**3GPP TSG-CT WG4 Meeting #99eC4-204261**

**E-Meeting, 18th – 28th August 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.510** | **CR** | **0383** | **rev** | **1** | **Current version:** | **16.4.0** |  |
|  | | | | | | | | |
| *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:*** | Corrections on attributes for SCP | | | | | | | | | |
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| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | CT4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eSBA | | | | |  | ***Date:*** | | | 2020-08-24 |
|  |  | | | |  | |  | | |  |
| ***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 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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | 3GPP TS 23.501 has defined that SCP register SCP domains it belongs to in its profile. 3GPP TS 29.510 has defined scpDomains attribute in NF profile but the description and table note are incorrect:   |  |  |  |  |  | | --- | --- | --- | --- | --- | | scpDomains | array(string) | O | 1..N | List of SCP domains the NF belongs to.  (NOTE 14) |   SCP Domain is a group of one or more SCPs. A normal NF doesn't belong to any SCP domain, instead a normal NF can be accessed via certain SCP(s) belong to certain SCP domain(s).  In ScpInfo, scpDomainInfoList attributes contains SCP domain specific information and the key is the SCP domain.     |  |  |  |  |  | | --- | --- | --- | --- | --- | | scpDomainInfoList | map(ScpDomainInfo) | O | 1..N | SCP domain specific information. The key of the map shall be the string identifying an SCP domain. |   It is not clear that whether all served SCP Domains shall be listed in scpDomainInfoList attribute for a SCP. According to the definition of ScpDomainInfo, it is suggesting only SCP domain with specific information differs than the common one (in NF profile level) shall be listed. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1/ Correct the description and table note for scpDomain attribute in NFProfile data type.  2/ Clarify only SCP domain specific information differs from the common one in NFProfile level attributes should be listed in scpDomainInfoList. | | | | | | | | |
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| ***Consequences if not approved:*** | | Incorrect description in specification, SCP cannot register its SCP domains in NF profile. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.1.6.2.2, 6.1.6.2.65, 6.2.6.2.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 require version update on any OpenAPI file. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Rev1:  Editorial corrections. | | | | | | | | |

