**3GPP TSG-SA5 Meeting #156 *S5-244881***

Maastricht, The Netherlands, 19 - 23 Aug 2024

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  |  | **CR** | **0165** | **rev** | **-** | **Current version:** | **.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 | **x** | Core Network | **x** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Rel 19 CR TS 28.105 Remove Support Qualifier from attribute constraints | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | AIML\_MGT | | | | |  | ***Date:*** | | | 2024-07-29 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **C** |  | | | | | ***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 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:*** | | Following changes to 32.160 the TS is updated to remove support qualifier from attribute constraints tables. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Support Qualifier is removed from attribute constraints table throughout the spec | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Not aligned with recommendation in 32.160 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 7.2a.2.1, 7.3a.1.2.2, 7.3a.1.2.3, 7.3a.1.2.4, 7.3a.1b.2.2, 7.3a.1b.2.3, 7.3a.3.2.2, 7.3a.3.2.3, 7.4.3, 7.4.4, 7.4.7 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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's revision history:*** | |  | | | | | | | | |

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| --- |
| **Start of modification** |

#### 7.2a.2.1 MLModel

##### 7.2a.2.1.1 Definition

This IOC represents the ML model. ML model algorithm or ML model are not subjects for standardization. It is name-contained by MLModelRepository.

This MLModel MOI can be created by the system (MnS producer) or pre-installed. The MnS consumer can request the system to delete the MLModel MOI.

The MLModel may contain 3 types of contexts - TrainingContext, ExpectedRunTimeContext and RunTimeContext which represent status and conditions of the MLModel. These contexts are of mLContext <<dataType>>, see clauses 7.4.3 and 7.5.1 for details.

It also contains a reference named retrainingEventsMonitorRef which is a pointer to ThresholdMnonitor MOI. This indicates the list of performance measurements and the corresponding thresholds that are monitored and used to identify the need for re-training by the MnS Producer. After the MLModel MOI has been instantiated, the MnS Consumer can request MnS producer to instantiate a ThresholdMonitor MOI and update the reference in the MLModel MOI that can be used by the MnS producer to decide on the re-training of the MLModel. The MnS producer can be ML Training MnS producer or ML Inference MnS Producer.

##### 7.2a.2.1.2 Attributes

Table 7.2a.2.1.2-1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| mLModelId | M | T | F | F | T |
| aIMLInferenceName | M | T | F | F | T |
| mLModelVersion | M | T | F | F | T |
| expectedRunTimeContext | M | T | T | F | T |
| trainingContext | CM | T | F | F | T |
| runTimeContext | O | T | F | F | T |
| supportedPerformanceIndicators | O | T | F | F | T |
| mLCapabilitiesInfoList | M | T | F | F | T |
| **Attribute related to role** |  |  |  |  |  |
| retrainingEventsMonitorRef | O | T | T | F | T |
| sourceTrainedMLModelRef | CM | T | F | F | T |

##### 7.2a.2.1.3 Attribute constraints

Table 7.2a.2.1.3-1

|  |  |
| --- | --- |
| Name | Definition |
| trainingContext | Condition: The trainingContext represents the status and conditions related to training and should be added when training is completed. |
| sourceTrainedMLModelRef | Condition: The MLModel MOI containing this attribute represents an ML model loaded to an inference function. |

##### 7.2a.2.1.4 Notifications

The common notifications defined in clause 7.6 are valid for this IOC, without exceptions or additions

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| **Next modifications** |

##### 7.3a.1.2.2 MLTrainingRequest

###### 7.3a.1.2.2.1 Definition

The IOC MLTrainingRequest represents the ML model training request that is trigered by the ML training MnS consumer.

To trigger the ML model training process, ML training MnS consumer needs create MLTrainingRequest object instances on the ML training MnS producer. The MLTrainingRequest MOI is contained under one MLTrainingFunction MOI.

The MLTrainingRequest MOI may represent the request for initial ML model training or re-training. For ML model re-training, the MLTrainingRequest is associated to one MLModel for re-training a single ML entity, or associated to one MLModelCoordinationGroup.

