**3GPP TSG CT WG3 Meeting #138 *C3-246133***

**Orlando, U.S; 18th – 22nd November 2024**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  | **29.552** | **CR** | **0133** | **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:***  | Removal of UPF info subscription from SMF |
|  |  |
| ***Source to WG:*** | ZTE |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | eNetAE19 |  | ***Date:*** | 2024-11-11 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***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 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-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
|  |  |
| ***Reason for change:*** |  23.288 has been updated since Rel-18 to enable the NWDAF to collect UPF data indirectly via SMF for service experience and DN performance analytics, therefore there is no need for NWDAF to subscribe for UPF info (UPF ID/address/FQDN information) from SMF any more.The TS reference No. for 29.503 and 29.522 are incorrect. |
|  |  |
| ***Summary of change:*** | 5.7.3, remove UPF info subscription from 4a-4b, correct step reference in 11a-11b and 13a-13b.5.7.16, remove UPF info subscription from 4a-4b.Correct the incorrect TS reference No. |
|  |  |
| ***Consequences if not approved:*** | Not aligned with stage2. Incorrect TS reference No. |
|  |  |
| ***Clauses affected:*** | 5.2.2.2, 5.2.3.2, 5.3.3, 5.7.3, 5.7.16, 5.11.1, 5.12.1 |
|  |  |
|  | **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:*** |  |

**Additional discussion(if needed):**

**Proposed changes:**

\*\*\* 1st Change \*\*\*

#### 5.2.2.2 Analytics Subscribe/Unsubscribe/Notify initiated by AFs via the NEF

This procedure is used by the AF to subscribe to/unsubscribe from analytics information from the NWDAF via the NEF, it is also used by the NWDAF to notify the analytics event(s) to the AF via the NEF, if subscribed before.



Figure 5.2.2.2-1: Analytics Subscribe/Unsubscribe/Notify initiated by AFs via the NEF

1. In order to subscribe to notification(s) of analytics exposure via the NEF, the AF invokes the Nnef\_AnalyticsExposure\_Subscribe request by sending an HTTP POST request message targeting the resource "Analytics Exposure Subscriptions" as defined in clause 4.4.14.1 of 3GPP TS 29.522 [10].

 In order to update an existing analytics exposure subscription, the AF shall send an HTTP PUT request message to the NEF to the resource "Individual Analytics Exposure Subscription" requesting to change the subscription.

2. Upon receipt of the HTTP request from the AF, if the AF is authorized with the requested analytics event(s) and the requested parameters comply with the inbound restriction in the analytics exposure mapping, the NEF shall invoke Nnwdaf\_EventsSubscription\_Subscribe service operation as described in step 1 in clause 5.2.2.1.

3. The NWDAF responds to the Nnwdaf\_EventsSubscription\_Subscribe service operation as described in step 2 in clause 5.2.2.1.

4. Upon receipt of the HTTP request response from the NWDAF, the NEF shall invoke the Nnef\_AnalyticsExposure\_Subscribe response message by mapping and forwarding the response to the AF.

5. If the NWDAF observes the subscribed event(s), the NWDAF invokes Nnwdaf\_EventsSubscription\_Notify service operation as described in step 3 in clause 5.2.2.1 to the NEF.

6. If the NEF receives an analytics information notification from the NWDAF indicating that the subscribed analytics event has been detected, the NEF shall invoke the Nnef\_AnalyticsExposure\_Notify request by sending HTTP POST request message provide a notification to the AF request including the AnalyticsEventNotification data structure at least with the detected analytics event identified by the notification URI together with the notification correlation identifier received during creation of the Individual Analytics Exposure Subscription.

7. Upon receipt of the analytics event notification, the AF shall respond the NEF with a "204 No Content" status code to confirm the received notification in Nnef\_AnalyticsExposure\_Notify response message.

8. The NEF shall forward the HTTP "204 No Content" response to the NWDAF.

9. In order to delete an existing analytics exposure subscription, the AF shall invoke the Nnef\_AnalyticsExposure\_Unsubscribe request by sending an HTTP DELETE request message to the NEF to the resource "Individual Analytics Exposure Subscription".

