**3GPP TSG CT WG3 Meeting #134 *C3-242182r1***

**Changsha, China, 15-19 April 2024**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **29.574** | **CR** | **0094** | **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)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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|  |
| ***Title:***  | Change NWDAF to NF serivce consumer in procedure figures |
|  |  |
| ***Source to WG:*** | ZTE |
| ***Source to TSG:*** | CT3 |
|  |  |
| ***Work item code:*** | eNetAE |  | ***Date:*** | 2024-04-08 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***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 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)* |
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| ***Reason for change:*** | In CT3 #113e meeting CT3 agreed to align CT3 SBI TSs to use "NF service consumers" whenever possible. |
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| ***Summary of change:*** | Change NWDAF to NF serivce consumer in procedure figures. |
|  |  |
| ***Consequences if not approved:*** | Specification will not be aligned with other CT3 SBI TSs and CT3 decision agreed in CT3 #113e meeting. |
|  |  |
| ***Clauses affected:*** | 4.2.2.2.4, 4.2.2.2.5, 4.2.2.3.3, 4.2.2.4.3 |
|  |  |
|  | **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 does not have any impact in the OpenAPI specification. |
|  |  |
| ***This CR's revision history:*** |  |

**Additional discussion(if needed):**

**Proposed changes:**

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

##### 4.2.2.2.4 Subscription for data notifications

Figure 4.2.2.2.4-1 shows a scenario where the NF service consumer sends a request to the DCCF to subscribe for data notifications.



Figure 4.2.2.2.4-1: NF service consumer subscribes to data notifications

The NF service consumer (i.e. NWDAF) shall invoke the Ndccf\_DataManagement\_Subscribe service operation to subscribe to data notification(s). The NF service consumer shall send an HTTP POST request with "{apiRoot}/ndccf-datamanagement/<apiVersion>/data-subscriptions" as Resource URI, as shown in figure 4.2.2.2.4-1, step 1, to create a subscription for an "Individual DCCF Data Subscription" resource according to the information in message body. The NdccfDataSubscription data structure provided in the request body shall include:

- a notification target address within the "dataNotifUri" attribute;

- a notification correlation identifier within the "dataNotifCorrId" attribute; and

- a data subscription within the "dataSub" attribute, which contains one of the following:

- AMF event exposure subscription within the "amfDataSub" attribute;

- SMF event exposure subscription within the "smfDataSub" attribute;

- UDM event exposure subscription within the "udmDataSub" attribute;

- NEF event exposure subscription within the "nefDataSub" attribute;

- AF event exposure subscription within the "afDataSub" attribute;

- NRF event exposure subscription within the "nrfDataSub" attribute;

- NSACF event exposure subscription within the "nsacfDataSub" attribute;

- GMLC event exposure subscription within the "gmlcDataSub" attribute;

- UPF event exposure subscription within the "upfDataSub" attribute, if the "UpEvents" feature is supported;

and may include:

- the notification endpoints within the "notifEndpoints" attribute, if the "DataAnaCollect" feature is supported;

- formatting instructions within the "formatInstruct" attribute;

- processing instructions within the "procInstructs" attribute;

- the indication for data storage within the "storeInd" attribute, if the "DataAnaCollect" feature is supported;

- a target NF identifier within the "targetNfId" attribute" or a target NF set identifier within the "targetNfSetId" attribute";

- an ADRF identifier within the "adrfId" attribute or an ADRF set identifier within the "adrfSetId" attribute; and/or

- time window of the occurrence of the requested data collection within the "timePeriod" attribute.

NOTE 1: The DCCF can use the provided time window e.g. to determine when to (un)subscribe to the data source NF and/or what subscription duration to indicate to it.

- the purpose of data collection within the "dataCollectPurposes" attribute.

- the indication that the NF service consumer has already checked the user consent within the "checkedConsentInd" attribute.

- storage handling information within the "storeHandl" attribute, if the "EnhDataMgmt" feature is supported.

