**3GPP TSG- Meeting #**

**Changsha, CN,15**th **– Revision of S5-241446**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  |  | **CR** |  **0115** | **rev** | **1** | **Current version:** |  |  |
|  |
| *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-18 CR TS 28.105 Performance management for ML training and testing |
|  |  |
| ***Source to WG:*** |  |
| ***Source to TSG:*** | S5 |
|  |  |
| ***Work item code:*** |  |  | ***Date:*** |  |
|  |  |  |  |  |
| ***Category:*** | F |  | ***Release:*** |  |
|  | *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)* |
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| ***Reason for change:*** | Correction in existing text is needed. The requirements are mandatory but should be optional as usage of the performance indicators are optional.There is no definition of ML entity type in the current version of TS in release 18 and the requirement for the consumer to ask about type of ML that a producer can train, or test is not solved. Change the requirements to be optional.  |
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| ***Summary of change:*** | Correct the text where issues and inconsistencies described above are stated.  |
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| ***Consequences if not approved:*** | The statement on requirments are not correct. |
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| ***Clauses affected:*** | 6.2a.2.1, 6.2a.2.2.1, 6.2a.2.2.2, 6.2a.2.3 |
|  |  |
|  | **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:*** |  |

***First change***

### 6.2a.2 Performance management for ML training and testing

#### 6.2a.2.1 Description

In the ML model training , the performance of ML entity needs to be evaluated on training data and testing data. The performance is the degree to which the ML entities fulfil the objectives for which they were trained. The related performance indicators need to be collected and analyzed.

#### 6.2a.2.2 Use cases

##### 6.2a.2.2.1 Performance indicator selection for ML training and testing

The ML model training function may support training for a single or several ML models and may support the capability to evaluate each ML entity by one or more performance indicators.

The MnS consumer may prefer to use some performance indicator(s) over others to evaluate one kind of ML entity. The performance indicators for training mainly include the following aspects:ML training process monitors performance indicators: the performance indicators of the system that trains the ML entity, including training duration indicator.

- ML training model performance indicators: performance indicators of the ML entity itself, including but not limited to:

- Accuracy indicator,

- Precision indicator,

- Recall indicator,

- F1 score indicator,

- MSE (Mean Squared Error) indicator, and

- MAE (Mean Absolute Error) indicator,

- RMSE (Root Mean Square Error) indicator.

The MnS consumer may prefer to use some performance indicator(s) over others to evaluate one kind of ML entity. The performance indicators for testing mainly include the following aspects:

- ML testing model performance indicators: performance indicators of the ML entity itself, including but not limited to:

- Accuracy indicator,

- Precision indicator,

- Recall indicator,

- F1 score indicator,

- MSE (Mean Squared Error) indicator,

- MAE (Mean Absolute Error) indicator, and

- RMSE (Root Mean Square Error) indicator.

The MnS producer for ML training and testing needs to provide the name(s) of supported performance indicator(s) for the MnS consumer to query and select for ML entity performance evaluation. The MnS consumer may also need to provide the performance requirements of the ML entity using the selected performance indicators.

The MnS producer for ML training and testing uses the selected performance indicators for evaluating ML training and testing, and reports with the corresponding performance score in the ML training report or ML testing report when the training or testing is completed.

***Next change***

#### 6.2a.2.3 Requirements for ML training and testing performance management

Table 6.2a.2.3-1

| Requirement label | Description | Related use case(s) |
| --- | --- | --- |
| **REQ-ML\_TRAIN\_PM-2** | The ML Training or Testing MnS producer should have a capability to allow an authorized consumer to query what performance indicators are supported by the ML training function or ML testing function for each ML entity. | Performance indicator selection for ML training (clause 6.2a.2.2.1) |
| **REQ-ML\_TRAIN\_PM-3** | The ML Training or Testing MnS producer should have a capability to allow an authorized consumer to select the performance indicators from those supported by the ML training functionor ML testing function for reporting the training or testing performance for each ML entity. | Performance indicator selection for ML training (clause 6.2a.2.2.1) |
| **REQ-ML\_TRAIN\_PM-4** | The ML Training MnS producer should have a capability to allow an authorized consumer to provide the performance requirements for the ML model training using the selected the performance indicators from those supported by the ML training function. | Performance indicator selection for ML training (clause 6.2a.2.2.1) |

| Requirement label | Description | Related use case(s) |
| --- | --- | --- |
| **REQ-ML\_TRAIN\_PM-1** | The ML Training or Testing MnS producer should have a capability to allow an authorized consumer to get the capabilities about what kind of ML models the ML training function or ML testing function is able to train or test. | Performance indicator selection for ML training (clause 6.2a.2.2.1) |
| **REQ-ML\_TRAIN\_PM-2** | The ML Training or Testing MnS producer should have a capability to allow an authorized consumer to query what performance indicators are supported by the ML training function or ML testing function for each kind of ML entity. | Performance indicator selection for ML training (clause 6.2a.2.2.1) |
| **REQ-ML\_TRAIN\_PM-3** | The ML Training or Testing MnS producer should have a capability to allow an authorized consumer to select the performance indicators from those supported by the ML training function or ML testing function for reporting the training or testing performance for each kind of ML entity. | Performance indicator selection for ML training (clause 6.2a.2.2.1) |
| **REQ-ML\_TRAIN\_PM-4** | The ML Training MnS producer should have a capability to allow an authorized consumer to provide the performance requirements for the ML model training using the selected the performance indicators from those supported by the ML training function. | Performance indicator selection for ML training (clause 6.2a.2.2.1) |

***End of changes***