**3GPP TSG-CT WG3 Meeting #108-eC3-201124**

**E-Meeting, 24th – 28th February 2020**

**Source: Huawei**

**Title: Complete the VAE\_MessageDelivery API**

**Spec: 29.486**

**Agenda item: 16.25**

**Document for: Decision**

**1. Introduction**

<Introduction part (optional)>

**2. Reason for Change**

VAE\_MessageDelivery API is updated in 23.286. Uplink message delivery is supported.

**3. Conclusions**

<Conclusion part (optional)>

**4. Proposal**

It is proposed to agree the following changes to 3GPP TS 29.486 V0.3.0.

\* \* \* First Change \* \* \* \*

# 4 Overview

The Vs interface is between the V2X application specific server and the VAE Server. It specifies RESTful APIs that allow the V2X application specific server to access the services and capabilities provided by VAE Server.

The stage 2 level requirements and signalling flows for the Vs interface are defined in 3GPP TS 23.286 [4].

The Vs interface supports the following APIs:

* VAE\_MessageDelivery
* VAE\_File\_Distribution
* VAE\_V2X\_Application\_Requirement
* \* \* \* Next Change \* \* \* \*

## 5.1 Introduction

The table 5.1-1 shows the services provided by the VAE server and corresponding Service Operations:

Table 5.1-1 List of services provided by the VAE Server

|  |  |  |  |
| --- | --- | --- | --- |
| Service Name | Service Operations | OperationSemantics | Example Consumer(s) |
| VAE\_ MessageDelivery | Deliver\_DL\_Message | Request/Response | V2X application specific server |
| Deliver\_UL\_Message | Subscribe/Notify | VAE server |
| V2X\_MessageDelivery\_Subscribe | V2X application specific server |
| V2X\_MessageDelivery\_Unsubscribe | V2X application specific server |
| VAE\_File\_Distribution | Initiate\_File\_Distribution | Request/ Response | V2X application specific server |
| VAE\_V2X\_Application\_Requirement | V2X\_Application\_Requirement | Request/Response | V2X application specific server |
| NOTE: A subscription applies for one UE, group of UE(s) or any UE. |

\* \* \* Next Change \* \* \* \*

## 5.2 VAE\_MessageDelivery Service

### 5.2.1 Service Description

This service enables a NF service consumer to communicate with the VAE server to exchange V2X messages with the V2X UEs.

### 5.2.2 Service Operations

#### 5.2.2.1 Introduction

The VAE\_MessageDelivery service supports following service operations:

- V2X\_MessageDelivery\_Subscribe;

- V2X\_MessageDelivery\_Unsubscribe;

- Deliver\_DL\_Message; and

- Deliver\_UL\_Message.

#### 5.2.2.2 V2X\_MessageDelivery\_Subscribe

##### 5.2.2.2.1 General

The V2X\_MessageDelivery\_Subscribe service operation is used to create a subscription for V2X messages delivery between the V2X application specific server and VAE server.

##### 5.2.2.2.2 Message Delivery Subscribe



Figure 5.2.2.3.2-1: Message delivery subscribe

When the NF service consumer (e.g. V2X application specific server) needs to receive the message from the V2X UE, the NF service consumer shall send the POST method as step 1of the figure 5.2.2.2.2-1 to request to create an "Individual Message Delivery Subscription".

The NF service consumer shall include MessageDeliverySubscriptionData data structure in the payload body of the HTTP POST to request a creation of representation of the "Individual Message Delivery Subscription" resource. The "Individual Message Delivery Subscription" resource is created as described below.

The NF service consumer shall include (if available) in MessageDeliverySubscriptionData data structure:

- The V2X service ID within the "serviceId" attribute;

- The geographical area identifier within the "geoId" attribute;

- The notification URI within the "notifUri" attribute; and

- The supported features with the "suppFeat" attribute.

When the VAE Server receives the HTTP POST request from the NF service consumer, the VAE server shall make an authorization based on the information received from the NF service consumer. If the authorization is successful, the VAE Server shall create a new resource, which represents "Individual Message Delivery Subscription", addressed by a URI as defined in clause 6.1.3.3.2 and contains a VAE Server created resource identifier. The VAE Server shall respond to the NF service consumer with a 201 Created message, including Location header field containing the URI for the created resource.

The NF service consumer shall use the URI received in the Location header in subsequent requests to the VAE Server to refer to the "Individual Message Delivery Subscription".

#### 5.2.2.3 V2X\_MessageDelivery\_Unsubscribe

##### 5.2.2.3.1 General

The V2X\_MessageDelivery\_Unsubscribe service operation is used to remove the V2X messages delivery subscription.

