**3GPP TSG-CT WG4 Meeting #105-eC4-214abc**

**E-Meeting, 17th – 27th August 2021 *was* C4-214459**

|  |
| --- |
| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **29.503** | **CR** | **0713** | **rev** | **1** | **Current version:** | **16.8.0** |  |
|  |
| *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:***  | Sub-Notify shared data |
|  |  |
| ***Source to WG:*** | Huawei, Hewlett Packard Enterprise |
| ***Source to TSG:*** | C4 |
|  |  |
| ***Work item code:*** | SBIProtoc16 |  | ***Date:*** | 2021-08-09 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-16 |
|  | *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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
|  |  |
| ***Reason for change:*** | 1. There is no UE id in the uri of Subscription to notifications of shared data change service operation, therefore the description below (exerpt forn clause 5.2.2.3.3) is incorrect.

*The NF service consumer sends a POST request to the parent resource (collection of subscriptions) (.../shared-data-subscriptions), to create a subscription as present in message body. The payload body of the POST request shall contain a representation of the shared data individual subscription resource to be created. There shall be only one shared data individual subscription per UE per NF service consumer identified by the ueId in URI and NfInstanceId in SdmSubscription.*Shared data is for the higher efficiency of data management, it is good to keep the subscription to the notifications of shared data change at a per NF Instance level of the NF service consumer in ordet to achieve the purpose of higher efficiency (i.e. less signals and less monitering events)1. How to indicate the required monitoring resource of shared data is not clear.
 |
|  |  |
| ***Summary of change:*** | 1. Removes the description related to subscription to notifications of shared data change higher at a UE level in clause 5.2.2.3.3.
2. Adds clear definition related to how to indicate the required monitoring resource of shared data.
 |
|  |  |
| ***Consequences if not approved:*** | Current description of subscription to notifications of shared data change and Modification of a subscription to notifications of shared data change is have some error and is also not clear, it may lead to different interpretations and implementations which may raise trouble in interoperability between different vendors.  |
|  |  |
| ***Clauses affected:*** | 5.2.2.2.1, 5.2.2.3.3, 5.2.2.2.xx(new), 6.1.3.1, 6.1.3.xx(new), A.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:*** | This CR introduces backward compatible corrects any the OpenAPI specification files of TS29503\_Nudm\_SDM.yaml. |
|  |  |
| ***This CR's revision history:*** | Rev1:1. Merged C4-214521
2. Added the definition of SharedDataIndividual resource and Individual Shared Subscription Data Retrieval service operation.
3. Proposed text for monitoredResourceURI removed
 |

\* \* \* Begin of Changes \* \* \* \*

##### 5.2.2.2.1 General

The following procedures using the Get service operation are supported:

- Slice Selection Subscription Data Retrieval

- Access and Mobility Subscription Data Retrieval

- SMF Selection Subscription Data Retrieval

- Session Management Subscription Data Retrieval

- SMS Subscription Data Retrieval

- SMS Management Subscription Data Retrieval

- UE Context in SMF Data Retrieval

- UE Context in SMSF Data Retrieval

- Retrieval Of Multiple Data Sets

- Identifier Translation

- Shared Subscription Data Retrieval

- Trace Data Retrieval

- LCS Privacy Data Retrieval

- LCS Mobile Originated Data Retrieval

- Enhanced Coverage Restriction Data Retrieval

- V2X Subscription Data Retrieval

- LCS Broadcast Assistance Subscription Data Retrieval

- UE Context in AMF Data Retrieval

- Individual Shared Subscription Data Retrieval

When the feature SharedData (see clause 6.1.8) is supported and the retrieved UE-individual data (i.e. data other than Shared Subscription Data) contain SharedDataIds, the NF service consumer shall also retrieve the shared data identified by the received shared data Ids unless the identified shared data are already available at the NF service consumer. The order of sequence of sharedDataIds within UE-individual data is significant: Individual data take precedence over shared data; shared data "SharedDataX" identified by a sharedDataId X takes precedence over shared data "SharedDataY" identified by a sharedDataId Y if X appears before Y within the list of SharedDataIds in the UE-individual data.

