**3GPP TSG-CT WG3 Meeting #130 *C3-234427r3***

**Xiamen, China, 9 - 13 October, 2023**

|  |
| --- |
| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **29.520** | **CR** | **0802** | **rev** | **-** | **Current version:** | **18.3.0** |  |
|  |
| *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)*.* |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

|  |
| --- |
|  |
| ***Title:***  | Updates to MLEventNotif in Nnwdaf\_MLModelProvision API |
|  |  |
| ***Source to WG:*** | Ericsson, Huawei |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | eNA\_Ph3 |  | ***Date:*** | 2023-09-27 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** |  Rel-18 |
|  | *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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | In TS 23.288 clause 6.2A.2, the NWDAF containing MTLF provides to the consumer of the ML model provisioning service operations ML Model Information, which includes:* the ML model file address (e.g. URL or FQDN); or
* ADRF (Set) ID.

When ADRF (Set) ID is provisioned, a Storage Transaction ID may also be provisioned.This CR proposes to update the MLEventNotif Data Type in Nnwdaf\_MLModelProvision API in clauses 5.4.6.2.6 and A.5. |
|  |  |
| ***Summary of change:*** | The changes include:* Added "NOTE 2: One of the "mLFileAddr" or "mLModelAdrf" attribute shall be provided" to Table 5.4.6.2.6-1.
* Added "mLModelAdrf" attribute to the "AdditionalMLModelInformation" data type in clause 5.4.6.2.14.
* Updated the description of feature "ModelProvisionExt" in Table 5.4.8-1.
* Updated the Nnwdaf\_MLModelProvision API in A.5.
 |
|  |  |
| ***Consequences if not approved:*** | Misalignment with stage 2 for Nnwdaf\_MLModelProvision service API may lead to implementation errors. |
|  |  |
| ***Clauses affected:*** | 5.4.6.2.6, 5.4.6.2.14, 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:*** | This CR introduces backwards compatible features to the Nnwdaf\_MLModelProvision API. |
|  |  |
| ***This CR's revision history:*** |  |

**Additional discussion(if needed):**

**Proposed changes:**

\*\*\* 1st 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 | 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 |
| 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 |
| 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 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. |

\*\*\* 2nd Change \*\*\*

##### 5.4.6.2.14 Type AdditionalMLModelInformation

Table 5.4.6.2.14-1: Definition of type AdditionalMLModelInformation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| mLFileAddr | MLModelAddr | C | 0..1 | Indicates the address (e.g. a URL or an FQDN) of the ML model file. (NOTE) |  |
| mLModelAdrf | MLModelAdrf | C | 0..1 | Indicates the ADRF (Set) information of the ML Model. (NOTE) | ModelProvisionExt |
| 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. |  |
| modelUniqueId | Uinteger | O | 0..1 | Unique identifier for an ML model. The identified shall be unique within 5GC scope. |  |
| modelRepRatio | Uinteger | O | 0..1 | Indicating the percentage of UEs in the group that is used to train an ML model when target of ML model reporting is a group of UEs. |  |
| mlDegradInd | boolean | O | 0..1 | 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 | array(TrainInputInfo) | O | 1..N | Training input data information that is used by NWDAF containing MTLF during training. |  |
| modelMetric | MLModelMetric | O | 0..1 | Indicates the ML model metric. | modelMetric |
| accMLModel | Accuracy | O | 0..1 | Represents the accuracy level of ML model.  |  |
| NOTE: If the "ModelProvisionExt" feature is supported, one of the "mLFileAddr" or "mLModelAdrf" attribute shall be provided. |

\*\*\* 3rd 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 | EnhDataMgmt | Indicates the support of enhanced data management mechanisms. |
| 4 | 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. |
| 5 | 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. |

\*\*\* 4th Change \*\*\*

# A.5 Nnwdaf\_MLModelProvision API

openapi: 3.0.0

info:

 title: Nnwdaf\_MLModelProvision

 version: 1.1.0-alpha.4

 description: |

 Nnwdaf\_MLModelProvision API Service.

 © 2023, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).

 All rights reserved.

externalDocs:

 description: 3GPP TS 29.520 V18.3.0; 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: >

 Vendor-specific information about the ML models.

 reqRepRatio:

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

 inferInpDataInfos:

 type: array

 items:

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

 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.

 TrainInputInfo:

 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'

 modelMetric:

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

 mlEvRepCon:

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

 preDetStatus:

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

 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'

 description: >

 Extended ML model parameters that a service consumer optionally sets when subscribing to

 an ML model to be provisioned.

 useCaseCxt:

 type: string

 description: >

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

 are not standardized.

 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

 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:

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

 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]

 MLModelMetric:

 description: Indicates the ML model metric.

 type: object

 properties:

 mlModelAcc:

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

 mlModelPre:

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

 mlModelRec:

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

 MLModelStatus:

 description: Indicates the pre-determined status of the ML model or training.

 type: object

 properties:

 mlReqAcc:

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

 mlTrainTime:

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

 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'

 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'

 description: Unique identifier for an ML model.

 modelRepRatio:

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

 description: >

 Minimum percentage of UEs whose data is used for training an ML model.

 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/TrainInputInfo'

 minItems: 1

 description: >

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

 modelMetric:

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

 accMLModel:

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

 oneOf:

 - required: [mLFileAddr]

 - required: [mLModelAdrf]

 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]

#

# 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.

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