API for rFMS vehicle data 5.0.0

Table of Contents

1 Document History 2
2 Introduction 5
2.1 Abbreviations 5
2.2 Definitions 6
2.3 References 6
3 Contract and subscription 7
4 General remarks 7
5 Communication technology 8
5.1 HTTP headers 8
6 Vehicle 10
6.1 Response 10
7 Vehicle position 13
7.1 Response 13
7.2 Limitations 14
8 Vehicle status 15
8.1 Content filter 16
8.2 Trigger filter 17
8.3 Response 20
8.4 Limitations 46
9 Triggers 46
9.1 Tell tale triggers 49
10 Pull method description 51
10.1 General 51
10.2 Sequence diagrams 51
11 Push method description 53
11.1 General 53
11.2 Sequence diagrams 53

© 2025 ACEA (European Automobile Manufacturers Association

1 Document History

Date	Changes/Additions	Version
2020-03-01	Publication	3.0.0
	Summary of changes from V2.1: • XML schema to JSON described in Swagger 2.0 • Authorization OAuth2 instead of Basic Authentication • Adding FMS Standard V4 data and triggers • Some information moved to Swagger 2.0 file and are no longer described in this document	
2021-09-17	Publication	4.0.0
	Summary of changes from V3.0.0 • OpenAPI 3.0 instead of Swagger 2.0 to • Some editorial changes • **2.2 Definitions: Crank mode added** • **2.3 References: rFMS_3.0.yaml replaced with rFMS_4.0.yaml** • **6.1.1 Vehicles: Addition of** - totalFuelTankCapacityGaseous - totalBatteryPackCapacity • **8 Vehicle status: some text added** • **8.1 Content filter: some text added** • **8.2 Trigger filter: some text added** • **8.2.1 Possible values: Addition of** - BATTERY_PACK_CHARGING_STATUS_CHANGE - BATTERY_PACK_CHARGING_CONNECTION_STATUS_CHANGE - TRAILER_CONNECTED - TRAILER_DISCONNECTED • **8.3.1 VehicleStatuses: Addition of** - totalElectricMotorHours - totalElectricEnergyUsed • **8.3.2 Accumulated data: Addition of** - fuelConsumptionDuringCruiseActiveGaseous - electricEnergyConsumptionDuringCruiseActive - fuelWheelbaseSpeedZeroGaseous - electricEnergyWheelbaseSpeedZero - fuelWheelbaseSpeedOverZeroGaseous - electricEnergyWheelbaseSpeedOverZero - electricEnergyAux - electricMotorTorqueClass - electricMotorTorqueAtCurrentSpeedClass - electricPowerRecuperationClass • **8.3.3 Snapshot data: Addition of** - electricMotorSpeed - batteryPackChargingStatus - batteryPackChargingConnectionStatus - batteryPackChargingDevice - batteryPackChargingPower	

© 2025 ACEA (European Automobile Manufacturers Association)

	- estimatedTimeBatteryPackChargingCompleted - estimatedDistanceToEmpty - vehicleAxles - trailerNo - trailerVin - trailerIdentificationData - trailerType - customerTrailerName - trailerAxles - trailerAxlePosition - trailerAxleLoad - trailerAxleLoadSum • **8.3.4 Uptime data: Addition of** - hvessOutletCoolantTemperature - hvessOutletCoolantTemperature - hvessTemperature • **8.3.4.1 TellTales: Addition of** - BATTERY_PACK - HIGH_VOLTAGE_SYSTEM_CAUTION - BATTERY_PACK_TEMPERATURE - LIMITED_PERFORMANCE_ELECTRIC_MOTOR - BATTERY_PACK_COOLING - OEM_SPECIFIC_TELL_TALE • **9 Triggers: Addition of** - BATTERY_PACK_CHARGING_STATUS_CHANGE - BATTERY_PACK_CHARGING_CONNECTION_STATUS_CHANGE - TRAILER_CONNECTED - TRAILER_DISCONNECTED	
2025-07-25	Publication	5.0.0
	Summary of changes from V4.0.0 • **All Chapters** - Some editorial changes - Some additional explanations • **2.3 Update of References** • **5.1.3 Rate Limitations for pull method renamed** • **5.1.4 Rate Limitations for push method added** • **6.1.1 Vehicles:** - Update of the response • **7 Vehicle position:** - Pull method description updated - Description of Push method added • **8 Vehicle status:** - Pull method description updated - Description of Push method added • **8.2.1 Possible values:** - trigger filter Alarm added	

© 2025 ACEA (European Automobile Manufacturers Association)

	• **8.3.1 VehicleStatuses:** - Update description - totalElectricEnergyRecuperated added • **8.3.2 Accumulated data:** - Update description - electricPowerRecuperationClassV2 added • **8.3.3 Snapshot data:** - Update description - ignition added - estimatedDistanceToEmpty added - vehicleAxlePosition added - vehicleAxleLoad added - vehicleTires added - vehicleTirePosition added - vehicleTirePressure added • **8.3.3.1 Driver Id:** - Update name - Update description • **8.3.3.2 TachoDriverIdentificationType:** - Update name • **8.3.4 Uptime data:** - Update description • **8.3.4.1 Telltales:** - Error correction for FMS id 52 - WATER_IN_FUEL_INDICATOR added • **9 Triggers:** - Update description - ALARM added • **10 Pull method description:** - Chapter added • **11 Push method description:** - Chapter added	

© 2025 ACEA (European Automobile Manufacturers Association)

2 Introduction

The rFMS API is used to remotely access vehicle FMS data in a standardized way without installing any additional hardware to the vehicle by using the existing OEM hardware.

The service has two communication methods to get data from the vehicle:

- a pull method - as already specified in previous versions (see chapter 10 for specific details of the pull method)
- a push method - introduced in V5.0.0 (see chapter 11 for specific details of the push method)

The pull and push methods describe two different approaches for data communication. With the **push method,** the system automatically and actively sends data to the recipient upon subscription. In contrast, with the **pull method,** the recipient actively requests the data from the server. This method is used when the recipient himself decides when he needs information.

2.1 Abbreviations

Abbreviation	Description
FMS	Fleet Management System
OEM	Original Equipment Manufacturer
rFMS	remote Fleet Management Standard
API	Application Programming Interface
REST	Representational State Transfer
HTTPS	Hypertext Transfer Protocol Secure
JSON	JavaScript Object Notation
VIN	Vehicle Identification Number

© 2025 ACEA (European Automobile Manufacturers Association)

2.2 Definitions

Abbreviation	Term	Description
M	Mandatory	The rFMS vehicle data API shall provide the mandatory parameters, provided that the vehicle supports rFMS vehicle data version 3.
O	Optional	It is up to each OEM to decide if they want to implement this information or not in the API.
M (bus)		Mandatory for buses. Optional for trucks
M (truck)		Mandatory for trucks. Optional for buses.
M/O		The field could be mandatory or optional based on the condition in the field description.
	Crank mode	Is used for electric motor to indicate that the vehicle is ready for propulsion

2.3 References

Document name
SAE J1939DA FEB24
fms_document_v_05_vers.07.07.2024.pdf
rFMS Authorization specification 1.1.x
rFMS_5_0.yaml

© 2025 ACEA (European Automobile Manufacturers Association)

3 Contract and subscription

The contract and subscription are OEM specific.

4 General remarks

The following is valid for all services.

Parameters not supported by the vehicle will not be part of the response even if they are marked as mandatory.

Parameters currently unavailable or invalid will not be part of the response even if they are marked as mandatory (e.g., missing consent of the driver).

Updates of data might not be possible during special conditions, e.g., ignition off, communication not possible, etc.

All responses are in JSON.

The API is defined in an OpenAPI 3.0 YAML-file. It describes both how to call the API as well as the JSON response.
There are many tools available for viewing the YAML file, e.g., https://editor.swagger.io/.
The YAML file can also be used to generate code both for client and server implementations in many different programming languages.

If there is a discrepancy between this specification and the OpenAPI 3.0 YAML file, the YAML-file is the relevant definition for naming and structure. The classification for Mandatory/optional is defined in this specification, as under special circumstances some mandatory data are not available.

The timestamps in the responses are in UTC and always formatted as a string according to ISO 8601.

Timestamps in the requests shall be sent according to ISO 8601. Timestamps sent with milliseconds will be accepted. However, milliseconds are ignored.

Data received during the latest, not fully elapsed, second at the server cannot be sent to the client, i.e., if the current time at the server is 10:01:02.123, only data registered up to 10:01:01.999 can be returned. This is to avoid duplicated and/or missing data.

© 2025 ACEA (European Automobile Manufacturers Association)

5 Communication technology

The rFMS API is a HTTPS based REST API.

5.1 HTTP headers

There are a few mandatory HTTP headers for the rFMS API.

- Authorization
- Accept

5.1.1 Security

5.1.1.1 OAuth2

An OAuth2 security solution shall be used, and it shall comply with the rFMS authorization specification 1.1.x
The access token is set in the Authorization HTTP header.

HTTP header field: **Authorization**

Format: **Bearer [access token]**

Example:

Authorization: Bearer QWxhZG.RpbjpvcGVuIHNl.c2FtZQ==

5.1.2 API versioning

The resource URLs have no versions, but the client defines in the media type HTTP header which response version that is wanted. This version is related to the version of the specification.

This is done in the **Accept** HTTP header.

Example:

Accept: application/json; rfms=vehiclestatuses.v5.0

In this example the clients expect to get a VehicleStatuses of API version 5.0 in JSON format back from the vehicle statuses resource.

© 2025 ACEA (European Automobile Manufacturers Association)

5.1.3 Rate Limitations for pull method

This is used to inform the client on the current rate limitations for the service.
Rate limits are divided into intervals, for each interval there is a pool of available requests.
The rate limitation is an optional feature and might not be available at all OEMs.

HTTP headers in response

Name	M/O	Description
X-Rate-Limit-Limit	O	The limit of requests within the given time frame
X-Rate-Limit-Remaining	O	The remaining number of requests until reset
X-Rate-Limit-Reset	O	The time in UTC until rate limit reset in second since 01.01.1970

When the limit is exceeded, the API will return HTTP 429 "Too Many Requests"

Remark: Assume each request will be counted even if it is a request based on the "more data available"

Example:

This is returned at 2016-04-06T20:00:00 (1459972800)

Resource	X-Rate-Limit-Remaining	X-Rate-Limit-Reset	X-Rate-Limit-Limit
/vehiclepositions	55	1459973400	60
/vehicles	2	1459984500	4
/vehiclestatuses	28	1459973460	30

In this example the client can

- request vehiclepositions 55 times for the next 10 minutes.
- request vehicles 2 times for the next 3 hours and 15 minutes.
- request vehiclestatuses 28 times for the next 11 minutes.

5.1.4 Rate Limitations for push method

Rate limit headers are not supported for push. It is the responsibility of the rFMS client to have enough capacity for the subscriptions it has created.

If the limit of the rFMS client is exceeded, it shall return HTTP 429 "Too Many Requests". The rFMS server will mark the message as failed and it can be retrieved as a failed message, see chapter 11.2.5. If HTTP 429 is returned more than X (OEM specific) times in a row, the subscription will be deleted, see chapter 11.2.4.2

© 2025 ACEA (European Automobile Manufacturers Association)

6 Vehicle

Information regarding how to call the API and how the JSON response is structured can be found in the OpenAPI 3.0 YAML file.
The vehicle resource is used to retrieve a list of all the vehicles the client credentials has access to.

For the vehicle resource there is only a pull method available to retrieve data, it is not possible to create a subscription
The vehicle list is always returned in the same order. The max number of items returned in one call is OEM specific.

6.1 Response

The response object Vehicle contains the following.

6.1.1 Vehicles

This is the response that will be sent back for a request to the Vehicles resource.
It will contain a list of vehicles matching the filter parameters supplied in the request.

If there are no vehicles in the account an empty list will be returned.

The response is

Name	M/O	Description
vin	M	vehicle identification number See ISO 3779 (17 characters)
customerVehicleName	O	The customer's name for the vehicle.
brand	M	The vehicle brand. rFMS standard values are VOLVO TRUCKS, SCANIA, DAIMLER, IVECO, DAF, MAN, RENAULT TRUCKS, VDL, VOLVO BUSES, IVECO BUS, HEULIEZ, VWTB, KENWORTH, PETERBILT, MACK TRUCKS, INTERNATIONAL, IC BUS Other brand names are allowed
type	M	Indicates the type of vehicle. rFMS standard values are TRUCK, BUS, VAN Other types are allowed
model	O	Indicates the model of the vehicle. OEM specific value.
productionDate	O	Indicates when the vehicle was produced.
registrationNumber	O	The registration number (license plate) of the vehicle
possibleFuelType	O	The possible fuel types supported by this vehicle, formatted as the HEX id number according to SPN 5837 (J1939DA FEB24). This does NOT indicate which fuel type that is presently being used.

