**3GPP TSG-CT WG3 Meeting #108-eC3-201127**

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

**Source: Huawei**

**Title: VAE\_DynamicGroup service**

**Spec: 29.486**

**Agenda item: 16.25**

**Document for: Decision**

**1. Introduction**

<Introduction part (optional)>

**2. Reason for Change**

VAE\_DynamicGroup Service shall be defined.

**3. Conclusions**

<Conclusion part (optional)>

**4. Proposal**

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

# 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\_File\_Distribution
* VAE\_V2X\_Application\_Requirement
* VAE\_DynamicGroup

\* \* \* First 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\_V2X\_Message\_Delivery | V2X\_Message\_Delivery | Request/Response | 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 |
| VAE\_DynamicGroup | Configure\_DynamicGroup | Subscribe/Notify | V2X application specific server |
| Notify\_DynamicGroup |
| NOTE: A subscription applies for one UE, group of UE(s) or any UE. |

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

## 5.5 VAE\_DynamicGroup Service

### 5.5.1 Service Description

This API enables the V2X application specific server to communicate with the VAE server to configure dynamic group information.

### 5.5.2 Service Operations

#### 5.5.2.1 Introduction

The VAE\_DynamicGroup service supports following service operations:

- Configure\_DynamicGroup

- Notify\_DynamicGroup

#### 5.5.2.2 Configure\_DynamicGroup

##### 5.5.2.2.1 General

The Configure\_DynamicGroup service operation is used to configures the dynamic group information at the VAE server..

##### 5.5.2.2.2 Configure Dynamic Group



Figure 5.5.2.2.2-1: Configure Dynamic Group

When the NF service consumer (e.g. V2X application specific server) needs to configures the dynamic group information at the VAE server, the NF service consumer shall send the POST method as step 1 of the figure 6.5.2.2.2-1 to request to create an "Individual Group Configuration".

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

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

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

- The group definition within the "definition" attribute;

- The group leader Id within the "leaderId" attribute;

- The duration within the "duration" attribute; and

- The notification URI within the "notifUri" 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 Group Configuration", addressed by a URI as defined in clause 6.4.3.3.2 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 Application Requirement".

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.

#### 5.5.2.3 Notify\_ DynamicGroup

##### 5.5.2.3.1 General

The Notify\_ DynamicGroup service operation is used to notify the dynamic group information (i.e. group member joins or leaves) at the VAE server.

##### 5.5.2.3.2 Notify Dynamic Group



Figure 5.5.2.3.2-1: Notify Dynamic Group

If the VAE Server receives the dynamic group information (i.e. group member joins or leaves), 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 DynamicGroupNotification data structure as request body that shall include:

- resource URI of the individual Application Requirement related to the notification within the "resourceUri" attribute;

- one or more joined group member within the "joinedUeIds" attribute if available; and

- one or more left group member within the "leftUeIds" attribute if available.

Upon the reception of the HTTP POST message, the NF service consumer shall send an "204 No Content" HTTP response for a succesfull processing.

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

## 6.4 VAE\_DynamicGroup API

### 6.4.1 Introduction

The VAE\_DynamicGroup service shall use the VAE\_DynamicGroup 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 "vae-dynamic-group".

- The {apiVersion} shall be "v1".

- The <apiSpecificResourceUriPart> shall be set as described in clause 6.4.3.

### 6.4.2 Usage of HTTP

#### 6.4.2.1 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\_DynamicGroup is contained in Annex A.

#### 6.4.2.2 HTTP standard headers

##### 6.4.2.2.1 General

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

##### 6.4.2.2.2 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".

#### 6.4.2.3 HTTP custom headers

##### 6.4.2.3.1 General

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

### 6.4.3 Resources

#### 6.4.3.1 Overview



Figure 6.4.3.1-1: Resource URI structure of the VAE\_DynamicGroup API

Table 6.4.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.4.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method or custom operation | Description |
| Group Configurations | {apiRoot}/vae-dynamic-group/{apiVersion}/group-configurations | POST | Create a new Individual Group Configuration resource for a V2X group ID. |
| Individual Group Configuration | {apiRoot}/vae-dynamic-group/{apiVersion}/group-configurations /{configId} | GET | Read the Individual Group Configuration resource. |
| DELETE | Delete the Individual Group Configuration resource. |

#### 6.4.3.2 Resource: Group Configurations

##### 6.4.3.2.1 Description

This resource represents the collection of the individual Application Requirement resources created in the VAE Server.