##### 5.2.2.3.2 Message Delivery Unsubscribe



Figure 5.2.2.3.2-1: message delivery unsubscribe

When the NF service consumer (e.g. V2X application specific server) needs to remove an existing subscription for the uplink message delivery from the V2X UE, the NF service consumer shall send the DELETE method as step 1of the figure 5.2.2.4.2-1 to request to delete an "Individual Uplink Message Delivery Subscription".

Upon the reception of the HTTP DELETE request, the SMF shall:

- remove the corresponding subscription; and

- send an HTTP "204 No Content" response.

#### 5.2.2.4 Deliver\_DL\_Message

##### 5.2.2.4.1 General

The Deliver\_DL\_Message service operation is used to deliver the V2X messages to the V2X UEs.

##### 5.2.2.4.2 Deliver Downlink Message



Figure 5.2.2.4.2-1: V2X message delivery

When the NF service consumer (e.g. V2X application specific server) needs to send the message to the V2X UE, the NF service consumer shall send the POST method as step 1of the figure 5.2.2.2.2-1 to request to create an "Individual Message Delivery".

The NF service consumer shall include V2xMessageDeliveryData data structure in the payload body of the HTTP POST to request a creation of representation of the "Individual Message Delivery" resource. The "Individual Message Delivery" resource is created as described below.

The NF service consumer shall include (if available) in V2xMessageDeliveryData data structure:

- The V2X UE ID within the "ueId" attribute;

- The V2X Group ID within the "groupId" attribute;

- The duration within the "duration" attribute;

- The V2X service ID within the "serviceId" attribute;

- The geographical area identifier within the "geoId" attribute; and

- V2X message payload carried by the V2X message within the "payload" attribute.

When the VAE Server receives the HTTP POST request from the NF service consumer, the VAE server shall make an authorization based on the information received from the NF service consumer. If the authorization is successful, the VAE Server shall create a new resource, which represents "Individual Message Delivery", addressed by a URI as defined in subclause 6.1.3.3.2 and contains a VAE Server created resource identifier. The VAE Server shall respond to the NF service consumer with a 201 Created message, including Location header field containing the URI for the created resource.

The NF service consumer shall use the URI received in the Location header in subsequent requests to the VAE Server to refer to the "Individual Message Delivery".

Upon receipt of the HTTP DELETE message from the NF service consumer, the VAE Server shall check if the Individual Message Delivery resource identified by the URI already exists. If the resource exists, the VAE Server shall delete the resource and respond to the NF service consumer with a 204 No Content success message.

When the message delivery duration expires, the VAE server may remove the associated Individual Message Delivery resource locally.

####

\* \* \* Next Change \* \* \* \*

#### 5.2.2.5 Deliver\_UL\_Message

##### 5.2.2.5.1 General

The Deliver\_UL\_Message service operation is used to deliver the uplink message to the NF service consumer (e.g. V2X application specific server).

##### 5.2.2.5.2 Deliver Uplink Message



Figure 5.2.2.5.2-1: Deliver Uplink Message

If the VAE Server receives the uplink message for a V2X UE which an NF service consumer has subscribed to or a V2X UE belongs to a V2X group which the NF service consumer has subscribed to, the VAE Server shall send an HTTP POST request with "{notifUri}" as previously provided by the NF service consumer within the corresponding subscription as URI and UplinkMessageDeliveryData data structure as request body that shall include:

- resource URI of the individual Message Delivery Subscription related to the notification within the "resourceUri" attribute;

- The V2X UE ID within the "ueId" attribute if the subscription is applicable to a V2X group;

- The V2X service ID within the "serviceId" attribute;

- V2X message payload carried by the V2X message within the "payload" attribute; and

- The geographical area identifier within the "geoId" attribute if available.

Upon the reception of the HTTP POST message, the NF shall send an "204 No Content" HTTP response for a succesfull processing.\* \* \* Next Change \* \* \* \*

## 6.1 VAE\_MessageDelivery Service API

### 6.1.1 Introduction

The VAE\_MessageDelivery shall use the VAE\_MessageDelivery API.

The request URI used in HTTP request from the NF service consumer towards the VAE Server shall have the structure defined in subclause 4.4.1 of 3GPP TS 29.501 [3], i.e.:

All resource URIs of this API shall have the following root:

**{apiRoot}/<apiName>/{apiVersion}/<apiSpecificResourceUriPart>**

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [3].

- The <apiName>shall be "vae-v2x-message-delivery".

- The {apiVersion} shall be "v1".