\* \* \* Next Change \* \* \* \*

##### 5.2.2.3.3 Subscription to notifications of shared data change

Figure 5.2.2.3.3-1 shows a scenario where the NF service consumer sends a request to the UDM to subscribe to notifications of shared data change. The request contains a callback URI and the URI of the monitored resource.



Figure 5.2.2.3.3-1: NF service consumer subscribes to notifications of shared data change

1. The NF service consumer sends a POST request to the parent resource (collection of subscriptions) (.../shared-data-subscriptions), to create a subscription as present in message body. The payload body of the POST request shall contain a representation of the shared data individual subscription resource to be created. There shall be only one shared data individual subscription per NF service consumer identified by NfInstanceId in SdmSubscription.

2. On success, the UDM responds with "201 Created" with the message body containing a representation of the created subscription. The Location HTTP header shall contain the URI of the created subscription.

On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the POST response body.

\* \* \* Next Change \* \* \* \*

##### 5.2.2.2.xx Individual Shared Subscription Data Retrieval

Figure 5.2.2.2.xx-1 shows a scenario where the NF service consumer (e.g. AMF) sends a request to the UDM to receive the individual shared subscription data indicated by the sharedDataId. The request contains the type of the requested information (/shared-data/{sharedDataId}) and query parameters (supported-features).



Figure 5.2.2.2.xx-1: Requesting shared data

1. The NF service consumer (e.g. AMF) sends a GET request to the resource representing the individual SharedData indicated by the sharedDataId and with query parameters indicating the supported-features.

2a. On success, the UDM responds with "200 OK" with the message body containing the individual SharedData.

2b. If there is no valid individual SharedData indicated by the sharedDataId, HTTP status code "404 Not Found" shall be returned including additional error information in the response body (in the "ProblemDetails" element).

On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the GET response body.

\* \* \* Next Change \* \* \* \*

#### 6.1.3.1 Overview



Figure 6.1.3.1-1: Resource URI structure of the nudm-sdm API

Table 6.1.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.1.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name(Archetype) | Resource URI | HTTP method or custom operation | Description |
| Supi(Document) | /{supi} | GET | Retrieve UE's subscription data |
| Nssai(Document) | /{supi}/nssai | GET | Retrieve the UE's subscribed Network Slice Selection Assistance Information |
| UeContextInAmfData(Document) | /{supi}/ue-context-in-amf-data | GET | Retrieve the UE's Context in AMF Data |
| AccessAndMobilitySubscriptionData(Document) | /{supi}/am-data | GET | Retrieve the UE's subscribed Access and Mobility Data |
| /{supi}/am-data/update-sor | update-sor(POST) | Trigger the update of Steering of Roaming Information at the UE |
| SorAck(Document) | /{supi}/am-data/sor-ack | PUT | Providing acknowledgement of Steering of Roaming |
| UpuAck(Document) | /{supi}/am-data/upu-ack | PUT | Providing acknowledgement of UE parameters update |
| CagAck(Document) | /{supi}/am-data/cag-ack | PUT | Providing acknowledgement of UE CAG configuration update |
| EnhancedCoverageRestrictionData | /{supi}/am-data/ecr-data | GET | Retrieve the UE's subscribed Enhance Coverage Restriction Data |
| SmfSelectionSubscriptionData(Document) | /{supi}/smf-select-data | GET | Retrieve the UE's subscribed SMF Selection Data |
| UeContextInSmfData(Document) | /{supi}/ue-context-in-smf-data | GET | Retrieve the UE's Context in SMF Data |
| SessionManagementSubscriptionData(Document) | /{supi}/sm-data | GET | Retrieve the UE's session management subscription data |
| SMSSubscriptionData(Document) | /{supi}/sms-data | GET | Retrieve the UE's SMS subscription data |
| SMSManagementSubscriptionData(Document) | /{supi}/sms-mng-data | GET | Retrieve the UE's SMS management subscription data |
| LcsPrivacySubscriptionData(Document) | /{ueId}/lcs-privacy-data | GET | Retrieve the UE's LCS privacy subscription data |
| LcsMobileOriginatedSubscriptionData(Document) | /{supi}/lcs-mo-data | GET | Retrieve the UE's LCS Mobile Originated subscription data |
| LcsBroadcastAssistanceSubscriptionData(Document) | /{supi}/lcs-bca-data | GET | Retrieve the UE's LCS Broadcast Assistance subscription data |
| V2xSubscriptionData(Document) | /{supi}/v2x-data | GET | Retrieve the UE's V2X subscription data |
| SdmSubscriptions(Collection) | /{ueId}/sdm-subscriptions | POST | Create a subscription |
| Individual subscription(Document) | /{ueId}/sdm-subscriptions/{subscriptionId} | DELETE | Delete the subscription identified by {subscriptionId}, i.e. unsubscribe |
| PATCH | Modify the sdm-subscription identified by {subscriptionId} |
| IdTranslationResult(Document) | /{ueId}/id-translation-result | GET | Retrieve a UE's SUPI or GPSI |
| UeContextInSmsfData(Document) | /{supi}/ue-context-in-smsf-data | GET | Retrieve the UE's Context in SMSF Data |
| TraceData(Document) | /{supi}/trace-data | GET | Retrieve Trace Configuration Data |
| SharedData(Collection) | /shared-data | GET | Retrieve shared data |
| SharedDataIndividual(Document) | /shared-data/{sharedDataId} | GET | Retrieve the individual Shared Data |
| SharedDataSubscriptions(Collection) | /shared-data-subscriptions | POST | Create a subscription |
| SharedDataIndividual subscription(Document) | /shared-data-subscriptions/{subscriptionId} | DELETE | Delete the subscription identified by {subscriptionId}, i.e. unsubscribe |
| PATCH | Modify the shared data subscription identified by {subscriptionId} |
| GroupIdentifiers(Document) | /group-data/group-identifiers | GET | Retrieve group identifiers and the UE identifiers belong to the group identifiers. |
| SnssaisAck(Document) | /{supi}/am-data/subscribed-snssais-ack | PUT | Providing acknowledgement of UE for subscribed S-NSSAIs |

