**3GPP TSG- Meeting #**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
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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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| ***Source to WG:*** |  | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
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| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***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 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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | The procedures for Data Collection using DCCF erroneously state that it is the NWDAF which uses the information about user consent in order to include or exclude SUPIs from the subsequent requests, while it is the DCCF itself that shall perform this task. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Correct the procedures to indicate that it is the DCCF that excludes the SUPI or GPSI from requests to collect data for users for whom the user consent is not granted. | | | | | | | | |
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| ***Consequences if not approved:*** | | Inconsistent specifications which may cause erroneous behaviour and/or interoperability issues if a DCCF does not enforce the user consent information as it shall, leaving it for the NWDAF instead. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.5.3.1, 5.5.3.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |
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| ***This CR's revision history:*** | |  | | | | | | | | |

\* \* \* \* First change \* \* \* \*

#### 5.5.3.1 Data Collection via DCCF

The procedure depicted in Figure 5.5.3.1-1 is used by a data consumer (e.g. NWDAF) to obtain data and be notified of events via the DCCF using the Ndccf\_DataManagement\_Subscribe service operation. Whether the data consumer directly contacts the Data Source or goes via the DCCF is based on configuration of the data consumer.



Figure 5.5.3.1-1: Data Collection via DCCF

1. In order to subscribe to notification(s) of events exposure via the DCCF based on local configuration, the Data Consumer invokes the Ndccf\_DataManagement\_Subscribe service operation by sending an HTTP POST request targeting the resource "DCCF Data Subscriptions" as described in clause 4.2.2.2.4 of 3GPP TS 29.574 [15].

2a. If data is to be collected for a user, i.e. for a SUPI or GPSI, the user consent has not been checked by the data consumer, and local policy and regulations require to check user consent, the DCCF invokes the Nudm\_SDM\_Get service operation by sending an HTTP GET request targeting the resource "AccessAndMobilitySubscriptionData" at the UDM to request the data type "User consent" as described in clause 5.2.2.2 of 3GPP TS 29.503 [22]. Otherwise the procedure continues with step 4.

3a. The UDM responds to the Nudm\_SDM\_Get service operation. If the request is accepted, the response includes the requested data with "200 OK". In subsequent steps, the DCCF excludes the SUPI or GPSI from requests to collect data for users for whom the user consent is not granted.

2b. For the users for which the user consent is granted, the DCCF subscribes to notifications of changes of the user consent by invoking the Nudm\_SDM\_Subscribe service operation by sending an HTTP POST request targeting the resource "SdmSubscriptions" at the UDM as described in clause 5.2.2.3 of 3GPP TS 29.503 [22].

3b. The UDM responds to the Nudm\_SDM\_Subscribe service operation. If the request is accepted, the UDM responds with "201 Created" status code.

4. The DCCF determines the NF type(s) and/or OAM to retrieve the data based on the Service Operation requested in step 1. If the NF instance or NF Set ID is not provided by the data consumer. The DCCF determines the NF instances that can provide data as described in TS 23.288 [2] clause 5A.2 and clause 6.2.2.2. If the consumer requested storage of data in an ADRF but the ADRF ID is not provided by the data consumer, or the collected data is to be stored in an ADRF according to configuration on the DCCF, the DCCF selects an ADRF to store the collected data.

The DCCF keeps track of the data actively being collected from the Data Sources it is coordinating. The NWDAF or ADRF may register the data collection profile (including the data collection related Service Operation, Analytics/Data Specification, NWDAF ID or ADRF ID) with the DCCF. The DCCF may then determine whether certain historical data may be available in the NWDAF or ADRF based on the data collection profile and the request time window.

If the historical data handling is not applicable or not supported, the DCCF shall proceed with step 5a and skip step 5b, step 6b, step 7b, step 5c, step 6c, and step 7c.

If the historical data is available in an ADRF, the DCCF shall proceed with step 5a and step 5b, and skip step 5c, step 6c, and step 7c.

