



Potential Use of Continuously-Connected Remote OBD in CARB's Heavy-Duty Inspection and Maintenance (HD I/M) Program

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HD I/M Workgroup Meeting
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Outline

- Background
 - HD I/M program development at a glance
 - Role of OBD in HD I/M
- Benefits of using Continuously Connected (CC)-Remote OBD in HD I/M
- Key envisioned tasks of CC-Remote OBD system in HD I/M
- Next steps
- Suggested discussion topics
- Open discussion

HD I/M Program Development at a Glance

- Senate Bill 210 (Leyva; Statutes of 2019) directs CARB to develop/implement a comprehensive HD I/M program
- Public workshops and HD I/M workgroup meetings will continue throughout program development
- HD I/M workgroup is an ongoing forum to discuss key technical and programmatic components
 - Purpose of today's webinar: convene an OBD sub-committee to discuss and advise CARB on key functionalities for remote telematic OBD data collection and submission
- Board hearing: expected in December 2021
- Implementation: expected to start in 2023

Role of OBD in HD I/M

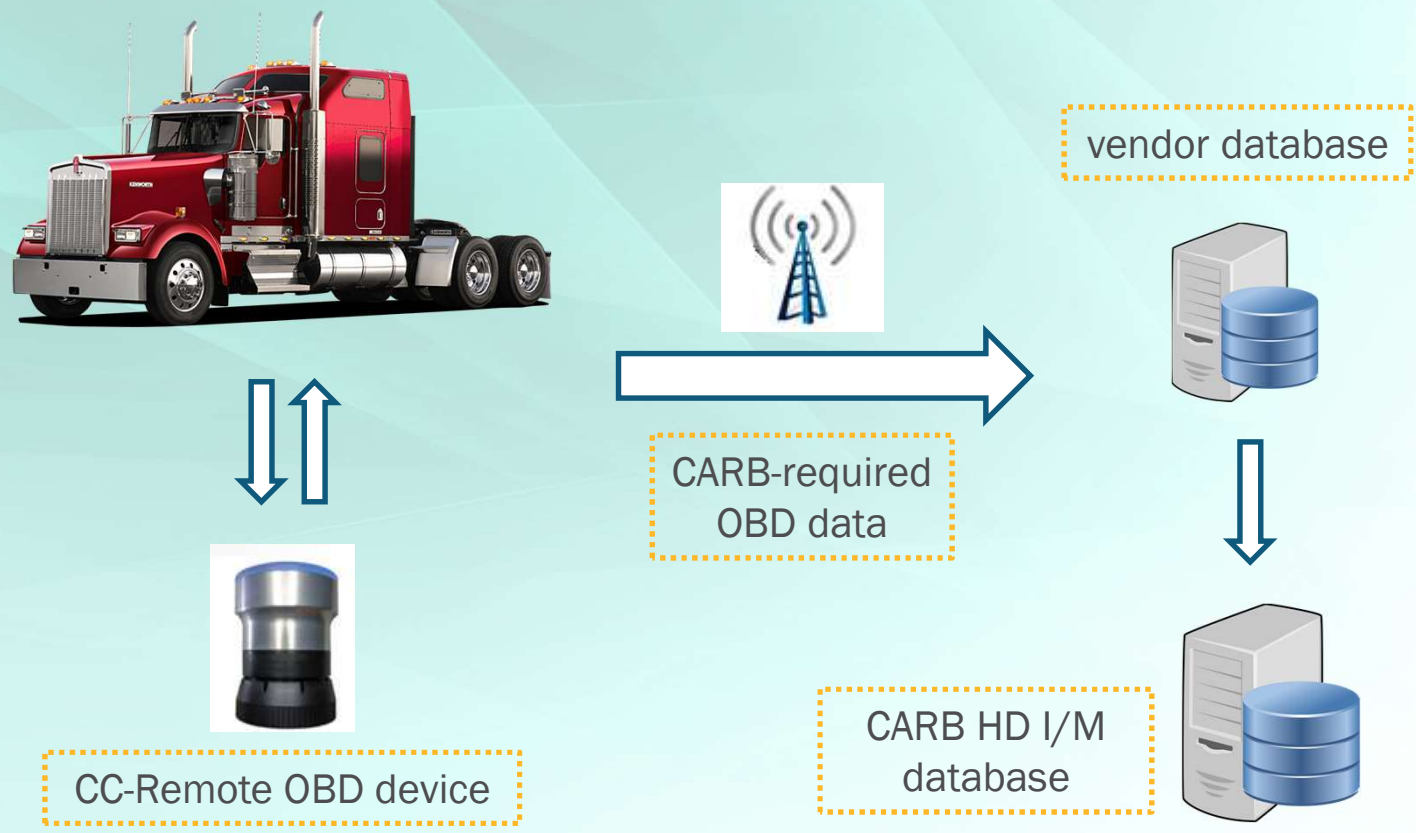
- OBD-equipped vehicles required to submit data at least every ~90 days:
 - Diesel engines MY 2013 and newer above 14,000 GVWR
 - Hybrid and Alt fuel engines MY 2018 and newer above 14,000 GVWR
- Collect OBD data using applicable protocol (SAE J1939, SAE J1979, UDS)
- Passing criteria for OBD data submissions:
 - No active fault codes, no permanent codes
- Testing options:
 - Continuously-connected: Original equipment manufacturer (OEM) and third-party telematics
 - Non continuously-connected:
 - i. Third-party locations: e.g. dongles, kiosks located at truck stops and/or rest areas
 - ii. Contractor in-person scans