The MLTrainingRequest may have a source to identify its origin, which may be used to prioritize the training resources for different sources. The sources may be for example the network functions, operator roles, or other functional differentiations.

Each MLTrainingRequest indicates the expectedRunTimeContext that describes the specific conditions for which the MLModel should be trained.

In case the request is accepted, the ML training MnS producer decides when to start the ML model training based on consumer requirements. Once the MnS producer decides to start the training based on the request, the ML training MnS producer instantiates one or more MLTrainingProcess MOI(s) that are responsible to perform the followings:

- collects (more) data for training, if the training data are not available or the data are available but not sufficient for the training;

- prepares and selects the required training data, with consideration of the consumer’s request provided candidate training data if any. The ML training MnS producer may examine the consumer's provided candidate training data and select none, some or all of them for training. In addition, the ML training MnS producer may select some other training data that are available in order to meet the consumer’s requirements for the ML model training;

- trains the MLModel using the selected and prepared training data.

The MLTrainingRequest may have a requestStatus field to represent the status of the specific MLTrainingRequest:

- The attribute values are "NOT\_STARTED", " IN\_PROGRESS", "SUSPENDED", "FINISHED", and "CANCELLED".

- When value turns to " IN\_PROGRESS", the ML training MnS producer instantiates one or more MLTrainingProcess MOI(s) representing the training process(es) being performed per the request and notifies the MLT MnS consumer(s) who subscribed to the notification.

When all of the training process associated to this request are completed, the value turns to "FINISHED".

The ML training MnS prodcuer shall delete the corresponding MLTrainingRequest instance in case of the status value turns to "FINISHED" or "CANCELLED". The MnS producer may notify the status of the request to MnS consumer after deleting MLTrainingRequest instance.

###### 7.3a.1.2.2.2 Attributes

Table 7.3a.1.2.2.1-1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| aIMLInferenceName | CM | T | F | F | T |
| candidateTrainingDataSource | O | T | T | F | T |
| trainingDataQualityScore | O | T | T | F | T |
| trainingRequestSource | M | T | T | F | T |
| requestStatus | M | T | F | F | T |
| expectedRuntimeContext | M | T | T | F | T |
| performanceRequirements | M | T | T | F | T |
| cancelRequest | O | T | T | F | T |
| suspendRequest | O | T | T | F | T |
| **Attribute related to role** |  |  |  |  |  |
| mLModelRef | CM | T | F | F | T |
| mLModelCoordinationGroupRef | CM | T | F | F | T |

###### 7.3a.1.2.2.3 Attribute constraints

Table 7.3a.1.2.2.3-1

|  |  |
| --- | --- |
| Name | Definition |
| inferenceType | Condition: MLTrainingRequest MOI represents the request for initial ML model training. |
| mLEntityToTrainRef | Condition: MLTrainingRequest MOI represents the request for ML model re-training. |
| mLEntityCoordinationGroupToTrainRef | Condition: MLTrainingRequest MOI represents the request for joint training of a group of ML models. |

###### 7.3a.1.2.2.4 Notifications

The common notifications defined in clause 7.6 are valid for this IOC, without exceptions or additions.

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| **Next modifications** |

##### 7.3a.1.2.3 MLTrainingReport

###### 7.3a.1.2.3.1 Definition

The IOC MLTrainingReport represents the ML model training report that is provided by the training MnS producer. The MLTrainingReport is associated with one MLModel or one MLModelCoordinationGroup.

The MLTrainingReport instance is created by the training MnS producer automatically when creating an MLTrainingRequest instance.

The MLTrainingReport MOI is contained under one MLTrainingFunction MOI.

