**3GPP TSG CT WG3 Meeting #137 C3-245269**

**Hefei, CN, 14 - 18 October, 2024 (revision of C3-245abc)**

|  |
| --- |
| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  | **29.520** | **CR** | **0955** | **rev** | **-** | **Current version:** | **19.0.0** |  |
|  |
| *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** |

|  |
| --- |
|  |
| ***Title:***  | Enhancement on the ML model notification to include the ML model provide indication |
|  |  |
| ***Source to WG:*** | Huawei |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | eNetAE19 |  | ***Date:*** | 2024-09-25 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-19 |
|  | *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 canbe 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-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
|  |  |
| ***Reason for change:*** | Clause 6.2A.2 defined ML Model provide indicator in the ML model notification message. Because the Nnwdaf\_MLModelProvision\_Notify service operation can be used for ML model notification and accuracy information notification, the consumer needs to differentiate the initial purpose of the message and decides whether to retrieve the ML model. *- [OPTIONAL] ML Model provide indicator: indicates that the ML Model corresponding to the ML Model identifier is updated (e.g. re-trained ML Model).* |
|  |  |
| ***Summary of change:*** | * Update the MLEventNotif data type to include the ML model provide indication.
* Define new feature to support the new attribute.
* Update the service description and OpenAPI file accordingly.
 |
|  |  |
| ***Consequences if not approved:*** | The stage 2 requirement is missing in stage 3. |
|  |  |
| ***Clauses affected:*** | 4.5.2.4.2, 5.4.6.2.6, 5.4.8, A.5 |
|  |  |
|  | **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 introduces backward compatible features to the OpenAPI file for Nnwdaf\_MLModelProvision API. |
|  |  |
| ***This CR's revision history:*** |  |

\*\*\* 1st 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;
* an address (e.g. a URL or an FQDN) of the ML model file as the "mLFileAddr" attribute or if the "ModelProvisionExt"feature is supported, the ADRF (Set) information of the ML Model as the "mLModelAdrf" addtribute and an unique identifier for the ML model as "modelUniqueId" attribute; and

the MLEventNotif data type may include:

* a notification correlation identifier as "notifCorreId" attribute; and
* 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; and
* if the feature "ModelProvisionExt" is supported, the additional ML model information as "addModelInfo" attribute; and
* if the feature "ModelProvisionExt" is supported, the filtering information of the ML Model as the "mLEventFilter" attribute; and
* if the "EnModelProvision" feature is supported, the indication that indicates the ML model is provided or updated as the "modelProvideInd" attribute; and
* if the feature "ModelProvisionExt" is supported, the target UEs of the ML Model as the "tgtUe" 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 NF service consumer receives the ADRF ID as the "adrfId" attribute or the ADRF Set ID as the "adrfSetId" attribute in the NwdafMLModelProvNotif data structure of the HTTP POST request, it may invoke Nadrf\_MLModelManagement\_RetrievalRequest service operation to retrieve ML Model from the ADRF (Set) as specified in 3GPP TS 29.575 [27].

If 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 clause 6.10.9 of 3GPP TS 29.500 [6].

If errors occur when processing the HTTP POST request, the NWDAF shall send an HTTP error response as specified in clause 5.4.7.

