**3GPP TSG-CT3 Meeting #118-e *C3-215227***

**E-Meeting, 11th – 15th October 2021 (Revision of C3-215XXX)**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.520** | **CR** | **0339** | **rev** | **-** | **Current version:** | **17.4.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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|  | | | | | | | | | | |
| ***Title:*** | Update of procedures and data type definition for Nnwdaf\_MLModelProvision Service | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, China Mobile Com. Corporation | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eNA\_Ph2 | | | | |  | ***Date:*** | | | 2021-09-30 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | The procedures and data types for Nnwdaf\_MLModelProvision service are still incomplete. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Update the procedures and related data types of Nnwdaf\_MLModelProvision Service. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Stage 3 specification is not completed. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.5.2.2.2, 4.5.2.4.2, 5.4.6.1, 5.4.6.2.2, 5.4.6.2.3, 5.4.6.2.4, 5.4.6.2.6 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | The CR does not impact the OpenAPI file. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

\*\*\* 1st Change \*\*\*

##### 4.5.2.2.2 Subscription for event notifications

Figure 4.5.2.2.2-1 shows a scenario where the NF service consumer sends a request to the NWDAF to subscribe for event notification(s) (as shown in 3GPP TS 23.288 [17]).



Figure 4.5.2.2.2-1: NF service consumer subscribes to notifications

The NF service consumer shall invoke the Nnwdaf\_MLModelProvision\_Subscribe service operation to subscribe to event notification(s). The NF service consumer shall send an HTTP POST request with "{apiRoot}/nnwdaf-mlmodelprovision/v1/subscriptions" as Resource URI representing the "NWDAF ML Model Provision Subscriptions", as shown in figure 4.5.2.2.2-1, step 1, to create a subscription for an "Individual NWDAF ML Model Provision Subscription" according to the information in message body.

The NwdafMLModelProvSubsc data structure provided in the request body shall include:

- an URI where to receive the requested notifications as the "notifUri" attribute; and- a description of the subscribed events as the "mLEventSubscs" attribute that, for each event, the MLEventSubscription data type shall include:

1. an event identifier as the "mLEvent" attribute;
2. event filter information as the "mLEventFilter" attirbute; and

and may include:

1. an identification of target UE information as the "tgtUe" attribute; and
2. a time interval during which the ML model shall be reported as the "mLTargetPeriod" attirbute.

The NwdafMLModelProvSubsc data structure provided in the request body may include:

- a notification correlation identifier assigned by the NF service consumer for the requested notifications as "notifCorreId" attribute; and

- the reporting requirement information of the subscription as the "eventReq" attribute.

For different event types, the "mLEventFilter" attribute within the MLEventSubscription data type:

- if the ServiceExperience feature is supported and the event is "SERVICE\_EXPERIENCE", shall provide

Editor’s Note: The mandatory and optional information is FFS for the ServiceExperience feature.

- if the UeMobility feature is supported and the event is "UE\_MOBILITY", shall provide

Editor’s Note: The mandatory and optional information is FFS for the UeMobility feature.

- if the UeCommunication feature is supported and the event is "UE\_COMM", shall provide

Editor’s Note: The mandatory and optional information is FFS for the UeCommunication feature.

- if the QoSSustainability feature is supported and the event is "QOS\_SUSTAINABILITY", shall provide

Editor’s Note: The mandatory and optional information is FFS for the QoSSustainability feature.

- if the AbnormalBehaviour feature is supported and the event is "ABNORMAL\_BEHAVIOUR", shall provide

Editor’s Note: The mandatory and optional information is FFS for the AbnormalBehaviour feature.

- if the UserDataCongestion feature is supported and the event is "USER\_DATA\_CONGESTION", shall provide

Editor’s Note: The mandatory and optional information is FFS for the UserDataCongestion feature.

- if the NfLoad feature is supported and the event is "NF\_LOAD", shall provide

Editor’s Note: The mandatory and optional information is FFS for the NfLoad feature.