###### 7.3.1.2.3.2 Attributes

Table 7.3a.1.2.3.2-1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| usedConsumerTrainingData | CM | T | F | F | T |
| modelConfidenceIndication | O | T | F | F | T |
| modelPerformanceTraining | M | T | F | F | T |
| areNewTrainingDataUsed | M | T | F | F | T |
| **Attribute related to role** |  |  |  |  |  |
| trainingRequestRef | CM | T | F | F | T |
| trainingProcessRef | M | T | F | F | T |
| lastTrainingRef | CM | T | F | F | T |
| mLModelGeneratedRef | M | T | F | F | T |
| mLModelCoordinationGroupGeneratedRef | CM | T | F | F | T |
| mLModelRef | M | T | F | F | T |

###### 7.3a.1.2.3.3 Attribute constraints

Table 7.3a.1.2.3.3-1

|  |  |
| --- | --- |
| Name | Definition |
| usedConsumerTrainingData | Condition: The value of areConsumerTrainingDataUsed attribute is ALL or PARTIALLY. |
| trainingRequestRef | Condition: The MLTrainingReport MOI represents the report for the ML model training that was requested by the MnS consumer (via MLTrainingRequest MOI). |
| lastTrainingRef | Condition: The MLTrainingReport MOI represents the report for the ML model training that was not initial training (i.e. the model has been trained before). |
| mLModelCoordinationGroupGeneratedRef | Condition: The MLTrainingReport MOI represents the report for a joint training of a group of ML Models. |

###### 7.3a.1.2.3.4 Notifications

The common notifications defined in clause 7.6 are valid for this IOC, without exceptions or additions.

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| **Next modifications** |

##### 7.3a.1.2.4 MLTrainingProcess

###### 7.3a.1.2.4.1 Definition

The IOC MLTrainingProcess represents the ML model training process. When a ML model training process starts, an instance of the MLTrainingProcess is created by the MnS Producer and notification is sent to MnS consumer who has subscribed to it.The MnS producer can delete the MLTrainingProcess instance whose attribute status equals to "FINISHED" or or "CANCELLED" automatically.

One MLTrainingProcess MOI may be instantiated for each MLTrainingRequest MOI or a set of MLTrainingRequest MOIs.

For each MLModel under training, a MLTrainingProcess is instantiated, i.e. an MLTrainingProcess is associated with one MLModel or one MLModelCoordinationGroup.The MLTrainingProcess may be associated with one or more MLTrainingRequest MOI.

The MLTrainingProcess does not have to correspond to a specific MLTrainingRequest, i.e. a MLTrainingRequest does not have to be associated to a specific MLTrainingProcess. The MLTrainingProcess may be managed separately from the MLTrainingRequest MOIs, e.g. the MLTrainingRequest MOI may come from consumers which are network functions while the operator may wish to manage the MLTrainingProcess that is instantiated following the requests. Thus, the MLTrainingProcess may be associated to either one or more MLTrainingRequest MOI.

Each MLTrainingProcess instance needs to be managed differently from the related MLModel, although the MLTrainingProcess may be associated to only one MLModel. For example, the MLTrainingProcess may be triggered to start with a specific version of the MLModel and multiple MLTrainingProcess instances may be triggered for different versions of the MLModel. In either case the MLTrainingProcess instances are still associated with the same MLModel but are managed separately from the MLModel.

Each MLTrainingProcess has a priority that may be used to prioritize the execution of different MLTrainingProcess instances.

Each MLTrainingProcess may have one or more termination conditions used to define the points at which the MLTrainingProcess may terminate.

The "progressStatus" attribute represents the status of the ML model training and includes information the ML training MnS consumer can use to monitor the progress and results. The data type of this attribute is "ProcessMonitor" (see 3GPP TS 28.622 [12]). The following specializations are provided for this data type for the ML model training process:

- The "status" attribute values are "RUNNING", "CANCELLING", "SUSPENDED", "FINISHED", and "CANCELLED". The other values are not used.

- The "timer" attribute is not used.

- When the "status" is equal to "RUNNING" the "progressStateInfo" attribute shall indicate one of the following states: "COLLECTING\_DATA", "PREPARING\_TRAINING\_DATA", "TRAINING".

- No specifications are provided for the "resultStateInfo" attribute. Vendor specific information may be provided though.

When the training is completed with "status" equal to "FINISHED", the MLT MnS producer provides the training report, by creating an MLTrainingReport MOI, to the MLT MnS consumer.