\*\*\* 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. |  |
| mlFile | string | O | 0..1 | Indicates the ML model file. The format of its value is out of 3GPP scope.This attribute is not applicable in the Nnwdaf\_MLModelProvision API. |  |
| mLFileAddr | MLModelAddr | C | 0..1 | Indicates the address (e.g. a URL or an FQDN) of the ML model file.(NOTE 1, NOTE 2) |  |
| mLModelAdrf | MLModelAdrf | C | 0..1 | Indicates the ADRF (Set) information of the ML Model.(NOTE 2) | ModelProvisionExt |
| modelProvideInd | boolean | O | 0..1 | Set to "true" to indicate that the ML model is provided or updated. Otherwise set to "false". Default value is "false" if omitted. | EnModelProvision |
| modelUniqueId | Uinteger | C | 0..1 | Unique identifier for an ML model. The identifier shall be unique within 5GC scope.It shall be provided only if the ModelProvisionExt feature is supported. | ModelProvisionExt |
| validityPeriod | TimeWindow | O | 0..1 | Indicates the time period when the provided ML model applies.(NOTE 1) |  |
| spatialValidity | NetworkAreaInfo | O | 0..1 | Indicates the area where the provided ML model applies.(NOTE 1) |  |
| addModelInfo | array(AdditionalMLModelInformation) | O | 1..N | Indicates the additional ML Model Information.(NOTE 1) | ModelProvisionExt |
| useCaseCxt | string | O | 0..1 | Indicates the context of the ML model.The value and format of this parameter are not standardized.This attribute is not applicable in the Nnwdaf\_MLModelProvision API. | ENAExt |
| mLEventFilter | EventFilter | O | 0..1 | Identifies the analytics filter for the subscribed event.May be present if multiple ML Models with the same analytics ID are provided in the notification.(NOTE 3) | ModelProvisionExt |
| tgtUe | TargetUeInformation | O | 0..1 | Identifies target UE information. May be present if multiple ML Models with the same analytics ID are provided in the notification.(NOTE 3) | ModelProvisionExt |
| NOTE 1: If the "addModelInfo" attribute is provided, then the attributes "validityPeriod" and "spatialValidity" shall not be provided and the value of the "mLFileAddr" attribute and "mLModelAdrf" attribute and "modelUniqueId" attribute of the MLEventNotif data type shall be ignored.NOTE 2: If the "ModelProvisionExt" feature is supported, one of the "mLFileAddr" or "mLModelAdrf" attribute shall be provided.NOTE 3: The "mLEventFilter" and/or "tgtUe" attributes may be present when the ML Model provisioning request includes the same Analytics ID but with different ML Model filter information and/or different targets of ML Model reporting. |

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

### 5.4.8 Feature negotiation

The optional features in table 5.4.8-1 are defined for the Nnwdaf\_MLModelProvision API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [6].

Table 5.4.8-1: Supported Features

|  |  |  |
| --- | --- | --- |
| Feature number | Feature Name | Description |
| 1 | FederatedLearning | Indicates the support of Federated Learning. |
| 2 | ModelSharing | This feature indicates the support of ML model sharing. |
| 3 | ENAExt | This feature indicates support for the general enhancements of network data analytics requirements, including support for use case context sent by the NF service consumer to the NWDAF. |
| 4 | ModelProvisionExt | This feature indicates support for the Model Provision Extension, including support for provisioning the ML model file address (e.g. URL or FQDN) or ADRF (Set) ID and additional ML Model Information to the NF service consumer. |
| 5 | EnModelProvision | This feature indicates the enhancements on the ML model provisioning service, including:* provisioning the ML Model provide indicator in the notification.
 |

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

# A.5 Nnwdaf\_MLModelProvision API

openapi: 3.0.0

info:

 title: Nnwdaf\_MLModelProvision

 version: 1.1.1

 description: |

 Nnwdaf\_MLModelProvision API Service.

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externalDocs:

 description: 3GPP TS 29.520 V18.7.0; 5G System; Network Data Analytics Services.

 url: https://www.3gpp.org/ftp/Specs/archive/29\_series/29.520/

servers:

 - url: '{apiRoot}/nnwdaf-mlmodelprovision/v1'

 variables:

 apiRoot:

 default: https://example.com

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

security:

 - {}

 - oAuth2ClientCredentials:

 - nnwdaf-mlmodelprovision

paths:

 /subscriptions:

 post:

 summary: Create a new Individual NWDAF ML Model Provision Subscription resource.

 operationId: CreateNWDAFMLModelProvisionSubcription

 tags:

