**3GPP TSG-WG SA2 Meeting #143E e-meeting  *S2-210xxxx***

 **Elbonia, Feb 24 – March 9, 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **23.288** | **CR** |  | **rev** | **-** | **Current version:** | **16.6.0** |  |
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| *For* [***HELP***](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 | **x** | Radio Access Network |  | Core Network | **X** |

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| ***Title:***  | New procedure for data collection from UE |
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| ***Source to WG:*** | Qualcomm |
| ***Source to TSG:*** | SA2 |
|  |  |
| ***Work item code:*** | eNA\_Ph2 |  | ***Date:*** | 2021-02-24 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***Release:*** | Rel-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 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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | According to the conclusion of KI#8: UE data as an input for analytics generation in TR 23.700-91, it is proposed to capture the new procedure for data collection from UE in TS 23.288. |
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| ***Summary of change:*** | - add the procedure for data collection from UE in clause 6.2.x. |
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| ***Consequences if not approved:*** | It is not supported to collect data from UE |
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| ***Clauses affected:*** | 6.2.1, 6.2.x (new clause), 6.2.x.1 (new clause), 6.2.x.2 (new clause), 6.2.x.2.1 (new clause), 6.2.x.2.1 (new clause), 6.2.x.2.2 (new clause), 6.2.x.2.3 (new clause), 6.2.x.2.4 (new clause) |
|  |  |
|  | **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----------------------------------------------------------

### 6.2.1 General

The Data Collection feature permits NWDAF to retrieve data from various sources (e.g. NF such as AMF, SMF, PCF, and AF; OAM), as a basis of the computation of network analytics.

All available data encompass:

- OAM global NF data,

- Data available in NFs, e.g. behaviour data related to individual UEs or UE groups (e.g. UE reachability), and pre-computed metrics covering UE populations (e.g. number of UEs present in a geographical area), per spatial and temporal dimensions (e.g. per region for a period of time),

- NF data available in the 5GC (e.g. NRF),

- Data available in AF.

The NWDAF shall use at least one of the following services:

- the Generic management services as defined in TS 28.532 [6], the Performance Management services as defined in TS 28.550 [7] or the Fault Supervision services as defined in TS 28.545 [9], offered by OAM in order to collect OAM global NF data.

- the Exposure services offered by NFs in order to retrieve data and other non-OAM pre-computed metrics available in the NFs.

- Other NF services in order to collect NF data (e.g. NRF)

The NWDAF shall obtain the proper information to perform data collection for a UE, a group of UEs or any UE:

- For an Analytics ID, NWDAF is configured with the corresponding NF Type(s) and/or event ID(s) and/or OAM measurement types.

- NWDAF shall determine which NF instance(s) of the relevant NF type(s) are serving the UE, the group of UEs or any UE, taking into account the S-NSSAI(s) and area of interest as defined in clause 7.1.3, TS 23.501 [2].

- NWDAF invokes Nnf\_EventExposure\_Subscribe services to collect data from the determined NF instance(s), and/or triggers the procedure in clause 6.2.3.2 to subscribe to OAM services to collect the OAM measurement.

The NWDAF performs data collection from an AF directly as defined in clause 6.2.2.2 or via NEF as defined in clause 6.2.2.3. According to the data collection request, the AF may further perform data collection from UE as defined in clause 6.2.x.

The NWDAF shall be able to discover the events supported by a NF.

Data collection procedures enables the NWDAF to efficiently obtain the appropriate data with the appropriate granularity.

When a request or subscription for statistics or predictions is received, the NWDAF may not possess the necessary data to perform the service, including:

- Data on the monitoring period in the past, which is necessary for the provision of statistics and predictions matching the Analytics target period.

- Data on longer monitoring periods in the past, which is necessary for model training.

Therefore, in order to optimize the service quality, the NWDAF may undertake the following actions:

- The NWDAF may return a probability assertion as stated in clause 6.1.3 expressing the confidence in the prediction produced. Prediction may be returned with zero confidence as described below. This confidence is likely to grow in the case of subscriptions.