###### 7.3a.1.2.4.2 Attributes

Table 7.3a.1.2.4.2-1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| priority | M | T | T | F | T |
| terminationConditions | M | T | T | F | T |
| progressStatus | M | T | F | F | T |
| cancelProcess | O | T | T | F | T |
| suspendProcess | O | T | T | F | T |
| **Attribute related to role** |  |  |  |  |  |
| trainingRequestRef | CM | T | F | F | T |
| trainingReportRef | M | T | F | F | T |
| mLModelGeneratedRef | CM | T | F | F | T |
| mLModelRef | M | T | F | F | T |

###### 7.3a.1.2.4.3 Attribute constraints

Table 7.3a.1.2.4.3-1

|  |  |
| --- | --- |
| Name | Definition |
| trainingRequestRef | Condition: The MLTrainingReport MOI represents the report for the ML model training that was requested by the training MnS consumer (via MLTrainingRequest MOI). |
| mLModelGeneratedRef | Condition: The MLTrainingProcess MOI is instantiated to retrain an existing MLModel. |

###### 7.3a.1.2.4.4 Notifications

The common notifications defined in clause 7.6 are valid for this IOC, without exceptions or additions.

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| **Next modifications** |

7.3a.1b.2.2 MLTestingRequest

7.3a.1b.2.2.1 Definition

The IOC MLTestingRequest represents the ML model testing request that is triggered by the ML testing MnS consumer.

To trigger the ML model testing process, ML testing MnS consumer needs to create MLTrainingRequest.

The MLTestingRequest MOI is contained under one MLTestingFunction MOI or MLTrainingFunction MOI which represents the logical function that conducts the ML model testing. Each MLTestingRequest is associated to at least one MLModel.

In case the request is accepted, the ML testing MnS producer decides when to start the ML model testing. Once the MnS producer decides to start the testing based on the request, the ML testing MnS producer:

- collects (more) data for testing, if the testing data are not available or the data are available but not sufficient for the testing;

- prepares and selects the required testing data;

- tests the MLModel by performing inference using the selected testing data, and

- reports the performance of the MLModel when it performs on the selected testing data.

The MLTestingRequest may have a requestStatus field to represent the status of the request:

- The attribute values are "NOT\_STARTED", "IN\_PROGRESS", "SUSPENDED", "FINISHED", and "CANCELLED".

The ML testing MnS prodcuer shall delete the corresponding MLTestingRequest instance in case of the status value turns to "FINISHED" or "CANCELLED". The MnS producer may notify the status of the request to MnS consumer before deleting MLTestingRequest instance.

7.3a.1b.2.2.2 Attributes

**Table 7.3a.1b.2.2.2-1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute name** | **Support Qualifier** | **isReadable** | **isWritable** | **isInvariant** | **isNotifyable** |
| requestStatus | M | T | F | F | T |
| cancelRequest | O | T | T | F | T |
| suspendRequest | O | T | T | F | T |
| **Attribute related to role** |  |  |  |  |  |
| mLModelRef | CM | T | F | F | T |
| mLModelCoordinationGroupRef | CM | T | F | F | T |

7.3a.1b.2.2.3 Attribute constraints

**Table 7.3a.1.2.6.3-1**

|  |  |
| --- | --- |
| **Name** | **Definition** |
| mLModelRef | Condition: The MLTestingRequest MOI represents the request for testing of a single ML model. |
| mLModelCoordinationGroupRef | Condition: The MLTestingRequest MOI represents the request for joint testing of a group of ML models. |

7.3a.1b.2.2.4 Notifications

The common notifications defined in clause 7.6 are valid for this IOC, without exceptions or additions.

|  |
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| **Next modifications** |

7.3a.1b.2.3 MLTestingReport

7.3a.1b.2.3.1 Definition

The IOC MLTestingReport represents the ML testing report that is provided by the ML testing MnS producer.

The MLTestingReport MOI is contained under one MLTestingFunction MOI or MLTrainingFunction MOI which represents the logical function that conducts the ML model testing.

For the joint testing of a group of ML models, the ML testing report contains the testing results for every ML model in the group.

The MLTestingReport instance is created by the ML testing MnS producer and notification is sent to ML testing Consumer who has subscribed to it.

