**3GPP TSG-CT WG4 Meeting #104-eC4-213xyz**

**E-Meeting, 19th – 28th May 2021 (was C4-213291)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.510** | **CR** | **0529** | **rev** | **1** | **Current version:** | **17.1.0** |  |
|  | | | | | | | | |
| *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:*** | NRF Info | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | CT4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | SBIProtoc17 | | | | |  | ***Date:*** | | | 2021-04-30 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | A local NRF may register its own profile into another NRF of a higher-level, in a hierarchical NRF deployment. The local NRF uses the NrfInfo data structure to include the registered NFs, indicated in the corresponding "servedxxxInfo" attributes.  When an NF Instance has registered in the local NRF its NFProfile, but it has not indicated an xxxInfo data structure, it is not possible for the local NRF to include such NF Instance in the list of registered NFs, because the "servedxxxInfo" attributes cannot contain an empty JSON object.  A particular case where this is problematic is, for example, for the SMF, where the SmfInfo data structure exists and, if present, it cannot be empty (since the "sNssaiSmfInfoList" attribute is mandatory). However, it is possible to register an SMF without any smfInfo attribute, and this has specific semantics, as indicated in NOTE 12 of Table 6.1.6.2.2-1:  *"The absence of both the smfInfo and smfInfoList attributes in an SMF profile indicates that the SMF can be selected for any S-NSSAI, DNN, TAI and access type."*  Therefore, it is necessary that a local NRF may be able to indicate to the higher-level NRF that an SMF has registered, while it may have not indicated any SmfInfo data. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Extend the definition of all "servedxxxInfo" and "servedxxxInfoList" attributes in NrfInfo, so they can contain key value pairs where the key is the NfInstanceId of the registering NF, and the value is an empty JSON object. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | It is not possible to convey registration of NF instances from local NRF to the higher-leve NRF, when such instances don't contain xxxInfo attributes. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.1.6.2.31, 6.1.9, A.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS 29.571 CR 0281 | | |
| ***affected:*** | |  | **x** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | This CR introduces backwards-compatible corrections with impacts on the following OpenAPI specifications:  - TS29510\_Nnrf\_NFManagement.yaml | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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