Upon the reception of an HTTP POST request with: "{apiRoot}/ndccf-datamanagement/<apiVersion>/subscriptions" as Resource URI and NdccfDataSubscription data structure as request body, the DCCF shall use the contents (e.g. "smfDataSub" attribute in NdccfDataSubscription data structure) of the request to determine whether the subscription can already be served or interactions with data sources (e.g. creation or modification of event exposure subscription for Nsmf\_EventExposure service) are required. If the DCCF cannot use the contents of the request to determine this, the DCCF shall send an HTTP "400 Bad Request" error response including the "cause" attribute set to "SUBSCRIPTION\_CANNOT\_BE\_SERVED".

NOTE 2: The "SUBSCRIPTION\_CANNOT\_BE\_SERVED" error can occur, for example, when the request is syntactically valid and there is no DCCF internal error, but the DCCF can neither find an existing subscription to a data source nor construct one based on the received subscription contents.

If the user consent has not been checked by the NF service consumer and is required for the requested data collection depending on local policy and regulations, then the DCCF shall check user consent for the targeted UE(s) based on the user consent subscription data that is retrieved via the Nudm\_SDM service API of the UDM as described in clause 5.2.2.24 and clause 6.1.3.32 of 3GPP TS 29.503 [20]. If the DCCF receive the response from the UDM that it is not granted for the impacted user(s), then the DCCF shall send an HTTP "403 Forbidden" error response including the "cause" attribute set to "USER\_CONSENT\_NOT\_GRANTED".

NOTE 3: When the target of reporting is a SUPI or a GPSI then the subscription can be rejected, e.g. because user consent is not granted, and the error is sent to the consumer. When the target of reporting is an Internal Group Id, or a list of SUPIs/GPSI(s) or any UE, and the user consent is not granted for a subset of the impacted users, then no error is sent, but a subset of the SUPIs/GPSIs is skipped if user consent is not granted.

Otherwise, if the user consent subscription data retrieved from the UDM indicate that the user consent is granted for the impacted user(s), the DCCF shall subscribe to notification of changes of the user consent (unless it is already subscribed) by invoking the Nudm\_SDM\_Subscribe service operation by sending an HTTP POST request targeting the resource "SdmSubscriptions" to the UDM as described in clause 5.2.2.3 of 3GPP TS 29.503 [23].

If the DCCF determines that the subscription can already be served (without requiring further interactions with the data sources) or a successful response from the data source(s) is received for the creation or modification of subscription(s) to serve this subscription, the DCCF shall:

- create a new subscription;

- assign a subscriptionId;

- store the subscription.

If the DCCF created an "Individual DCCF Data Subscription" resource, the DCCF shall respond with "201 Created" with the message body containing a representation of the created subscription, as shown in figure 4.2.2.2.4-1, step 2. The DCCF shall include a Location HTTP header field. The Location header field shall contain the URI of the created subscription i.e. "{apiRoot}/ndccf-datamanagement/<apiVersion>/data-subscriptions/{subscriptionId}". If an immediate reporting indication is provided in the subscription, the DCCF shall include the reports of the events subscribed, if available, in the HTTP POST response within the "dataSub" attribute, or, potentially within the "immReport" attribute, if the DataAnaCollect feature is supported.

When the notification flag of the "dataSub" attribute (e.g. the "notifFlag" attribute within the "eventsRepInfo" attribute in the case of AF events) is included and set to "DEACTIVATE" in the request, the DCCF shall mute the event notification and store the available events until the NF service consumer requests to retrieve them by setting the notification flag to "RETRIEVAL" or until a muting exception occurs (e.g. full buffer). When a muting exception occurs, if the EnhDataMgmt feature is supported, the DCCF may consider the contents of the muting instructions of the "dataSub" attribute (if provided; e.g. the "notifFlagInstruct" attribute within the "eventsRepInfo" attribute in the case of AF events) and/or local configuration to determine its actions.