© 2025 ACEA (European Automobile Manufacturers Association)

Name	M/O	Description
emissionLevel	O	The emission level this vehicle supports. Possible values: European Union, Heavy-Duty Truck and Bus Engines: EURO_III, EURO_III_EEV, EURO_IV, EURO_V, EURO_VI, EURO_VII European Union, Nonroad Engines: EURO_STAGE_III, EURO_STAGE_IV, EURO_STAGE_V United_States, Heavy-Duty Truck and Bus Engines: EPA_2004, EPA_2007, EPA_2010, EPA_2015_NOX10, EPA_2015_NOX05, EPA_2015_NOX02 United_States, Nonroad Engines: EPA_TIER_2, EPA_TIER_3, EPA_TIER_4_2008, EPA_TIER_4_2013 Brazil, Heavy-Duty Truck and Bus Engines: PROCONVE_P5, PROCONVE_P6, PROCONVE_P7 Brazil, Nonroad Engines: PROCONVE_MARI Other emission level values are allowed
tellTaleCode	O	This parameter indicates how the tell tales shall be interpreted, the code is unique for each OEM. One OEM can have different interpretations depending on vehicle type.
chassisType	O	The chassis type of the vehicle. OEM specific value. This is used mainly for buses
noOfAxles	O	Number of axles on the vehicle This is used mainly for buses.
totalFuelTankVolume	O	Total fuel tank volume for all tanks in millilitres.
totalFuelTankCapacityGaseous	O	Total gas tank volume capacity for all tanks in kilograms
totalBatteryPackCapacity	O	Total battery pack capacity in watt hours from the Vehicle specification. The value is static, i.e. does not take aging into consideration.
tachographType	O	The type of tachograph in the vehicle rFMS standard values MTCO, DTCO, TSU, DTCO_G1, DTCO_G2, NONE DTCO - Digital tachograph, unknown generation DTCO_G1 - Digital tachograph generation 1 DTCO_G2 - Digital tachograph generation 2 NONE - No tachograph in the vehicle MTCO - Modular tachograph TSU - Tachograph simulator Other tachograph types are allowed
gearboxType	O	The type of gearbox the vehicle is equipped with rFMS standard values MANUAL, AUTOMATIC, SEMI_AUTOMATIC, NO_GEAR (e.g., electrical)

© 2025 ACEA (European Automobile Manufacturers Association)

Name	M/O	Description
bodyType	O	The type of body on the chassis. rFMS standard values CITY_BUS, INTERCITY_BUS, COACH This is used mainly for buses.
doorConfiguration	O	The door configuration. The door order definition is OEM specific. E.g. [1, 2, 2] means the bus has 3 doors: 1 front door, double doors for door 2 and 3 This is used mainly for buses.
hasRampOrLift	O	If the vehicle is equipped with a ramp or not. This is used mainly for buses.
authorizedPaths	O	Paths that the client is authorized to call, e.g., /vehiclestatuses, /vehiclepositions
moreDataAvailable	M	This will be set to true if the result set was too large to be sent back in one reply. A new request must be sent to get the rest of the vehicles, where the lastVin parameter must be supplied. The lastVin should be set to the VIN of the last vehicle in the result set of this message.

© 2025 ACEA (European Automobile Manufacturers Association)

7 Vehicle position

Information regarding how to call the API and how the JSON response is structured can be found in the OpenAPI 3.0 YAML file.

The vehicle position resource is used to retrieve the positions for one or several vehicles.

There are two methods to retrieve the data, pull and push. The client can pull for data by calling the vehicle position resource or create a vehicle position subscription and the server will push data to the subscribing client.

Pull

The ***starttime***, ***stoptime*** & ***latestOnly*** parameters can be used to get all historical positions between a start and stop time or the latest known position only.

The ***vin*** parameter can be used to get all historical positions between starttime and stoptime or latest position for one individual vehicle.
If the ***vin*** parameter isn't set the response will contain all vehicles the client has access to.

If a request is made for data in a period where no data has been received, an empty list will be returned.
The max number of items returned in one call is OEM specific.

Push

The ***vin*** parameter can be used to create a subscription for one or several individual vehicles.

If the ***vin*** parameter isn't set the subscription will contain all vehicles the client has access to.

The ***notification only*** flag can be used to only include notifications as part of the subscription response.

For specific details of the pull method see chapter 10.

7.1 Response

The response object VehiclePositions contains a list of vehicle positions matching the filter parameter including the following data items.

The recommended sources refer to data specified in standards and should normally be used, but equivalent sources are allowed.

Name	M/O	Description	Recommended sources
triggerType	M	Indication of the type of trigger that triggered this event. See chapter 9 for trigger definitions.	
requestServerDateTime	M	Time to be used to ask for historical data at customers (for starttime), to solve the problem of having different times at server and clients. This is the time at the server when this request was received. To avoid losing any messages or get duplicates, this is the time that should be supplied in the startTime parameter in the next request in ISO 8601 format.	

© 2025 ACEA (European Automobile Manufacturers Association)

Name	M/O	Description	Recommended sources
receivedDateTime	M	Reception at Server . To be used for handling of "more data available" in ISO 8601 format.	
latitude	M	Latitude (WGS84 based)	
longitude	M	Longitude (WGS84 based)	
heading	O	The direction of the vehicle (0-359)	
altitude	O	The altitude of the vehicle. Where 0 is sea level, negative values below sealevel and positive above sealevel. Unit in meters.	
speed	O	The GNSS (e.g., GPS) -speed in km/h	
positionDateTime	M	The time of the position data in ISO 8601 format	
createdDateTime	M	When the data was retrieved in the vehicle in ISO 8601 format	
vin	M	vehicle identification number See ISO 3779 (17 characters)	FMS: Vehicle identification number SAE J1939: SPN 237
wheelBasedSpeed	M	Wheel-Based Vehicle Speed in km/h (Speed of the vehicle as calculated from wheel or tail shaft speed)	FMS: Wheel based speed SAE J1939: SPN 84
tachographSpeed	O	Tachograph vehicle speed in km/h (Speed of the vehicle registered by the tachograph)	FMS: Tachograph vehicle speed SAE J1939: SPN 1624
moreDataAvailable	M	This will be set to true if the result set was too large to be sent back in one reply. A new request must be sent to get the rest of the vehicle positions, where the starttime parameter must be supplied. The starttime should be set to the latest ReceivedDateTime + 1 second of the last vehicle in the result set of this message.	

7.2 Limitations

The refresh rate of data of the vehicle position for each vehicle is at least once every 15 minutes.

Storage period is minimum 2 weeks from when the position event was received from the vehicle, both for the pull and the push methods.

The last position received is always available for current requests (not available for historical requests if it is outside the storage period).

© 2025 ACEA (European Automobile Manufacturers Association)

8 Vehicle status

Information regarding how to call the API and how the JSON response is structured can be found in the OpenAPI 3.0 YAML file.

The vehicle status resource is used to retrieve the status reports for one or several vehicles.

There are two methods to retrieve data, pull and push. The client can pull for data by calling the vehicle status resource or create a vehicle status subscription and the server will push data to the subscribing client.

Pull

Using the ***starttime***, ***stoptime*** & ***latestOnly*** parameters it can be used to get all historical status reports between a start and stop time or the latest known status only.

Using the ***vin*** parameter, it can be used to get all historical vehicle reports or latest status for one individual vehicle.

If a request is made for data in a period where no data has been received, an empty list will be returned. The max number of items returned in one call is OEM specific.

It is mandatory to either supply the starttime (for historical requests) or latestOnly (for getting the latest data). If neither of these parameters is set, a HTTP 400 error will be returned indicating that the parameters supplied are invalid.

If latestOnly and starttime and/or stoptime are set, a HTTP 400 error will be returned indicating that the parameters supplied are invalid.

If the moreDataAvailable is set to true in the response and the latestOnly was set to true in the request, then the next request shall state the last received VIN to get the full set.

The vehicles are always returned in the same order, when using latestOnly. The ordering is OEM specific.

Otherwise use the last ReceivedDateTime + 1 second of the last vehicle from the last response using it as the starttime parameter in the next request.

If the ***latestOnly*** is set to true only the latest vehicle status event, matching the trigger filter (if used), is returned for each vehicle in the response. If ***latestOnly*** is set to false (or not present) all vehicle status events matching the starttime/stoptime criteria is returned for each vehicle in the response.

Push

The ***vin*** parameter can be used to create a subscription for one or several individual vehicles.

If the ***vin*** parameter isn't set the subscription will contain all vehicles the client has access to.

The ***notification only*** flag can be used to only include notifications as part of the subscription response.

© 2025 ACEA (European Automobile Manufacturers Association)

8.1 Content filter

The content filter can be used to limit the data in the response to the requested blocks.
Will only return data reports that contain information in the area defined by the filters. Detailed information for this parameter can be found in the Content chapter. If this filter parameter isn't supplied the returned reports contain all available blocks.

8.1.1 Possible values

- ACCUMULATED
- SNAPSHOT
- UPTIME

See chapter 8.2.2 Examples for using the content filter and trigger filter

© 2025 ACEA (European Automobile Manufacturers Association)

8.2 Trigger filter

The trigger filter can be used to limit the response to contain only events that are triggered by the specified triggers (e.g., events triggered by a driver login).

Will only return data reports that were triggered by the trigger defined by the filter. Detailed information for this parameter can be found in the Trigger filter chapter in the API documentation. If this filter parameter isn't supplied the returned data reports contain data reports triggered by any trigger.

8.2.1 Possible values

The following list of triggers is the ones in the rFMS standard.

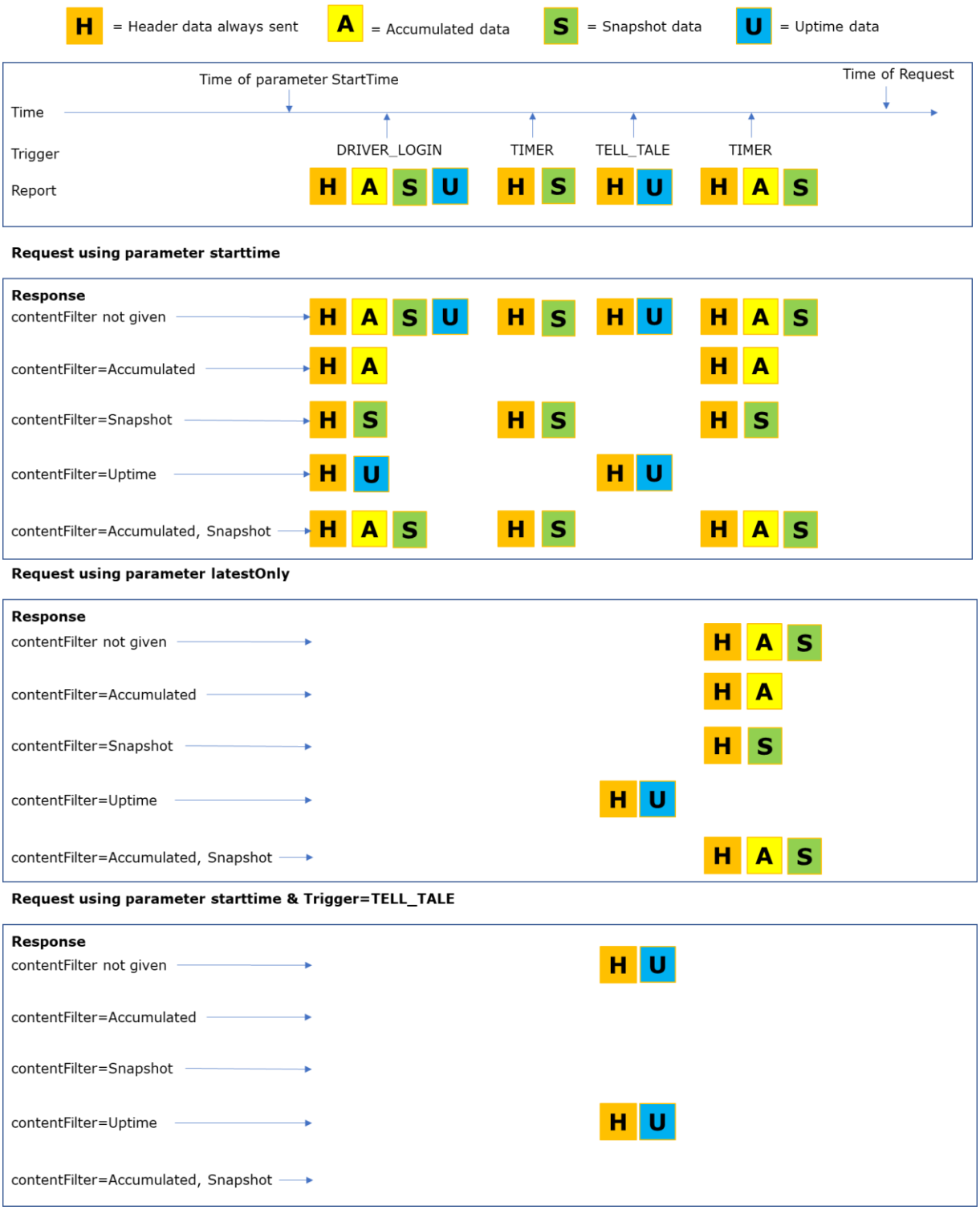
Complementing this list, the different OEMs can also have their own triggers, the list of these can be retrieved by each OEM.