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

##### 6.1.6.2.2 Type: NFProfile

Table 6.1.6.2.2-1: Definition of type NFProfile

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| nfInstanceId | NfInstanceId | M | 1 | Unique identity of the NF Instance. |
| nfType | NFType | M | 1 | Type of Network Function |
| nfStatus | NFStatus | M | 1 | Status of the NF Instance (NOTE 5) |
| nfInstanceName | string | O | 0..1 | Human readable name of the NF Instance |
| heartBeatTimer | integer | C | 0..1 | Time in seconds expected between 2 consecutive heart-beat messages from an NF Instance to the NRF.  It may be included in the registration request. When present in the request it shall contain the heartbeat time proposed by the NF service consumer.  It shall be included in responses from NRF to registration requests (PUT) or in NF profile updates (PUT or PATCH). If the proposed heartbeat time is acceptable by the NRF based on the local configuration, it shall use the same value as in the registration request; otherwise the NRF shall override the value using a preconfigured value. |
| plmnList | array(PlmnId) | C | 1..N | PLMN(s) of the Network Function (NOTE 7).  This IE shall be present if this information is available for the NF.  If not provided, PLMN ID(s) of the PLMN of the NRF are assumed for the NF. |
| snpnList | array(PlmnIdNid) | C | 1..N | SNPN(s) of the Network Function.  This IE shall be present if the NF pertains to one or more SNPNs. |
| sNssais | array(ExtSnssai) | O | 1..N | S-NSSAIs of the Network Function.  If not provided, the NF can serve any S-NSSAI.  When present this IE represents the list of S-NSSAIs supported in all the PLMNs listed in the plmnList IE.  If the sNSSAIs attribute is provided in at least one NF Service, the S-NSSAIs supported by the NF Profile shall be the set or a superset of the S-NSSAIs of the NFService(s). |
| perPlmnSnssaiList | array(PlmnSnssai) | O | 1..N | This IE may be included when the list of S-NSSAIs supported by the NF for each PLMN it is supporting is different. When present, this IE shall include the S-NSSAIs supported by the Network Function for each PLMN supported by the Network Function. When present, this IE shall override sNssais IE. (NOTE 9)  If the perPlmnSnssaiList attribute is provided in at least one NF Service, the S-NSSAIs supported per PLMN in the NF Profile shall be the set or a superset of the perPlmnSnssaiList of the NFService(s). |
| nsiList | array(string) | O | 1..N | NSI identities of the Network Function.  If not provided, the NF can serve any NSI. |
| fqdn | Fqdn | C | 0..1 | FQDN of the Network Function (NOTE 1) (NOTE 2). For AMF, the FQDN registered with the NRF shall be that of the AMF Name (see 3GPP 23.003 [12] clause 28.3.2.5). |
| interPlmnFqdn | Fqdn | C | 0..1 | If the NF needs to be discoverable by other NFs in a different PLMN, then an FQDN that is used for inter-PLMN routing as specified in 3GPP 23.003 [12] shall be registered with the NRF (NOTE 8).  A change of this attribute shall result in triggering a "NF\_PROFILE\_CHANGED" notification from NRF towards subscribing NFs located in a different PLMN, but the new value shall be notified as a change of the "fqdn" attribute. |
| ipv4Addresses | array(Ipv4Addr) | C | 1..N | IPv4 address(es) of the Network Function (NOTE 1) (NOTE 2) |
| ipv6Addresses | array(Ipv6Addr) | C | 1..N | IPv6 address(es) of the Network Function (NOTE 1) (NOTE 2) |
| allowedPlmns | array(PlmnId) | O | 1..N | PLMNs allowed to access the NF instance.  If not provided, any PLMN is allowed to access the NF.  A change of this attribute shall not trigger a "NF\_PROFILE\_CHANGED" notification from NRF, and this attribute shall not be included in profile change notifications to subscribed NFs. |
| allowedSnpns | array(PlmnIdNid) | O | 1..N | SNPNs allowed to access the NF instance.  If this attribute is present in the NFService and in the NF profile, the attribute from the NFService shall prevail.  The absence of this attribute in both the NFService and in the NF profile indicates that no SNPN, other than the SNPN(s) registered in the snpnList attribute of the NF Profile, is allowed to access the service instance.  A change of this attribute shall not trigger a "NF\_PROFILE\_CHANGED" notification from NRF, and this attribute shall not be included in profile change notifications to subscribed NFs. |
| allowedNfTypes | array(NFType) | O | 1..N | Type of the NFs allowed to access the NF instance.  If not provided, any NF type is allowed to access the NF.  A change of this attribute shall not trigger a "NF\_PROFILE\_CHANGED" notification from NRF, and this attribute shall not be included in profile change notifications to subscribed NFs. |