If the historical data is available in an NWDAF, the DCCF shall proceed with step 5a and step 5c, and skip step 5b, step 6b, and step 7b.

5a. The DCCF shall determine whether the data requested in step 1 are already being collected.

If the data requested are already being collected by a data consumer, the DCCF adds the data consumer to the list of data consumers that are subscribed for these data.

If the DCCF determines that no subscriptions need to be created or modified (e.g. because all the data can be made available either via pre-existing subscriptions or because of the historical data handling) then step 6a and step 7a are skipped.

6a. If the data requested in step 1 are not yet available, the DCCF shall invoke the Nnf\_EventExposure\_Subscribe service operation by sending an HTTP POST request message request to the NF targeting the resource representing event exposure subscriptions to subscribe to a new event exposure subscription, e.g. as described in clause 5.5.2.2 of 3GPP TS 29.503 [22] for the UDM, clause 5.3.2.2 of 3GPP TS 29.518 [18] for the AMF, clause 4.2.3 of 3GPP TS 29.508 [6] for the SMF, clause 4.2.2.2 of 3GPP TS 29.591 [11] for the NEF, or clause 4.2.2 of 3GPP TS 29.517 [12] for the AF.

Otherwise, if the requested data subscribed in step 1 partially matches data that is already being collected by the DCCF from an NF, and a modification of this subscription to the NF would satisfy both the existing data subscriptions as well as the newly requested data, the DCCF shall send a request to the individual event exposure subscription resource to update an existing event exposure subscription, e.g. as described in clause 5.5.2.5 of 3GPP TS 29.503 [22] for the UDM, clause 5.3.2.2.3 of 3GPP TS 29.518 [18] for the AMF, clause 4.2.3.3 of 3GPP TS 29.508 [6] for the SMF, clause 4.2.2.2.3 of 3GPP TS 29.591 [11] for the NEF, or clause 4.2.2.3 of 3GPP TS 29.517 [12] for the AF.

7a. The NF responds to the Nnf\_EventExposure\_Subscribe service operation.

Upon receipt of an HTTP POST request, if the subscription is accepted to be created, the NF responds to the DCCF with "201 Created" status code, and the URI of the created subscription is included in the Location header field.

Upon receipt of an HTTP PUT request, if the subscription is accepted to be updated, the NF responds to the DCCF with "200 OK" or "204 No Content" status code.

5b. If the historical data handling is applicable, and the DCCF determines to retrieve data from the ADRF, the DCCF shall determine which ADRF instances might provide the data.

6b. In order to retrieve the historical data from the ADRF, the DCCF shall invoke the Nadrf\_DataManagement\_RetrievalSubscribe service operation by sending an HTTP POST request message targeting the resource "ADRF Data Retrieval Subscriptions" as described in clause 4.2.2.6 of 3GPP TS 29.575 [16].

7b. The ADRF responds to the Nadrf\_DataManagement\_RetrievalSubscribe service operation.

Upon receipt of the HTTP POST request, if the subscription is accepted to be created, the ADRF responds to the DCCF with "201 Created" status code, and the URI of the created subscription is included in the Location header field.

5c. If the historical data handling is applicable, and the DCCF determines to retrieve data from the NWDAF, the DCCF shall determine which NWDAF instances might provide the requested data.

6c. In order to retrieve the historical data from the NWDAF, the DCCF shall invoke the Nnwdaf\_DataManagement\_Subscribe service operation by sending an HTTP POST request message targeting the resource "NWDAF Data Management Subscriptions", as described in clause 4.4.2.2 of 3GPP TS 29.520 [5].

7c. The NWDAF responds to the Nnwdaf\_DataManagement\_Subscribe service operation.

Upon receipt of the HTTP POST request, if the subscription is accepted to be created, the NWDAF responds to the DCCF with "201 Created" status code, and the URI of the created subscription is included in the Location header field.

