**3GPP TSG-WG SA2 Meeting #153ES2-2208824r03**

**E-Meeting, 10th – 17th October 2022**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **23.288** | **CR** | **0550** | **rev** | **-** | **Current version:** | **17.6.0** |  |
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| *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:***  | Formatting and Processing Instructions related correction to Nadrf\_DataManagement service |
|  |  |
| ***Source to WG:*** | ZTE |
| ***Source to TSG:*** | SA2 |
|  |  |
| ***Work item code:*** | eNA\_Ph2 |  | ***Date:*** | 2022-09-28 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** |  |
|  | *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-16 (Release 16)**Rel-17 (Release 17)**Rel-18 (Release 18)**Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | 1. The NOTE in 10.2.8 wrongly mentions DCCF instead of ADRF. If applied to ADRF it would mean ADRF can do formatting and processing, which was never intended in Rel-17 discussions.
2. Formatting Instructions and Processing Instructions included in Nadrf\_DataManagement\_StorageSubscriptionRequest still applies, allowing ADRF to include them when subscribing to a DCCF or NWDAF for Data or Analytics to be stored
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| ***Summary of change:*** | 10.2.8, delete the NOTE.10.2.6: add fetch flag to inputs.10.2.3, add a note to clarify use of formatting and processing instructions in Nadrf\_DataManagement\_StorageSubscriptionRequest. |
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| ***Consequences if not approved:*** | Incorrect specification. |
|  |  |
| ***Clauses affected:*** | 5A.4, 10.2.6, 10.2.8, 10.2.3 |
|  |  |
|  | **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:*** |  |

\* \* \* \* 1st change \* \* \* \*

## 5A.4 Data Formatting and Processing

Formatting and/or Processing instructions may be provided in requests by Data Consumers via the Ndccf\_DataManagement service and Nnwdaf\_DataManagement service. As an alternative to providing individual events, formatting can be used to aggregate notifications and processing can be used to extract and send summary information from multiple notifications. Data Formatting and Processing are applicable to notifications due to events as they occur at data sources (runtime data or analytics) and historical data as described in clause 5A.5.

When using the Messaging Framework, the DCCF sends the formatting and/or processing instructions to the Messaging Framework via the Nmfaf\_3daData\_Management Service so the MFAF may format and/or process the data before sending notifications to the Data Consumers / notification endpoints. When using Data Delivery via the DCCF, the DCCF performs formatting and/or processing before sending notifications.

Formatting determines when a notification is sent to the Consumer. Formatting Instructions may indicate:

- Notification Event clubbing: Buffering and sending of several notifications in one message. The consumer may specify a minimum and/or maximum number of notifications to be clubbed.

- Notification Time Window (example: notifications are buffered and sent between 2 and 3 AM).

- Cross event reference-based notification: When a subscribing NF is subscribing to multiple events (e.g. event X and event Y) the notification for an Event-X is buffered and reported only when the Event-Y occurs.

- Consumer triggered Notification: Notifications containing data or analytics are buffered until the consumer requests delivery using Nnwdaf\_DataManagement, Ndccf\_DataManagement or Nmfaf\_3caDataManagement Service. The consumer requests Consumer triggered notification by setting a "fetch flag" in its subscription request to the DCCF or NWDAF. When the requested data or analytics is available for retrieval, the DCCF, NWDAF or MFAF sends a notification containing fetch instructions to the consumer. The consumer must then fetch the data or analytics before an expiry time as provided in the fetch instructions.

NOTE: When this indication is set by the consumer, DCCF, NWDAF or MFAF notifications to the consumer contain Fetch Instructions (see clauses 8.2.4, 7.4.4, and 9.3.2).

- Exact time-based Notification: Notifications are sent to the Consumer at an exact time, irrespective of whether the event occurs (example: every 30 min). Exact time-based notifications may be periodic.

- Increasing time window based notification: Notifications are sent to the Consumer at an increasing periodicity (example: the first notification is sent immediately, subsequent received notifications are sent after 5 min, then after 10 min, then after 15 min, etc.).