| allowedNfDomains | array(string) | O | 1..N | Pattern (regular expression according to the ECMA-262 dialect [8]) representing the NF domain names within the PLMN of the NRF allowed to access the NF instance.  If not provided, any NF domain is allowed to access the NF.  A change of this attribute shall not trigger a "NF\_PROFILE\_CHANGED" notification from NRF, and this attribute shall not be included in profile change notifications to subscribed NFs. |
| allowedNssais | array(ExtSnssai) | O | 1..N | S-NSSAI of the allowed slices to access the NF instance.  If not provided, any slice is allowed to access the NF.  A change of this attribute shall not trigger a "NF\_PROFILE\_CHANGED" notification from NRF, and this attribute shall not be included in profile change notifications to subscribed NFs. |
| priority | integer | O | 0..1 | Priority (relative to other NFs of the same type) within the range 0 to 65535, to be used for NF selection; lower values indicate a higher priority. Priority may or may not be present in the nfServiceList parameters, xxxInfo parameters and in this attribute. Priority in the nfServiceList has precedence over the priority in this attribute, which has precedence over the priority in xxxInfo parameter. (NOTE 4).  The NRF may overwrite the received priority value when exposing an NFProfile with the Nnrf\_NFDiscovery service. |
| capacity | integer | O | 0..1 | Static capacity information within the range 0 to 65535, expressed as a weight relative to other NF instances of the same type; if capacity is also present in the nfServiceList parameters, those will have precedence over this value. (NOTE 4). |
| load | integer | O | 0..1 | Dynamic load information, within the range 0 to 100, indicates the current load percentage of the NF. |
| loadTimeStamp | DateTime | O | 0..1 | It indicates the point in time in which the latest load information (sent by the NF in the "load" attribute of the NF Profile) was generated at the NF Instance.  If the NF did not provide a timestamp, the NRF should set it to the instant when the NRF received the message where the NF provided the latest load information. |
| locality | string | O | 0..1 | Operator defined information about the location of the NF instance (e.g. geographic location, data center) (NOTE 3) |
| udrInfo | UdrInfo | O | 0..1 | Specific data for the UDR (ranges of SUPI, group ID …) |
| udrInfoList | map(UdrInfo) | O | 1..N | Multiple entries of UdrInfo. This attribute provides additional information to the udrInfo. udrInfoList may be present even if the udrInfo is absent.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters. |
| udmInfo | UdmInfo | O | 0..1 | Specific data for the UDM (ranges of SUPI, group ID…) |
| udmInfoList | map(UdmInfo) | O | 1..N | Multiple entries of UdmInfo. This attribute provides additional information to the udmInfo. udmInfoList may be present even if the udmInfo is absent.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters. |
| ausfInfo | AusfInfo | O | 0..1 | Specific data for the AUSF (ranges of SUPI, group ID…) |
| ausfInfoList | map(AusfInfo) | O | 1..N | Multiple entries of AusfInfo. This attribute provides additional information to the ausfInfo. ausfInfoList may be present even if the ausfInfo is absent.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters. |
| amfInfo | AmfInfo | O | 0..1 | Specific data for the AMF (AMF Set ID, …) |
| amfInfoList | map(AmfInfo) | O | 1..N | Multiple entries of AmfInfo. This attribute provides additional information to the amfInfo. amfInfoList may be present even if the amfInfo is absent.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters. |
| smfInfo | SmfInfo | O | 0..1 | Specific data for the SMF (DNN's, …).  (NOTE 12) |
| smfInfoList | map(SmfInfo) | O | 1..N | Multiple entries of SmfInfo. This attribute provides additional information to the smfInfo. smfInfoList may be present even if the smfInfo is absent.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters.  (NOTE 12) |
| upfInfo | UpfInfo | O | 0..1 | Specific data for the UPF (S-NSSAI, DNN, SMF serving area, interface…) |
| upfInfoList | map(UpfInfo) | O | 1..N | Multiple entries of UpfInfo. This attribute provides additional information to the upfInfo. upfInfoList may be present even if the upfInfo is absent.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters. |
| pcfInfo | PcfInfo | O | 0..1 | Specific data for the PCF |
