**3GPP TSG-SA3 Meeting #115 *S3-240577***

Athens, Greece, 26th February - 1st March 2024

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** | **1927** | **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 |  | Core Network | **X** |

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| Title: | Authorization of NWDAF MTLF to request FL process on behalf of AnLF | | | | | | | | | |
| ***us*** |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** | S3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eNA\_Ph3\_SEC | | | | |  | ***Date:*** | | | 2024-02-26 |
|  |  | | | |  | |  | | |  |
| ***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 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)* | |
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| ***Reason for change:*** | | This CR addresses the issue indicated in NOTE 2 of TS 23.288 clause 5.3:  *How to authorize an MTLF to request ML models on behalf of an AnLF to another MTLF (e.g., FL server NWDAF) is up to SA WG3*  According to the TS 23.288 clause 5.3, an MTLF can request ML models on behalf of an AnLF to another MTLF such as an FL server NWDAF, which further will need to be authorized by the correspondig NWDAF containing MTLF acting as FL clients as specified in Annex X.9 of TS 33.501.  Thus the chain for required authorization can be represented as follows:  AnLF🡪 MTLF 🡪 MTLF (FL Server) 🡪 MTLF (FL Client) | | | | | | | | |
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| ***Summary of change:*** | | This CR proposes a solution to allow the authorization of the request of ML models by MTLF on behalf of AnLF to MTLF FL Server. | | | | | | | | |
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| ***Consequences if not approved:*** | | Models could be shared with consumers not under control of the model producer in Federated Learning scenarios | | | | | | | | |
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| ***Clauses affected:*** | | Annex X.9 | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **XX** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

# X.9 Authorization of selection of participant NWDAF instances in the Federated Learning group

The authorization for selecting participant NWDAF instances in the Federated Learning (FL) group uses token-based authorization as specified in clause 13.4.1, with the following additions.

Figure X.9-1 depicts the authorization mechanism for NWDAF containing MTLF acting as FL Server to initiate the Federated Learning process on the NWDAF containing MTLF(s) acting as FL Client(s). The authorization is based upon the FL capability type (FL server or FL client) provided by the NWDAF containing MTLF acting as FL server during registration, and the Analytics ID and Interoperability Indicator per Analytics ID provided by the NWDAF containing MTLF acting as FL client during registration.

Editor’s note: The use of Service area and Availability time requirement for authorization is FFS.



Figure X.9-1: FL Authorization for selecting participant NWDAF instances

Step 1a. The NWDAF containing. MTLF acting as FL client registers to the NRF with its FL related information, including supported FL capability (FL client), Analytics ID(s) and Interoperability Indicator per Analytics ID as described in clause 5.2 of TS 23.288.

The NWDAF containing MTLF acting as FL server registers to the NRF with its FL capability (FL Server).

NOTE: In the case of multiple NF Service consumers (e.g. NWDAF AnLF, NWDAF MTLF) requesting to initiate the FL process at the FL Server (i.e. NWDAF MTLF), the core principles of X.10 are followed. The NF Service Consumers requests an access token from NRF to retrieve trained ML model from the FL Server. The NRF authorizes the the NF Service Consumers to receive ML model from FL server and generates access token similar to Step 4b. of X.10 and sends it to NF Service Consumer (i.e NWDAF AnLF or NWDAF MTLF acting on behalf of AnLF).

b along with the access token if received earlier.

Step 1c. The NWDAF containing FL server in the case when receives request from other NF Service Consumers verifies the access token and initiates the FL process.

Step 2. The NWDAF containing MTLF acting as FL server (NF Service Consumer) sends a discovery request to NRF and receives the available NWDAFs containing MTLF acting as FL client(s) (NF Service Producer) as a response, as specified in clause 6.2C.2.1 of TS 23.288 [105].

Step 3. The NWDAF containing MTLF acting as FL server (NF Service Consumer) sends an access token request to the NRF as specified in clause 13.4.1. The access token request may contain the Analytics ID for the requested Federated Learning process.

Step 4. The NRF authorizes the NWDAF containing MTLF acting as FL server (NF Consumer) based upon the information received in Step 1b, and after verifying that the FL Server NWDAF’s Vendor ID is included in the Interoperability Indicator for the requested Analytics ID provided in Step 1a. If the authorization succeeds, NRF generates the access token(s) as specified in clause 13.4.1. The access token claims may include the Analytics ID for the request Federated Learning process

NOTE: Fine-grained authorization can be done locally at the NWDAFs containing MTLF acting as FL client(s) (NF Service Producer).

Step 5a, 5b. The NRF sends the access token to the NWDAF containing MTLF acting as FL Server, or rejects the request in case of failed authorization, as described in clause 13.4.1.

Step 6. The NWDAF containing MTLF acting as FL server sends the service request to the NWDAF(s) containing MTLF acting as FL client with the access token received in Step 5a. along with the Analytics ID information for which the FL process is to be performed, as described in TS 23.288 [105].

Step 7, 8. The NWDAF containing MTLF acting as FL client (NF Service Producer) verifies the received access token as specified in clause 13.4.1. In case of successful access token verification, the NWDAF containing MTLF acting as FL client sends a success response to the NWDAF containing MTLF acting as FL server, as described in TS 23.288 [105].

Step 9. After a successful response from the NWDAF(s) containing MTLF acting as FL client, the NWDAF containing MTLF acting as FL server initiates the Federated Learning process as described in TS 23.288 [105].

Authorization of the NWDAF containing MTLF acting as FL client is implicit, since it can join a Federated Learning group only when selected by the NWDAF containing MTLF acting as FL server.

**\*\*\*\*** END OF CHANGE **\*\*\*\***