Benefits of Using CC-Remote OBD in HD I/M

- Using existing OEM or third-party telematics services to demonstrate compliance
 - A growing number of heavy-duty vehicles use telematics to meet Electronic Logging Device (ELD) requirements and for fleet logistics management
- Reduced unnecessary downtime (making appointment, driving to test stations, etc.)
- Fully automatic with no human intervention and testing downtime
- Substantially lower program implementation costs for the state
- Earlier detection of emissions-related malfunctions expected to result in more timely maintenance, hence reduced costs and improved environmental protection

CARB's Concept for Using CC-Remote OBD in HD I/M



Key Envisioned Tasks of CC-Remote OBD System in HD I/M

1. Establish connection with the vehicle and confirm vehicle's support of HD OBD
2. Identify when full OBD data submission to the HD I/M database should occur (continuously connected, not continuously logging):
 - A key event detected
 - Or
 - No full data submission from vehicle in 90 days
3. Collect the required OBD data
4. Submit data via a standardized data submission format

Task 1 – Establish Communication with Vehicle

- Establish and maintain communication with the correct protocol to access the standardized HD OBD data
- Confirm vehicle is compliant with CARB and EPA's HD OBD regulations via information received from responding ECUs



Vehicle's OBD system



CC-Remote OBD Device

Task 2 – Identify When to Submit Data

- Vendors can choose to perform Task 2 at the device or their database level.
 - a) **Upon detecting a key event**
 - Run a key event check within 5 minutes of every engine start
 - Key events are:
 - i. Power loss of the CC-Remote OBD device
 - ii. Change in MIL status
 - iii. Change in Electronic identifiers of the vehicle and the OBD system (e.g., E-VIN, ECU ID, etc.)
 - iv. Change in readiness profile of the OBD monitors
 - v. Vehicle entered CA (optional key event parameter)



Task 2 – Identify When to Submit Data (cont.)

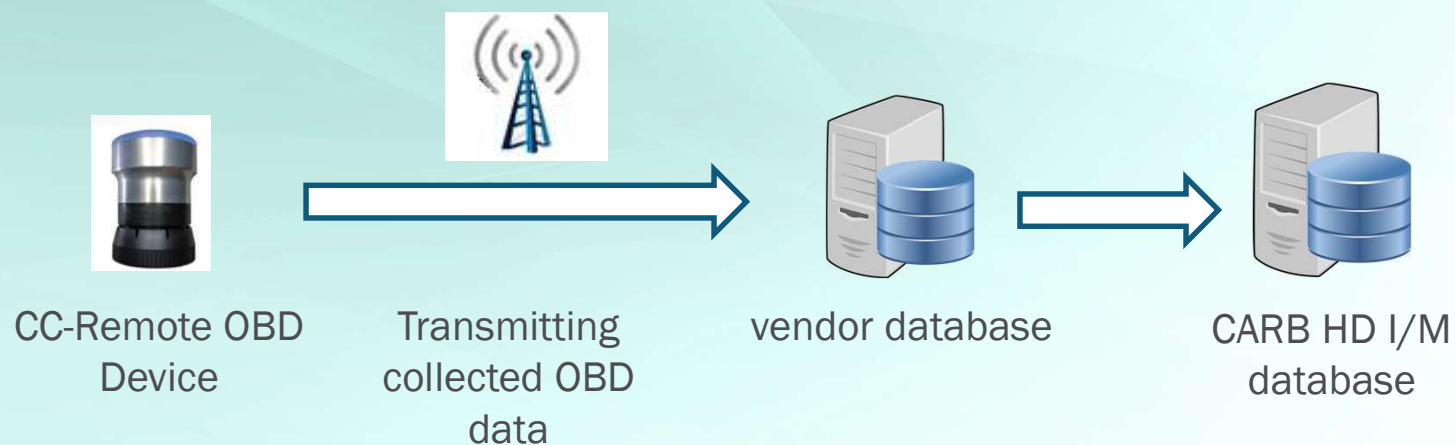
Optional geofencing feature

- Likely used by fleets that may not be active within CA every 90 days (intermittent/seasonal operation)
- CC-Remote OBD would identify if the vehicle has entered or exited CA since the last engine start through CA state geofence parameters.
- Full data submission upon entering CA
- Inform database when leaving CA
- No submission until coming back to CA

Task 2 – Identify When to Submit Data (cont.)