- TIMER
- TELL_TALE
- DRIVER_LOGIN
- DRIVER_LOGOUT
- IGNITION_ON
- IGNITION_OFF
- ENGINE_ON
- ENGINE_OFF
- PTO_ENABLED
- PTO_DISABLED
- DISTANCE_TRAVELLED
- DRIVER_1_WORKING_STATE_CHANGED
- DRIVER_2_WORKING_STATE_CHANGED
- FUEL_TYPE_CHANGE
- PARKING_BRAKE_SWITCH_CHANGE
- BATTERY_PACK_CHARGING_STATUS_CHANGE
- BATTERY_PACK_CHARGING_CONNECTION_STATUS_CHANGE
- TRAILER_CONNECTED
- TRAILER_DISCONNECTED
- ALARM

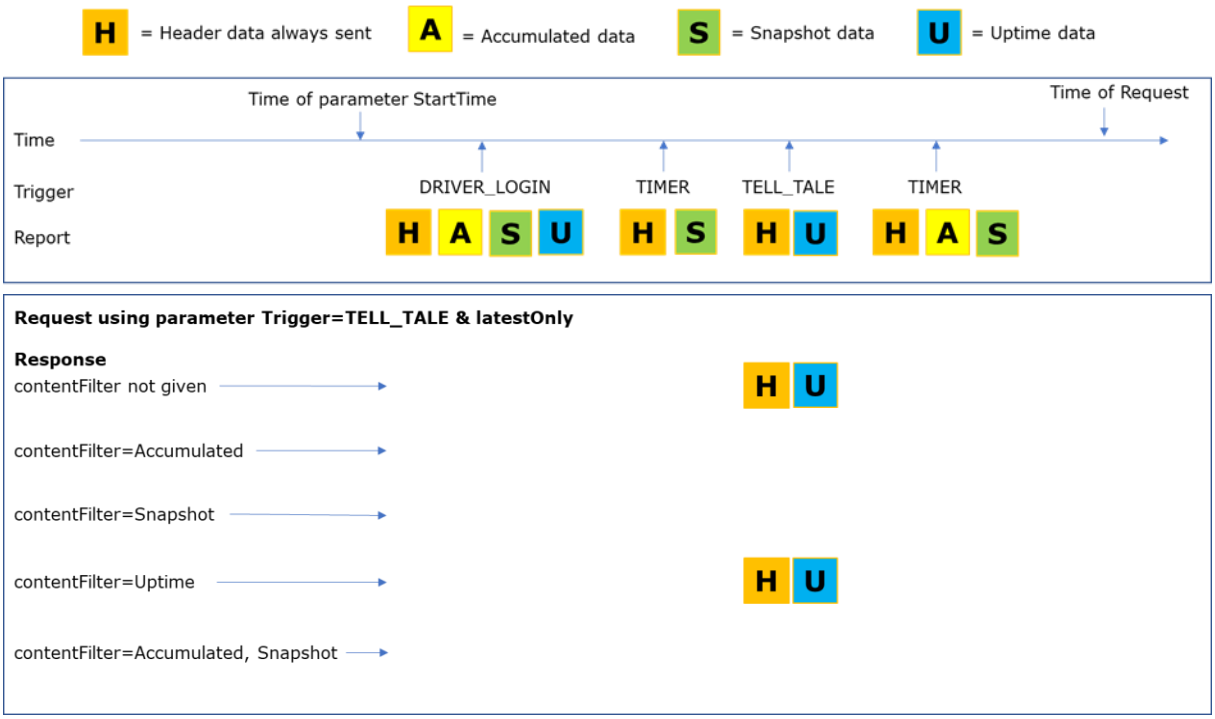
© 2025 ACEA (European Automobile Manufacturers Association)

8.2.2 Examples for using the content filter and trigger filter

These examples are only valid for the Pull method.



© 2025 ACEA (European Automobile Manufacturers Association)



© 2025 ACEA (European Automobile Manufacturers Association)

8.3 Response

8.3.1 VehicleStatuses

This is the vehicle status response.

It will contain a list of vehicle statuses matching the filter parameters.

The recommended sources refer to data specified in standards and should normally be used, but equivalent sources are allowed.

Name	M/O	Description	Recommended sources
vin	M	vehicle identification number See ISO 3779 (17 characters)	FMS: Vehicle identification number SAE J1939: SPN 237
triggerType	M	Indication of the type of trigger that triggered this event.	
createdDateTime	M	When the data was retrieved in the vehicle in ISO 8601 format .	
receivedDateTime	M	Reception at Server. To be used for handling of "more data available" in ISO 8601 format	
hrTotalVehicleDistance	M	Accumulated distance travelled by the vehicle during its operation in meter Should not be reset during lifetime of the vehicle	FMS: High resolution total vehicle distance SAE J1939: SPN 917
totalEngineHours	M/O	The total hours of operation for the vehicle combustion engine during its lifetime. At least one of totalEngineHours or totalElectricMotorHours is mandatory Should not be reset during lifetime of the engine	FMS: Engine total hours of Operation SAE J1939: SPN 247
totalElectricMotorHours	M/O	The total hours the electric motor is ready for propulsion (i.e. crank mode) during its lifetime. At least one of totalEngineHours or totalElectricMotorHours is mandatory Should not be reset during lifetime of the motor	
engineTotalFuelUsed	M/O	The total fuel the vehicle has used during its lifetime in millilitres. At least one of engineTotalFuelUsed, totalFuelUsedGaseous or totalElectricEnergyUsed is mandatory Should not be reset during lifetime of the vehicle	FMS: High resolution engine total fuel used SAE J1939: SPN 5054

© 2025 ACEA (European Automobile Manufacturers Association)

Name	M/O	Description	Recommended sources
totalFuelUsedGaseous	M/O	Total fuel consumed in kg (trip drive fuel + trip PTO governor moving fuel + trip PTO governor non-moving fuel + trip idle fuel) over the life of the engine. At least one of engineTotalFuelUsed, totalFuelUsedGaseous or totalElectricEnergyUsed is mandatory Should not be reset during lifetime of the vehicle	FMS: Total Fuel Used (Gaseous) SAE J1939: SPN 1040
totalElectricEnergyRecuperated	M/O	Total electric energy recuperated by the vehicle during its lifetime, in watt hours. Should not be reset during lifetime of the vehicle	
totalElectricEnergyUsed	M/O	Total electric energy consumed by the vehicle, excluding when plugged in (vehicle coupler) for charging, (incl. motor, PTO, cooling, etc.) during its lifetime, in watt hours. Recuperation is subtracted from the value. At least one of engineTotalFuelUsed, totalFuelUsedGaseous or totalElectricEnergyUsed is mandatory. Should not be reset during lifetime of the vehicle	
grossCombinationVehicleWeight	O	The full vehicle weight in kg	FMS: Gross Combination Vehicle Weight SAE J1939: SPN 1760
driver1Id	M	The driver 1 identity	FMS: Driver 1 Identification SAE J1939: SPN 1625
accumulatedData	O	A list of accumulated vehicle data, see chapter 8.3.2	
snapshotData	O	A list of snapshot vehicle data, see chapter 8.3.3	
uptimeData	O	A list of uptime vehicle data, see chapter 8.3.4	
status2OfDoors	M (bus)	Composite indication of all bus door statuses. Bus specific parameter	FMS: Status 2 of doors SAE J1939: SPN 3411
doorStatus	O	Individual status for each door. Bus specific parameter	FMS: Status of doors 1-10 SAE J1939: SPN 3412-3441

© 2025 ACEA (European Automobile Manufacturers Association)

8.3.2 Accumulated data

The content of the accumulated data block. The recommended sources refers to data specified in standards and should normally be used, but equivalent sources are allowed.
The data items in the accumulated data section contains values that start from zero.

The OEM specifies if the values are reset only when the vehicle is produced, or also at owner change and/or service activation.

Name	Unit	M/O	Description	Recommended sources
durationWheelbasedSpeedOverZero	Seconds	M	The time the vehicle speed has been over zero.	FMS: Wheel based speed SAE J1939: SPN 84
distanceCruiseControlActive	Meter	M	The distance the vehicle has been driven with cruise control active	
durationCruiseControlActive	Seconds	M	The time the vehicle has been driven with cruise control active	
fuelConsumptionDuringCruiseActive	MilliLitres	M/O	The fuel the vehicle has consumed while driven with cruise control active, in millilitres. At least one of fuelConsumptionDuringCruiseActive, fuelConsumptionDuringCruiseActiveGaseous or electricEnergyConsumptionDuringCruiseActive is mandatory.	
fuelConsumptionDuringCruiseActiveGaseous	Kilograms	M/O	The gas the vehicle has consumed while driven with cruise control active, in kilograms. At least one of fuelConsumptionDuringCruiseActive, fuelConsumptionDuringCruiseActiveGaseous or electricEnergyConsumptionDuringCruiseActive is mandatory.	

© 2025 ACEA (European Automobile Manufacturers Association

Name	Unit	M/O	Description	Recommended sources
electricEnergyConsumptionDuringCruiseActive	Watt hours	M/O	The electric energy the vehicle has consumed while driven with cruise control active, in watt-hours. At least one of fuelConsumptionDuringCruiseActive, fuelConsumptionDuringCruiseActiveGaseous or electricEnergyConsumptionDuringCruiseActive is mandatory.	
durationWheelbasedSpeedZero	Seconds	M	The time the vehicle speed has been equal to zero, in seconds. Engine on (RPM>0 or electric motor is in crank mode) and no PTO active	FMS: Wheel based speed, Engine speed, PTO state SAE J1939: SPN 84, SPN 190, SPN 3948
fuelWheelbasedSpeedZero	MilliLitres	M/O	The fuel the vehicle has consumed while the vehicle speed has been equal to zero. Engine on (RPM>0) and no PTO active Unit in millilitres At least one of fuelWheelbasedSpeedZero, fuelWheelbasedSpeedZeroGaseous or electricEnergyWheelbasedSpeedZero is mandatory.	FMS: Wheel based speed, Engine speed, PTO state SAE J1939: SPN 84, SPN 190, SPN 3948
fuelWheelbasedSpeedZeroGaseous	Kilograms	M/O	The gas the vehicle has consumed while the vehicle speed has been equal to zero. Engine on (RPM>0) and no PTO active. Unit in kilograms. At least one of fuelWheelbasedSpeedZero, fuelWheelbasedSpeedZeroGaseous or electricEnergyWheelbasedSpeedZero is mandatory.	

© 2025 ACEA (European Automobile Manufacturers Association)

Name	Unit	M/O	Description	Recommended sources
electricEnergyWheelbasedSpeedZero	Watt hours	M/O	The electric energy the vehicle has consumed while the vehicle speed has been equal to zero. Electric motor is in crank mode and no PTO active. Unit in watt-hours. At least one of fuelWheelbasedSpeedZero, fuelWheelbasedSpeedZeroGaseous or electricEnergyWheelbasedSpeedZero is mandatory.	
fuelWheelbasedSpeedOverZero	MilliLitres	M/O	The fuel the vehicle has consumed while the vehicle speed has been over zero. Engine on (RPM>0). Unit in millilitres At least one of fuelWheelbasedSpeedOverZero, fuelWheelbasedSpeedOverZeroGaseous or electricEnergyWheelbasedSpeedOverZero is mandatory.	FMS: Wheel based speed, Engine speed SAE J1939: SPN 84, SPN 190
fuelWheelbasedSpeedOverZeroGaseous	Kilograms	M/O	The gas the vehicle has consumed while the vehicle speed has been over zero. Engine on (RPM>0). Unit in kilograms At least one of fuelWheelbasedSpeedOverZero, fuelWheelbasedSpeedOverZeroGaseous or electricEnergyWheelbasedSpeedOverZero is mandatory.	
electricEnergyWheelbasedSpeedOverZero	Watt hours	M/O	The electric energy the vehicle has consumed (including recuperation) while the vehicle speed has been over zero. Electric motor is in crank mode. Unit in watt-hours At least one of fuelWheelbasedSpeedOverZero, fuelWheelbasedSpeedOverZeroGaseous or electricEnergyWheelbasedSpeedOverZero is mandatory.	