- The value of the confidence depends on the level or urgency expressed by the parameter "preferred level of accuracy of the analytics" as listed in clause 6.1.3, the parameter "time when analytics information is needed" as listed in clause 6.1.3, and the availability of data. If no sufficient data is collected to provide an estimation for the requested level of accuracy before the time deadline, the service shall return a zero confidence. Otherwise, the NWDAF may wait until enough data is collected before providing a response or a first notification.

- In order to be prepared for future requests on analytics from NFs/OAM, the NWDAF, upon operator configuration, may collect data on its own initiative, e.g. on samples of UEs, and retain the data collected in the data storage.

NOTE 1: The NWDAF can send an error response to the analytics consumer to indicate that statistics are unavailable if the NWDAF was not prepared for future requests and did not collect data on its own initiative.

 The volume and maximum duration of data storage is also subject to operator configuration.

The NWDAF may decide to reduce the amount of data collected to reduce signalling load, by either prioritizing requests received from analytics consumers, or reducing the extent (e.g. duration, scope) of data collection, or modifying the sampling ratios.

The NWDAF may skip data collection phase when the NWDAF already has enough information to provide requested analytics.

The data which NWDAF may collect is listed for each analytics in input data clause and is decided by the NWDAF.

NOTE 2: NWDAF can skip data collection phase for some specific input data per the requested analytics e.g. when some of the data is already available at NWDAF for the requested analytics, or when NWDAF considers that some of the data is not needed at all to provide the requested analytics as per the analytics consumer request (e.g. based on preferred level of accuracy or based on the time when analytics are needed).

--------------------------------------------------------------------All New Text----------------------------------------------------------

### 6.2.x Data Collection from UE

#### 6.2.x.1 General

The NWDAF may interact with an AF to collect data from the UE Application as an input for analytics generation. The AF can be in the MNO domain as a trusted AF or an AF external to MNO domain as an untrusted AF. The data collection request from NWDAF may trigger the AF to collect data from the UE Application.

UE establishes a connection to the AF in the MNO domain or external to MNO domain over user plane via a PDU session. The AF communicates with the UE’s Application and collects data from UE’s Application.

For both Trusted AF and untrusted AF (which supports to collect data from UE application), the SLA between the operator and the application server provider determines:

- The AF for the UE’s Application to connect to (e.g. based on the FQDN).

- The information that the UE’s Application shares with the AF, subject to user consent.

- Possible Data Anonymization, Aggregation or Normalization, algorithms (if used).

- The authentication information that enable the AF to verify the UE’s Application that provides data.

NOTE 1: The mutual authentication info that is used by the UE Application and AF and how user consent is obtained is out of SA2’s scope.

AF (which supports the data collection) is configured based on the SLA above.

A UE’s Application (which is supported to provide data to an AF) is configured/ provisioned with the below information from the Applicatioin Server:

- The address of the AF to contact for the application about data collection.

- The parameters that are authorized to provide to the AF.

- The authentication information to enable the UE’s Application to verify the AF that requests data.

NOTE 2: The authentication and authorization info that is used by the UE Application and AF for collection and how user consent is obtained is out of SA2’s scope.

NOTE 3: The configuration procedure for the above information from the Application Server to UE’s Application is out of SA2 scope.

#### 6.2.x.2 Procedure for data collection from UE

##### 6.2.x.2.1 Connection establishment between UE Application and AF

UE Application layer receives the data collection configuration from Application Server. The configuration information is as described in clause 6.2.x.1. The data collection configuration procedure is out of 3GPP’s SA2 scope.

Both direct data collection procedure (from UE’s Application layer to the AF, either trusted or untrusted) and indirect data collection procedure (from UE’s Application layer to the Application server and from the Application server to the AF) shall be supported. The data collection procedure is out of SA2 scope and is in the scope of SA4.

UE’s Application provides the External Application ID to the AF. The UE’s Application may also provide an External UE identifier, i.e. GPSI to the AF. The AF stores the information from UE’s Application along with the retrieved IP address of the UE (in the PDU session used) in order to request data collection from UE’s Application layer.

Editor’s NOTE: The procedure on how AF obtains the External Application ID, External UE ID and UE IP address will be added once SA4/SA3 develops the procedure.

NOTE 1: Whether multiple user plane connections are established, or a single user plane connection is established for different applications between the UE and Trusted AF are based on implementation that are out of 3GPP scope.