For an ADRF endpoint, Formatting Instructions sent to the messaging framework may further specify whether Nmfaf services are used to deliver notifications to an ADRF, or whether the data are sent to the ADRF using a Nadrf service.

Processing instructions allow summarizing of notifications to reduce the volume of data reported to the Data Consumer. The processing results in summarizing of information from multiple notifications into a common report. Processing of data for inclusion in each notification sent to consumers occurs over a Processing Interval specified in the Processing Instructions. Notifications sent to consumers may represent partial intervals if formatting instructions or Event Reporting Information (as specified in TS 23.502 [3] table 4.15.1.1-1) require that a notification be sent to the consumer before the end of a processing interval. Processing Instructions are provided per Event ID or Analytics ID and are applied to multiple notifications that result from the same subscription and for the same Event ID or Analytics ID. Processing Instructions, in addition to the Processing Interval, may specify the parameter names, parameter values and the attributes to be determined and reported to the Consumer. Processing Instructions may also specify aggregation level (e.g. per-UEs, per AoIs) or temporal aggregation (e.g. per minute, per hour) and anonymization rules to anonymize UE identification. The processed notifications may comprise the following depending on the Event and Processing Instructions:

- Event;

- Processing Interval;

- List of Event Parameter Name(s) and for each Event Parameter Name, one Event Parameter Values and sets of the following attributes as indicated in the processing instructions:

- Event Spacing: Average and variance of the time interval separating two consecutive occurrences of the same event and parameter value, or periodicity for periodic reporting;

- Event Duration: Average and variance of the Time for which the parameter value applies;

- Number of countable occurrences for the parameter (e.g.: Mobility Registration Update);

- Average, variance, most frequent value, least frequent value and skew of the parameter (e.g.: number of UEs in an AoI);

- Maximum and minimum parameter values (e.g.: number of UEs in an AoI).

Event Parameter Names are Event specific and not all attributes are applicable for all parameter names. Examples of Event Parameter Names and Parameter values are provided in table 5A.4-1.

Table 5A.4-1: Examples of Event Parameter Names, Parameter values

|  |  |  |  |
| --- | --- | --- | --- |
| Event | Event parameter name | Parameter values | Attributes |
| Location Report | TAI | TAI-7 | - Average and variance of the time interval between TA boundary crossings.- Number of TA boundary crossing. |
| Number of UEs in a Region | Region | AMF-3 | - Average and variance of the number of UEs in the Region. |
| UE Reachability (status change) | CM State | Connected | - Average and variance of time between CM connected state transitions.- Average and variance of the time spent in CM connected state.- Number of transitions to CM connected state. |
| PDU Session Establishment | DNN | Internet | - Average and variance of time between PDU Session establishments to the Internet DN.- Average and variance of the duration of PDU Sessions established to the Internet DN.- Number of PDU Session establishments to the Internet DN. |
| PDU Session Establishment | PDU Session Type | Ethernet | - Average and variance of time between Ethernet PDU Session establishments.- Average and variance of the duration of Ethernet PDU Sessions.- Number of Ethernet PDU Session establishments. |

\* \* \* \* 2nd change \* \* \* \*

### 10.2.6 Nadrf\_DataManagement\_RetrievalSubscribe service operation

**Service operation name:** Nadrf\_DataManagement\_RetrievalSubscribe

**Description:** The consumer NF uses this service operation to retrieve stored data or analytics from the ADRF and to receive future notifications containing the corresponding data or analytics received by ADRF.

**Inputs, Required:** Service Operation, Analytics Specification or Data Specification, Time Window.

"Service Operation" identifies the service used to obtain the data or analytics from a Data Source (e.g. Namf\_EventExposure\_Subscribe or Nnwdaf\_AnalyticsSubscription\_Subscribe).