8. The DCCF responds to the Ndccf\_DataManagement\_Subscribe service operation with HTTP "204 No Content" status code.

9a. When the data are available, the NF invokes the Nnf\_EventExposure\_Notify service operation by sending an HTTP POST request message to notify the data events to the DCCF, e.g. as described in clause 5.5.2.4 of 3GPP TS 29.503 [22] for the UDM, clause 5.3.2.4 of 3GPP TS 29.518 [18] for the AMF, clause 4.2.2 of 3GPP TS 29.508 [6] for the SMF, clause 4.2.2.4 of 3GPP TS 29.591 [11] for the NEF, or clause 4.2.4 of 3GPP TS 29.517 [12] for the AF.

10a. The DCCF responds to the Nnf\_EventExposure\_Notify service operation with HTTP "204 No Content" status code.

9b. When the historical data are available in the ADRF, the ADRF shall invoke the Nadrf\_DataManagement\_RetrievalNotify service operation by sending an HTTP POST request message to notify the historical data or Fetch Instructions to the DCCF as described in clause 4.2.2.8 of 3GPP TS 29.575 [16].

10b. The DCCF responds to the Nadrf\_DataManagement\_RetrievalNotify service operation with HTTP "204 No Content" status code.

9c. When the historical data are available in the NWDAF, the NWDAF shall invoke the Nnwdaf\_DataManagement\_Notify service operation by sending an HTTP POST request message to notify the historical data to the DCCF as described in clause 4.4.2.4 of 3GPP TS 29.520 [5].

10c. The DCCF responds to the Nnwdaf\_DataManagement\_Notify service operation with HTTP "204 No Content" status code.

11. If the DCCF is configured to deliver the data itself (and not via the MFAF), the DCCF invokes the Ndccf\_DataManagement\_Notify service operation by sending HTTP POST request message(s) to send the data to all notification endpoints indicated in step 1. Data sent to notification endpoints may be processed and formatted by the DCCF, so they conform to delivery requirements for each NF service consumer or notification endpoint.

NOTE: According to Formatting Instructions provided by the NF service consumer, multiple notifications from a NF can be combined in a single Ndccf\_DataManagement\_Notify so that many notifications from an NF result in fewer notifications (or one notification) to the Data Consumer. Alternatively, a notification can instruct the data notification endpoint to fetch the data from the DCCF.

12. The NF service consumer responds to the Ndccf\_DataManagement\_Notify service operation with HTTP "204 No Content" status code.

13. The Data Consumer invokes the Ndccf\_DataManagement\_Fetch service operation by sending an HTTP GET request message as described in clause 4.2.2.5 of 3GPP TS 29.574 [15] to fetch the data from the DCCF before an expiry time, if the fetch instruction was previously received via the NdccfDataManagement\_Notify service operation in step 11.

14. The DCCF responds to the Ndccf\_DataManagement\_Fetch service operation with HTTP "200 OK" status code with the message body containing the data received earlier from the data source.

15. When the NF service consumer no longer needs the subscription to the requested data in step 1, it shall invoke the Ndccf\_DataManagement\_Unsubscribe service operation by sending an HTTP DELETE request message as described in clause 4.2.2.3.3 of 3GPP TS 29.574 [15]. The DCCF removes the NF service consumer from the list of NF service consumers that are subscribed for these data.

16. The DCCF responds to the Ndccf\_DataManagement\_Unsubscribe service operation with HTTP "204 No Content" status code, if the NF service consumer is successfully removed from the list of NF service consumers that are subscribed for these data.

17a. If there are no other NF service consumers subscribed to the data, the DCCF invokes the Nnf\_EventExposure\_Unsubscribe service operation by sending an HTTP DELETE request message to the Data Source, e.g. as described in clause 5.5.2.3 of 3GPP TS 29.503 [22] for the UDM, clause 5.3.2.3 of 3GPP TS 29.518 [18] for the AMF, clause 4.2.4 of 3GPP TS 29.508 [6] for the SMF, clause 4.2.2.3 of 3GPP TS 29.591 [11] for the NEF, or clause 4.2.3 in 3GPP TS 29.517 [12] for the AF.