10. If the NEF receives an HTTP DELETE request from the AF, the NEF shall invoke the Nnwdaf\_EventsSubscription\_Unsubscribe service operation as described in step 5 in clause 5.2.2.1.

11. The NWDAF responds to the Nnwdaf\_EventsSubscription\_Unsubscribe service operation as described in step 6 in clause 5.2.2.1.

12. The NEF shall forward the HTTP "204 No Content" response to the AF.

NOTE: Details of AnalyticsExposure API refer to clause 4.4.14 and clause 5.6 of 3GPP TS 29.522 [10].

\*\*\* 2nd Change \*\*\*

#### 5.2.3.2 Analytics information request initiated by AFs via the NEF

This procedure is used by the AFs to retrieve analytics information from the NWDAF via the NEF.



Figure 5.2.3.2-1: Analytics Request initiated by AFs via the NEF

1. In order to fetch analytics information, the AF invokes the Nnef\_AnalyticsExposure\_Fetch request by sending an HTTP POST request message to the NEF to the customized operation URI "{apiRoot}/3gpp-analyticsexposure/v1/fetch" as defined in clause 4.4.14.2 of 3GPP TS 29.522 [10].

2. Upon receipt of the HTTP request from the AF, if the AF is authorized with the requested analytics event and the requested parameters comply with the inbound restriction in the analytics exposure mapping, the NEF shall invoke the Nnwdaf\_AnalyticsInfo\_Request service operation as described in step 1 in clause 5.2.3.1.

3. The NWDAF responds with the analytics information as described in step 2 in clause 5.2.3.1 to the NEF.

4. The NEF responds with the analytics information to the AF.

NOTE: Details of AnalyticsExposure API refer to clause 4.4.14 and clause 5.6 of 3GPP TS 29.522 [10].

\*\*\* 3rd Change \*\*\*

### 5.3.3 Analytics aggregation without provisioning of Area of Interest

This procedure is used by the service consumer to request Analytics event(s) without providing an Area of Interest, in which multiple NWDAFs are required to serve the request collectively.



Figure 5.3.3-1: Analytics aggregation without provisioning of Area of Interest

1a-1c. In order to obtain the specific network data analytics, the NF service consumer selects an NWDAF (e.g. NWDAF1) with aggregation capability according to the results returned by NRF or available information obtained by other means. The NWDAF service consumer invokes Nnwdaf\_AnalyticsInfo\_Request or Nnwdaf\_EventsSubscription\_Subscribe service operations as described in clause 5.2.3.1 and clause 5.2.2.1 to the selected NWDAF. If not, the NWDAF service consumer should select a NWDAF with large serving area from the candidate NWDAFs which supports analytics aggregation, e.g. NWDAF1.

2a-4b. If the requested analytics requires UE location information, e.g. for the Analytics events "UE\_MOBILITY", "ABNORMAL\_BEHAVIOUR", or "USER\_DATA\_CONGESTION", then:

- 2a-2b: The Aggregator NWDAF may query UDM to discover the NWDAF serving the UE by invoking Nudm\_UECM\_Get service operation as described in clause 5.3.2.5.12 of 3GPP TS 29.503 [22], if it is supported.

- 3a-4b: The Aggregator NWDAF may determine the AMF serving the UE, then requests UE location information from the AMF by invoking Namf\_EventExposure\_Subscribe service operation as described in clause 5.3.2.2.2 of 3GPP TS 29.518 [18]. The AMF notifies the UE location information by invoking Namf\_EventExposure\_Notify service operation as described in 3GPP TS 29.518 [18] clause 5.3.2.4.

5. If the requested analytics does not require UE location information, e.g. for the Analytics events "SERVICE\_EXPERIENCE", "NF\_LOAD", or "UE\_COMM", the Aggregator NWDAF can determine the NFs to be contacted for data collection.

6. With the data obtained in step 3a-5, the Aggregator NWDAF may query the NRF for discovering the required NWDAF, by sending an NF discovery request including UE location or NF serving area as a filter to NRF, and obtains candidates target NWDAF(s) that can provide the required analytics.

7. If a single target NWDAF (e.g. NWDAF2) can provide the requested analytics data, the Aggregator NWDAF can redirect the Nnwdaf\_AnalyticsInfo\_Request to that target NWDAF or request an analytics subscription transfer to that target NWDAF.