##### 6.1.6.2.31 Type: NrfInfo

Table 6.1.6.2.31-1: Definition of type NrfInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| servedUdrInfo | map(UdrInfo) | O | 1..N | This attribute contains all the udrInfo attributes locally configured in the NRF or the NRF received during NF registration. The key of the map is the nfInstanceId of which the udrInfo belongs to. |
| servedUdrInfoList | map(map(UdrInfo)) | O | 1..N | This attribute contains the udrInfoList attribute locally configured in the NRF or that the NRF received during NF registration. The key of the map is the nfInstanceId to which the map entry belongs to. |
| servedUdmInfo | map(UdmInfo) | O | 1..N | This attribute contains all the udmInfo attributes locally configured in the NRF or the NRF received during NF registration. The key of the map is the nfInstanceId of which the udmInfo belongs to. |
| servedUdmInfoList | map(map(UdmInfo)) | O | 1..N | This attribute contains the udmInfoList attribute locally configured in the NRF or that the NRF received during NF registration. The key of the map is the nfInstanceId to which the map entry belongs to. |
| servedAusfInfo | map(AusfInfo) | O | 1..N | This attribute contains all the ausfInfo attributes locally configured in the NRF or the NRF received during NF registration. The key of the map is the nfInstanceId of which the ausfInfo belongs to. |
| servedAusfInfoList | map(map(AusfInfo)) | O | 1..N | This attribute contains the ausfInfoList attribute locally configured in the NRF or that the NRF received during NF registration. The key of the map is the nfInstanceId to which the map entry belongs to. |
| servedAmfInfo | map(AmfInfo) | O | 1..N | This attribute contains all the amfInfo attributes locally configured in the NRF or the NRF received during NF registration. The key of the map is the nfInstanceId of which the amfInfo belongs to. |
| servedAmfInfoList | map(map(AmfInfo)) | O | 1..N | This attribute contains the amfInfoList attribute locally configured in the NRF or that the NRF received during NF registration. The key of the map is the nfInstanceId to which the map entry belongs to. |
| servedSmfInfo | map(SmfInfo) | O | 1..N | This attribute contains all the smfInfo attributes locally configured in the NRF or the NRF received during NF registration. The key of the map is the nfInstanceId of which the smfInfo belongs to. |
| servedSmfInfoList | map(map(SmfInfo)) | O | 1..N | This attribute contains the smfInfoList attribute locally configured in the NRF or that the NRF received during NF registration. The key of the map is the nfInstanceId to which the map entry belongs to. |
| servedUpfInfo | map(UpfInfo) | O | 1..N | This attribute contains all the upfInfo attributes locally configured in the NRF or the NRF received during NF registration. The key of the map is the nfInstanceId of which the upfInfo belongs to. |
| servedUpfInfoList | map(map(UpfInfo)) | O | 1..N | This attribute contains the upfInfoList attribute locally configured in the NRF or that the NRF received during NF registration. The key of the map is the nfInstanceId to which the map entry belongs to. |
| servedPcfInfo | map(PcfInfo) | O | 1..N | This attribute contains all the pcfInfo attributes locally configured in the NRF or the NRF received during NF registration. The key of the map is the nfInstanceId of which the pcfInfo belongs to. |
| servedPcfInfoList | map(map(PcfInfo)) | O | 1..N | This attribute contains the pcfInfoList attribute locally configured in the NRF or that the NRF received during NF registration. The key of the map is the nfInstanceId to which the map entry belongs to. |
| servedBsfInfo | map(BsfInfo) | O | 1..N | This attribute contains all the bsfInfo attributes locally configured in the NRF or the NRF received during NF registration. The key of the map is the nfInstanceId of which the bsfInfo belongs to. |
| servedBsfInfoList | map(map(BsfInfo)) | O | 1..N | This attribute contains the bsfInfoList attribute locally configured in the NRF or that the NRF received during NF registration. The key of the map is the nfInstanceId to which the map entry belongs to. |
| servedChfInfo | map(ChfInfo) | O | 1..N | This attribute contains all the chfInfo attributes locally configured in the NRF or the NRF received during NF registration. The key of the map is the nfInstanceId of which the chfInfo belongs to. |
| servedChfInfoList | map(map(ChfInfo)) | O | 1..N | This attribute contains the chfInfoList attribute locally configured in the NRF or that the NRF received during NF registration. The key of the map is the nfInstanceId to which the map entry belongs to. |
| servedNefInfo | map(NefInfo) | O | 1..N | This attribute contains all the nefInfo attributes locally configured in the NRF or the NRF received during NF registration. The key of the map is the nfInstanceId of which the nefInfo belongs to. |
| servedNwdafInfo | map(NwdafInfo) | O | 1..N | This attribute contains all the nwdafInfo attributes locally configured in the NRF or the NRF received during NF registration. The key of the map is the nfInstanceId of which the nwdafInfo belongs to. |
| servedPcscfInfoList | map(map(PcscfInfo)) | O | 1..N | This attribute contains all the pcscfInfo attributes locally configured in the NRF or the NRF received during NF registration. The key of the map is the nfInstanceId to which the map entry belongs to. |
| servedGmlcInfo | map(GmlcInfo) | O | 1..N | This attribute contains all the gmlcInfo attributes locally configured in the NRF or the NRF received during NF registration. The key of the map is the nfInstanceId of which the gmlcInfo belongs to. |
| servedLmfInfo | map(LmfInfo) | O | 1..N | This attribute contains all the lmfInfo attributes locally configured in the NRF or the NRF received during NF registration. The key of the map is the nfInstanceId of which the lmfInfo belongs to. |
| servedNfInfo | map(NfInfo) | O | 1..N | This attribute contains information of other NFs without corresponding NF type specific Info extensions locally configured in the NRF or the NRF received during NF registration. The key of the map is the nfInstanceId of the NF. |
| servedHssInfoList | map(map(HssInfo)) | O | 1..N | This attribute contains all the hssInfo attributes locally configured in the NRF or the NRF received during NF registration. The key of the map is the nfInstanceId to which the map entry belongs to. |
| servedUdsfInfo | map(UdsfInfo) | O | 1..N | This attribute contains all the udsfInfo attributes locally configured in the NRF or the NRF received during NF registration. The key of the map is the nfInstanceId to which the map entry belongs to. |
| servedUdsfInfoList | map(map(UdsfInfo)) | O | 1..N | This attribute contains the udsfInfoList attribute locally configured in the NRF or that the NRF received during NF registration. The key of the map is the nfInstanceId to which the map entry belongs to. |
| servedScpInfoList | map(ScpInfo) | O | 1..N | This attribute contains the scpInfo attribute locally configured in the NRF or that the NRF received during SCP registration. The key of the map is the nfInstanceId to which the scpInfo belongs to. |
| servedSeppInfoList | map(SeppInfo) | O | 1..N | This attribute contains the seppInfo attribute locally configured in the NRF or that the NRF received during SEPP registration. The key of the map is the nfInstanceId to which the seppInfo belongs to. |
| servedAanfInfoList | map(map(AanfInfo)) | O | 1..N | This attribute contains the aanfInfoList attribute locally configured in the NRF or that the NRF received during NF registration. The key of the map is the nfInstanceId to which the map entry belongs to. |
| NOTE 1: The absence of these parameters means the NRF is able to serve any NF discovery request.  NOTE X: For any of the servedxxxInfo/servedxxxInfoList attributes (other than servedNfInfo), if the data type definition of the corresponding xxxInfo attribute allows to use an empty JSON object, the registering NRF shall include in the servedxxxInfo/servedxxxInfoList a map entry with an empty JSON object as value, to indicate the registration of an NF Instance that did not include any xxxInfo/xxxInfoList attributes; otherwise, the registering NRF shall check the support of the feature "Empty-Objects-Nrf-Info" (see clause 6.1.9) in the target NRF and, if the feature is not supported, it shall use the generic servedNfInfo attribute (instead of the servedxxxInfo corresponding to its NF type) to signal the registration of such NF instance with absent xxxInfo/xxxInfoList attributes. | | | | |

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

### 6.1.9 Features supported by the NFManagement service

The syntax of the supportedFeatures attribute is defined in clause 5.2.2 of 3GPP TS 29.571 [7].

