**3GPP TSG-CT WG3 Meeting #142C3-253637**

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**Source: China Mobile, Ericsson, Huawei, Nokia**

**Title: Pseudo-CR on Naf\_VFLInference Service model definition**

**Spec: 3GPP TS 29.530v0.1.0**

**Agenda item: 19.39**

**Document for: Approval**

**1. Introduction**

Introduce AF VFL Inference service.

**2. Reason for Change**

Align with 3GPP TS 23.288 clause 11.3 to introduce AF VFL Inference service.

**3. Conclusions**

API not completed defined.

**4. Proposal**

It is proposed to agree the following changes to 3GPP TS 29.530v0.1.0.

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

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[3] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[4] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

[5] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

[6] OpenAPI: "OpenAPI Specification Version 3.0.0", <https://spec.openapis.org/oas/v3.0.0>.

[7] 3GPP TR 21.900: "Technical Specification Group working methods".

[8] 3GPP TS 33.501: "Security architecture and procedures for 5G system".

[9] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".

[10] 3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3".

[11] IETF RFC 9113: "HTTP/2".

[12] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".

[13] IETF RFC 9457: "Problem Details for HTTP APIs".

[29571] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

[29523] 3GPP TS 29.523: "5G System; Policy Control Event Exposure Service; Stage 3".

[29520] 3GPP TS 29.520: "5G System; Network Data Analytics Services; Stage 3".

[9112] IETF RFC 9112: "HTTP/1.1".

[9119] IETF RFC 9110: "HTTP Semantics".

[9111] IETF RFC 9111: "HTTP Caching".

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

## 6.2 Naf\_VFLInference Service API

### 6.2.1 Introduction

The Naf\_VFLInference service shall use the Naf\_VFLInference API.

The API URI of the Naf\_VFLInference API shall be:

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

The request URIs used in each HTTP requests from the NF service consumer towards the AF shall have the Resource URI structure defined in clause 4.4.1 of 3GPP TS 29.501 [5], i.e.:

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

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].

- The<apiName>shall be "naf-vflinference".

- The <apiVersion> shall be "v1".

- The <apiSpecificResourceUriPart> shall be set as described in clause 5.5.3.

### 6.2.2 Usage of HTTP

#### 6.2.2.1 General

If the AF is untrusted, support of HTTP/1.1 (IETF RFC 9112 [9112], IETF RFC 9110 [9110] and IETF RFC 9111[9111] over TLS is mandatory and support of HTTP/2 (IETF RFC 9113 [11]) over TLS is recommended. TLS shall be used as specified in clause 12.3 and clause 13.1 of 3GPP TS 33.501 [8].

If the AF is trusted, HTTP/2, IETF RFC 9113 [11], shall be used as specified in clause 5.2 of 3GPP TS 29.500 [4].

HTTP/2, IETF RFC 9113 [11], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [4].

The OpenAPI [6] specification of HTTP messages and content bodies for the Naf\_VFLInference 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 [4] for the usage of HTTP standard headers.

##### 6.2.2.2.2 Content type

JSON, IETF RFC 8259 [12], 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 [4]. The use of the JSON format shall be signalled by the content type "application/json".

"Problem Details" JSON object shall be used to indicate additional details of the error in a HTTP response body and shall be signalled by the content type "application/problem+json", as defined in IETF RFC 9457 [13].

#### 6.2.2.3 HTTP custom headers

The Naf\_VFLInference service API shall support mandatory HTTP custom header fields specified in clause 5.2.3.2 of 3GPP TS 29.500 [4] and may support HTTP custom header fields specified in clause 5.2.3.3 of 3GPP TS 29.500 [4].

In this release of the specification, no specific custom headers are defined for the Naf\_VFLInference service API.

### 6.2.3 Resources

#### 6.2.3.1 Resource Structure

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 6.2.3.1-1 depicts the resource URIs structure for the Naf\_VFLInference API.