| pcfInfoList | map(PcfInfo) | O | 1..N | Multiple entries of PcfInfo. This attribute provides additional information to the pcfInfo. pcfInfoList may be present even if the pcfInfo is absent.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters. |
| bsfInfo | BsfInfo | O | 0..1 | Specific data for the BSF |
| bsfInfoList | map(BsfInfo) | O | 1..N | Multiple entries of BsfInfo. This attribute provides additional information to the bsfInfo. bsfInfoList may be present even if the bsfInfo is absent.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters. |
| chfInfo | ChfInfo | O | 0..1 | Specific data for the CHF |
| chfInfoList | map(ChfInfo) | O | 1..N | Multiple entries of ChfInfo. This attribute provides additional information to the chfInfo. chfInfoList may be present even if the chfInfo is absent.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters. |
| nefInfo | NefInfo | O | 0..1 | Specific data for the NEF |
| nrfInfo | NrfInfo | O | 0..1 | Specific data for the NRF |
| udsfInfo | UdsfInfo | O | 0..1 | Specific data for the UDSF |
| udsfInfoList | map(UdsfInfo) | O | 1..N | Multiple entries of udsfInfo. This attribute provides additional information to the udsfInfo. udsfInfoExt may be present even if the udsfInfo is absent. |
| nwdafInfo | NwdafInfo | O | 0..1 | Specific data for the NWDAF. |
| pcscfInfoList | map(PcscfInfo) | O | 1..N | Specific data for the P-CSCF.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters.  (NOTE 11) |
| hssInfoList | map(HssInfo) | O | 1..N | Specific data for the HSS.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters. |
| customInfo | object | O | 0..1 | Specific data for custom Network Functions |
| recoveryTime | DateTime | O | 0..1 | Timestamp when the NF was (re)started (NOTE 5) (NOTE 6) |
| nfServicePersistence | boolean | O | 0..1 | - true: If present, and set to true, it indicates that the different service instances of a same NF Service in this NF instance, supporting a same API version, are capable to persist their resource state in shared storage and therefore these resources are available after a new NF service instance supporting the same API version is selected by a NF Service Consumer (see 3GPP 23.527 [27]).  - false (default): Otherwise, it indicates that the NF Service Instances of a same NF Service are not capable to share resource state inside the NF Instance. |
| nfServices | array(NFService) | O | 1..N | List of NF Service Instances. It shall include the services produced by the NF that can be discovered by other NFs, if any.  This attribute is deprecated; the attribute "nfServiceList" should be used instead. |
| nfServiceList | map(NFService) | O | 1..N | Map of NF Service Instances, where the "serviceInstanceId" attribute of the NFService object shall be used as the key of the map.  It shall include the services produced by the NF that can be discovered by other NFs, if any. |
| nfProfileChangesSupportInd | boolean | O | 0..1 | NF Profile Changes Support Indicator.  See Annex B.  This IE may be present in the NFRegister or NFUpdate (NF Profile Complete Replacement) request and shall be absent in the response.  true: the NF Service Consumer supports receiving NF Profile Changes in the response.  false (default): the NF Service Consumer does not support receiving NF Profile Changes in the response.  Write-Only: true |
| nfProfileChangesInd | boolean | O | 0..1 | NF Profile Changes Indicator.  See Annex B.  This IE shall be absent in the request to the NRF and may be included by the NRF in NFRegister or NFUpdate (NF Profile Complete Replacement) response.  true: the NF Profile contains NF Profile changes.  false (default): complete NF Profile.  Read-Only: true |
| defaultNotificationSubscriptions | array(DefaultNotificationSubscription) | O | 1..N | Notification endpoints for different notification types.  (NOTE 10) |
| lmfInfo | LmfInfo | O | 0..1 | Specific data for the LMF |
| gmlcInfo | GmlcInfo | O | 0..1 | Specific data for the GMLC |
| nfSetIdList | array(NfSetId) | C | 1..N | NF Set ID defined in clause 28.12 of 3GPP TS 23.003 [12].  At most one NF Set ID shall be indicated per PLMN of the NF.  This information shall be present if available. |
| servingScope | array(string) | O | 1..N | The served area(s) of the NF instance.  The absence of this attribute does not imply that the NF instance can serve every area in the PLMN.  (NOTE 13) |
| lcHSupportInd | boolean | O | 0..1 | This IE indicates whether the NF supports Load Control based on LCI Header (see clause 6.3 of 3GPP TS 29.500 [4]).  - true: the NF supports the feature.  - false (default): the NF does not support the feature. |