The following features are defined for the Nnrf\_NFManagement service.

Table 6.1.9-1: Features of supportedFeatures attribute used by Nnrf\_NFManagement service

|  |  |  |  |
| --- | --- | --- | --- |
| Feature Number | Feature | M/O | Description |
| 1 | Service-Map | M | Support of defining in the profile of the NF Instance the list of NF Service Instances based on a map type (i.e. support of the "nfServiceList" attribute in NFProfile). |
| x | Empty-Objects-Nrf-Info | O | Support of receiving empty JSON objects as values in the servedxxxInfo/servedxxxInfoList map attributes of the NrfInfo data structure used by an NRF during registration into another NRF (see clause 6.1.6.2.31).  An NRF that supports registering into another NRF shall support this feature. |
| Feature number: The order number of the feature within the supportedFeatures attribute (starting with 1).  Feature: A short name that can be used to refer to the bit and to the feature.  M/O: Defines if the implementation of the feature is mandatory ("M") or optional ("O").  Description: A clear textual description of the feature. | | | |

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

## A.2 Nnrf\_NFManagement API

*(... text not shown for clarity ...)*

NrfInfo:

description: Information of an NRF NF Instance, used in hierarchical NRF deployments

type: object

properties:

servedUdrInfo:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/UdrInfo'

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

minProperties: 1

servedUdrInfoList:

type: object

additionalProperties:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/UdrInfo'

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

minProperties: 1

minProperties: 1

servedUdmInfo:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/UdmInfo'

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

minProperties: 1

servedUdmInfoList:

type: object

additionalProperties:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/UdmInfo'

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

minProperties: 1

minProperties: 1

servedAusfInfo:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/AusfInfo'

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

minProperties: 1

servedAusfInfoList:

type: object

additionalProperties:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/AusfInfo'

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

minProperties: 1

minProperties: 1

servedAmfInfo:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/AmfInfo'

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

minProperties: 1

servedAmfInfoList:

type: object

additionalProperties:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/AmfInfo'

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

minProperties: 1

minProperties: 1

servedSmfInfo:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/SmfInfo'

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

minProperties: 1

servedSmfInfoList:

type: object

additionalProperties:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/SmfInfo'

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

minProperties: 1

minProperties: 1

servedUpfInfo:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/UpfInfo'

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

minProperties: 1

servedUpfInfoList:

type: object

additionalProperties:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/UpfInfo'

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

minProperties: 1

minProperties: 1

servedPcfInfo:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/PcfInfo'

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

minProperties: 1

servedPcfInfoList:

type: object

additionalProperties:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/PcfInfo'

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

minProperties: 1

minProperties: 1

servedBsfInfo:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/BsfInfo'

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

minProperties: 1

servedBsfInfoList:

type: object

additionalProperties:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/BsfInfo'

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

minProperties: 1

minProperties: 1

servedChfInfo:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/ChfInfo'

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

minProperties: 1

servedChfInfoList:

type: object

additionalProperties:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/ChfInfo'

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

minProperties: 1

minProperties: 1

servedNefInfo:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/NefInfo'

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

minProperties: 1

servedNwdafInfo:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/NwdafInfo'

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

minProperties: 1

servedPcscfInfoList:

type: object

additionalProperties:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/PcscfInfo'

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

minProperties: 1

minProperties: 1

servedGmlcInfo:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/GmlcInfo'

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

minProperties: 1

servedLmfInfo:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/LmfInfo'

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

minProperties: 1

servedNfInfo:

type: object

additionalProperties:

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

minProperties: 1

servedHssInfoList:

type: object

additionalProperties:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/HssInfo'

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

minProperties: 1

minProperties: 1

servedUdsfInfo:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/UdsfInfo'

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

minProperties: 1

servedUdsfInfoList:

type: object

additionalProperties:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/UdsfInfo'

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

minProperties: 1

minProperties: 1

servedScpInfoList:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/ScpInfo'

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

minProperties: 1

servedSeppInfoList:

type: object

additionalProperties:

anyOf:

- $ref: '#/components/schemas/SeppInfo'

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

minProperties: 1

servedAanfInfoList:

type: object

description: A map(list of key-value pairs) where NF Instance Id serves as key

additionalProperties:

type: object

description: A map(list of key-value pairs) where a valid JSON string serves as key

additionalProperties:

anyOf:

- $ref: '#/components/schemas/AanfInfo'

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

minProperties: 1

*(... text not shown for clarity ...)*

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