© 2025 ACEA (European Automobile Manufacturers Association)

Name	Unit	M/O	Description	Recommended sources
electricEnergyAux	Watt hours	M/O	The electric energy the auxiliary systems have consumed, in watt hours. Auxiliary systems are all consumers except electric motor(s) and PTO(s)	
ptoActiveClass		M	2 Classes: Label WHEELBASED_SPEED_ZERO At least one PTO active during wheelbased speed=0 Counters for time (seconds) and consumption (millilitres, kilograms, watt-hours) Label WHEELBASED_SPEED_OVER_ZERO At least one PTO active during wheelbased speed>0 Counters for time (seconds), distance (meter) and consumption (millilitres, kilograms, watt-hours)	FMS: Wheel based speed, PTO state SAE J1939: SPN 84, SPN 3948
brakePedalCounterSpeedOverZero		M	The total number of times the brake pedal has been used while the vehicle was driving.	FMS: Brake pedal position, Wheel based speed SAE J1939: SPN 521, SPN 84
distanceBrakePedalActiveSpeedOverZero	Meter	M	The total distance the vehicle has driven where the brake pedal has been used. Unit Meters	FMS: Brake pedal position, Wheel based speed SAE J1939: SPN 521, SPN 84

© 2025 ACEA (European Automobile Manufacturers Association)

Name	Unit	M/O	Description	Recommended sources
accelerationPedalPositionClass		M	In percent. Minimum 5 classes: [0, 20[[20, 40[[40, 60[[60, 80[[80, 100] Counters for duration (seconds), consumption (millilitres, kilograms, watt hours) and distance (meters)	FMS: Accelerator pedal position 1 SAE J1939: SPN 91
brakePedalPositionClass		O	In percent. Minimum 5 classes: [0, 20[[20, 40[[40, 60[[60, 80[[80, 100] Counters for duration (seconds), consumption (millilitres, kilograms, watt hours) and distance (meters)	FMS: Brake pedal position SAE J1939: SPN 521
accelerationClass		M	In m/s^2. Minimum 13 classes:], -1.1]]-1.1, -0.9]]-0.9, -0.7]]-0.7, -0.5]]-0.5, -0.3]]-0.3, -0.1]]-0.1, 0.1[[0.1, 0.3[[0.3, 0.5[[0.5, 0.7[[0.7, 0.9[[0.9, 1.1[[1.1, [Counters for duration (seconds), consumption (millilitres, kilograms, watt hours) and distance (meters)	
retarderTorqueClass		M	In percent (how the retarder is used as a positive value). Minimum 5 classes]0, 20[[20, 40[[40, 60[[60, 80[[80, 100] Counters for duration (seconds), consumption (millilitres, kilograms, watt hours) and distance (meters)	FMS: Actual Retarder - Percent Torque SAE J1939: SPN 520

© 2025 ACEA (European Automobile Manufacturers Association)

Name	Unit	M/O	Description	Recommended sources
highAccelerationClass		O	In m/s^2: Minimum 11 classes], -3.0]]-3.0, -2.5]]-2.5, -2.0]]-2.0, -1.5]]-1.5, -1.1]]-1.1, 1.1[[1.1, 1.5[[1.5, 2.0[[2.0, 2.5[[2.5, 3.0[[3.0, [Counters for duration (seconds), consumption (millilitres, kilograms, watt hours) and distance (meters)	
drivingWithoutTorqueClass		M	1 label: DRIVING_WITHOUT_TORQUE Driving without torque, with gear (clutch is engaged). Counters for duration (seconds), consumption (millilitres, kilograms, watt hours) and distance (meters)	FMS: Actual Engine – Percent Torque, Clutch switch, Current Gear SAE J1939: SPN 513, SPN 598, SPN 523
engineTorqueClass		M	In percent based on EEC1 value (Actual Engine-Percent Torque). Minimum 10 classes: [0, 10[[10, 20[[20, 30[[30, 40[[40, 50[[50, 60[[60, 70[[70, 80[[80, 90[[90, 100] Counters for duration (seconds), consumption (millilitres, kilograms, watt hours) and distance (meters)	FMS: Actual Engine – Percent Torque SAE J1939: SPN 513

© 2025 ACEA (European Automobile Manufacturers Association)

Name	Unit	M/O	Description	Recommended sources
electricMotorTorqueClass		O	In percent (Actual Engine-Percent Torque). Minimum 10 classes [0, 10[[10, 20[[20, 30[[30, 40[[40, 50[[50, 60[[60, 70[[70, 80[[80, 90[[90, 100] Counters for duration (seconds), consumption (watt hours) and distance (meters)	
engineTorqueAtCurrentSpeedClass		O	In percent based on EEC2 value (Engine Percent Load At Current Speed). Minimum 10 classes: [0, 10[[10, 20[[20, 30[[30, 40[[40, 50[[50, 60[[60, 70[[70, 80[[80, 90[[90, 100] Counters for duration (seconds), consumption (millilitres, kilograms) and distance (meters)	FMS: Engine Percent Load At Current Speed SAE J1939: SPN 92
electricMotorTorqueAtCurrentSpeedClass		O	In percent (Engine Percent Load At Current Speed). Minimum 10 classes: [0, 10[[10, 20[[20, 30[[30, 40[[40, 50[[50, 60[[60, 70[[70, 80[[80, 90[[90, 100] Counters for duration (seconds), consumption (watt hours) and distance (meters)	

© 2025 ACEA (European Automobile Manufacturers Association)

Name	Unit	M/O	Description	Recommended sources
vehicleSpeedClass		M	In km/h. Engine on (RPM>0 or electric motor in crank mode) Minimum 40 classes: [0, 4[[4, 8[[8, 12[[12, 16[[16, 20[[20, 24[… [156, [Counters for duration (seconds), consumption (millilitres, kilograms, watt hours) and distance (meters)	FMS: Wheel based speed, Engine speed SAE J1939: SPN 84, SPN 190
engineSpeedClass		M/O	Classes refer to the RPM of the combustion engine. Only mandatory if the vehicle has a combustion engine for propulsion. Minimum 10 classes: [0, 400[[400, 800[[800, 1200[[1200, 1600[[1600, 2000[[2000, 2400[[2400, 2800[[2800, 3200[[3200, 3600[[3600, [Counters for duration (seconds), consumption (millilitres, kilograms, watt hours) and distance (meters) Note: Engine on (RPM>0 or electric motor in crank mode)	FMS: Engine speed SAE J1939: SPN 190
accelerationDuringBrakeClass		O	in m/s^2. Minimum 13 classes:], -1.1]]-1.1, -0.9]]-0.9, -0.7]]-0.7, -0.5]]-0.5, -0.3]]-0.3, -0.1]]-0.1, 0.1[[0.1, 0.3[[0.3, 0.5[[0.5, 0.7[[0.7, 0.9[[0.9, 1.1[[1.1, [Counters for duration (seconds), consumption (millilitres, kilograms, watt hours) and distance (meters)	FMS: Brake pedal position SAE J1939: SPN 521

© 2025 ACEA (European Automobile Manufacturers Association)

Name	Unit	M/O	Description	Recommended sources
selectedGearClass		O	The currently selected gear One class per gear. Neutral is also a gear. Park is also a gear. This is formatted according to SPN 524, supplied as a decimal value. Example: 0 = Neutral, 1 = 1:st gear... Counters for duration (seconds), consumption (millilitres, kilograms, watt hours) and distance (meters) This is mainly used for Buses.	FMS: Selected Gear SAE J1939: SPN 524
currentGearClass		O	The currently used gear One class per gear. Neutral is also a gear. Park is also a gear. This is formatted according to SPN 523, supplied as a decimal value. Example: 0 = Neutral, 1 = 1:st gear... Counters for duration (seconds), consumption (millilitres, kilograms, watt hours) and distance (meters) This is mainly used for Buses.	FMS: Current Gear SAE J1939: SPN 523
chairliftCounter		O	The total number of times the chairlift has been outside the bus. This is mainly used for Buses	FMS: Ramp/Wheel chairlift SAE J1939: SPN 1820

© 2025 ACEA (European Automobile Manufacturers Association)

Name	Unit	M/O	Description	Recommended sources
stopRequestCounter		O	The total number of stop requests made. This is mainly used for Buses	FMS: Telltale Stop Request
kneelingCounter		O	The total number of times the bus has knelt.	FMS: Telltale Kneeling
pramRequestCounter		O	The total number of pram requests made. This is mainly used for Buses	FMS: Telltale Pram request
electricPowerRecuperationClass	Kilowatt	O	Classes refer to the recuperated electric power in kilowatt Minimum 11 classes [0, 100[[100, 200[[200, 300[… [900, 1000[[1000, [This class is deprecated	
electricPowerRecuperationClassV2	Kilowatt	O	Classes refer to the recuperated electric power in kilowatt Minimum 21 classes [0, 50[[50, 100[[100, 150[… [950, 1000[[1000, [This parameter replaces electricPowerRecuperationClass with a higher resolution	

© 2025 ACEA (European Automobile Manufacturers Association)

8.3.2.1 Class parameters

A class parameter can be defined using labels or intervals. The class parameter values (time, distance and consumption) are incremented continuously whenever the condition of the label is fulfilled, or the measured parameter is within the defined interval.

Note: The OEM specifies if the values are reset only when the vehicle is produced, or also at owner change and/or service activation. The starting point of the class parameters are OEM specific.

A class parameter defined using labels is fixed, i.e., the labels are defined in this standard.

A class parameter defined using intervals, is divided into a minimum set of intervals. Each such interval can be further divided into subintervals, still allowing for aggregation of these back into the minimum set of defined intervals. It is however not allowed to define intervals that are spanning the defined intervals. The table below shows two examples of interval definitions that are OK and one example that is not OK.

	Intervals	Comments
Defined intervals	0-20 | 20-40 | 40-60	Minimum set of intervals
OEM1 specific intervals (OK)	0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60	e.g. 0-10 & 10-20 can be aggregated to 0-20
OEM2 specific intervals (OK)	0-20 | 20-25 | 25-30 | 30-40 | 40-60	20-25 & 25-30 & 30-40 can be aggregated to 20-40
Not OK intervals	0-15 | 15-30 | 30-45 | 45-60	Not OK as it is not possible to aggregate these intervals into the defined intervals.

© 2025 ACEA (European Automobile Manufacturers Association)

8.3.2.2 Interval definition

The minimum set of intervals is represented using a bracket notation indicating if a value is part of the block or not. Considering this interval definition with a set of 7 intervals,

], -2]]-2, -1]]-1, -0.1]]-0.1, 0.1[[0.1, 1[[1, 2[[2, [

it would mean the following:

Interval	Mathematical	Description
], -2]	value <= -2	value is below -2 (-2 is included)
]-2, -1]	-2 < value <= -1	value is between -2 and -1 (-2 is not included, -1 is included)
]-1, -0.1]	-1 < value <= 0.1	value is between -1 and -0.1 (-1 is not included, -0.1 is included)
]-0.1, 0.1[	-0.1 < value < 0.1	value is between -0.1 and 0.1 (-0.1 is not included, 0.1 is not included)
[0.1, 1[	0.1 <= value < 1	value is between 0.1 and 1 (0.1 is included, 1 is not included)
[1, 2[	1 <= value < 2	value is between 1 and 2 (1 is included, 2 is not included)
[2,[	2 <= value	value is above 2 (2 is included)

If we exemplify this with receiving this list of durations in seconds (7 values):

40, 10, 20, 2000, 30, 31, 60

The vehicle would have spent:

40 seconds below (and including) -2
10 seconds between -1.99999… and -1
20 seconds between -0.99999… and -0.1
2000 seconds between -0.099999… and 0.099999…
30 seconds between 0.1 and 0.99999…
31 seconds between 1 and 1.99999…
60 seconds above (and including) 2

© 2025 ACEA (European Automobile Manufacturers Association)

8.3.2.3 Class parameter examples

Here are two examples of class parameters, one defined by labels and one with intervals.

ptoActiveClass is a class parameter defined by two labels.

This is an example of how it could be returned.

	Wheel based speed = 0	Wheel based speed > 0
Duration (seconds)	345345	9585
Distance (meters)	0	4545
Consumption (millilitres)	75934579	456456

accelerationPedalPositionClass is a class parameter defined by intervals.

This is an example of how it could be returned.

	0-20 %	20-40 %	40-60 %	60-80 %	80-100 %
Duration (seconds)	93475	4058	345345	854	849
Distance (meters)	457397	79779	97987	779	977
Consumption (millilitres)	87979	79797	98797	7798	9780

© 2025 ACEA (European Automobile Manufacturers Association)

8.3.3 Snapshot data

The content of the snapshot data block. The recommended sources refer to data specified in standards and should normally be used, but equivalent sources are allowed.

Name	Unit	M/O	Description	Recommended sources
latitude	WGS84	M	Latitude	
longitude	WGS84	M	Longitude	
heading	Degrees	O	The direction of the vehicle (0-359)	
altitude	meter	O	The altitude of the vehicle. Where 0 is sea level, negative values below sealevel and positive above sealevel.	
speed	km/h	O	The GNSS (e.g. GPS)-speed in km/h	
positionDateTime	Time	M	The time of the position data in ISO 8601 format.	
wheelBasedSpeed	Km/h	M	The vehicle wheelbased speed	FMS: Wheel based speed SAE J1939: SPN 84
tachographSpeed	Km/h	O	The Tacho speed	FMS: Tachograph vehicle speed SAE J1939: SPN 1624
engineSpeed	rpm	O	The engine (Diesel/gaseous) speed in rev/min	FMS: Engine speed SAE J1939: SPN 190
electricMotorSpeed	rpm	O	The electric motor speed in rev/min	
ignition	enum	O	Indicates if the ignition is on or off ON – ignition is on OFF-ignition is off	
fuelType		O	Type of fuel currently being utilized by the vehicle acc. SPN 5837 (J1939DA FEB24)	FMS: Fuel Type SAE J1939: SPN 5837
fuelLevel1	%	M	The fuel level percentage	FMS: Fuel Level 1 SAE J1939: SPN 96

© 2025 ACEA (European Automobile Manufacturers Association)

