**3GPP TSG-CT WG3 Meeting #108-eC3-201125**

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

**Source: Huawei**

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

**Spec: 29.486**

**Agenda item: 16.25**

**Document for: Decision**

**1. Introduction**

<Introduction part (optional)>

**2. Reason for Change**

VAE\_FileDistribution API is updated in 23.286. QoE reporting procedure is not defined in 23.286. So it is proposed that the QoE Reporting is not supported in this release.

**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\_V2X\_Message\_Delivery
* VAE\_FileDistribution
* 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 | Operation  Semantics | Example Consumer(s) |
| VAE\_V2X\_Message\_Delivery | V2X\_Message\_Delivery | Request/Response | V2X application specific server |
| VAE\_FileDistribution | Distribute\_File | 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 \* \* \* \*

## 5.3 VAE\_FileDistribution Service

### 5.3.1 Service Description

This API enables the V2X application specific server to communicate with the VAE server to initiate file distribution to the V2X UEs.

### 5.3.2 Service Operations

#### 5.3.2.1 Introduction

The VAE\_FileDistribution service supports following service operations:

- Distribute\_File

#### 5.3.2.2 Distribute File

##### 5.3.2.2.1 General

The Distribute\_File service operation is used to distributes files to the V2X UEs.

##### 5.3.2.2.2 Distribute File



Figure 5.3.2.2.2-1: Distribute File

When the NF service consumer (e.g. V2X application specific server) needs to distribute the file to the V2X UEs, the NF service consumer shall send the POST method as step 1 of the figure 6.2.2.2-1 to request to create an "Individual File Distribution".

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

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

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

- The serving class within the "serviceClass" attribute;

- The geographical area within the "geoArea" attribute;

- The duration within the "duration" attribute;

- maximum bitrate for the V2X application within the "maxBitrate" attribute; and

- maximum delay for the V2X application within the "maxDelay" attribute.

When the VAE Server receives the HTTP POST request from the NF service consumer, the VAE servier 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 File Distribution", addressed by a URI as defined in clause 6.2.3.3.2 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 VAE Server shall use the URI received in the Location header in subsequent requests to the VAE Server to refer to the "Individual File Distribution".

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.

The VAE server makes use of the xMB procedures as defined 3GPP TS 29.116 [y] to create MBMS sessions whose type is set to "files" and to request the delivery of files over these sessions. Before provisioning files to the BM‑SC, the VAE server prepares the file for distribution, which may include partition of large files into smaller files or encryption.

The VAE server is responsible for translating the parameters related to the V2X application triggering the file delivery into corresponding xMB parameters. Table 5.3.2.2.2-1 describes the mapping between the VAE\_FileDistribution API attribute and the xMB API properties specified in 3GPP TS 29.116 [19].

Table 5.3.2.2.2-1: Mapping between VAE\_FileDistribution API and xMB API

|  |  |
| --- | --- |
| V2X parameter | Corresponding xMB API property |
| serviceClass | service-class |
| fileLists | file-list |
| geoArea | geographical-area |
| maxBitrate | max-bitrate |
| maxDelay | max-delay |

NOTE: The list of V2X parameters needed for file delivery is not exhaustive and can be updated based on the specific V2X application requirements.

\* \* \* 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\_V2X\_Message\_Delivery 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 subclause 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 |
| Downlink Message Deliveries | {apiRoot}/ vae-message-delivery/ v1/message-deliveries | POST | Create a new Individual Message Delivery resource for **a** V2X UE ID **or** V2X group ID. |
| Individual Downlink Message Delivery | {apiRoot}/ vae-message-delivery/ v1/message-deliveries/{downlinkDeliveryId} | GET | Read the Individual Message Delivery resource. |
| DELETE | Delete the Individual Message Delivery resource. |
| Uplink Message Delivery Subscriptions | {apiRoot}/ vae-message-delivery/ v1/message-deliveries/subscriptions | POST | Create a new Individual Uplink Message Delivery Subscription resource. |
| Individual Uplink Message Delivery Subscription | {apiRoot}/ vae-message-delivery/ v1/message-deliveries/subscriptions/{subscriptionId} | GET | Read an Individual Uplink Message Delivery Subscription resource. |
| DELETE | Delete an Individual Uplink Message Delivery Subscription resource. |

#### 6.1.3.2 Resource: Downlink Message Deliveries

##### 6.1.3.2.1 Description

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

##### 6.1.3.2.2 Resource Definition

Resource URI: **{apiRoot}/vae-message-delivery/v1/message-deliveries**

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 subclause 6.1.1 |
| apiVersion | See subclause 6.1.1 |

##### 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 |
| DownlinkMessageDeliveryData | M | 1 | Parameters to create an individual Message Delivery resources. |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | 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. | | | | |

##### 6.1.3.2.4 Resource Custom Operations

None.