If the EnhDataMgmt feature is supported and the DCCF accepts the provided notification flag and muting instructions, it may indicate the applied muting notification settings in the response (e.g. within the "mutingSetting" attribute in the case of AF events). If the DCCF does not accept the provided notification flag and muting instructions, it shall send an HTTP "403 Forbidden" error response including the "cause" attribute set to "MUTING\_INSTR\_NOT\_ACCEPTED".

If the DCCF receives storage handling information in the request but determines (e.g. based on local policy) that a different storage approach shall be followed, it indicates the determined storage approach to the consumer by setting accordingly the "storeHandl" attribute (e.g. providing a different lifetime, or setting the indication about deletion alerts to "false") in the message body of the response. When more than one consumer has requested storage lifetime for the same data, the storage approach should be based on the longest requested storage lifetime.

NOTE 4: The default operator policy for how long data is to be stored can be longer or shorter than the lifetime requested by the consumer. A default operator policy can for example accept only consumer requested lifetimes that are shorter or longer than the default policy.

If an error occurs when processing the HTTP POST request, the DCCF shall send an HTTP error response as specified in clause 5.1.7.

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

##### 4.2.2.2.5 Update subscription for data notifications



Figure 4.2.2.2.5-1: NF service consumer updates subscription to data notifications

The NF service consumer (i.e. NWDAF) shall invoke the Ndccf\_DataManagement\_Subscribe service operation to update a subscription to data notifications. The NF service consumer shall send an HTTP PUT request with "{apiRoot}/ndccf-datamanagement/<apiVersion>/data-subscriptions/{subscriptionId}" as Resource URI, as shown in figure 4.2.2.2.5-1, step 1, to update the subscription for an "Individual DCCF Data Subscription" resource identified by the {subscriptionId}. The NdccfDataSubscription data structure provided in the request body shall include the same contents as described in clause 4.2.2.2.4.

Upon the reception of an HTTP PUT request with "{apiRoot}/ndccf-datamanagement/<apiVersion>/data-subscriptions/{subscriptionId}" as Resource URI and NdccfDataSubscription data structure as request body, the DCCF shall use the contents of the request to determine whether the updated subscription can already be served or interactions with the data sources (e.g. modification of event exposure subscriptions) are required. If the DCCF cannot use the contents of the request to determine this, the DCCF shall send an HTTP "400 Bad Request" error response including the "cause" attribute set to "SUBSCRIPTION\_CANNOT\_BE\_SERVED".

NOTE 1: The "SUBSCRIPTION\_CANNOT\_BE\_SERVED" error can occur, for example, when the request is syntactically valid and there is no DCCF internal error, but the DCCF can neither find an existing event exposure subscription nor construct one based on the received subscription contents.

If the user consent has not been checked by the NF service consumer and is required for the requested data collection depending on local policy and regulations, then the DCCF shall check user consent for the targeted UE(s) based on the user consent subscription data that is retrieved via the Nudm\_SDM service API of the UDM as described in clause 5.2.2.24 and clause 6.1.3.32 of 3GPP TS 29.503 [20]. If the DCCF receive the response from the UDM that it is not granted for the impacted user(s), then the DCCF shall send an HTTP "403 Forbidden" error response including the "cause" attribute set to "USER\_CONSENT\_NOT\_GRANTED".

NOTE 2: When the target of reporting is a SUPI or a GPSI then the subscription can be rejected, e.g. because user consent is not granted, and the error is sent to the consumer. When the target of reporting is an Internal Group Id, or a list of SUPIs/GPSI(s) or any UE, and the user consent is not granted for a subset of the impacted users, then no error is sent, but a subset of the SUPIs/GPSIs is skipped if user consent is not granted.

Otherwise, if the user consent subscription data retrieved from the UDM indicate that the user consent is granted for the impacted user(s), the DCCF shall subscribe to notification of changes of the user consent (unless it is already subscribed) by invoking the Nudm\_SDM\_Subscribe service operation by sending an HTTP POST request targeting the resource "SdmSubscriptions" to the UDM as described in clause 5.2.2.3 of 3GPP TS 29.503 [23].