Name	Unit	M/O	Description	Recommended sources
fuelLevel2	%	O	Ratio of volume of fuel to the total volume of fuel storage container, in percent. When Fuel Level 2 is not used, Fuel Level 1 represents the total fuel in all fuel storage containers. When Fuel Level 2 is used, Fuel Level 1 represents the fuel level in the primary or left-side fuel storage container.	FMS: Fuel Level 2 SAE J1939: SPN 38
catalystFuelLevel	%	O	The adblue level percentage	FMS: Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Level SAE J1939: SPN 1761
driver1WorkingState		O	Tachograph working state of driver 1	FMS: driver 1 working state SAE J1939: SPN 1612
driver2Id		O	The Id of driver 2	FMS: Driver 2 Identification SAE J1939: SPN 1626
driver2WorkingState		O	Tachograph working state of driver 2	FMS: driver 2 working state SAE J1939: SPN 1613
parkingBrakeSwitch		O	Switch signal which indicates when the parking brake is set. In general, the switch actuated by the operator's park brake control, whether a pedal, lever or other control mechanism. true - parking brake set false - parking brake not set	FMS: Parking Brake Switch SAE J1939: SPN 70
hybridBatteryPackRemainingCharge	%	O	Indicates the hybrid battery pack remaining charge. 0% means no charge remaining, 100% means full charge remaining. Is used as well for full electrical vehicles	FMS: Hybrid Battery Pack Remaining Charge SAE J1939: SPN 5464

© 2025 ACEA (European Automobile Manufacturers Association)

Name	Unit	M/O	Description	Recommended sources
batteryPackChargingStatus	enum	O	Indicates the charging status of the battery pack. Recuperation is excluded. Not charging - No charging Charging - Charging ongoing (AC or DC is unknown) Charging AC - charging ongoing using AC Charging DC - charging ongoing using DC Error - An error occurred when charging Not available - Charging status is not available	
batteryPackChargingConnectionStatus	enum	O	Indicates the charging connection status of the battery pack. Connecting - A charger is being connected Connected - A charger is connected Disconnecting - A charger is being disconnected Disconnected - No charger is connected Error - An error occurred when connecting or disconnecting Not available - Charging connection status is not available	
batteryPackChargingDevice	enum	O	Device used to charge the battery pack. Standard rFMS values taken from ISO 15118 (OEM can have additional values): ACD - Automatic Connection Device WPT - Wireless Power Transfer VEHICLE_COUPLER - manual connection of a flexible cable to an EV NONE - No device connected NOT_AVAILABLE - Unknown	
batteryPackChargingPower	Watt	O	Charging power in watts	
estimatedTimeBatteryPackChargingCompleted	Date-time	O	Estimated time when charging has reached the target level	

© 2025 ACEA (European Automobile Manufacturers Association)

Name	Unit	M/O	Description	Recommended sources
estimatedDistanceToEmpty	Meter	O	Estimated distance to empty (tanks and/or battery packs) in meters	
vehicleAxles		O	A list of vehicle axles	
vehicleAxlePosition		O	Axle position from 1 to 15, 1 being in the front of the truck	
vehicleAxleLoad	Kilogram	O	The static vertical load of a vehicle axle in kilograms.	
vehicleTires		O	A list of vehicle tires	
vehicleTirePosition		O	Tire position (on the specified axle) from 1 to 15, counting left to right when facing in the direction of normal vehicle travel (forward).	
vehicleTirePressure	kPa	O	Tire pressure in kPa	
trailerNo		O	List of trailers connected to the truck Trailer number from 1 to 5, 1 being closest to the truck, according to ISO 11992-2	
trailerVin		O	The vehicle identification number of the trailer. See ISO 3779 (17 characters). If the trailerIdentificationData is reporting a true VIN, trailerVin will have the same value. If it is possible to map the trailerIdentificationData to a true VIN using other sources, the value can be provided here.	

© 2025 ACEA (European Automobile Manufacturers Association)

Name	Unit	M/O	Description	Recommended Sources
trailerIdentificationData		O	The identification data sent by the trailer to the truck in the RGE23 message of ISO 11992-2. An alternative source is the DID (Data identifier definition) record VIN, as specified in ISO 11992-4. Even though both ISO 11992-2 and ISO 11992-4 specifies this as a VIN, the actual data sent from a trailer is not always the true VIN of the trailer	
trailerType		O	Indicates the type of the trailer. The type is sent in the EBS24 message of ISO 11992-2: - SEMI_TRAILER - CENTRE_AXLE_TRAILER - FULL_TRAILER - CONVERTER_DOLLY - LINK_TRAILER - TOWING_SEMI_TRAILER - TOWING_CENTRE_AXLE_TRAILER - TOWING_FULL_TRAILER - UNKNOWN	
customerTrailerName		O	The customer's name for the trailer	
trailerAxles		O	A list of trailer axles	
trailerAxlePosition		O	Axle position from 1 to 15, 1 being in the front closest to the truck	Acc. ISO 11992-2
trailerAxleLoad		O	The static vertical load of a trailer axle in kilograms. The load is sent in the RGE22 message of ISO11992-2	

© 2025 ACEA (European Automobile Manufacturers Association)

Name	Unit	M/O	Description	Recommended Sources
trailerAxleLoadSum		O	The sum of the static vertical loads of the trailer axles in kilograms. The load is sent in the EBS22 message of ISO 11992-2	
ambientAirTemperature	Degrees Celsius	O	The Ambient air temperature in Celsius	FMS: Ambient Air Temperature SAE J1939: SPN 171

© 2025 ACEA (European Automobile Manufacturers Association)

8.3.3.1 Driver Id

The id of the driver.

The Id can either be an EU tacho driver id or an OEM specific driver Id.

Name	Unit	M/O	Description
tachoDriverIdentification		O	The unique identification of a driver in a Member State. This fields is formatted according the definition for driverIdentification in COMMISSION REGULATION (EC) No 1360/2002 Annex 1b
oemDriverIdentification	String	O	An OEM specific driver id.
idType	String	O	Contains an optional id type (e.g. pin, USB, encrypted EU id…)

8.3.3.2 TachoDriverIdentificationType

Name	Description
tachoDriverIdentificationType	The EU standard driver tachograph id. The fields in this struct are formatted according to: COMMISSION REGULATION (EC) No 1360/2002 Annex 1b http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2002:207:0001:0252:EN:PDF
driverIdentification	The unique identification of a driver in a Member State. This fields is formatted according the definition for driverIdentification in: COMMISSION REGULATION (EC) No 1360/2002 Annex 1b
cardIssuingMemberState	The country alpha code of the Member State having issued the card. This fields is formatted according the definition for NationAlpha in: COMMISSION REGULATION (EC) No 1360/2002 Annex 1b
driverAuthenticationEquipment	Code to distinguish different types of equipment for the tachograph application. See description of the field 'DriverAuthenticationEquipment' in: COMMISSION REGULATION (EC) No 1360/2002 Annex 1b
cardReplacementIndex	A card replacement index. This fields is formatted according the definition for CardReplacementIndex (chap 2.26) in: COMMISSION REGULATION (EC) No 1360/2002 Annex 1b
cardRenewalIndex	A card renewal index. This fields is formatted according the definition for CardRenewalIndex (chap 2.25) in: COMMISSION REGULATION (EC) No 1360/2002 Annex 1b

© 2025 ACEA (European Automobile Manufacturers Association)

8.3.4 Uptime data

The content of the uptime data block. The recommended sources refer to data specified in standards and should normally be used, but equivalent sources are allowed to be used.

Name	Unit	M/O	Description	Recommended sources
tellTaleInfo		M	List of tell tales with the actual status for each tell tale.	See 8.3.4.1 for definitions SAE J1939: PGN 64893
serviceDistance	Meter	O	The distance in meter to the next service	FMS: Service distance SAE J1939: SPN 914
engineCoolantTemperature	Celsius	O	The temperature of the coolant liquid.	FMS: Engine coolant temperature SAE J1939: SPN 110
hvessOutletCoolantTemperature	Celsius	O	The temperature of the battery pack coolant in Celsius HVESS - High Voltage Energy Storage System	SAE J1939: SPN 8089
hvessTemperature	Celsius	O	The temperature of the battery pack in Celsius HVESS - High Voltage Energy Storage System	SAE J1939: SPN 9119
serviceBrakeAirPressureCircuit1	Pascal	O	The air pressure in circuit 1 in Pascal.	FMS: Service Brake Air Pressure Circuit #1 SAE J1939: SPN 1087
serviceBrakeAirPressureCircuit2	Pascal	O	The air pressure in circuit 2 in Pascal.	FMS: Service Brake Air Pressure Circuit #2 SAE J1939: SPN 1088
durationAtLeastOneDoorOpen	Seconds	O	The total time at least one door has been opened in the bus. Used mainly for buses.	FMS: Position of doors SAE J1939: SPN 1821
alternatorStatus		M (bus)	The alternator status of the up to 4 alternators. Used mainly for buses.	FMS: Alternator Status 1-4 SAE J1939: SPN 3353-3356
bellowPressureFrontAxleLeft	Pascal	O	The bellow pressure in the front axle left side in Pascal. Used mainly for buses.	FMS: Bellow Pressure Front Axle Left SAE J1939: SPN 1725
bellowPressureFrontAxleRight	Pascal	O	The bellow pressure in the front axle right side in Pascal. Used mainly for buses.	FMS: Bellow Pressure Front Axle Right SAE J1939: SPN 1726
bellowPressureRearAxleLeft	Pascal	O	The bellow pressure in the rear axle left side in Pascal. Used mainly for buses.	FMS: Bellow Pressure Rear Axle Left SAE J1939: SPN 1727

© 2025 ACEA (European Automobile Manufacturers Association)

bellowPressureRearAxleRight	Pascal	O	The bellow pressure in the rear axle right side in Pascal. Used mainly for buses.	FMS: Bellow Pressure Rear Axle Right SAE J1939: SPN 1728

© 2025 ACEA (European Automobile Manufacturers Association)

8.3.4.1 Telltales

The table below lists the telltales defined in rFMS. The telltale information is derived from information displayed to the driver's dashboard. The telltale number is related to the symbols in the ISO 7000 document and not to the description. The telltales not related to ISO 7000 are stated with "no". There are 8 possible states: Red, Yellow, Info, Off, Reserved 4-6, Not available. The interpretation of the state is manufacturer dependent and might be different. For details, please refer to the manufacturers' document. The symbols used in the dash display of each manufacturer might vary from ISO symbols.

FMS id	Telltale	M/O	Based on ISO 7000 number
1	COOLING_AIR_CONDITIONING	O	27
2	HIGH_BEAM_MAIN_BEAM	O	82
3	LOW_BEAM_DIPPED_BEAM	O	83
4	TURN_SIGNALS	O	84
5	HAZARD_WARNING	O	85
6	PROVISIONING_HANDICAPPED_PERSON	O	100
7	PARKING_BRAKE	O	238
8	BRAKE_MALFUNCTION	M	239
9	HATCH_OPEN	O	242
10	FUEL_LEVEL	O	245
11	ENGINE_COOLANT_TEMPERATURE	M	246
12	BATTERY_CHARGING_CONDITION	M (bus)	247
13	ENGINE_OIL	M	248
14	POSITION_LIGHTS	O	456
15	FRONT_FOG_LIGHT	O	633
16	REAR_FOG_LIGHT	O	634
17	PARKING_HEATER	O	637
18	ENGINE_MIL_INDICATOR	M	640
19	SERVICE_CALL_FOR_MAINTENANCE	O	717
20	TRANSMISSION_FLUID_TEMPERATURE	O	1168
21	TRANSMISSION_MALFUNCTION	M	1396
22	ANTI_LOCK_BRAKE_FAILURE	M	1407
23	WORN_BRAKE_LININGS	O	1408
24	WINDSCREEN_WASHER_FLUID	O	1422
25	TIRE_MALFUNCTION	O	1434
26	GENERAL_FAILURE	M	1603
27	ENGINE_OIL_TEMPERATURE	M	2426
28	ENGINE_OIL_LEVEL	M	2427
29	ENGINE_COOLANT_LEVEL	M	2429
30	STEERING_FLUID_LEVEL	O	2440
31	STEERING_FAILURE	O	2441

© 2025 ACEA (European Automobile Manufacturers Association

FMS id	Telltale	M/O	Based on ISO 7000 number
32	HEIGHT_CONTROL	O	2461
33	RETARDER	O	2574
34	ENGINE_EMISSION_FAILURE	M	2596
35	ESC_INDICATOR	O	2630
36	BRAKE_LIGHTS	O	-
37	ARTICULATION	O	-
38	STOP_REQUEST	O	-
39	PRAM_REQUEST	O	-
40	BUS_STOP_BRAKE	O	-
41	ADBLUE_LEVEL	O	2946
42	RAISING	O	-
43	LOWERING	O	-
44	KNEELING	O	-
45	ENGINE_COMPARTMENT_TEMPERATURE	O	-
46	AUXILLARY_AIR_PRESSURE	O	-
47	AIR_FILTER_CLOGGED	O	2432
48	FUEL_FILTER_DIFF_PRESSURE	O	2452
49	SEAT_BELT	O	249
50	EBS	M	-
51	LANE_DEPARTURE_INDICATOR	O	2682
52	ADVANCED_EMERGENCY_BRAKING	O	-
53	ACC	O	2581
54	TRAILER_CONNECTED	O	-
55	ABS_TRAILER	O	2444/2445
56	AIRBAG	O	2108
57	EBS_TRAILER_1_2	O	-
58	TACHOGRAPH_INDICATOR	O	-
59	ESC_SWITCHED_OFF	O	2649
60	LANE_DEPARTURE_WARNING_SWITCHED_OFF	O	-
61	ENGINE_EMISSION_FILTER_SOOT_FILTER	O	2433
62	ELECTRIC_MOTOR_FAILURES	O	2633
63	ADBLUE_TAMPERING	O	-
64	MULTIPLEX_SYSTEM	O	-
65	BATTERY_PACK	O	2632
66	HIGH_VOLTAGE_SYSTEM_CAUTION	O	6042
67	BATTERY_PACK_TEMPERATURE	O	3129
68	LIMITED_PERFORMANCE_ELECTRIC_MOTOR	O	2639
69	BATTERY_PACK_COOLING	O	2455
no	WATER_IN_FUEL_INDICATOR	O	3452
	OEM_SPECIFIC_TELL_TALE	O	

© 2025 ACEA (European Automobile Manufacturers Association)

8.4 Limitations

The refresh rate of data of the vehicle status reports for each vehicle is at least once every 60 minutes.