b) If no data submission has been received within the last 90 days

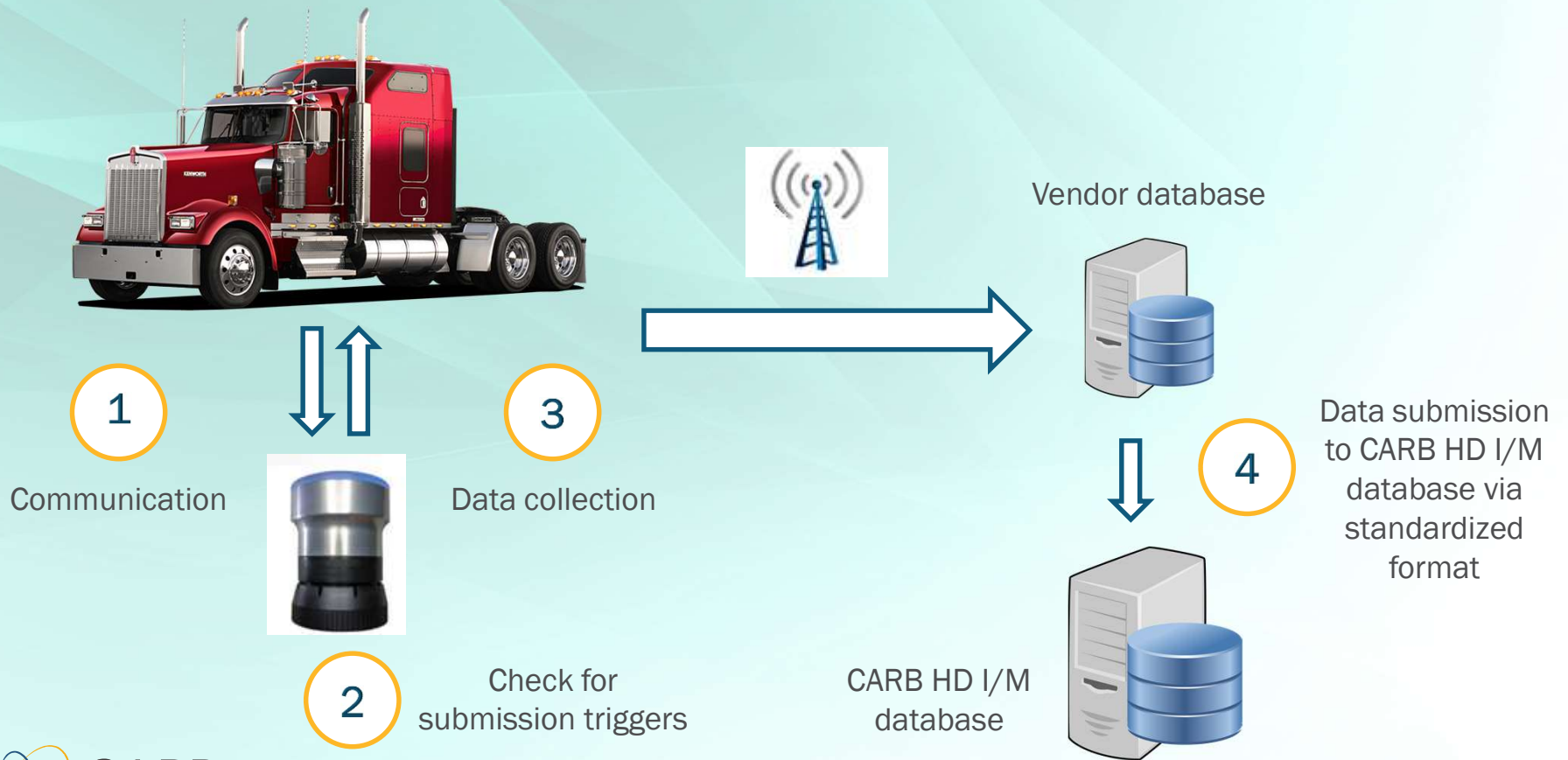
- To check in the vehicle is operating with no emissions-related malfunctions



Tasks 3 & 4 – Collect and submit the required OBD data

- When full data submission is triggered, device would need to collect and submit the required data.
 - OBD data required by HD OBD reg (CCR 1971.1.13) including:
 - i. Vehicle and controller identifiers
 - ii. Diagnostic trouble codes (DTCs)
 - iii. Readiness information
 - iv. Monitors support status and performance
 - v. Data stream
 - vi. REAL data
- Securely submit data to the HD I/M database in a standardized format.

Recap of CC-Remote OBD System's Tasks



Next Steps

- Continue development work with interested parties
- Develop and validate the CC-Remote OBD protocol and requirement-through conducting testing and demonstrations.
- CARB seeks participation from interested telematics vendors, OEMs, and fleets to test and validate the process.

Suggested Discussion Topics

- Considerations for incorporating the developed specifications into the existing telematics systems
- Communications between the device and vehicle
 - Possible communication issues to anticipate
 - Considerations for UDS (SAE J1979-2)
- Key event check
 - Any other item to add to the checklist?
 - Frequency and timing of the checks
 - Considerations for using the optional geofencing feature

Thank You!

Open Discussion

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CARB HD I/M webpage: <https://ww2.arb.ca.gov/our-work/programs/heavy-duty-inspection-and-maintenance-program>