Meet the Needs of Owners, Drivers and Fleet Managers

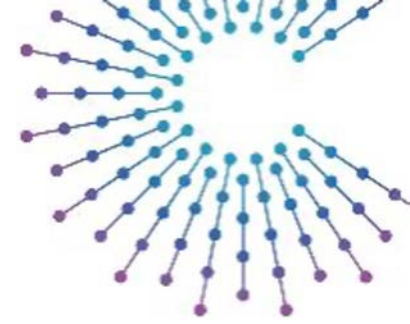




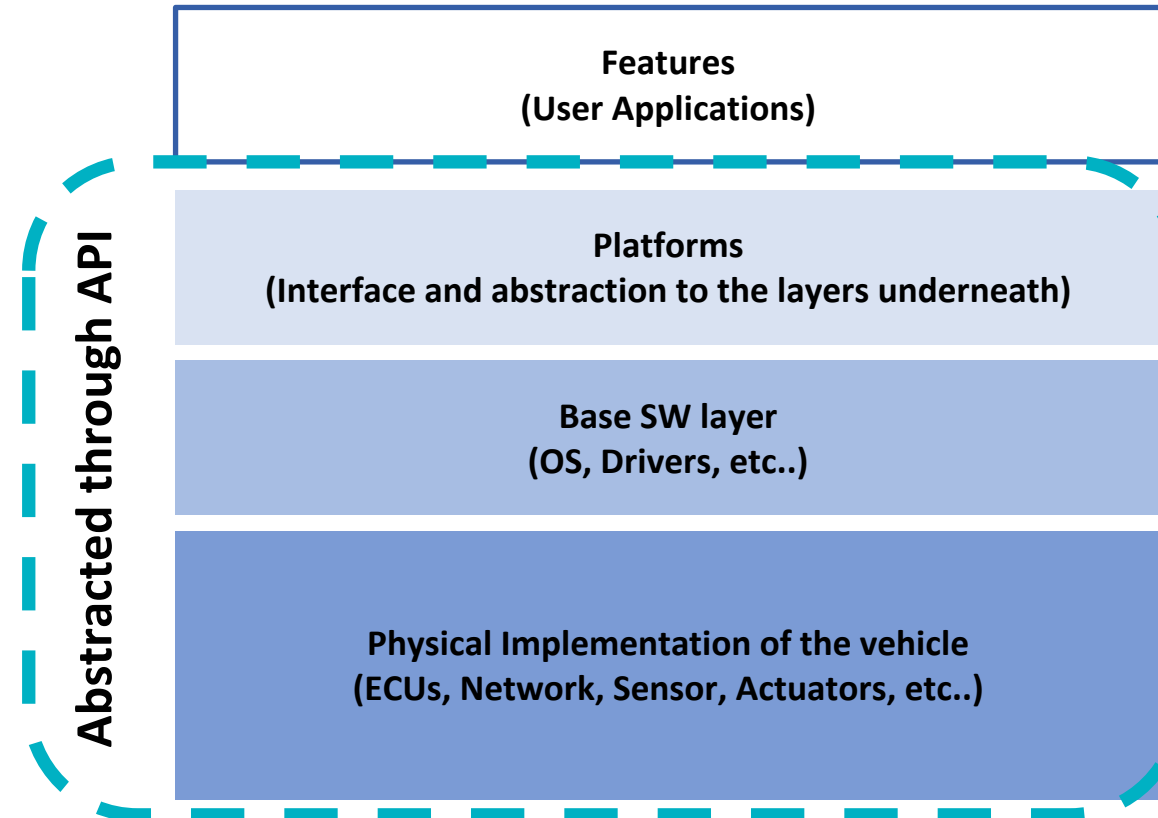
What makes commercial vehicles* unique? How can we as *a community* advance commercial vehicle needs?