- The <apiSpecificResourceUriPart> shall be set as described in subclause 6.1.3.

### 6.1.2 Usage of HTTP

#### 6.1.2.1 General

Support of HTTP/1.1 (IETF RFC 7230 [12], IETF RFC 7231 [13], IETF RFC 7232 [14], IETF RFC 7233 [15], IETF RFC 7234 [16] and IETF RFC 7235 [17]) over TLS (IETF RFC 5246 [18]) is mandatory and support of HTTP/2 as specified in clause 5 of 3GPP TS 29.500 [2] is recommended. A V2X application specific server desiring to use HTTP/2 shall use the HTTP upgrade mechanism to negotiate applicable HTTP version as described in IETF RFC 7540 [5].

HTTP/2, shall be transported as specified in subclause 5.3 of 3GPP TS 29.500 [2].

An OpenAPI [6] specification of HTTP messages and content bodies for the VAE\_MessageDelivery is contained in Annex A.

#### 6.1.2.2 HTTP standard headers

##### 6.1.2.2.1 General

See subclause 5.2.2 of 3GPP TS 29.500 [2] for the usage of HTTP standard headers.

##### 6.1.2.2.2 Content type

JSON, IETF RFC 8259 [7], shall be used as content type of the HTTP bodies specified in the present specification as specified in subclause 5.4 of 3GPP TS 29.500 [2]. The use of the JSON format shall be signalled by the content type "application/json".

#### 6.1.2.3 HTTP custom headers

##### 6.1.2.3.1 General

The mandatory HTTP custom header fields specified in clause 5.2.3.2 of 3GPP TS 29.500 [2] shall be applicable.

### 6.1.3 Resources

#### 6.1.3.1 Overview



Figure 6.1.3.1-1: Resource URI structure of the VAE\_MessageDelivery API

Table 6.1.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.1.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method or custom operation | Description |
| Message Delivery Subscriptions | {apiRoot}/vae-message-delivery/{apiVersion}/{appSerId}/Subscriptions | POST | Create a new Individual Message Delivery Subscription resource. |
| Individual Message Delivery Subscription | {apiRoot}/vae-message-delivery/{apiVersion}//{appSerId}/subscriptions/{subscriptionId} | GET | Read an Individual Message Delivery Subscription resource. |
| DELETE | Delete an Individual Message Delivery Subscription resource. |
| Downlink Message Deliveries | {apiRoot}/vae-message-delivery/{apiVersion}/{appSerId}/subscriptions/{subscriptionId}/message-deliveries | POST | Create a new Individual Downlink Message Delivery resource for a V2X UE ID or V2X group ID. |
| Individual Downlink Message Delivery | {apiRoot}/vae-message-delivery/{apiVersion}/{appSerId}/subscriptions/{subscriptionId}/message-deliveries/{dlDeliveryId} | GET | Read the Individual Downlink Message Delivery resource. |
| DELETE | Delete the Individual Downlink Message Delivery resource. |

#### 6.1.3.2 Resource: Message Delivery Subscriptions

##### 6.1.3.2.1 Description

This resource represents the collection of the Individual Message Delivery Subscription resources created in the VAE Server.

##### 6.1.3.2.2 Resource Definition

Resource URI: **{apiRoot}/vae-message-delivery/{apiVersion}/{appSerId}}/subscriptions**

This resource shall support the resource URI variables defined in table 6.1.3.2.2-1.

Table 6.1.3.2.2-1: Resource URI variables for this resource

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See clause 6.1.1 |
| apiVersion | See clause 6.1.1 |
| appSerId | Identity of the V2X application specific server of type AppServerId. |

##### 6.1.3.2.3 Resource Standard Methods

###### 6.1.3.2.3.1 POST

This method shall support the URI query parameters specified in table 6.1.3.2.3.1-1.

Table 6.1.3.2.3.1-1: URI query parameters supported by the POST method on this resource

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description | Applicability |
| n/a |  |  |  |  |  |

This method shall support the request data structures specified in table 6.1.3.2.3.1-2 and the response data structures and response codes specified in table 6.1.3.2.3.1-3.

Table 6.1.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| MessageDeliverySubscriptionData | M | 1 | Parameters to create an Individual Message Delivery Subscription resources. |

Table 6.1.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Responsecodes | Description |
| MessageDeliverySubscriptionData | O | 0..1 | 201 Created | An Individual Message Delivery Subscription resource for the V2X UE ID or V2X group ID is created successfully. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [2] shall also apply. |

##### 6.1.3.2.4 Resource Custom Operations

None.