#### 6.1.3.3 Resource: Individual Downlink Message Delivery

##### 6.1.3.3.1 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.

##### 6.1.3.3.2 Resource definition

Resource URI: **{apiRoot}/vae-v2x-message-delivery/v1/message-deliveries/{deliveryId}**

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 subclause 5.1 |
| deliveryId | Unique identifier of the individual Message Delivery resource for the V2X UE ID **or** 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 |
| DownlinkMessageDeliveryData | M | 1 | 200 OK | An individual Dowlink 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. | | | | |

###### 6.1.3.3.3.2 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 | Response  codes | 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.

#### 6.1.3.4 Resource: Uplink Message Delivery Subscriptions

##### 6.1.3.4.1 Description

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

##### 6.1.3.4.2 Resource Definition

Resource URI: **{apiRoot}/vae-message-delivery/v1/message-deliveries/subscriptions**

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 subclause 6.1.1 |
| apiVersion | See subclause 6.1.1 |

##### 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 |
| UplinkMessageDeliverySubscriptionData | M | 1 | Parameters to create an Individual Uplink Message Delivery Subscription resources. |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| UplinkMessageDeliverySubscriptionData | 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. | | | | |

##### 6.1.3.4.4 Resource Custom Operations

None.

#### 6.1.3.5 Resource: Individual Uplink Message Delivery Subscription

##### 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/v1/message-deliveries/subscriptions/{subscriptionId}**

This resource shall support the resource URI variables defined in table 6.1.3.5.2-1.

Table 6.1.3.5.2-1: Resource URI variables for this resource

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See subclause 5.1 |
| subscriptionId | Unique identifier of the individual Uplink Message Delivery Subscription resource for the V2X UE IDor 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 |
| UplinkMessageDeliverySubscriptionData | M | 1 | 200 OK | An individual Uplink 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. | | | | |

###### 6.1.3.5.3.2 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 | Response  codes | Description |
| n/a |  |  | 204 No Content |  |

##### 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 subclause 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 subclause 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. |  |
| 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 |  |
| 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 |  |
| 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 first interaction. |  |

##### 6.1.6.2.3 Type: UplinkMessageDeliverySubscriptionData

Table 6.1.6.2.3-1: Definition of type UplinkMessageDeliverySubscriptionData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| appSerId | string | M | 1 | Identity of the V2X application specific server. |  |
| 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 first interaction. |  |

##### 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 | O | 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 subclause defines simple data types and enumerations that can be referenced from data structures defined in the previous subclauses.

##### 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 |
| 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 subclause 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\_ApplicationRequirement 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 |
|  |  |  |

## 6.2 VAE\_FileDistribution Service API

### 6.2.1 Introduction

The VAE File Distribution shall use the VAE\_FileDistribution API.

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

**{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 "<service 1 API name>".

- The {apiVersion} shall be "v1".

- The <apiSpecificResourceUriPart> shall be set as described in clause 5.3.

### 6.2.2 Usage of HTTP

#### 6.2.2.1 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 clause 5.3 of 3GPP TS 29.500 [2].

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

#### 6.2.2.2 HTTP standard headers

##### 6.2.2.2.1 General

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

##### 6.2.2.2.2 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 clause 5.4 of 3GPP TS 29.500 [2]. The use of the JSON format shall be signalled by the content type "application/json".

#### 6.2.2.3 HTTP custom headers

##### 6.2.2.3.1 General

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

### 6.2.3 Resources

#### 6.2.3.1 Overview



Figure 6.2.3.1-1: Resource URI structure of the VAE\_FileDistribution API

Table 6.2.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.2.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method or custom operation | Description |
| File Distributions | {apiRoot}/ vae-file-distribution/ v1/file-distributions | POST | Create a new Individual File Distribution resource for a V2X group ID. |
| Individual File Distribution | {apiRoot}/ vae-file-distribution/ v1/file-distributions/{distributionId} | GET | Read the Individual File Distribution resource. |
| DELETE | Delete the Individual File Distribution resource. |

#### 6.2.3.2 Resource: File Distributions

##### 6.2.3.2.1 Description

This resource represents the collection of the individual File Distribution resources created in the VAE Server.

##### 6.2.3.2.2 Resource Definition

Resource URI: **{apiRoot}/vae-file-distribution/v1/file-distributions**

This resource shall support the resource URI variables defined in table 6.2.3.2.2-1.

