**Smart Edge Data upload API**

**Publication History**

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| --- | --- | --- | --- | --- |
| Version | Date | Description, updates and changes | Editor | Status |
| 1.0 | Dec. 02. 2024 | First draft | Han-Gyun Jung | Draft |
| 1.1 | Jan. 26. 2025 | 1. Change HTTP method  - HTTP 🡪 HTTPS  - POST 🡪 PUT  2. Change SED message upload pattern  - One-off 🡪 Periodicity  - For the FMS server to continuously monitor whether S-IVS is operating normally. | Han-Gyun Jung | Draft |

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1. **Scope**

This document defines the API for transmitting SED(Smart Edge Data) from S-IVS(Smart Edge In-Vehicle System) to FMS(Fleet Management System) server. It’s depend on the “Smart Edge Data upload protocol”

1. **References**
   1. **Normative references**

[1] Smart Edge Message Definition(Innoca)

* 1. **Informative references**

void.

1. **Definition of terms, symbols, abbreviations and notation**
   1. **Terms**

Refer to Smart Edge Message Definition(Innoca)

* 1. **Symbols**

void.

* 1. **Abbreviations**

|  |  |
| --- | --- |
| API | Application Programming Interface |
| DMS | Driver Monitoring System |
| FMS | Fleet Management System |
| HTTP | Hyper Text Transfer Protocol |
| JSON | JavaScript Object Notation |
| SED | Smart Edge Data |
| S-IVS | Smart Edge In-Vehicle System |

* 1. **Notation**

void.

1. **SED message upload protocol**

This chapter defines the protocol for uploading SED message from S-IVS to the FMS server.

S-IVS uploads SED messages at regular intervals. In situations where no event occurs, only basic information such as vehicle information is uploaded, and when an event(risky driving behaviors, road events or DMS events) is detected, the event information is also uploaded.

The minimum interval for message upload is 1 second. If two different events occur within tens to hundreds of milliseconds, they will be included together in a message uploaded every second.

S-IVS can upload the same message up to three times in consideration of data loss in the wireless transmission section. Messages that are repeatedly uploaded can be distinguished by the *msgid* value in the SED message payload.

* 1. **SED message upload API**

S-IVS can upload SED message to the FMS server using the following API.

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| --- | --- |
| FMS server URL | **To be defined by FPS** |
| FMS server port number | **To be defined by FPS** |
| HTTPS method | PUT |
| HTTPS request header | content-type: application/json |
| HTTPS request body | JSON string per 4.2 |

* 1. **SED message payload**

SED message payload encoded as a JSON string is delivered in the request body of the SED message Upload API.

The items, meaning, and format of each SED follow the definitions in the Smart Edge Message Definition document, and the JSON keys and format applied when each SED item is encoded in JSON format are as follows.

When uploading a message, the *msgid, timestamp* and *vehicle\_info* keys must always be included. The *risky\_drv, road\_event* and *dms\_event* keys are included depending on the event situation that occurs. If the keys *risky\_drv, road\_event* or *dms\_event* are included, at least one subkey must be included within each key.