##### 6.4.3.2.2 Resource Definition

Resource URI: **{apiRoot}/vae-dynamic-group/{apiVersion}/group**-**configuration**s

This resource shall support the resource URI variables defined in table 6.4.3.2.2-1.

Table 6.4.3.2.2-1: Resource URI variables for this resource

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

##### 6.4.3.2.3 Resource Standard Methods

###### 6.4.3.2.3.1 POST

This method shall support the URI query parameters specified in table 6.4.3.2.3.1-1.

Table 6.4.3.2.3.1-1: 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 6.4.3.2.3.1-2 and the response data structures and response codes specified in table 6.4.3.2.3.1-3.

Table 6.4.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| GroupConfigurationData | M | 1 | Parameters to create an individual Group Configuration resource. |

Table 6.3.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Responsecodes | Description |
| GroupConfigurationData | O | 0..1 | 201 Created | An individual Group Configuration 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. |

##### 6.4.3.2.4 Resource Custom Operations

None.

#### 6.4.3.3 Resource: Individual Group Configuration

##### 6.4.3.3.1 Description

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

##### 6.4.3.3.2 Resource definition

Resource URI: **{apiRoot}/vae-dynamic-group/{apiVersion}/group**-**configuration**s **/{configId}**

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

Table 6.4.3.3.2-1: Resource URI variables for this resource

|  |  |
| --- | --- |
| Name | Definition |
| apiRoot | See clause 6.1.1. |
| apiVersion | See clause 6.1.1 |
| configId | Unique identifier of the individual group configuration resource for the V2X group ID. |

##### 6.4.3.3.3 Resource Standard Methods

###### 6.4.3.3.3.1 GET

This method shall support the URI query parameters specified in table 6.4.3.3.3.1-1.

Table 6.4.3.3.3.1-1: 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 6.4.3.3.3.1-2 and the response data structures and response codes specified in table 6.4.3.3.3.1-3.

Table 6.4.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

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

Table 6.4.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| GroupConfigurationData | M | 1 | 200 OK | An individual Group Configuration 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. |

###### 6.4.3.3.3.2 DELETE

This method shall support the URI query parameters specified in table 6.4.3.3.3.2-1.

Table 6.4.3.3.3.2-1: 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 6.4.3.3.3.2-2 and the response data structures and response codes specified in table 6.4.3.3.3.2-3.

Table 6.4.3.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

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

Table 6.4.3.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Responsecodes | Description |
| n/a |  |  | 200 OK |  |
| NOTE: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [2] shall also apply. |

##### 6.4.3.4 Resource Custom Operations

None.

### 6.4.4 Custom Operations without associated resources

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

### 6.4.5 Notifications

#### 6.4.5.1 General

The VAE server and NF service consumer shall support the on-network dynamic group notifications using a separate HTTP connection towards an address as assigned the NF service consumer described in clause 6.4.5.2.

A VAE server and NF service consumer may support testing a notification connection as described in clause 6.4.5.3. A VAE server and NF service consumer may support the delivery of Notification using Websocket (IETF RFC 6455 [21]) as described in clause 6.4.5.4.

#### 6.4.5.2 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.

#### 6.4.5.3 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.

#### 6.4.5.4 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.

#### 6.4.5.5 Methods

Table 6.4.5.5-1: Methods

|  |  |  |
| --- | --- | --- |
| Custom operation URI | Mapped HTTP method | Description |
| {notifUri} | POST | Notify the dynamic group information (i.e. group member joins or leaves). |

#### 6.4.5.6 Notify Dynamic Group

##### 6.4.5.6.1 Description

This notification is used by the VAE Server to notify the dynamic group information (i.e. group member joins or leaves).