Storage period is minimum 2 weeks from when the vehicle status event was received from the vehicle, both for the pull and the push methods.
The last received vehicle status event is always available for the current requests (not available for historical requests if it is outside the storage period)

9 Triggers

The triggers that can be used for triggering of positions or vehicle statuses events. In addition to the trigger the mandatory fields will contain information.

Name	Context	M/O	Mandatory fields	Description
TIMER	rFMS	M	none	Data was sent due to a timer trigger. (Timer value set outside rFMS scope)
IGNITION_ON	rFMS	O	none	Data was sent due to an ignition on
IGNITION_OFF	rFMS	O	none	Data was sent due to an ignition off
PTO_ENABLED	rFMS	O	None or ptoId	Data was sent due to that a PTO was enabled, will be sent for each PTO that gets enabled
PTO_DISBALED	rFMS	O	None or ptoId	Data was sent due to that a PTO was disabled, will be sent for each PTO that gets disabled.
DRIVER_LOGIN	rFMS	M	driverId	Data was sent due to a successful driver login.
DRIVER_LOGOUT	rFMS	M	driverId	Data was sent due to a driver logout
TELL_TALE	rFMS	M	tellTaleInfo	Data was sent due to that at least one tell tale changed state
ENGINE_ON	rFMS	O	none	Data was sent due to an engine on. For electric motor crank is on
ENGINE_OFF	rFMS	O	none	Data was sent due to an engine off. For electric motor crank is off
DRIVER_1_WORKING_STATE_CHANGED	rFMS	O	driverId	Data was sent due to that driver 1 changed working state
DRIVER_2_WORKING_STATE_CHANGED	rFMS	O	driverId	Data was sent due to that driver 2 changed working state
DISTANCE_TRAVELLED	rFMS	O	none	Data was sent due to that a set distance was travelled. (Distance set outside rFMS scope)
FUEL_TYPE_CHANGE	rFMS	O	none	Data was sent due to that the type of fuel currently being utilized by the vehicle changed

© 2025 ACEA (European Automobile Manufacturers Association

Name	Context	M/O	Mandatory fields	Description
PARKING_BRAKE_SWITCH_CHANGE	rFMS	O	none	Data was sent due to that the parking brake state has changed
BATTERY_PACK_CHARGING_STATUS_CHANGE	rFMS	O	none	Data was sent due to a change in the battery pack charging status. CHARGING_STARTED - Charging has started CHARGING_COMPLETED - Charging is completed CHARGING_INTERRUPTED - Charging has been interrupted (no error) ERROR - An error occurred when charging ESTIMATED_COMPLETION_TIME_CHANGED - The estimated time for completed charging has changed. (Threshold is outside scope of rFMS) TIMER - A predefined time has passed since last charge status update. (Frequency is outside the scope of rFMS) CHARGING_LEVEL - The charging level has reached a predefined level. (Charging levels are outside the scope of rFMS)
BATTERY_PACK_CHARGING_CONNECTION_STATUS_CHANGE	rFMS	O	none	Data was sent due to a change in the battery pack charging connection status. Additional information can be provided if the trigger type is BATTERY_PACK_CHARGING_STATUS_CHANGE: CONNECTING - Vehicle is being connected to a charger CONNECTED - Vehicle is connected to a charger DISCONNECTING - Vehicle is being disconnected from the charger DISCONNECTED - Vehicle is not connected to a charger ERROR - An error occurred
TRAILER_CONNECTED	rFMS	O	none	One or several trailers were connected
TRAILER_DISCONNECTED	rFMS	O	none	One or several trailers were disconnected

© 2025 ACEA (European Automobile Manufacturers Association)

Name	Context	M/O	Mandatory fields	Description
ALARM	rFMS	O	None	Alarm was armed, disarmed or triggered Alarmtypes: THEFT – Generell theft alarm (Vehicle, Cargo, etc.) FUEL_THEFT - Fuel theft alarm FIRE - Fire alarm PANIC - Panic alarm CARGO_TEMPERATURE - Cargo temperature alarm OEM specifc types can be added Alarmstatus: ARMED - The alarm is armed ARMED_WITH_ERRORS - The alarm has been armed with errors DISARMED - The alarm is disarmed TRIGGERED - The alarm has been fired/triggered UNTRIGGERED - The alarm has been untriggered in an authorized way ERROR - An error has occured in the alarm system OEM specific statuses can be added Alarm details: OEM specific e.g. DRIVER_DOOR_OPENED, CARGO_DOOR_OPENED
OEM defined	OEM brand	O	OEM specific	Additional OEM specific TriggerInfo content. Can be used for both OEM specific and rFMS defined triggers E.g. TRAILER_ATTACHED_TRIGGER [id of trailer]

© 2025 ACEA (European Automobile Manufacturers Association)

9.1 Tell tale triggers

These are the tell tales possible in the rFMS API.

For the triggers, only the ***any -> red*** and ***red -> any*** transitions are mandatory.

9.1.1 Trucks

The following tell tales are mandatory as triggers for trucks:

FMS Id	Tell tale description
8	Brake failure/brake system malfunction
13	Engine oil
18	Engine / Mil indicator
22	Anti-lock brake system failure
26	Malfunction/general failure
34	Engine Emission system failure

© 2025 ACEA (European Automobile Manufacturers Association

9.1.2 Buses and Coaches

The following tell tales are mandatory as triggers for buses:

FMS Id	Tell tale description
8	Brake failure/brake system malfunction
12	Battery charging condition
13	Engine oil
18	Engine / Mil indicator
22	Anti-lock brake system failure
26	Malfunction/general failure
34	Engine Emission system failure

© 2025 ACEA (European Automobile Manufacturers Association)

10 Pull method description

10.1 General

The pull method is implemented using REST endpoints at the resource server and the client is normally retrieving data with a fixed frequency to always have the complete set of vehicle data. There is also a possibility for the rFMS client to only retrieve vehicle data when it is needed.

10.2 Sequence diagrams

10.2.1 Vehicle Position request with "MoreDataAvailable"

In this example, the rFMS client, which is interested in retrieving the information related to vehicles' position has to invoke the vehicle position resource exposed by the rFMS server, optionally providing additional parameters to provide better context to the request (see Chapter 7).

© 2025 ACEA (European Automobile Manufacturers Association)

Diagram: Get vehicle positions with moreDataAvailable

© 2025 ACEA (European Automobile Manufacturers Association)

11 Push method description

11.1 General

The push method is implemented using callbacks, i.e. it is using REST endpoints at the rFMS client to which the rFMS server is pushing data or notifications about new data. To manage which data to push, the rFMS client is creating subscriptions at the rFMS server using REST endpoints.

The following chapters contains examples of how these interactions works.

11.2 Sequence diagrams

11.2.1 Push Positions With Payload

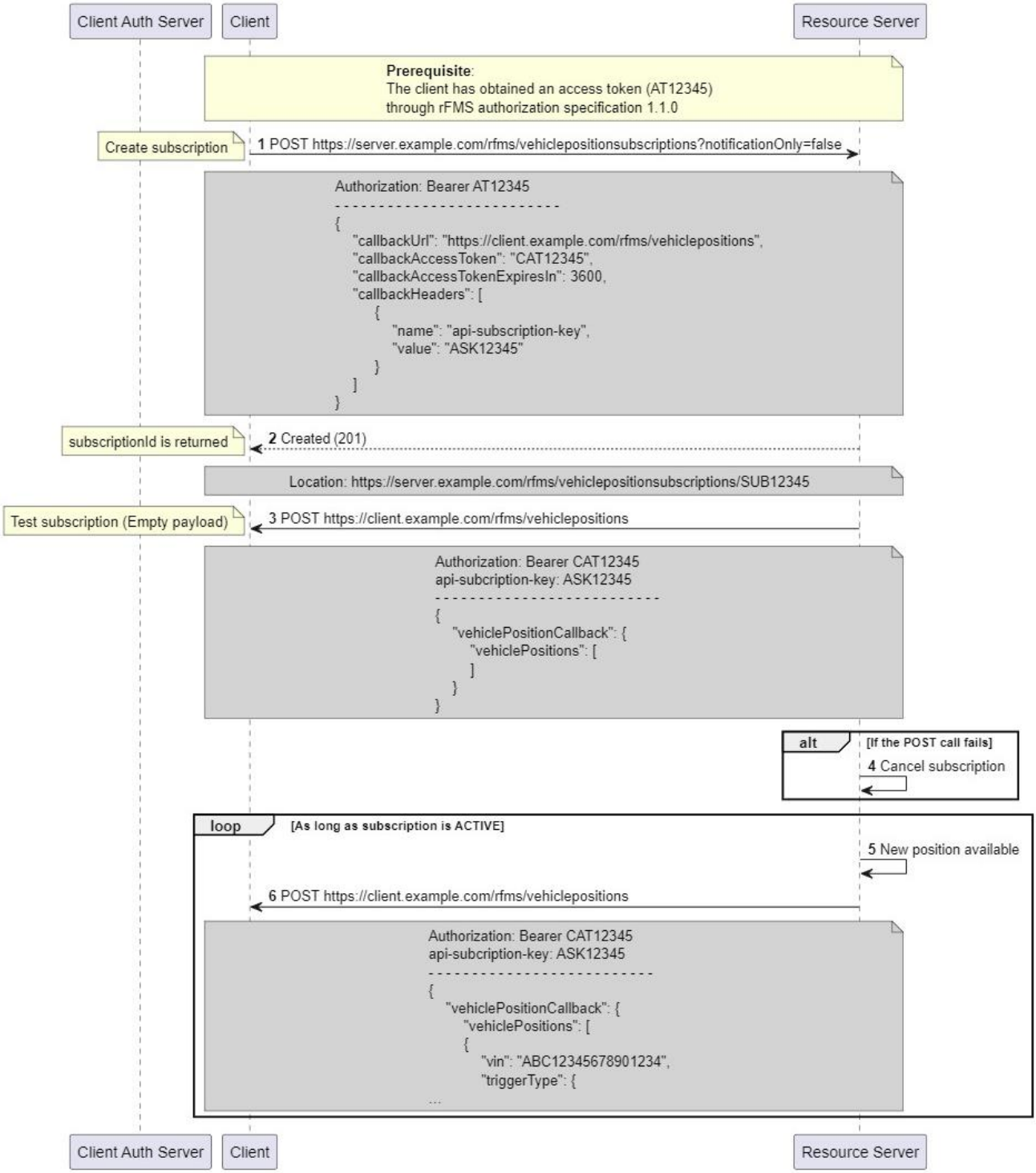
11.2.1.1 Push positions using Bearer Token

In this scenario, the notification flag has been set to false: for this reason, the rFMS server will send actual data in the callback invocation.

The rFMS client must provide the URL the rFMS server is supposed to invoke (callback); optionally, it can provide additional HTTP headers that the rFMS server is expected to include in the callback invocations.