"Analytics Specification or Data Specification" is the "Service Operation" specific required and optional input parameters that identify the data that was stored (e.g. Analytics ID(s) / Event ID (s), Target of Analytics Reporting or Target of Event Reporting, Analytics Filter or Event Filter, etc.). Service Operations and input parameters are defined in clause 7 for NWDAF and in TS 23.502 [3], clause 5.2 for the other NFs.

"Time Window" is the start and stop time when the requested data or analytics was collected. If Time Window includes a period in the future, subsequent notifications containing the requested data or analytics received by the ADRF are sent to the notification endpoint.

**Inputs, Optional:** fetch flag.

**Outputs Required:** Result Indication.

**Outputs, Optional:** Subscription Correlation ID.

\* \* \* \* 3rd change \* \* \* \*

### 10.2.8 Nadrf\_DataManagement\_RetrievalNotify service operation

**Service operation name:** Nadrf\_DataManagement\_RetrievalNotify

Description: This service operation provides consumers with either data or analytics from an ADRF, or instructions to fetch the data or analytics from an ADRF. The notifications are provided to consumers that have subscribed using the Nadrf\_DataManagement\_RetrievalSubscribe service operation. Historical data or analytics may be retrieved from ADRF storage and data received in the future be sent when obtained by the ADRF.

**Inputs, Required:** Notification Correlation Information, time stamp representing time when ADRF completed preparation of the requested data.

**Inputs, Optional:** Requested Data or Analytics, Fetch Instructions, Termination Request.

Fetch Instructions indicate whether the data or analytics are to be fetched from the ADRF by the Consumer. If the data or analytics are to be fetched, the fetch instructions include an address from which the data may be fetched, one or more Fetch Correlation IDs. and a deadline to fetch the data (Fetch Deadline).

Data or Analytics are fetched using the Nadrf\_DataManagement\_RetrievalRequest service operation.

Termination Request indicates that the ADRF requests to terminate the subscription, i.e. ADRF will not provide further notifications related to this subscription, e.g. when all data or analytics requested by the consumer have been provided to the consumer.

**Outputs, Required:** Operation execution result indication.

**Outputs, Optional:** None.

\* \* \* \* 4th change \* \* \* \*

### 10.2.3 Nadrf\_DataManagement\_StorageSubscriptionRequest service operation

**Service operation name:** Nadrf\_DataManagement\_StorageSubscriptionRequest

**Description:** The consumer (NWDAF or DCCF) uses this service operation to request the ADRF to initiate a subscription for data or analytics (see clause 6.2B.3). Data or analytics provided in notifications as a result of the subsequent subscription by the ADRF are stored in the ADRF.

This service operation provides parameters needed by the ADRF to initiate the subscription (to a DCCF or NWDAF).

**Inputs, Required:** Service operation, Analytics Specification or Data Specification, Target NF (or Set) to subscribe to for notifications.

"Service Operation" identifies the service used to request data or analytics from a Data Source (e.g. Namf\_EventExposure\_Subscribe or Nnwdaf\_AnalyticsSubscription\_Subscribe)

"Analytics Specification or Data Specification" is the "Service Operation" specific required and optional input parameters that identify the data to be collected (e.g. Analytics ID(s) / Event ID (s), Target of Analytics Reporting or Target of Event Reporting, Analytics Filter or Event Filter, etc.). Service Operations and input parameters are defined in clause 7 for NWDAF and in TS 23.502 [3], clause 5.2 for the other NFs.

"Target NF (or Set) to subscribe to for notifications" may be a DCCF or NWDAF that can provide the data or analytics

**Inputs, Optional:** Formatting Instructions, Processing Instructions.

Formatting Instructions and Processing Instructions are as defined in clause 5A.4.

**Outputs Required:** Transaction Reference ID.

**Outputs, Optional:** None.

NOTE: The parameters used in this service operation, including Formatting and Processing Instructions (if provided) are used by the ADRF when subscribing to a DCCF or NWDAF for Data or Analytics to be stored.

\* \* \* \* End of change \* \* \* \*