**3GPP TSG-CT WG4 Meeting #97eC4-203**

**E-Meeting, 15th – 24th April 2020 was C4-203057**

|  |
| --- |
| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **29.503** | **CR** | **0415** | **rev** | **2** | **Current version:** | **16.3.0** |  |
|  |
| *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** |

|  |
| --- |
|  |
| ***Title:***  | HTTP Header storage in UDR |
|  |  |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | CT4 |
|  |  |
| ***Work item code:*** | SBIProtoc16 |  | ***Date:*** | 2020-06-08 |
|  |  |  |  |  |
| ***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:*** | When the UDM receives a registration request from AMF, SMF or SMSF, the request may contain HTTP headers (e.g. 3gpp-Sbi-Binding) which need to be stored in the UDR for later use. Similarly for SDM Subscriptions and EE-Subscriptions |
|  |  |
| ***Summary of change:*** | Add origHeaders to registration and subscription resources.Clarify that supported features stored in registration resources and subscriptions are the features supported by the registering/subscribing NF (AMF, SMF, SMSF) and not the features supported by the UDM that stores the information in the UDR,  |
|  |  |
| ***Consequences if not approved:*** | OrigHeaders cannot be stored in the UDR and are not available for later use. |
|  |  |
| ***Clauses affected:*** | 6.1.6.2.3, 6.1.6.2.xx (new) 6.2.6.2.2, 6.2.6.2.3, 6.2.6.2.4, 6.2.6.2.6, 6.4.6.2.2, A.2, A.3, A.5 |
|  |  |
|  | **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 a backwards compatible additions to Nudm\_SDM,Nudr\_DR APIs |
|  |  |
| ***This CR's revision history:*** | Rev 2: The attribute origHeaders is replaced with contextInfo which is an (extensible) object containing the origHeaders.  |

\* \* \* \* First Change \* \* \* \*

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[3] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[4] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

[5] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

[6] 3GPP TS 33.501: "Security Architecture and Procedures for 5G System".

[7] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces Stage 3".

[8] 3GPP TS 23.003: "Numbering, addressing and identification".

[9] 3GPP TS 29.504: "5G System; Unified Data Repository Services; Stage 3".

[10] 3GPP TS 29.505: "5G System; Usage of the Unified Data Repository Services for Subscription Data; Stage 3".

[11] 3GPP TS 32.255: "Charging management; 5G data connectivity domain charging".

[12] 3GPP TS 32.298: "Charging management; Charging Data Record (CDR) parameter description".

[13] IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".

[14] OpenAPI Initiative, "OpenAPI 3.0.0 Specification", <https://github.com/OAI/OpenAPI-Specification/blob/master/versions/3.0.0.md>

[15] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".

[16] IETF RFC 7807: "Problem Details for HTTP APIs".

[17] IETF RFC 7396: "JSON Merge Patch".

[18] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".

[19] 3GPP TS 29.510: "Network Function Repository Services; Stage 3".

[20] 3GPP TS 23.122: "Non-Access-Stratum (NAS) functions related to Mobile Station in idle mode".

[21] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[22] 3GPP TS 29.338: "Diameter based protocols to support Short Message Service (SMS) capable Mobile Management Entities (MMEs)"

[23] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".

[24] 3GPP TS 29.509: "Authentication Server Services; Stage 3".

[25] IETF RFC 7232: "Hypertext Transfer Protocol (HTTP/1.1): Conditional Requests".

[26] IETF RFC 7234: "Hypertext Transfer Protocol (HTTP/1.1): Caching".

[27] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".

[28] ETSI TS 102 225: "Smart Cards; Secured packet structure for UICC based applications".

[29] IETF RFC 7542: "The Network Access Identifier".

[30] 3GPP TR 21.900: "Technical Specification Group working methods".

[31] IETF RFC 3986: "Uniform Resource Identifier (URI): Generic Syntax".

[32] 3GPP TS 23.632: "User Data Interworking, Coexistence and Migration"

[33] 3GPP TS 29.519: "Policy Data, Application Data and Structured Data for Exposure; Stage 3".

[34] 3GPP TS 29.572: "5G System; Location Management Services; Stage 3".

[35] 3GPP TS 23.288: "Architecture enhancements for 5G System (5GS) to support network data analytics services".