8. If the Aggregator NWDAF decides to request analytics from one or more target NWDAFs, the steps 2-9b of the analytics aggregation procedure in clause 5.3.2 are executed.

\*\*\* 4th Change \*\*\*

### 5.7.3 Observed Service Experience Analytics

This procedure is used by the NF to obtain the Service Experience analytics which are calculated by the NWDAF based on the information collected from the AMF, SMF, UPF, GMLC, AF, OAM and/or MDAF. If the NF is an AF which is untrusted, the AF will request analytics via the NEF as described in clause 5.2.3.2.



Figure 5.7.3-1: Procedure for Service Experience Analytics

1a. In order to obtain the Service Experience analytics, the NF may invoke Nnwdaf\_AnalyticsInfo\_Request service operation as described in clause 5.2.3.1.

1b-1c. In order to obtain the Service Experience analytics, the NF may invoke Nnwdaf\_EventsSubscription\_Subscribe service operation as described in clause 5.2.2.1.

2a-2b. If the event is set to "SERVICE\_EXPERIENCE", the NWDAF may invoke Namf\_EventExposure\_Subscribe service operation as described in clause 5.3.2.2.2 of 3GPP TS 29.518 [18] to subscribe to the notification of UE ID and UE location. The AMF responds to the NWDAF an HTTP "201 Created" response.

3a-3b. If step 2a and step 2b are performed, the AMF invokes Namf\_EventExposure\_Notify service operation as described in 3GPP TS 29.518 [18] clause 5.3.2.4. The NWDAF responds to the AMF an HTTP "204 No Content" response.

4a-4b. The NWDAF may invoke Nsmf\_EventExposure\_Subscribe service operation by sending an HTTP POST request targeting the resource "SMF Notification Subscriptions" to subscribe to QFI\_ALLOC event. The SMF responds to the NWDAF an HTTP "201 Created" response.

5a-5b. If step 4a and step 4b are performed, the SMF may invoke Nsmf\_EventExposure\_Notify service operation by sending an HTTP POST request to the NWDAF identified by the notification URI received in step 4a. The NWDAF responds to the SMF an HTTP "204 No Content" response.

6a-6b. If the AF is trusted, the NWDAF may invoke Naf\_EventExposure\_Subscribe service operation by sending an HTTP POST request targeting the resource "Application Event Subscriptions" to request the service data and performance data from AF directly. The AF responds to the NWDAF an HTTP "201 Created" response.

7a-7b. If step 6a and step 6b are performed, the AF may invoke Naf\_EventExposure\_Notify service operation by sending an HTTP POST request to the NWDAF identified by the notification URI received in step 6a. The NWDAF responds to the AF an HTTP "204 No Content" response.

8a-8d. If the AF is untrusted, the NWDAF may invoke Nnef\_EventExposure\_Subscribe service operation to the NEF by sending an HTTP POST request targeting the resource "Network Exposure Event Subscriptions" and then the NEF invokes Naf\_EventExposure\_Subscribe service operation by sending an HTTP POST request targeting the resource "Application Event Subscriptions". The AF responds to the NEF an HTTP "201 Created" response and then the NEF responds to the NWDAF an HTTP "201 Created" response.

9a-9d. If step 8a to step 8d are performed, the AF may invoke Naf\_EventExposure\_Notify service operation by sending an HTTP POST request to the NEF identified by the notification URI received in step 8b and the NEF invokes Nnef\_EventExposure\_Notify service operation by sending an HTTP POST request to the NWDAF identified by the notification URI received in step 8a. The NWDAF responds to the NEF an HTTP "204 No Content" response and then the NEF responds to the AF an HTTP "204 No Content" response.

10a-10b. The NWDAF may invoke Nsmf\_EventExposure\_Subscribe service operation by sending an HTTP POST request targeting the resource "SMF Notification Subscriptions" as described in 3GPP TS 29.508 [6] to subscribe via the SMF to UPF information for a specific UE. The SMF subscribes to the UPF on behalf of the NWDAF via N4 Session Reporting Rule as described in clause 5.2.8 of 3GPP TS 29.244 [45] and, after having received the successful response from the UPF, it responds to the NWDAF with an HTTP "201 Created" response.