- if the NetworkPerformance feature is supported and the event is "NETWORK\_PERFORMANCE", shall provide

Editor’s Note: The mandatory and optional information is FFS for the NetworkPerformance feature.

- if the NsiLoad feature is supported and the event is "NSI\_LOAD\_LEVEL", shall provide

Editor’s Note: The mandatory and optional information is FFS for the NsiLoad feature.

- if the SMCongestion feature is supported and the event is "SM\_CONGESTION", shall provide

Editor’s Note: The mandatory and optional information is FFS for the SMCongestion feature.

- if the RedundantTransmission feature is supported and the event is "REDUNDANT\_TRANSMISSION", shall provide

Editor’s Note: The mandatory and optional information is FFS for the RedundantTransmission feature.

- if the WLANPerformance feature is supported and the event is "WLAN\_PERFORMANCE", shall provide

Editor’s Note: The mandatory and optional information is FFS for the WLANPerformance feature.

Upon the reception of an HTTP POST request with: "{apiRoot}/nnwdaf-mlmodelprovision/v1/subscriptions" as Resource URI and NwdafMLModelProvSubsc data structure as request body, the NWDAF shall create a new subscription and store the subscription.

If the NWDAF created an "Individual NWDAF ML Model Provision Subscription" resource, the NWDAF shall respond with "201 Created" with the message body containing a representation of the created subscription, as shown in figure 4.5.2.2.2-1, step 2. The NWDAF shall include a Location HTTP header field. The Location header field shall contain the URI of the created subscription i.e. "{apiRoot}/nnwdaf-mlmodelprovision/v1/subscriptions/{subscriptionId}".

If the immediate reporting indication in the "immRep" attribute within the "evtReq" attribute sets to true during the event subscription, the NWDAF shall include the reports of the subscribed events, if available, as the "mLEventNotifs" attribute in the HTTP POST response.

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

##### 4.5.2.4.2 Notification about subscribed event

Figure 4.5.2.4.2-1 shows a scenario where the NWDAF sends a request to the NF Service Consumer to notify for event notifications (see also 3GPP TS 23.288 [17]).



Figure 4.5.2.4.2-1: NWDAF notifies the subscribed event

The NWDAF shall invoke the Nnwdaf\_MLModelProvision\_Notify service operation to notify the subscribed event. The NWDAF shall send an HTTP POST request with "{notifUri}" received in the Nnwdaf\_MLModelProvision\_Subscribe service operation as Resource URI, as shown in figure 4.2.2.4.2-1, step 1. The NwdafMLModelProvNotif data structure provided in the request body that shall include:

* an event subscriptionId as "subscriptionId" attribute; and
* description of the notified event as "eventNotifs" attribute, that for each event, the MLEventNotif data type shall include an event identifier as the "event" attribute, a notification correlation identifier as "notifCorreId" attribute, either an address (e.g. a URL or an FQDN) of the ML model file as the "mLFileAddr" attribute, and may include a time period when the provided ML model applies as the "validityPeriod" attribute and an area where the provided ML model applies as the "spatialValidity" attribute.

Upon the reception of an HTTP POST request, if the NF service consumer successfully processed and accepted the received HTTP POST request, the NF Service Consumer shall store the notification and respond with HTTP "204 No Content" status code.

If the feature "ES3XX" is supported, and the NF service consumer determines the received HTTP POST request needs to be redirected, the NF service consumer shall send an HTTP redirect response as specified in subclause 6.10.9 of 3GPP TS 29.500 [6].

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

#### 5.4.6.1 General

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

Table 5.4.6.1-1 specifies the data types defined for the Nnwdaf\_ service based interface protocol.