| olcHSupportInd | boolean | O | 0..1 | This IE indicates whether the NF supports Overload Control based on OCI Header (see clause 6.4 of 3GPP TS 29.500 [4]).  - true: the NF supports the feature.  - false (default): the NF does not support the feature. |
| nfSetRecoveryTimeList | map(DateTime) | O | 1..N | Map of recovery time, where the key of the map is the *NfSetId* of NF Set(s) that the NF instance belongs to.  When present, the value of each entry of the map shall be the recovery time of the NF Set indicated by the key. |
| serviceSetRecoveryTimeList | map(DateTime) | O | 1..N | Map of recovery time, where the key of the map is the *NfServiceSetId* of the NF Service Set(s) configured in the NF instance.  When present, the value of each entry of the map shall be the recovery time of the NF Service Set indicated by the key. |
| scpDomains | array(string) | O | 1..N | List of SCP domains the SCP belongs to, or list of SCP domains via which the NF (other than SCP) can be accessed.  (NOTE 14) |
| scpInfo | ScpInfo | O | 0..1 | Specific data for the SCP |
| NOTE 1: At least one of the addressing parameters (fqdn, ipv4address or ipv6adress) shall be included in the NF Profile. If the NF supports the NF services with "https" URI scheme (i.e use of TLS is mandatory), then the FQDN shall be provided in the NF Profile or the NF Service profile (see clause 6.1.6.2.3). See NOTE 1 of Table 6.1.6.2.3-1 for the use of these parameters. If multiple ipv4 addresses and/or ipv6 addresses are included in the NF Profile, the NF Service Consumer of the discovery service shall select one of these addresses randomly, unless operator defined local policy of IP address selection, in order to avoid overload for a specific ipv4 address and/or ipv6 address.  NOTE 2: If the type of Network Function is UPF, the addressing information is for the UPF N4 interface.  NOTE 3: A requester NF may use this information to select a NF instance (e.g. a NF instance preferably located in the same data center).  NOTE 4: The capacity and priority parameters, if present, are used for NF selection and load balancing. The priority and capacity attributes shall be used for NF selection in the same way that priority and weight are used for server selection as defined in IETF RFC 2782 [23].  NOTE 5: The NRF shall notify NFs subscribed to receiving notifications of changes of the NF profile, if the NF recoveryTime or the nfStatus is changed. See clause 6.2 of 3GPP 23.527 [27].  NOTE 6: A requester NF may consider that all the resources created in the NF before the NF recovery time have been lost. This may be used to detect a restart of a NF and to trigger appropriate actions, e.g. release local resources. See clause 6.2 of 3GPP 23.527 [27].  NOTE 7: A NF may register multiple PLMN IDs in its profile within a PLMN comprising multiple PLMN IDs. If so, all the attributes of the NF Profile shall apply to each PLMN ID registered in the plmnList. As an exception, attributes including a PLMN ID, e.g. IMSI-based SUPI ranges, TAIs and GUAMIs, are specific to one PLMN ID and the NF may register in its profile multiple occurrences of such attributes for different PLMN IDs (e.g. the UDM may register in its profile SUPI ranges for different PLMN IDs).  NOTE 8: Other NFs are in a different PLMN if they belong to none of the PLMN ID(s) configured for the PLMN of the NRF.  NOTE 9: This is for the use case where an NF (e.g. AMF) supports multiple PLMNs and the slices supported in each PLMN are different. See clause 9.2.6.2 of 3GPP TS 38.413 [29].  NOTE 10: If notification endpoints are present both in the profile of the NF instance (NFProfile) and in some of its NF Services (NFService) for a same notification type, the notification endpoint(s) of the NF Services shall be used for this notification type.  NOTE 11: The absence of the pcscfInfoList attribute in a P-CSCF profile indicates that the P-CSCF can be selected for any DNN and Access Type.  NOTE 12: 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.  NOTE 13: The servingScope attribute may indicate geographical areas, It may be used e.g. to discover and select NFs in centralized Data Centers that are expected to serve users located in specific region(s) or province(s). It may also be used to reduce the large configuration of TAIs in the NF instances.  NOTE 14: If an NF (other than a SCP) includes this information in its profile, this indicates that the services produced by this NF should be accessed preferably via an SCP that belongs to at least one of the listed SCP domain(s). | | | | |

