**3GPP TSG-CT WG3 Meeting #138C3-246342**

**Orlando, US, 18 - 22 November, 2024**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.552** | **CR** | **0141** | **rev** | **-** | **Current version:** | **19.0.0** |  |
|  | | | | | | | | |
| *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** |

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| ***Title:*** | Procedure for Vertical Federated Learning when NWDAF is acting as VFL server | | | | | | | | | |
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| ***Source to WG:*** | China Mobile | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | AIML\_CN | | | | |  | ***Date:*** | | | 2024-11-11 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | B |  | | | | | ***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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | It is agreed in S2-2411194 that procedure of Vertical Federated Learning when NWDAF is acting as VFL server is introduced. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Adding the procedure for Vertical Federated Learning when NWDAF is acting as VFL server. | | | | | | | | |
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| ***Consequences if not approved:*** | | Stage 2 requirement cannot be fulfilled. | | | | | | | | |
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| ***Clauses affected:*** | | 5.10.1, 5.10.3(NEW) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS 23.288 CR 1134 | | |
| ***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 \* \* \* \*

### 5.10.1 General

The NWDAF containing MTLF can leverage Federated Learning (FL) technique to train an ML model. To apply FL technique for ML model training, there is no need for input data transfer (e.g. centralized into one NWDAF) but only need for cooperation among multiple NWDAFs (MTLF) distributed in different areas, i.e. sharing of ML model(s) and of the learning results among multiple NWDAFs (MTLF).

The NWDAF containing MTLF determines to train an ML model either based on local configuration or when it receives the request from NWDAF containing AnLF as described in clause 5.3 of 3GPP TS 23.288 [17]. If the NWDAF containing MTLF can act as an FL server for the ML model training, then FL procedure is initiated by the NWDAF containing MTLF as FL server NWDAF directly, otherwise, the NWDAF containing MTLF should discover an FL server NWDAF as described in clause 5.3.2.2 of 3GPP TS 29.510 [26] and request the FL server NWDAF to provide the trained ML model as described in clause 5.10.2.1.

The NWDAF and the AF can leverage Vertical Federated Learning (VFL) technique to perform ML model and inference without changing/sharing local data set.

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

### 5.10.3 Procedures related to Vertical Federated Learning

#### 5.10.3.1 General Procedure for Vertical Federated Learning when NWDAF is acting as VFL server

This procedure is used by the NWDAF containing VFL Server to trigger training procedure for Vertical Federated Learning among multiple NWDAF instances and/or AF containing VFL client.

Editor’s Note: As current stage2 procedure is not stable, and also the Data type used in the procedure have not been defiended, it is FFS how to document the procedures related to VFL.

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