[36] 3GPP TS 29.518: "Access and Mobility Management Services".

[37] 3GPP TS 23.316: "Wireless and wireline convergence access support for the 5G System (5GS); Stage 2".

[38] 3GPP TS 23.273: "5G System (5GS) Location Services (LCS); Stage 2".

[39] 3GPP TS 29.515: "5G System; Gateway Mobile Location Services; Stage 3".

[40] 3GPP TS 29.508: "5G System; Session Management Event Exposure Service; Stage 3".

[41] IETF RFC 6902: "JavaScript Object Notation (JSON) Patch".

[42] BBF TR-069: "CPE WAN Management Protocol".

[43] BBF TR-369: "User Services Platform (USP)".

[44] 3GPP TS 29.524: "5G System; Cause codes mapping between 5GC interfaces; Stage 3".

[45] 3GPP TS 29.122: "T8 reference point for Northbound APIs".

[46] 3GPP TS 24.008: "Mobile radio interface Layer 3 specification; Core network protocols; Stage 3".

[47] 3GPP TS 22.071: "Location Services (LCS); Service description; Stage 1".

[yy] IETF RFC 7230: "Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing".

\* \* \* \* 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. |  |
| 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]. |  |
| singleNssai | Snssai | O | 0..1 | This IE may be present if the consumer is SMF. This attribute shall be also used as filter as filter for the Nudr notifications when sdmSubscription is included in subscriptionDataSubscription in Nudr POST operation.See NOTE. |  |
| dnn | Dnn | O | 0..1 | This IE may be present if the consumer is SMF. This attribute shall be also used as filter 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.See NOTE. |  |
| 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: 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". |

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

##### 6.1.6.2.xx Type: ContextInfo

Table 6.1.6.2.xx-1: Definition of type ContextInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| origHeaders | array(string) | O | 1..N | Headers received by the UDM from NFs consuming Nudm services. The encoding of the header shall comply with clause 3.2 of IETF RFC 7230 [yy] |