Table 5.4.6.1-1: Nnwdaf\_MLModelProvision specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Section defined | Description | Applicability |
| NwdafMLModelProvSubsc | 5.4.6.2.2 |  |  |
| NwdafMLModelProvNotif | 5.4.6.2.5 |  |  |
| MLEventSubscription | 5.4.6.2.3 |  |  |
| MLEventNotif | 5.4.6.2.6 |  |  |
| MLAnalyticsFilter | 5.4.6.2.4 |  |  |

Table 5.4.6.1-2 specifies data types re-used by the Nnwdaf\_MLModelProvision 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 Nnwdaf service based interface.

Table 5.4.6.1-2: Nnwdaf\_MLModelProvision re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| DateTime | 3GPP TS 29.571 [8] | Identifies the time. |  |
| EventFilter | 5.2.6.2.3 | Identifies the filter for the subscribed event. |  |
| NetworkAreaInfo | 3GPP TS 29.554 [18] | Identifies the network area. |  |
| NwdafEvent | 5.1.6.3.4 |  |  |
| RedirectResponse | 3GPP TS 29.571 [8] |  |  |
| ReportingInformation | 3GPP TS 29.523 [20] | Represents the requirements of reporting the subscription. |  |
| SupportedFeatures | 3GPP TS 29.571 [8] |  |  |
| TargetUeInformation | 5.1.6.2.8 |  |  |
| TimeWindow | 3GPP TS 29.122 [19] |  |  |
| Uri | 3GPP TS 29.571 [8] |  |  |

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

##### 5.4.6.2.2 Type NwdafMLModelProvSubsc

Table 5.4.6.2.2-1: Definition of type NwdafMLModelProvSubsc

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| mLEventSubscs | array(MLEventSubscription) | M | 1..N | Each element identifies the subscription for each event. |  |
| notifUri | Uri | M | 1 | Identifies the recipient of Notifications sent by the NWDAF. |  |
| mLEventNotifs | array(MLEventNotif) | C | 1..N | Notifications about Individual Events.  Shall only be present if the immediate reporting indication in the "immRep" attribute within the "evtReq" attribute sets to true in the event subscription, and the reports are available. |  |
| suppFeats | SupportedFeatures | C | 0..1 | List of Supported features used as described in subclause 5.4.8.  It shall be supplied by NF service consumer in the POST requests that request the creation of an NWDAF ML Model Provision Subscriptions resource, and shall be supplied by the NWDAF in the reply of corresponding request. |  |
| notifCorreId | string | O | 0..1 | The value of Notification Correlation ID in the corresponding notification. |  |
| eventReq | ReportingInformation | O | 0..1 | Reporting requirement information of the subscription.  If omitted, the default values within the ReportingInformation data type apply. |  |

Editor’s Note: It’s FFS for partial failure events handling.

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

##### 5.4.6.2.3 Type MLEventSubscription

Table 5.4.6.2.3-1: Definition of type MLEventSubscription

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| mLEvent | NwdafEvent | M | 1..N | Identifies the subscribed event. |  |
| mLEventFilter | EventFilter | M | 1..N | Identifies the analytics filter for the subscribed event. |  |
| tgtUe | TargetUeInformation | O | 0..1 | Identifies target UE information. |  |
| mLTgtPeriod | TimeWindow | O | 0..1 | Indicates the time interval during which the ML model shall be reported. |  |

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

##### 5.4.6.2.4 Void

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

##### 5.4.6.2.6 Type MLEventNotif

Table 5.4.6.2.6-1: Definition of type MLEventNotif

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| event | NwdafEvent | M | 1 | Identifies the subscribed event. |  |
| notifCorreId | string | O | 0..1 | Notification correlation ID used to identify the subscription to which the notification relates. It shall be set to the same value as the "notifCorreId" attribute of NwdafMLModelProvSubsc data type. |  |
| mLFileAddr | string | M | 0..1 | Indicates the address (e.g. a URL or an FQDN) of the ML model file. |  |
| validityPeriod | TimeWindow | O | 0..1 | Indicates the time period when the provided ML model applies. |  |
| spatialValidity | NetworkAreaInfo | O | 0..1 | Indicates the area where the provided ML model applies. |  |

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