Editor's note: Whether an NF can register the SCP domains it pertains to in its NF profile (e.g. to simplify SCP profile configuration and discovery, and to allow an SCPc to determine whether NFp is reachable through an SCPp) is pending confirmation from SA2.

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

##### 6.1.6.2.65 Type: ScpInfo

Table 6.1.6.2.65-1: Definition of type ScpInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| scpDomainInfoList | map(ScpDomainInfo) | O | 1..N | SCP domain specific information of the SCP that differs from the common information in NFProfile data type. The key of the map shall be the string identifying an SCP domain. |
| addressDomains | array(string) | O | 1..N | Pattern (regular expression according to the ECMA-262 dialect [8]) representing the address domain names reachable through the SCP. |
| ipv4Addresses | array(Ipv4Addr) | O | 1..N | List of IPv4 addresses reachable through the SCP. |
| ipv6Prefixes | array(Ipv6Prefix) | O | 1..N | List of IPv6 prefixes reachable through the SCP. |
| ipv4AddrRanges | array(Ipv4AddressRange) | O | 1..N | List of IPv4 addresses ranges reachable through the SCP. |
| ipv6PrefixRanges | array(Ipv6PrefixRange) | O | 1..N | List of IPv6 prefixes ranges reachable through the SCP. |
| servedNfSetIdList | array(NfSetId) | O | 1..N | List of NF set ID of NFs served by the SCP. |
| servedNfTypeList | array(NFType) | O | 1..N | List of NF types served by the SCP. |
| remotePlmnList | array(PlmnId) | O | 1..N | List of remote PLMNs reachable through the SCP. |

Editor's note: Whether an SCP profile may contain the served NF IDs and served NF Types is pending clarification from SA2.