Figure 6.2.3.1-1: Resource URI structure of the Naf\_VFLInference 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 |
| AF VFL Inference Subscriptions | /subscriptions | POST | Creates a new Individual AF VFL Inference Subscription resource. |
| Individual AF VFL Inference Subscription | /subscriptions/{subscriptionId} | DELETE | Deletes an Individual AF VFL Inference Subscription identified by subresource {subscriptionId}. |
| PUT | Updates an existing Individual AF VFL Inference Subscription identified by subresource {subscriptionId}. |
| PATCH | Modifies an existing Individual AF VFL Inference Subscription identified by subresource {subscriptionId}. |

#### 6.2.3.2 Resource: AF VFL Inference Subscriptions

##### 6.2.3.2.1 Description

The AF VFL Inference Subscriptions resource represents all VFL Inference subscriptions to the Naf\_VFLInference service at a given AF. The resource allows an NF service consumer to create a new Individual AF VFL Inference Subscription resource.

##### 6.2.3.2.2 Resource definition

Resource URI: **{apiRoot}/naf-vflinference/<apiVersion>/subscriptions**

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 | Data type | Definition |
| apiRoot | string | See clause 6.2.1 |

##### 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 |
| 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 |
| VflInferSub | M | 1 | Creates a new Individual AF VFL Inference Subscription 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** |
| VflInferSub | M | 1 | 201 Created | The creation of an Individual AF VFL Inference Subscription resource is confirmed and a representation of that resource is returned. |
| 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] also apply. | | | | |

Table 6.2.3.2.3.1-4: Headers supported by the 201 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/naf-vflinference/<apiVersion>/subscriptions/{subscriptionId} |

##### 6.2.3.2.4 Resource Custom Operations

None in this release of the specification.

#### 6.2.3.3 Resource: Individual AF VFL Inference Subscription

##### 6.2.3.3.1 Description

The Individual AF VFL Inference Subscription resource represents a single VFL inference subscription to the Naf\_VFLInference service at a given AF.

##### 6.2.3.3.2 Resource definition

Resource URI: **{apiRoot}/naf-vflinference/<apiVersion>/subscriptions/{subscriptionId}**

The <apiVersion> shall be set as described in clause 6.2.1.

This resource shall support the resource URI variables defined in table 6.2.3.3.2-1.

Table 6.2.3.3.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.2.1. |
| subscriptionId | string | Identifies a VFL inference subscription to the Naf\_VFLInference service. |

##### 6.2.3.3.3 Resource Standard Methods

###### 6.2.3.3.3.1 PUT

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 PUT method on this resource

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

This method shall support the request data structures specified in table 6.2.3.3.3.1-2 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 PUT Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| VflInferSub | M | 1 | Parameters to replace a subscription to AF VFL Subscription resource. |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Data type** | **P** | **Cardinality** | **Response codes** | **Description** |
| VflInferSub | M | 1 | 200 OK | The Individual AF VFL Subscription resource was modified successfully, and a representation of that resource is returned. |
| n/a |  |  | 204 No Content | The Individual AF VFL Subscription resource was modified successfully. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection.  (NOTE 2) |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection.  (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the PUT method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.  NOTE 2: The RedirectResponse data structure may be provided by an SCP (cf. clause 6.10.9.1 of 3GPP TS 29.500 [4]). | | | | |

Table 6.2.3.3.3.1-4: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains an alternative URI of the resource located in an alternative AF (service) instance towards which the request is redirected.  For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Contains the identifier of the target NF (service) instance towards which the request is redirected |

Table 6.2.3.3.3.1-5: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains an alternative URI of the resource located in an alternative AF (service) instance towards which the request is redirected.  For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Contains the identifier of the target NF (service) instance towards which the request is redirected |