If the DCCF determines that the updated subscription can already be served (without requiring further interactions with the data sources) or a successful response from the data source(s) is received for the creation or modification of subscription(s) to serve this subscription, the DCCF shall:

- update the subscription of the corresponding subscriptionId; and

- store the subscription.

If the DCCF successfully updated the "Individual DCCF Data Subscription" resource, the DCCF shall respond with:

a) HTTP "200 OK" status code with the message body containing a representation of the updated subscription, as shown in figure 4.2.2.2.5-1, step 2a; If an immediate reporting indication is provided in the subscription, the DCCF shall include the reports of the events subscribed, if available, in the HTTP PUT response within the "dataSub" attribute, or, potentiallyE within the "immReport" attribute, if the DataAnaCollect feature is supported; or

b) HTTP "204 No Content" status code, as shown in figure 4.2.2.2.5-1, step 2b.

When the notification flag of the "dataSub" attribute (e.g. the "notifFlag" attribute within the "eventsRepInfo" attribute in the case of AF events) is included in the request with the value "DEACTIVATE", the DCCF shall mute the event notification and store the available events until the NF service consumer requests to retrieve them by setting the notification flag attribute to "RETRIEVAL" or until a muting exception occurs (e.g. full buffer). When a muting exception occurs, if the EnhDataMgmt feature is supported, the DCCF may consider the contents of the muting instructions of the "dataSub" attribute (if provided; e.g. the "notifFlagInstruct" attribute within the "eventsRepInfo" attribute in the case of AF events) and/or local configuration to determine its actions; if the notification flag is set to the value "RETRIEVAL", the DCCF shall send the stored events to the NF service consumer, mute the event notification again and store available events; if the notification flag is set to the value "ACTIVATE" and the event notifications are muted (due to a previously received "DECATIVATE" value), the DCCF shall unmute the event notification, i.e. start sending again notifications for available events.

If the EnhDataMgmt feature is supported and the DCCF accepts the provided notification flag and muting instructions, it may indicate the applied muting notification settings in the response (e.g. within the "mutingSetting" attribute in the case of AF events). If the DCCF does not accept the provided notification flag and muting instructions, it shall send an HTTP "403 Forbidden" error response including the "cause" attribute set to "MUTING\_INSTR\_NOT\_ACCEPTED".

If the DCCF receives storage handling information in the request but determines (e.g. based on local policy) that a different storage approach shall be followed, it indicates the determined storage approach to the consumer by setting accordingly the "storeHandl" attribute (e.g. providing a different lifetime, or setting the indication about deletion alerts to "false") in the message body of the response. When more than one consumer has requested storage lifetime for the same data, the storage approach should be based on the longest requested storage lifetime.

NOTE 3: The default operator policy for how long data is to be stored can be longer or shorter than the lifetime requested by the consumer. A default operator policy can for example accept only consumer requested lifetimes that are shorter or longer than the default policy.

If an error occurs when processing the HTTP PUT request, the DCCF shall send an HTTP error response as specified in clause 5.1.7.

If the DCCF determines the received HTTP PUT request needs to be redirected, the DCCF shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [4].

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

##### 4.2.2.3.3 Unsubscribe from data notifications

Figure 4.2.2.3.3-1 shows a scenario where the NF service consumer sends a request to the DCCF to unsubscribe from data notifications.



Figure 4.2.2.3.3-1: NF service consumer unsubscribes from data notifications

The NF service consumer shall invoke the Ndccf\_DataManagement\_Unsubscribe service operation to unsubscribe to data notifications. The NF service consumer shall send an HTTP DELETE request with "{apiRoot}/ndccf-datamanagement/<apiVersion>/data-subscriptions/{subscriptionId}" as Resource URI representing an "Individual DCCF Data Subscription" resource, as shown in figure 4.2.2.3.3-1, step 1, where "{subscriptionId}" is the identifier of the existing data subscription that is to be deleted.