#### 6.1.3.3 Resource: Individual Message Delivery Subscription

##### 6.1.3.3.1 Description

The Individual Message Subscription resource represents an Individual Message Delivery Subscription created in the VAE Server and associated with the V2X UE ID or V2X group ID.

##### 6.1.3.3.2 Resource definition

Resource URI: **{apiRoot}/vae-message-delivery/{apiVersion}/{appSerId}}/subscriptions/{subscriptionId}**

This resource shall support the resource URI variables defined in table 6.1.3.3.2-1.

Table 6.1.3.3.2-1: Resource URI variables for this resource

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See clause 6.1.1 |
| apiVersion | See clause 6.1.1 |
| appSerId | Identity of the V2X application specific server of type AppServerId. |
| subscriptionId | Unique identifier of the individual Uplink Message Delivery Subscription resource for the V2X UE IDor V2X group ID. |

##### 6.1.3.3.3 Resource Standard Methods

###### 6.1.3.3.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.3.3.1-1.

Table 6.1.3.3.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| n/a |  |  |  |  |

This method shall support the request data structures specified in table 6.1.3.3.3.1-2 and the response data structures and response codes specified in table 6.1.3.3.3.1-3.

Table 6.1.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| n/a |  |  |  |

Table 6.1.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| MessageDeliverySubscriptionData | M | 1 | 200 OK | An individual Message Delivery Subscription resource for the V2X UE ID or V2X group ID is returned successfully. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [2] shall also apply. |

###### 6.1.3.3.3.2 DELETE

This method shall support the URI query parameters specified in table 6.1.3.3.3.2-1.

Table 6.1.3.3.3.2-1: URI query parameters supported by the DELETE method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| n/a |  |  |  |  |

This method shall support the request data structures specified in table 6.1.3.3.3.2-2 and the response data structures and response codes specified in table 6.1.3.3.3.2-3.

Table 6.1.3.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| n/a |  |  |  |

Table 6.1.3.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Responsecodes | Description |
| n/a |  |  | 204 No Content |  |

##### 6.1.3.3.4 Resource Custom Operations

None.

#### 6.1.3.4 Resource: Downlink Message Deliveries

##### 6.1.3.4.1 Description

This resource represents the collection of the individual Downlink Message Delivery resources created in the VAE Server.

##### 6.1.3.4.2 Resource Definition

Resource URI: **{apiRoot}/vae-message-delivery/{apiVersion}/{appSerId}}/subscriptions/{subscriptionId}/message-deliveries**

This resource shall support the resource URI variables defined in table 6.1.3.4.2-1.

Table 6.1.3.4.2-1: Resource URI variables for this resource

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See clause 6.1.1 |
| apiVersion | See clause 6.1.1 |
| appSerId | Identity of the V2X application specific server of type AppServerId. |
| subscriptionId | Unique identifier of the individual Uplink Message Delivery Subscription resource for the V2X UE IDor V2X group ID. |

##### 6.1.3.4.3 Resource Standard Methods

###### 6.1.3.4.3.1 POST

This method shall support the URI query parameters specified in table 6.1.3.4.3.1-1.

Table 6.1.3.4.3.1-1: URI query parameters supported by the POST method on this resource

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description | Applicability |
| n/a |  |  |  |  |  |

This method shall support the request data structures specified in table 6.1.3.4.3.1-2 and the response data structures and response codes specified in table 6.1.3.4.3.1-3.

Table 6.1.3.4.3.1-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| DownlinkMessageDeliveryData | M | 1 | Parameters to create an individual Message Delivery resources. |

Table 6.1.3.4.3.1-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Responsecodes | Description |
| DownlinkMessageDeliveryData | O | 0..1 | 201 Created | An individual Downlink Message Delivery resource for the V2X UE ID or V2X group ID is created successfully. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [2] shall also apply. |

##### 6.1.3.4.4 Resource Custom Operations

None.

#### 6.1.3.5 Resource: Individual Downlink Message Delivery

##### 6.1.3.5.1 Description

The Individual Downlink Message Delivery resource represents an Individual Downlink Message Delivery created in the VAE Server and associated with the V2X UE ID or V2X group ID.

##### 6.1.3.5.2 Resource definition

Resource URI: **{apiRoot}/vae-message-delivery/{apiVersion}/{appSerId}}/subscriptions/{subscriptionId}/message-deliveries/{dlDeliveryId}**

This resource shall support the resource URI variables defined in table 6.1.3.3.2-1.