*: Commercial Vehicles is a term that describes a wide variety – this presentation focuses on one type

Improving SW development process



- Physical implementation is transparent to features (application) development
- Enables fast turn around time for updates
- More efficient development and validation processes



Expanding the horizon of capabilities while increasing quality

Vehicle as a platform



Apps/Features

- Implement domain agnostic business logic
- Decouple feature from IO
- Does not handle Time Critical, functional safety and *regulatory requirements



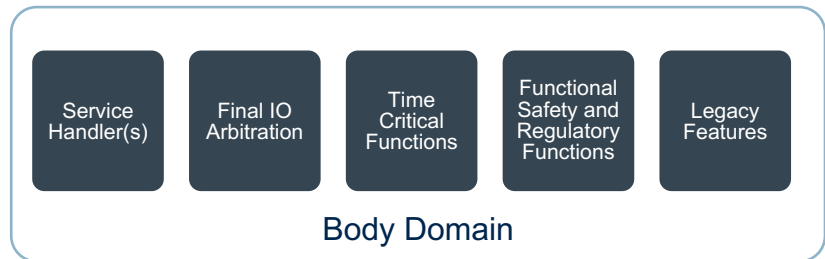
Vehicle Control Services

- Vehicle Network Agnostic
- Decouple feature from IO devices
- Perform feature arbitration, request and response queue management



Commodity ECUs

- Handle time critical functionality.
- Maintain legacy features
- Perform final arbitration, hardware protection, regulatory requirements, functional safety, etc.
- Implements Service Handlers to expose input/output signals to vehicle services.

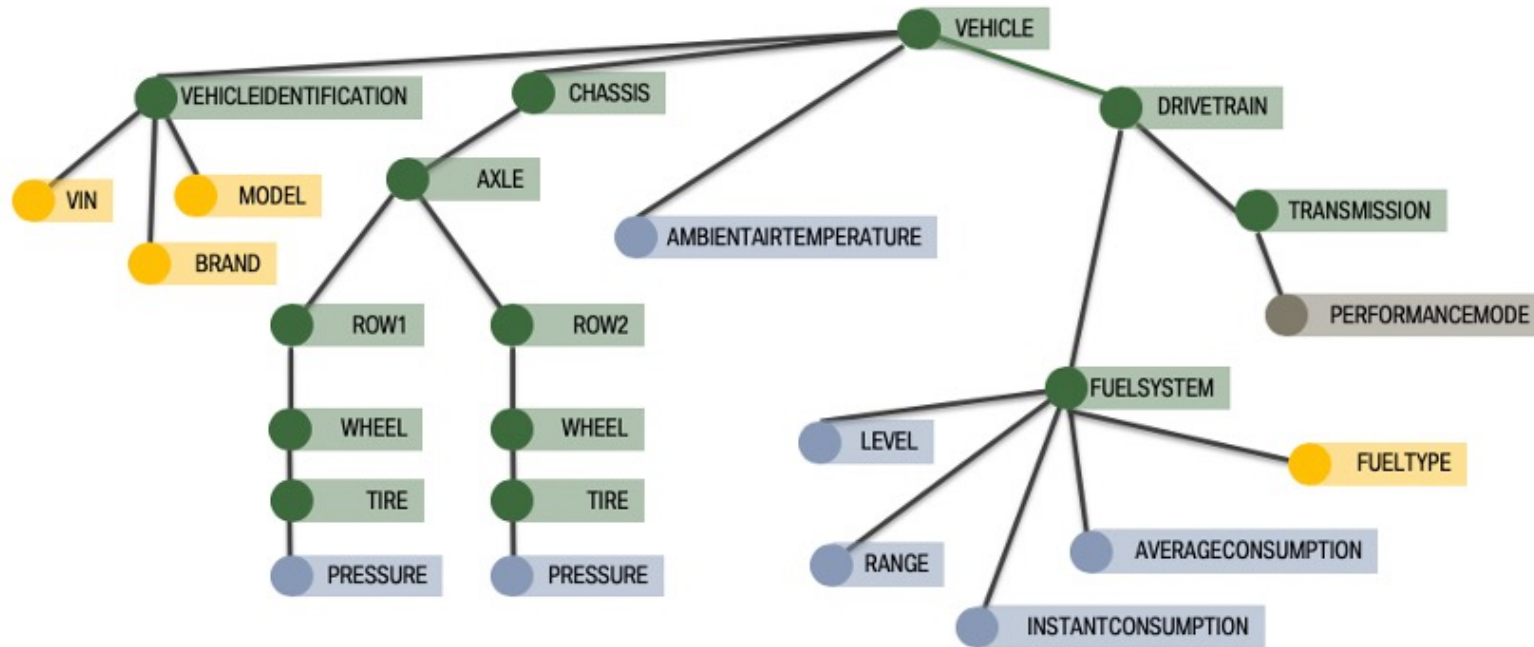
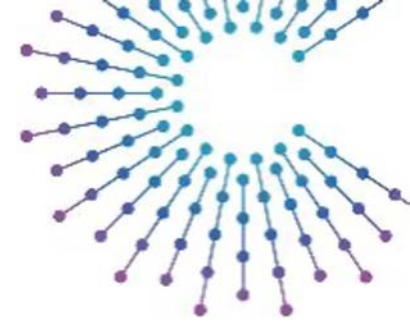


Example APIs

- Move seat
- Adjust seat climate
- Adjust seat massage
- Fold seat
- Check seat occupancy
- ...