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

##### 6.2.6.2.2 Type: Amf3GppAccessRegistration

Table 6.2.6.2.2-1: Definition of type Amf3GppAccessRegistration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| amfInstanceId | NfInstanceId | M | 1 | The identity the AMF uses to register in the NRF. |
| deregCallbackUri | Uri | M | 1 | A URI provided by the AMF to receive (implicitly subscribed) notifications on deregistration. The deregistration callback URI shall have unique information within AMF set to identify the UE to be deregistered. |
| guami | Guami | M | 1 | This IE shall contain the serving AMF's GUAMI. |
| ratType | RatType | M | 1 | This IE shall indicate the current RAT type of the UE. |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.2.8These are the features supported by the AMF. |
| purgeFlag | PurgeFlag | O | 0..1 | This flag indicates whether or not the AMF has deregistered. It shall not be included in the Registration service operation. |
| pei | Pei | O | 0..1 | Permanent Equipment Identifier. |
| imsVoPs | ImsVoPs | O | 0..1 | Indicates per UE if "IMS Voice over PS Sessions" is homogeneously supported in all TAs in the serving AMF, or homogeneously not supported, or if support is non-homogeneous/unknown. Absence of this attribute shall be interpreted as "non homogenous or unknown" support. |
| amfServiceNameDereg | ServiceName | O | 0..1 | When present, this IE shall contain the name of the AMF service to which the Deregistration Notification is to be sent (see clause 6.5.2.2 of 3GPP TS 29.500 [4]). |
| pcscfRestorationCallbackUri | Uri | O | 0..1 | A URI provided by the AMF to receive (implicitly subscribed) notifications on the need for P-CSCF Restoration. |
| amfServiceNamePcscfRest | ServiceName | O | 0..1 | When present, this IE shall contain the name of the AMF service to which P-CSCF Restoration Notifications are to be sent (see clause 6.5.2.2 of 3GPP TS 29.500 [4]). This IE may be included if pcscfRestorationCallbackUri is present. |
| initialRegistrationInd | boolean | C | 0..1 | This IE shall be included by the AMF and set to true if the UE performs an Initial Registration. If the UE does not perform initial registration it shall be absent or set ot false. When present and true, the UDM+HSS is requested to cancel previous registration in MME/SGSN, if any.Not applicable for Nudr and Nudm\_UECM GET operation. |
| backupAmfInfo | array(BackupAmfInfo) | C | 1..N | This IE shall be included if the NF service consumer is an AMF and the AMF supports the AMF management without UDSF for the first interaction with UDM.The UDM uses this attribute to do an NRF query in order to invoke later services in a backup AMF, e.g. Namf\_EventExposure. |
| drFlag | DualRegistrationFlag | O | 0..1 | Dual Registration flag. When present and true, this flag indicates that the UDM+HSS is requested not to send S6a-CLR to the registered MME (if any). Otherwise, the registered MME (if any) shall be cancelled. Not applicable for Nudr and Nudm\_UECM GET operation. |
| urrpIndicator | boolean | O | 0..1 | This IE indicates whether "UE\_REACHABILITY\_FOR\_SMS" event for this user has been subscribed or not:- true: the event has been subscribed- false, or absence of this attribute: the event for this user is currently not subscribed |
| amfEeSubscriptionId | string | C | 0..1 | Shall be present if urrpIndicator is true and the UDM has subscribed to UE-reachability notification at the AMF. It contains the subscription Id allocated by the AMF as received by the UDM as part of the HTTP "Location" header of the Namf\_EventExposure\_Subscribe response.The UDM shall make use of the Nudr\_DataRepository Update service operation (see 3GPP TS 29.504 [9]) to store the amfEeSubscription Id in the UDR. |
| epsInterworkingInfo | EpsInterworkingInfo | C | 0..1 | This IE shall be included if the AMF has determined per APN/DNN which PGW-C+SMF is selected for EPS interworking with N26 and the AMF supports EPS interworking of non-3GPP access. For each APN/DNN, only one PGW-C+SMF shall be selected by the AMF for EPS interworking. |
| ueSrvccCapability | boolean | O | 0..1 | This IE indicates whether the UE supports 5G SRVCC:- true: 5G SRVCC is supported by the UE and AMF;- false, or absence of this attribute: 5G SRVCC is not supported. |
| nid | Nid | C | 0..1 | Network ID. Shall be present if the serving network is a SNPN. |
| registrationTime | DateTime | C | 0..1 | Time of Amf3GppAccessRegistration. Shall be present when used on Nudr. |
| vgmlcAddressIpv4 | Ipv4Addr | O | 0..1 | When present, indicates VGMLC IPv4 address. |
| vgmlcAddressIpv6 | Ipv6Addr | O | 0..1 | When present, indicates VGMLC IPv6 address. |
| vgmlcFqdn | Fqdn | O | 0..1 | When present, indicates FQDN of the VGMLC IPv6 address. |
| contextInfo | ContextInfo | C | 0..1 | This IE if present may contain e.g. the headers received by the UDM along with the 3GppAccessRegistration. Shall be absent on Nudm and may be present on Nudr |
| NOTE: The urrpIndicator attribute shall only be exposed over the Nudr SBI, and it shall not be included by the AMF. |