Upon the reception of an HTTP DELETE request with "{apiRoot}/ndccf-datamanagement/<apiVersion>/data-subscriptions /{subscriptionId}" as Resource URI, if the DCCF successfully processed and accepted the received HTTP DELETE request, the DCCF shall:

- remove the corresponding subscription;

- respond to the NF service consumer:

- with HTTP "204 No Content" status code if the "EnhDataMgmt" feature is not supported or no stored unsent data events to be included in the response; or

- with HTTP "200 OK" status code if the "EnhDataMgmt" feature is supported and including the stored unsent data events in the NdccfDataSubscriptionNotification data type in the response.

If errors occur when processing the HTTP DELETE request, the DCCF shall send an HTTP error response as specified in clause 5.1.7.

If the DCCF determines the received HTTP DELETE request needs to be redirected, the DCCF shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [4].

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

##### 4.2.2.4.3 Notification about subscribed data event

Figure 4.2.2.4.3-1 shows a scenario where the DCCF sends a request to the NF Service Consumer to notify it about data event(s).

NF service consumer

DCCF

1

.

POST

{

notificationURI

}

2

.

204

No Content or 200 OK

Figure 4.2.2.4.3-1: DCCF notifies the NF service consumer about a subscribed data event

The DCCF shall invoke the Ndccf\_DataManagement\_Notify service operation to notify about a subscribed data event. The DCCF shall send an HTTP POST request with "{notificationURI}" as Resource URI (where "{notificationURI}" has the value of the notification URI received in the NdccfDataSubscription data structure of the Ndccf\_DataManagement\_Subscribe service operation, see clause 5.1.5 for the definition of this notification URI), as shown in figure 4.2.2.4.3-1, step 1. The NdccfDataSubscriptionNotification data structure provided in the request body shall include:

- the data notification correlation identifier within the "dataNotifCorrId" attribute;

- the time stamp which represents the time when DCCF completes preparation of the requested data within the "timeStamp" attribute;

- one of the following:

- the data notification within the "dataNotif" attribute;

- summarized data derived from events based on processing instructions and formatting instructions that occurred in the "dataReports" attribute;

- information for fetching the contents of the notification in the "fetchInstruct" attribute;

- a deletion alert in the "delAlert" attribute, if the "EnhDataMgmt" feature is supported.

The NdccfDataSubscriptionNotification data structure provided in the request body may include:

- a termination request provided by the DCCF within the "terminationReq" attribute;

- a cause for termination in the "termCause" attribute, if the "TerminationCause" feature is supported and the "terminationReq" attribute is set to "true", i.e. DCCF wants to request the termination of this subscription and will send no further notifications for it; and/or

- a pending notification cause for the stored unsent data in the "pendDataNotifCause" attribute if the "EnhDataMgmt" feature is supported.

If the NF service consumer successfully processed and accepted the received HTTP POST request, the NF service consumer shall:

- store the notification;

- respond with HTTP "204 No Content" status code, or with HTTP "200 OK" status code and the NotifResponse data structure in the response body if the "EnhDataMgmt" feature is supported.

If errors occur when processing the HTTP POST request, the NF service consumer shall send an HTTP error response as specified in clause 5.1.7.

If the NF service consumer determines the received HTTP POST request needs to be redirected, the NF service consumer shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [4].

After the successful processing of the HTTP POST request:

- if the DCCF requests the NF service consumer to retrieve the data with the "fetchInstruct" attribute, the NF service consumer may invoke the Ndccf\_DataManagement\_Fetch service operation to retrieve the notified data as defined in clause 4.2.2.5.

- if the DCCF provided a deletion alert to the NF service consumer, the NF service consumer may invoke the Nadrf\_DataManagement\_RetrievalRequest service operation as defined in 3GPP TS 29.575 [25] clause 4.2.2.5, using the storage transaction identifier received within the "alertStorTransId" attribute of the "delAlert" attribute, in order to retrieve the data that are about to be deleted.

NOTE: The "alertStorTransId" attribute, which is used for retrieving data prior to deletion, does not have to be the same with or related to the storage transaction identifier that is assigned and returned during the storage of the data in the ADRF.

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