18a. The Data Source responds to the Nnf\_EventExposure\_Unsubscribe service operation with HTTP "204 No Content" status code, if the data event(s) subscription is successfully removed.

17b. If the DCCF determines that no other NF service consumers require the historical data from the ADRF, the DCCF invokes the Nadrf\_DataManagement\_RetrievalUnsubscribe service operation by sending an HTTP DELETE request message to the ADRF as described in clause 4.2.2.7 of 3GPP TS 29.575 [16].

18b. The ADRF responds to the Nadrf\_DataManagement\_RetrievalUnsubscribe service operation with HTTP "204 No Content" status code, if the data retrieval subscription is successfully removed.

17c. If DCCF determines that no other NF service consumers require the historical data from the NWDAF, the DCCF invokes the Nnwdaf\_DataManagement\_Unsubscribe service operation by sending an HTTP DELETE request message to the NWDAF as described in clause 4.4.2.3 of 3GPP TS 29.520 [5].

18c. The NWDAF responds to the Nnwdaf\_DataManagement\_Unsubscribe service operation with HTTP "204 No Content" status code, if the data subscription is successfully removed.

\* \* \* \* Next change \* \* \* \*

#### 5.5.3.2 Data Collection via Messaging Framework

This procedure depicted in Figure 5.5.3.2-1 is used by a data consumer (e.g. NWDAF) to obtain data and be notified of events using the DCCF and a Messaging Framework. The 3GPP DCCF Adaptor (3da) Data Management service and 3GPP Consumer Adaptor (3ca) Data Management service of the Messaging Framework Adaptor Function (MFAF) are used to interact with the Messaging Framework. Whether the data consumer directly contacts the Data Source or goes via the DCCF is based on configuration.



Figure 5.5.3.2-1: Data Collection via DCCF and via Messaging Framework

1. In order to subscribe to notification(s) of events exposure via the DCCF based on local configuration, the Data Consumer invokes the Ndccf\_DataManagement\_Subscribe service operation by sending an HTTP POST request message targeting the resource "DCCF Data Subscriptions", as described in clause 4.2.2.2.4 of 3GPP TS 29.574 [15].

2a. If data is to be collected for a user, i.e. for a SUPI or GPSI, the user consent has not been checked by the data consumer, and local policy and regulations require to check user consent, the DCCF invokes Nudm\_SDM\_Get service operation by sending an HTTP GET request message targeting the resource "AccessAndMobilitySubscriptionData" at the UDM to request the data type "User consent" as described in clause 5.2.2.2 of 3GPP TS 29.503 [22]. Otherwise the procedure continues with step 4.

3a. The UDM responds to the Nudm\_SDM\_Get service operation. If the request is accepted, the response includes the requested data with "200 OK" status code. In subsequent steps, the DCCF excludes the SUPI or GPSI from requests to collect data for users for whom the user consent is not granted.

2b. For the users for which the user consent is granted, the DCCF subscribes to notifications of changes of the user consent by invoking the Nudm\_SDM\_Subscribe service operation by sending an HTTP POST request message targeting the resource "SdmSubscriptions" at the UDM as described in clause 5.2.2.3 of 3GPP TS 29.503 [22].

3b. The UDM responds to the Nudm\_SDM\_Subscribe service operation. If the request is accepted, the UDM responds with "201 Created" status code.

4. If the DCCF is configured to perform data delivery via the MFAF, in order to create configuration of mapping data in the MFAF, the DCCF shall invoke the Nmfaf\_3daDataManagement\_Configure service operation by sending an HTTP POST request message targeting the resource "MFAF Configurations", as described in clause 4.2.2.2.2 of 3GPP TS 29.576 [17].