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

##### 6.2.6.2.3 Type: AmfNon3GppAccessRegistration

Table 6.2.6.2.3-1: Definition of type AmfNon3GppAccessRegistration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| amfInstanceId | NfInstanceId | M | 1 | The identity the AMF uses to register in the NRF. |
| deregCallbackUri | Uri | M | 1 | A URI provided by the AMF to receive (implicitly subscribed) notifications on deregistration.The deregistration callback URI shall have unique information within AMF set to identify the UE to be deregistered. |
| guami | Guami | M | 1 | This IE shall contain the serving AMF's GUAMI. |
| ratType | RatType | M | 1 | This IE shall indicate the current RAT type of the UE. |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.2.8 These are the features supported by the AMF. |
| purgeFlag | PurgeFlag | O | 0..1 | This flag indicates whether or not the AMF has deregistered. It shall not be included in the Registration service operation. |
| pei | Pei | O | 0..1 | Permanent Equipment Identifier |
| imsVoPs | ImsVoPs | M | 1 | Indicates per UE if "IMS Voice over PS Sessions" is supported, or not supported.The value NON\_HOMOGENEOUS\_OR\_UNKNOWN is not applicable. |
| amfServiceNameDereg | ServiceName | O | 0..1 | When present, this IE shall contain the name of the AMF service to which the Deregistration Notification is to be sent (see clause 6.5.2.2 of 3GPP TS 29.500 [4]). |
| pcscfRestorationCallbackUri | Uri | O | 0..1 | A URI provided by the AMF to receive (implicitly subscribed) notifications on the need for P-CSCF Restoration. |
| amfServiceNamePcscfRest | ServiceName | O | 0..1 | When present, this IE shall contain the name of the AMF service to which P-CSCF Restoration Notifications are to be sent (see clause 6.5.2.2 of 3GPP TS 29.500 [4]). This IE may be included if pcscfRestorationCallbackUri is present. |
| backupAmfInfo | array(BackupAmfInfo) | C | 1..N | This IE shall be included if the NF service consumer is an AMF and the AMF supports the AMF management without UDSF for the first interaction with UDM.The UDM uses this attribute to do an NRF query in order to invoke later services in a backup AMF, e.g. Namf\_EventExposure. |
| urrpIndicator | boolean | O | 0..1 | This IE indicates whether "UE\_REACHABILITY\_FOR\_SMS" event for this user has been subscribed or not:- true: the event has been subscribed- false, or absence of this attribute: the event for this user is currently not subscribed |
| amfEeSubscriptionId | string | C | 0..1 | Shall be present if urrpIndicator is true and the UDM has subscribed to UE-reachability notification at the AMF. It contains the subscription Id allocated by the AMF as received by the UDM as part of the HTTP "Location" header of the Namf\_EventExposure\_Subscribe response. The UDM shall make use of the Nudr\_DataRepository Update service operation (see 3GPP TS 29.504 [9]) to store the amfEeSubscription Id in the UDR. |
| nid | Nid | C | 0..1 | Network ID. Shall be present if the serving network is a SNPN. |
| registrationTime | DateTime | C | 0..1 | Time of AmfNon3GppAccessRegistration. Shall be present when used on Nudr. |
| vgmlcAddressIpv4 | Ipv4Addr | O | 0..1 | When present, indicates VGMLC IPv4 address. |
| vgmlcAddressIpv6 | Ipv6Addr | O | 0..1 | When present, indicates VGMLC IPv6 address. |
| vgmlcFqdn | Fqdn | O | 0..1 | When present, indicates FQDN of the VGMLC IPv6 address. |
| contextInfo | ContextInfo | C | 0..1 | This IE if present may contain e.g. the headers received by the UDM along with AmfNon3GppRegistration. Shall be absent on Nudm and may be present on Nudr. |
| NOTE: The urrpIndicator attribute shall only be exposed over the Nudr SBI, and it shall not be included by the AMF. |

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

##### 6.2.6.2.4 Type: SmfRegistration

Table 6.2.6.2.4-1: Definition of type SmfRegistration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| smfInstanceId | NfInstanceId | M | 1 | NF Instance Id of the SMF |
| smfSetId | NfSetId | C | 0..1 | This IE shall be present if the SMF belongs to a SMF SET.If present, it indicates the NF Set ID of SMF Set. |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.2.8 These are the features supported by the SMF. |
| pduSessionId | PduSessionId | M | 1 | PDU Session ID |
| singleNssai | Snssai | M | 1 | A single Network Slice Selection Assistance Information |
| dnn | Dnn | C | 0..1 | Data Network Name; shall be present if emergencyServices is false or absent.When present, this IE shall contain the Network Identifier only. |
| emergencyServices | boolean | C | 0..1 | Indication of Emergency Services; absence indicates false. |
| pcscfRestorationCallbackUri | Uri | O | 0..1 | a URI provided by the SMF to receive (implicitly subscribed) notifications on the need for P-CSCF Restoration |
| plmnId | PlmnId | M | 1 | Serving node PLMN identity. |
| pgwFqdn | string | C | 0..1 | FQDN of the PGW in the "PGW-C+SMF", to be included for interworking with EPS. |
| epdgInd | boolean | O | 0..1 | Indicate whether access is from ePDG.true: access from ePDG.false or absent: not access from ePDG |
| deregCallbackUri | Uri | O | 0..1 | A URI provided by the SMF to receive (implicitly subscribed) notifications on deregistration. The deregistration callback URI shall have unique information within SMF set to identify the UE to be deregistered. |
| registrationReason | RegistrationReason | O | 0..1 | Indicates registration reason. |
| registrationTime | DateTime | C | 0..1 | Time of SmfRegistration. Shall be present when used on Nudr. |
| contextInfo | ContextInfo | C | 0..1 | This IE if present may contain e.g. the headers received by the UDM along with the SmfRegistration. Shall be absent on Nudm and may be present on Nudr. |