Vehicle is a deterministic platform that enables evolving applications

Vehicle Signal Specification



ATTRIBUTE **BRANCH** **SENSOR** **ACTUATOR**

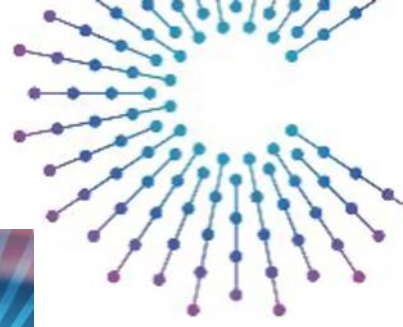
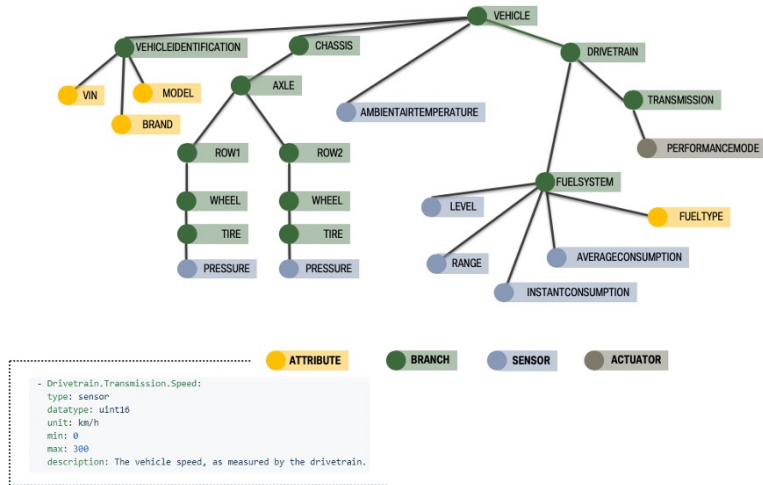
```
- Drivetrain.Transmission.Speed:  
  type: sensor  
  datatype: uint16  
  unit: km/h  
  min: 0  
  max: 300  
  description: The vehicle speed, as measured by the drivetrain.
```

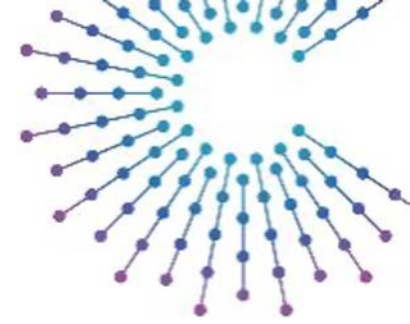
Source: [covesa.github.io](https://github.com/covesa)

VSS is a common approach for describing vehicle data

A VSS Focus Expansion Needed

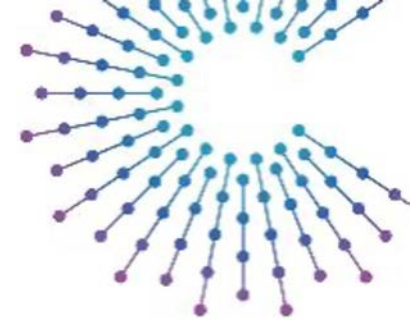
- VSS currently focused on retails (sedan) vehicles and usages
- Retail provides a more predictable problem to be represented in SW