\* \* \* Next Change \* \* \* \*

#### 6.1.3.xx Resource: SharedDataIndividual (Document)

##### 6.1.3.xx.1 Description

This resource represents the individual Shared Data.

##### 6.1.3.xx.2 Resource Definition

Resource URI: {apiRoot}/nudm-sdm/<apiVersion>/shared-data/{sharedDataId}

This resource shall support the resource URI variables defined in table 6.1.3.xx.2-1.

Table 6.1.3.xx.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.1.1 |
| sharedDataId | SharedDataId | Contains the individual Shared Data Identifier. |

##### 6.1.3.xx.3 Resource Standard Methods

###### 6.1.3.xx.3.1 GET

This method shall support the URI query parameters specified in table 6.1.3.xx.3.1-1.

Table 6.1.3.xx.3.1-1: URI query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| supported-features | SupportedFeatures | O | 0..1 | see 3GPP TS 29.500 [4] clause 6.6 |

This method shall support the request data structures specified in table 6.1.3.xx.3.1-2 and the response data structures and response codes specified in table 6.1.3.xx.3.1-3.

Table 6.1.3.xx.3.1-2: Data structures supported by the GET Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| n/a |  |  |  |

Table 6.1.3.xx.3.1-3: Data structures supported by the GET Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Responsecodes | Description |
| SharedData | M | 1 | 200 OK | Upon success, a response body containing the individual Shared Data shall be returned. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:- DATA\_NOT\_FOUND |
| NOTE: In addition common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] are supported. |