7.3a.1b.2.3.2 Attributes

**Table 7.3a.1b.2.3.2-1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute name** | **Support Qualifier** | **isReadable** | **isWritable** | **isInvariant** | **isNotifyable** |
| modelPerformanceTesting | M | T | F | F | T |
| mLTestingResult | M | T | F | F | T |
| **Attribute related to role** |  |  |  |  |  |
| testingRequestRef | CM | T | F | F | T |

7.3a.1b.2.3.3 Attribute constraints

**Table 7.3a.1b.2. 3.3-1**

|  |  |
| --- | --- |
| **Name** | **Definition** |
| testingRequestRef | Condition: The MLTestingReport MOI represents the report for the ML model testing that was requested by the MnS consumer (via MLTestingRequest MOI). |

7.3a.1b.2.3.4 Notifications

The common notifications defined in clause 7.6 are valid for this IOC, without exceptions or additions.

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| **Next modifications** |

##### 7.3a.3.2.2 MLModelLoadingPolicy

###### 7.3a.3.2.2.1 Definition

This IOC represents the ML model loading policy set by the MnS consumer to the producer for loading an ML model to the target inference function(s).

To specify ML model loading policy for one or muiltiply ML models, MnS consumer needs to create MLModelLoadingPolicy object instances.

To remove ML model loading policy for one or muiltiply ML models, MnS consumer needs to delete MLModelLoadingPolicy object instances.

This IOC is used for the MnS consumer to set the conditions for the producer-initated ML model loading. The MnS producer is only allowed to load the ML model when all of the conditions are met.

###### 7.3a.3.2.2.2 Attributes

Table 7.3a.3.2.2.2-1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| aIMLInferenceName | CM | T | T | F | T |
| policyForLoading | M | T | T | F | T |
| **Attribute related to role** |  |  |  |  |  |
| mLModelRef | CM | T | F | F | F |

###### 7.3a.3.2.2.3 Attribute constraints

Table 7.3a.3.2.2.3-1

|  |  |
| --- | --- |
| Name | Definition |
| aIMLInferenceName | Condition: The ML model loading policy is related to an initially trained ML model. |
| mLModelRef | Condition: The ML model loading policy is related to a re-trained ML entity. |

###### 7.3a.3.2.2.4 Notifications

The common notifications defined in clause 7.6 are valid for this IOC, without exceptions or additions.

|  |
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| **Next modifications** |

##### 7.3a.3.2.3 MLModelLoadingProcess

###### 7.3a.3.2.3.1 Definition

This IOC represents the ML model loading process.

For the consumer requested ML model loading, one or more MLModelLoadingProcess MOI(s) may be instantiated for each ML model loading request presented by the MLModelLoadingRequest MOI.

For the producer-initiated ML model loading, one or more MLModelLoadingProcess MOI(s) may be instantiated and associated with each MLModelLoadingPolicy MOI.

One MLModelLoadingProcess MOI represent the ML model loading process(es) corresponding to one or more target inference function(s).

The "progressStatus" attribute represents the status of the ML model loading process and includes information the MnS consumer can use to monitor the progress and results. The data type of this attribute is "ProcessMonitor" (see 3GPP TS 28.622 [12]). The following specializations are provided for this data type for the ML model loading process:

- The "status" attribute values are "RUNNING", "CANCELLING", "SUSPENDED", "FINISHED", and "CANCELLED". The other values are not used.

- The "timer" attribute is not used.

- When the "status" is equal to "RUNNING" the "progressStateInfo" attribute shall indicate one of the following state: "LOADING".

- No specifications are provided for the "resultStateInfo" attribute. Vendor specific information may be provided though.

When the loading is completed with "status" equal to "FINISHED", the MnS producer creates the MOI(s) of loaded MLModel under each MOI of the target inference function(s).

When a ML model loading process starts, an instance of the MLModelLoadingProcess is created by the MnS Producer and notification is sent to MnS consumers who have subscribed to it. The MnS producer can delete the MLModelLoadingProcess instance whose attribute status equals to "FINISHED" or or "CANCELLED" automatically.