Table 6.1.3.5.2-1: Resource URI variables for this resource

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See clause 6.1.1 |
| apiVersion | See clause 6.1.1 |
| appSerId | Identity of the V2X application specific server of type AppServerId. |
| subscriptionId | Unique identifier of the individual Uplink Message Delivery Subscription resource for the V2X UE IDor V2X group ID. |
| dlDeliveryId | Unique identifier of the individual Message Delivery resource for the V2X UE ID or V2X group ID. |

##### 6.1.3.5.3 Resource Standard Methods

###### 6.1.3.5.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.5.3.1-1.

Table 6.1.3.5.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| n/a |  |  |  |  |

This method shall support the request data structures specified in table 6.1.3.5.3.1-2 and the response data structures and response codes specified in table 6.1.3.5.3.1-3.

Table 6.1.3.5.3.1-2: Data structures supported by the GET Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| n/a |  |  |  |

Table 6.1.3.5.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| DownlinkMessageDeliveryData | M | 1 | 200 OK | An individual Downlink Message Delivery resource for the V2X UE ID or V2X group ID is returned successfully. |
| NOTE: The mandatory HTTP error status codes for the GET method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [2] shall also apply. |

###### 6.1.3.5.3.2 DELETE

This method shall support the URI query parameters specified in table 6.1.3.5.3.2-1.

Table 6.1.3.5.3.2-1: URI query parameters supported by the DELETE method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| n/a |  |  |  |  |

This method shall support the request data structures specified in table 6.1.3.5.3.2-2 and the response data structures and response codes specified in table 6.1.3.5.3.2-3.

Table 6.1.3.5.3.2-2: Data structures supported by the DELETE Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| n/a |  |  |  |

Table 6.1.3.5.3.2-3: Data structures supported by the DELETE Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Responsecodes | Description |
| n/a |  |  | 200 OK |  |
| ProblemDetails | M | 1 | 404 Not Found | Indicates the deletion of subscription has failed due to application error.  |

##### 6.1.3.3.4 Resource Custom Operations

None.

### 6.1.4 Custom Operations without associated resources

There are no custom operations without associated resources supported on VAE\_MessageDelivery.

### 6.1.5 Notifications

#### 6.1.5.1 General

The VAE server and NF service consumer shall support the delivery of Notifications using a separate HTTP connection towards an address as assigned the NF service consumer described in clause 6.3.5.2.

A VAE server and NF service consumer may support testing a notification connection as described in clause 6.1.5.3. A VAE server and NF service consumer may support the delivery of Notification using Websocket (IETF RFC 6455 [21]) as described in clause 6.1.5.4.

#### 6.1.5.2 Notification Delivery using a separate HTTP connection

The descriptions in clause 5.2.5.2 of 3GPP TS 29.122 [22] apply with following differences:

- description of SCS/AS applies to the NF service consumer;

- description of SCEF applies to the VAE server; and

- "notificationDestination" attribute is replaced by the "notifUri" attribute.

#### 6.1.5.3 Notification Test Event

The descriptions in clause 5.2.5.3 of 3GPP TS 29.122 [22] apply with following differences:

- description of SCS/AS applies to the NF service consumer; and

- description of SCEF applies to the VAE server.

#### 6.3.5.4 Notification Delivery using Websocket

The descriptions in clause 5.2.5.3 of 3GPP TS 29.122 [22] apply with following differences:

- description of SCS/AS applies to the NF service consumer; and

- description of SCEF applies to the VAE server.

#### 6.1.5.5 Methods

Table 6.1.5.5-1: Notifications

|  |  |  |
| --- | --- | --- |
| Custom operation URI | Mapped HTTP method | Description |
| {notifUri} | POST | Uplink Message Delivery. |

#### 6.1.5.6 Uplink Message Delivery

##### 6.1.5.6.1 Description

This notification is used by the VAE Server to deliver the uplink message to the update the policy.

##### 6.1.5.6.2 Operation Definition

This operation shall support the request data structures specified in table 6.1.5.6.2-1 and the response data structure and response codes specified in table 6.1.5.6.2-2.

Table 6.1.5.6.2-1: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| UplinkMessageDeliveryData | M | 1 | Contains the uplink message delivery data |

Table 6.1.5.6.2-2: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| n/a |  |  | 204 No Content | The uplink message is delivery successfully. |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] shall also apply. |

### 6.1.6 Data Model

#### 6.1.6.1 General

This clause specifies the application data model supported by the API.

Table 6.1.6.1-1 specifies the data types defined for the VAE\_MessageDelivery API.