NOTE 2: The Connection establishment procedure from UE’s Application to the AF as above is out of SA2’s scope. For the 3GPP defined services, the Connection establishment procedure is in the scope of SA4. For the non-3GPP defined services, the Connection establishment procedure is out of 3GPP’s scope.

##### 6.2.x.2.2 AF registration and discovery with NRF

The AF registers its available NF profile to the NRF. The trusted AF registers to the NRF by using the Nnrf\_NFManagement service that defined in clause 5.2.7.2 in TS 23.502 [3]. The untrusted AF registers the available NF profile to the NRF via the NEF as described in clause 6.2.2.3.

Since the UE Application provides the the external application ID as described in clause 6.2.x.2.1 while the NWDAF request contains the SUPI and the internal application ID, the AF needs to correlate both the external application ID and the internal application ID. The trusted AF or NEF (for an untrusted AF) registers at the NRF both the external application ID and internal application ID (or any relevant Event ID) as part of its available NF profile as also described in clause 6.2.2.3.

NOTE 1: For the AF supported for data collection, it is only support to registered the external application ID and internal application ID as AF profiles to NRF in this release.

The NWDAF discovers the AF served the Internal Application ID from NRF by using the Nnrf\_NFDiscovery service that defined in clause 5.2.7.3 in TS 23.502 [3].

##### 6.2.x.2.3 Data Collection Procedure from UE

Figure 6.2.x.2.3-1 Data Collection Procedure from UE

1. An NF subscribes to Analytics from the NWDAF as described in clause 6.1.1.1, that includes Analytics ID, Analytics Filter Information including e.g. AoI, Internal Application ID(s) and Target of Analytics Reporting. NWDAF may also initiate the data collection prior to this subscription.

2. NWDAF discovers the AF that provided data collection (based on AF profiles registered in NRF as described in 6.2.x.2.2) by using the Nnrf\_NFDiscovery service that described in clause 6.2.x.2.2.

Step 3a is used for the trusted AF while step 3b is used for untrusted AF.

3a. NWDAF subscribes to the trusted AF for UE data collection input data for analytics, by using Naf\_Event\_Exposure\_Subscribe that described in clause 5.2.19.2 in TS 23.502.

3b. NWDAF subscribes to the untrusted AF for UE data collection input data for analytics, by using step 3b (i.e. the step 2 and 3 of the procedure that described in Figure 6.2.2.3-1).

4. The AF collects the UE data using either direct or indirect data collection procedure in clause 6.2.x.2.1. The establishment of the connection can be performed at anytime prior to this. The AF links the data collection request from step 3 to the user plane connection as described in clause 6.2.x.2.4.

NOTE: The Direct data collection and indirect data collection procedure is decided by SA4.

Step 5a is used for the trusted AF case while step 5b is used for Untrusted AF case.

5a. The trusted AF receives the input data from the UE, and processes the data (e.g. anonimizes, enriches, aggregates and normalizes) according to the SLA that configured in AF described in clause 6.2.x.1, Event ID(s) and Event Filter(s) set during step 3a. The trusted AF then notifies the NWDAF on the data collected according to the NWDAF subscription in step 3a.

5b. The Untrusted AF receives the input data from the UE, and processes the data (e.g. anonimizes, enriches, aggregates and normalizes) according to the SLA that configured in AF described in clause 6.2.x.1, Event ID(s) and Event Filter(s) set during step 3b. The untrusted AF notifies the NWDAF by using step 5b (i.e. step 4 and step 5 of the procedure that described in Figure 6.2.2.3-1).

6. The NWDAF produces Analytics.

7. The NWDAF provides analytics to the consumer NF.

Editor’s Note: Any steps related to architecture enhancement (e.g. NCCF) in this procedure will further update.

##### 6.2.x.2.4 Correlation between UE data collection and the NWDAF data request.

The AF may only be able to identify the UE IP address, in this case, the AF (for trusted AF) or NEF (for untrusted AF) needs to retrieve the Permanent identifier of the UE based on the IP address after UE application establishes the user plane connection to AF.

Editor’s Note: The procuedure about how to map the UE IP address to a Permanent identifier of UE is FFS and subject to further coordination and progress in SA3/SA4/SA6.

------------------------------------------------------------END OF CHANGES--------------------------------------------------------