11a-11b. If step 10a and step 10b are performed, the UPF may invoke Nupf\_EventExposure\_Notify service operation as described in 3GPP TS 29.564 [40] by sending an HTTP POST request to the NWDAF identified by the notification URI provided in step 10a. The NWDAF responds to the UPF an HTTP "204 No Content" response.

12a-12b. If the NF requestes fine granularity location analytics information, the NWDAF may invoke Ngmlc\_Location\_ProvideLocation service operation to retrieve UE Location and UE Location Accuracy by sending an HTTP POST request to the URI associated with the "provide-location" custom operation as described in 3GPP TS 29.515 [41] clause 5.2.2.2. The GMLC responds to the NWDAF an HTTP "200 OK" response.

13a-13b. If step 12a and step 12b are performed, the GMLC may invoke Ngmlc\_Location\_EventNotify service operation by sending an HTTP POST request to the NWDAF identified by the notification URI received in step 12a. The NWDAF responds to the GMLC an HTTP "204 No Content" response.

14a. The NWDAF may collect Reference Signal Received Power and Reference Signal Received Quality as specified in clause 5.5 of TS 38.331 [33] and clause 5.5.5 of TS 36.331 [34], Signal-to-noise and interference ratio as specified in clause 5.1 of TS 38.215 [35], the mapping information between cell ID and frequency and/or Cell Energy Saving State data as specified in clauses 3.1 and 6.2 of TS 28.310 [36] from OAM. If the NF is AF or NEF requesting per application analytics with UE granularity, the NWDAF may collect the average UL/DL RAN throughput, the UL/DL RAN packet delay and the UL/DL RAN Packet loss rate as described in clause 5.2.1.1 and 5.4.1.1 of TS 37.320 [29].

14b. The NWDAF may collect service experience and energy saving state analysis as specified in clause 8.4.2.1.3 and clause 8.4.4.3 of TS 28.104 [38] from MDAF. The information element of the analysis from MDAF include ServiceExperienceIssueType, AffectedObjects, ServiceExperienceStatistics, ServiceExperiencePredictions, and StatisticsOfCellsEsState.

15. The NWDAF calculates the Service Experience analytics based on the data collected from AMF, SMF, UPF, GMLC, AF, OAM and/or MDAF.

16a. If step 1a is performed, the NWDAF responds to the Nnwdaf\_AnalyticsInfo\_Request service operation as described in clause 5.2.3.1.

16b-16c. If step 1b and step 1c are performed, the NWDAF invokes Nnwdaf\_EventsSusbcription\_Notify service operation as described in clause 5.2.2.1.

17a-17b. The same as step 3a and step 3b.

18a-18b. The same as step 5a and step 5b.

19a-19d. The same as step 7a and step 7b.

20a-20d. The same as step 9a and step 9b.

21a-21b. The same as step 11a and step 11b.

22a-22b. The same as step 13a and step 13b.

23. The same as step 15.

24a-24b. The same as step 16b and step 16c.

NOTE 1: For details of Nsmf\_EventExposure\_Subscribe/Notify service operations refer to 3GPP TS 29.508 [6].

NOTE 2: For details of Nnef\_EventExposure\_Subscribe/Notify service operations refer to 3GPP TS 29.591 [11].

NOTE 3: For details of Naf\_EventExposure\_Subscribe/Notify service operations refer to 3GPP TS 29.517 [12].

\*\*\* 5th Change \*\*\*

### 5.7.16 DN Performance Analytics

This procedure is used by the NF to obtain DN performance analytics, which is calculated by the NWDAF based on the information collected from the AMF, SMF, AF, UPF and/or OAM. If the NF is an AF which is untrusted, the AF will request analytics via the NEF as described in clause 5.2.3.2.



Figure 5.7.16-1: Procedure for DN Performance Analytics

1a. In order to obtain the DN performance analytics, the NF may invoke Nnwdaf\_AnalyticsInfo\_Request service operation as described in clause 5.2.3.1.

1b-1c. In order to obtain the DN performance analytics, the NF may invoke Nnwdaf\_EventsSubscription\_Subscribe service operation as described in clause 5.2.2.1.