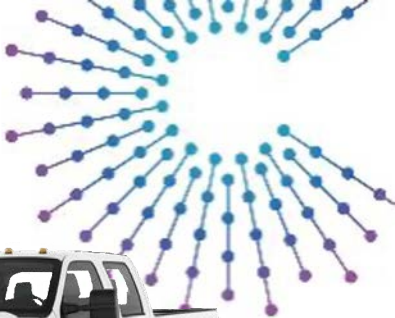


Commercial Vehicles

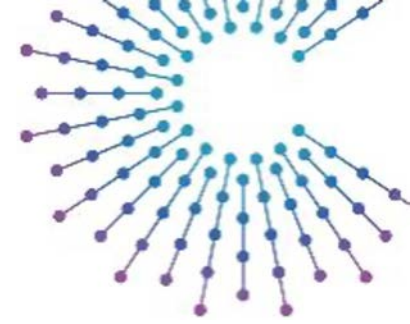
Commercial Vehicles



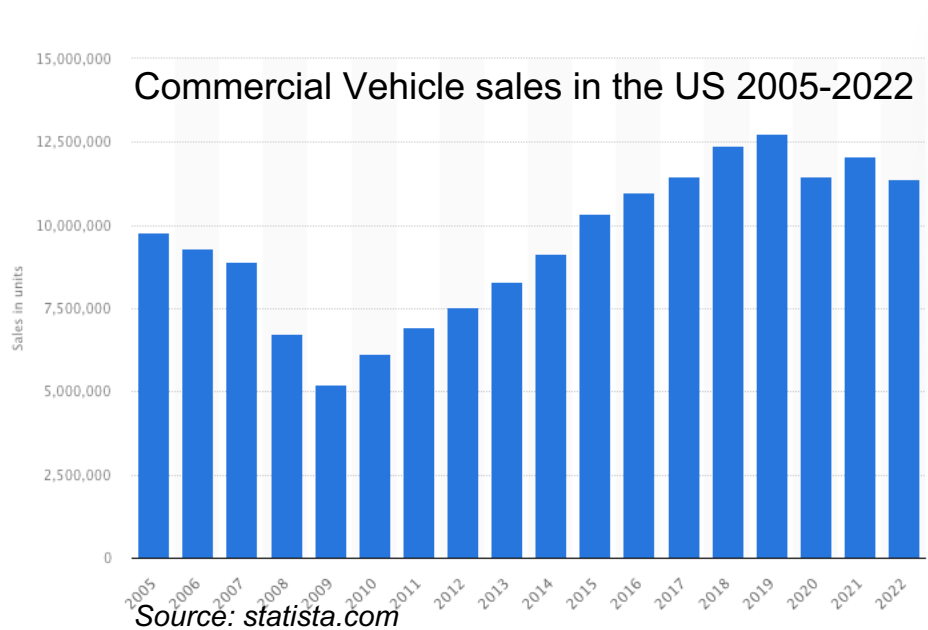
Commercial Vehicles



Commercial Vehicles Importance



- Commercial vehicles market is a growing market
- Requires higher safety measures
- Reliability is more critical compared to retail
- Efficiency – every Dollar matters
- Highly competitive market



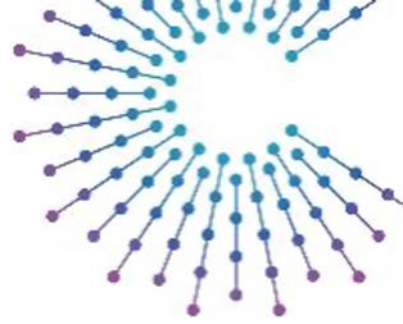
Q1 2023 Results

	Ford Blue	Ford Pro
Wholesales (000)	706	337
H / (L) Q1 22	6 %	18 %
Revenue (\$B)	\$ 25.1	\$ 13.2
H / (L) Q1 22	21 %	28 %
EBIT (\$M)	\$ 2,623	\$ 1,366
H / (L) Q1 22	1,295	875
EBIT Margin (%)	10.4 %	10.3 %
H / (L) Q1 22	4.1 ppts	5.6 ppts