Table 6.1.6.1-1: VAE\_MessageDelivery specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| DownlinkMessageDeliveryData | 6.1.6.2.2 | Contains the downlink V2X message delivery data |  |
|  |  |  |  |
| GeoId | 6.1.6.3.2 | Geographical area identifier |  |
| UplinkMessageDeliveryData | 6.1.6.2.x | Contains the uplink V2X message delivery data |  |
| UplinkMessageDeliverySubscriptionData | 6.1.6.2.3 | Contains the uplink V2X message delivery subscription data |  |
| V2xGroupId | 6.1.6.3.2 | The group ID for which the V2X message is addressed |  |
|  |  |  |  |
| V2xServiceID | 6.1.6.3.2 | The V2X service ID to which the V2X message belongs to |  |
| V2xUeId | 6.1.6.3.2 | Identifier of the destination V2X UE |  |
| V2xMessagePayload | 6.1.6.3.2 | V2X message payload carried by the V2X message |  |

Table 6.1.6.1-2 specifies data types re-used by the VAE\_V2X\_Message\_Delivery service based interface protocol from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the VAE\_V2X\_Message\_Delivery service based interface.

Table 6.1.6.1-2: VAE\_V2X\_Message\_Delivery re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| Bytes | 3GPP TS 29.571 [11] | String with format "byte" as defined in OpenAPI Specification [6], i.e, base64-encoded characters |  |
| DateTime | 3GPP TS 29.571 [11] | String with format "date-time" as defined in OpenAPI Specification [6]. |  |
| SupportedFeatures | 3GPP TS 29.571 [11] |  |  |
| TestNotification | 3GPP TS 29.122 [22] | Represents a notification that can be sent to test whether a chosen notification mechanism works. | Notification\_test\_event |
| Uri | 3GPP TS 29.571 [11] |  |  |
| WebsockNotifConfig | 3GPP TS 29.122 [22] | Pepresents configuration for the delivery of notifications over Websockets. | Notification\_websocket |

#### 6.1.6.2 Structured data types

##### 6.1.6.2.1 Introduction

This clause defines the structures to be used in resource representations.

##### 6.1.6.2.2 Type: DownlinkMessageDeliveryData

Table 6.1.6.2.2-1: Definition of type DownlinkMessageDeliveryData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| ueId | V2xUeId | O | 0..1 | Indicates an identifier of the V2X UE. |  |
| groupId | V2xGroupId | O | 0..1 | Indicates a group ID for which the V2X message is addressed. |  |
|  |  |  |  |  |  |
| geoId | GeoId | O | 0..1 | Indicates a geographical area identifier. |  |
| payload | V2xMessagePayload | M | 1 | Contains the V2X message payload carried by the V2X message |  |
| duration | DateTime | O | 0..1 | Identifies the absolute time at which the related Individual Message Delivery resource is considered to expire. When omitted in the request, it indicates the resource is requested to be valid forever by the NF service consumer. When omitted in the response, it indicates the resource is set to valid forever by the VAE server |  |
|  |  |  |  |  |  |
| NOTE: Either "ueId" attribute or "groupId" attribute shall be included. |

##### 6.1.6.2.3 Type: MessageDeliverySubscriptionData

Table 6.1.6.2.3-1: Definition of type MessageDeliverySubscriptionData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| serviceId | V2xServiceId | M | 1 | Indicates a V2X service ID to which the V2X message belongs to. |  |
| geoId | GeoId | O | 0..1 | Indicates a geographical area identifier. |  |
| notifUri | Uri | M | 1 | Contains the notification URI。 |  |
| requestTestNotification | boolean | O | 0..1 | Set to true by the NF service consumer to request the VAE server to send a test notification as defined in clause 6.1.5.3. Set to false or omitted otherwise. | Notification\_test\_event |
| websockNotifConfig | WebsockNotifConfig | O | 0..1 | Configuration parameters to set up notification delivery over Websocket protocol as defined in clause 6.1.5.4. | Notification\_websocket |
| suppFeat | SupportedFeatures | C | 0..1 | Indicates the features supported by the service consumer and VAE server. It shall be included in the request and response of the creation of individual Message Delivery Subscription resource.  |  |

##### 6.1.6.2.x Type: UplinkMessageDeliveryData

Table 6.1.6.2.x-1: Definition of type UplinkMessageDeliveryData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| resourceUri | Uri | M | 1 | The resource URI of the individual Uplink Message Delivery Subscription related to the notification. |  |
| ueId | V2xUeId | M | 0..1 | Indicates an identifier of the V2X UE. |  |
| serviceId | V2xServiceId | M | 1 | Indicates a V2X service ID to which the V2X message belongs to. |  |
| geoId | GeoId | O | 0..1 | Indicates a geographical area identifier. |  |
| payload | V2xMessagePayload | M | 1 | Contains the V2X message payload carried by the V2X message |  |

#### 6.1.6.3 Simple data types and enumerations

##### 6.1.6.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

##### 6.1.6.3.2 Simple data types

The simple data types defined in table 6.1.6.3.2-1 shall be supported.