In order to update configuration of mapping data in the MFAF, the DCCF shall invoke the Nmfaf\_3daDataManagement\_Configure service operation by sending an HTTP PUT request message targeting the resource "Individual MFAF Configuration", as described in clause 4.2.2.2.3 of 3GPP TS 29.576 [17].

5. The MFAF responds to the Nmfaf\_3daDataManagement\_Configure service operation.

Upon receipt of the HTTP POST request message, if the configuration is accepted to be created, the MFAF responds to the DCCF with "201 Created" status code, and the URI of the created configuration is included in the Location header field.

Upon receipt of the HTTP PUT request message, if the configuration is accepted to be updated, the MFAF responds to the DCCF with "200 OK" or "204 No Content" status code.

6. The DCCF determines the NF type(s) and/or OAM to retrieve the data based on the Service Operation requested in step 1. If the NF instance or NF Set ID is not provided by the data consumer. the DCCF determines the NF instances that can provide data as described in TS 23.288 [2] clause 5A.2 and clause 6.2.2.2. If the consumer requested storage of data in an ADRF but the ADRF ID is not provided by the data consumer, or the collected data is to be stored in an ADRF according to configuration on the DCCF, the DCCF selects an ADRF to store the collected data.

The DCCF keeps track of the data actively being collected from the Data Sources it is coordinating. The NWDAF or ADRF may register the data collection profile (including the data collection related Service Operation, Analytics/Data Specification, NWDAF ID or ADRF ID) with the DCCF. The DCCF may then determine whether certain historical data may be available in the NWDAF or ADRF based on the data collection profile and the request time window.

If the historical data handling is not applicable or not supported, the DCCF shall proceed with step 7a, and skip step 7b, step 8b, step 9b, step 7c, step 8c, and step 9c.

If the historical data is available in an ADRF, the DCCF shall proceed with step 7a and step 7b, and skip step 7c, step 8c, and step 9c.

If the historical data is available in an NWDAF, the DCCF shall proceed with step 7a and step 7c, and skip step 7b, step 8b, and step 9b.

7a. The DCCF shall determine whether the data requested in step 1 are already being collected.

If the data requested are already being collected by a data consumer, the DCCF adds the data consumer to the list of data consumers that are subscribed for these data.

If the DCCF determines that no subscriptions need to be created or modified (e.g. because all the data can be made available either via pre-existing subscriptions or because of the historical data handling) then step 8a and step 9a are skipped.

8a. If data requested in step 1 are not available yet, the DCCF shall invoke the Nnf\_EventExposure\_Subscribe service operation by sending an HTTP POST request message request to the NF targeting the resource representing event exposure subscriptions to subscribe to a new event exposure subscription, e.g. as described in clause 5.5.2.2 of 3GPP TS 29.503 [22] for the UDM, clause 5.3.2.2 of 3GPP TS 29.518 [18] for the AMF, clause 4.2.3 of 3GPP TS 29.508 [6] for the SMF, clause 4.2.2.2 of 3GPP TS 29.591 [11] for the NEF, or clause 4.2.2 of 3GPP TS 29.517 [12] for the AF.

Otherwise, if the requested data subscribed in step 1 partially matches data that is already being collected by the DCCF from an NF, and a modification of this subscription to the NF would satisfy both the existing data subscriptions as well as the newly requested data, the DCCF shall send a request to the individual event exposure subscription resource to update an existing event exposure subscription, e.g. as described in clause 5.5.2.5 of 3GPP TS 29.503 [22] for the UDM, clause 5.3.2.2.3 of 3GPP TS 29.518 [18] for the AMF, clause 4.2.3.3 of 3GPP TS 29.508 [6] for the SMF, clause 4.2.2.2.3 of 3GPP TS 29.591 [11] for the NEF, or clause 4.2.2.3 of 3GPP TS 29.517 [12] for the AF.