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

##### 6.2.6.2.3 Type: NFProfile

Table 6.2.6.2.3-1: Definition of type NFProfile

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| nfInstanceId | NfInstanceId | M | 1 | Unique identity of the NF Instance. |
| nfType | NFType | M | 1 | Type of Network Function |
| nfStatus | NFStatus | M | 1 | Status of the NF Instance |
| nfInstanceName | string | O | 0..1 | Human readable name of the NF Instance |
| plmnList | array(PlmnId) | C | 1..N | PLMN(s) of the Network Function (NOTE 5). This IE shall be present if this information is available for the NF. If this information was not provided by the NF during registration, the NRF should return the list of PLMN ID(s) of the PLMN of the NRF. If this IE is absent in the response, PLMN ID(s) of the PLMN of the NRF are assumed for the NF. |
| sNssais | array(ExtSnssai) | O | 1..N | S-NSSAIs of the Network Function.  If not provided, the NF can serve any S-NSSAI.  If the sNSSAIs attribute is provided in at least one NF Service, the sNssais attribute in the NF Profile shall be present and be the set or a superset of the sNSSAIs of the NFService(s). |
| perPlmnSnssaiList | array(PlmnSnssai) | O | 1..N | The per-PLMN list of S-NSSAI(s) supported by the Network Function.  If the perPlmnSnssaiList attribute is provided in at least one NF Service, the perPlmnSnssaiList attribute in the NF Profile shall be present and be the set or a superset of the perPlmnSnssaiList of the NFService(s). |
| nsiList | array(string) | O | 1..N | List of NSIs of the Network Function.  If not provided, the NF can serve any NSI. |
| fqdn | Fqdn | C | 0..1 | FQDN of the Network Function (NOTE 1, NOTE 3) |
| ipv4Addresses | array(Ipv4Addr) | C | 1..N | IPv4 address(es) of the Network Function (NOTE 1) |
| ipv6Addresses | array(Ipv6Addr) | C | 1..N | IPv6 address(es) of the Network Function (NOTE 1) |
| capacity | integer | O | 0..1 | Static capacity information within the range 0 to 65535, expressed as a weight relative to other NF instances of the same type; if capacity is also present in the nfServiceList parameters, those will have precedence over this value. (See NOTE 2) |
| load | integer | O | 0..1 | Latest known load information of the NF within the range 0 to 100 in percentage (See NOTE 4) |
| loadTimeStamp | DateTime | O | 0..1 | It indicates the point in time in which the latest load information of the NF Instance was sent from the NF to the NRF. |
| locality | string | O | 0..1 | Operator defined information about the location of the NF instance (e.g. geographic location, data center) |
| priority | integer | O | 0..1 | Priority (relative to other NFs of the same type) within the range 0 to 65535, to be used for NF selection; lower values indicate a higher priority. Priority may or may not be present in the nfServiceList parameters, xxxInfo parameters and in this attribute. Priority in the nfServiceList has precedence over the priority in this attribute, which has precedence over the priority in xxxInfo parameter.  (NOTE 2) |
| udrInfo | UdrInfo | O | 0..1 | Specific data for the UDR (ranges of SUPI, …) |
| udrInfoList | map(UdrInfo) | O | 1..N | Multiple entries of UdrInfo. This attribute provides additional information to the udrInfo. udrInfoList may be present even if the udrInfo is absent.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters. |
| udmInfo | UdmInfo | O | 0..1 | Specific data for the UDM |
| udmInfoList | map(UdmInfo) | O | 1..N | Multiple entries of UdmInfo. This attribute provides additional information to the udmInfo. udmInfoList may be present even if the udmInfo is absent.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters. |
| ausfInfo | AusfInfo | O | 0..1 | Specific data for the AUSF |
| ausfInfoList | map(AusfInfo) | O | 1..N | Multiple entries of AusfInfo. This attribute provides additional information to the ausfInfo. ausfInfoExt may be present even if the ausfInfo is absent. |
| amfInfo | AmfInfo | O | 0..1 | Specific data for the AMF (AMF Set ID, …) |
| amfInfoList | map(AmfInfo) | O | 1..N | Multiple entries of AmfInfo. This attribute provides additional information to the amfInfo. amfInfoList may be present even if the amfInfo is absent.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters. |
| smfInfo | SmfInfo | O | 0..1 | Specific data for the SMF (DNN's, …).  (NOTE 8) |
| smfInfoList | map(SmfInfo) | O | 1..N | Multiple entries of SmfInfo. This attribute provides additional information to the smfInfo. smfInfoList may be present even if the smfInfo is absent.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters.  (NOTE 8) |
| upfInfo | UpfInfo | O | 0..1 | Specific data for the UPF (S-NSSAI, DNN, SMF serving area, …) |
| upfInfoList | map(UpfInfo) | O | 1..N | Multiple entries of UpfInfo. This attribute provides additional information to the upfInfo. upfInfoList may be present even if the upfInfo is absent.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters. |
| pcfInfo | PcfInfo | O | 0..1 | Specific data for the PCF |
| pcfInfoList | map(PcfInfo) | O | 1..N | Multiple entries of PcfInfo. This attribute provides additional information to the pcfInfo. pcfInfoList may be present even if the pcfInfo is absent.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters. |
| bsfInfo | BsfInfo | O | 0..1 | Specific data for the BSF |
| bsfInfoList | map(BsfInfo) | O | 1..N | Multiple entries of BsfInfo. This attribute provides additional information to the bsfInfo. bsfInfoList may be present even if the bsfInfo is absent.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters. |
| chfInfo | ChfInfo | O | 0..1 | Specific data for the CHF |
| chfInfoList | map(ChfInfo) | O | 1..N | Multiple entries of ChfInfo. This attribute provides additional information to the chfInfo. chfInfoList may be present even if the chfInfo is absent.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters. |
| udsfInfo | UdsfInfo | O | 0..1 | Specific data for the UDSF |
| udsfInfoList | map(UdsfInfo) | O | 1..N | Multiple entries of udsfInfo. This attribute provides additional information to the udsfInfo. udsfInfoList may be present even if the udsfInfo is absent.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters. |
| nefInfo | NefInfo | O | 0..1 | Specific data for the NEF |
| nwdafInfo | NwdafInfo | O | 0..1 | Specific data for the NWDAF |