 - Subscriptions (Collection)

 requestBody:

 required: true

 content:

 application/json:

 schema:

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

 responses:

 '201':

 description: Create a new Individual NWDAF ML Model Provision Subscription resource.

 content:

 application/json:

 schema:

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

 headers:

 Location:

 description: >

 Contains the URI of the newly created resource, according to the structure

 {apiRoot}/nnwdaf-mlmodelprovision/v1/subscriptions/{subscriptionId}.

 required: true

 schema:

 type: string

 '400':

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

 '401':

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

 '403':

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

 '404':

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

 '411':

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

 '413':

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

 '415':

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

 '429':

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

 '500':

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

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

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

 default:

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

 callbacks:

 myNotification:

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

 post:

 requestBody:

 required: true

 content:

 application/json:

 schema:

 type: array

 items:

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

 minItems: 1

 responses:

 '204':

 description: No Content, Notification was succesfull

 '307':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/307'

 '308':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/308'

 '400':

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

 '401':

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

 '403':

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

 '404':

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

 '411':

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

 '413':

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

 '415':

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

 '429':

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

 '500':

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

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

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

 default:

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

 /subscriptions/{subscriptionId}:

 put:

 summary: update an existing Individual NWDAF ML Model Provision Subscription

 operationId: UpdateNWDAFMLModelProvisionSubcription

 tags:

 - Individual NWDAF ML Model Provision Subscription (Document)

 requestBody:

 required: true

 content:

 application/json:

 schema:

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

 parameters:

 - name: subscriptionId

 in: path

 description: String identifying a subscription to the Nnwdaf\_MLModelProvision Service.

 required: true

 schema:

 type: string

 responses:

 '200':

 description: >

 The Individual NWDAF ML Model Provision Subscription resource was modified successfully

 and a representation of that resource is returned.

 content:

 application/json:

 schema:

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

 '204':

 description: >

 The Individual NWDAF ML Model Provision Subscription resource was modified successfully.

 '307':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/307'

 '308':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/308'

 '400':

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

 '401':

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

 '403':

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

 '404':

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

 '411':

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

 '413':

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

 '415':

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

 '429':

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

 '500':

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

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

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

 default:

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

 delete:

 summary: Delete an existing Individual NWDAF ML Model Provision Subscription.

 operationId: DeleteNWDAFMLModelProvisionSubcription

 tags:

 - Individual NWDAF ML Model Provision Subscription (Document)

 parameters:

 - name: subscriptionId

 in: path

 description: String identifying a subscription to the Nnwdaf\_MLModelProvision Service.

 required: true

 schema:

 type: string

 responses:

 '204':

 description: >

 No Content. The Individual NWDAF ML Model Provision Subscription matching the

 subscriptionId was deleted.

 '307':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/307'

 '308':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/308'

 '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'

 '502':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/502'

 '503':

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

 default:

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

components:

 securitySchemes:

 oAuth2ClientCredentials:

 type: oauth2

 flows:

 clientCredentials:

 tokenUrl: '{nrfApiRoot}/oauth2/token'

 scopes:

 nnwdaf-mlmodelprovision: Access to the Nnwdaf\_MLModelProvision API

 schemas:

 NwdafMLModelProvSubsc:

 description: Represents NWDAF Event Subscription resources.

 type: object

 properties:

 mLEventSubscs:

 type: array

 items:

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

 minItems: 1

 description: Subscribed events

 notifUri:

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

 mLEventNotifs:

 type: array

 items:

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

 minItems: 1

 description: >

 Notifications about Individual Events.Shall only be present if the immediate reporting

 indication in the "immRep" attribute within the "eventReq" attribute sets to true in the

 event subscription, and the reports are available.

 suppFeats:

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

 notifCorreId:

 type: string

 eventReq:

 $ref: 'TS29523\_Npcf\_EventExposure.yaml#/components/schemas/ReportingInformation'

 failEventReports:

 type: array

 items:

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

 minItems: 1

 description: >

 Supplied by the NWDAF containing MTLF when available, shall contain the event(s) that

 the subscription is not successful including the failure reason(s).

 required:

 - mLEventSubscs

 - notifUri

 ModelProvisionParamsExt:

 description: >

 Extended parameters for ML model provisioning which can optionally be set by a service

 consuumer NF.

 type: object

 properties:

 modelInterInfo:

 type: string

 description: String representing the ML Model Interoperability Information.

 reqRepRatio:

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

 inferInpDataInfos:

 type: array

 items:

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

 minItems: 1

 description: >

 Inference information that is used by NWDAF containing AnLF during inference.

 multModelsInd:

 type: boolean

 description: Indicates if the NF service consumer supports multiple models.

 numModels:

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

 accuLevels:

 type: array

 items:

 $ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/Accuracy'

 minItems: 1

 description: >

 Provided accuracy levels of interest for ML models.

 InputDataInfo:

 description: Contains information about inference that is used by NWDAF containing AnLF.

 type: object

 properties:

 ratio:

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

 maxNumSamples:

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

 maxTimeInterval:

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

 inpEvent:

 $ref: 'TS29574\_Ndccf\_DataManagement.yaml#/components/schemas/DccfEvent'

 nfInstanceIds:

 type: array

 items:

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

 minItems: 1

 nfSetIds:

 type: array

 items:

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

 minItems: 1

 required:

 - inpEvent

 MLEventSubscription:

 description: Represents a subscription to a single event.

 type: object

 properties:

 mLEvent:

 $ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/NwdafEvent'

 mLEventFilter:

 $ref: 'TS29520\_Nnwdaf\_AnalyticsInfo.yaml#/components/schemas/EventFilter'

 tgtUe:

 $ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/TargetUeInformation'

 mLTargetPeriod:

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

 expiryTime:

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

 timeModelNeeded:

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

 mlEvRepCon:

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

 modelInterInfo:

 type: string

 description: String representing the ML Model Interoperability Information.

 nfConsumerInfo:

 $ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/VendorId'

 modelProvExt:

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

 useCaseCxt:

 type: string

 description: >

 Indicates the context of usage of the analytics. The value and format of this parameter

 are not standardized.

 inferDataForModel:

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

 modelId:

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

 required:

 - mLEvent

 - mLEventFilter

 NwdafMLModelProvNotif:

 description: Represents notifications on events that occurred.

 type: object

 properties:

 eventNotifs:

 type: array

 items:

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

 minItems: 1

 description: Notifications about Individual Events.

 subscriptionId:

 type: string

 description: String identifying a subscription to the Nnwdaf\_MLModelProvision Service.

 required:

 - eventNotifs

 - subscriptionId

 MLEventNotif:

 description: Represents a notification related to a single event that occurred.

 type: object

 properties:

 event:

 $ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/NwdafEvent'

 notifCorreId:

 type: string

 description: >

 Contains 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.

 mlFile:

 type: string

 description: Contains the ML model file.

 mLFileAddr:

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

 mLModelAdrf:

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

 validityPeriod:

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

 spatialValidity:

 $ref: 'TS29554\_Npcf\_BDTPolicyControl.yaml#/components/schemas/NetworkAreaInfo'

 addModelInfo:

 type: array

 items:

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

 minItems: 1

 description: Contains the additional ML Model Information besides the ML Model Address

 modelUniqueId:

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

 useCaseCxt:

 type: string

 description: >

 String identifying the context of use of ML model. The value and format of this

 parameter are not standardized.

 mLEventFilter:

 $ref: 'TS29520\_Nnwdaf\_AnalyticsInfo.yaml#/components/schemas/EventFilter'

 tgtUe:

 $ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/TargetUeInformation'

 modelProvideInd:

 type: boolean

 description: >

 Set to "true" to indicate that the ML model is provided or updated. The default value is

 "false" if omitted.

 allOf:

 - required: [event]

 - oneOf:

 - required: [mLFileAddr]

 - required: [mLModelAdrf]

 FailureEventInfoForMLModel:

 description: >

 Represents the event(s) that the subscription is not successful including the failure

 reason(s).

 type: object

 properties:

 event:

 $ref: 'TS29520\_Nnwdaf\_EventsSubscription.yaml#/components/schemas/NwdafEvent'

 failureCode:

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

 required:

 - event

 - failureCode

 MLModelAddr:

 description: Addresses of ML model files.

 type: object

 properties:

 mLModelUrl:

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

 mlFileFqdn:

 type: string

 description: The FQDN of the ML Model file.

 oneOf:

 - required: [mLModelUrl]

 - required: [mlFileFqdn]

 MLRepEventCondition:

 description: Indicates the ML event reporting condition.

 type: object

 properties:

 mlTrainRound:

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

 mlTrainRepTime:

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

 mlAccuracyThreshold:

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

 modelMetric:

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

 AdditionalMLModelInformation:

 description: Represents the additional ML Model Information.

 type: object

 properties:

 mLFileAddr:

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

 mLModelAdrf:

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

 validityPeriod:

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

 spatialValidity:

 $ref: 'TS29554\_Npcf\_BDTPolicyControl.yaml#/components/schemas/NetworkAreaInfo'

 modelUniqueId:

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

 modelRepRatio:

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

 mlDegradInd:

 type: boolean

 description: >

 Set to "true" to indicate support degration of an ML model. Set to "false" to indicate

 not support degration of an ML model. Default value is "false" if omitted.

 trainInpInfos:

 type: array

 items:

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

 minItems: 1

 description: >

 Training information that is used by NWDAF containing MTLF during training.

 modelMetric:

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

 accMLModel:

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

 oneOf:

 - required: [mLFileAddr]

 - required: [mLModelAdrf]

 required:

 - modelUniqueId

 MLModelAdrf:

 description: ADRF (Set) information of the ML Model.

 type: object

 properties:

 adrfId:

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

 adrfSetId:

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

 storTransId:

 type: string

 description: String identifying a Storage Transaction ID.

 oneOf:

 - required: [adrfId]

 - required: [adrfSetId]

 TrainInputDataInfo:

 description: Contains Training input data information that is used by NWDAF containing MTLF.

 type: object

 properties:

 dataInfo:

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

 time:

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

 dataStatisticsInfos:

 type: string

 InferenceDataForModelTrain:

 description: >

 Indicates the inference data stored in ADRF which can be used by MTLF to retrain or

 reprovision of the ML model.

 type: object

 properties:

 adrfId:

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

 adrfSetId:

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

 dataSetTag:

 $ref: 'TS29575\_Nadrf\_DataManagement.yaml#/components/schemas/DataSetTag'

 modelId:

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

 oneOf:

 - required: [adrfId]

 - required: [adrfSetId]

#

# ENUMERATIONS DATA TYPES

#

 FailureCode:

 anyOf:

 - type: string

 enum:

 - UNAVAILABLE\_ML\_MODEL

 - type: string

 description: >

 This string provides forward-compatibility with future extensions to the enumeration but

 is not used to encode content defined in the present version of this API.

 description: |

 Represents the failure code.

 Possible values are:

 - UNAVAILABLE\_ML\_MODEL: Indicates the requested ML model for the event is unavailable.

 MLModelMetric:

 anyOf:

 - type: string

 enum:

 - ACCURACY

 - type: string

 description: >

 This string provides forward-compatibility with future extensions to the enumeration but

 is not used to encode content defined in the present version of this API.

 description: |

 Represents the metric of the ML model.

 Possible values are:

 - ACCURACY: ML Model Accuracy metric.

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