9a. The NF responds to the Nnf\_EventExposure\_Subscribe service operation.

Upon receipt of the HTTP POST request message, if the subscription is accepted to be created, the NF responds to the DCCF with "201 Created" status code, and the URI of the created subscription is included in the Location header field.

Upon receipt of the HTTP PUT request message, if the subscription is accepted to be updated, the NF responds to the DCCF with "200 OK" or "204 No Content" status code.

7b. If the historical data handling is applicable, and the DCCF determines to retrieve data from the ADRF, the DCCF shall determine which ADRF instances might provide the data.

8b. In order to retrieve the historical data from the ADRF, the DCCF shall invoke the Nadrf\_DataManagement\_RetrievalSubscribe service operation by sending an HTTP POST request message targeting the resource "ADRF Data Retrieval Subscriptions", as described in clause 4.2.2.6 of 3GPP TS 29.575 [16].

9b. The ADRF responds to the Nadrf\_DataManagement\_RetrievalSubscribe service operation.

Upon receipt of the HTTP POST request message, if the subscription is accepted to be created, the ADRF responds to the DCCF with "201 Created" status code, and the URI of the created subscription is included in the Location header field.

7c. If the historical data handling is applicable, and the DCCF determines to retrieve data from the NWDAF, the DCCF shall determine which NWDAF instances might provide the data.

8c. In order to retrieve the historical data from the NWDAF, the DCCF shall invoke the Nnwdaf\_DataManagement\_Subscribe service operation by sending an HTTP POST request message targeting the resource "NWDAF Data Management Subscriptions", as described in clause 4.4.2.2 of 3GPP TS 29.520 [5].

9c. The NWDAF responds to the Nnwdaf\_DataManagement\_Subscribe service operation.

Upon receipt of the HTTP POST request message, if the subscription is accepted to be created, the NWDAF responds to the DCCF with "201 Created" status code, and the URI of the created subscription is included in the Location header field.

10. The DCCF responds to the Ndccf\_DataManagement\_Subscribe service operation with HTTP "204 No Content" status code.

11a. When the data are available, the NF invokes the Nnf\_EventExposure\_Notify service operation by sending an HTTP POST request message to notify the data events to the MFAF, e.g. as described in clause 5.5.2.4 of 3GPP TS 29.503 [22] for the UDM, clause 5.3.2.4 of 3GPP TS 29.518 [18] for the AMF, clause 4.2.2 of 3GPP TS 29.508 [6] for the SMF, clause 4.2.2.4 of 3GPP TS 29.591 [11] for the NEF, or clause 4.2.4 of 3GPP TS 29.517 [12] for the AF.

12a. The MFAF responds to the Nnf\_EventExposure\_Notify service operation with HTTP "204 No Content" status code.

11b. When the historical data are available in the ADRF, the ADRF shall invoke the Nadrf\_DataManagement\_RetrievalNotify service operation by sending an HTTP POST request message to notify the historical data or Fetch Instructions to the MFAF as described in clause 4.2.2.8 of 3GPP TS 29.575 [16].

12b. The MFAF responds to the Nadrf\_DataManagement\_RetrievalNotify service operation with HTTP "204 No Content" status code.

11c. When the historical data are available in the NWDAF, the NWDAF shall invoke the Nnwdaf\_DataManagement\_Notify service operation by sending an HTTP POST request message to notify the historical data to the MFAF as described in clause 4.4.2.4 of 3GPP TS 29.520 [5].

12c. The MFAF responds to the Nnwdaf\_DataManagement\_Notify service operation with HTTP "204 No Content" status code.

13. The MFAF invokes the Nmfaf\_3caDataManagement\_Notify service operation by sending HTTP POST request message(s) to send the data to all notification endpoints indicated in step 1. Data sent to notification endpoints may be processed and formatted by the MFAF so they conform to delivery requirements for each NF service consumer or notification endpoint.

