**3GPP TSG-CT WG3 Meeting #135 *C3-243299r1***

**Hyderabad, IN, 27 - 31 May, 2024 (Revision of C3-24xxxx)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.520** | **CR** | **0910** | **rev** | **1** | **Current version:** | **18.5.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Updates to Nnwdaf\_RoamingData and Nnwdaf\_RoamingAnalytics services | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eNA\_Ph3 | | | | |  | ***Date:*** | | | 2024-05-09 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19) Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | The update subscription descriptions are missing in several related clauses.  Correct H-RE-NWDAF as V-RE-NWDAF for VPLMN in clause 4.9.1.2.  Also complete some related procedure descriptions and aligned condition in OpenAPI files. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Adding the missing update subscription descriptions in procedures.  Correct H-RE-NWDAF as V-RE-NWDAF for VPLMN in clause 4.9.1.2.  Also complete some related procedure descriptions and aligned condition in OpenAPI files. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Not aligned with stage 2 requirement on roaming and not aligned within this specification. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.1, 4.8.1.1, 4.8.1.3.1, 4.8.1.3.2, 4.9.1.1, 4.9.1.2, 4.9.1.3.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 does not impact the OpenAPI file. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**Additional discussion(if needed):**

**Proposed changes:**

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

## 4.1 Introduction

The Nnwdaf services are used by the NWDAF to provide specific analytics information and ML models.

Analytics information is either statistical information of past events, or predictive information.

The following services are specified for the NWDAF:

Table 4.1-1: Services provided by NWDAF

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Service Name | Description | Service Operations | Operation  Semantics | | Example Consumer(s) |
| Nnwdaf\_EventsSubscription  (NOTE 1) | This service enables the NF service consumers to subscribe to/unsubscribe from notifications for different analytics information from the NWDAF. It also enables the transfer of subscriptions between NWDAFs | Subscribe | Subscribe / Notify | | PCF, NSSF, AMF, SMF, NEF, AF, LMF, OAM, CEF, NWDAF, DCCF |
| Unsubscribe |
| Notify |
| Transfer | Request / Response | | NWDAF |
| Nnwdaf\_AnalyticsInfo | This service enables the NF service consumers to request and get specific analytics or context information related to analytics subscriptions from the NWDAF. | Request | Request / Response | | PCF, NSSF, AMF, SMF, NEF, AF, LMF, OAM, NWDAF, DCCF |
| ContextTransfer | Request / Response | | NWDAF |
| Nnwdaf\_DataManagement | This service enables the NF service consumers to subscribe to/unsubscribe from notifications when subscribed event(s) are detected or retrieve the subscribed data from the NWDAF. | Subscribe | Subscribe / Notify | | NWDAF, DCCF, MFAF |
| Unsubscribe |
| Notify |
| Fetch | Request / Response | | NWDAF, DCCF, MFAF |
| Nnwdaf\_MLModelProvision  (NOTE 2) | This service enables the NF service consumers to subscribe to/unsubscribe from notifications when a ML model matching the subscription parameters becomes available. | Subscribe | Subscribe / Notify | | NWDAF |
| Unsubscribe |
| Notify |
| Nnwdaf\_MLModelTraining  (NOTE 3) | This service enables the NF service consumers to subscribe to/unsubscribe/modify from notifications for a ML model training. | Subscribe | Subscribe / Notify | | NWDAF |
| Unsubscribe |
| Notify |
| Nnwdaf\_MLModelMonitor | This service enables the NF service consumer to subscribe/unsubscribe for ML model accuracy, provide Analytics feedback information for the analytics generated by an NWDAF and enable the NWDAF containing AnLF registers the use and monitoring capability for an ML model into the model provider NWDAF | Subscribe | | Subscribe / Notify | NWDAF |
| Unsubscribe | |
| Notify | |
| Register | | Request / Response |
| Deregister | |
| Nnwdaf\_RoamingData | This service enables the consumer to subscribe (or update subscription)/unsubscribe for input data related to roaming UE(s) for NWDAF analytics. | Subscribe | | Subscribe / Notify | H-RE-NWDAF,  V-RE-NWDAF |
| Unsubscribe | |
| Notify | |
| Nnwdaf\_RoamingAnalytics | This service enables the NF service consumers to subscribe (or update subscription) to and unsubscribe from notifications for network data analytics related to roaming UE(s). | Subscribe (NOTE 4) | | Subscribe / Notify | H-RE-NWDAF,  V-RE-NWDAF |
| Unsubscribe | |
| Notify | |
| NOTE 1: This service corresponds to the Nnwdaf\_AnalyticsSubscription service defined in 3GPP TS 23.288 [17].  NOTE 2: This service implements also the Nnwdaf\_MLModelInfo service as specified in 3GPP TS 23.288 [17] by using immediate and one-time reporting requirement.  NOTE 3: This service implements also the Nnwdaf\_MLModelTrainingInfo service as specified in 3GPP TS 23.288 [17] by using immediate and one-time reporting requirement.  NOTE 4: The Nnwdaf\_RoamingAnalytics\_Subscribe service operation implements also the Nnwdaf\_RoamingAnalytics\_Request service operation specified in 3GPP TS 23.288 [17] by using immediate and one-time reporting requirement. | | | | | |

Table 4.1-2 summarizes the corresponding APIs defined in this specification.