Table 6.2.3.2.2-1: Resource URI variables for this resource

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See clause 6.1.1 |
| apiVersion | See clause 6.1.1 |

##### 6.2.3.2.3 Resource Standard Methods

###### 6.2.3.2.3.1 POST

This method shall support the URI query parameters specified in table 6.2.3.2.3.1-1.

Table 6.2.3.2.3.1-1: 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 6.2.3.2.3.1-2 and the response data structures and response codes specified in table 6.2.3.2.3.1-3.

Table 6.2.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| FileDistributionData | M | 1 | Parameters to create an individual File Distribution resource. |

Table 6.2.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| FileDistributionData | O | 0..1 | 201 Created | An individual File Distribution resource for the 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. | | | | |

##### 6.2.3.2.4 Resource Custom Operations

None.

#### 6.2.3.3 Resource: Individual File Distribution

##### 6.2.3.3.1 Description

The individual File Distribution resource represents an individual File Distribution created in the VAE Server and associated with the V2X group ID.

##### 6.2.3.3.2 Resource definition

Resource URI: **{apiRoot}/vae-file-distribution/v1/file-distributions/{distributionId}**

This resource shall support the resource URI variables defined in table 6.2.3.3-1.

Table 6.2.3.3.2-1: Resource URI variables for this resource

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See clause 6.1 |
| distributionId | Unique identifier of the individual File Distribution resource for the V2X group ID. |

##### 6.2.3.3.3 Resource Standard Methods

###### 6.2.3.3.3.1 GET

This method shall support the URI query parameters specified in table 6.2.3.3.3.1-1.

Table 6.2.3.3.3.1-1: 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 6.3.3.3.3.1-2 and the response data structures and response codes specified in table 6.2.3.3.3.1-3.

Table 6.2.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.2.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| FileDistributionData | M | 1 | 200 OK | An individual File Distribution resource for the 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. | | | | |

###### 6.2.3.3.3.2 DELETE

This method shall support the URI query parameters specified in table 6.2.3.3.3.2-1.

Table 6.2.3.3.3.2-1: 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 6.2.3.3.3.2-2 and the response data structures and response codes specified in table 6.2.3.3.3.2-3.

Table 6.2.3.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

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

Table 6.2.3.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

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

##### 6.2.3.4 Resource Custom Operations

None.

### 6.2.4 Custom Operations without associated resources

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

### 6.2.5 Notifications

N/A

### 6.2.6 Data Model

#### 6.2.6.1 General

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

Table 6.2.6.1-1 specifies the data types defined for the VAE\_FileDistribution API.

Table 6.2.6.1-1: VAE\_FileDistribution specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| FileStatus | 6.2.6.3.3 |  |  |
| FileDistributionData | 6.2.6.2.2 |  |  |
|  |  |  |  |

Table 6.1.6.1-2 specifies data types re-used by the VAE\_FileDistribution 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\_FileDistribution service based interface.

Table 6.2.6.1-2: VAE\_FileDistribution re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| BitRate | 3GPP TS 29.571 [11] |  |  |
| DateTime | 3GPP TS 29.571 [11] |  |  |
| DurationSec | 3GPP TS 29.571 [11] |  |  |
| GeographicArea | 3GPP TS 29.572 [20] |  |  |
| SupportedFeatures | 3GPP TS 29.571 [11] |  |  |
| Uinteger | 3GPP TS 29.571 [11] |  |  |
| V2xGroupId | 6.1.6.3.2 |  |  |

#### 6.2.6.2 Structured data types

##### 6.2.6.2.1 Introduction

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

##### 6.2.6.2.2 Type: FileDistributionData

Table 6.2.6.2.2-1: Definition of type FileDistributionData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| groupId | V2xGroupId | O | 0..1 | Indicates a group ID for which the V2X message is addressed. |  |
| fileLists | array(FileList) | M | 1..N | File lists. |  |
| serviceClass | string | O | 0..1 | Information about the V2X application (e.g., software update, HD map download) |  |
| geoArea | GeographicArea | M | 1 | Target geographical area for the V2X Ues |  |
| maxBitrate | BitRate | M | 1 | Maximum bitrate for the V2X application. |  |
| maxDelay | Uinteger | M | 1 | Unsigned integer identifying a maximum delay in units of milliseconds for the V2X application. |  |
| duration | DateTime | O | 0..1 | Identifies the absolute time at which the related Individual File Distribution Data 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 |  |
| 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 File Distribution Data resource. |  |