| pcscfInfoList | map(PcscfInfo) | O | 1..N | Specific data for the P-CSCF.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters.  (NOTE 7) |
| hssInfoList | map(HssInfo) | O | 1..N | Specific data for the HSS.  The key of the map shall be a (unique) valid JSON string per clause 7 of IETF RFC 8259 [22], with a maximum of 32 characters. |
| customInfo | object | O | 0..1 | Specific data for custom Network Functions |
| recoveryTime | DateTime | O | 0..1 | Timestamp when the NF was (re)started |
| nfServicePersistence | boolean | O | 0..1 | - true: If present, and set to true, it indicates that the different service instances of a same NF Service in the NF instance, supporting a same API version, are capable to persist their resource state in shared storage and therefore these resources are available after a new NF service instance supporting the same API version is selected by a NF Service Consumer (see 3GPP 23.527 [27]).  - false (default): Otherwise, it indicates that the NF Service Instances of a same NF Service are not capable to share resource state inside the NF Instance. |
| nfServices | array(NFService) | O | 1..N | List of NF Service Instances.  (NOTE 10)  This attribute is deprecated; the attribute "nfServiceList" should be used instead. |
| nfServiceList | map(NFService) | O | 1..N | Map of NF Service Instances, where the "serviceInstanceId" attribute of the NFService object shall be used as the key of the map.  (NOTE 10) |
| defaultNotificationSubscriptions | array(DefaultNotificationSubscription) | O | 1..N | Notification endpoints for different notification types.  (NOTE 6) |
| lmfInfo | LmfInfo | O | 0..1 | Specific data for the LMF |
| gmlcInfo | GmlcInfo | O | 0..1 | Specific data for the GMLC |
| snpnList | array(PlmnIdNid) | C | 1..N | SNPN(s) of the Network Function.  This IE shall be present if the NF pertains to one or more SNPNs. |
| nfSetIdList | array(NfSetId) | C | 1..N | NF Set ID defined in clause 28.12 of 3GPP TS 23.003 [12].  At most one NF Set ID shall be indicated per PLMN of the NF.  This information shall be present if available. |
| servingScope | array(string) | O | 1..N | The served area(s) of the NF instance.  The absence of this attribute does not imply the NF instance can serve every area. |
| lcHSupportInd | boolean | O | 0..1 | This IE indicates whether the NF supports Load Control based on LCI Header (see clause 6.3 of 3GPP TS 29.500 [4]).  - true: the NF supports the feature.  - false (default): the NF does not support the feature. |
| olcHSupportInd | boolean | O | 0..1 | This IE indicates whether the NF supports Overload Control based on OCI Header (see clause 6.4 of 3GPP TS 29.500 [4]).  - true: the NF supports the feature.  - false (default): the NF does not support the feature. |
| nfSetRecoveryTimeList | map(DateTime) | O | 1..N | Map of recovery time, where the key of the map is the NfSetId of NF Set(s) that the NF instance belongs to.  When present, the value of each entry of the map shall be the recovery time of the NF Set indicated by the key. |
| serviceSetRecoveryTimeList | map(DateTime) | O | 1..N | Map of recovery time, where the key of the map is the NfServiceSetId of the NF Service Set(s) configured in the NF instance.  When present, the value of each entry of the map shall be the recovery time of the NF Service Set indicated by the key. |
| scpDomains | array(string) | O | 1..N | List of SCP domains the SCP belongs to, or list of SCP domains via which the NF (other than SCP) can be accessed.  (NOTE 9) |
| scpInfo | ScpInfo | O | 0..1 | Specific data for the SCP |
| NOTE 1: At least one of the addressing parameters (fqdn, ipv4address or ipv6adress) shall be included in the NF Profile. See NOTE 1 of Table 6.2.6.2.4-1 for the use of these parameters. If multiple ipv4 addresses and/or ipv6 addresses are included in the NF Profile, the NF Service Consumer shall select one of these addresses randomly, unless operator defined local policy of IP address selection, in order to avoid overload for a specific ipv4 address and/or ipv6 address.  NOTE 2: The capacity and priority parameters, if present, are used for NF selection and load balancing. The priority and capacity attributes shall be used for NF selection in the same way that priority and weight are used for server selection as defined in IETF RFC 2782 [23].  NOTE 3: If the requester-plmn in the query parameter is different from the PLMN of the discovered NF, then the fqdn attribute value shall contain the interPlmnFqdn value registered by the NF during NF registration (see clause 6.1.6.2.2). The requester-plmn is different from the PLMN of the discovered NF if it belongs to none of the PLMN ID(s) configured for the PLMN of the NRF.  NOTE 4: The usage of the load parameter by the NF service consumer is implementation specific, e.g. be used for NF selection and load balancing, together with other parameters.  NOTE 5: An NF may register multiple PLMN IDs in its profile within a PLMN comprising multiple PLMN IDs. If so, all the attributes of the NF Profile shall apply to each PLMN ID registered in the plmnList. As an exception, attributes including a PLMN ID, e.g. IMSI-based SUPI ranges, TAIs and GUAMIs, are specific to one PLMN ID and the NF may register in its profile multiple occurrences of such attributes for different PLMN IDs (e.g. the UDM may register in its profile SUPI ranges for different PLMN IDs).  NOTE 6: If notification endpoints are present both in the profile of the NF instance (NFProfile) and in some of its NF Services (NFService) for a same notification type, the notification endpoint(s) of the NF Services shall be used for this notification type.  NOTE 7: The absence of the pcscfInfoList attribute in a P-CSCF profile indicates that the P-CSCF can be selected for any DNN and Access Type.  NOTE 8: 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.  NOTE 9: If an NF (other than a SCP) includes this information in its profile, this indicates that the services produced by this NF should be accessed preferably via an SCP that belongs to at least one of the listed SCP domain(s).  NOTE 10: If the NF Service Consumer that issued the discovery request indicated support for the "Service-Map" feature, the NRF shall return in the discovery response the list of NF Service Instances in the "nfServiceList" map attribute. Otherwise, the NRF shall return the list of NF Service Instances in the "nfServices" array attribute. | | | | |

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