© 2025 ACEA (European Automobile Manufacturers Association)

Diagram: Push positions with payload (Happy flow) Bearer Token



© 2025 ACEA (European Automobile Manufacturers Association)

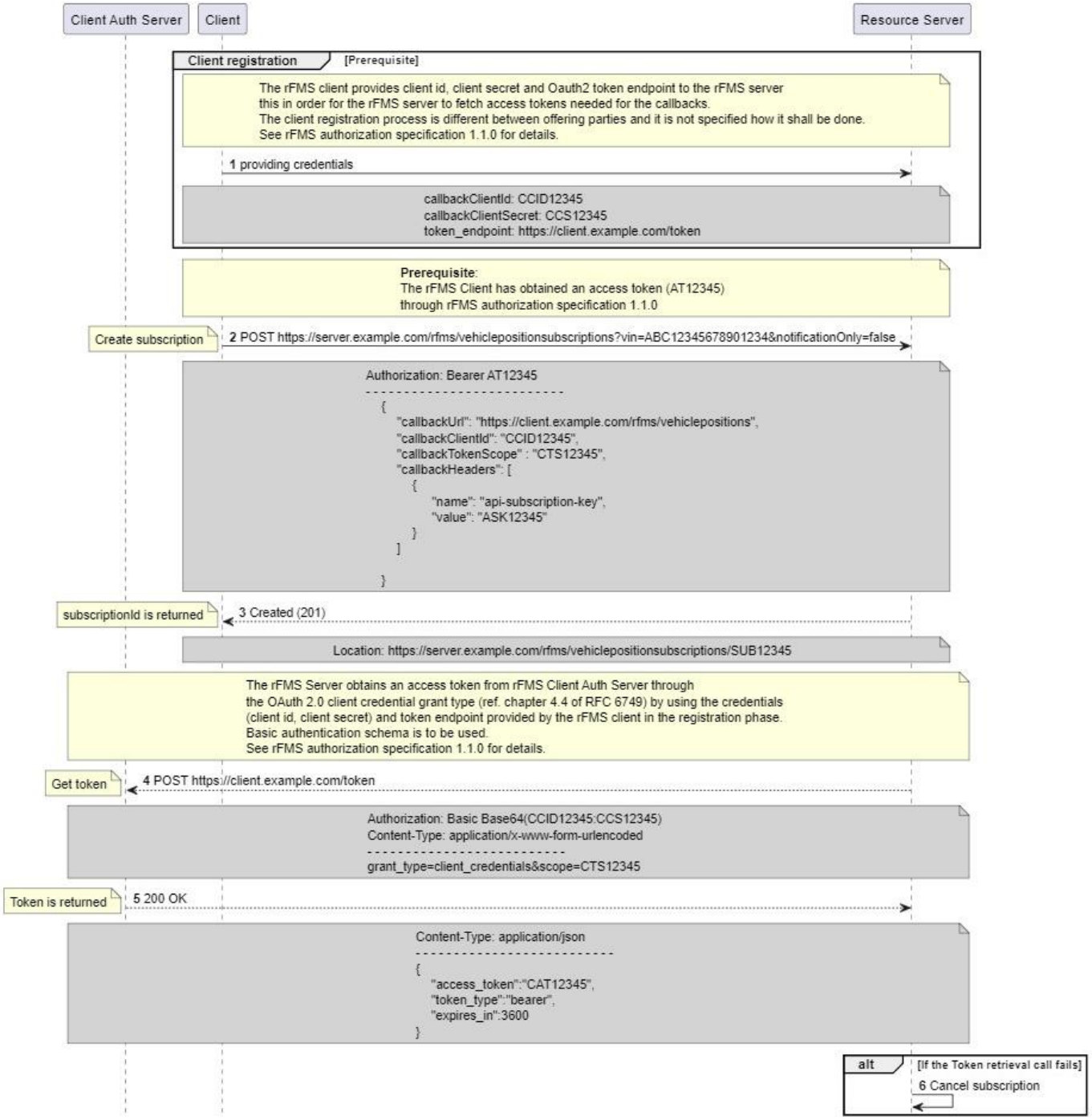
11.2.1.2 Push position using client credential grant

In this scenario, the notification flag has been set to false: for this reason, the rFMS server will send actual data in the callback invocation after obtaining an access token from the rFMS Client Auth Server.

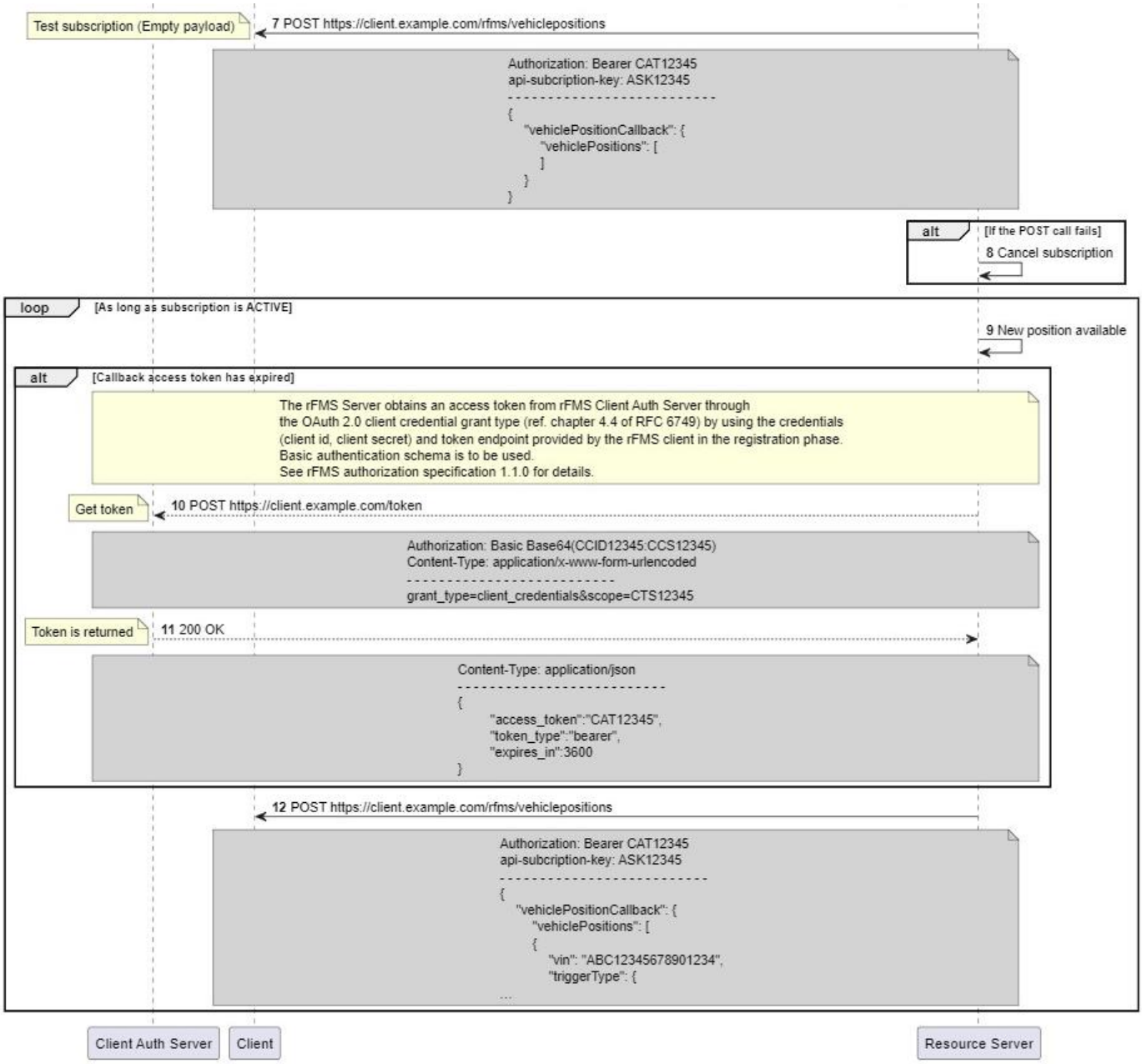
The rFMS client must provide the URL the rFMS server is supposed to invoke (callback); optionally, it can provide additional HTTP headers that the rFMS server is expected to include in the callback invocations.

© 2025 ACEA (European Automobile Manufacturers Association)

Diagram: Push positions with payload (Happy flow) client credential grant



© 2025 ACEA (European Automobile Manufacturers Association)



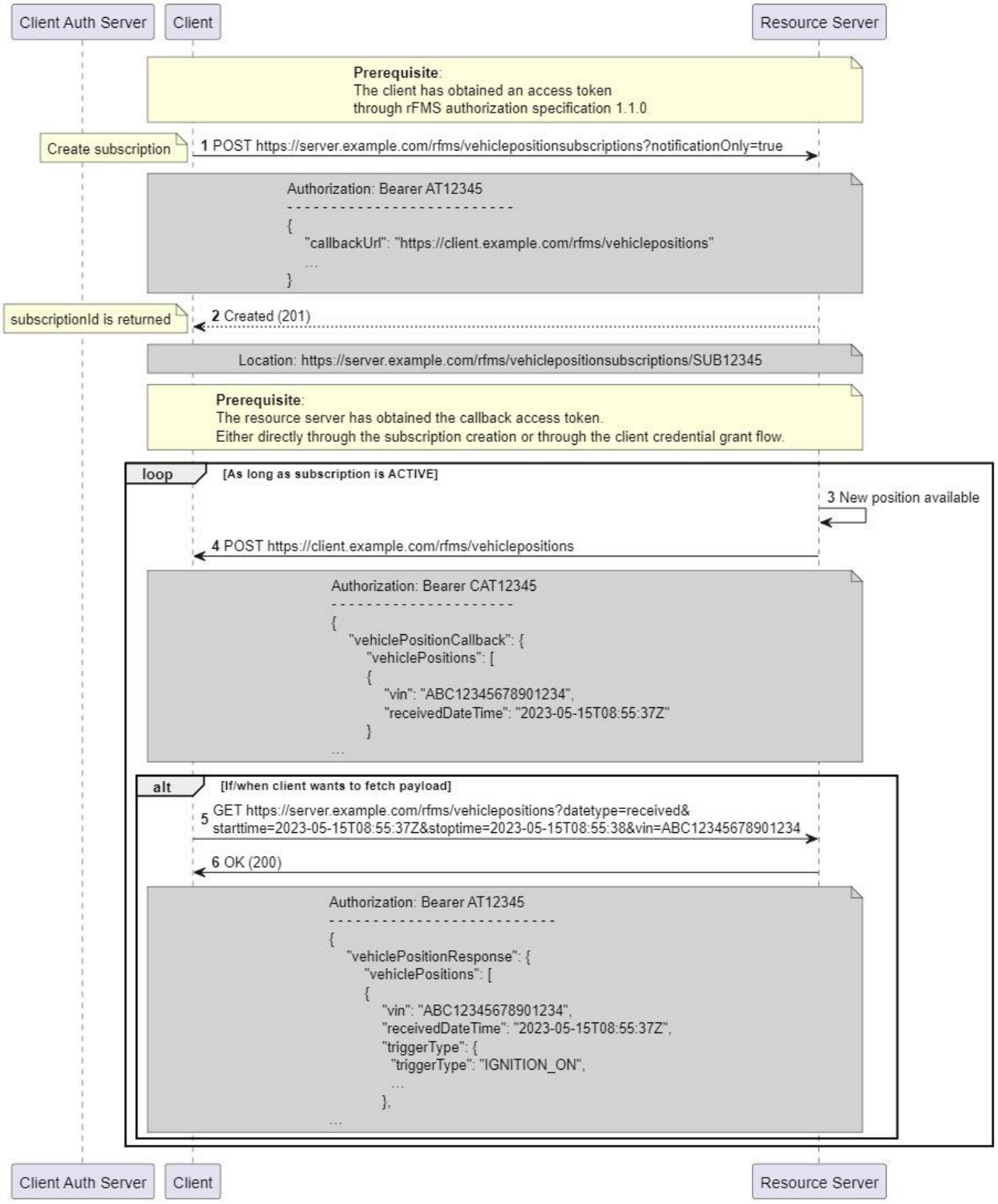
11.2.2 Push Positions With Notification only

In this scenario, the notification flag has been set to true: for this reason, the rFMS server will not send actual data in the callback invocation.

The rFMS client is supposed to use the "pull" vehicleposition API to retrieve the actual data.

© 2025 ACEA (European Automobile Manufacturers Association)

Diagram: Push positions with notification (Happy flow)

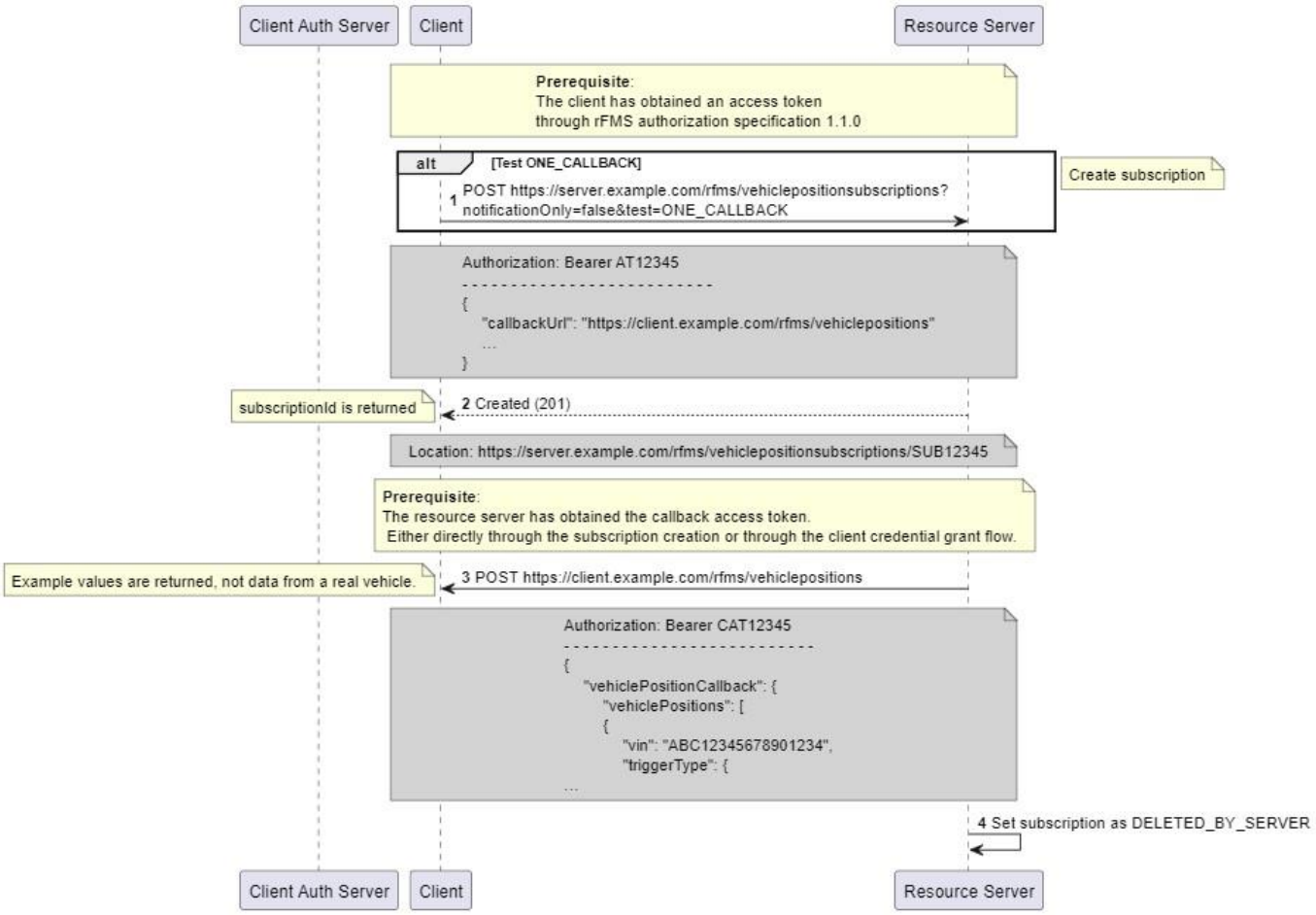


© 2025 ACEA (European Automobile Manufacturers Association)

11.2.3 TestPushPositions

In this scenario, the "test" parameter has been set: for this reason, after the creation of the subscription the rFMS server will invoke the callback push test data. After the invocation, the server will delete the subscription which will result marked as "DELETED_BY_SERVER".