###### 6.2.3.3.3.2 PATCH

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 PATCH 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 PATCH Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| VflInferSubPatch | M | 1 | Partial update of parameters to a subscription to AF VFL Inference Subscription resource. |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Data type** | **P** | **Cardinality** | **Response codes** | **Description** |
| VflInferSub | M | 1 | 200 OK | The Individual AF VFL Inference Subscription resource was partial modified successfully and a representation of that resource is returned. |
| n/a |  |  | 204 No Content | The Individual AF VFL Inference Subscription resource was partial modified successfully. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection.  (NOTE 2) |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection.  (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the PATCH method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.  NOTE 2: The RedirectResponse data structure may be provided by an SCP (cf. clause 6.10.9.1 of 3GPP TS 29.500 [4]). | | | | |

Table 6.2.3.3.3.2-4: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains an alternative URI of the resource located in an alternative AF (service) instance towards which the request is redirected.  For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Contains the identifier of the target NF (service) instance towards which the request is redirected |

Table 6.2.3.3.3.2-5: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains an alternative URI of the resource located in an alternative AF (service) instance towards which the request is redirected.  For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Contains the identifier of the target NF (service) instance towards which the request is redirected |

###### 6.2.3.3.3.3 DELETE

This method shall support the URI query parameters specified in table 6.2.3.3.3.3-1.

Table 6.2.3.3.3.3-1: 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 6.2.3.3.3.3-2 and the response data structures and response codes specified in table 6.2.3.3.3.3-3.

Table 6.2.3.3.3.3-2: Data structures supported by the DELETE Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
|  |  |  |  |

Table 6.2.3.3.3.3-3: Data structures supported by the DELETE Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Successful case: The Individual AF VFL Subscription resource matching the subscriptionId was deleted. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection.  (NOTE 2) |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection.  (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.  NOTE 2: The RedirectResponse data structure may be provided by an SCP (cf. clause 6.10.9.1 of 3GPP TS 29.500 [4]). | | | | |

Table 6.2.3.3.3.3-4: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains an alternative URI of the resource located in an alternative AF (service) instance towards which the request is redirected.  For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Contains the identifier of the target NF (service) instance towards which the request is redirected. |

Table 6.2.3.3.3.3-5: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains an alternative URI of the resource located in an alternative AF (service) instance towards which the request is redirected.  For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Contains the identifier of the target NF (service) instance towards which the request is redirected. |

##### 6.2.3.3.4 Resource Custom Operations

None in this release of the specification.

### 6.2.4 Custom Operations without associated resources

None in this release of the specification.

### 6.2.5 Notifications

#### 6.2.5.1 General

Notifications shall comply with clause 6.2 of 3GPP TS 29.500 [4] and clause 4.6.2.3 of 3GPP TS 29.501 [5].

Table 6.2.5.1-1: Notifications overview

|  |  |  |  |
| --- | --- | --- | --- |
| Notification | Callback URI | HTTP method or custom operation | Description (service operation) |
| Event Notification | {notifUri} | POST | Report one or several observed Events. |

#### 6.2.5.2 VFL Inference Event Notification

##### 6.2.5.2.1 Description

The VFL Inference Event Notification is used by the AF to report one or several observed VFL Inference Events to a NF service consumer that has subscribed to such Notifications via the Individual AF VFL Inference Subscription Resource.

##### 6.2.5.2.2 Operation Definition

Callback URI: **{notifUri}**

The operation shall support the callback URI variables defined in table 6.2.5.2.2-1, the request data structures specified in table 6.2.5.2.2-2 and the response data structure and response codes specified in table 6.2.5.2.2-3.

Table 6.2.5.2.2-1: Callback URI variables

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| notifUri | Uri | The Notification Uri as assigned within the Individual AF VFL Inference Subscription. |

Table 6.2.5.2.2-2: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| VflInferNotif | M | 1 | Provides Information about observed events. |

**Table 6.2.5.2.2-3: Data structures supported by the POST Response Body on this resource**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Data type** | **P** | **Cardinality** | **Response codes** | **Description** |
| n/a |  |  | 204 No Content | The receipt of the Notification is acknowledged. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection.  (NOTE 2) |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection.  (NOTE 2) |
| 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] also apply.  NOTE 2: The RedirectResponse data structure may be provided by an SCP (cf. clause 6.10.9.1 of 3GPP TS 29.500 [4]). | | | | | |