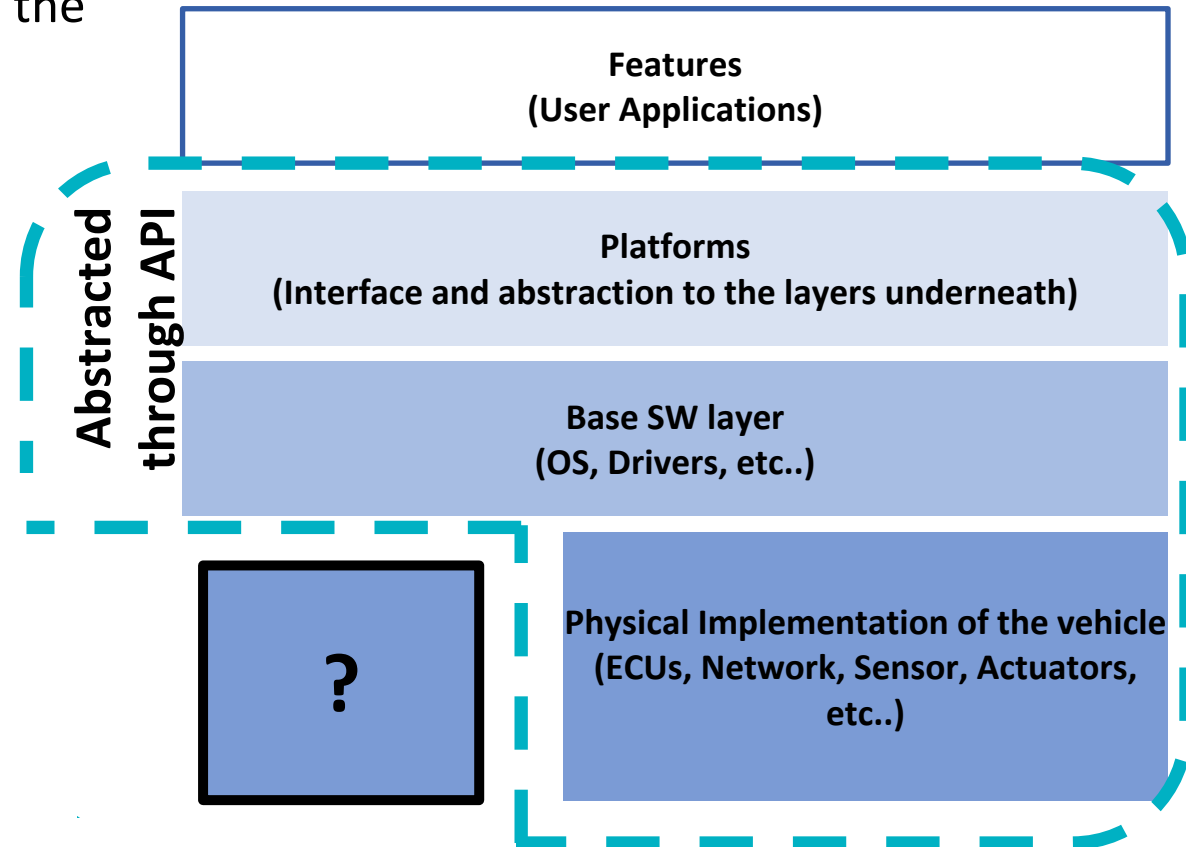
Source: media.ford.com



Commercial Vehicles Introduce new challenges

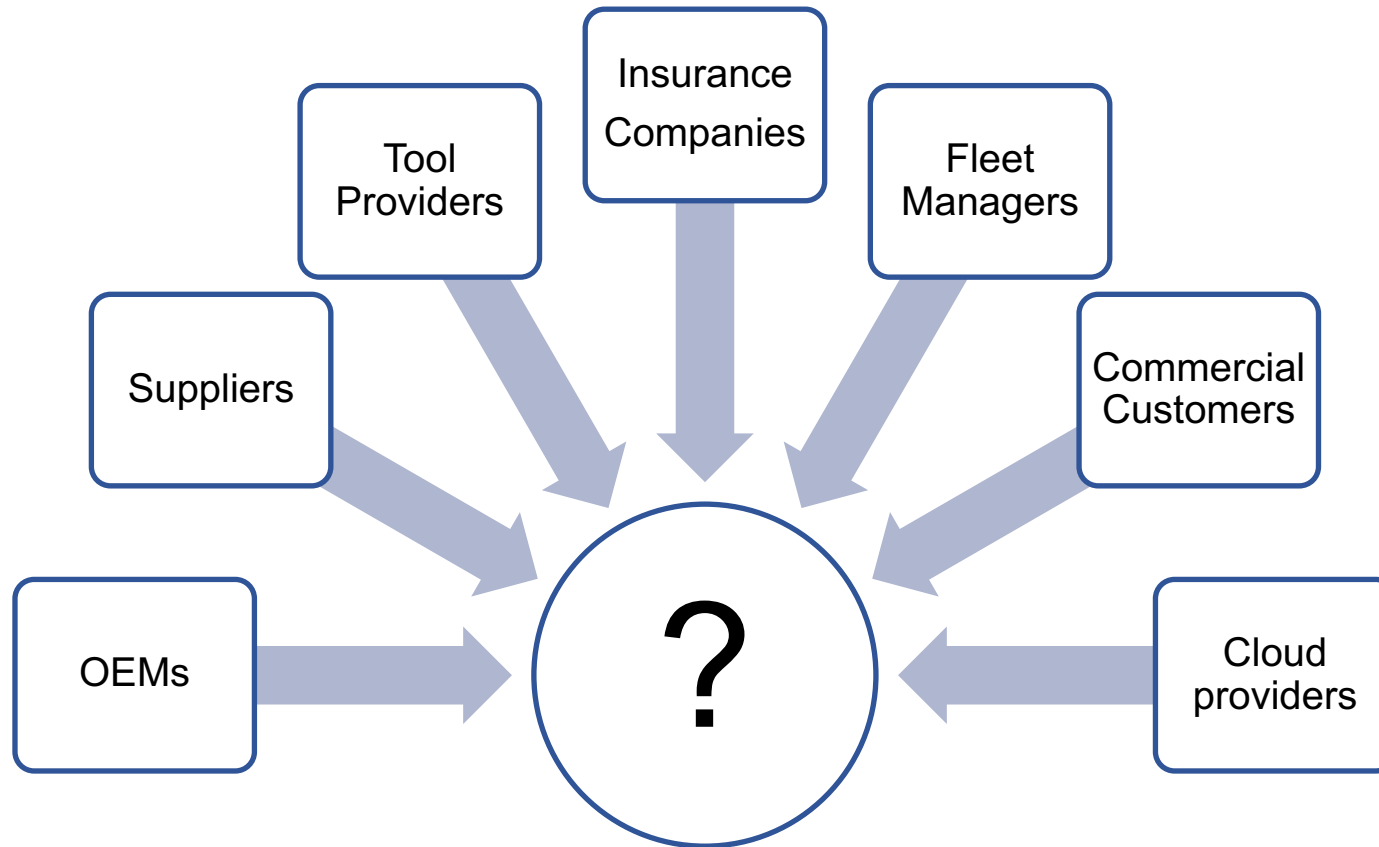
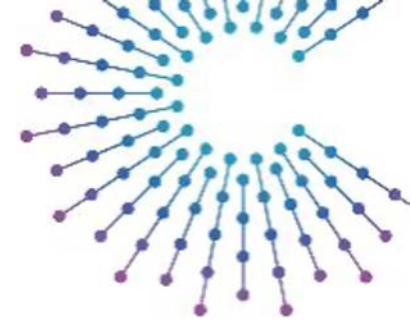


- A product that its physical implementation complete by the end user
- Brings new use-cases and challenges:
 - Driver behavior monitoring
 - Increased safety and efficiency
 - Data analytics
 - Layered SW Updates
 - Etc..