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| --- | --- | --- | --- | --- | --- | --- |
| SED item  (per Smart Edge Message Definition) | | JSON key | | JSON value | | |
| Type | Length  (Bytes) | Description |
| Message unique ID | | msgid | | INTEGER | 4  (max) | A unique identifier that identifies each upload message.  It is generally created using a time value and increases each time a message is uploaded. |
| Time stamp | | timestamp | | STRING | 12  (fixed) | YYMMDDHHMMSS |
| Vehicle Information | Vehicle Identification Number | vehicle\_info | vin | STRING | 17  (fixed) | ASCII string |
| Vehicle Type | vehicle\_type | INTEGER | 1  (max) | 0: none  16(0x10): passenger vehicle  (Class M1)  32(0x20): buses and coaches  (Class M2)  48(0x30): buses and coaches  (Class M3)  64(0x40): light commercial vehicles  (Class N1)  80(0x50): heavy duty vehicles  (Class N2)  96(0x60): heavy duty vehicles  (Class N3) |
| Vehicle location : Position LAT | vehicle\_lat | INTEGER | 4  (max) | 0.1 micro-degree unit |
| Vehicle Location : Position LNG | vehicle\_lng | INTEGER | 4  (max) | 0.1 micro-degree unit |
| Risky Driving Behaviors | Excessive Speed | risky\_drv | ex\_speed | INTEGER | 1  (max) | 0: not detected  1: detect  If value is 0, it can be omitted. |
| Continuous Excessive Speed | cont\_ex\_speed | INTEGER | 1  (max) | 0: not detected  1: detect  If value is 0, it can be omitted. |
| Rapid Acceleration | rapid\_acc | INTEGER | 1  (max) | 0: not detected  1: detect  If value is 0, it can be omitted. |
| Rapid Start | rapid\_start | INTEGER | 1  (max) | 0: not detected  1: detect  If value is 0, it can be omitted. |
| Rapid Deceleration | rapid\_dec | INTEGER | 1  (max) | 0: not detected  1: detect  If value is 0, it can be omitted. |
| Rapid Braking | rapid\_braking | INTEGER | 1  (max) | 0: not detected  1: detect  If value is 0, it can be omitted. |
| Rapid Lane Change | rapid\_lane\_change | INTEGER | 1  (max) | 0: not detected  1: detect  If value is 0, it can be omitted. |
| Sharp Passing | sharp\_passing | INTEGER | 1  (max) | 0: not detected  1: detect  If value is 0, it can be omitted. |
| Sharp Left Turn | sharp\_left\_turn | INTEGER | 1  (max) | 0: not detected  1: detect  If value is 0, it can be omitted. |
| Sharp Right Turn | sharp\_right\_turn | INTEGER | 1  (max) | 0: not detected  1: detect  If value is 0, it can be omitted. |
| Sharp U-Turn | sharp\_u\_turn | INTEGER | 1  (max) | 0: not detected  1: detect  If value is 0, it can be omitted. |
| Road Condition Analysis | Road Condition | road\_event | road\_cond | INTEGER | 1  (max) | 0: not detected  1: detect  If value is 0, it can be omitted. |
| Driver Status Monitoring | Drowsy Driving | dms\_event | drowsy\_drv | INTEGER | 1  (max) | 0: not detected  1: detect  If value is 0, it can be omitted. |
| Driver Distraction | driver\_distraction | INTEGER | 1  (max) | 0: not detected  1: detect  If value is 0, it can be omitted. |

An example of a JSON string containing SED is as follows.

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| --- |
| {  "msgid": 342423434,  "timestamp": 241129102033,  "vehicle\_info": {  "vin": "1HGBH41JXMN109186",  "vehicle\_type": 16,  "vehicle\_lat": 515194040,  "vehilce\_lng": -1109205  },  "risky\_drv": {  "ex\_speed": 1,  "rapid\_start": 1,  "sharp\_right\_turn": 0,  "sharp\_u\_turn": 1  },  "road\_event": {  "road\_cond": 1  },  "dms\_event": {[  "drowsy\_drv": 1,  "driver\_distraction": 0  }  } |

An example of message upload using curl utility is as follows

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| curl --request PUT --header 'content-type: application/json' --url http://fms.fps.co.kr:66154/ --data '{  "msgid": 342423434,  "timestamp": 241129102033,  "vehicle\_info": {  "vin": "1HGBH41JXMN109186",  "vehicle\_type": 16,  "vehicle\_lat": 515194040,  "vehilce\_lng": -1109205  },  "risky\_drv": {  "ex\_speed": 1,  "rapid\_start": 1,  "sharp\_right\_turn": 0,  "sharp\_u\_turn": 1  },  "road\_event": {  "road\_cond": 1  },  "dms\_event": {  "drowsy\_drv": 1,  "driver\_distraction": 0  }  }' |