Table 6.2.5.2.2-4: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains an alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected.  For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Contains the identifier of the target NF (service) instance towards which the notification request is redirected. |

Table 6.2.5.2.2-5: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | Contains an alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected.  For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Contains the identifier of the target NF (service) instance towards which the notification request is redirected |

### 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 Naf\_VFLInference service-based interface protocol.

Table 6.2.6.1-1: Naf\_VFLInference specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| TermCause | 6.2.6.2.5 | Represents cause of a VFL inference subscriptino. |  |
| VflInferNotif | 6.2.6.2.4 | Represents notification of a VFL inference subscription. |  |
| VflInferSub | 6.2.6.2.2 | Represents a VFL inference subscription. |  |
| VflInferSubPatch | 6.2.6.2.3 | Represents parameters to request the modification of a VFL inference subscription. |  |
| VflTermCause | 6.2.6.3.3 | Represents a cause of termination of a VFL inference subscription. |  |

Table 6.2.6.1-2 specifies data types re-used by the Naf\_VFLInference 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 Naf\_VFLInference service-based interface.

Table 6.2.6.1-2: Naf\_VFL re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| EventFilter | 3GPP TS 29.520 [29520] | Identifies the filter for the subscribed event. |  |
| NwdafEvent | 3GPP TS 29.520 [29520] | Describes the AF Events. |  |
| ReportingInformation | 3GPP TS 29.523 [20] | Represents the type of reporting a subscription requires. |  |
| RedirectResponse | 3GPP TS 29.571 [29571] | Contains redirection related information. |  |
| SupportedFeatures | 3GPP TS 29.571 [29571] | Represents the list of supported features. |  |
| Uri | 3GPP TS 29.571 [29571] | Represents a URI. |  |
| VflInferAnaSub | 3GPP TS 29.520 [29520] | Represents the VFL inference subscription information for the subscribed analytics ID. |  |
| VflInferReq | 3GPP TS 29.520 [29520] | Represents requirements for VFL inference. |  |
| VflInferResult | 3GPP TS 29.520 [29520] | Represents intermediate VFL inference result per target. |  |

#### 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 VflInferSub

Table 6.2.6.2.2-1: Definition of type VflInferSub

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| notifCorreId | string | M | 1 | The value of Notification Correlation ID in the corresponding notification. |  |
| notifUri | Uri | M | 1 | URI at which the NF service consumer requests to receive notifications. |  |
| suppFeats | SupportedFeatures | C | 0..1 | List of Supported features used as described in clause 6.2.8.  It shall be supplied by NF service consumer in the POST requests that request the creation of an AF VFL Subscriptions resource and shall be supplied by the AF in the reply of corresponding request. |  |
| vflInferAnaSubs | array(VflInferAnaSub) | M | 1 | Identifies the VFL inference subscription information for the subscribed analytics ID(s).  (NOTE) |  |
| vflInferReq | VflInferReq | O | 0..1 | Represents required conditions to apply VFL inference. |  |
| vflInferResults | array(VflInferResult) | O | 1..N | Represents intermediate VFL inference results.  (NOTE) |  |
| vlfReportInfo | ReportingInformation | O | 0..1 | Reporting requirement information of the VFL inference subscription.  If omitted, the default values within the ReportingInformation data type apply. |  |
| NOTE: The "intGroupIds" and "supis" attributes of the data type are not applicable for the AF services if the AF is an untrusted AF. The "exterGroupIds" and "gpsis" attributes of the data type are not applicable for the AF services if the AF is a trusted AF | | | | | |

##### 6.2.6.2.3 Type VflInferSubPatch

Table 6.2.6.2.3-1: Definition of type VflInferSubPatch

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| notifUri | Uri | O | 0..1 | URI at which the NF service consumer requests to receive notifications. |  |
| vflInferReq | VflInferReq | O | 0..1 | Represents required conditions to apply VFL inference. |  |
| vflReportInfo | ReportingInformation | O | 0..1 | Reporting requirement information of the VFL inference subscription. |  |