##### 6.4.5.6.2 Operation Definition

This operation shall support the request data structures specified in table 6.4.5.6.2-1 and the response data structure and response codes specified in table 6.4.5.6.2-2.

Table 6.4.5.6.2-1: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| DynamicGroupNotification | M | 1 | Notify the dynamic group information (i.e. group member joins or leaves). |

Table 6.3.5.6.2-2: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| n/a |  |  | 204 No Content | . |
| 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. |

### 6.4.6 Data Model

#### 6.4.6.1 General

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

Table 6.4.6.1-1 specifies the data types defined for the VAE\_DynamicGroup API.

Table 6.4.6.1-1: VAE\_DynamicGroup specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| DynamicGroupNotification | 6.3.6.2.3 |  |  |
| GroupConfigurationData | 6.3.6.2.2 |  |  |
|  |  |  |  |

Table 6.4.6.1-2 specifies data types re-used by the VAE\_DynamicGroup 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\_DynamicGroup service based interface.

Table 6.4.6.1-2: VAE\_DynamicGroup re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| 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 |
| V2xGroupId | 6.1.6.3.2 |  |  |
| V2xUeId | 6.1.6.3.2 | Identifier of the destination V2X UE |  |
| WebsockNotifConfig | 3GPP TS 29.122 [22] | Pepresents configuration for the delivery of notifications over Websockets. | Notification\_websocket |

#### 6.4.6.2 Structured data types

##### 6.4.6.2.1 Introduction

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

##### 6.4.6.2.2 Type: GroupConfigurationData

Table 6.4.6.2.2-1: Definition of type GroupConfigurationData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| groupId | V2xGroupId | M | 1 | Indicates a group ID to be used for the V2X group. |  |
| definition | string | M | 1 | Information about the V2X group. |  |
| leaderId | V2xUeId | M | 1 | Indicates a UE ID to be used for user controlled group join. |  |
| duration | DateTime | O | 0..1 | Identifies the absolute time at which the related Individual Group Configuration 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 |  |
| notifUri | Uri | M | 1 | Identifies the recipient of V2X dynamic group notification sent by the VAE server. |  |
| 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 Group Configuration resource.  |  |

##### 6.4.6.2.3 Type: DynamicGroupNotification

Table 6.4.6.2.2-1: Definition of type DynamicGroupNotification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| resourceUri | Uri | M | 1 | The resource URI of the individual Application Requirement related to the notification. |  |
| joinedUeIds | array(V2xUeId) | O | 0..1 | The joined group member(s). |  |
| leftUeIds | array(V2xUeId) | O | 0..1 | The left group member(s). |  |

#### 6.4.6.3 Simple data types and enumerations

##### 6.4.6.3.1 Introduction

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

##### 6.4.6.3.2 Simple data types

The simple data types defined in table 6.4.6.3.2-1 shall be supported.

Table 6.4.6.3.2-1: Simple data types

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

### 6.4.7 Error Handling

#### 6.4.7.1 General

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

#### 6.4.7.2 Protocol Errors

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

#### 6.4.7.3 Application Errors

The application errors defined for the VAE\_DynamicGroup service are listed in Table 6.4.7.3-1.

Table 6.4.7.3-1: Application errors

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

## 6.4.8 Feature negotiation

The optional features in table 6.4.8-1 are defined for the VAE\_DynamicGroup API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [2].

Table 6.4.8-1: Supported Features

|  |  |  |
| --- | --- | --- |
| Feature number | Feature Name | Description |
| 1 | Notification\_test\_event | The testing of notification connection is supported according to clause 6.4.5.3. |
| 2 | Notification\_websocket | The delivery of notifications over Websocket is supported according to clause 6.4.5.4. This feature requires that the Notification\_test\_event feature is also supported. |

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