**3GPP TSG- Meeting # *S5-213200***

**10 May to 19 May 2021, E-meeting**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  |  | **CR** | **0081** | **rev** | **-** | **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:*** | Add ML support for MnS | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Intel | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eMDAS | | | | |  | ***Date:*** | | | 30 |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***Release:*** | | | 17 |
|  | *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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)*  *Rel-17 (Release 17)* | |
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| ***Reason for change:*** | | ML (Machine Learning) capabilities may be used to support one or more MnSs (e.g., MDAS), and there are some generic aspects of ML capabilities for supporting the various MnSs.  This CR is to add the generic aspects of ML capabilities for supporting MnSs. | | | | | | | | |
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| ***Summary of change:*** | | Add ML support for MnS, including the ML capabilities for MnS and the relation between ML and MnS. | | | | | | | | |
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| ***Consequences if not approved:*** | | The ML capabilities for supporting MnSs where needed cannot be supported. | | | | | | | | |
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| ***Clauses affected:*** | | 3.2, 5.x (new) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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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| **1st modified section** |

# 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1], TS 28.530 [3], in NFV-MANO [27] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

CM Configuration Management

LCM Lifecycle Management

MDAS Management Data Analytics Service

MnF Management Function

MnS Management Service

NF Network Function

NFV-MANO Network Functions Virtualisation Management and Orchestration

PM Performance Management

SBMA Service Based Management Architecture

ML Machine Learning

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| **Next modified section** |

## 5.x Machine Learning (ML) for MnS

### 5.x.1 Introduction

An MnS (e.g., MDAS) may be supported by ML capabilities.

The following sub-clauses in clause 5.x provide how an MnS can be supported by ML and the possible relations between ML and MnS.

### 5.x.2 ML capabilities for MnS

When ML is used for an MnS, the following ML capabilities are provided for supporting the MnS as illustrated in Figure 5.x.2-1.

The ML capabilities are provided by a producer to a consumer, and the ML model needs to be deployed in the ML capability producer. How the ML model is deployed is not addressed in the present document.



Figure 5.x.2-1: ML for MnS

**ML model training**: The ML capability producer trains the ML model (i.e., to train the algorithm of the ML model) to be able to provide the expected output when processing the input for an MnS. The ML capability producer may train the ML model based on the training data (including the training input and the expected output) provided by the consumer, and provide the training report to the consumer. The ML capability producer may re-train the ML model based on the validation feedback, including training report validation feedback and processing output validation feedback, provided by the consumer.

**Data processing**: The ML capability producer processes the input data using the trained ML model and generates the processing output for an MnS. The ML capability producer provides the processing output to the consumer.

**Validation**: The ML capability consumer may validate the training report and/or the processing output related to an MnS and provides validation feedback to the producer. The training report validation feedback may indicate whether or not the training has met the expectation, and the processing output validation feedback may indicate whether the output are erroneous or accurate.

### 5.x.3 Relation between ML and MnS

The ML capabilities may be provided to support MnS in the following possible ways:

1) MnS producer acts as ML capability consumer

The MnS producer acts as ML capability consumer as illustrated in Figure 5.x.3-1, and does not expose the ML capabilities to MnS consumer.



Figure 5.x.3-1: MnS producer acts as ML capability consumer

2) MnS producer acts as ML capability producer and exposes ML capabilities to MnS consumer

The MnS producer acts as ML capability producer as illustrated in Figure 5.x.3-2, and exposes the ML capabilities to MnS consumer (i.e., the MnS consumer also acts as ML capability consumer).



Figure 5.x.3-2: MnS producer acts as ML capability producer and exposes ML capabilities to MnS consumer

3) MnS producer uses ML capabilities privately and does not expose ML capabilities to MnS consumer

The MnS producer uses ML capabilities privately (i.e., the MnS producer acts as both ML capability producer and ML capability consumer) as illustrated in Figure 5.x.3-3, and does not exposes the ML capabilities to MnS consumer.



Figure 5.x.3-3: MnS producer uses ML capabilities privately and does not expose ML capabilities to MnS consumer

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| **End of modified section** |