###### 7.3a.3.2.3.2 Attributes

Table 7.3a.3.2.3.2-1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| progressStatus | M | T | F | F | T |
| cancelProcess | O | T | T | F | T |
| suspendProcess | O | T | T | F | T |
| **Attribute related to role** |  |  |  |  |  |
| MLModelLoadingRequestRef | CM | T | F | F | T |
| MLModelLoadingPolicyRef | CM | T | F | F | T |
| LoadedMLModelRef | M | T | F | F | T |

###### 7.3a.3.2.3.3 Attribute constraints

Table 7.3a.3.2.3.3-1

|  |  |
| --- | --- |
| Name | Definition |
| MLModelLoadingRequestRef | Condition: The MLModelLoadingProcess MOI is corresponding to the ML model loading requested by the MnS consumer. |
| MLModelLoadingPolicyRef | Condition: The MLModelLoadingProcess MOI is corresponding to the ML model loading initiated by the MnS producer. |

###### 7.3a.3.2.3.4 Notifications

The common notifications defined in clause 7.6 are valid for this IOC, without exceptions or additions.

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| **Next modifications** |

### 7.4.3 MLContext <<dataType>>

#### 7.4.3.1 Definition

The MLContext represents the status and conditions related to the MLModel. There are three types of context - the ExpectedRunTimeContext, the trainingContext and the RunTimeContext, see clause 7.5.1 for details of each type.

#### 7.4.3.2 Attributes

Table 7.4.3.2-1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| inferenceModelRef | CM | T | F | F | F |
| dataProviderRef | M | T | F | F | F |

#### 7.4.3.3 Attribute constraints

Table 7.4.3.3-1

|  |  |
| --- | --- |
| Name | Definition |
| inferenceModelRef | Condition: The MLContext is used for expectedRunTimeContext, trainingContext or runTimeContext. |

#### 7.4.3.4 Notifications

The notifications specified for the IOC using this <<dataType>> for its attribute(s), shall be applicable.

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| **Next modifications** |

### 7.4.4 SupportedPerfIndicator <<dataType>>

#### 7.4.4.1 Definition

This data type specifies a Performance indicator of an ML model. The data type may be used to indicate which performance indicators shall be applicable to either of training, testing or inference.

#### 7.4.4.2 Attributes

Table 7.4.4.2-1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| performanceIndicatorName | M | T | F | F | T |
| isSupportedForTraining | CM | T | F | F | T |
| isSupportedForTesting | CM | T | F | F | T |

#### 7.4.4.3 Attribute constraints

Table 7.4.4.3-1

|  |  |
| --- | --- |
| Name | Definition |
| isSupportedForTraining | Condition: if the performance indicator named performanceIndicatorName is applicable for training, the isSupportedforTraining must be stated |
| isSupportedForTesting | Condition: if the performance indicator named performanceIndicatorName is applicable for testing, the isSupportedForTesting must be stated |

#### 7.4.4.4 Notifications

The notifications specified for the IOC using this <<dataType>> for its attribute(s), shall be applicable.

|  |
| --- |
| **Next modifications** |

### 7.4.7 ManagedActivationScope <<choice>>

#### 7.4.7.1 Definition

This <<choice>> defines the scopes for activating or deactivating the ML Inference function. It is a choice between the scopes parameter required for the activation or deactivation.

#### 7.4.7.2 Attributes

Table 7.4.7.2-1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| CHOICE\_1.1 dNList | CM | T | T | F | T |
| CHOICE\_1.2 timeWindow | CM | T | T | F | T |
| CHOICE\_1.3 geoPolygon | CM | T | T | F | T |

#### 7.4.7.3 Attribute constraints

Table 7.4.7.3-1

|  |  |
| --- | --- |
| Name | Definition |
| dNList | Condition: if the sub scope is per list of managed elements (e.g., DN list) |
| timeWindow | Condition: if the sub scope is per list of time window. |
| geoPolygon | Condition: if the sub scope is per list of GeoArea. |

#### 7.4.7.4 Notifications

The notifications specified for the IOC using this <<dataType>> for its attribute(s), shall be applicable.

|  |
| --- |
| **End of modifications** |