Commercial vehicles introduce an open architecture challenge

Use-cases are driven by many entities

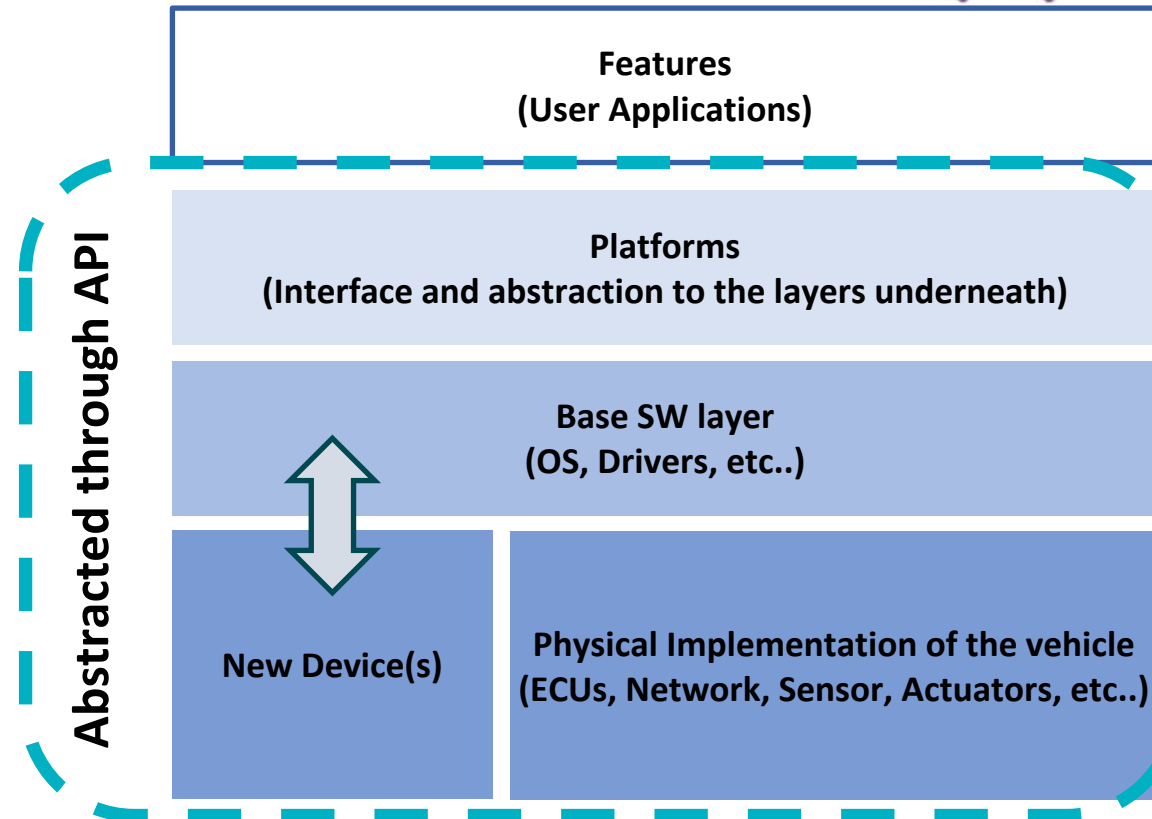


Open-source, data driven, collaborative environment is the key to success

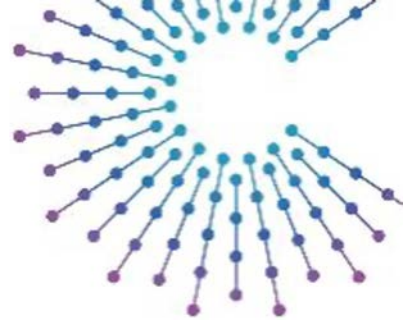
Integral Device(s) in the platform



- Discovery - Meta-data, profiles, Identification requests.
- Identification – Device type, protocols, APIs, etc..
- Registration - Integral part of the full platform .
- Configuration – Network, authentication, FW updates and other enables to start working.
- Testing – does it meet the requirement of the full platform.
- Maintenance – SW updates to ensure functionality over time.
- Continuous data analysis



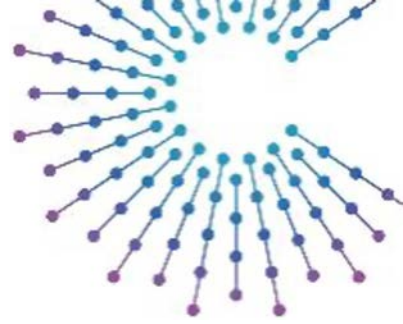
Summary



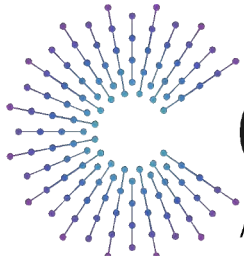
- Main objective – Increase the spectrum of capabilities – Enable developers
- Commercial vehicles bring a unique and important use-case
- VSS`s current focus on retail needs to expand
- Alignment is key
 - Adding and configuring new devices
 - Exposing new interfaces to developers
- Requires multi-entity collaboration
- We are not the first to do this

**Navigating the Open Road:
Overcoming the Open Architecture Challenge in Commercial Vehicles**

Call to action



- **Reuse available tools**
 - Don't reinvent the wheel
 - Look into other industries (IoT as an example)
- **Collaborate**
 - Commercial Vehicles BoF, Ted Guild, Mondays 7:00am ET
 - AMM, Wednesday, 3:30-5:50pm ET
- **Thoughts for next time**
 - Bring retail to commercial – utilizing SW only for commercial
- **Start Contributing**



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Accelerating the future of connected vehicles