##### 6.2.6.2.4 Type VflInferNotif

Table 6.2.6.2.4-1: Definition of type VflInferNotif

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| notifCorreId | string | M | 1 | The value of Notification Correlation ID in the corresponding notification. |  |
| vflInferResults | array(VflInferResult) | C | 1..N | Represents intermediate inference results. (NOTE) |  |
| termCauses | array(TermCause) | C | 0..N | Termination cause(s) for which the VFL client will send no further notifications for this subscription. Its presence indicates that the VFL client requests the termination of the events indicated by the "vflCorreIds" attribute. (NOTE) |  |
| NOTE: At least one of the "vflInferResults" or "termCauses" attribute shall be provided. | | | | | |

##### 6.2.6.2.5 Type TermCause

Table 6.2.6.2.5-1: Definition of type TermCause

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| vflTermCause | VflTermCause | M | 1 | Termination cause(s) for which the VFL client will send no further notifications for this subscription. Its presence indicates that the VFL client requests the termination of the events indicated by the "vflCorreIds" attribute. |  |
| vflCorreIds | array(string) | O | 0..N | VFL correlation ID used to identify the VFL process to be executed among the candidate VFL participants to which the inference subscription procedure relates. (NOTE) |  |
| NOTE: When omitted, it means the "termCause" apply to all the events within the individual subscription. | | | | | |

#### 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 5.1.6.3.2-1 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: VflTermCause

Table 6.2.6.3.3-1: Enumeration VflTermCause

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| OVERLOAD | The NF is overloaded. |  |

### 6.2.7 Error handling

#### 6.2.7.1 General

For the Naf\_VFLInference API, HTTP error responses shall be supported as specified in clause 4.8 of 3GPP TS 29.501 [5]. Protocol errors and application errors specified in table 5.2.7.2-1 of 3GPP TS 29.500 [4] shall be supported for an HTTP method if the corresponding HTTP status codes are specified as mandatory for that HTTP method in table 5.2.7.1-1 of 3GPP TS 29.500 [4].

In addition, the requirements in the following clauses are applicable for the Naf\_VFLInference API.

#### 6.2.7.2 Protocol Errors

No specific procedures for the Naf\_VFLInference service are specified.

#### 6.2.7.3 Application Errors

The application errors defined for the Naf\_VFLInference API 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 6.2.8-1 are defined for the Naf\_VFLInference API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 6.2.8-1: Supported Features

|  |  |  |
| --- | --- | --- |
| Feature number | Feature Name | Description |
|  |  |  |

### 6.2.9 Security

As indicated in 3GPP TS 33.501 [8] and 3GPP TS 29.500 [4], the access to the Naf\_VFLInference API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [9]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [10]) plays the role of the authorization server.

If OAuth2 is used, an NF Service Consumer, prior to consuming services offered by the Naf\_VFLInference API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [10], clause 5.4.2.2.

NOTE: When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF Service Consumer used for discovering the Naf\_VFLInference service.

The Naf\_VFLInference API defines a single scope "naf-vflinference" for the entire service, and it does not define any additional scopes at resource or operation level.

### 6.2.10 HTTP redirection

An HTTP request may be redirected to a different AF service instance when using direct or indirect communications (see 3GPP TS 29.500 [4]).

An SCP that reselects a different AF producer instance will return the NF Instance ID of the new AF producer instance in the 3gpp-Sbi-Producer-Id header, as specified in clause 6.10.3.4 of 3GPP TS 29.500 [4].

If an AF redirects a service request to a different AF using an HTTP 307 Temporary Redirect or 308 Permanent Redirect status code, the identity of the new AF towards which the service request is redirected shall be indicated in the 3gpp-Sbi-Target-Nf-Id header of the HTTP 307 Temporary Redirect or 308 Permanent Redirect response as specified in clause 6.10.9.1 of 3GPP TS 29.500 [4].

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