Table 6.1.6.3.2-1: Simple data types

|  |  |  |  |
| --- | --- | --- | --- |
| Type Name | Type Definition | Description | Applicability |
| AppServerId | string | Identity of the V2X application specific server |  |
| GeoId | string | Defines a geographical area identifier. |  |
| V2xGroupId | string | Defines a group ID for which the V2X message is addressed. |  |
| V2xServiceId | string | Defines a V2X service ID to which the V2X message belongs to |  |
| V2xUeId | string | Identifier of the V2X UE |  |
| V2xMessagePayload | Bytes | V2X message payload carried by the V2X message. |  |

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  |  |  |  |

### 6.1.7 Error Handling

#### 6.1.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.4 of 3GPP TS 29.500 [2].

#### 6.1.7.2 Protocol Errors

In this Release of the specification, there are no additional protocol errors applicable for the VAE\_MessageDelivery API.

#### 6.1.7.3 Application Errors

The application errors defined for the VAE\_MessageDelivery service are listed in Table 6.1.7.3-1.

Table 6.1.7.3-1: Application errors

|  |  |  |
| --- | --- | --- |
| Application Error | HTTP status code | Description |
|  |  |  |

### 6.1.8 Feature negotiation

The optional features in table 6.1.8-1 are defined for the VAE\_MessageDelivery API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [2].

Table 6.1.8-1: Supported Features

|  |  |  |
| --- | --- | --- |
| Feature number | Feature Name | Description |
| 1 | Notification\_test\_event | The testing of notification connection is supported according to clause 6.1.5.3. |
| 2 | Notification\_websocket | The delivery of notifications over Websocket is supported according to clause 6.1.5.4. This feature requires that the Notification\_test\_event feature is also supported. |

* \* \* \* Next Change \* \* \* \*

## A.2 VAEMessageDelivery API

openapi: 3.0.0

info:

 version: 1.0.0.alpha-4

 title: VAE\_MessageDelivery

 description: VAE Message Delivery Service

security:

 - {}

 - oAuth2ClientCredentials: []

externalDocs:

 description: 3GPP TS 29.486 V0.3.0 V2X Application Enabler (VAE) Services

 url: 'http://www.3gpp.org/ftp/Specs/archive/29\_series/29.486/'

servers:

 - url: '{apiRoot}/vae-message-delivery/v1'

 variables:

 apiRoot:

 default: https://example.com

 description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501

paths:

 /{appSerId}/subscriptions:

 post:

 summary: Create a new Individual Message Delivery Data Subscription resource

 operationId: CreateIndividualMessageDeliveryDataSubscription

 tags:

 - Message Delivery Data Subscriptions (Collection)

 requestBody:

 required: true

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/MessageDeliverySubscription'

 responses:

 '201':

 description: The subscription was created successfully.

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/MessageDeliverySubscription'

 headers:

 Location:

 description: 'Contains the URI of the newly created resource'

 required: true

 schema:

 type: string

 '400':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '411':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/411'

 '413':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/413'

 '415':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/415'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '503':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29571\_CommonData.yaml#/components/responses/default'

 callbacks:

 uplinkMessageDelivery:

 '{$request.body#/notifUri}':

 post:

 requestBody:

 required: true

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/UplinkMessageDeliveryData'

 responses:

 '204':

 description: No Content, Notification was successful

 '400':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/404'

 '411':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/411'

 '413':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/413'

 '415':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/415'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '503':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29571\_CommonData.yaml#/components/responses/default'

 /{appSerId}/subscriptions/{subscriptionId}:

 get:

 summary: Get an existing individual Message Delivery Subscription resource

 operationId: ReadIndividualMessageDeliverySubscription

 tags:

 - Individual Message Delivery Subscription (Document)

 parameters:

 - name: subscriptionId

 in: path

 description: String identifying a subscription to the Individual Message Delivery Subscription

 required: true

 schema:

 type: string

 responses:

 '200':

 description: The subscription information is returned.