2a-2b. The NWDAF may invoke Namf\_EventExposure\_Subscribe service operation as described in clause 5.3.2.2.2 of 3GPP TS 29.518 [18] to retrieve the UE location information and SUPI(s) from AMF. The AMF responds to the NWDAF an HTTP "201 Created" response.

3a-3b. If step 2a and step 2b are performed, the AMF may invoke Namf\_EventExposure\_Notify service operation as described in 3GPP TS 29.518 [18] clause 5.3.2.4. The NWDAF responds to the AMF an HTTP "204 No Content" response.

4a-4b. The NWDAF may invoke Nsmf\_EventExposure\_Subscribe service operation by sending an HTTP POST request targeting the resource "SMF Notification Subscriptions" to subscribe to QFI\_ALLOC event. The SMF responds to the NWDAF an HTTP "201 Created" response.

5a-5b. If step 4a and step 4b are performed, the SMF may invoke Nsmf\_EventExposure\_Notify service operation by sending an HTTP POST request to the NWDAF identified by the notification URI received in step 4a. The NWDAF responds to the SMF an HTTP "204 No Content" response.

6a-6b. To collect QoS flow bit rate, QoS flow packet delay, packet transmission and packet retransmission information from UPF, after step 5 was performed, the SMF may subscribe to the UPF on behalf of the NWDAF via N4 Session Reporting Rule as described in clause 5.2.8 of 3GPP TS 29.244 [45].

7a-7b. The UPF invokes Nupf\_EventExposure\_Notify service operation by sending an HTTP POST request to the NWDAF identified by the notification URI received in step 6a. The NWDAF responds to the UPF an HTTP "204 No Content" response.

7c. The NWDAF may collect performance data from AF as described in clause 5.7.7 from step 6a to step 9d.

8. The NWDAF may collect Reference Signal Received Power and Reference Signal Received Quality as specified in clause 5.5 of TS 38.331 [33] and clause 5.5.5 of TS 36.331 [34], Signal-to-noise and interference ratio as specified in clause 5.1 of TS 38.215 [35], the mapping information between cell ID and frequency and Cell Energy Saving State data as specified in clauses 3.1 and 6.2 of TS 28.310 [36] from OAM.

9. The NWDAF calculates the DN performance analytics based on the data collected from AMF, SMF, AF, UPF and/or OAM.

10a. If step 1a is performed, the NWDAF responds to the Nnwdaf\_AnalyticsInfo\_Request service operation as described in clause 5.2.3.1.

10b-10c. If step 1b and step 1c are performed, the NWDAF may invoke Nnwdaf\_EventsSusbcription\_Notify service operation as described in clause 5.2.2.1.

11a-11b. The same as step 3a and step 3b.

12a-12b. The same as step 5a and step 5b.

13. The same as step 6.

14. The same as step 9.

15a-15b. The same as step 10b and step 10c.

NOTE 1: For details of N4 Session Reporting Report refer to 3GPP TS 29.244 [45].

NOTE 2: For details of Nsmf\_EventExposure\_Subscribe/Notify service operations refer to 3GPP TS 29.508 [6].

NOTE 3: For details of Nnwdaf\_EventsSubscription\_Subscribe/Unsubscribe/Notify or Nnwdaf\_AnalyticsInfo\_Request service operations refer to 3GPP TS 29.520 [5].

\*\*\* 6th Change \*\*\*

### 5.11.1 General

The services defined in 3GPP TS 29.520 [5], 3GPP TS 29.574 [15], 3GPP TS 29.575 [16], 3GPP TS 29.503 [22], and 3GPP TS 28.104 [38] may be used to perform analytics accuracy monitoring based on the procedures and the requirements of 3GPP TS 23.288 [17] clauses 6.2D, 6.1.1.1 step 2, and 6.1.1.2 step 4.

\*\*\* 7th Change \*\*\*

### 5.12.1 General

The services defined in 3GPP TS 29.520 [5], 3GPP TS 29.574 [15], 3GPP TS 29.575 [16], 3GPP TS 29.503 [22], and 3GPP TS 28.104 [38] may be used to perform ML Model accuracy monitoring based on the procedures and the requirements of 3GPP TS 23.288 [17] clauses 6.2E, 6.1.1.1 step 2, and 6.1.1.2 step 4.

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