**3GPP TSG-CT WG3 Meeting #130C3-234061**

**Xiamen, China, 9 - 13 October, 2023 (revision of C3-233abc)**

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| --- |
| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **29.520** | **CR** | **0782** | **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)*.* |
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|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

|  |
| --- |
|  |
| ***Title:***  | Corrections on ML model provisioning |
|  |  |
| ***Source to WG:*** | Huawei |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | eNA\_Ph3 |  | ***Date:*** | 2023-09-25 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***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:*** | * The precision and recall were removed from the definition of ML model metric in TS 23.288. The MLModelMetric data type needs to be updated to align with the stage 2 requirement. In addition, the metric refers to the measurement dimensions of a ML model, but a specific value, the specific value is indicated by the accuracy threshold in the subscription and the accuracy value in the notification. See the following descriptions in 23.288:

*- [OPTIONAL] ML Model Monitoring Information:**- [OPTIONAL] ML Model metric: i.e. ML Model Accuracy.**- [OPTIONAL] ML model monitoring reporting mode: such as Accuracy reporting interval or pre-determined status. Depending on the reporting mode, the NWDAF containing MTLF reports the model accuracy to NWDAF containing AnLF either periodically or when the ML model accuracy is crossing an ML Model Accuracy threshold, i.e. the accuracy either becomes higher or lower than the ML Model Accuracy threshold.**- [OPTIONAL] ML Model Accuracy Threshold: indicating the accuracy threshold of the ML Model requested by the consumer (as a kind of pre-determined status). It also can be used as an indication that the MTLF is triggered to execute the accuracy monitoring operations for the ML Model provisioned to AnLF.**- [OPTIONAL]ML Model Accuracy Information: indicates the accuracy of the ML model if ML Model accuracy threshold is requested, which includes:**- the accuracy value of the ML model.**- [OPTIONAL] ML model metric (i.e. ML Model Accuracy).** The consumer may include the pre-determined status, i.e. ML model Accuracy threshold or Time when the ML model is needed. In the current implementation, the threshold information was already included in MLRepEventCondition data type, which means that the accuracy in MLModelStatus data type is redundant. The consumer may provide the latest time when the model is needed, but not a time window during which the model is needed. The time information can be provided as an independent attribute in MLEventSubscription data type. Hence the MLModelStatus data type is not needed. See the following descriptions in 23.288:

*- [OPTIONAL] Time when model is needed: indicates the latest time when the consumer expects to receive the ML model(s).* |
|  |  |
| ***Summary of change:*** | * Redefine the MLModelMetric data type as enumeration.
* Remove MLModelStatus data type.
* Correct the description of "mlDegradInd" attribute.
 |
|  |  |
| ***Consequences if not approved:*** | Misalignment between stage 2 and stage 3 errors in the specification. |
|  |  |
| ***Clauses affected:*** | 5.4.6.2.3, 5.4.6.2.9, 5.4.6.2.10, 5.4.6.2.11, 5.4.6.2.14, 5.4.6.3.4(new), 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 corrections to the OpenAPI file for Nnwdaf\_MLModelProvision API. |
|  |  |
| ***This CR's revision history:*** |  |

**Additional discussion(if needed):**

**Proposed changes:**

\*\*\* 1st 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 | Identifies the subscribed event. |  |
| mLEventFilter | EventFilter | M | 1 | Identifies the analytics filter for the subscribed event. |  |
| tgtUe | TargetUeInformation | O | 0..1 | Identifies target UE information |  |
| mLTargetPeriod | TimeWindow | O | 0..1 | Indicates the time interval during which the ML model shall be reported. |  |
| expiryTime | DateTime | O | 0..1 | Indicates the time when the subscription expired. |  |
|  |  |  |  |  |  |
| mlEvRepCon | MLRepEventCondition | O | 0..1 | Indicates the ML event reporting condition. This attribute can be provided when the "notifMethod" attribute within the ReportingInformation structure is set to "ON\_EVENT\_DETECTION" in the "eventReq" attribute within the NwdafMLModelProvSubsc data type. | FederatedLearningModelProvisionExt |
|  |  |  |  |  |  |
| modelInterInfo | string | O | 0..1 | Represents the ML Model Interoperability Information. This is vendor-specific information and is agreed between vendors, if necessary for sharing purposes.The format of value is out of 3GPP. | ModelSharing |
| nfConsumerInfo | VendorId | O | 0..1 | Identifies a vendor. Vendor ID of the NF Service Consumer instance, according to the IANA-assigned "SMI Network Management Private Enterprise Codes" [30]. | ModelSharing |
| modelProvExt | ModelProvisionParamsExt | O | 0..1 | Extended ML model provisioning parameters. | ModelProvisionExt |
| useCaseCxt | string | O | 0..1 | Indicates the context of usage of the analytics.The value and format of this parameter are not standardized. | ENAExt |

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

##### 5.4.6.2.9 Void

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
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\*\*\* Next Change \*\*\*

##### 5.4.6.2.10 Void

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

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

##### 5.4.6.2.11 Type MLRepEventCondition

Table 5.4.6.2.11-1: Definition of type MLRepEventCondition

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| mlTrainRound | Uinteger | O | 0..1 | Indicates the report shall occur when the number of training round is a multiple of the value set for the attribute. |  |
| mlTrainRepTime | TimeWindow | O | 0..1 | Indicates the report shall occur when every training time interval is achieved. |  |
| mlAccuracyThreshold | Uinteger | O | 0..1 | Indicates the report shall occur when the ML model accuracy is crossing the ML Model Accuracy threshold of the value set for the attribute, i.e., the accuracy either becomes higher or lower than the value set for the attribute. |  |
| modelMetric | MLModelMetric | O | 0..1 | Indicates the ML model metric. |  |

\*\*\* Next 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 | M | 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. |  |
| modelUniqueId | Uinteger | O | 0..1 | Unique identifier for an ML model. The identifier 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 that the ML model is degraded.Set to "false" to indicate that the ML model is not degraded.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 | Uinteger | O | 0..1 | Indicates the accuracy value of the ML model.Minimum = 0. Maximum = 100. |  |

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

##### 5.4.6.3.4 Enumeration: MLModelMetric

Table 5.4.6.3.4-1: Enumeration MLModelMetric

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability |
| ACCURACY | ML Model Accuracy metric. |  |

\*\*\* Next 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.

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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'

 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'

 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'

 required:

 - event

 - mLFileAddr

 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'

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

 required:

 - mLFileAddr

 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.

 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 \*\*\*