\* \* \* Next Change \* \* \* \*

##### 6.1.6.2.3 Type: SdmSubscription

Table 6.1.6.2.3-1: Definition of type SdmSubscription

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| nfInstanceId | NfInstanceId | M | 1 | Identity of the NF Instance creating the subscription. |  |
| implicitUnsubscribe | boolean | O | 0..1 | If present with value true indicates that the subscription expires when the subscribing NF (AMF, SMF, SMSF) identified by the nfInstanceId ceases to be registered at the UDM.When the subscribing NF is an SMF, this means that the subscription is terminated by UDM when the last PDU session of such SMF is deregistered for a given SUPI.If the subscribing NF (AMF. SMF, SMSF) is not registered when the SDM subscription with implicitUnsubscribe indicator set to true is received by the UDM, the UDM should return a confirmed expiry time in the expires attribute to the subscribing NF even when the expires attribute is absent from the request.See NOTE 1. |  |
| expires | DateTime | C | 0..1 | If present, indicates the point in time at which the subscription expires. Shall be present if implicitUnsubscribe is absent or false. Within a POST request the proposed expiry time is conveyed whereas in a POST response or PATCH response the confirmed expiry time is returned. |  |
| callbackReference | Uri | M | 1 | URI provided by the NF service consumer to receive notifications |  |
| amfServiceName | ServiceName | O | 0..1 | When present, this IE shall contain the name of the AMF service to which Data Change Notifications are to be sent (see clause 6.5.2.2 of 3GPP TS 29.500 [4]). This IE may be included if the NF service consumer is an AMF. |  |
| monitoredResourceUris | array(Uri) | M | 1..N | A set of URIs that identify the resources for which a change triggers a notification.The URI shall take the form of either an absolute URI or an absolute-path reference as defined in IETF RFC 3986 [31].See NOTE 3. |  |
| singleNssai | Snssai | O | 0..1 | This IE may be present if the consumer is SMF.This attribute shall be also used as filter for the Nudr notifications when sdmSubscription is included in subscriptionDataSubscription in Nudr POST operation.See NOTE 2. |  |
| dnn | Dnn | O | 0..1 | This IE may be present if the consumer is SMF.This attribute shall be also used as filter for the Nudr notifications when sdmSubscription is included in subscriptionDataSubscription in Nudr POST operation.When present, this IE shall contain the Network Identifier only, or Wildcard DNN.See NOTE 2. |  |
| subscriptionId | string | C | 0..1 | This attribute shall be present if the SdmSubscription is sent in a GET response message on Nudr. It identifies the individual sdmSubscription stored in the UDR and may be used by the UDM to delete an expired or implicitly unsubscribed sdmSubscription. |  |
| plmnId | PlmnId | C | 0..1 | If present, it indicates the PLMN of the NF Instance creating the subscription (i.e., the PLMN serving the UE).It shall be present if the NF Instance is located in a different PLMN than the UDM.If absent, the Home PLMN ID is used as default. |  |
| immediateReport | boolean | O | 0..1 | This IE indicates whether immediate report is needed or not.When present, this IE shall be set as following:- true: immediate report is required- false (default) immediate report is not required | ImmediateReport |
| report | SubscriptionDataSets | C | 0..1 | This IE shall be present in Subscribe response, if the immediateReport attribute is set to "true" in Subscribe request.When present, this IE shall contain the representation of subscription data sets that to be monitored, i.e. listed in monitoredResourceUris attribute. | ImmediateReport |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.1.8 These are the features supported by the NF subscribing at the UDM. |  |
| contextInfo | ContextInfo | C | 0..1 | This IE if present may contain e.g. the headers received by the UDM along with the SdmSubscription.Shall be absent on Nudm and may be present on Nudr. |  |
| NOTE 1: The subscription expires if the last registration identified by the nfInstanceId for the UE is deregistered at the UDM, e.g. the UDM shall remove the SdmSubscription of the SMF, if the UE's last PDU session SMF registration of this SMF is deregistered.NOTE 2: If "singleNssai" is not included, and "dnn" is not included, the UDM shall notify the data change of all DNN configurations and network slice(s). If "singleNssai" is included, and "dnn" is not included, the UDM shall notify the data change of network slice identified by "singleNssai" and all DNN configurations for the requested network slice identified by "singleNssai". If "singleNssai" is not included, and "dnn" is included, the UDM shall notify the data change of all network slices where such DNN is available and all DNN configurations identified by "dnn". If "singleNssai" is included, and "dnn" is included, the UDM shall notify the data change of network slice identified by "singleNssai" where such DNN is available and the DNN configuration identified by "dnn", if such DNN is available in the network slice identified by "singleNssai".NOTE 3: The UDM should handle only the relative-path part (apiSpecificResourceUriPart, see 3GPP TS 29.501 [5] clause 4.4.1) and ignore possible inconsistencies in the base URI part. |