Diagram: Test push positions



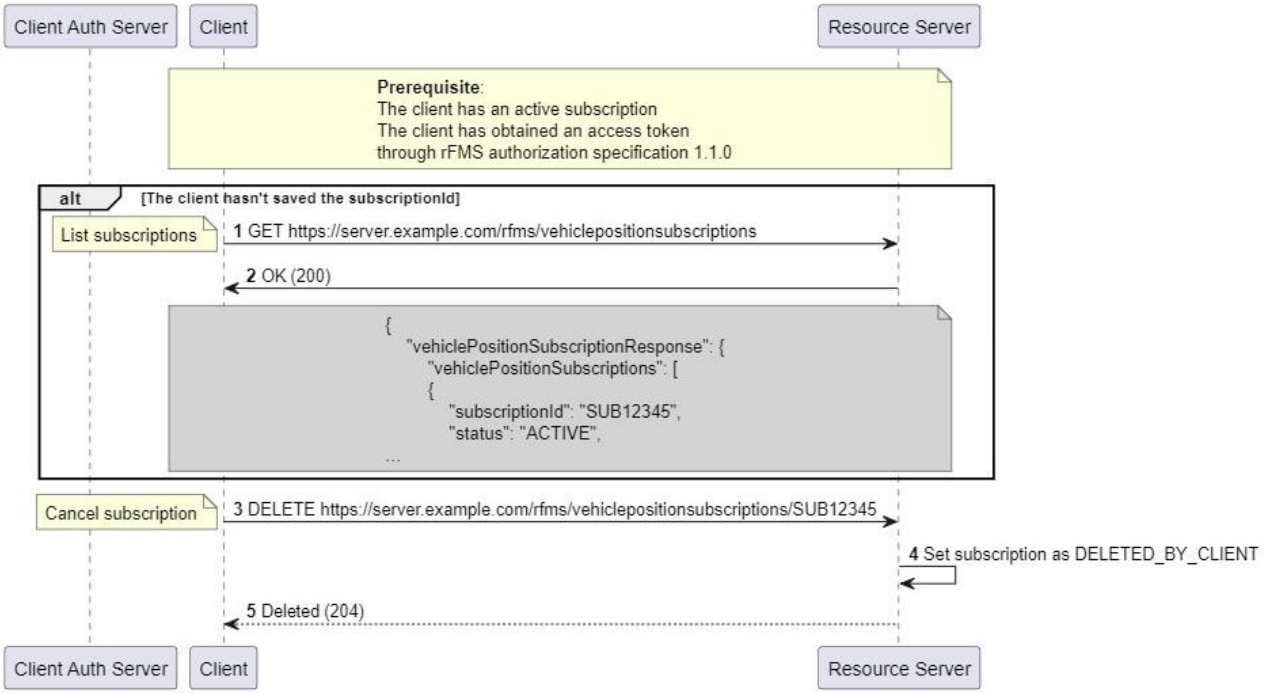
© 2025 ACEA (European Automobile Manufacturers Association)

11.2.4 Subscription deletion

11.2.4.1 Subscription deletion by rFMS client

The rFMS client asks explicitly to delete a specific subscription by using the subscriptionId.

Diagram: Client cancels subscription



11.2.4.2 Subscription deletion by rFMS server

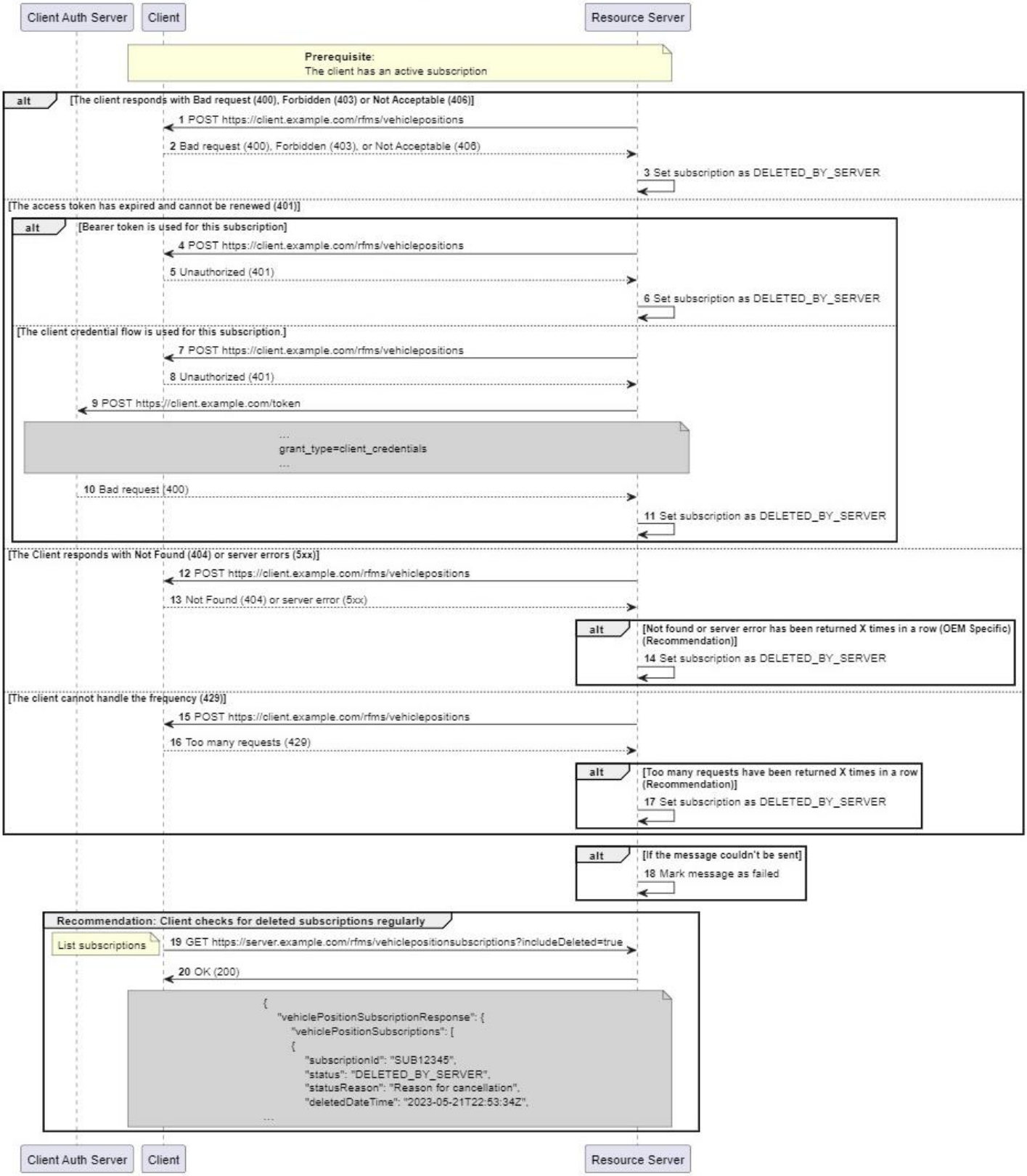
The rFMS server sets the subscription to "deleted" when an error is returned by the rFMS client:

- If a 400 Bad Request, 403 Forbidden, 406 Not Acceptable is returned, the rFMS server deletes the subscription immediately
- If a 404 Not Found, 429 Too Many Requests or any 5XX Error is returned, the rFMS server will retry x times before deleting the subscription

The rFMS client can ask anytime the rFMS server the status of the subscription by means of GET subscriptions API.

© 2025 ACEA (European Automobile Manufacturers Association)

Diagram: Server cancels subscription

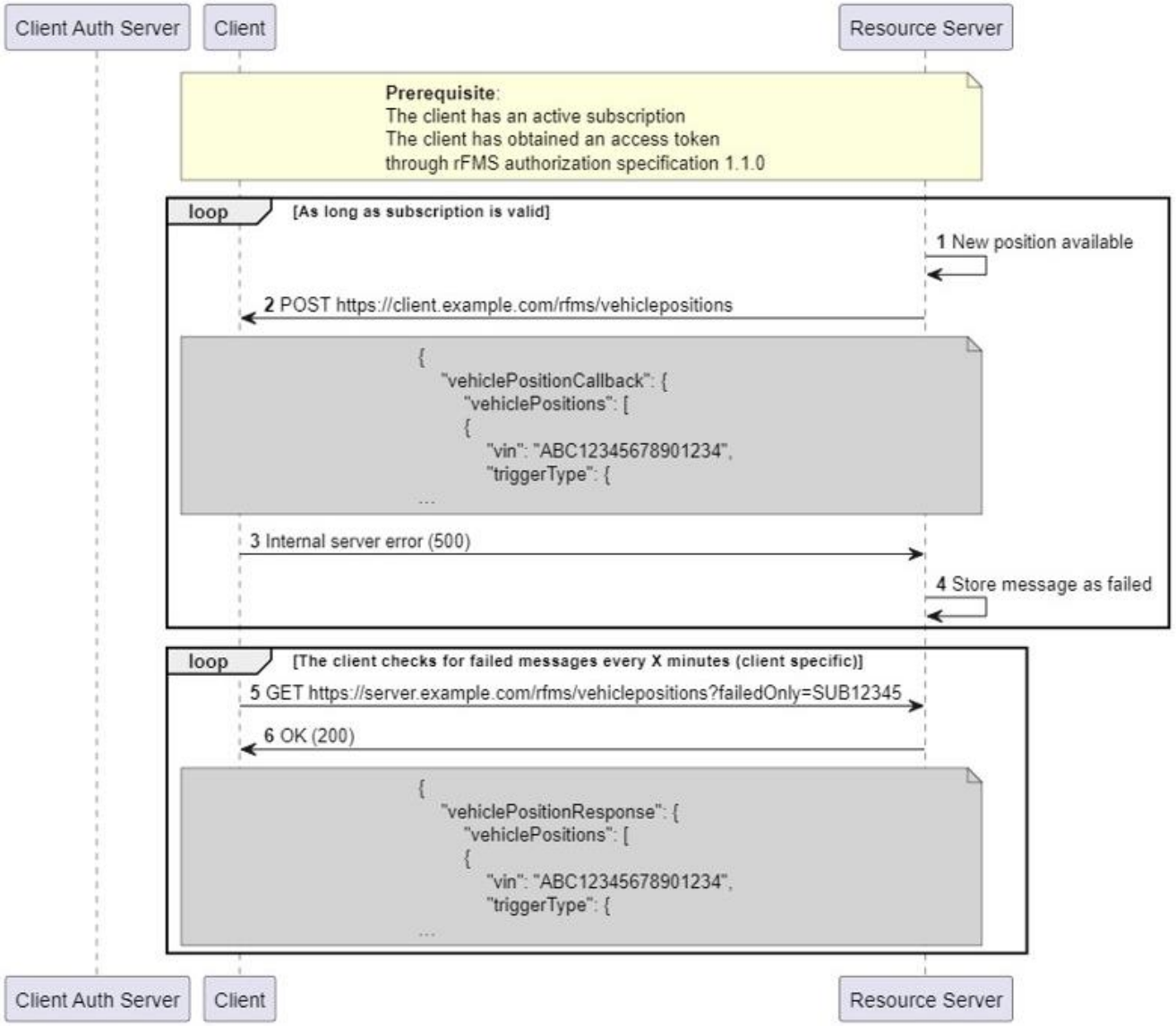


© 2025 ACEA (European Automobile Manufacturers Association)

11.2.5 Retrieve Failed Messages

After the rFMS server has received a 5XX error when push new data, the rFMS client has still the possibility to retrieve this data by using the "failedOnly" parameter with the vehicleposition and vehiclestatus APIs; the data returned are failed messages for the supplied subscriptionId as parameter value.

Diagram: Push positions with payload (Lost message)



© 2025 ACEA (European Automobile Manufacturers Association)