##### 6.2.6.2.3 Type: FileList

Table 6.2.6.2.4-1: Definition of type FileList

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| fileUri | Uri | M | 1 |  |  |
| fileDisplayUri | Uri | M | 1 |  |  |
| fileEarFetchTime | DateTime | M | 1 |  |  |
| fileLatFetchTime | DateTime | M | 1 |  |  |
| fileSize | Uinteger | O | 0..1 |  |  |
| fileStatus | FileStatus | M | 1 |  |  |
| completionTime | DateTime | M | 1 |  |  |
| keepUpdateInterval | DurationSec | M | 1 |  |  |
| uniAvailability | Boolean | O | 0..1 |  |  |
| fileRepetition | Uinteger | O | 0..1 |  |  |



#### 6.2.6.3 Simple data types and enumerations

##### 6.2.6.3.1 Introduction

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

##### 6.2.6.3.2 Simple data types

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

Table 6.2.6.3.2-1: Simple data types

|  |  |  |  |
| --- | --- | --- | --- |
| Type Name | Type Definition | Description | Applicability |
|  |  |  |  |

##### 6.2.6.3.3 Enumeration: FileStatus

Table 6.2.6.3.3-1: Enumeration FileStatus

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| PENDING | The file is pending. |  |
| FETCHED | The file is fetched |  |
| PREPARED | The file is prepared |  |
| TRANSMITTING | The file is transmitting |  |
| SENT | The file is sent. |  |

### 6.2.7 Error Handling

#### 6.2.7.1 General

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

#### 6.2.7.2 Protocol Errors

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

#### 6.2.7.3 Application Errors

The application errors defined for the VAE\_FileDistribution service are listed in Table 6.2.7.3-1.

Table 6.2.7.3-1: Application errors

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

### 6.2.8 Feature negotiation

The optional features in table 6.1.8-1 are defined for the VAE\_FileDistribution 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 |
|  |  |  |

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

## A.3 VAE\_FileDistribution API

openapi: 3.0.0

info:

version: 1.0.0.alpha-3

title: VAE\_FileDistribution

description: VAE File Distribution 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-file-distribution/v1'

variables:

apiRoot:

default: https://example.com

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

paths:

/file-distributions:

post:

summary: VAE File Distributions resource create service Operation

tags:

- file distributions collection (Document)

operationId: CreateFileDistributions

requestBody:

content:

application/json:

schema:

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

required: true

responses:

'201':

description: File Distribution Resource Created

headers:

Location:

description: 'Contains the URI of the newly created resource, according to the structure: {apiRoot}/vae-file-distribution/v1/file-distributions/{distributionId}'

required: true

schema:

type: string

content:

application/json:

schema:

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

'400':

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

'401':

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

'403':

$ref: 'TS29571\_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:

description: Unexpected error

/file-distributions/{distributionId}:

get:

summary: Get an existing individual file distribution resource

operationId: ReadIndividualFileDistribution

tags:

- Individual File Distribution (Document)

parameters:

- name: distributionId

in: path

description: Identifier of a file distribution resource

required: true

schema:

type: string

responses:

'200':

description: OK. Resource representation is returned

content:

application/json:

schema:

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

'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 File Distribution resource delete service Operation

tags:

- Individual file distribution (Document)

operationId: DeleteFileDistribution

parameters:

- name: distributionId

in: path

required: true

description: Unique ID of the file distribution to be deleted

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:

description: Unexpected error

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{nrfApiRoot}/oauth2/token'

scopes:

vae-file-distribution: Access to the VAE\_FileDistribution API

schemas:

FileDistributionData:

type: object

properties:

groupId:

$ref: 'TS29486\_VAE\_Message\_Delivery.yaml#/components/schemas/V2xGroupId'

fileLists:

type: array

items:

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

minItems: 1

serviceClass:

type: string

geoArea:

$ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/GeographicArea'

maxBitrate:

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

maxDelay:

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

duration:

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

suppFeat:

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

required:

- fileLists

- geoArea

- maxBitrate

- maxDelay

FileList:

type: object

properties:

fileUri:

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

fileDisplayUri:

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

fileEarFetchTime:

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

fileLatFetchTime:

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

fileSize:

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

fileStatus:

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

completionTime:

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

keepUpdateInterval:

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

uniAvailability:

type: boolean

fileRepetition:

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

required:

- fileUri

- fileDisplayUri

- fileEarFetchTime

- fileLatFetchTime

- fileStatus

- completionTime

- keepUpdateInterval

FileStatus:

anyOf:

- type: string

enum:

- PENDING

- FETCHED

- PREPARED

- TRANSMITTING

- SENT

- type: string

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