\* \* \* Next Change \* \* \* \*

##### 6.1.6.2.31 Type: SdmSubsModification

Table 6.1.6.2.31-1: Definition of type SdmSubsModification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| expires | DateTime | O | 0..1 | If present, indicates the point in time at which the subscription expires. Within a PATCH request the proposed new expiry time is conveyed.  |
| monitoredResourceUris | array(Uri) | O | 1..N | If present, indicates the updated resources URIs to be monitored.The URI shall take the form of either an absolute URI or an absolute-path reference as defined in IETF RFC 3986 [31].See NOTE. |
| NOTE: The UDM should handle only the relative-path part (apiSpecificResourceUriPart, see 3GPP TS 29.501 [5] clause 4.4.1) and ignore possible inconsistencies in the base URI part. |

\* \* \* Next Change \* \* \* \*

## A.2 Nudm\_SDM API

openapi: 3.0.0

**\*\*\*\*\*\*\*\*\*\*text skipped for clarity\*\*\*\*\*\*\*\*\***

 /group-data/group-identifiers:

 get:

 summary: Mapping of Group Identifiers

 operationId: GetGroupIdentifiers

 tags:

 - Group Identifiers

 parameters:

 - name: ext-group-id

 in: query

 description: External Group Identifier

 required: false

 schema:

 $ref: '#/components/schemas/ExtGroupId'

 - name: int-group-id

 in: query

 description: Internal Group Identifier

 required: false

 schema:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/GroupId'

 - name: ue-id-ind

 in: query

 description: Indication whether UE identifiers are required or not

 required: false

 schema:

 type: boolean

 default: false

 - name: supported-features

 in: query

 description: Supported Features

 schema:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

 - name: If-None-Match

 in: header

 description: Validator for conditional requests, as described in RFC 7232, 3.2

 schema:

 type: string

 - name: If-Modified-Since

 in: header

 description: Validator for conditional requests, as described in RFC 7232, 3.3

 schema:

 type: string

 responses:

 '200':

 description: Expected response to a valid request

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/GroupIdentifiers'

 headers:

 Cache-Control:

 description: Cache-Control containing max-age, as described in RFC 7234, 5.2

 schema:

 type: string

 ETag:

 description: Entity Tag, containing a strong validator, as described in RFC 7232, 2.3

 schema:

 type: string

 Last-Modified:

 description: Timestamp for last modification of the resource, as described in RFC 7232, 2.2

 schema:

 type: string

 '400':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/400'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '503':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/503'

 default:

 description: Unexpected error

 /shared-data/{sharedDataId}:

 get:

 summary: retrieve the individual shared data

 operationId: GetIndividualSharedData

 tags:

 - Retrieval of the individual shared data

 parameters:

 - name: sharedDataId

 in: path

 description: Id of the Shared data

 required: true

 schema:

 $ref: '#/components/schemas/SharedDataIds'

 - name: supported-features

 in: query

 description: Supported Features

 schema:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/SupportedFeatures'

 - name: If-None-Match

 in: header

 description: Validator for conditional requests, as described in RFC 7232, 3.2

 schema:

 type: string

 - name: If-Modified-Since

 in: header

 description: Validator for conditional requests, as described in RFC 7232, 3.3

 schema:

 type: string

 responses:

 '200':

 description: Expected response to a valid request

 content:

 application/json:

 schema:

 $ref: '#/components/schemas/SharedData'

 headers:

 Cache-Control:

 description: Cache-Control containing max-age, as described in RFC 7234, 5.2

 schema:

 type: string

 ETag:

 description: Entity Tag, containing a strong validator, as described in RFC 7232, 2.3

 schema:

 type: string

 Last-Modified:

 description: Timestamp for last modification of the resource, as described in RFC 7232, 2.2

 schema:

 type: string

 '400':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/400'

 '404':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/404'

 '500':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/500'

 '503':

 $ref: 'TS29571\_CommonData.yaml#/components/responses/503'

 default:

 description: Unexpected error

components:

 securitySchemes:

 oAuth2ClientCredentials:

 type: oauth2

 flows:

 clientCredentials:

 tokenUrl: '{nrfApiRoot}/oauth2/token'

 scopes:

 nudm-sdm: Access to the nudm-sdm API

**\*\*\*\*\*\*\*\*\*\*text skipped for clarity\*\*\*\*\*\*\*\*\***

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