Table 4.1-2: API Descriptions

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Service Name | Clause | Description | OpenAPI Specification File | apiName | Annex |
| Nnwdaf\_EventsSubscription | 5.1 | Nnwdaf Events Subscription Service. | TS29520\_Nnwdaf\_EventsSubscription.yaml | nnwdaf-eventssubscription | A.2 |
| Nnwdaf\_AnalyticsInfo | 5.2 | Nnwdaf Analytics Information Service | TS29520\_Nnwdaf\_AnalyticsInfo.yaml | nnwdaf-analyticsinfo | A.3 |
| Nnwdaf\_DataManagement | 5.3 | NWDAF Data Management Service | TS29520\_Nnwdaf\_DataManagement.yaml | nnwdaf-datamanagement | A.4 |
| Nnwdaf\_MLModelProvision | 5.4 | NWDAF ML Model Provision Service | TS29520\_Nnwdaf\_MLModelProvision.yaml | nnwdaf-mlmodelprovision | A.5 |
| Nnwdaf\_MLModelTraining | 5.5 | NWDAF ML Model Training Service | TS29520\_Nnwdaf\_MLModelTraining.yaml | nnwdaf-mlmodeltraining | A.6 |
| Nnwdaf\_MLModelMonitor | 5.6 | NWDAF ML model monitoring Service | TS29520\_Nnwdaf\_MLModelMonitoring.yaml | nnwdaf-mlmodelmonitor | A.7 |
| Nnwdaf\_RoamingData | 5.7 | NWDAF Roaming Data Service | TS29520\_Nnwdaf\_ RoamingData.yaml | nnwdaf-roamingdata | A.8 |
| Nnwdaf\_RoamingAnalytics | 5.8 | NWDAF Roaming Analytics service | TS29520\_Nnwdaf\_RoamingAnalytics.yaml | nnwdaf-roaminganalytics | A.9 |

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

#### 4.8.1.1 Overview

The Nnwdaf\_RoamingData service as defined in 3GPP TS 23.288 [17], is provided by the Network Data Analytics Function (NWDAF) with roaming exchange capability, which is called Roaming Exchange NWDAF (RE-NWDAF).

This service:

- allows the NF service consumers to subscribe (or update subscription) to and unsubscribe from the data of roaming UEs exposed by an RE-NWDAF; and

- notifies the NF service consumers about the data of roaming UEs exposed by an RE-NWDAF.

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

##### 4.8.1.3.1 Network Data Analytics Function (NWDAF)

The Network Data Analytics Function (NWDAF) with roaming exchange capability, i.e. the V-RE-NWDAF or H-RE-NWDAF, provides data information related to roaming UE(s) to NF service consumers.

The Network Data Analytics Function (NWDAF) allows NF service consumers to subscribe (or update subscription) to and unsubscribe from one-time, periodic notification or notification when an event is detected.

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

##### 4.8.1.3.2 NF Service Consumers

The Network Data Analytics Function (NWDAF) with roaming exchange capability, i.e. the H-RE-NWDAF or V-RE-NWDAF, supports (un)subscription or update subscription to the notification of the data of roaming UEs exposed by an NWDAF.

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

4.9.1.1 Overview

The Nnwdaf\_RoamingAnalytics service is provided by the Network Data Analytics Function (NWDAF) with roaming exchange capability, which is called Roaming Exchange NWDAF (RE-NWDAF).

This service:

- allows NF service consumers to subscribe (or update subscription) to and unsubscribe from different analytics events related to roaming UE(s); and

- notifies NF service consumers with a corresponding subscription about observed events related to roaming UE(s).

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

#### 4.9.1.2 Service Architecture

The 5G System Architecture is defined in 3GPP TS 23.501 [2]. The Network Data Analytics Exposure architecture, including the case of roaming, is defined in 3GPP TS 23.288 [17]. The Network Data Analytics signalling flows are defined in 3GPP TS 29.552 [25], the Policy and Charging related 5G architecture is also described in 3GPP TS 23.503 [4] and 3GPP TS 29.513 [5].

The Nnwdaf\_RoamingAnalytics service is part of the Nnwdaf service-based interface exhibited by the Network Data Analytics Function (NWDAF), but it can be provided only by an NWDAF with the roaming exchange capability, which is called Roaming Exchange NWDAF (RE-NWDAF).

The only known consumer of the Nnwdaf\_RoamingAnalytics service is the Roaming Exchange NWDAF (RE-NWDAF).

Both the RE-NWDAF that provides the Nnwdaf\_RoamingAnalytics service and the RE-NWDAF that consumes the Nnwdaf\_RoamingAnalytics service may be in the HPLMN (in which case it is denoted as H-RE-NWDAF) or in the VPLMN (in which case it is denoted as V-RE-NWDAF). If the NF service producer is the H-RE-NWDAF then the NF service consumer is the V-RE-NWDAF and vice versa.



Figure 4.9.1.2-1: Reference Architecture for the Nnwdaf\_RoamingAnalytics Service; SBI representation



Figure 4.9.1.2-2: Reference Architecture for the Nnwdaf\_RoamingAnalytics Service: reference point representation

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

##### 4.9.1.3.1 Network Data Analytics Function (NWDAF)

The Network Data Analytics Function (NWDAF) with roaming exchange capability, i.e. the RE-NWDAF, provides analytics information for different analytics events related to roaming UE(s) to NF service consumers.

The Network Data Analytics Function (NWDAF) allows NF service consumers to subscribe (or update subscription) to and unsubscribe from one-time, periodic notification or notification when an event is detected.

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