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/MessageDeliverySubscriptionData'

 '400':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '406':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/406'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '503':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29571\_CommonData.yaml#/components/responses/default'

 delete:

 summary: Delete an individual Message Delivery Subscription resource

 operationId: DeleteMessageDeliverySubscription

 tags:

 - Individual Message Delivery Subscription (Document)

 parameters:

 - name: subscriptionId

 in: path

 description: String identifying a subscription to the Individual Message Delivery Subscription

 required: true

 schema:

 type: string

 responses:

 '204':

 description: The subscription was terminated successfully.

 '400':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '503':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29571\_CommonData.yaml#/components/responses/default'

 /{appSerId}/subscriptions/{subscriptionId}/message-deliveries:

 post:

 summary: VAE Message delivery resource create service Operation

 tags:

 - message deliveries collection (Collection)

 operationId: CreateDownlinkMessageDelivery

 requestBody:

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/DownlinkMessageDeliveryData'

 required: true

 responses:

 '201':

 description: Downlink Message Delivery Resource Created

 headers:

 Location:

 description: 'Contains the URI of the newly created resource, according to the structure: {apiRoot}/vae-message-delivery/v1/message-deliveries/{downlinkDeliveryId}'

 required: true

 schema:

 type: string

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/DownlinkMessageDeliveryData'

 '400':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/403'

 '404':

 description: Not Found

 '411':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/411'

 '413':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/413'

 '415':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/415'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '503':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/503'

 default:

 description: Unexpected error

 /{appSerId}/subscriptions/{subscriptionId}/message-deliveries/{dlDeliveryId}:

 get:

 summary: VAE Message delivery resource Read service Operation

 tags:

 - Individual downlink message delivery (Document)

 operationId: ReadIndividualDownlinkMessageDelivery

 parameters:

 - name: downlinkDeliveryId

 in: path

 description: Identifier of a downlink messge delivery resource

 required: true

 schema:

 type: string

 responses:

 '200':

 description: OK. Resource representation is returned

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/DownlinkMessageDeliveryData'

 '400':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '406':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/406'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '503':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/503'

 default:

 $ref: 'TS29571\_CommonData.yaml#/components/responses/default'

 delete:

 summary: VAE Message delivery resource delete service Operation

 tags:

 - Individual downlink message delivery (Document)

 operationId: DeleteDownlinkMessageDelivery

 parameters:

 - name: dlDeliveryId

 in: path

 required: true

 description: Unique ID of the message delivery to be deleted

 schema:

 type: string

 responses:

 '204':

 description: No Content (Successful deletion of the existing subscription)

 '400':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/400'

 '401':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/401'

 '403':

 $ref: 'TS29122\_CommonData.yaml#/components/responses/403'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '429':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/429'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '503':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/503'

 default:

 description: Unexpected error

components:

 securitySchemes:

 oAuth2ClientCredentials:

 type: oauth2

 flows:

 clientCredentials:

 tokenUrl: '{nrfApiRoot}/oauth2/token'

 scopes:

 vae-message-delivery: Access to the VAE\_MessageDelivery API

 schemas:

 DownlinkMessageDeliveryData:

 type: object

 properties:

 ueId:

 $ref: '#/components/schemas/V2xUeId'

 groupId:

 $ref: '#/components/schemas/V2xGroupId'

 duration:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'

 geoId:

 $ref: '#/components/schemas/GeoId'

 payload:

 $ref: '#/components/schemas/V2xMessagePayload'

 required:

 - payload

 MessageDeliverySubscriptionData:

 type: object

 properties:

 serviceId:

 $ref: '#/components/schemas/V2xServiceId'

 geoId:

 $ref: '#/components/schemas/GeoId'

 notifUri:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'

 requestTestNotification:

 type: boolean

 description: Set to true by the NF service consumer to request the VAE server to send a test notification as defined in clause 6.1.5.3. Set to false or omitted otherwise.

 websockNotifConfig:

 $ref: 'TS29122\_CommonData.yaml#/components/schemas/WebsockNotifConfig'

 suppFeat:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

 required:

 - serviceId

 - notifUri

 UplinkMessageDeliveryData:

 type: object

 properties:

 resourceUri:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'

 ueId:

 $ref: '#/components/schemas/V2xUeId'

 serviceId:

 $ref: '#/components/schemas/V2xServiceId'

 geoId:

 $ref: '#/components/schemas/GeoId'

 payload:

 $ref: '#/components/schemas/V2xMessagePayload'

 required:

 - resourceUri

 - serviceId

 - payload

 AppServerId:

 type: string

 V2xUeId:

 type: string

 V2xGroupId:

 type: string

 V2xServiceId:

 type: string

 GeoId:

 type: string

 V2xMessagePayload:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Bytes'

\* \* \* End of Changes \* \* \* \*