NOTE: According to Formatting Instructions provided by the NF service consumer, multiple notifications from a NF can be combined in a single Nmfaf\_3caDataManagement\_Notify so that many notifications from an NF results in fewer notifications (or one notification) to the Data Consumer. Alternatively, a notification can instruct the data notification endpoint to fetch the data from the MFAF.

14. The NF service consumer responds to the Nmfaf\_3caDataManagement\_Notify service operation with HTTP "204 No Content" status code.

15. The Data Consumer invokes the Nmfaf\_3caDataManagement\_Fetch service operation by sending an HTTP GET request message as described in clause 4.2.2.5 of 3GPP TS 29.574 [15] to fetch the data from the DCCF before an expiry time, if the fetch instruction was received in Nmfaf\_3caDataManagement\_Notify service operation in step 13.

16. The MFAF responds to the Nmfaf\_3caDataManagement\_Fetch service operation with HTTP "200 OK" status code with the message body containing the NmfafResourceRecord data structure.

17. When the NF service consumer no longer needs the subscription to the requested data in step 1, it shall invoke the Ndccf\_DataManagement\_Unsubscribe service operation by sending an HTTP DELETE request message as described in clause 4.2.2.3.3 of 3GPP TS 29.574 [15]. The DCCF removes the NF service consumer from the list of NF service consumers that are subscribed for these data.

18. The DCCF responds to the Ndccf\_DataManagement\_Unsubscribe service operation with HTTP "204 No Content" status code, if the NF service consumer is successfully from the list of NF service consumers that are subscribed for these data.

19a. If there are no other NF service consumers subscribed to the data, the DCCF invokes the Nnf\_EventExposure\_Unsubscribe service operation by sending an HTTP DELETE request message to the Data Source, e.g. as described in clause 5.5.2.3 of 3GPP TS 29.503 [22] for the UDM, clause 5.3.2.3 of 3GPP TS 29.518 [18] for the AMF, clause 4.2.4 of 3GPP TS 29.508 [6] for the SMF, clause 4.2.2.3 of 3GPP TS 29.591 [11] for the NEF, or clause 4.2.3 in 3GPP TS 29.517 [12] for the AF.

20a. The Data Source responds to the Nnf\_EventExposure\_Unsubscribe service operation with HTTP "204 No Content" status code, if the data event(s) subscription is successfully removed.

19b. If DCCF determines that no other NF service consumers requiring the historical data from the ADRF, the DCCF may invoke the Nadrf\_DataManagement\_RetrievalUnsubscribe service operation by sending an HTTP DELETE request message to the ADRF as described in clause 4.2.2.7 of 3GPP TS 29.575 [16].

20b. The ADRF responds to the Nadrf\_DataManagement\_RetrievalUnsubscribe service operation with HTTP "204 No Content" status code, upon the data retrieval subscription is removed.

19c. If DCCF determines that no other NF service consumers require the historical data from the NWDAF, the DCCF may invoke the Nnwdaf\_DataManagement\_Unsubscribe service operation by sending an HTTP DELETE request message to the NWDAF as described in clause 4.4.2.3 of 3GPP TS 29.520 [5].

20c. The NWDAF responds to the Nnwdaf\_DataManagement\_Unsubscribe service operation with HTTP "204 No Content" status code, upon the data subscription is removed.

19d. When the DCCF determines that an NF service consumer mapping has to be removed from MFAF, the DCCF invokes the Nmfaf\_3daDataManagement\_Deconfigure service operation by sending an HTTP DELETE request message to the MFAF as described in clause 4.2.2.3 of 3GPP TS 29.576 [17].

20d. The MFAF responds to the Nmfaf\_3daDataManagement\_Deconfigure service operation with HTTP "204 No Content" status code, if the individual resource linked to the delete request is successfully removed.

\* \* \* \* End of changes \* \* \* \*