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

##### 6.2.6.2.6 Type: SmsfRegistration

Table 6.2.6.2.6-1: Definition of type SmsfRegistration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| smsfInstanceId | NfInstanceId | M | 1 | NF Instance Id of the SMSF |
| smsfSetId | NfSetId | C | 0..1 | This IE shall be present if the SMSF belongs to an SMSF SET.If present, it indicates the NF Set ID of SMSF Set. |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.2.8 These are the features supported by the SMSF. |
| plmnId | PlmnId | M | 1 | Serving node PLMN identity |
| smsfMAPAddress | E164Number | C | 0..1 | International E.164 number of the SMSF; shall be present if the SMSF supports MAP (see 3GPP TS 29.002 [21]) |
| smsfDiameterAddress | NetworkNodeDiameterAddress | C | 0..1 | shall be present if the SMSF supports Diameter (see 3GPP TS  29.338 [22]) |
| registrationTime | DateTime | C | 0..1 | Time of SmsfRegistration. Shall be present when used on Nudr. |
| contextInfo | ContextInfo | C | 0..1 | This IE if present may contain e.g. the headers received by the UDM along with the SmsfRegistration. Shall be absent on Nudm and may be present on Nudr.. |

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

##### 6.4.6.2.2 Type: EeSubscription

Table 6.4.6.2.2-1: Definition of type EeSubscription

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| callbackReference | Uri | M | 1 | URI provided by the NF service consumer to receive notifications |
| monitoringConfigurations | map(MonitoringConfiguration) | M | 1..N | A map (list of key-value pairs where referenceId converted from integer to string serves as key; see clause 6.4.6.3.2) of MonitoringConfigurations;see clause 6.4.6.2.3 |
| reportingOptions | ReportingOptions | O | 0..1 | This IE may be included if the NF service consumer wants to describe how the reports of the event to be generated. |
| supportedFeatures | SupportedFeatures | O | 0..1 | See clause 6.4.8 These are the features supported by the NF subscribing at the UDM. |
| subscriptionId | string | C | 0..1 | This attribute shall be present if the EeSubscription is sent in a GET response message on Nudr. It identifies the individual EeSubscription stored in the UDR and may be used by the UDM to delete an EeSubscription. |
| contextInfo | ContextInfo | C | 0..1 | This IE if present may contain e.g. the headers received by the UDM along with the EeSubscription. Shall be absent on Nudm and may be present on Nudr. |

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

## A.2 Nudm\_SDM API

openapi: 3.0.0

\*\*\*\*\*\*\*\*\*\*\*\*\*\*text not shown for clarity\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

 SdmSubscription:

 type: object

 required:

 - nfInstanceId

 - callbackReference

 - monitoredResourceUris

 properties:

 nfInstanceId:

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

 implicitUnsubscribe:

 type: boolean

 expires:

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

 callbackReference:

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

 amfServiceName:

 $ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/ServiceName'

 monitoredResourceUris:

 type: array

 items:

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

 minItems: 1

 singleNssai:

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

 dnn:

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

 subscriptionId:

 type: string

 plmnId:

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

 immediateReport:

 type: boolean

 default: false

 report:

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

 supportedFeatures:

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

 contextInfo:

 $ref: '#components/schemas/ContextInfo'

\*\*\*\*\*\*\*\*\*\*\*\*\*\*text not shown for clarity\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

 ContextInfo:

 type: object

 properties:

 origHeaders:

 type: array

 items:

 type: string

 minItems: 1

# SIMPLE TYPES:

\*\*\*\*\*\*\*\*\*\*\*\*\*\*text not shown for clarity\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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

## A.3 Nudm\_UECM API

openapi: 3.0.0

\*\*\*\*\*\*\*\*text not shown for clarity\*\*\*\*\*\*\*\*\*\*

 Amf3GppAccessRegistration:

 type: object

 required:

 - amfInstanceId

 - deregCallbackUri

 - guami

 - ratType

 properties:

 amfInstanceId:

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

 supportedFeatures:

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

 purgeFlag:

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

 pei:

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

 imsVoPs:

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

 deregCallbackUri:

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

 amfServiceNameDereg:

 $ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/ServiceName'

 pcscfRestorationCallbackUri:

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

 amfServiceNamePcscfRest:

 $ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/ServiceName'

 initialRegistrationInd:

 type: boolean

 guami:

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

 backupAmfInfo:

 type: array

 items:

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

 minItems: 1

 drFlag:

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

 ratType:

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

 urrpIndicator:

 type: boolean

 amfEeSubscriptionId:

 type: string

 epsInterworkingInfo:

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

 ueSrvccCapability:

 type: boolean

 nid:

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

 registrationTime:

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

 vgmlcAddressIpv4:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

 vgmlcAddressIpv6:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Addr'

 vgmlcFqdn:

 $ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/Fqdn'

 contextInfo:

 $ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/ContextInfo'

\*\*\*\*\*\*\*\*text not shown for clarity\*\*\*\*\*\*\*\*\*\*

 AmfNon3GppAccessRegistration:

 type: object

 required:

 - amfInstanceId

 - imsVoPs

 - deregCallbackUri

 - guami

 - ratType

 properties:

 amfInstanceId:

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

 supportedFeatures:

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

 purgeFlag:

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

 pei:

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

 imsVoPs:

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

 deregCallbackUri:

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

 amfServiceNameDereg:

 $ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/ServiceName'

 pcscfRestorationCallbackUri:

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

 amfServiceNamePcscfRest:

 $ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/ServiceName'

 guami:

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

 backupAmfInfo:

 type: array

 items:

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

 minItems: 1

 ratType:

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

 urrpIndicator:

 type: boolean

 amfEeSubscriptionId:

 type: string

 nid:

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

 registrationTime:

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

 vgmlcAddressIpv4:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv4Addr'

 vgmlcAddressIpv6:

 $ref: 'TS29571\_CommonData.yaml#/components/schemas/Ipv6Addr'

 vgmlcFqdn:

 $ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/Fqdn'

 contextInfo:

 $ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/ContextInfo'

\*\*\*\*\*\*\*\*text not shown for clarity\*\*\*\*\*\*\*\*\*\*

 SmfRegistration:

 type: object

 required:

 - smfInstanceId

 - pduSessionId

 - singleNssai

 - plmnId

 properties:

 smfInstanceId:

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

 smfSetId:

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

 supportedFeatures:

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

 pduSessionId:

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

 singleNssai:

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

 dnn:

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

 emergencyServices:

 type: boolean

 pcscfRestorationCallbackUri:

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

 plmnId:

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

 pgwFqdn:

 type: string

 epdgInd:

 type: boolean

 default: false

 deregCallbackUri:

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

 registrationReason:

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

 registrationTime:

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

 contextInfo:

 $ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/ContextInfo'

 SmsfRegistration:

 type: object

 required:

 - smsfInstanceId

 - plmnId

 properties:

 smsfInstanceId:

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

 smsfSetId:

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

 supportedFeatures:

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

 plmnId:

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

 smsfMAPAddress:

 $ref: '#/components/schemas/E164Number'

 smsfDiameterAddress:

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

 registrationTime:

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

 contextInfo:

 $ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/ContextInfo'

\*\*\*\*\*\*\*\*text not shown for clarity\*\*\*\*\*\*\*\*\*\*

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

## A.5 Nudm\_EE API

openapi: 3.0.0

\*\*\*\*\*\*\*\*text not shown for clarity\*\*\*\*\*\*\*\*\*\*

 EeSubscription:

 type: object

 required:

 - callbackReference

 - monitoringConfigurations

 properties:

 callbackReference:

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

 monitoringConfigurations:

 description: A map (list of key-value pairs where ReferenceId serves as key) of MonitoringConfigurations

 type: object

 additionalProperties:

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

 minProperties: 1

 reportingOptions:

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

 supportedFeatures:

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

 subscriptionId:

 type: string

 contextInfo:

 $ref: 'TS29503\_Nudm\_SDM.yaml#/components/schemas/ContextInfo'

\*\*\*\*\*\*\*\*text not shown for clarity\*\*\*\*\*\*\*\*\*\*

\* \* \* \* End Of Change \* \* \* \*